Lead the Charge

The Race to Cleaner Automotive Steel

Key Findings from the 2025
Lead the Charge Leaderboard

2025 STEEL BRIEFING

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Executive Summary

The automotive industry stands at a pivotal moment in the race to decarbonize steel — the most used material by mass in vehicle manufacturing. Steel accounts for around 16-30% of the average vehicle's embodied carbon dioxide emissions and, globally, the industry is responsible for approximately 7% of the world's greenhouse gas (GHG) emissions, making it a critical lever for automakers committed to manufacturing truly clean vehicles.

This briefing provides an analysis of the progress made by automakers on decarbonizing the steel used in their vehicles, utilizing the findings from the 2025 Lead the Charge Leaderboard. This year's edition of the Leaderboard reveals both encouraging momentum and urgent gaps in automaker efforts to transform their steel supply chains. Industry leaders are continuing to set the pace for others to follow, whilst a growing number behind them are beginning to pick up speed.

The findings are clear: since the publication of the first edition of the Leaderboard in 2023, steel decarbonization has shifted from a marginal issue to a mainstream imperative. In the first year, two thirds of automakers were doing nothing on steel decarbonization.

Just two years later the situation has flipped with two thirds of automakers starting to take action on green steel.Leading automakers, such as Volvo and Mercedes, are leveraging their purchasing power to unlock investments in, and secure access to, green steel produced with technologies such as direct reduced iron (DRI) produced with green hydrogen, which can slash steel emissions by up to 97%. Progress is also being made on steel circularity, with a growing number of automakers investing in closed loop processes to recover and reuse post-consumer steel scrap.

Yet significant opptortunities remain untapped. The best-in-class score for steel, calculated by adding up the highest scores achieved by any company for each indicator, now stands at 72% - more than five times higher than the average score across all automakers of just 13%. This means that automakers could dramatically improve their performance simply by matching the leading practices of their peers across different indicators.

The window for action is now. As the International Energy Agency warns, 2050 is just one investment cycle away for the steel industry, meaning that breakthrough technologies needed for fossil-free steel production must be brought to market at scale before 2030 in order for the industry to stand a chance at meeting climate goals. As one of the largest consumers of steel globally, automakers wield unprecedented influence to catalyze the decarbonization of an industry that currently emits more greenhouse gas emissions each year than all of the countries in the European Union combined.

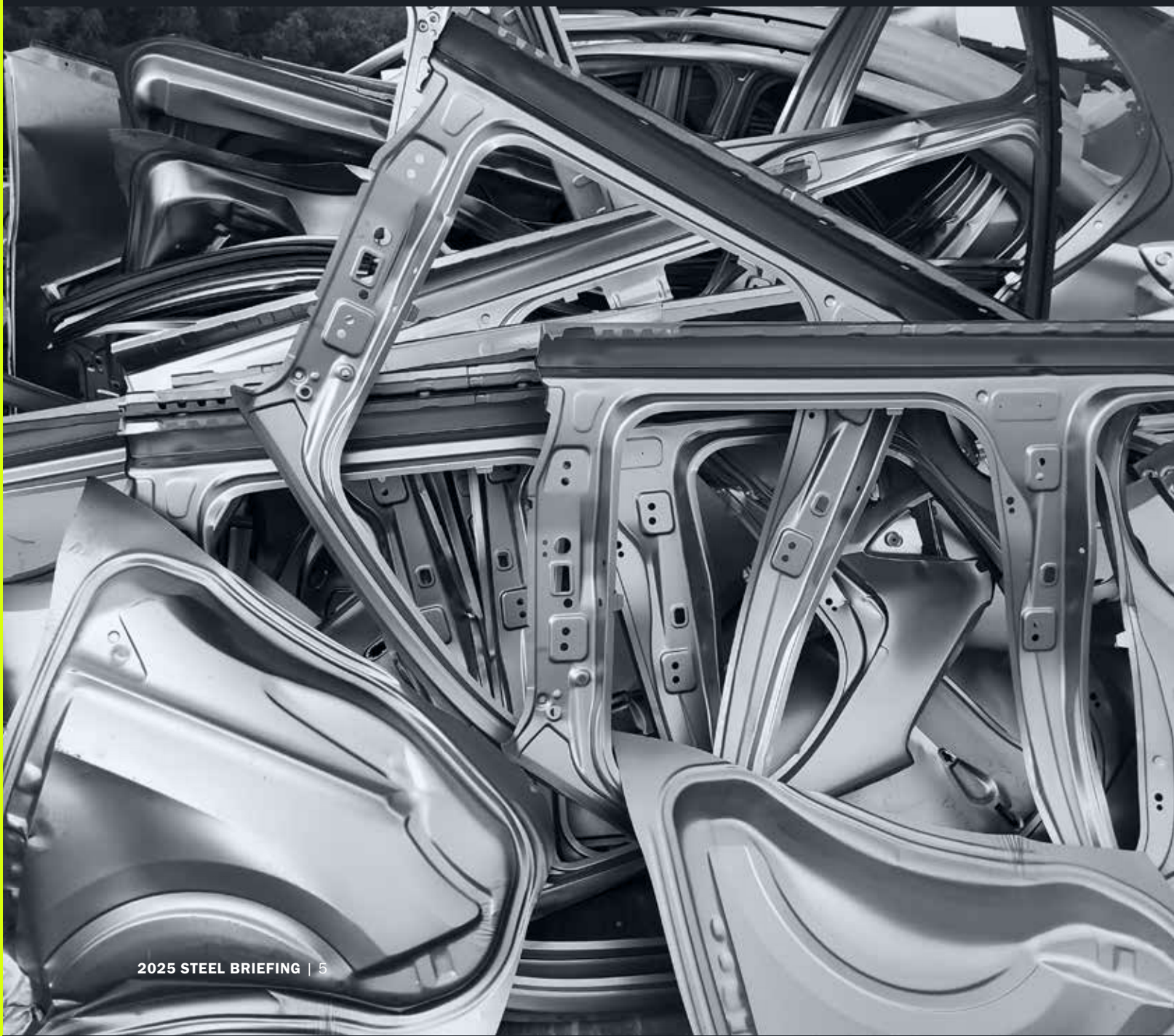
Introduction

Steel forms the backbone of every vehicle on the road today. Accounting for approximately half the weight of the average passenger vehicle, steel is also responsible for 16-30% of a car's embodied carbon emissions — driven primarily by the continued dependence of vehicle manufacturing on primary steelmaking produced by burning huge quantities of coal. As the automotive industry accelerates its essential transition to electric vehicles, a fundamental question emerges: can a car be truly "clean" if it's still built with fossil fuel-intensive steel?

This briefing examines how the world's leading automakers are rising to meet this challenge, based on the findings of the 2025 Lead the Charge Leaderboard. By evaluating 18 major automakers across comprehensive indicators—from emissions transparency to concrete procurement commitments—we reveal who's leading the charge toward fossil-free steel and who's falling behind. The message is clear: the solutions exist, the leaders are moving, and the race towards truly clean cars has begun.

CHAPTER 001

The Automotive Industry as a Strategic Lever for Steel Decarbonization



The Steel Industry's Massive Climate Impact

The climate impact of the steel industry is massive, producing approximately 7% of global greenhouse gas (GHG) emissions and 11% of global carbon dioxide (CO2) emissions. This is roughly four times more CO2 emissions than are emitted by the aviation sector.

The steel industry's direct emissions have doubled since 2000, and the industry is off track in decarbonizing at the rate needed to keep global warming to 1.5°C, a key threshold agreed upon by governments and scientists for mitigating the catastrophic impacts of climate change.

As explained by Steelwatch, the culprit for the vast majority of steel production's emissions is the coal used in ironmaking for steel production. Across the globe, more than two-thirds of steel is predominantly based on ore-based iron (in opposition to recycled iron and steel). Over 90% of this steel is currently produced with the help of coal-fired blast furnaces. According to World Steel estimates, one ton of primary steel produced in this way produces an average of 2.32 tonnes of CO2 emissions. With methane emissions included, ore-based steel production using met coal emits the equivalent of 4.2 gigatons of CO2 per year and is responsible for 90% of emissions for the entire industry.

The Automotive Sector's Responsibility, and Opportunity

The automotive industry has an outsized influence on the steel industry due to the fact that, collectively, the industry is the third-largest consumer of steel globally (accounting for approximately 12% of global steel demand), and a particularly important consumer of high-grade steel, predominantly ore-based. In Europe the automotive sector absorbs 17% of steel demand, whilst in the US and Germany it accounts for around 26% of steel demand.

Steel accounts for about half of the weight of the average passenger vehicle and is responsible for around 16 - 30% of the average vehicle's embodied carbon dioxide emissions. Further, it is estimated that around 75% of the steel used in vehicle manufacturing is predominantly ore-based. This means that the automotive industry has a particularly outsized influence on predominantly ore-based steel production specifically. In the United States, for example, the automotive sector represents 26% of all steel consumption, but over 60% of predominantly ore-based steel consumption.

This underscores the automotive sector's responsibility for the climate impacts of coal-based steel production globally, but also the opportunity for the industry to use its leverage to shift the sector toward manufacturing processes that are free from fossil fuels.

Pathways to Decarbonize Steel Production

The are several pathways for decarbonising steel production that can be supported by automakers, including:

- Deploying new technologies that eliminate the use of fossil fuels from ore-based steel production. These include producing direct reduced iron (DRI) using green hydrogen produced from renewable electricity, and molten oxide electrolysis (MOE) using renewable electricity. The green hydrogen DRI pathway is currently the most advanced option in terms of technological readiness that can offer the most substantial emissions reductions: in combination with a renewable electricity-powered EAF, this pathway would cut the emissions intensity of ore-based steelmaking by up to 97%.
- Increasing scrap-based production, which only "requires only around one-tenth of the energy of ore-based steel production." According to the Mission Possible Partnership, increased scrap-based production will therefore "play an increasingly important role in decarbonising the sector, both as an input to secondary steelmaking (which relies heavily on electricity and will decarbonise in tandem with the decarbonisation of the power sector) and as an input to primary steelmaking that can help lower the carbon intensity of production."
- Using zero-emissions electricity, which "will further reduce scrap-based emissions due to the large and increasing portion of this material that is processed in electric-arc furnaces."

Although maximizing circularity and the use of recycled steel is important for reducing the climate and environmental impacts of steel production, comprehensive action to decarbonize primary steel made from virgin iron ore is also needed.

This is because, the Mission Possible Partnership outlines, "even in a more circular economy, over one billion tonnes per annum of primary steel (using iron ore feedstock as opposed to scrap) will be needed globally by 2050. Under a business-as-usual scenario, the increase in demand would result in 2.8 billion tonnes of annual CO2 emissions from the steel sector in 2050. This figure greatly exceeds the remaining carbon budget for the steel industry envisioned by the IEA's beyond 2°C scenario, and the more stringent net-zero emissions target advocated by an increasing cohort of observers and countries... It is therefore critical that low-and eventually zero-carbon technologies are developed and deployed for primary steel production."

However, the window for action is rapidly closing. According to the IEA, a key challenge to decarbonize heavy industries, such as steel, is that "the year 2050 is just one investment cycle away." This means that it is imperative "to ensure that innovative near-zero emissions industrial technologies that are at large prototype and demonstration stage today reach markets within the next decade, when around 30% of existing assets will have reached 25 years of age and thus face an investment decision. If these innovative technologies are not ready, or not used even if ready, this would have a major negative impact on the pace of emissions reductions or risk an increase in stranded assets... The critical window of opportunity from now to 2030 should not be missed."

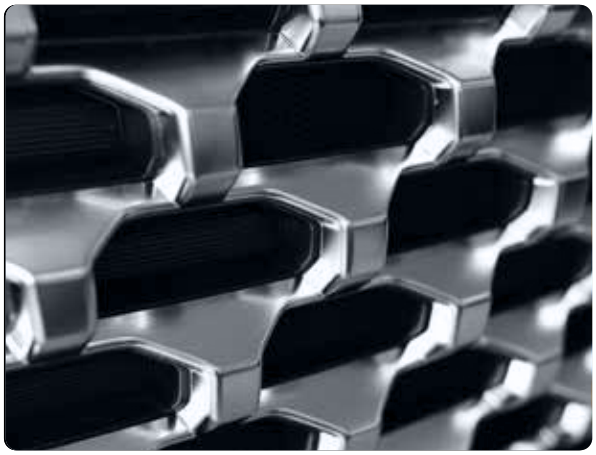
The Crucial Role of Demand Signals

Unlocking the necessary investments to bring these breakthrough technologies to market by 2030 will require major steel buyers, such as automakers, to send strong demand signals to steel manufacturers, so as to provide them, and their financiers, with greater certainty regarding a future market for near-zero emissions steel.

According to the Mission Possible Partnership, such demand signals can take three forms:

- A direct offtake agreement, which is "actual agreement between a steel buyer and a specific steel supplier, intended to give the steel company the certainty needed to invest in a breakthrough production route and the steel buyer the assurance of access to a particular volume of low-CO2 steel meeting its specifications." Such agreements can take the form of bilateral offtake (or advance purchase) agreement or a direct investment in a company or facility.
- A future purchase commitment, which is "a commitment that is not directed to any specific supplier, but instead indicates a willingness to buy low-CO2 steel, to the supply market as a whole."
- And finally indirect demand signals, which "can be sent by a much broader pool of organisations that operate across complex value chains to indicate a willingness to decarbonise their supply chains and encourage their suppliers to engage in green steel demand." These kinds of demand signals are typically mobilized through buyers' groups and other multi-stakeholder initiatives, such as SteelZero, First Movers' Coalition and ResponsibleSteel.

The climate policy think-tank Sandbag explains that automakers are uniquely well-positioned to lead the uptake of such demand signals for green steel because, in addition to their outsized purchasing power, "automotive manufacturers have a relatively simple and often well-integrated supply chain, with few players in the intermediate stages of manufacturing," facilitating traceability and more stable relationships with steelmakers.



Moreover, Sandbag continues, the cost of sourcing automotive steel "is marginal compared to the value added to the vehicle during the manufacturing stages and its final price when sold to end-users." This means there will only be a relatively small incremental cost to manufacture vehicles with low-carbon steel. Multiple studies have estimated that the increase in the retail price of passenger cars would be well below 1%. The CEO of ArcelorMittal contends that this would result in a cost increase of just $100-200 for the average car, while a Transport & Environment report calculates that the cost increase in Europe would be €57 for a BEV using 40% green steel in 2030 and just €8 for a BEV using 100% green steel by 2040.

Such shifts by automakers towards the procurement of green steel could be further incentivized by strategic policy. For example, the CEO of Stegra has stated that buyers of fossil-free steel in the EU "will be paying about as much as buyers of conventional steel in 2030" due to the EU's emissions trading system. In China, a study by Transition Asia has shown that targeted government subsidies for EVs using green steel of just $100 per vehicle before 2035, and then $50 per vehicle by 2050 would offset the cost of the green premium, providing on average 1.9 tons CO2 reduction per vehicle. And in the EU, a report by CEPS has shown how a range of policy levers, including transparency requirements, mandatory targets and carbon thresholds for steel procurement, could incentivize green steel adoption by automakers.

CHAPTER 002

The Lead the Charge Leaderboard

The Lead the Charge Leaderboard, published annually and now in its third edition, evaluates the progress of 18 of the world's leading automakers towards this vision of building equitable, sustainable and fossil-free supply chains. As vehicle production shifts to electric vehicles (EVs) to reduce greenhouse gas emissions, the Lead the Charge Leaderboard aims to establish a new expectation for what is meant by "clean car". This means not just zero tailpipe emissions, but EVs with an equitable, sustainable, and fossil fuel-free supply chain.

A clean car is thus defined as having:

- a fossil-free supply chain that also has the lowest possible negative impact on biodiversity, resource depletion, and ecosystem resilience; and
- a supply chain that respects the rights of Indigenous Peoples, workers, and local communities.

This definition, and the Leaderboard itself, was developed following a review of existing benchmarking initiatives, reporting standards, best practice supply chain initiatives and legislative requirements in the two of the largest EV markets (EU and United States). The indicators were aligned to international norms and widely recognized standards, such as the Task Force on Climate-Related Financial Disclosures, Global Reporting Initiative, the International Energy Agency, and the EU Taxonomy.

Structure of the Leaderboard

The Leaderboard is designed to give companies a score out of 100%. This enables an analysis of relative performance between automakers and of how close or far companies are to meeting the expectations within the scorecard.

The Leaderboard is divided into two main sections: fossil-free and environmentally sustainable supply chains, and human rights and responsible sourcing. Within each of these there are four subsections, representing different supply chain issue areas, which are outlined in the box below.

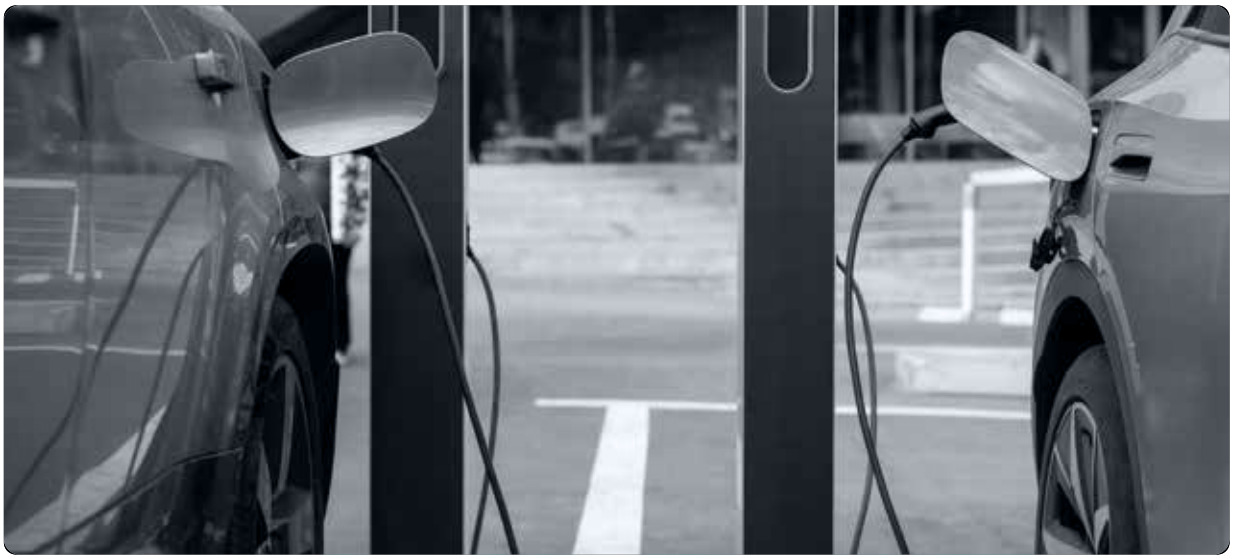
LEADERBOARD SECTIONS

Fossil-free and Environmentally Sustainable supply chains (climate and environment):

- Fossil-Free and Environmentally Sustainable Supply Chains (General)
- Fossil-Free and Environmentally Sustainable Steel
- Fossil-Free and Environmentally Sustainable Aluminum
- Fossil-Free and Environmentally Sustainable Batteries
  - Climate Lobbying (applied as a multiplier to total scores in this section)

Human Rights & Responsible Sourcing:

- Respect for Human Rights (General)
- Responsible Sourcing of Transition Minerals
- Respect for Indigenous Rights and Free Prior and Informed Consent
- Respect for Workers' Rights



Assessment of Steel Decarbonization Progress

This report focuses on the findings of the "Fossil-Free and Environmentally Sustainable Steel" subsection of the Leaderboard.

The indicators within this subsection (as well as the other subsections in the Fossil-free and Environmentally Sustainable Supply Chains section) use the following indicator structure, which was modeled on a framework from an SBTi report on strategies for supply chain emissions reductions:

- Disclose: evaluates the level of transparency that automakers provide with regards to the emissions that originate from their steel supply chains.
- Target setting and progress: evaluates whether automakers have set targets to increase their use of green steel and recycled steel, and whether they disclose the progress they are making towards those targets on an annual basis.
- Supply chain levers: evaluates the specific actions and investments that automakers have implemented with suppliers and other stakeholders to unlock greater production of green steel and recycled steel. This includes joining procurement campaigns such as SteelZero and the First Movers' Coalition, requiring suppliers to undergo audits and certifications through ResponsibleSteel, signing offtake agreements for green steel and investing in closed loop processes to improve steel recycling.

In order to reward automakers' progress towards the delivery of clean vehicles, the scoring is intentionally weighted towards implementation indicators. These indicator categories and weightings are set out below.

STEEL INDICATORS: STRUCTURE & WEIGHTING

INDICATOR CATEGORIES	NORMALIZED WEIGHTING
Disclose	1 point
Target setting & progress	1.5 points
Supply chain levers	2 points

The Leaderboard differentiates between lower emission steel (also called co2-reduced or low-carbon steel), fossil-free steel (also called green steel or near-zero emissions steel) and recycled steel. The former is defined to be steel made with existing commercially available steelmaking technologies but with lowered emissions.[11] Fossil-free steel is defined to be steel made with breakthrough technologies that are needed for the steel industry to move towards fossil-fuel free steel production, such as green hydrogen DRI and iron ore electrolysis.[12] Recycled steel is steel that is made from pre-consumer or post-consumer steel scrap. Further, the Leaderboard also refers to "environmentally responsible steel" which refers to steel that is produced in ways that minimize other environmental impacts in areas such as air pollution and water usage.

The indicators and score weightings provide the framework for assessing the automakers. Company policies and activities were then analyzed, which was limited to reviewing official company disclosures as opposed to press releases, media or third-party reports. This focus on company disclosures was adopted to ensure the analysis was based on official company policy and reporting that had received board level sign-off, as well as to encourage greater transparency in the industry.

Further details on the methodology for evaluating automakers' progress on steel decarbonization is included in Annex 1. Annex 2 provides the full list of steel indicators in the Leaderboard.

11 The Leaderboard indicators use SteelZero's threshold of < 2 tons CO2e/ton for primary steel with 0% scrap through to < 0.35 tons CO2e/ton for secondary steel with 100% scrap for this type of steel

12 The Leaderboard uses the First Movers Coalition and IEA thresholds of 0.4 tCO2e/t for primary steel with 0% scrap and 0.05

Which Companies are Assessed?

The companies assessed within the Leaderboard were selected because they are the largest producers of BEVs within specific regions, or are the largest global automakers. As such, the Leaderboard is focused on companies that are, or could be, leading the transition to EVs and who can therefore play a pivotal role in creating a race to the top on EV supply chain practices.

All automakers were contacted before publication to provide the results and the opportunity for discussion, questions, clarifications, and feedback. All feedback received was reviewed, and where pertinent, incorporated into the final Leaderboard scores and this resulting report.

Automakers included within the analysis

OEM	BEV Sales	Total Vehicle Sales	BEV %	Headquartered Country
BMW Group	364,001	2,243,785	16%	Germany
BYD	1,937,574	4,513,032	43%	China
Ford	148,336	4,030,064	4%	United States
GAC	380,251	817,239	47%	China
Geely Auto Group	682,018	2,527,240	27%	China
GM	821,270	5,424,831	15%	United States
Honda Motor	65,659	3,789,631	2%	Japan
Hyundai Motor (inc. Hyundai and Kia)	190,326	3,200,080	6%	South Korea
Mercedes-Benz Group	252,840	2,104,218	12%	Germany
R-N-M Alliance (inc. Renault and Nissan)	134,572	2,520,120	5%	France/Japan
SAIC	261,795	1,456,717	18%	China
Stellantis	216,195	5,355,849	4%	Netherlands
Tesla Inc.	1,977,734	1,977,734		United States
Toyota Motor Corp.	133,796	9,363,271	1%	Japan
VW Group	707,516	8,450,970	8%	Germany
Volvo Car Group	175,194	763,389	23%	Sweden

*Volvo Cars' and Geely Autos' sales are also combined in Marklines under Geely Holding Group, however Volvo Cars publishes disaggregated BEV sales data and so this data was used for Volvo and subtracted from Geely Holding Group's sales figures.

Source: Marklines. All figures are YTD up to and including July 2023. Data covers passenger vehicles only and covers Europe, China, South Korea, Japan, and USA and Canada

CHAPTER 003

2025 Leaderboard Findings on Fossil-Free and Environmentally Responsible Steel

Overall Findings

Volvo and Mercedes continue to be the industry leaders on accelerating the transition towards fossil-free and environmentally responsible steel. Volvo scores well across the Leaderboard's range of indicators on steel, having made progress on emissions transparency, setting targets to increase its usage of both low-carbon steel and recycled steel, signing agreements for the supply of near-zero emissions steel and investing in closed-loop processes for steel recycling.

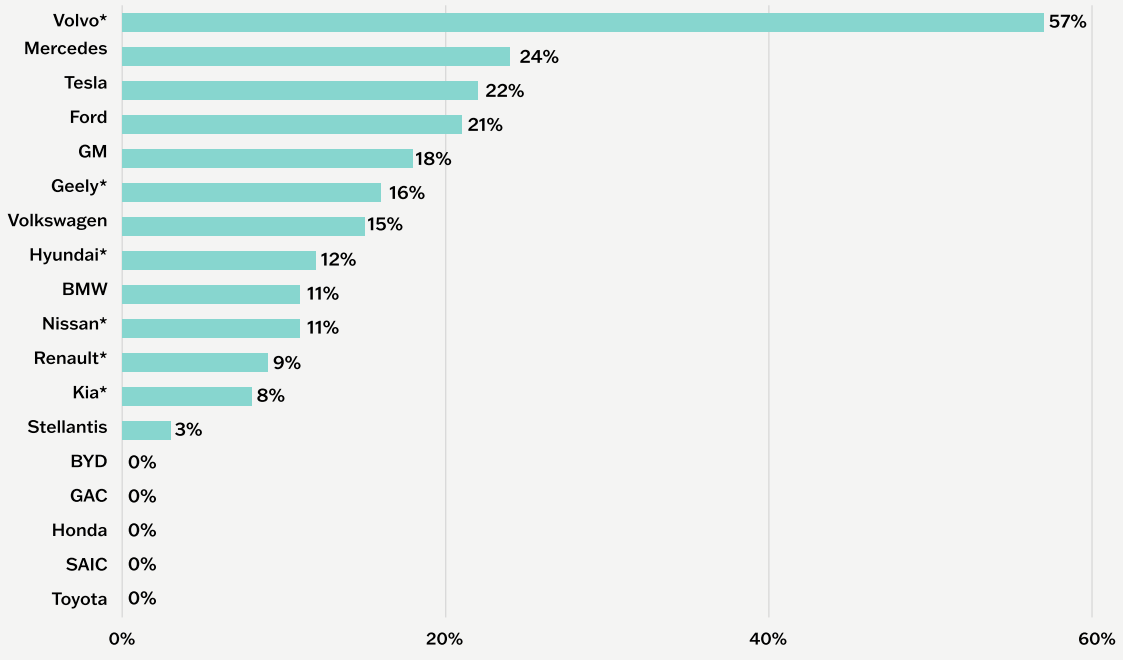
Mercedes, meanwhile, is the clear industry leader when it comes to establishing purchase agreements with steel suppliers to incentivize investment in, and greater production of, fossil-free steel, having disclosed multiple such agreements that the company has signed with suppliers in both Europe and North America.

Notably, the two automakers also achieved the largest score improvements this year, in both cases for actively engaging their steel suppliers regarding certification by ResponsibleSteel. Volvo also published new lifecycle assessments for its EX30 and EX40 EVs, which include disaggregated emissions data from the steel used in the vehicles. With these improvements, **Volvo's score on steel decarbonization is now four times the industry average.**

Volvo and Mercedes' continued progress on fossil-free and environmentally responsible steel sets a clear example of how industry leaders can continue to raise the bar for others to follow.

Tesla, Ford and GM also continued in this year's top five ranking. Tesla continues to be the only company to disclose disaggregated scope 3 emissions from its steel supply chain, a crucial first step towards taking effective and targeted action to reduce those emissions. Ford and GM, meanwhile, joined the First Movers Coalition's sector group on steel at the end of 2022, through which they committed to purchasing at least 10% near-zero steel by volume by 2030. Both companies have also signed offtake agreements for the supply of lower emission steel.

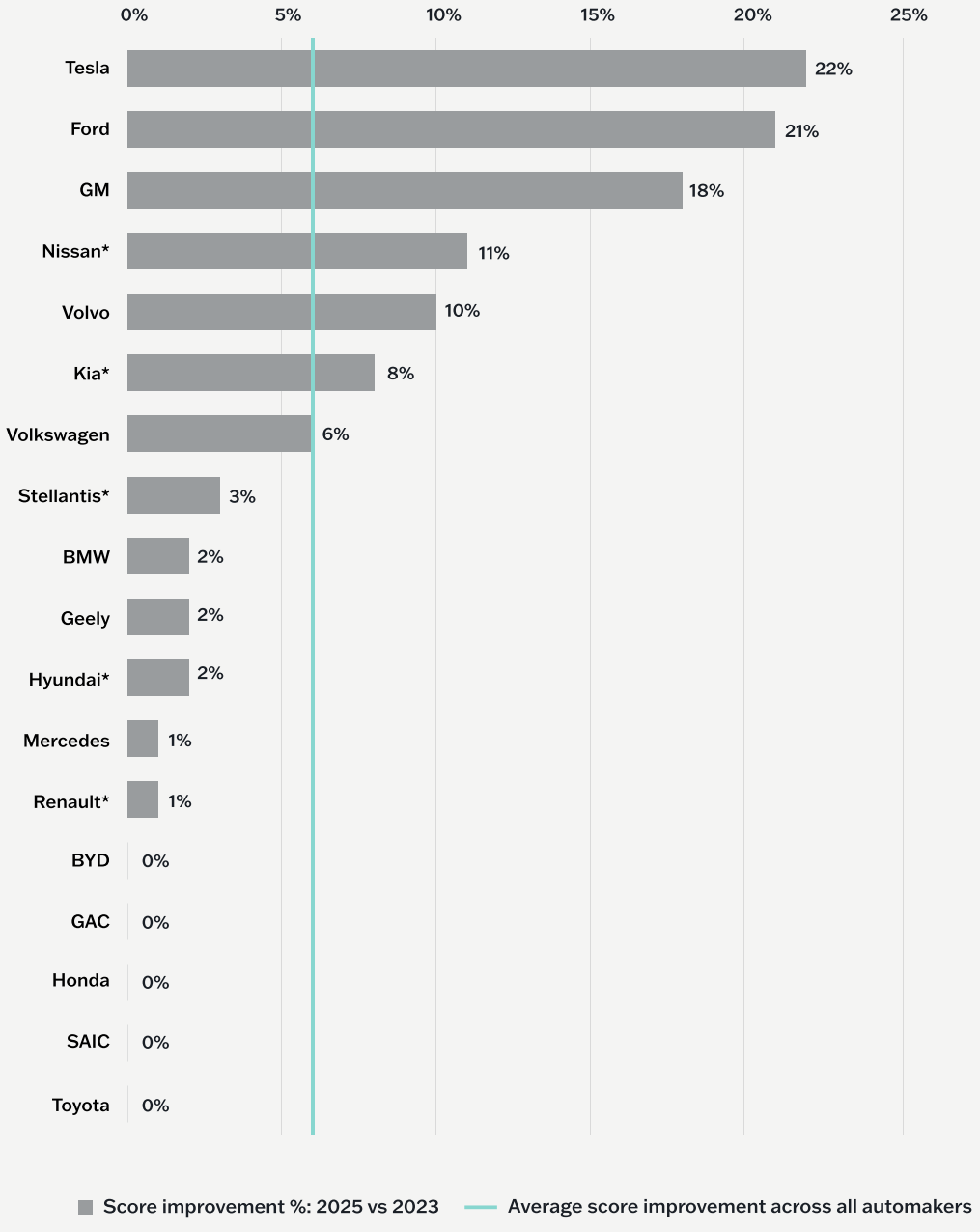
Figure 1 — **2025 Leaderboard scores and rankings for the fossil-free and environmentally sustainable steel subsection**



Although progress on the steel indicators was more limited in this year's Leaderboard compared to the 2024 edition, with the average score across all automakers rising by just 1 percentage point, significant progress has been made on steel decarbonization since the launch of the first edition of the Leaderboard in 2023. In 2023, 61% of automakers achieved a score of 0% on their efforts to decarbonize their steel supply chains. Just two years later, that figure has dropped to 28%, leaving automakers that have failed to take any steps as a rapidly dwindling minority.

The following graph shows the progress that has been made by automakers in the fossil-free and environmentally sustainable steel subsection since the 2023 edition.

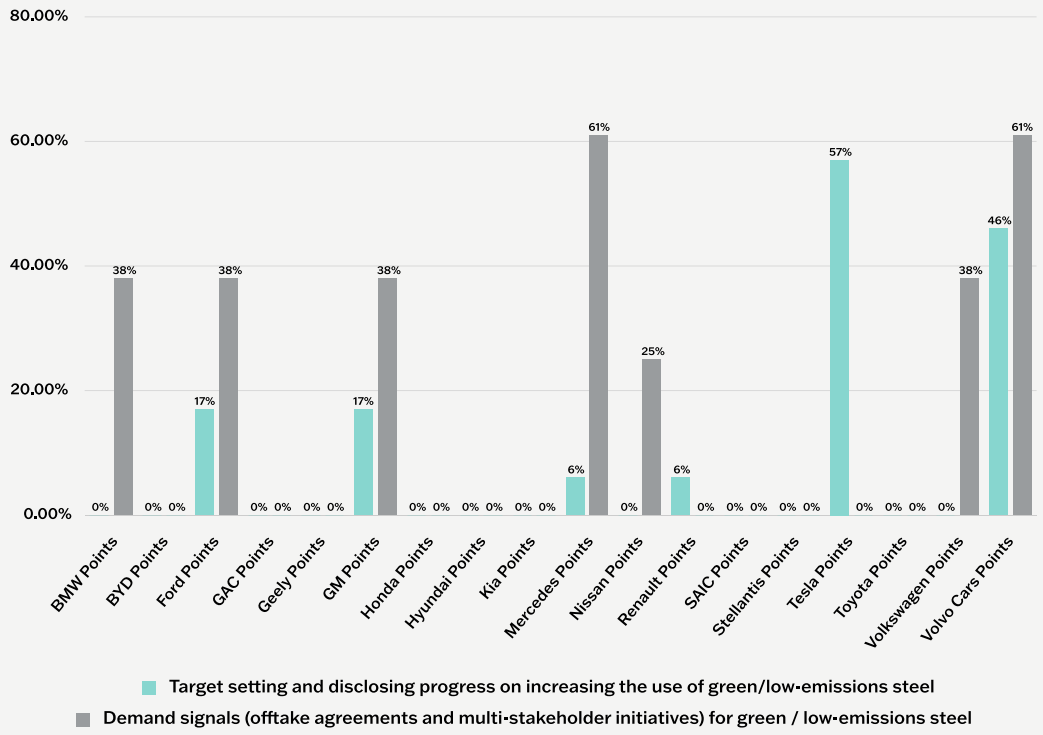
Figure 2 — **Score improvements by automakers against the steel indicators from 2023 to 2025**



Encouragingly, the best-in-class score for steel, calculated by adding up the highest scores achieved by any company for each indicator on steel decarbonization, now stands at 72%. This means that automakers could increase their total score for the steel subsection of the Leaderboard simply by matching the practices of their highest performing peers across the different indicators. Moreover, the best in class score in the 2025 edition rose by 3% compared to the 2024 edition, demonstrating that automakers are continuing to raise the bar for others to follow.

The following two sections provide a more detailed analysis of company performance against the steel indicators in the Leaderboard: looking first at performance against the indicators focused on steel decarbonization and then at the indicators focused on steel recycling/circularity.

Figure 3 — **Automaker progress on the steel decarbonization indicators in the 2025 Leaderboard**



Progress on steel decarbonization indicators

The graph below shows the performance of different automakers against the indicators focused on steel decarbonization. The blue columns combine automakers' scores on indicators requiring them to have set targets to decarbonize their steel supply chains (see indicator 2.2.1. in Annex 2) and being transparent on the progress they are making towards achieving those targets by disclosing disaggregated emissions data on their steel supply chains (indicator 2.1.1.), as well as the quantity of lower emission steel they are currently using in their annual production cycle (indicator 2.2.2.).

The gray columns combine automakers' scores on indicators focused on sending demand signals to drive greater investment in and production of fossil-free steel. These include signing offtake agreements for the supply of fossil-free steel (indicator 2.3.3.) and joining multi-stakeholder initiatives such as SteelZero, First Movers Coalition and Responsible Steel that aggregate demand for fossil-free and environmentally responsible steel (indicators 2.3.1. and 2.3.2.).

Progress on steel decarbonization indicators

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The gray columns combine automakers' scores on indicators focused on sending demand signals to drive greater investment in and production of fossil-free steel. These include signing offtake agreements for the supply of fossil-free steel (indicator 2.3.3.) and joining multi-stakeholder initiatives such as SteelZero, First Movers Coalition and Responsible Steel that aggregate demand for fossil-free and environmentally responsible steel (indicators 2.3.1. and 2.3.2.).

Multiple automakers have now set targets to increase their use of fossil-free and lower emission steel. Ford and GM have set targets through the First Movers Coalition to ensure that at least 10% of all their steel purchased per year will be near-zero emissions by 2030, whilst Volvo has set a target to use 50% low-emission steel by 2030 through its membership of SteelZero.

Mercedes has also set a target for one third of the steel used in its European press shops to be low-emissions steel by 2030 and has also stated that it intends to purchase over 200,000 tonnes of CO2-reduced steel per year from European suppliers for its own press plants before the end of this decade. However, because the company does not provide data to indicate what percentage of the company's global steel use these figures would represent, making it challenging to compare the ambition of their commitments with those of other automakers, Mercedes scores lower than Volvo, Ford and GM on this indicator.

Similarly, Renault has set an overall target of reducing CO2 emissions/kg by 30% in the area of the extraction of raw materials and the manufacture of parts, "through a specific effort on steel, aluminum, tires, polymers and electronic components," but because this target is not disaggregated for steel specifically the company also scores lower on this indicator.

Automakers score much lower against the transparency indicators. No companies disclose the current quantity of low-emissions steel used in their annual production cycle and only Tesla provides disaggregated GHG emissions for its entire steel supply chain, disclosing that steel accounted for 6.48% of its commodity supply chain emissions in 2023. Volvo does disclose this information at the product level in the lifecycle assessments (LCAs) that it provides for its EV and hybrid models. Notably, the LCA for its latest EX30 model shows the lowest carbon footprint of any fully electric Volvo car to date.

Similarly, of the companies evaluated, very few had joined multi-stakeholder initiatives aimed at catalyzing greater investments in, and production of, fossil-free and environmentally responsible steel. Only Mercedes and Volvo are members of ResponsibleSteel and actively incentivize their steel suppliers to achieve ResponsibleSteel certification, with Volvo committing to having all of its steel suppliers certify their sites with ResponsibleSteel by 2030.

Only three automakers have joined procurement campaigns to aggregate demand for green steel. Ford and GM have joined the First Movers Coalition group on steel, whilst Volvo has joined SteelZero.

Automakers perform better on the indicator focused on offtake agreements for green steel. Mercedes was the only company to score full points on this indicator, disclosing multiple agreements that the company has signed with suppliers in both Europe and North America. These include a binding contract signed with H2 Green Steel for the supply of 50,000 tonnes of steel produced at the company's green hydrogen DRI-EAF facility in Sweden and a contract signed with Steel Dynamics for the supply of more than 50,000 tonnes of CO2-reduced steel produced with green electricity at the company's plant in Alabama.

Progress on Steel Recycling Indicators

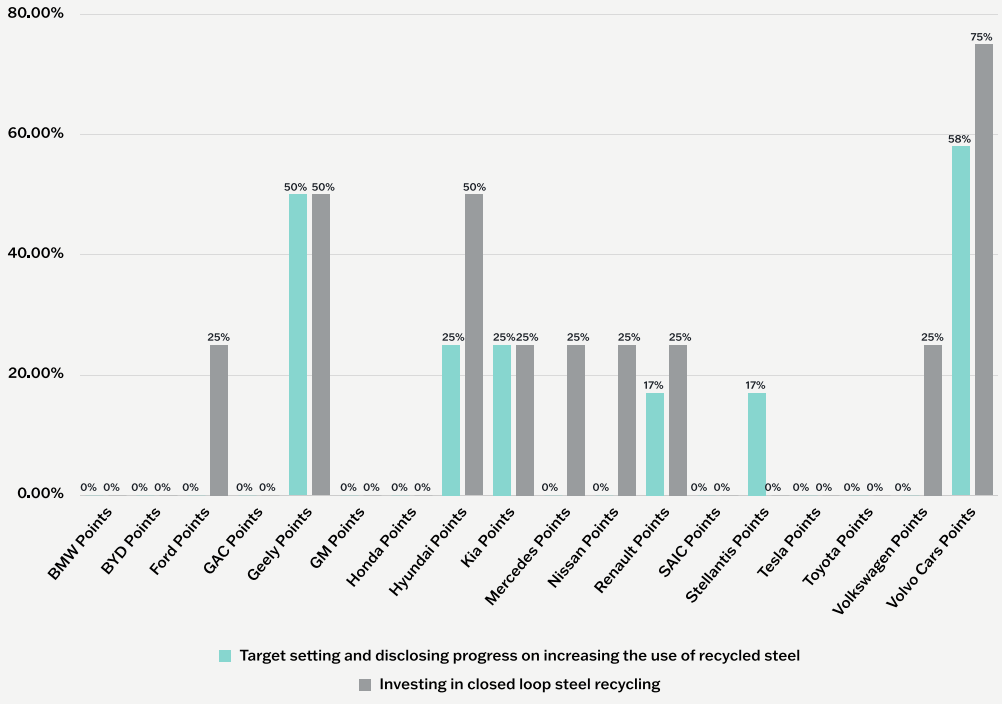
Other automakers that scored points against this indicator include:

- BMW, which has invested in US start-up Boston Metal for “carbon free” steel production and has signed a contract with H2 Green Steel (now Stegra) to purchase green hydrogen DRI-based steel.
- Ford, which has entered into memorandums of understandings with 3 European steel suppliers to secure a supply of “near-zero emissions steel.”
- GM, which has disclosed agreements with Nucor, U.S. Steel and ArcelorMittal for lower emission steel.
- Nissan, which has been collaborating with Kobe Steel to procure steel with “significantly reduced CO2 emissions” from January 2023.
- Volkswagen, which has signed an MOU with Salzgitter AG for Salzgitter AG’s low-CO2 steel. VW’s subsidiary, Scania, has also signed an agreement with H2 Green Steel for green steel.
- Volvo, which discloses that it has “secured access to near-zero primary and recycled sheet steel from SSAB”, including SSAB Fossil-freeTM (produced with green hydrogen-DRI production route) and SSAB ZeroTM steel, and it plans to use the secured steel in an upcoming car programme by 2026.

Figure 4 aggregates the scores of automakers against the indicators in the Leaderboard focused on steel circularity. The blue columns show the companies’ total scores against the indicators requiring them to have set targets to increase their use of recycled steel (indicator 2.2.3.) and to disclose the current quantity of recycled steel used in their annual production cycle (indicator 2.2.4.). The gray columns show automaker progress on establishing closed looped systems for steel recycling (indicator 2.3.4.).

These indicators award additional points for automakers that can demonstrate progress on recycling post-consumer steel scrap, in addition to pre-consumer (or manufacturing) steel scrap, as this represents a key challenge for maximizing steel circularity within the automotive industry.

Figure 4 — **Automaker progress on the steel recycling indicators in the 2025 Leaderboard**



Geely and Volvo were the only companies to score points for setting targets to increase their use of recycled steel by 2030. Volvo aims to use 25% recycled steel in its vehicles by 2025 and 35% by 2030, whilst Geely has a target for its tier-1 key suppliers to use 20% recycled steel by 2025.

More companies have made progress on disclosing quantities of recycled steel used across their annual production cycles. Hyundai, Kia and Volvo were the only companies that provided data on the amount of recycled steel used across their entire annual production cycles, although none of the companies differentiated between pre and post-consumer steel scrap. For example, Kia disclosed that, out of 207,000 tons of steel used by the company in 2023, 101,900 tons were recycled scrap.

Other companies partially disclosed this information. Geely disclosed that its ZEEKR 001 model uses 15% renewable steel plate material. Stellantis stated that "up to 30% of the steel used by Stellantis comes from scraps." And Renault disclosed the estimated percentage of recycled materials for some specific elements within its annual production cycle, such as the Blast Furnaces sector and long steels.

A range of companies had made progress on establishing closed loop processes for steel recycling. However, only Ford and Geely provided information on closed loop processes for recycling post-consumer steel scrap specifically. Ford disclosed that, in 2023, it "reclaimed 4,077 metric tons of steel... from transmission material" and "1,128 metric tons of cast iron, 534 metric tons of steel... from engine material." Geely stated, in 2023, the company "completed closed-loop bidding for steel and aluminum waste materials, accelerating the process of closing the loop for steel and aluminum materials" and conducted "joint technological R&D with scrapped car recycling and dismantling companies."

Other notable progress disclosed by automakers for this indicator includes:

- Mercedes disclosed that it works with voestalpine to recycle and reuse steel scrap produced at the company's Sindelfingen plant.
- Nissan stated that it is taking steps to "reduce the steel and aluminum scrap left over in the manufacturing process, and working globally with business partners to collect and reuse this scrap as material for new vehicles through closed-loop recycling initiatives."
- Renault provides detail on closed-loop processes for recycling manufacturing steel scrap.
- Volvo states that it "aims for closing the loop on steel recycling" and has started to work with the steel scrap from its inhouse stamping facilities. The company also states that it "aims to circulate scrap from end-of-life-vehicle (ELV) back to automotive steel grades", however this closed-loop process for post-consumer scrap does not yet appear to be operational.

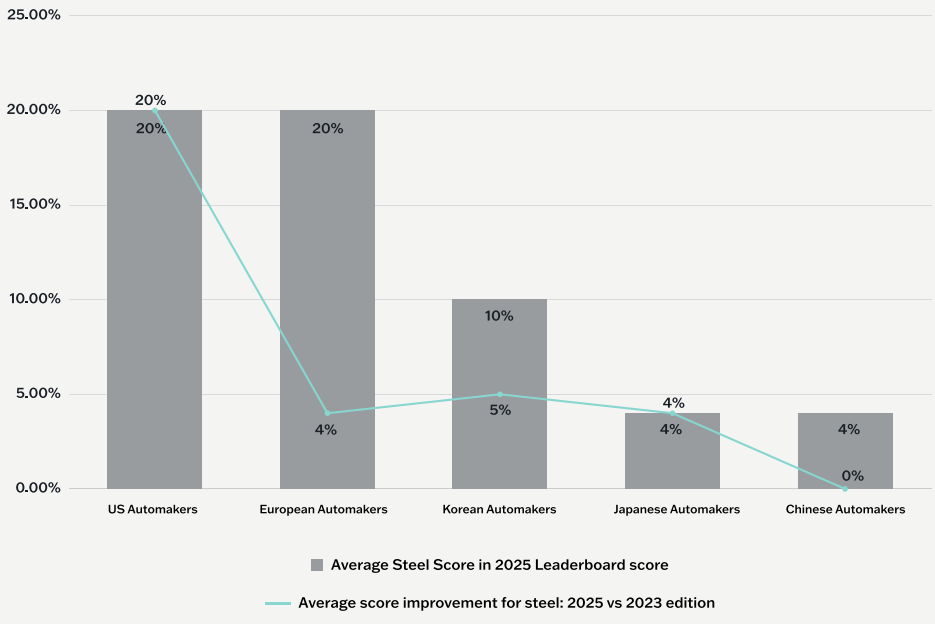
Differences between and within markets

As Figure 5 shows, the average scores for the steel subsection across US and European automakers are virtually tied. However, the US automakers, which all scored 0% on the steel indicators in the first edition of the Leaderboard, have made far more progress on the steel indicators than their European counterparts.

Within Europe, there are large differences in performance between the automakers. Most notably, Volvo achieved a score that was more than twice as high as the European average. On the other hand, Stellantis achieved a score of less than 3%, seven times lower than the European average. In fact, the data shows that the average score of the European automakers would be 3 percentage points higher than that of their US counterparts if it wasn't for the lack of progress made by Stellantis.

Both the US and the European automakers continue to score significantly higher on the steel indicators than their counterparts from Korea, Japan and China. However, it is notable that the Korean automakers have made more progress on steel overall than their European counterparts, although this progress has only been made against the indicators focused on steel recycling.

Figure 5 — **Average scores and score improvements on steel across different markets**



Recent Progress & Analysis

Since the launch of this year's Leaderboard, additional announcements and analysis have been released that provide further insight into progress on steel decarbonization by automakers.

In May, a group of civil society organisations, think thanks and recycling companies called on the European Union co -legislators to adopt a target of 30% recycled content for steel from post-consumer scrap in all vehicles covered by the Regulation by 2030, increasing to 40% by 2035, in the updated end-of-life vehicle directive that is currently being discussed. This open letter was published on the back of four recently published studies[3] which showed that achieving such a target would be feasible and impactful, if supported by appropriate measures and policies.

In June, the International Council on Clean Transportation (ICCT) published its annual Global Automaker Rating, which included a new section on green steel progress by automakers. The findings of ICCT largely mirror the findings of the 2025 Leaderboard, with Mercedes-Benz receiving the highest overall score on steel decarbonization, followed by BMW, Ford, VW and GM.[4]

One notable difference between ICCT's and the Leaderboard's rankings on green steel is that VW and BMW scored notably higher in the ICCT Global Auto Rating. This is partly due to some methodological differences: for example, the Leaderboard only considers information included in automakers' official sustainability reporting, while the ICCT Global Auto Rating also includes steel targets and offtake agreements announced in press releases, capturing several additional green steel announcements made by BMW. It is also because the ICCT report captures several new green steel agreements announced by VW after the 2025 Leaderboard's cut off date, showing that progress on green steel continues to be made by automakers.

Similar to the Leaderboard, the ICCT report finds that automakers from Korea, China, Japan and India, meanwhile, are largely falling behind their competitors in the EU and the US. However, the ICCT identified a noteworthy exception from Chery, which has signed an MOU with Baosteel for the supply of CO2-reduced steel from 2026.

3 https://institut-mobilites-en-transition.org/en/publications/car-to-car-steel/; https://www.transportenvironment.org/articles/setting-recycled-content-targets-for-steel-under-the-elv-regulation; https://theicct.org/publication/improving-automotive-steel-recycling-for-a-circular-economy-mar25/; https://sandbag.be/2025/03/13/recycled-steel-initial-target/

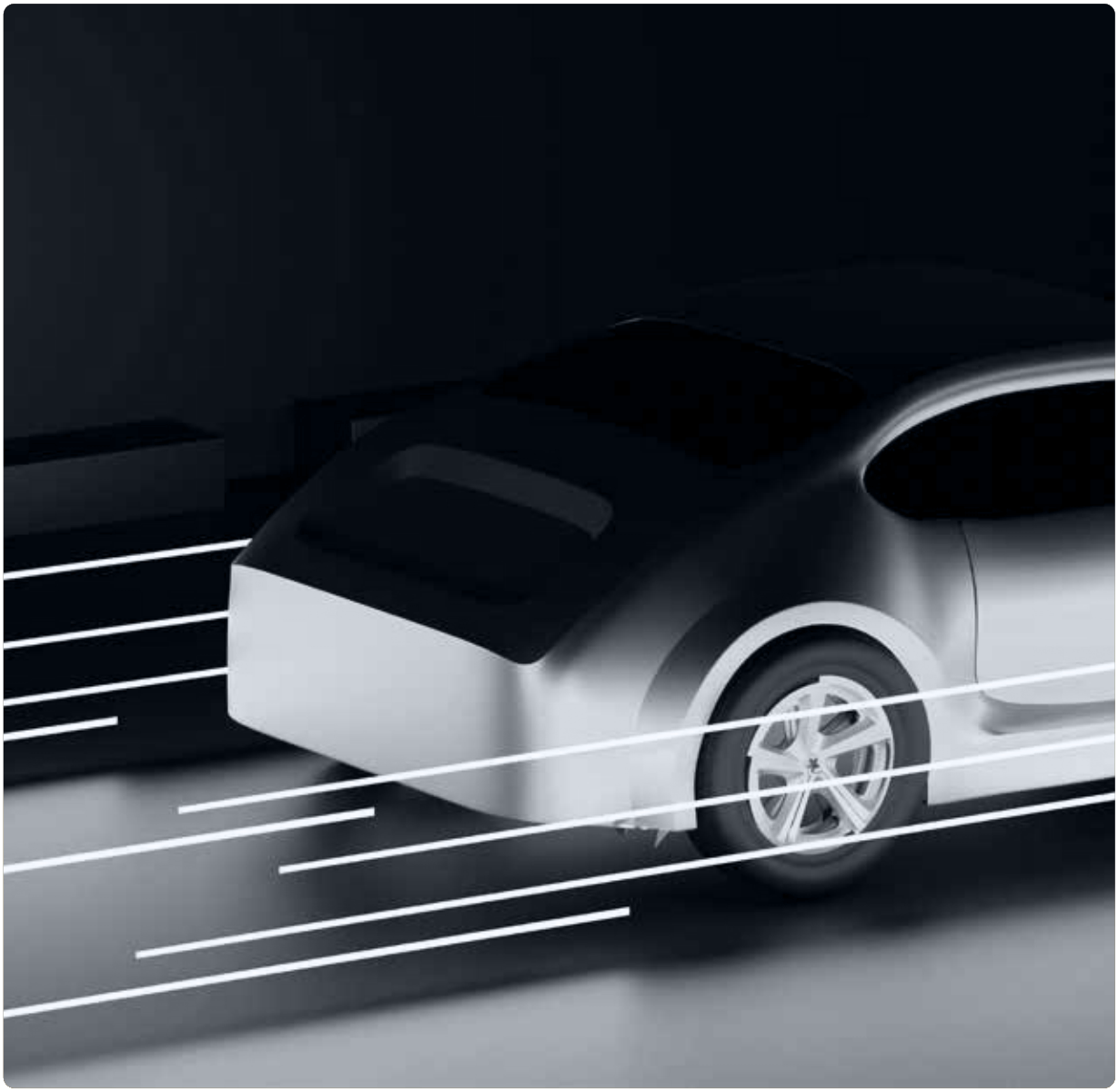
4 Volvo was not evaluated separately in ICCT analysis, but rather as part of Geely Holding Group.

Conclusions and Recommendations

The transformation of automotive steel supply chains towards a cleaner future is no longer a question of if, but when and how fast. The 2025 Leaderboard findings demonstrate that while industry leaders like Volvo and Mercedes are charting the path forward, the pace of change must accelerate dramatically for the industry to stand a chance at meeting climate goals.

Fortunately, the 2025 Leaderboard shows that there are clear opportunities for rapid improvement. The large gap between the average score on steel across all automakers (13%) and the best-in-class score across the steel indicators (72%) demonstrates that automakers which are falling behind today could dramatically improve their scores simply by emulating the practices of their highest-performing peers across different indicators.

At the same time, the fact that the-best-in-class score has risen year-on-year shows that industry leaders are continuing to raise the bar for others to follow. Industry leaders must double down on this progress, sending a clear message to those automakers that are trailing behind that slowing down is not an option.



The next five years will be decisive. With a large number of existing steel assets across the globe facing major investment decisions by 2030, the choices made today will determine whether the industry successfully transitions to clean technologies or locks in high-carbon infrastructure for decades to come.

If automakers are to rise to this challenge, they must:

Embrace greater transparency of their steel supply chains and disclose progress on the road to steel decarbonization:

- Disclose disaggregated scope 3 emissions for their steel supply chains.
- Publish lifecycle assessments for their EV models that include disaggregated steel emissions data.
- Report annually on quantities of low-carbon and recycled steel used in production.

Set ambitious, time-bound targets for fossil-free steel procurement:

- Establish publicly disclosed, time-bound commitments to transition to 100% fossil-free steel, accompanied by interim targets to purchase increasing quantities of lower emission and fossil-free steel by 2030.
- Aggregate demand signals for lower emission and fossil-free steel by joining procurement campaigns such as SteelZero and the First Movers' Coalition.
- Set targets to increase the quantity of recycled steel used in annual production cycles, focusing in particular on post-consumer scrap steel.

Maximize steel circularity through closed-loop recycling of post-consumer scrap:

- Establish closed-loop recycling systems that capture both manufacturing and post-consumer steel scrap.
- Invest in vehicle design for enhanced steel recovery and recycling.

Sign binding, long-term offtake agreements for fossil-free steel:

- Move beyond non-binding memorandums of understanding to legally binding contracts for fossil-free and lower emission steel procurement, in order to provide steel producers with the certainty needed to invest in fossil-free steel production.
- Prioritize agreements for fossil-free steel produced with breakthrough technologies, such as green hydrogen DRI, molten oxide electrolysis and electrowinning.
- Disclose quantities, timelines, and production methods for green steel offtake agreements to enable comparison and encourage competition among suppliers.

Implement robust decarbonization incentives for existing steel suppliers:

- Introduce incentives and requirements for existing steel suppliers to progressively decarbonize their steel production.
- Require existing steel suppliers, as well as key component suppliers, to provide product carbon footprint (PCF) data, environmental product declarations (EPDs) or similar for products supplied to the company.
- Progressively shift procurement budgets toward suppliers demonstrating concrete progress on emissions reductions while phasing out contracts with those failing to meet decarbonization milestones.

Appendix 1: Methodology for Steel Assessment in the Leaderboard

The bulk of GHG associated with the production of steel occurs during smelting. As such, transitioning from coal-based steel production with blast furnaces and decarbonizing the electricity used during the smelting process are critical in creating sustainable steel supply chains for the auto industry. In this regard, automakers have an important role to play in unlocking investments in new, or upgraded, steel facilities that utilise innovative technologies that can move the industry towards fossil-fuel free steel manufacturing.

Indicators in this, and the following, sub-section have been structured around the demand signal framework presented in Mission Possible Partnership's Steeling Demand report[511], which illustrates how demand signals from major steel buyers (such as automakers) to steel manufacturers can help unlock investment decisions and bring to market the next generation of breakthrough technologies needed for primary steel to become truly net-zero.

This report puts forwards three types of demand signals that can serve this purpose:

A direct offtake agreement, which is "actual agreement between a steel buyer and a specific steel supplier, intended to give the steel company the certainty needed to invest in a breakthrough production route and the steel buyer the assurance of access to a particular volume of low-CO2 steel meeting its specifications." Such agreements can take the form of bilateral offtake (or advance purchase) agreement or a direct investment in a company or facility. This type of demand signal is evaluated in indicator 2.3.3.

A future purchase commitment, which is "a commitment that is not directed to any specific supplier, but instead indicates a willingness to buy low-CO2 steel, to the supply market as a whole." This type of demand signal is evaluated in the target-setting indicator 2.2.1.

And finally indirect demand signals, which "can be sent by a much broader pool of organisations that operate across complex value chains to indicate a willingness to decarbonise their supply chains and encourage their suppliers to engage in green steel demand." These kinds of demand signals are typically mobilized through buyers' groups and other multi-stakeholder initiatives, such as SteelZero, First Movers' Coalition and ResponsibleSteel, and they are evaluated in indicators 2.3.1. and 2.3.2. Automakers can score additional points by joining all three of these initiatives, which are considered complementary as they target different elements of steel decarbonisation.[12]

Additional requirements have been integrated into the indicator on direct offtake agreements in order to differentiate between advance purchase agreements that are more effective in achieving the purpose of providing a steel company with the certainty needed to invest in a breakthrough production route[13], namely:

- Giving preference to binding contracts over non-binding memorandums of understanding
- Giving preference to contracts for which quantities to be purchased and timelines are publicly disclosed, so as to be able to evaluate and compare the levels of ambition and commitment between automakers.
- Giving preference to purchase agreements that are technology forcing, i.e. are used to support investments in breakthrough technologies that are needed for the steel industry to move towards fossil-fuel free steel production. These technologies have been detailed by the IEA[14] and Mission Possible Partnership[15] and include green hydrogen DRI and iron ore electrolysis. Post-consumer scrap-based EAF production routes powered by renewable energy are also considered here due to the technical challenges of using steel scrap for automotive manufacturing.[16] However, CCUS is not considered for scoring since it is not a technology that can support the transition of the industry away from fossil-fuels.

11 https://www.energy-transitions.org/publications/steeling-demand/#download-form
12 SteelZero (2023), How demand signals work together to decarbonise the steel market: Overview of commonalities and distinctions between First Movers Coalition, SteelZero and the IDDI-Green Procurement Pledge
13 https://www.latitudemedia.com/news/ev-makers-have-the-chance-to-catalyze-the-clean-steel-and-aluminum-markets https://www.latitudemedia.com/news/opinion-green-steel-evs
14 https://www.iea.org/energy-system/industry/steel
15 https://www.energy-transitions.org/publications/making-net-zero-steel-possible/
16 See: https://www.transportenvironment.org/articles/cleaning-up-steel-in-cars-why-and-how

In order for stakeholders to be able to evaluate automakers' actual progress on decarbonizing the steel supply chains, indicators are also included on disclosing disaggregated emissions from the company's steel supply chain and the quantity of low-carbon steel currently used in the company's production cycle. For the latter indicator, the definition of "low-carbon steel" is taken from SteelZero's commitment framework[11], which is considered to be a sufficiently ambitious carbon footprint threshold that is also achievable with current steelmaking technologies. This definition, which has also been adopted by IIGCC's Steel Purchasers Framework[12], is < 2 tons CO2e/ton for primary steel with 0% scrap through to < 0.35 tons CO2e/ton for secondary steel with 100% scrap.

Implementing effective means through which to recover and recycle scrap steel is an important consideration for autos in the decarbonisation of steel supply chains. Increasing the amount of secondary relative to primary steel used in the auto manufacturing process reduces the embodied carbon of the BEV, as well as its demands for primary resources (i.e. iron ore).

The IEA Guidance for Heavy Industry has recycling, re-use: scrap as a share of input in steel production as 54% by 2030. As such, the scorecard measures company target setting with regards to recycling. Additionally, the scorecard assesses the extent to which companies are integrating improved recyclability of steel into the design and manufacturing process. Finally, there is additional emphasis on the approach automakers take with regards the closed-loop processes regarding recycling and recovery of steel. A truly closed-loop process should include both pre- and post-consumer scrap. Scorecard indicators on this issue are therefore weighted towards recycling and recovery of steel processes including considerations for post-consumer scrap. Companies will still be credited for closed-loop processes utilising recycling scrap from the manufacturing process, albeit to a lesser extent.

Finally, it is noted that steel production - from iron ore mining through to steel manufacturing - can also cause negative environmental impacts beyond producing significant quantities of greenhouse gas emissions.[13] Automakers use of ResponsibleSteel, a highly regarded multi-stakeholder assurance scheme for the steel industry that includes a range of performance measures on environmental impacts (such as water stewardship, biodiversity, waste and air pollution), is included as a way to assess their efforts in reducing these impacts in their supply chain.

11 SteelZero Commitment Framework v1.1 | June 2024
12 IIGCC-Steel-Purchaser Framework 2023
13 The Real Cost of Steel

Appendix 2:
List of Leaderboard indicators on steel decarbonization

THEME	INDICATOR CATEGORY	INDICATORS	
Fossil Free and Environmentally Sustainable Steel	**2.1. Disclosure of scope 3 GHG emissions due to steel supply chains**	**2.1.1. The company discloses disaggregated GHG emissions for their steel supply chains.**	**2.1.1. The company discloses disaggregated GHG emissions for their steel supply chains.** The following scores are absolute, not cumulative: **100%:** The company discloses scope 3 GHG emissions for purchased goods and services, disaggregated for their steel supply chains **50%:** The company discloses a Life Cycle Assessment (LCA) for at least one electric vehicle model that includes disaggregated data on the embodied GHG emissions from the steel used in that vehicle.
	2.2. Target setting and progress towards fossil free and environmentally sustainable steel supply chains	**2.1.1. The company discloses disaggregated GHG emissions for their steel supply chains.**	The scores below are not additive. They indicate specific thresholds for getting that percentage of points: **100%:** the company has a commitment to source 100% fossil free steel by 2050 and 50% fossil free steel by 2030. **80%:** the company has a commitment to source 100% Responsible Steel Level 4 certified steel by 2040 and 50% automotive steel that is ResponsibleSteel level 3 or 4 by 2030 **60%:** the company has set a target that is aligned with First Movers Coalition guidance of 10% "low-CO2" primary steel by 2030 AND/OR aligns with SteelZero Commitment to source 100% net zero steel by 2050, with an interim commitment of using 50% Lower Emission Steel by 2030 **40%:** the company has an emissions reduction target for steel that is aligned with IEA Heavy Industry Guidance (27% emissions reduction by 2030 and 95% by 2050) **20%:** the company has a commitment to net zero steel by 2050 and/or a 2030 emissions reduction target for steel that is below the IEA Heavy Industry Guidance
		2.2.2. The company publishes progress towards their target by disclosing the current percentage of low-CO2 steel in their annual production cycle.	**50%:** The company discloses the current percentage of low-CO2 steel in their production cycle (definition of low-CO2 steel taken from SteelZero / ResponsibleSteel, specifically < 2 tons CO2e/ton for primary steel with 0% scrap through to < 0.35 tons CO2e/ton for secondary steel with 100% scrap). **50%:** the company discloses the current percentage of Responsible Steel certified steel in their supply chain. Note: depending on the level of certification, companies may score points under the first category. **MODIFIER:** Half points will be awarded if a company discloses information that meets either, or both, of the above criteria but only for some elements in its annual production cycle.
		2.2.3. The company has a target for the use of secondary/ scrap steel by 2030.	**2.1.1. The company discloses disaggregated GHG emissions for their steel supply chains.** The following scores are absolute, not cumulative: **100%:** The company discloses scope 3 GHG emissions for purchased goods and services, disaggregated for their steel supply chains **50%:** The company discloses a Life Cycle Assessment (LCA) for at least one electric vehicle model that includes disaggregated data on the embodied GHG emissions from the steel used in that vehicle.

		2.2.4. The company publishes progress towards their target by disclosing the current percentage of recycled steel used in its annual production cycle.	The following scores are absolute, not cumulative: 100%: the company discloses the percentage of recycled steel in their annual production cycle including volumes of both pre- and post-consumer steel. 75%: the company discloses the percentage of recycled steel in their annual production cycle. 50%: The company partially discloses the percentage of recycled steel for some elements within their annual production cycle. NB: Total recycled/scrap steel volume is sufficient if total steel volume is disclose
	2.3. Use of supply chain levers to achieve fossil free and environmentally sustainable steel supply chains	**2.3.1. The company participates in multi-stakeholder procurement initiatives to collaborate with other buyers to incentivise investment in and production of fossil free steel at scale.**	50%: the company is a member of SteelZero. 50%: the company is a member of the First Movers Coalition's sector group on steel
		2.3.2. The company participates in multi-stakeholder standard / certification initiatives to drive investment in and production of socially and environmentally sustainable steel at scale.	25%: the company is a member of ResponsibleSteel. 50%: the company actively engages their steel suppliers regarding ResponsibleSteel certification. 25%: the company has disclosed purchasing commitments for ResponsibleSteel certified steel. Note: 0.6 points modifier applied due to multistakeholder initiative assessment. See sheet 8.
		2.3.3. The company has entered into formal arrangements with suppliers to incentivise investment in and greater production of fossil free steel.	50%: the company states that it has entered into a formal arrangement with at least one steel supplier to invest in and scale-up production of low-CO2 steel. 25%: at least one purchase agreement signed by the company with a steel supplier for the provision of low-CO2 steel is a binding contract for which timelines and scale of supply (e.g. volume of steel to be purchased per year) are publicly disclosed. 25%: at least one purchase agreement signed by the company is for the provision of steel produced with new technologies for fossil-free steelmaking.

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