[For immediate release]

Subsidising Green Steel Procurement to Drive Carbon Reduction and Cost Savings in China's Automotive Industry

Transition Asia's analysis on Geely Automobile shows the unit decarbonisation cost of green steel procurement to be at least 50% lower than a shift from ICE to BEVs

- **Green steel procurement can be regarded as an excellent method for automobile companies** to reduce carbon emissions.
- Based on Geely Automobile's data, the analysis shows the procurement of green steel would require relatively low government subsidies of approximately **US$100 per vehicle before 2035**, reduced by half to **$50 per vehicle by 2050**, providing an average of **1.9 tons CO_2 reduction per vehicle**.
- By channelling subsidies towards decarbonising the automotive sector, China can maintain its strong position in manufacturing and innovation and also position itself as a leader in sustainable technologies related to steel.

Hong Kong, 5 September 2023 - **Transition Asia**, **a Hong Kong-based non-profit think tank** that focuses on driving 1.5°C-aligned corporate climate action, today published a research report on the integration of green steel into China's decarbonisation strategy for the automotive industry. Leveraging publicly accessible data from Geely Automobile Holdings, a leading Chinese automaker, along with Transition Asia's proprietary Green Steel Premium (GSP) Model, **the study aims to uncover potential cost advantages linked to adopting green steel**. This analysis is particularly relevant given the rising trend of new electric vehicle (NEV) development in China.

Shifting from internal combustion engine (ICE) vehicles to battery electric vehicles (BEVs) is the most effective decarbonisation strategy in the auto industry. At this stage, in terms of the full life cycle carbon emissions of a vehicle, **the average emissions level of an ICE is 39.7 tons of CO_2, while a BEV is 22.4 tons, which means that 17.3 tons of CO_2 (43.6%) are expected to be reduced if an auto company replaces one ICE with a BEV**. However, shifting to BEVs also means much higher expenditures for auto companies because the production cost of BEVs is currently 45% higher than ICE. This unsubsidised cost difference is still expected to be 9% higher in 2030[1].

Examining Geely Automobile as a case study, Transition Asia examined the effect of green steel procurement on the automaker's **decarbonisation effectiveness focusing on vehicle carbon**

[1]Ruffo, Gustavo Henrique. "EVs Are Still 45% More Expensive to Make than Combustion-Engined Cars." InsideEVs, 17 Sept. 2020, insideevs.com/news/444542/evs-45-percent-more-expensive-make-ice/.

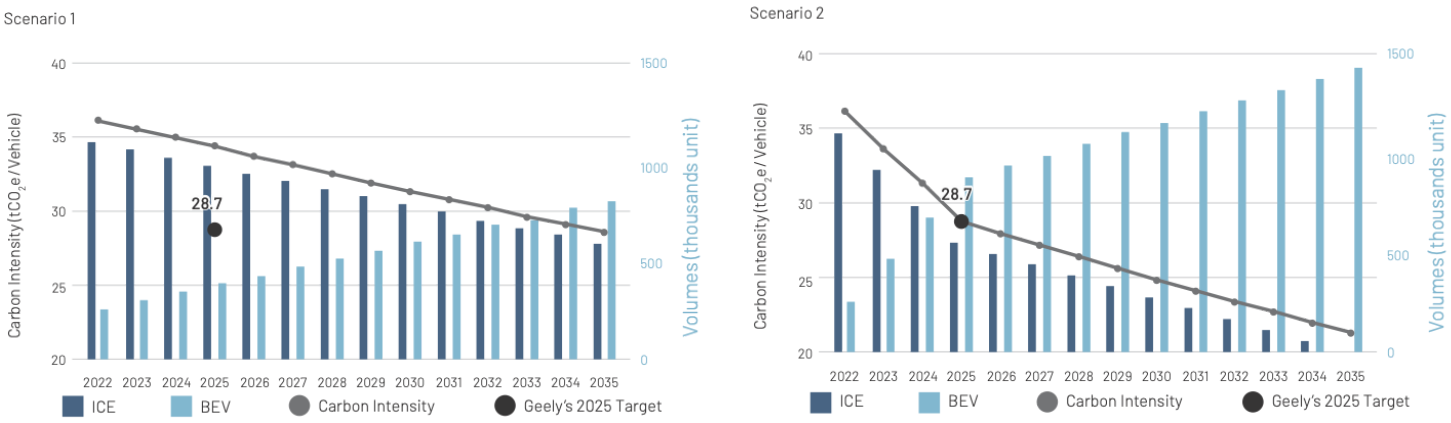
intensity to reach Geely Automobile's 2025 carbon reduction target**.** By integrating green steel into their supply chain, Transition Asia's analysis indicates that **the auto sector can achieve emissions reductions in a more cost-efficient manner by utilising green steel**. Based on Transition Asia's study into GSPs, the China-specific decarbonisation cost ($/tCO$_2$) for scrap-electric arc furnace (EAF) and green hydrogen DRI-EAF in 2023 is around $75 and $89, respectively, whereas the unit decarbonisation cost of shifting to BEVs in 2023 exceeds $350. **Before 2030, the unit decarbonisation cost of green steel procurement is projected to be at least 50% lower** than shifting from ICE and Plug-in hybrid vehicles (PHEVs) to BEVs.

Shifting production from ICE and PHEVs to BEVs needs to come at a faster pace

In the analysis, Transition Asia uses two different scenarios to exemplify the effectiveness of decarbonisation pathways. Scenario 1 involves Geely Automobile gradually shifting all production from ICE and PHEVs to BEVs by 2050, following a linear progression. Scenario 2 aligns Geely Automobile's 2025 target and the European Union's policy banning ICE vehicles by 2035, represented in the model as a rapid phasing out of ICE and PHEVs by 2035[2]. In both scenarios, a consistent linear green steel procurement is implemented, in line with SteelZero's recommendation: adoption of 50% low emissions steel by 2030, and 100% net-zero steel by 2050[3].

Figure 1 indicates that if Geely Automobile pursues Scenario 1, the 2025 emissions reduction target cannot be achieved until 2035 (a decade behind its target of 2025), as the carbon intensity is expected to remain higher than 30 tCO$_2$e per vehicle in 2025, which is 58% behind the expected emissions reduction trajectory.

Figure 1 - Auto Volumes and Carbon Intensity by Scenario



Source: Transition Asia

[2] We have assumed that sales volumes equal to production volumes in the analysis over the period studied. The unit cost of a vehicle is predicted based on the International Energy Agency (IEA) and Oliver Wyman. Carbon intensity data for the carbon footprint per vehicle lifetime is referred to the Chinese Auto industry data.

[3] "Building Demand for NET Zero Steel." Climate Group, www.theclimategroup.org/steelzero. Accessed 14 Aug. 2023.

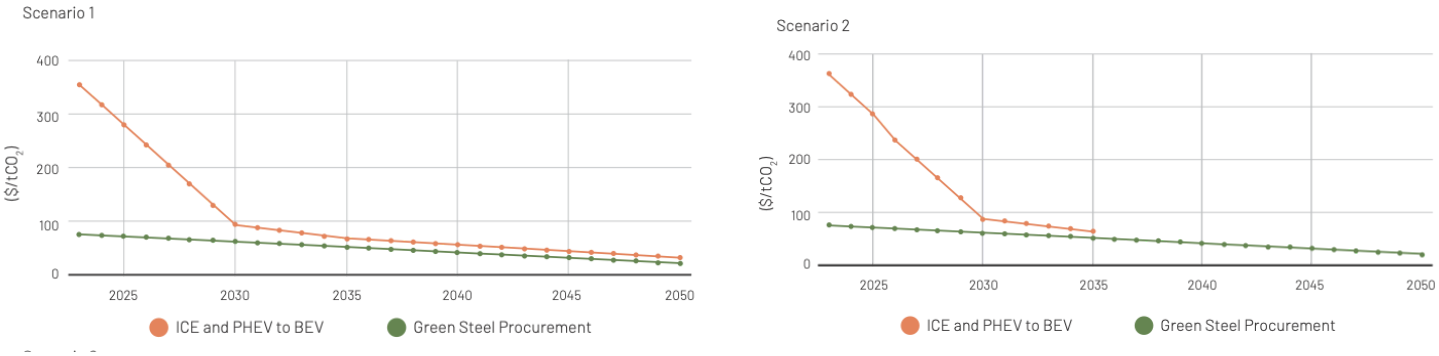
In contrast, Scenario 2 yields significant emissions reduction but requires a swifter and radical transformation. To meet the 2025 target, Geely Automobile has to cease all PHEV production and cut ICE vehicles production in half by 2025. Moreover, BEV production needs to increase by 236% from its 2022 level by 2025, with green steel consumption reaching 20%. Following this rapid decrease in ICE and PHEV production, a slightly slower, albeit still aggressive, phase out of ICE vehicles and PHEVs will result in zero production in 2035. Subsequently, large quantities of BEVs are produced, accounting for the majority of vehicle production in 2025 and all vehicles produced by 2035.

It is crucial to note that traditional auto companies, including Geely Automobile, cannot avoid substantial costs when shifting to BEV. The cost difference between ICE vehicles and BEVs is expected to remain high before 2030, with BEVs ranging from 9% to 45% more than ICE vehicles[4].

Cost implications

Transition Asia examined the effect of green steel procurement on Geely Automobile's **unit decarbonisation cost** by comparing the unit decarbonisation cost of the following two options: exclusively shifting ICE and PHEV to BEV, and solely implementing green steel procurement. In our analysis, the decarbonisation cost of each option is divided by its corresponding carbon reduction. This methodology evaluates the cost-effectiveness of the green steel transition, without relying on uncertain variables like sales volume, production units, or the proportion of green steel supply. This approach allows for a fair and accurate assessment of the economic implications with adopting green steel in regards to the carbon emissions reduction.

Figure 2 - Unit decarbonisation cost



Source: Transition Asia

In both scenarios, the unit decarbonisation cost of green steel procurement is lower than that of shifting to BEVs, and this cost differential is anticipated to diminish over time. According to

[4]IEA (2022), World Energy Outlook 2022, IEA, Paris https://www.iea.org/reports/world-energy-outlook-2022, License: CC BY 4.0 (report); CC BY NC SA 4.0 (Annex A)

Transition Asia's prior research on GSPs, the China-specific unit decarbonisation cost ($/tCO2) of scrap-EAF and green hydrogen DRI-EAF stands at approximately $75 and $89 respectively, while the unit decarbonisation cost of shifting to BEV is above $350. **Prior to 2030, the unit decarbonisation cost of green steel procurement is projected to be at least 50% lower than shifting production from ICE and PHEVs to BEVs**.

Post-2030, assuming ICE vehicles gradually phase out from most of Geely Automobile's markets, **the carbon reduction impact of shifting from ICE to BEVs will reach its maximum potential.** This is especially relevant under Scenario 2, where ICE is expected to be phased out in 2035, so competitiveness of shifting to BEV production for emissions reduction wanes. Simultaneously, with the decline of the GSP year-over-year, its carbon reduction effect and cost efficiency will become more pronounced.

Our proposal: Green steel procurement subsidies for automakers in China

There is currently no government subsidy focused on green steel for the auto industry whereas subsidies for BEVs and other NEVs have existed for many years. State subsidies within the steel sector have predominantly favoured Blast Furnace-Basic Oxygen Furnace (BF-BOF) steel production, concentrating on energy and raw materials like coking coal. Transition Asia advocates for a recalibration of state steel subsidies, transitioning from fossil fuels to both the supply and demand aspects of green steel. This transition is projected to yield an average reduction of 1.9 tons of CO_2 per vehicle.

For the procurement of green steel produced via scrap steel+EAF or H2-DRI-EAF where energy and hydrogen are produced via renewable energy, government subsidies would be relatively low, estimated at around **$126 per vehicle by 2025 and $88 per vehicle towards 2035**. **By 2050, due to the declining price of green steel, the average green steel subsidy has been reduced to an inconsequential $50 per vehicle.**

By channelling subsidies towards decarbonising the auto sector, China can not only maintain its strong position in manufacturing and innovation but also position itself as a leader in sustainable technologies related to steel. This multi-faceted approach showcases China's commitment to tackling the urgent challenges of climate change while simultaneously bolstering its economic resilience and influence on the global stage. Subsidies for the Chinese auto sector represent a golden opportunity to harmonise environmental stewardship, economic advancement and strategic leadership.

Lauren Huleatt, Transition Asia's Program Manager and Investor Lead comments, " Government subsidies for green steel can drive systemic decarbonisation throughout one of the most polluting industries in the world, by affecting entire supply chains that rely on steel. The ongoing reduction in renewable energy and green hydrogen prices further solidifies the sustainable economic benefits of incentivising corporations to opt for green steel procurement."

-ENDS-

Notes to Editor

1. All currency indicated above is in USD.
2. Green steel in this report is defined as steel produced from either Electric Arc Furnace(EAF) that is charged with 100% scrap (Scrap-EAF) and powered by as much renewable energy as possible, or using H2-Direct Reduced Iron (DRI)-EAF where the scrap in the EAF can be supplemented by DRI, a production process where green hydrogen replaces fossil fuels to make iron.
3. Special terms used in the model:
    a. **Scenario 1**: A smooth decarbonisation scenario in which Geely Automobile gradually shifts all its production from internal combustion engine (ICE) vehicles and plug-in hybrid electric vehicles (PHEVs) to battery electric vehicles (BEVs) by 2050 in a linear fashion, together with green steel procurement growth aligned to SteelZero's suggestion.
    b. **Scenario 2**: An aggressive decarbonisation scenario where Geely Automobile aims to align with its 2025 target and the European Union's policy banning ICE vehicles by 2035, reflected in our model as a rapid phase out of ICE and PHEVs by 2035, together with green steel procurement growth aligned to SteelZero's suggestion.

About Transition Asia

Founded in 2021, Transition Asia is a Hong Kong-based non-profit think tank that focuses on driving 1.5°C-aligned corporate climate action in East Asia through in-depth sectoral and policy analysis, investor insights, and strategic engagement. Transition Asia works with corporate, finance, and policy stakeholders across the globe to achieve transformative change for a net-zero, resilient future. Visit transitionasia.org to learn more.

Media Contact

Monica Wong: monica@transitionasia.org
Lauren Huleatt : lauren@transitionasia.org