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Automotive-Steel and Aluminum Green Supply Chain Collaborative Carbon Reduction Research and Evaluation Report

Institute of Public & Environmental Affairs (IPE)

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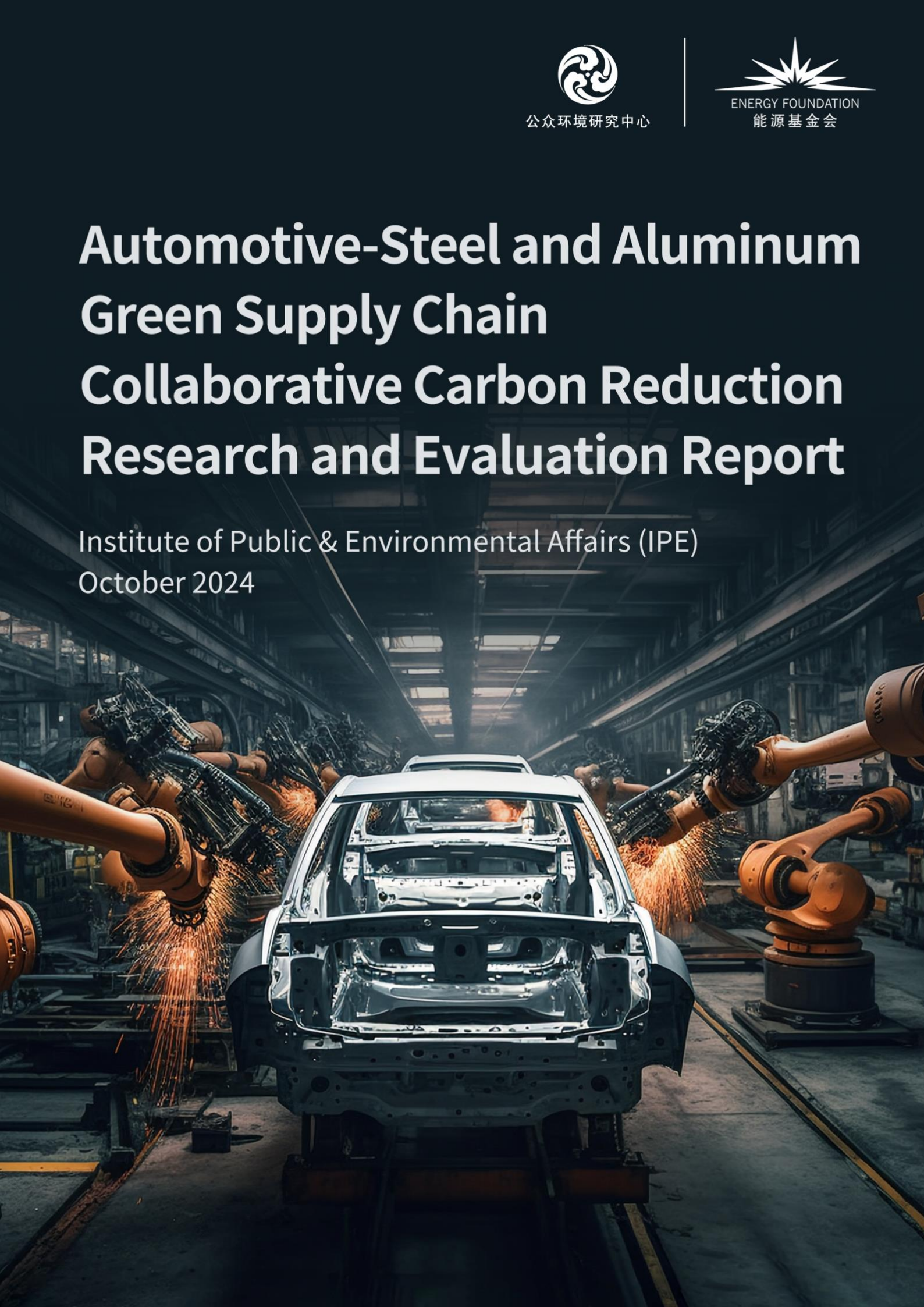

Executive Summary

In 2023, the global automobile production and sales reached as high as 92.72 million units[1], with China's annual automobile production and sales surpassing 30 million units for the first time, ranking first in the world[2]. The automotive industry's 'contribution' to greenhouse gas emissions is also significant. Globally, the transportation industry accounts for about 16% of global greenhouse gas emissions[3], with the processing and manufacturing of raw materials such as steel and aluminum being the emission hotspots and major contributors to China's industrial carbon emissions. The automotive industry urgently needs to innovate and explore pathways for collaborative carbon reduction measures with their suppliers, to incentivize and accelerate the innovation and application of low-carbon green technologies, and to drive the low-carbon transition of steel and aluminum enterprises.

In view of this, with the support of the Energy Foundation, IPE has conducted research on the 'Collaborative Decarbonization of Automotive, Steel, and Aluminum Green Supply Chains,' with a focus on motivating the automotive industry to set and disclose supply chain carbon reduction targets, implement low-carbon procurement requirements, and lead and incentivize hard-to-abate industries such as steel and aluminum smelting to accelerate the production and supply of low-carbon products, thereby assisting the automotive industry's decarbonization process, supporting China's 'dual carbon' goals, and contributing to climate change mitigation.

To evaluate the progress of collaborative carbon reduction in the automotive industry, particularly the challenges and best practices in reducing emissions in the production of raw materials such as steel and aluminum, IPE developed the Automotive Industry Climate Action CATI Index based on previous research conducted by fellow institutions. Using the latest data on automotive product carbon footprints, the index quantitatively evaluates the climate action and low carbon transition of 51

[1] https://www.oica.net/category/sales-statistics/

[2] http://finance.people.com.cn/n1/2024/0119/c1004-40162571.html

[3] Our World in Data. Sector by sector: where do global greenhouse gas emissions come from? [EB/OL]. [2024-05-10]. https://ourworldindata.org/ghg-emissions-by-sector.

companies across five dimensions: governance mechanisms, measurement and disclosure, carbon target setting, carbon target performance, and emission reduction actions.

The evaluation shows that Chinese car companies are transitioning to new energy on a larger scale. Six of them, including NIO, Leapmotor, Xpeng, and Li Auto, have achieved 100% sales of new energy vehicles. Six others have their new energy vehicle sales exceeding 20% in 2023. With the advancement of global energy transition, the carbon emissions of electric vehicles during their usage phase will continue to decrease. Thus, Chinese car companies are expected to play a greater role in assisting the decarbonization of transportation in China and globally.

On the other hand, the emissions from raw materials in the production process is relatively high regardless of fuel or electric vehicle; and the higher the vehicle class[4], the higher the vehicle carbon footprint. This is mainly due to the higher carbon emissions associated with materials such as steel and aluminum in higher-class vehicles. With the advancement of energy transition, the proportion of carbon emissions in the production process of automobiles and raw materials will continue to increase. This requires traditional and new energy car companies to pay more attention to low-carbon manufacturing, focusing on reducing carbon emissions in the production of raw materials such as steel and aluminum smelting.

The evaluation also shows that new energy car companies score lower than traditional car companies in areas such as supply chain carbon emission calculation disclosure and target setting. Automakers headquartered in Europe, North America, Japan, and South Korea had an earlier start in setting Scope 3 carbon neutrality targets and emission reduction targets for raw materials such as steel and aluminum. However, with the advancement of the 'dual carbon' goals, Chinese automakers such as Geely Auto have begun researching the product carbon footprint of supply chain raw materials. Geely, Changan, and others have started setting emission reduction targets for the supply chain, while Li Auto, Xpeng, NIO, Seres, Chery, and BAIC Group have begun disclosing emission reduction pilots for steel and aluminum.

[4] The vehicle classes from low to high are: microcar, subcompact car, compact car, midsize car, upper midsize car, and full-size car

In recent years, IPE has been collaborating with the China City Greenhouse Gas Working Group to build the China Products Carbon Footprint Factors Database (CPCD) and the Product Carbon Footprint Disclosure and Catalogue (PCFD). Since 2023, through collaboration with the China Automotive Carbon Digital Technology Center Co.,Ltd. (CPP), IPE has conducted quantitative analyses of the carbon footprint of various mainstream automotive models and the proportion of carbon emissions from material production in automotive manufactured by 40 new energy and traditional car companies.

In this evaluation, IPE conducted research and interviews with car companies, auto parts manufacturers, steel companies, and other upstream enterprises in the industry chain to understand the obstacles and challenges faced by car companies in procuring low-carbon materials. These include: the automotive companies' procurement of low-carbon materials remains in the pilot stage, while there is a lack of clear emission reduction targets and performance evaluation mechanisms for steel and aluminum. It is difficult to obtain actual data from suppliers, and some emission factors are not representative, making it challenging to accurately grasp the Scope 3 supply chain emissions status and reduction progress. The emission reduction path for Scope 3, especially for the upstream material supply chain is also unclear. The green premium for using low-carbon technologies and recycled resources in the production of upstream raw materials like steel and aluminum in the automotive industry remains high.

These challenges are closely related to a series of external obstacles. Firstly, the mainstream ESG ratings have yet to effectively evaluate the low-carbon procurement performance of automotive supply chains, resulting in a lack of motivation for car companies. Secondly, there is no consensus on the definitions of 'low carbon emission steel/green steel' and 'low carbon emission aluminum/green aluminum,' making it more difficult for car companies to choose low-carbon materials. The recycling mechanism for scrap steel and aluminum is not yet optimal, and recycled aluminum alloy materials can only be downgraded for use. Lastly, the consumers' willingness to pay a green premium for green low-carbon products is also significantly lacking.

In spite of this, IPE also identifies significant opportunities for collaborative carbon reduction in the automotive industry. In recent years, China’ s Ministry of Ecology and

Environment, the Ministry of Industry and Information Technology, the National Development and Reform Commission, and other ministries have issued policies to guide the steel and aluminum smelting industries in implementing energy-saving and emission reduction measures, and actively promote their inclusion into China's carbon market. At the same time, the large-scale expansion of China's renewable energy installations provides an important foundation for decarbonization. Data-based solutions and internet technology enables automotive and steel-aluminum companies to enhance their carbon management capabilities and assist the public in monitoring the implementation of corporate climate goals.

Meanwhile, China is actively formulating corporate carbon accounting and disclosure standards, and accelerating the development of product carbon footprint accounting methodologies and LCA factor databases. The carbon footprints of various mainstream vehicle models and the carbon emission data of key materials used in this evaluation are sourced from the China Automotive Carbon Digital Technology Center Co.,Ltd. (CPP), the China Steel Industry EPD Platform, China Nonferrous Metals Industry EPD Platform, and publicly disclosed carbon footprints by enterprises, as well as CPCD and PCFD.

Based on the evaluation results, IPE recommends Chinese and foreign car companies to accurately assess the global low-carbon development trend of the automotive industry, leverage their leading influence, and set quantifiable green procurement requirements for suppliers, including those of steel and aluminum. In particular, new energy car companies should balance 'manufacturing green' with 'green manufacturing,' thereby playing a greater role in climate action for China and globally. IPE also suggests car companies to improve the accuracy of Scope 3 and product carbon footprint data accounting, scientifically set greenhouse gas emission reduction and neutrality targets, and break them down into raw material manufacturing stages such as steel and aluminum. This will encourage core material suppliers to independently set emission reduction targets, accelerate the use of renewable energy, and apply energy-saving and low-carbon metallurgical technologies. Car companies should also participate in improving the recycling mechanism and expanding the use of recycled materials, and ensure information disclosure and environmental statements so as to assist investors in assessing the

progress and potential of a company's low carbon transition, while guiding consumers in making green choices.

IPE also suggests stakeholders to work together to build an accountability mechanism. This includes government authorities improving the carbon accounting standards for key industries such as steel and aluminum, and incorporating them into the carbon market as soon as possible. The government should also establish and gradually improve the product carbon footprint management system of the automotive industry chain, and accelerate the construction of a local product lifecycle emission factor database in China. A product labeling certification system for low carbon automobiles, low carbon emission steel, and aluminum should also be established so as to empower financial institutions to implement transition finance, while guiding the public to pay attention to the climate impact of the entire lifecycle of automobiles and choose low carbon automobile products. This will incentivize car companies to accelerate their low carbon transition, thereby driving deep decarbonization in upstream hard-to-abate industries and promoting the low carbon transition of the entire industry chain.

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About IPE

The Institute of Public & Environmental Affairs (IPE) is a non-profit environmental organization based in Beijing, China. Since its establishment in 2006, IPE has developed and operated the Blue Map Database (wwwen.ipe.org.cn), and launched the Blue Map app in 2014, promoting environmental information disclosure, facilitating green supply chain and green finance, empowering the green transition and growth of enterprises, and boosting multi-stakeholder participation in environmental governance.

About Energy Foundation

Energy Foundation is a professional grantmaking charitable organization registered in California, U.S. It has been working in China since 1999, and is dedicated to China's sustainable energy development.

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