

# THE RESEARCH OF THE INTERNATIONALIZATION PATH OF CHINA'S NEW ENERGY VEHICLE INDUSTRY

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**Abstract:** With the strengthening of international environmental and climate governance treaties, China is expected to bear more responsibilities in emissions reduction as a populous country. The new energy vehicle (NEV) industry represents a sustainable future and embodies China's commitment to low-carbon responsibilities. As a strategic sector of the national economy, the industry produces numerous mature brands venturing overseas. In 2022, the Chinese brand BYD surpassed Tesla to become the global leader in sales. How did China's new energy vehicle (NEV) industry achieve internationalization? And how did BYD stand out among them? The study takes China's new energy vehicles (NEVs) as the research object to explore the internationalization path, through quantitative analysis of changes in trade data from an industry perspective and qualitative analysis of BYD's successful internationalization strategies from the enterprise perspective. The study discovers the significant role played by Belt and Road countries in this process, has a deeper understanding of the industry's internationalization process through BYD strategy, and provides valuable insights for the subsequent development of high-end green industries.

**Keywords:** New energy vehicles, BYD, low-carbon, high-end industry, going global, green driven

## 1. Introduction

With the background of global concerns about climate change and declining sales of fuel vehicles, the demand for new energy vehicles (NEVs) is expected to grow rapidly, since 2000, China has tried to address high emissions allegations and fostered the growth of the auto industry through strategic initiatives focusing on NEVs. Now, the remarkable sales performance of BYD in recent years is proving that China has become a dominant force in the NEV industry. This prompts crucial questions: How has China disrupted the long-standing monopoly of the overseas auto market and what shifts have occurred in trade dynamics as a result?

This study will answer these two questions by examining industry export trade data and analyzing the successful case of BYD. This study aims to gain a deeper understanding of the internationalization path of China's NEV industry and provide valuable insights for the internationalization of other high-end green industries.

## 2. Literature review

Nowadays, scholars' discussions on China's new energy vehicle industry mainly focus on three aspects.

Regarding policy evolution research, the failure of the traditional automobile "market for technology" strategy has prompted the Chinese government to shift its support toward the NEV industry. Scholars generally assert that this shift is reflected in the sequence of industrial strategic initiatives, including the 863 major special plans, the "ten cities and thousands of vehicles" promotion projects, China's seven strategic emerging industries cultivation planning, the automobile subsidy pilot work, and most recently, the "Opinions on promoting the green development of the Belt and Road" (Kendall, 2018).

Other scholars have focused on examining the impact of policy evolution on the production and marketing of NEVs. For instance, Rao, Y.B. (2023) investigates the differential impact of the "double integral policy" on both the quantity and quality of patent innovation within the NEV industry. Meanwhile, Xiong, Y.Q. (2022) explores the effects of subsidies on the production and consumption links of NEV enterprises, taking into account the political relevance of these enterprises. Additionally, Panyagometh, A. (2023) provides empirical evidence for policy support in the NEV industry based on signaling theory.

There is limited research on the export trade of NEVs. Most scholars prefer to classify NEVs as high-tech products (Zhao, Qing, et al., 2023) or green products (Hu, Feng et al., 2021) to explore China's position and strategy in the trade network. However, it is evident that the export trends and strategies of NEVs are garnering considerable attention in international trade.,

Generally, NEVs are regarded as products of significant strategic importance at present, but most scholars focus on discussing policy aspects and adopt a macro perspective to research export trade. So, there is limited research on the internationalization paths specific to the industry. Based on the literature review, this study aims to fill this research gap by exploring the internationalization paths of China's NEV industry, offering a new perspective and research content for a comprehensive understanding of the industry.

### 3. Research Methodology

#### Research framework

Based on the research gaps mentioned in the previous literature review, this study adopts a mixed research method combining qualitative and quantitative analysis, i.e., industry trade data and enterprise cases are used to answer the question of how trade dynamics change and how the industry breaks the monopoly of the automotive industry in developed countries.

#### Quantitative analysis from an industry perspective

This study will explore the internationalization process of China's NEVs through industry trade data analysis. The classification of NEVs by China's Ministry of Industry and Information Technology (MIIT) is used, and the HS code is set to 87 (including eight products such as 8702 and 8703) to obtain trade import and export data from 2018-2022. After excluding extreme and discontinuous values, the study obtained 63,933 data to explore the dynamics of China's export trade of NEVs, focusing on changes in export trade value and export destination.

#### Qualitative analysis from the enterprise perspective

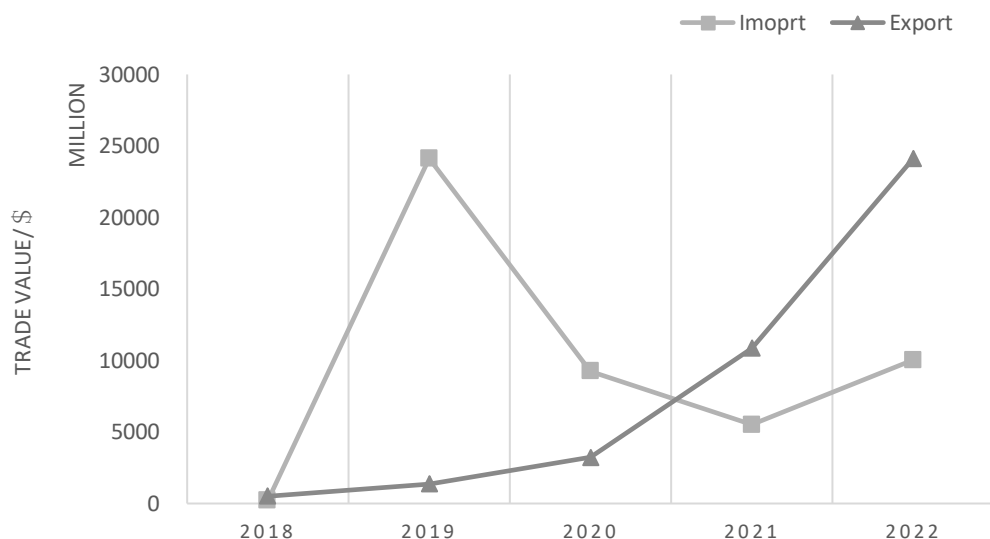
Due to the complexity of the NEV industry, it is challenging to comprehensively cover all related enterprises. Therefore, this study selects BYD which is a leading industry company, as a case study to answer the question of how China's NEVs broke the monopoly of the automotive industry to achieve successful internationalization

### 4. Quantitative analysis of China's NEVs Industry Trade change

In this section, this study provides an in-depth analysis of trade dynamics based on the 63,933-trade data processed in the previous section, focusing on the changes in the value of China's export trade and export destinations of new NEVs, to provide a more intuitive understanding of the internationalization paths of China's NEVs.

#### Changes in the value of export trade

China's NEVs have experienced a change from deficit to surplus in 2018-2022, along with the shrinking import market, export trade value, and ranking changes highlighting that China's NEVs are becoming a powerful country in the industry.



**Figure 1. Changes in the value of China's import and export of NEVs**

As shown in Figure 1, the value of China's import trade continued to decline from 2019 to 2021 and was lower than the value of export trade for the first time in 2021. Between 2019 and 2020, imports decreased sharply, and this change is related to the COVID-19 pandemic on global NEV production, chip shortages, and supply chain disruptions. With the epidemic gradually brought under control in 2022, the value of import trade has increased slightly, but it is still lower than the value of export trade. This change is related to the improvement of China's NEV technology reserves and the increasingly perfect industrial chain layout. According to CPCA1 statistics, China's NEVs in the Chinese mainland market sales penetration rate increased year by year. In addition, in 2020, the industry giant Tesla achieved mass production in Shanghai and exported to overseas markets such as Europe and Australia, which has also had a huge impact on the scale of China's imports and exports.

**Table 1 Five countries (regions) with the highest import value of NEVs in the world from 2018 to 2022**

Rank	2018	2019	2020	2021	2022
1	USA	USA	USA	USA	Germany
2	Belgium	Belgium	Germany	Germany	United Kingdom
3	Norway	China	Belgium	United Kingdom	USA
4	United Kingdom	Norway	China	Norway	Norway
5	China	Netherlands	United Kingdom	Belgium	Belgium

Note: Data collated from Un Comtrade database. Due to space constraints, only the top five are shown.

As Table 2 shows, China has dropped out of the top five global NEV import values after 2020, but this does not mean that China's NEV market has shrunk, on the contrary, from 2018 to 2022, China's NEV export value ranking continued to rise (Figure 2), and successfully surpassed Japan in 2022, second only to Germany.

<sup>1</sup> The Automotive Market Research Branch under the China Circulation Association.

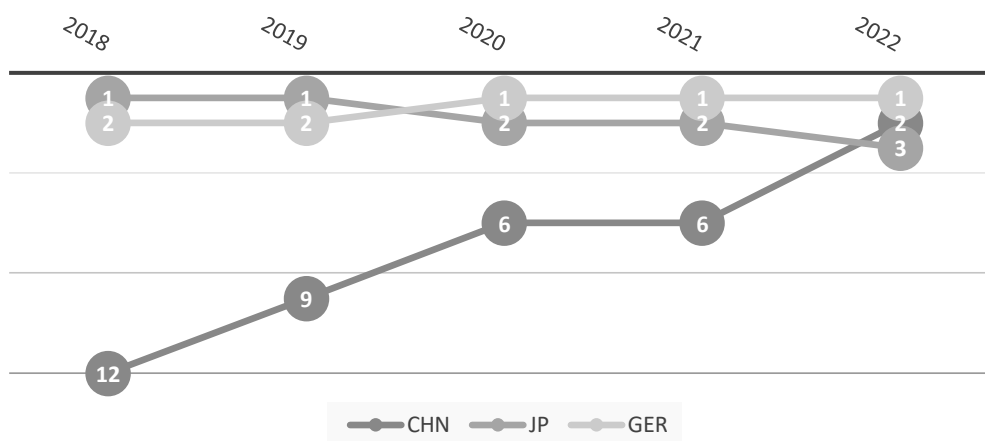


Figure 2. Changes in export value rankings of China, Japan, and Germany from 2018 to 2022

Note: Data collated from Un Comtrade database.

This substitution effect has had an important impact on a global scale. Technically, it has promoted industrial upgrading at home and abroad, strongly supported China's "dual carbon" goal by 2030, and promoted the evolution of the global NEV industry and global green transformation. Politically and economically, it has aroused the international community's attention to China's green rise, and gradually dispelled the outside world's doubts about China's "black export" or "neocolonialism". But at the same time, it has also inspired some countries to worry about China's competitiveness in the global high-end industry, and relevant industrial technology embargoes and prohibited procurement policies are frequent. The US market, which has topped the import list in Table 2 for four consecutive years, has set tariff limits of up to 27.5% on Chinese NEVs.

**Changes in export destinations: The Belt and Road region has become an important export destination**

From 2018 to 2022, China's NEV exports have significantly changed, and the "Belt and Road" countries have changed their previous unknown status and become a strong incremental market for China's NEV exports.

Table 2 Top 10 countries with the highest export value of NEVs from China in 2018-2022

Rank	2018	2019	2020	2021	2022
1	USA	Netherlands	Belgium	Belgium	Belgium
2	Bangladesh	United Kingdom	United Kingdom	United Kingdom	United Kingdom
3	Chile	Bangladesh	Netherlands	Germany	Spain
4	Belgium	Chile	Germany	Slovenia	Slovenia
5	Netherlands	Sweden	Germany	Germany	Australia
6	Korea	Brazil	Sweden	Australia	Israel
7	Japan	Germany	Colombia	France	Germany
8	India	Germany	USA	Israel	United Arab Emirates
9	Germany	France	Chile	Qatar	France
10	Brazil	Thailand	Korea	Thailand	Thailand

Note: Compiled from Un Comtrade database.

As shown in Table 3, China's NEV exports are getting rid of their dependence on European and American markets after 2019, and "Belt and Road" countries such as Bangladesh in South Asia, Slovenia in non-traditional

developed European countries, the United Arab Emirates in the Middle East, Qatar, and Thailand in ASEAN countries have become key export destinations with significant diversification characteristics.

Since these countries are regional, and the regions have different natural and economic conditions, this study will focus on the following "Belt and Road" different geographical regions, to reveal the characteristics and development trends of NEV trade between China and these regions.

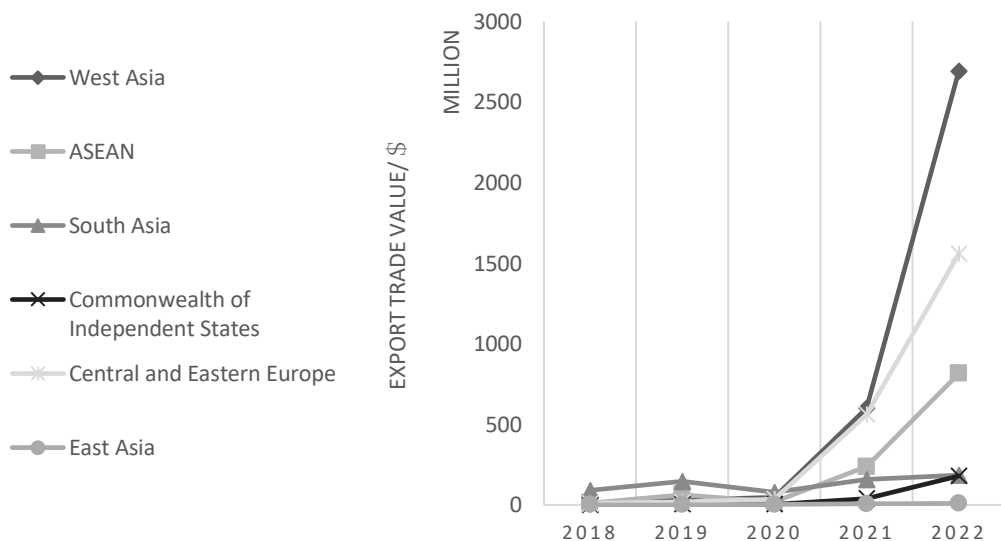


Figure 3. Changes in the value of China's export trade to countries along the Belt and Road from 2018 to 2022

Note: Compiled from Un Comtrade database

As shown in Figure 3, from 2018 to 2020, the export value of China's NEVs to "One Belt and One Road" countries is low and relatively stable and only shows a small decline in 2020 due to the impact of the epidemic. The upward trend is obvious, and the changes in West Asia, Central and Eastern Europe, and ASEAN regions are larger, especially from 2021 to 2022, showing a steep increase. To more clearly show the long-term changes in the trade pattern, this paper produced Figure 4: Pie chart of the value share of China's export trade of NEVs to "Belt and Road" countries in 2018 /2022.

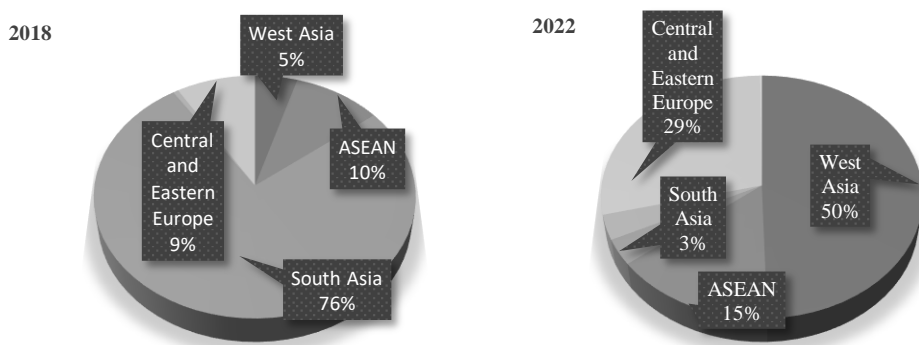


Figure 4. Percentage of export value of NEVs from China to "One Belt and One Road" countries in 2018/2022

Note: Compiled from Un Comtrade database

As shown in Figure 4, regions such as West Asia have captured 75% of the market share that South Asia held in 2018. By 2022, South Asia's share has dwindled to just 3%, while in contrast, West Asia's share has surged from 5% in 2018 to 48% in 2022. Central and Eastern Europe as well as ASEAN (Association of Southeast Asian Nations) have also seen increases of 20% and 4% respectively. In the following sections, the study will delve into the specific reasons for these geographical shifts.

**South Asian** countries were once important collaborative regions for China in the export trade of NEVs. According to the findings of the study, Bangladesh and Pakistan imported a significant number of used NEVs from China around 2019, as reflected in Table 3. However, in the long-term perspective, factors such as lower purchasing power among the population, weak industrial infrastructure, and the difficulty in forming a complete supply chain have prevented South Asia from maintaining a high share of China's NEV export trade value. Another South Asian country with a relatively well-established high-tech market foundation, has imposed tariffs as high as 60% on imported NEVs to protect its nascent domestic industry in recent years.

The expansion of market share in the **West Asian** region has been the most significant. In Table 3, countries such as the UAE, Israel, and Qatar have consistently ranked among the top 10 in terms of trade value. This can be attributed to the following reasons:

- a) High Per Capita GDP: the region surpasses that of South Asian countries by 20 to 33 times.
- b) Strong demand for economic transformation to break away from traditional energy dependence under a low-carbon backdrop. For instance, China has cooperated with countries like Qatar and Saudi Arabia to promote electrification of public transportation, leveraging opportunities such as the Green World Cup and the Import Expo.
- c) Abundant Renewable Energy Resources: The Arab region is one of the best-endowed areas globally with solar and wind energy resources, offering ideal conditions for the development of new energy sources. Under the support of the "Green Belt and Road" Initiative, Chinese enterprises have been deeply involved in their active development of clean and renewable energy.
- d) Strong Technological Reserves and Market Acceptance: Through YOZMA, Israel has reached out to technology markets effectively. The UAE's leading NEV manufacturers have Chinese component factories.

Part of countries in **Central and Eastern Europe** have inherited the automotive industry base from the Soviet era, and the China-Europe Railway Express has broken the monopoly of maritime transportation for automobiles. According to Figure 4, China's export trade value to Central and Eastern European countries has increased by \$1,548.41 million, with market share soaring from 8% to 28%, showing significant growth.

Favorable policies in the **ASEAN** region and the **Commonwealth of Independent States (CIS)**, such as tariff reductions and trade liberalization, have provided an impetus for Chinese enterprises to actively adapt to local green development processes and promote the localization of operations for NEVs. Particularly in the ASEAN region, a globally radiating production system for NEVs has been achieved.

Developing countries such as the Belt and Road are becoming key destinations in China's NEV exports. In summary, there are several reasons for this.

**Table 3 The reasons of Belt and Road countries are becoming new export destinations**

Government Policy Support	The "Green Belt and Road" Initiative has spurred long-term cooperation in green projects and energy infrastructure development, spanning various sectors including transportation and hydropower. These cooperations inject strong momentum and market support into China's export of NEVs.
Market Growth Potential	Despite being developing countries, these nations possess relatively sound economic foundations, some of them even endowed with significant green resources.

	<p>These countries' automotive industry infrastructure is relatively weak, and the capacity for traditional fuel vehicles is limited, posing no obstacles to NEV market transformation.</p> <p>Other countries' NEV series have yet to dominate here.</p>
Market Preparation of Enterprise	<p>Chinese NEV enterprise aligns its corporate strategies with the "Green Belt and Road" Initiative, successfully expanding its market through localized strategies such as deep technical cooperation and implementation of green supply chains.</p> <p>Investments from local institutions enhance the stability of overseas operations. Such as NIO's strategic investment from Abu Dhabi.</p>

### 5. Qualitative analysis of China's enterprise Internationalization case

In the previous section, this study analyzed the changes in export destinations and trade value of Chinese NEVs. In the following section, the study will explore the export strategies of Chinese NEV enterprises through qualitative analysis.

**Table 4 Partial Gross Profit Margins of Selected NEV Brands**

Brand	Tesla	BYD	NIO	LI	Xpeng
Gross Profit Margin per Vehicle	27.9%	17.39%	17.42%	21.81%	9.73%

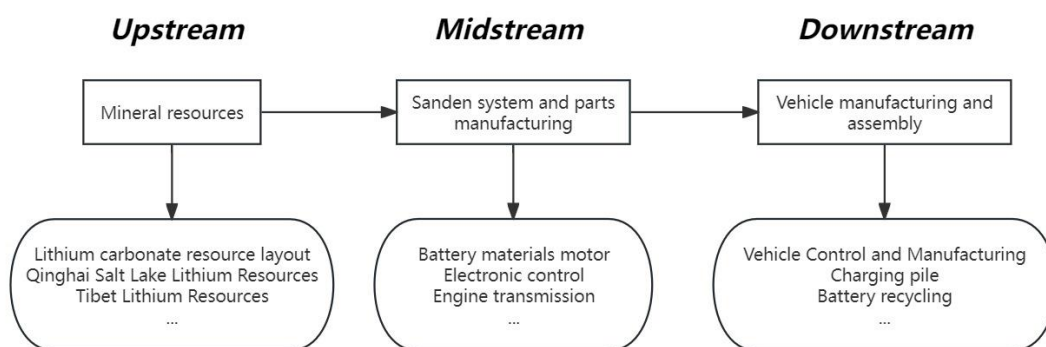
Note: Financial Reports of Various Automotive Brands in 2022

With the increasing number of mature Chinese NEV brands, Tesla took the lead in initiating a price war. Although domestic brands have lower profit margins and less room for price reductions (as shown in Table 4), BYD successfully responded to the bidding model. By 2022, BYD's cumulative exports had grown by 307.2% year-on-year, surpassing Tesla to become the world's top-selling brand of NEVs. So how did BYD succeed in internationalization?

#### BYD's Three Core Strategic Advantage

##### Mastery of Core Technologies, Autonomous and Controllable Supply Chain

BYD has been deeply involved in the field of NEVs for 17 years, developing and manufacturing independently, and has become the enterprise that simultaneously masters core technologies and product components of the entire industry chain, including batteries, motors, electronic controls, and chips.



**Figure 5. BYD's NEV Industry Chain Ecosystem**

As shown in Figure 5, from upstream stable lithium mining resources to midstream core technology advantages and high-level manufacturing, and then to downstream vehicle development and strong production capacity

support, BYD has constructed a stable and reliable industrial chain ecosystem with significant synergies. This vertically integrated full-industry chain supply has also helped BYD successfully navigate the pressures of the global automotive shipping market in 2022, accelerating its overseas expansion process.

### Green Transportation Strategy: Government-Enterprise Consistency

BYD deeply participates in China's automotive industry transformation and low-carbon strategies. Its green transportation strategy aligns with China's urban traffic electrification transformation, providing a strong impetus for the rise of China's NEV industry. This government-enterprise consistency makes BYD a positive example of China's industrial rise. In contrast, European traditional fuel vehicle enterprises have shown poor coordination with EU emissions standards such as Euro 7, which hampers their competitiveness in the NEV market.

### Establishment of a Green Operation Ecosystem: Avoid high carbon charges

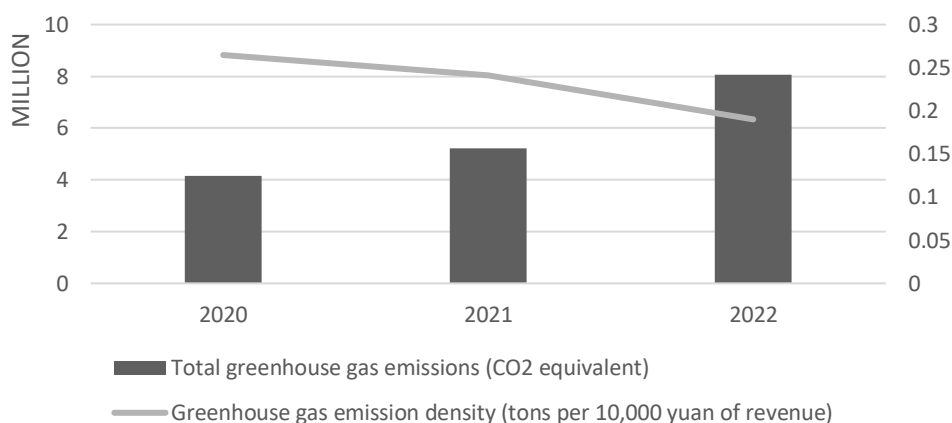


Figure 6. Changes in BYD's Total Greenhouse Gas Emissions and Density from 2020 to 2022

Note: Data from BYD's 2022 ESG annual report

As an active responder to China's "dual carbon" goals and global green transformation, BYD continuously promotes industry energy conservation. For example, BYD has established a carbon emissions management system, regularly hires third-party auditors for evaluation and testing, and has built "zero-carbon industry" parks. By implementing the "Three Transformations Theory" - electrification of energy, digitalization of electricity, and intelligent digitization - BYD has achieved the goal of comprehensive green operations. The strict green operation ecosystem has enabled BYD to continuously reduce greenhouse gas emissions density for three consecutive years despite the increase in emission intensity due to capacity expansion (Figure 6).

### BYD's Internationalization Strategy

#### Large Before Small: Exporting Complete Vehicles to Developed Countries

Due to the close correlation between the scale of the NEV market and factors such as government support for green and low-carbon policies, the level of green economic development, and accompanying measures, BYD has chosen the strategy of "Large Before Small" to enter markets with relatively mature preparations in developed countries. This strategy involves first promoting large-scale vehicles, such as new energy buses and taxis, before promoting small-sized new energy passenger vehicles. For instance, after BYD's K9 buses obtained the top standard certification of WVTA (Whole Vehicle Type Approval) in the European Union, BYD gained unrestricted freedom of sales in the EU market. Additionally, in Norway, BYD also demonstrated the practicality of NEVs in low-temperature regions through "pure electric buses" which helped build a positive reputation for passenger vehicles like the Tang EV. This strategic approach has enabled BYD to achieve significant breakthroughs in global sales and market share.



## Building Supply Chains in Developing Countries

In developing countries, BYD chooses to expand the market for NEVs, catering to the urgent industrial upgrading needs of these countries due to the lack of high-end manufacturing industries. Currently, BYD has invested in or jointly established multiple factories in countries such as Thailand, Vietnam, and Brazil, and has hired a large number of local employees. According to BYD's ESG report, by the end of 2022, the proportion of local employees in BYD's overseas bases reached 92.5%. This strategy not only improves delivery efficiency but also radiates to multiple regions through these countries with advantageous geographical locations and trade agreements with developed countries.

The strategy has created opportunities to increase employment and build high-end industrial chains, made technology sharing and talent cultivation to contribute to the upgrading of local industries, and promoted the adoption of renewable energy in developing countries to support global sustainable development.

## Challenges of BYD and other enterprises' internationalization

Despite the significant achievements made by BYD, the Chinese NEV industry still faces challenges such as the lack of industry discourse power. The industry still encounters hurdles.

From internal to external, the Cost Advantage is Difficult to Sustain Overseas: The internal market with intense competition leading to vicious competition in single-vehicle gross profit margins. More and more enterprises are venturing abroad, making external competition inevitable. The "price-for-market" model relying on domestic cost advantages is challenging to replicate successfully overseas.

Excess Capacity under International Risks: Intensified inflation, frequent geopolitical conflicts, and other international fluctuations have significantly increased the risks associated with exchange rates and receivables. Chinese enterprises need to exercise caution in expanding production capacity counter-cyclically.

Carbon Tariff Barriers and Increasing Frequency and Scale of Hidden Carbon Costs: Currently, some developed countries are actively establishing new green competitive barriers with low carbon as the core. This includes targeted punitive tariffs and carbon footprint reviews. Chinese enterprises need to quickly enhance relevant technologies to cope with more frequent industry scrutiny.

ESG Compliance Faces Continuous Challenges: Currently, most Chinese NEV enterprises have not implemented ESG governance systems that are aligned with international standards. Chinese enterprises are exposed to significant shortcomings in community relations, privacy security, and labor management in MSCI ratings. Despite being the only Chinese enterprise in the industry to receive an MSCI A rating, BYD encounters negative opinions, such as subsidy shortages and privacy breaches.

## 6. Conclusion and Recommendations

### Conclusion

Based on the quantitative analysis of industry trade data and the qualitative analysis of BYD's successful cases, this study concludes that China's NEVs:

China's NEVs have achieved relatively successful internationalization from the industry's perspective, with significant diversification of trade patterns. In addition, the scope of influence of Chinese NEVs has expanded, and export trade to the "Belt and Road" countries (especially in West Asian) has shown a significant upward trend. Under BYD's corporate perspective, China's NEVs rely on the three core advantages of a solid domestic industrial chain, government-enterprise synergies, and green-driven low-carbon operations, and the expansion strategy of "first big and then small" in developed countries, and the establishment of an industrial chain in developing countries to circumvent trade sanctions, which not only realizes internationalization smoothly but also creates a new opportunity for developing countries to realize the "One Belt, One Road" concept of "one country, two systems". It has not only successfully realized internationalization, but also created jobs and increased

economic vitality for developing countries. However, looking at the development of NEV enterprises such as BYD, there are still challenges such as the lack of industry discourse, the escalation of green barriers, and the difficulty of meeting ESG standards.

### Recommendations

As an industry with distinct Chinese characteristics, the NEV sector contributes to China's emission reduction targets and the internationalization of high-end industries. Therefore, the study proposes the following recommendations for the development of China's NEV industry:

#### **Strategic regional collaboration to achieve economies of scale and prevent blind expansion of production capacity.**

The diversified development of China's NEVs relies heavily on regional cooperation and support from the "Belt and Road" initiative. Therefore, balancing national and corporate strategies, enhancing industrial cohesion, and achieving coordinated development is imperative. For instance, further tapping into the market potential of regions with low trade value and enhancing trade maintenance in high-value trade regions. These measures can enhance the complexity of the export trade network, ensuring the stability and security of regional trade cooperation. Additionally, using localized production can bring cost benefits from economies of scale, leading to industrial spillovers. Furthermore, enterprises need to carefully consider the matching of production capacity to avoid blind expansion of capacity.

#### **Enhance green core technologies and achieve carbon neutrality across the entire industry chain.**

The industry chain involves various sectors, and the production and supply of raw materials and components remain high-carbon emission areas. Facing with green barrier, Chinese NEV enterprises need to achieve carbon neutrality across the entire industry chain from an industrial ecological perspective. For example: (1) Increase the proportion of renewable energy sources used. (2) Reduce the carbon footprint of the industry chain through methods such as forest carbon sinks, carbon capture, and storage.

#### **Enhance ESG governance standards to mitigate legal and environmental risks.**

With the introduction of the EU Corporate Sustainability Reporting Directive (CSRD), it can be expected that overseas markets will impose stricter requirements on the ESG governance standards of Chinese NEV enterprises. Therefore, to achieve sustainable development in overseas markets, Chinese enterprises need to establish ESG governance systems that are aligned with international standards and proactively disclose ESG reports. Additionally, when investing or entering into joint ventures overseas, enterprises can proactively develop ESG compliance plans to prevent potential commercial disputes from evolving into international political events.

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