Population, Resources & Environmental Economics (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/pree.2025.060115
ISSN 2616-2253 Vol. 6 Num. 1

Research on the OFDI Pathway of NEV Tech Corporates: A Case Study of CATL

Yafang Li[a,*], Huimin Zhou[b]

School of Economics and Trade, Guangzhou Xinhua University, Dongguan City, Guangdong Province, China
[a]1078725296@qq.com, [b]zhouhuimin@xhsysu.edu.cn
**Corresponding author*

Keywords: Outward Foreign Direct Investment; NEV Tech Corporates; CATL

Abstract: Against the backdrop of the global boom in the New Energy Vehicle industry (hereinafter referred to as NEV), power batteries, as the core component, have garnered gerat attention for the market dynamics and technological advancements. Contemporary Amperex Technology Co., Limited (CATL) has emerged as a leading player in the power battery sector, distinguished by its outstanding market performance and cutting-edge technological prowess. This paper takes CATL's global investment strategy as a case study to conduct an analysis of its investment experience, key success factors, and market performance. By doing so, it aims to provide actionable insights into investment pathway for other power battery corporates, thereby empowering them to enhance competitiveness within the global industrial supply chain.

1. Introduction

To achieve carbon neutrality goals and drive sustainable development, every country is accelerating their transitions toward green energy systems. As the second-largest economy, China bears significant responsibility in addressing climate change and advancing low-carbon development, with NEV industry emerging as a pivotal lever for achieving the "dual carbon" objectives. In recent years, Chinese NEV manufacturers have demonstrated robust growth in both domestic and international markets. The NEV Industry Development Plan (2021-2035) targets a 20% penetration rate by 2025, supported by fiscal subsidies, R&D incentives, and other policy tools to drive industrial upgrading. Chinese automakers have also achieved breakthroughs in power battery through technological innovation and international collaborations. However, as the NEV sector expands rapidly, challenges emerged to resource access and supply chain security, concerning critical raw materials such as Li and Co. These challenges underscore the growing significance of resource-oriented OFDI strategy.

Drawing on the OLI (Ownership, Location, Internalization advantages, hereinafter referred to as OLI) theory of Dunning, this paper examines the resource-oriented investment strategy pathways of Chinese NEV Tech Corporates. Through the case analysis of CATL, it illustrates how technological capabilities, policies and industrial ecosystem localization jointly shape the efficacy of resource-driven OFDI. The findings aim to inform sustainable development strategies for others Chinese

NEV industries in the green energy transition.

2. Definition and Characteristics of OFDI

Outward Foreign Direct Investment (hereinafter referred to as OFDI) is a significant form of corporates' cross-border operations. In recent years, with the rise of emerging economies, scholars have begun to focus on the unique motivations and behavioral of OFDI about developing countries. As a representative of emerging economies, China's OFDI path exhibits distinct characteristics of resource-oriented orientation. The core of resource-oriented OFDI lies in acquiring scarce resources through overseas investments to alleviate domestic resource shortages. Research indicates that resource-oriented OFDI can reduce import costs[1], stabilize resource supply[2], and promote the development of related industries in the home country through linkage effects [3].

However, resource-oriented OFDI also has certain limitations. Over-reliance on resource extraction may simplify the host country's economic structure, while neglecting the deep processing and sustainable utilization of the host country's resources. In addition, resource-oriented OFDI may face greater uncertainties due to the high political risks in host countries[4]. Therefore, research on the path of resource-oriented investment is of great significance for Chinese corporates in globalization.

3. Current Status of China's NEV Industry

3.1 OFDI Scale in the New Energy Sector

As it shows in Table 1, over the past decade, China's OFDI in the new energy sector has witnessed remarkable growth. According to the Statistical Bulletin of China's Outward Foreign Direct Investment, China's OFDI net flow reached $107.84 billion in 2013, peaking at $196.15 billion in 2016 before declining for three consecutive years. However, from 2020 onward, OFDI began to rebound, with total investment reaching $177.29 billion in 2023.

Table1: Compotion of China’s OFDI Flows, 2013-2023

Year	Amount/Billions of US Dollars	Industrial Distributions Amount/Billions of US Dollars	
		Manufacturing	Mining
2013	107.84	7.19	24.81
2014	123.12	9.58	16.55
2015	145.67	19.99	11.23
2016	196.15	29.05	1.93
2017	158.29	29.61	-3.70
2018	143.04	19.11	4.63
2019	136.91	20.24	5.13
2020	153.71	25.84	6.13
2021	178.82	26.87	8.42
2022	163.12	27.15	15.1
2023	177.29	27.34	9.88

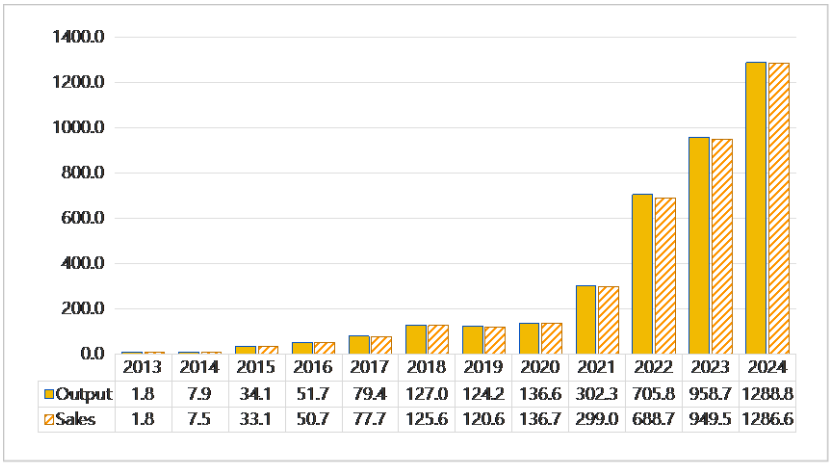
Data Source: Statistical Bulletin of China's Outward Foreign Direct Investment

Notably, OFDI flows to the manufacturing sector amounted to $27.34 billion in 2023, accounting for 15.4% of total investment. The new energy vehicle (NEV) industry emerged as a key investment hotspot within this category. Meanwhile, OFDI in the mining sector surged to $9.88

billion, representing 5.6% of the total. This rapid expansion of mining-related OFDI has been a critical driver of growth in the NEV industry's OFDI, as it secures access to upstream raw materials essential for battery output (e.g., lithium, cobalt, nickel)."

3.2 Output and sales of New Energy Vehicles

Driven by OFDI in the manufacturing and mining sectors, the output and sales of NEVs in China have also shown a rapid growth trend. As illustrated in Figure 1, NEVs first emerged in the market in 2013, and it took only five years to over one million units. The industry entered a phase of rapid growth starting from 2021. In 2023, the volumes increased to 9.587 million and 9.495 million units respectively, representing a year-on-year growth of 35.8% and 37.9% separately, with output and sales volumes remaining relatively balanced. In 2024, China's NEVs output and sales continued to grow, surpassing the 10 million unit mark.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Output	1.8	7.9	34.1	51.7	79.4	127.0	124.2	136.6	302.3	705.8	958.7	1288.8
Sales	1.8	7.5	33.1	50.7	77.7	125.6	120.6	136.7	299.0	688.7	949.5	1286.6

Data Source: EVTank

Figure1: Output and sales of China's VEVs, 2013-2024 (Unit: 10,000 Vehicles)

From the perspective of the NEV industrial chain, the upstream mainly encompasses the supply of components such as batteries, electric motors, and electronic control systems. The midstream refers to the manufacturing of complete NEVs, which can be categorized into passenger vehicles, commercial vehicles, and special-purpose vehicles according to their usage. The downstream includes application areas such as NEV charging services and after-market services, as illustrated in Figure 2. Overall, the core competitiveness of NEVs lies in battery performance. Therefore, the battery manufacturing segment in the upstream stands as the core link in the NEV industrial chain.

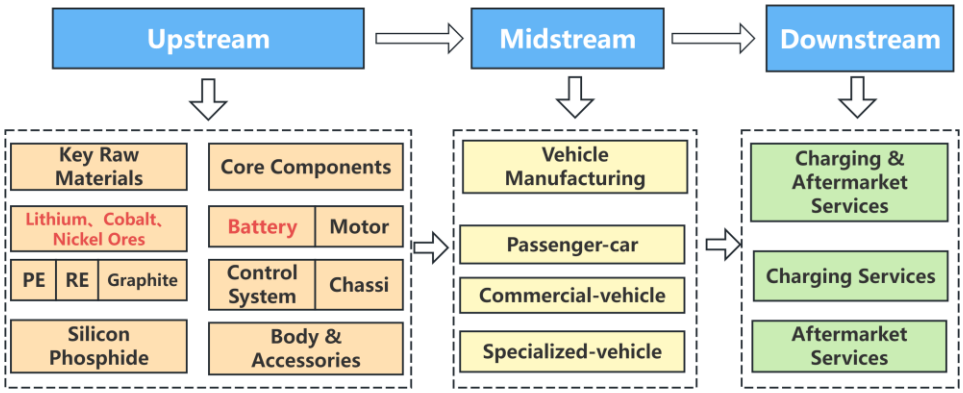
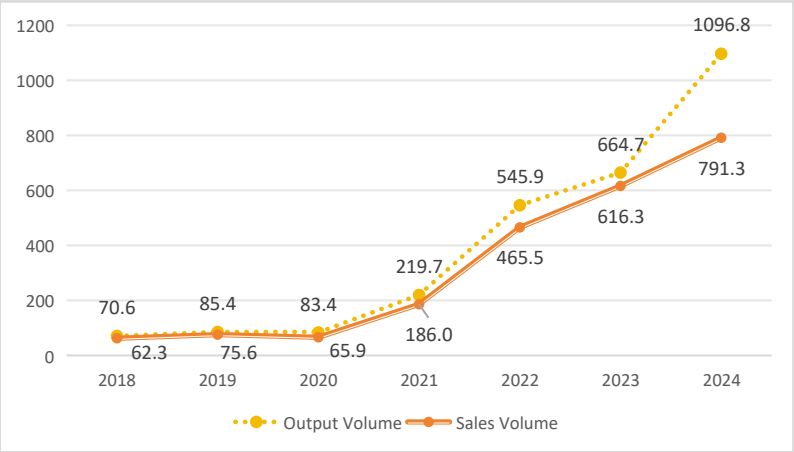


Figure 2: Industrial Chain of China's NEV Sector

3.3 Output and sales of Power Batteries

As shown in Figure 3, the output of China's power battery reached 70.6 GWh in 2018, with sales at 62.3 GWh, indicating that the industry was still in its developmental stage. From 2019, there were two-year decline. However, it began to rebound in 2021 and experienced explosive growth. In 2022, production soared to 545.9 GWh, and sales hit 465.5 GWh. This significant increase was closely related to the rapid rise of the new energy vehicle market, technological advancements, and strong policy support. In 2023, production further increased to 664.7 GWh, and sales reached 616.3 GWh, demonstrating a positive trend of sustained industry development. By 2024, production had skyrocketed to 1,096.8 GWh, and sales reached 791.3 GWh, achieving another substantial growth. This indicates, under the combined effect of factors such as technological innovation, market demand pull and industrial policy guidance, China's power battery industry is moving towards large-scale development.



Data Source: Yearly report of CATL

Figure3: Output and sales of China's Power Batteries, 2018-2023 (Unit: GWh)

Meanwhile, as can be seen from Table 2, from 2022 to 2024, CATL, BYD, and LGES have generally secured their positions in the top 3, with a relatively stable competitive structure. In 2024, the total global shipment of power batteries reached 998 GWh. Among them, CATL's shipment amounted to as high as 381 GWh, accounting for over one-third of the total shipment volume that year, its outstanding market performance merits in-depth study and reference.

Table 2: TOP10 Corporates of global power battery shipment, 2022-2024

2022		2023		2024	
Rank	Corporate	Rank	Corporate	Rank	Corporate
1	CATL	1	CATL	1	CATL
2	BYD	2	BYD	2	BYD
3	LGES	3	LGES	3	LGES
4	Panasonic	4	Panasonic	4	CALB
5	SK On	5	SK On	5	SK On
6	SDI	6	SDI	6	Panasonic
7	CALB	7	CALB	7	SDI
8	Gotion	8	EVE	8	Gotion
9	Sunwoda	9	Gotion	9	EVE
10	EVE	10	Farasis	10	Svolt

Data Source: EVTank

4. Case Analysis: Layout Strategy of CATL's Global Supply Chain

4.1 Corporate Background of CATL

Contemporary Amperex Technology Co., Limited (hereinafter referred to as CATL) was established in 2011, with its headquarters located in Ningde City, Fujian Province, China. In its early days, CATL focused on the research, development, production and sales of power battery and energy storage for NEVs. In 2012, CATL cooperated with Brilliance BMW, since then, CATL has entered a phase of rapid development. In 2015, CATL acquired Guangdong Brunp Recycling Technology Co., Ltd., laying out the battery recycling business and further perfecting its industrial chain. In 2017, CATL ranked first globally in terms of power lithium-ion battery shipments, surpassing international giants such as Panasonic and LG for the first time and becoming the leading corporate in global. It was listed on the ChiNext Market of the Shenzhen Stock Exchange in 2018. Currently, CATL's main businesses cover three major fields: power batteries, energy storage batteries, and battery recycling&utilization. The power battery business is CATL's core operation.

4.2 The global nickel resource layout of CATL

In Figure 2, we can observe that mineral resources such as lithium, cobalt, and nickel are key elements for batteries. As the world's largest power battery manufacturer, CATL has started to establish an upstream raw material supply chain globally to address the supply issues of critical resources. According to data from the USGS, the global nickel ore reserves exceeded 130 million tons in 2024. Indonesia, as the world's largest nickel-resource country, accounts for approximately 40%-45% of the global nickel reserves, making it a crucial hub in CATL's global resource layout.

4.2.1 Project Background with Indonesia

In January 2020, the Indonesian government imposed stringent restrictions and began banning the export of nickel ore, aiming to enhance the value chain of nickel products and strengthen the local industry. This policy dealt a blow to the global nickel ore supply chain, prompting CATL to opt for investing in Indonesia to establish an integrated battery manufacturing industrial chain to ensuring supply of nickel ore.

In April 2022, CATL collaborated with Indonesia's state-owned mining company PT Aneka Tambang (ANTAM) and PT Industri Baterai Indonesia (IBC) to jointly invest in the development of laterite nickel ore and the construction of a battery industrial chain. In this cooperation, CATL took the lead in initiating the hydrometallurgical technology, which can efficiently extract nickel and cobalt from laterite nickel ore and represents the frontier technological trend of nickel resources development.

4.2.2 The Resource-Oriented Investment Pathway

The cooperation adopted an "exchange technology for mining rights" model, where CATL exchanged advanced hydrometallurgical technology for nickel ore development rights in Indonesia. It is reported that the application of hydrometallurgical technology has reduced nickel production costs by approximately 20%-30% compared to traditional methods. Additionally, through localized production, logistics costs have also been significantly reduced. This cooperation model not only lowers CATL's expenditure, also ensures a stable supply of nickel ore resources[5].

Meanwhile, this kind of investment modle demonstrates OLI’s adaptive reconstruction. As illustrated in Figure 4. Firstly, there is a two-way locking mechanism of location advantages. In the traditional model, corporates unilaterally select resource-intensive regions. However, Indonesia

mandates foreign investment participation in the smelting process through policies, binding resource control rights with technology to achieve a dynamic balance between the interests of the host country(Indonesia) and the investment corporate(CATL) in this cooperation. Secondly, the green transformation of ownership advantages replaces traditional monopoly advantages with clean technologies, thereby forming technological barriers. For example, CATL holds patents for its CTP 3.0 Qilin battery which is a core bargaining chip in cross-border investment. When Indonesia requires foreign investors to build supporting smelting plants, CATL can exchange its patents for resource rights. Thirdly, the extension of the industrial chain, which represents internalization advantages, enables CATL to mitigate market risks through vertical integration. While enhancing resource utilization efficiency (such as patents for hydrometallurgical processing of laterite nickel ore). CATL's full-chain layout from mining to battery manufacturing is precisely an application of internalization advantages, strengthening the explanatory power of the OLI framework.

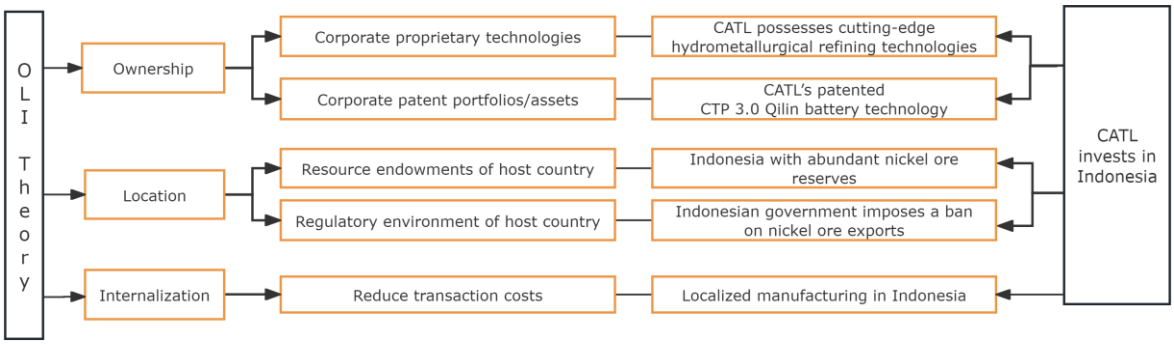
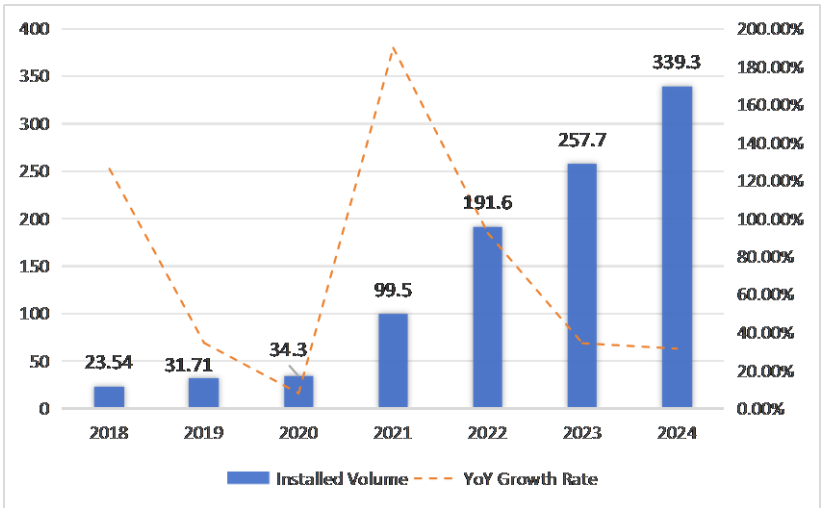


Figure 4: The OLI Diagram of CATL

4.3 Market Performance of CATL

4.3.1 Installation Volume of Power Batteries



Data Source: Yearly report of CATL

Figure 5: Installation Volume of CATL's Power Batteries, 2018-2024 (Unit: GWh)

Following its listing in 2018, Figure 5 shows that CATL has witnessed a remarkable year-on-year growth rate of 126.35% in its power battery instalation volume. Although the growth rate declined somewhat from 2019 to 2020, the installation volume continued to increase steadily. After

CATL embarked on its global investment and expansion strategy, the growth rate soared to 1.9 times in 2021, hitting a new high. In 2024, CATL's global power battery installation volume reached 339.3 GWh, representing a year-on-year increase of 31.66%. Its global market share further rose to 37.9%, securing the top position globally for the eighth consecutive year.

4.3.2 Market Share of CATL

As CATL intensifies its efforts in self-developed battery technologies, its domestic market share experienced a slight decline in 2022. In 2023, its market share for domestic power battery installations dropped to 43.10%, with its domestic share hovering within 45%-50% in recent years. However, in overseas markets, CATL has accelerated its expansion through strategies such as technology licensing and localized production capacity. Its global market share has steadily increased from 21.90% in 2018 to 37.90% in 2024, securing its top position globally, which shown in Table 3. Overall, CATL has formed a market pattern characterized by "steady yet pressured domestic growth and rapid overseas expansion" through technological innovation, full-industry-chain integration, and a globalization strategy.

Table 3: Market share of CATL, 2018-2024

Year	Global Region	Domestic Region
2018	21.90%	41.30%
2019	27.87%	50.57%
2020	24.82%	50.00%
2021	32.60%	52.10%
2022	37.00%	48.20%
2023	36.80%	43.10%
2024	37.90%	45.08%

Data Source: Yearly report of CATL

4.3.3 Operating Revenue of CATL

Table 4: Operating Revenue of CATL 2017-2024 (Amount/Billions of RMB)

Year	Total	YOY Growth Rate (%)	Overseas	Share of Overseas (%)
2018	29.61	48.08%	1.05	3.53%
2019	45.79	54.63%	2.00	4.37%
2020	50.32	9.90%	7.91	15.71%
2021	130.36	159.06%	27.87	21.34%
2022	328.59	152.07%	76.92	23.41%
2023	400.92	22.01%	130.99	32.67%
2024	362.01	-9.70%	110.34	30.48%

Data Source: Yearly report of CATL

CATL's operating revenue has continued to grow in tandem with the expansion of its market share. As shown in Table 4, its operating revenue exhibited a rapid growth from 2018 to 2023. Notably, in 2021 and 2022, the growth rates reached 159.06% and 152.07%, respectively, with the revenue peaking at RMB 400.92 billion in 2023. In 2024, influenced by adjustments in battery selling prices due to the decline in raw material prices, the operating revenue decreased to RMB 362.01 billion, marking the first revenue decline since its listing. Regarding overseas operations, CATL has steadily advanced its internationalization strategy. In 2023, its overseas revenue

amounted to RMB 130.99 billion, accounting for approximately one-third of the total revenue. This demonstrates that the growth of overseas business has provided significant support for the company's annual performance.

5. Conclusion

As a bellwether in the global power battery industry, the OFDI pathway of CATL's offers multi-faceted practical insights for the new energy sector. The "exchange technology for mining rights" model endeavors in Indonesia not only reduces geopolitical risks but also spurs the development of a new energy industrial cluster through the technology spillover effect, providing a replicable and innovative paradigm for global operations. This sort of investment strategy that deeply aligns corporate strategy with the national "dual carbon" goals. Mearnwhile, it opens up new strategic pathway for NEV industry players to achieve sustainable growth.

References

[1] Zhao, M. L., Gao, Y., Feng, J. K., & Sun, W. (2025). Effect test of China's outward foreign direct investment reverse technology spillover on green total factor productivity under cultivation of new quality productive forces. Bulletin of Chinese Academy of Sciences, 40(2), 350–361.

[2] Han, Y. F. (2023). Research on the Impact of Outward Foreign Direct Investment on the Green Economic Development of the Manufacturing Industry [M]. Beijing: China Financial & Economic Publishing House.

[3] Hao, K., & Liu, L. M. (2023). Research on the reverse technology spillover of OFDI by listed manufacturing enterprises [J]. Co-operative Economy & Science, 2023(714), 36-42.

[4] Li C., Zhang Z. (2025). The Impact of Administrative Approval System Reform on Corporate Green Investment: An Analysis Based on Resource Acquisition and Allocation, as Well as Managerial Myopia [J]. Reform, (05): 115-131.

[5] Huang W., Liu Y. J. (2023). Research on the Selection of Resource-Based Joint Investment Strategies under the Background of the "Belt and Road" Initiative [J]. Scientific Decision Making, (03): 1-13.