Analysis of the process and experience of China's new energy vehicle purchase subsidy policy

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Abstract： Since the launch of the "Energy-Saving and New Energy Vehicle Demonstration and Promotion Project" in 2009, China has officially implemented the new energy vehicle purchase subsidy policy, which expired at the end of 2022. This is one of the most effective support policies for the development of new energy vehicles in China, forming a development model suited to China's national conditions and contributing Chinese wisdom to the world. This article summarizes the development process of China's new energy vehicle purchase subsidy policy system and reviews relevant policy experiences, providing valuable references for supporting policies for the development of strategic emerging industries.

Key words: New energy vehicles; subsidy policies; process and experience

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1 Research background

According to the development stage of industries and the degree of implementation, China's new energy vehicle subsidy policy can be divided into three phases: "the pilot demonstration phase from 2009 to 2012, the expanded promotion and application phase from 2013 to 2015, and the full-scale promotion and application phase since 2016." Under a series of policy supports primarily through fiscal subsidies, China has become the world's largest market for new energy vehicles, firmly holding the top spot globally. The technical level has made a leap from "catching up" to "leading," and there have been positive advancements in building stronger domestic brands. These efforts have also contributed to energy conservation, economic development, and enhancing international competitiveness.

China's new energy vehicle purchase subsidy policy, as a national strategic industrial policy, is the core policy tool for promoting the transformation and upgrading of the automotive industry and achieving the "dual carbon" goals. Since the launch of the "Ten Cities, Thousand Vehicles" demonstration project in 2009 (initially covering 13 cities including Beijing and Shanghai), this policy has successfully guided the new energy vehicle industry to complete its leapfrog transition from policy-driven (2009-2017) to market-driven (since 2018) through a dual-wheel drive of "subsidy incentives + technical standards." In terms of technological iteration, the subsidy policy set tiered energy density thresholds (requiring battery energy density ≥90Wh/kg in 2017, increased to ≥125Wh/kg in 2021), which forced companies like CATL to break through with CTP technology for lithium iron phosphate batteries, reducing battery costs by 82% over a decade.

In terms of market expansion, early substantial purchase subsidies (such as the maximum subsidy of 60,000 yuan per vehicle for pure electric passenger cars in 2013) combined with local supporting policies (like free license plates in Shanghai) significantly reduced the cost of buying a car, driving the share of private consumption from 30% in 2015 to 78% in 2022. In 2023, the number of new energy vehicles exceeded 20 million, with a market penetration rate of 31.6%, and the ratio of charging stations to vehicles improved from 1:8 in 2015 to 1:2.4.

The more profound impact is reflected in the restructuring of industrial competitiveness: BYD completed its vertical integration during the subsidy window period, with its blade battery technology enabling a vehicle range exceeding 700 kilometers, and overseas sales surged by 337% year-over-year in 2023; NIO addressed the anxiety over charging through its BaaS battery leasing model, with the average price per vehicle surpassing 350,000 yuan, making its high-end strategy increasingly clear. At the industrial chain level, domestic power batteries account for 63% of the global market share, and the localization rate of lithium materials exceeds 90%, with CATL signing long-term contracts worth hundreds of billions with international giants like BMW and Tesla.

This policy practice not only reshapes the domestic industrial landscape but also participates in global governance through "technology export + standard leadership." In 2023, China's lead in formulating the electric vehicle battery swap safety standard was adopted by ISO, becoming the world's first international standard for battery swapping.

2 The process of new energy vehicle purchase subsidy policy

2.1 Pilot demonstration phase (2009-2012)

The promotion and application of new energy vehicles in our country started with public sector vehicles. In January 2009, the Ministry of Finance and the Ministry of Science and Technology jointly issued the "Notice on Carrying Out Pilot Work for Energy-Saving and New Energy Vehicle Demonstration and Promotion" (Cai Jian [2009] No.6), deciding to launch pilot projects in 13 cities including Beijing and Shanghai. To further accelerate the industrialization of energy-saving and new energy vehicles, in May 2010, the Ministry of Finance, the Ministry of Science and Technology, the Ministry of Industry and Information Technology, and the National Development and Reform Commission (hereinafter referred to as the four ministries) jointly issued the "Notice on Expanding Public Service Sector Energy-Saving and New Energy Vehicle Demonstration and Promotion" (Cai Jian [2010] No.227), adding 7 more pilot cities, followed by another 5 cities, bringing the total number of demonstration and promotion pilot cities to 25. The vehicle subsidy requirements and standards were implemented according to the "Notice on Carrying Out Pilot Work for Energy-Saving and New Energy Vehicle Demonstration and Promotion" (Cai Jian [2009] No.6), as shown in Table 1. In May 2010, the four ministries jointly issued the "Notice on Carrying Out Pilot Work for Subsidies for Private Purchase of New Energy Vehicles" (Cai Jian [2010] No.230), selecting 5 cities to conduct pilot work for subsidies for private purchase of new energy vehicles; in June of the same year, it was determined that pilot work would be launched in Shanghai, Changchun, Shenzhen, Hangzhou, and Hefei, adopting a subsidy method of "per kilowatt-hour subsidy, capped subsidy, and phased reduction based on usage," as shown in Table 2. By 2012, China has formed nearly 100 independent vehicle and parts enterprises of new energy vehicles, with a production capacity of more than 600,000 vehicles. China has basically mastered the core technologies of vehicles and key components, and has demonstrated and promoted nearly 30,000 energy-saving and new energy vehicles.

2.2 Phase of expanding promotion and application (2013-2015)

In July 2012, the State Council issued the "Energy Conservation and New Energy Vehicle Industry Development Plan (2012-2020)" (Guo Fa [2012] No.22), establishing a national strategy for the development of new energy vehicles. The plan clarified the definition, technical roadmap, and development approach for new energy vehicles, further solidifying the confidence of the industry, enterprises, and investors in developing new energy vehicles. To accelerate the development of the new energy vehicle industry, in September 2013, four ministries jointly released the "Notice on Continuing to Promote the Application of New Energy Vehicles" (Cai Jian [2013] No.551). This notice proposed that from 2013 to 2015, efforts would continue to promote the application of new energy vehicles in cities, further detailing the scope of subsidies, subsidy recipients, technical requirements, and subsidy standards, thus laying the foundation for the basic framework of the new energy vehicle subsidy policy system.

2.3 Comprehensive promotion and application phase (2016 and beyond)

At this stage, the purchase subsidy policy, while ensuring market development, encourages technological innovation and supports the growth of high-quality enterprises and products. In April 2015, four ministries jointly issued the "Notice on Fiscal Support Policies for the Promotion and Application of New Energy Vehicles from 2016 to 2020" (Cai Jian [2015] No.134). From 2016 to 2020, subsidies were provided for the purchase of new energy vehicles nationwide to promote their application and promotion. This phase expanded the scope of promotion and application to the entire country, driving the development of upstream and downstream industries in basic materials, power batteries, drive motors, and complete vehicles, achieving a leap in market scale.

3 Experience of new energy vehicle purchase subsidy policy

3.1 In terms of strategic positioning, we should seize the strategic opportunity period to strengthen the

layout of financial support.

The global financial crisis has catalyzed a new round of technological revolution, ushering in a period of key technological breakthroughs for the international new energy vehicle industry: Tesla's first Roadster electric sports car caused a stir in the industry, while models like the Nissan Leaf and GM Volt accelerated their industrialization processes. The annual increase in battery energy density was 8-10%, and advancements in permanent magnet synchronous motor technology pushed the efficiency of drive systems to over 95%. Seizing the opportunity of reshaping the global industrial landscape, China launched the "Ten Cities, Thousand Vehicles" energy-saving and new energy vehicle demonstration promotion project in January 2009. This initiative provided dual support through a 50% subsidy from central government funds for public service sector purchases and a 30% matching contribution from local governments, along with a package of policies including tax exemptions and vehicle and vessel tax incentives. This strategic move not only declared China's determination to seize the new energy race globally but also reshaped the industrial ecosystem through substantial investment. Domestic companies such as BYD and CATL gained critical growth windows, with battery costs dropping from 5 yuan per Wh in 2009 to 2 yuan per Wh in 2015. Charging infrastructure was incorporated into the scope of new infrastructure construction, and annual social capital investment exceeded 100 billion yuan. By 2015, China's production and sales of new energy vehicles surpassed 300,000 units, overtaking the United States to become the world's largest market. A complete industrial chain system covering batteries, motors, and electronic control systems was initially established, laying a decisive foundation for subsequent explosive growth in the industry.

Around 2009, technological advancements in the international new energy vehicle industry accelerated, and the industry entered its nascent stage. China seized the strategic opportunity of electrification, researching, formulating, and implementing fiscal support policies for new energy vehicles. The purchase subsidy policy was timely launched and continued to provide support, signaling the state's firm commitment to the development of the new energy vehicle industry at the societal level. This initiative boosted the industry's enthusiasm for deploying new energy vehicles, further promoting the continuous aggregation of social resources and accelerating the development process of China's new energy vehicle industry.

3.2 In terms of technical adjustment, the technical requirements should be adjusted timely to adapt to industrial development.

As the power battery energy density surged by an average of 15% annually and charging efficiency surpassed 90%, during the technological iteration wave from 2015 to 2018, core indicators of new energy vehicles experienced a disconnect between policy and market: the subsidy threshold set for a range of 150 kilometers in 2015 saw 60% of the models on sale exceed 300 kilometers by 2018, rendering the original target ineffective as a guide for industry development. Meanwhile, A00-class models, despite their low cost and 40% market share, enjoyed substantial subsidies, leading to a subsidy inversion compared to mid-to-high-end models. Data from 2017 showed that top-tier models received subsidies accounting for up to 45% of their selling price, distorting the market. Policy adjustments were urgently needed: the new regulations implemented in 2019 raised the range threshold to 250 kilometers, added a mandatory requirement for a power battery system with an energy density of at least 125Wh/kg, and introduced a dual-factor tiered subsidy system based on "range + energy consumption," creating five differentiated subsidy tiers. Specifically, a 30-minute charge ratio was introduced to evaluate fast-charging performance, ensuring that policy levers precisely drive technological upgrades and compel companies to focus resources on core areas of the three-electric system, thus reconstructing a fair competitive market environment.

Due to the rapid advancement of new energy vehicle technology and the time lag in the implementation of subsidy policies, relevant technical requirements have become outdated. Meanwhile, with the significant increase in the scale of new energy vehicles and continuous cost reductions, the subsidy standards for some models have become excessively high, affecting fair competition among various types of vehicles in the market and hindering the sustainable and healthy development of the industry. Therefore, it is timely to adjust the purchase subsidy policy according to factors such as industrial development, technological progress, and promotion scale, increase technical requirements for different types,

and set tiered threshold requirements for technical indicators with significant differences in distribution.

3.3 In terms of subsidy standards, we should grasp the relationship between "degree" and "quantity".

Strategic emerging industries need to overcome the "valley of death": In the early stages of power battery development, the unit energy cost exceeded 4,000 yuan/kWh, eight times the current cost, and companies had to bear substantial technical validation expenses. In 2013, the electricity consumption for a hundred kilometers of a mainstream model reached 22 kWh, offering less cost advantage compared to traditional vehicles, with market penetration below 0.3%. Subsidy policies set technical thresholds and financial support mechanisms; from 2015 to 2018, central government funding exceeded 100 billion yuan, driving battery costs down at an average annual rate of 18%. However, the pace of reduction must be carefully managed: when the subsidy reduction rate reached 50% in 2019, the new energy vehicle market experienced its first negative growth, with some companies seeing their gross profit margins plummet by 12 percentage points. Policy design should establish a dynamic calibration model, linking subsidy intensity to 15 core technical indicators such as battery energy density and charging rate, setting a 20%-40% reduction buffer zone, while also providing non-monetary support like charging station construction subsidies and priority road access, forming a three-dimensional policy matrix of "R&D subsidies + market cultivation + infrastructure support."

In the early stages of strategic emerging industries, factors such as high investment, significant risks, insufficient product competitiveness, and low consumer acceptance constrain development. It is necessary to provide substantial subsidies to "pioneers" in production and products to encourage increased R&D investment. At the same time, compared with traditional gasoline vehicles, the overall cost of current new energy vehicles at the same level remains relatively high, and there are still challenges like charging. If subsidy standards decrease too quickly or too low, it could lead to a cliff-like decline in the market. Therefore, subsidy policies need to balance support methods and adjustment speeds, coordinating the relationship between "subsidy intensity" and "promotion volume." They should neither excessively encourage fraud and waste of fiscal funds nor be so low as to affect the sustainable and healthy development of the industry.

3.4 In terms of capital supervision, strengthen regulatory measures to purify the environment for industrial development.

The new energy vehicle industry encountered a "subsidy fraud" scandal during its incubation period, exposing short-term shortcomings in the industrial regulatory system. To address the dilemma of fund utilization efficiency, four ministries including the Ministry of Industry and Information Technology and the Ministry of Finance have established a multi-dimensional regulatory framework: they set up a national monitoring and management platform for new energy vehicles, using VIN code traceability technology to monitor data throughout the vehicle's production, sales, and operation lifecycle. Since the platform went live in 2016, over 1.2 billion yuan in problematic subsidies have been recovered; they also established a "double random, one open" inspection mechanism, incorporating core indicators such as battery energy density and charging rate into mandatory testing lists, with the inspection ratio increasing to 15% in 2018; a joint reporting channel was opened for multiple departments, implementing a "blacklist" system for behaviors like tampering with key parameters or fabricating operational mileage, with a total of 78 non-compliant companies being publicly listed; an innovative operational mileage threshold was introduced, linking subsidy distribution to actual road travel data, requiring non-private user vehicles to accumulate at least 20,000 kilometers of driving by 2019. This comprehensive approach has increased the efficiency of fiscal fund usage by 37%, reduced the incidence of subsidy fraud cases from 8.3% in 2015 to 0.7% in 2020, and laid a solid regulatory foundation for the healthy development of the industry.

The new energy vehicle industry, as a strategic emerging industry, inevitably encounters issues such as "subsidy fraud" during its cultivation and growth phase. To effectively enhance the efficiency of fund utilization, four ministries have further strengthened supervision and management in areas including information platform oversight, consistency inspection mechanisms, regulatory channels, penalties for fraudulent subsidies, and operational mileage requirements.

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