

Green ABS Deep Dive

FAQ: Embracing the "New" future – Residual Value Risk of Green Auto ABS and Used EV Market

November 14, 2023

In our previous episode “FAQ: Turn the ‘Green’ into ‘Gold’ – Green Auto ABS Market Overview and Outlook”, we point out the close link between the EV residual values and used EV market. Compared with the conventional used car market, the used EV market in China is still a “toddler”, faced with more consumer concerns, especially regarding the use and maintenance of EVs once the automobile manufacturers suffer difficulties. Nonetheless, the latest data suggest that an increasing number of carmakers and consumers have turned their focus to the used EV market despite the challenges ahead. The prevailing impression of EVs’ extremely fast-paced depreciation has gradually softened. Is the used EV market going to make a breakthrough and thrive with new opportunities? In this second episode of our Green ABS Deep Dive series, we try to answer some questions about the used EV market that market participants are interested in and articulate our rationale for analyzing the residual value risk of green auto ABS.

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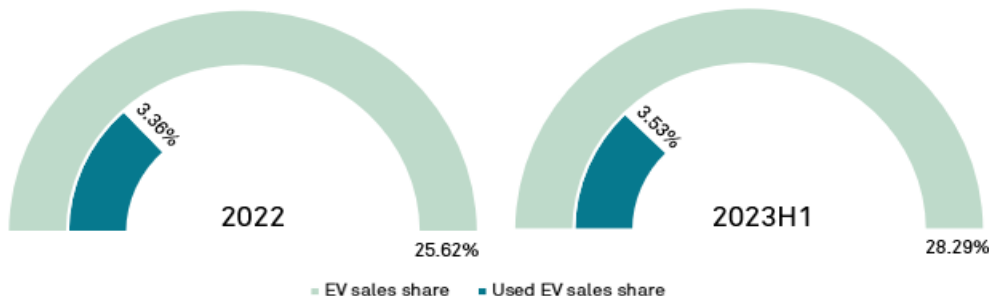
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1. What’s the current scale of China’s used EV market?

Chart 1

EV Penetration Overview



Note: EV sales share = cumulative EV sales in the corresponding period/overall vehicle sales; Used EV sales share = cumulative used EV sales in the corresponding period/overall used car sales.

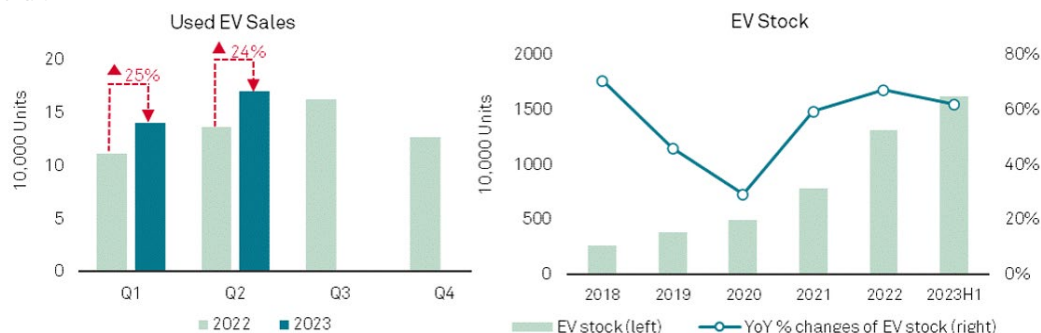
Source: China Association of Automobile Manufacturers (“CAAM”), collected by S&P Global (China) Ratings.

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The used EV market is still small but sees strong growth. As EVs have become an automobile market darling in recent years, more and more consumers show growing interest in the EV sector. However, the used EV market doesn’t gain as much heat as the new EV market. In the first half of 2023, new EV sales accounted for 28.29% of total automobile sales, while used EV sales only make up 3.53% of total used car transactions. As of the end of June 2023, the stock of EVs in China reached about 16.2 million, which contrasted sharply with about only 50 thousand transactions of

used EVs per month. This marks the great discrepancy between the market scales of used EVs and used internal combustion engine (“ICE”) vehicles. Meanwhile, we observe that cumulative used EV transactions grew by about 25% YoY in the first half of 2023, roughly 9 percentage points higher than the growth rate for the overall used car market.

Chart 2



Note: Hybrid electric vehicles (“HEVs”) are not included from used EV transaction data.

Sources: China Passenger Car Association (“CPCA”), Ministry of Public Security, collected by collected by S&P Global (China) Ratings.

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EV stock enjoys robust growth and circulation continues improving, boding well for the used EV market. As a core driver for used EV market expansion, EV stock has sustained a year-on-year growth of over 50% since 2021, a solid momentum that builds the potential for the used EV market. Besides, with the progress in charging and battery replacement technologies and continuously enhanced infrastructure, safety concerns and mileage anxiety have been eased. We expect EV stock to keep an upward trend and used EV circulation to continue improving.

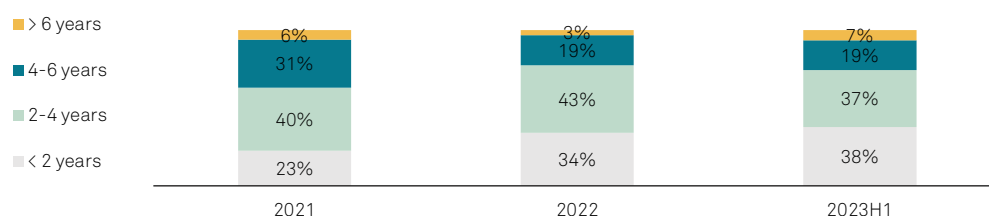
2. What are the typical features of the used EV market relative to the conventional used car market?

Through analyzing and comparing used EV and ICE vehicle transactions across the market in terms of vehicle age, transaction price, place of transaction, and cross-region circulation, we identify the following two characteristics for China’s used EV market:

- **Used EVs’ service life is typically shorter and likely to shorten further.** In 2022, used EVs with an age of less than 2 years accounted for 34% of overall used EV transactions, a proportion that was 4 percentage points higher than that for used ICE vehicles with less than 3 years of age. To the contrary, the proportion of used EVs with more than 6 years of age was 27 percentage points lower than that for used ICE vehicles with same age. In June 2023, the proportion of used EVs within 2 years of age in total used EV sales increased further. In our view, given the rapid evolution of EV models and limited battery life, coupled with a great portion of used EVs coming from mobility service companies, the replacement cycle for EVs is generally short.

Chart 3

Used EV Market Breakdown by Vehicle Age



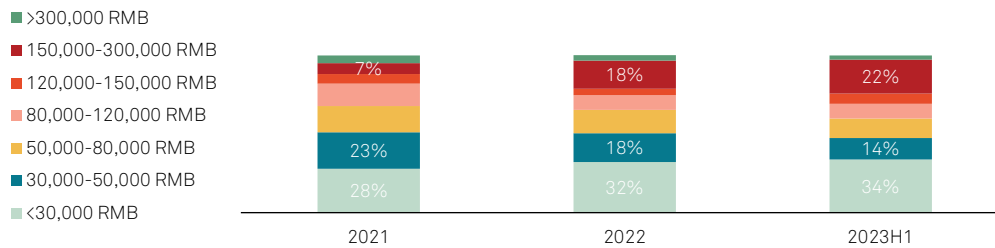
Source: CPCA, collected by collected by S&P Global (China) Ratings.

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- **Low-price used EVs represent a larger share in overall used EV sales, and transaction prices may pick up.** Similar to used ICE vehicles, used EVs are primarily sold at prices below 50,000 RMB, mainly because mini- and small-size EV models are updated rapidly and owned by a large consumer base, while at the same time being traded frequently. However, unlike the conventional used car market, used EV transaction prices gradually take on a dumbbell-shaped distribution. Chart 4 shows that the proportion of used EVs priced below 30,000 RMB and within the range of 150,000-300,000 RMB increased from 2021 to 2022 and such trend continued through the first half of 2023. This was led by an uplift in average transaction price of EVs and an increased share of medium and high-end models in overall EV transactions.

Chart 4

Used EV Market Breakdown by Transaction Price



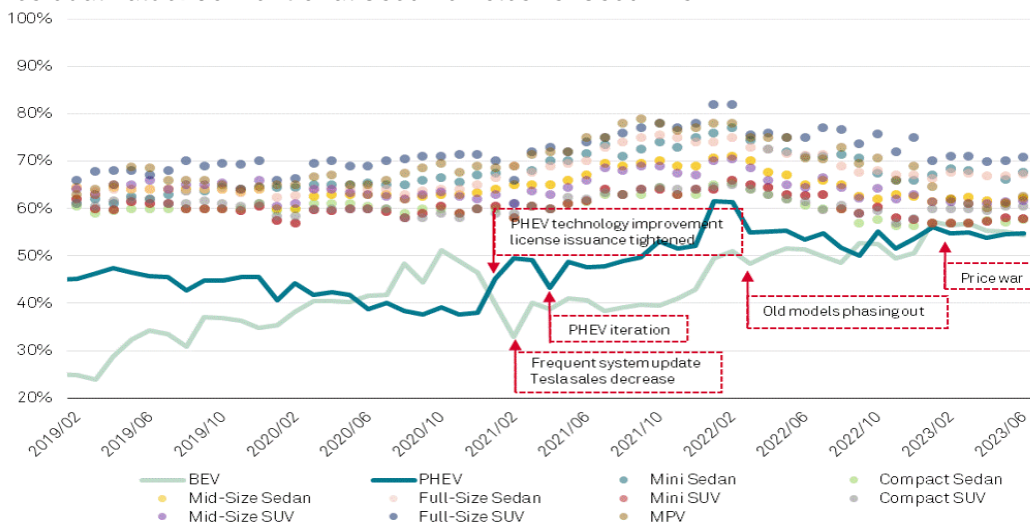
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3. What are the residual values of EVs?

EV residual values improve significantly, but still below the level for ICE vehicles. EV residual values have remained around 50%-55% since 2022, but still lower than the typical range of 60%-70% for ICE vehicles. Notably, compared to the conventional used car market, which sees residual values fluctuating within a limited range, even a decline in residual values for certain models, EVs have seen their residual values on the upswing over the past three years, despite volatility. Residual values of battery electric vehicles ("BEVs") and plug-in hybrid vehicles ("PHEVs") have increased from 25% and 45% in early 2019 to 54.4% and 54.7% in June 2023, respectively, both exceeding the 50% threshold. BEV residual values soared and once surpassed that for PHEVs in January 2023. The image of used EVs having low residual values has been gradually reversed.

Chart 5

Residual Value: Conventional Used Vehicles vs. Used EVs



Note: Residual value = transaction price of a used car with an age of 3 years and in good condition/manufacture's suggested price for a new car. This formula is applicable throughout the commentary.

Source: CPCA, collected by S&P Global (China) Ratings.

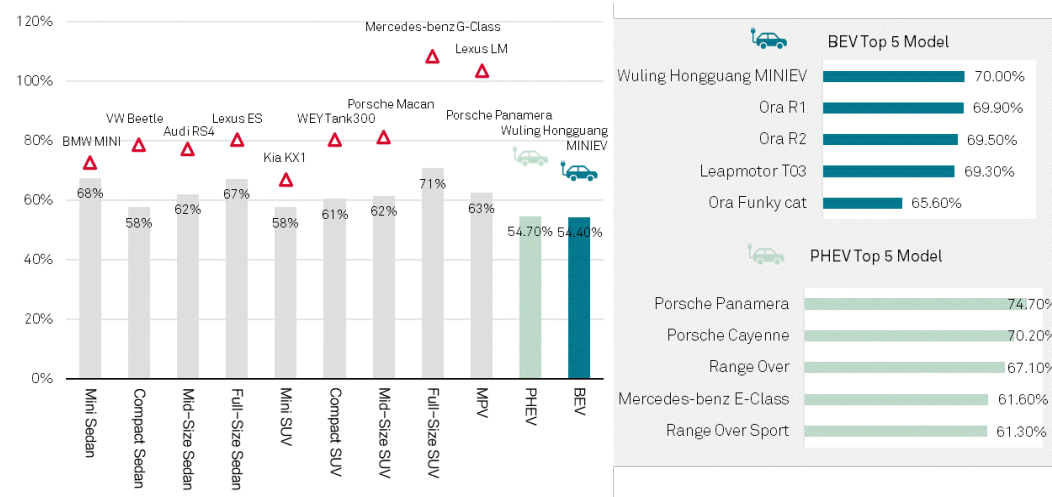
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Technological progress, policies and pricing mechanism together affect EV residual values. Breakthroughs in battery and intelligence-focused technologies have become the key factor to drive up the residual values of EVs in recent years, but the subsequent model substitution and software upgrade could lead to temporary fluctuation and slippage in the rate. For example, PHEVs and BEVs both experienced a decline in residual values in March 2022, due to the launch of new models that feature longer range and enhanced intelligence-related functions. Besides vehicle-specific factors, expectations of buyers and sellers also affect the transactions prices of used cars. Changes in new vehicle prices directly affect consumers' decision about whether to buy a used car. Compared to a mature market for ICE vehicles, the EV market is greatly influenced by subsidy policies and carmakers' sales strategies. This leads to amplified volatility in new EV prices, which spills over to the used EV market and affects its supply and demand dynamics. Since the beginning of 2023, some carmakers have joined the price war after Tesla made several rounds of price cuts, so that used car dealers and consumers became hesitant in making further moves. This puts some pressure on the residual values. With the phase-out of national subsidies on EVs and weakening purchase tax benefits in the near future, we expect the pricing mechanism for EVs to become more market-oriented, and the residual values of used EVs may gradually approach that of used ICE vehicles.

Residual values among different vehicle types and brands differentiate. The residual values for a specific model under different brands diverge significantly, as is the case with EVs. The rankings in June 2023 showed that top 5 BEVs in terms of residual value were mostly comprised of mini-sized models, in which Wuling Hongguang MINIEV took the lead with highest residual value thanks to its relatively low price and extensive market share. For PHEVs, luxury brands became outperformers due to their energy efficiency attribute. Consumers are gradually taking PHEVs as the substitute for ICE vehicles, fueling strong demand that ensures the high residual values.

Chart 6

Residual Values by Car Type and Models with Highest Residual value in June 2023



Sources: CPCA/Jingzheng.com, collected by S&P Global (China) Ratings.
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4. What are the obstacles to used EV circulation at present?

Used car trading constitutes a critical part of the automobile industry's value chain. A healthy used car market will allow consumers to replace their old cars smoothly while at the same time propelling new vehicle sales. Nonetheless, market participants in domestic used EV market are suffering the bottlenecks below, curbing used car circulation as a result.

- **Used EVs are difficult to be assessed.** Major players in the current used EV market include used car exchange markets, independent used car dealers, OEM dealers, online trade platforms, and individual car sellers, demonstrating a highly fragmented market. Small and medium-size independent used car dealers dominate the market through in-

person transaction. Different from the evaluation for ICE vehicles, the assessment on battery management system (“BMS”), motor control unit (“MCU”), and vehicle control unit (“VCU”) is essential for evaluating an EV. However, the inadequate information transparency and under-developed valuation system faced by the used EV market at present, coupled with the rapid evolution of battery and intelligence-related technologies, add difficulty to used EV valuation. Lacking certainty about the degree of battery capacity loss, some used car dealers stay on hold while others attempt to reduce risks through pushing down the purchase prices, putting EV residual values under pressure. In addition, there’s no credible evaluation agency in place to assess the quality of used EVs, hindering consumers from making buying decisions.

- **Rights and interests of used EV users and after-sale services are hard to be guaranteed.** Used EV owners are not able to enjoy the benefits granted to the original owners, which is another shortcoming dragging on used EV circulation. Used EV buyers may need to tackle more repairs and maintenance than new EV buyers. Although EV manufacturers have offered a lifetime warranty on BMS, MCU and VCU, an eligible vehicle for such services needs to meet numerous requirements. It will be even more difficult for a used EV to be qualified. Besides, such lifetime warranty is primarily only offered to original EV owners, with used EV buyers unable to enjoy the equal benefits.

We have also observed that mainstream EV manufacturers such as Tesla, NIO, XPeng, BYD and Geely are vigorously expanding their certified used car business; for instance, BYD sets up showrooms across the nation to exhibit its used models and offers professional assessment services, e.g., battery monitoring based on cloud-based data, and warranty for used car owners. Meanwhile, many EV manufacturers roll out vehicle repurchase policies for their proprietary brands to improve residual values. In 2015, Tesla launched the campaign to repurchase Model S at half of the original selling price. However, due to carmakers’ strict evaluation criteria, the number of used EVs eligible to be sold on their official trade platforms or repurchased is still limited. The effect of carmakers’ certified used car business and vehicle repurchase services remains to be seen. Compared to other participants in the used car market, EV manufacturers, as the original source of used EVs, are able to conduct more accurate monitoring and assessment on vehicle performance and provide more comprehensive services. We expect an increasing number of carmakers to make inroads into used car businesses going forward. Services covering the full lifecycle of an EV could help stabilize the vehicle’s residual value, thus removing the obstacles to used EV circulation.

5. How do we analyze the residual value risk of green auto ABS?

As we mentioned in our first episode, EVs see lower residual value and sluggish circulation in the used car market compared to ICE vehicles. We make adjustment to our base-case recovery rate assumption to factor in the low residual value and disposal difficulties faced by EVs. We also focus on the following aspects in our analysis of EVs’ residual value risk:

- **Characteristics of asset pool may change.** Although the weighted average LTV for green auto loan ABS issued by most originators has been maintained below 70% at present, the LTV cap for EV loans is set at as high as 85%. Given the expansion of EV-related finance business toward low-tier cities, some lenders may relax their underwriting standards as sales come under pressure; the potential changes in interest subsidy policies would also affect borrowers’ preference for the down payment ratio. Considering the diverging residual values among different types of EVs under various brands, the proportion of each type of EV included as underlying asset will also affect the overall credit performance of the asset pool.
- **Collection methods for different originators and financial products deserve attention.** Delinquent auto loans are collected primarily through borrowers’ cash payments rather than the vehicle repossession, leading to limited residual value risk for green auto loan ABS. Noteworthy, collection methods for different types of auto financial products may vary, such as the difference between auto loan and direct/sale-and-lease-back of auto lease in terms of vehicle ownership and disposal in the event of delinquency. Therefore,

we base our recovery assumptions on the recovery process and efficiency of different auto finance products and business modes.

- **EV manufacturers' ability to continue as a going concern is noteworthy.** Unlike ICE vehicles, EVs rely more on the ongoing services offered by their manufacturers amid rapid battery and intelligence technology updates. These services include warranty covering maintenance of BMS, MCU and VCU, provision of charging and battery replacement facilities, OTA software update, distant diagnosis service and etc. EV owners' driving experience and the vehicles' residual values would be impacted once EV manufacturers are unable to provide the post-sale support. For example, as soon as WM Motor entered into preliminary restructuring in October this year, its customers immediately underwent EV control system dysfunction, shortfall in auto parts and accessories and difficulty in disposing of the vehicle. This may weaken borrowers' willingness in making repayments. Hence, we take into account borrowers' reliance on EV manufacturers' ongoing services and support when assessing the residual value risk of EVs while at the same time placing a focus on manufacturers' operational risk.

Related Commentaries and Research:

- Green ABS Deep Dive: Turn the “Green” into “Gold” – Green Auto ABS Market Overview and Outlook
- Commentary: Understanding Our Approach to China Consumer Asset-Backed Securities
- China's Auto ABS Sector Deep Dive: 2023 Edition

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