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Shanghai, China



2023 Shanghai Auto Show Highlights and Take-Aways

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Automotive Committee*



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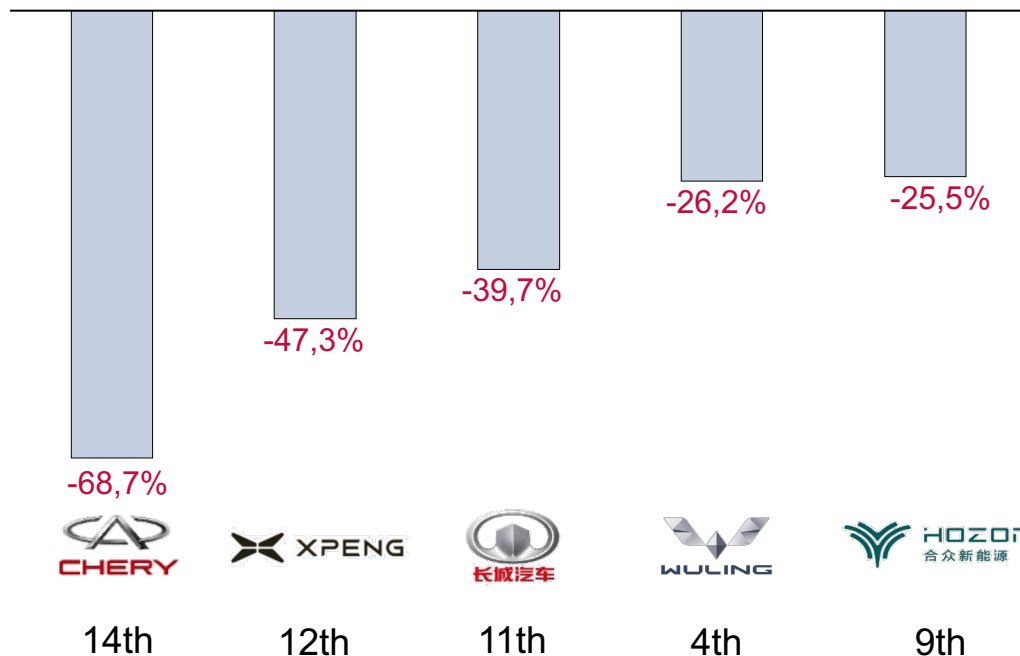
Key Takeaways from the 2023 Shanghai Auto Show

Key Takeaways

- **PV market is racing to the middle, with affordable upgrades available in aftermath of the price war**
 - BYD is the clear market leader, and its Seagull is a well equipped yet affordable electric vehicle that will democratize electric mobility
 - Low end of the market is falling off a cliff as mid-market EVs become more affordable
- **PHEV has emerged as a growth segment dominated by BYD and Li Auto**
 - BYD's Gen-4 DM platform has emerged as a competitive advantage
 - Geely and GWM are making great efforts in the segment
- **Smart EV makers lead their messaging with technology, immersive experience and services**
 - The sales trend of “three new forces” have diverged since recent product introductions
- **Fewer EV brands were present at this Auto Show: consolidation is unavoidable**
 - Some existing EV brands will lose their right to win in next two years if they could not hold a strong value proposition on affordability, digital experience, etc.
- **Great Wall Ora's “young girls” marketing strategy is controversial and (so far) ineffective**
- **Foreign carmakers are living in an alternate universe where incrementalism prevails**
 - Volkswagen is “shadow boxing”: its biggest rival of Volkswagen is itself
 - Carry-over interior/exterior designs, branding, and “vowel” nameplates are symptomatic of a larger problem of a basic lack of understanding
- **BMW's Ice Cream headache extends the PR nightmare for foreign carmakers**
 - Media presence was decidedly local, and social media amplifies clickbait stories

Several NEV brands are facing precipitous double-digit declines in 2023

Worst performing NEV brands in 23Q1
(in terms of YoY Retail PV sales)

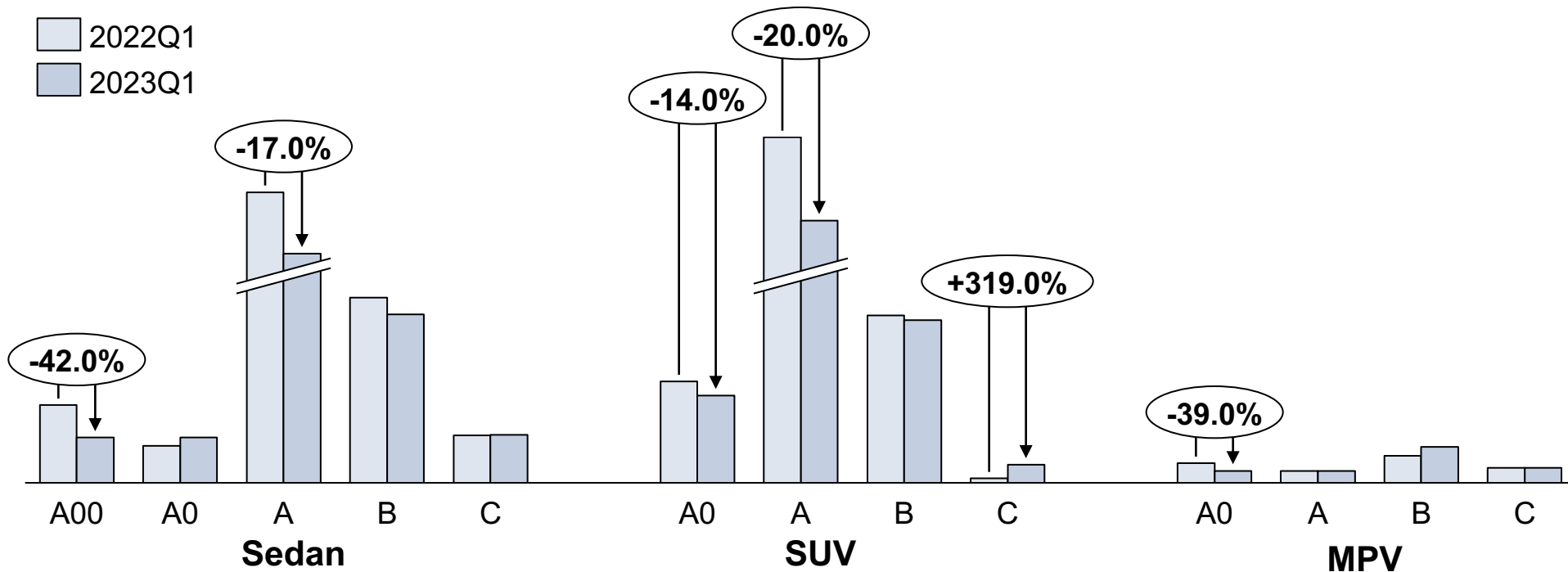


China's NEV market is "racing to the middle"

- Target customer demographic for low-end EV brands is more **impacted by overall economic weakness** and are less likely to purchase new vehicles
- Price war** initiated by Tesla pushes retail prices of mid-market segment into competition for "upgraders" seeking more
- BYD** is now offering several value-priced models (Ocean series: Seal, Dolphin)
- ICE brands are clearing inventory** by offering huge discounts

PV market is racing to the middle, with affordable upgrades available in the aftermath of the price war

Retail PV sales, by segment, 2022Q1 - 2023Q1



Comments

- Total retail PV sales declined 13% yearly in 2023Q1. The biggest declines are in the **A00 Sedan** and **A0 MPV** segment, and the C SUV segment has increased 319%.
- PV customers who were **shopping entry level** vehicles are now **racing to the middle** market. And the demand for family vehicles is **still strong after doubling growth in 2022**.

Source: Desktop research, Automobility analysis

BYD Seagull is a well equipped yet affordable electric vehicle that will democratize electric mobility



Exterior



Interior



Safety Configurations



Rear Seats

Details

- Pure electric mini-car
- Length/ width /height: 3780*1715*1540 mm
- Battery: **30kwh (Sodium)** / 38kwh (Lithium)
- Range (CLTC): 305/ 405km
- **Max speed: 130km/h**
- Power output: 55kw
- **Display size: 10-inch**
- Fast-charging: 80% in 0.5 hour
- Four airbags as standard configuration (2 optional)
- **Price: 78.8-95.8k RMB**

Seagull will crush all other mini EVs with abundant size, digital features and safety upgrades (1/2)

	BYD Seagull	Wuling Mini EV	Changan Lumin	Dongfeng Mini EV	Chery QQ EV
Price / RMB	78.8k	70.8k	69.9k	59.1k	57.5k
Size / mm	3780*1715*1540	3089*1521*1604	3270*1700*1545	2995*1495*1640	3033*1496*1656
Wheelbase / mm	2500	2010	1980	1960	1960
Range / km	305	300	301	220	170
Battery / kwh	30	26.5	28	16.8	13.9
Max speed / kw/h	130	100	100	100	100
Power output / kw	55	30	35	30	20
Display size	10-inch	-	10-inch	-	8-inch
Power window	Front & Rear	Front	Front	Front	Front
Internet of Vehicle	4G	-	-	-	4G
Fast-charging	80% in 0.5 hour	-	-	-	-
Voice control	●	-	-	-	●

Notes: ● Equipped - Not equipped

Source: Desktop research, Automobility analysis

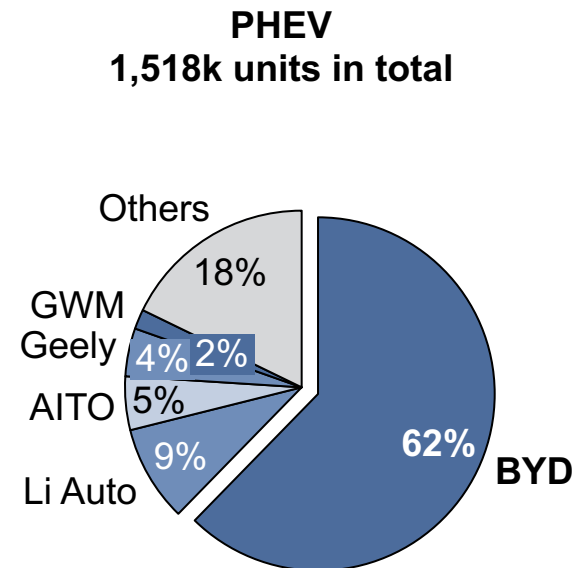
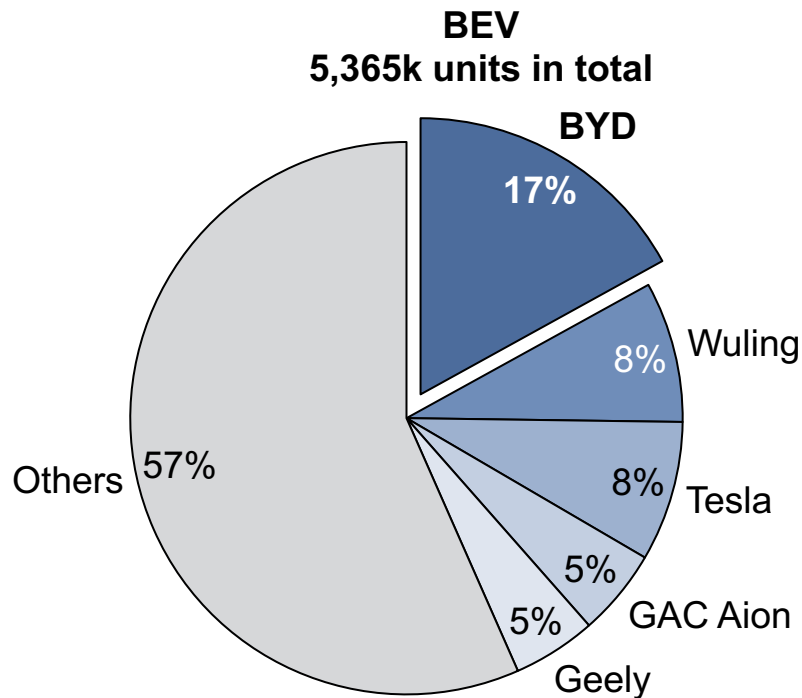
Seagull will crush all other mini EVs with abundant size, digital features and safety upgrades (2/2)

	BYD Seagull	Wuling Mini EV	Changan Lumin	Dongfeng Mini EV	Chery QQ EV
Price / RMB	78.8k	70.8k	69.9k	59.1k	57.5k
EBA ¹	●	-	-	-	-
TCS ²	●	-	-	-	-
ESP ³	●	-	-	-	-
CCS ⁴	●	-	-	●	-
KSS ⁵	●	-	-	-	-
Electric-controlled side mirrors	●	-	-	●	-
Airbags	4	1	2	1	1
Camera	1	-	1	-	-
Ultrasonic radar	3	-	2	-	-
Speakers	4	2	2	2	2

Notes: ● Equipped - Not equipped 1. EBA: Emergency Brake Assist. 2. TCS: Traction Control System. 3. ESP: Electronic Stability Program. 4. CCS: Cruise Control System. 5. KSS: Keyless Start System.
Source: Desktop research, Automobility analysis

BYD is the clear leader in the BEV category and is completely dominating the PHEV category

BYD's share in NEV, by segments, 2022



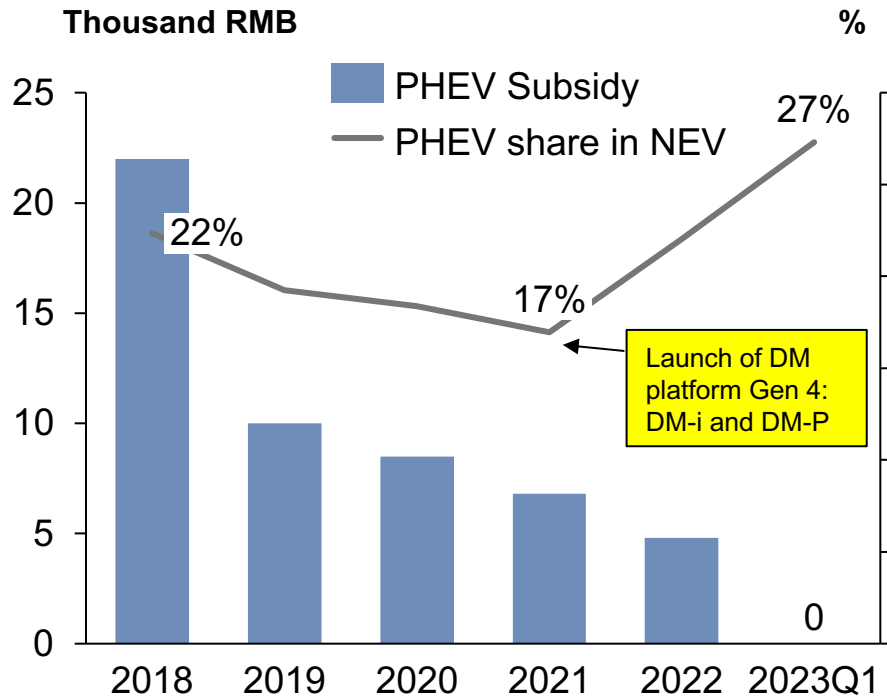
Comments

- **BYD sold more PHEVs (946k) than BEVs (911k) in 2022**, taking 62% market share of PHEV in 2022. And its **PHEV dominance widened in 2023Q1, reaching 65.4%**.
- “Other” PHEV players include sino-foreign JVs like VW, Audi and Mercedes, but none of them has achieved a 1% market share.

Source: Desktop research, Automobility analysis

PHEV share of NEV has been increasing since 2021 even as subsidies are decreasing

Subsidy and share of PHEV, 2018-2023Q1



Comparison among BEV, PHEV and ICE

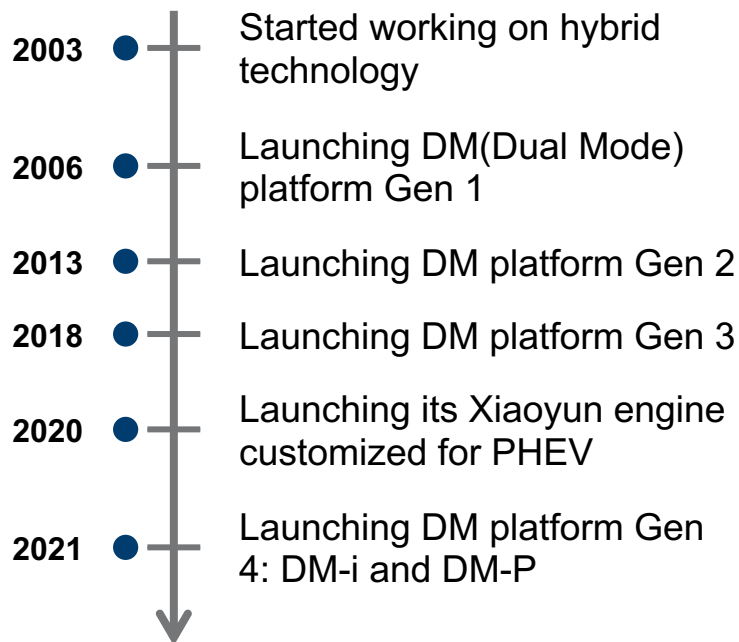
Category	BEV	PHEV	ICE
Model	BYD Qin EV	BYD Qin DM-i	VW Lavida
Range	510km	55km(battery) +1200km(fuel)	800km
Price	139.8k	99.8k	120.9k
Fuel consumption per 100km	-	3.8L	6.5L

PHEVs deliver longer range, lower fuel consumption and also qualify for free NEV license plates (until 2023).

Source: Desktop research, Automobility analysis

BYD began R&D on PHEV in 2003 and launched an engine configuration optimized for PHEV in 2021

History of development of BYD DM platform



BYD's Xiaoyun 1.5L engine customized for PHEV



Comments

- BYD 's PHEVs are **cheaper than their BEV version**, while other OEMs choose to sell the PHEV versions more expensive than the BEV versions.
- BYD's cost advantages are due to **the vertical integration of engines and batteries**.

BYD dominance in PHEV segment will be challenged by Geely and Great Wall



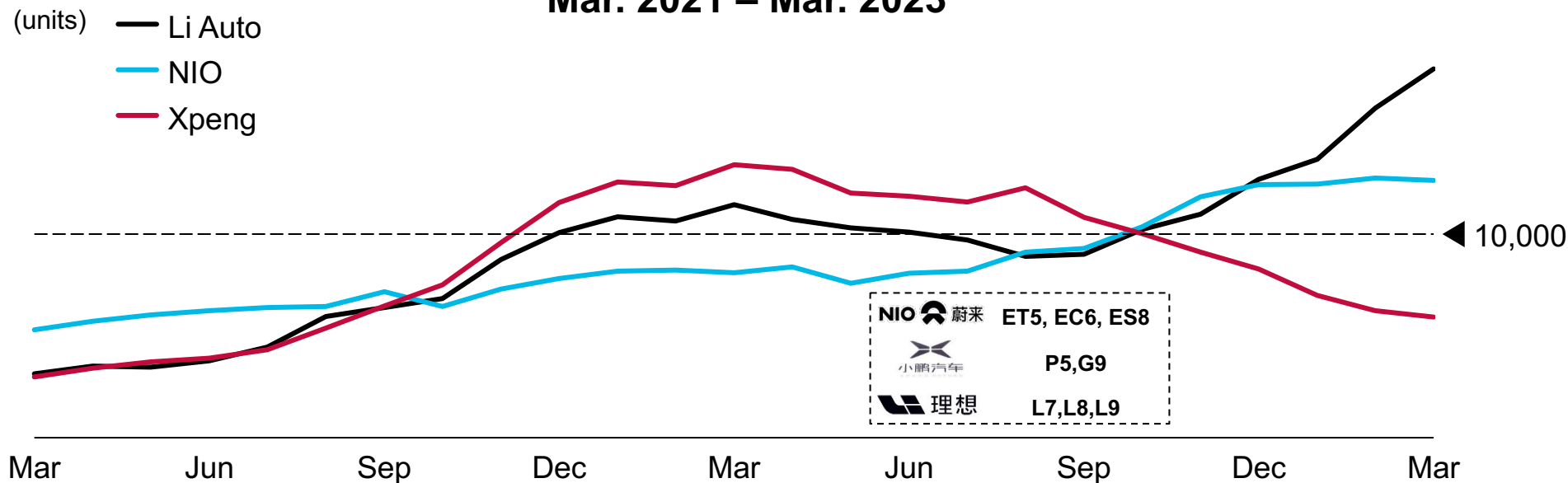
Comments

- Geely launched its **customized engine** for PHEV which will be firstly carried on Galaxy L7. The engine has **the highest thermal efficiency** among all mass production types.
- **4 of Great Wall's 5 brands** have launched PHEV products. And Great Wall has made plug-in hybrid products its **main products in mainstream price range**.

Source: Desktop research, Automobility analysis

A clear separation is emerging among the Smart EV players in China since their recent launches

Sales of EV new forces, rolling 6m average
Mar. 2021 – Mar. 2023



Comments

- The sales trend of three EV new forces went very differently after **the second tie in September 2022** mainly due their product strategies.
- All three brands have **launched new models** during June to September 2022. And Tesla has started its **price war in China** in October 2022.

Li Auto announced its intelligence and pure electric strategy with AD MAX 3.0 and fast charging solutions

Intelligence and Pure Electric Strategy



Li Auto L7 Pro



Li Auto L8 Pro



Comments

- Li Auto unveiled its all-electric solution starting with introductions of its fast-charging plan. The coming BEV models will be equipped with **the latest 4C batteries of CATL**, featuring **800V super charging solution**.
- Li Auto launched its flagship 5-seat family SUV L7 Pro and its **proprietary ADAS solution- Li AD Pro**, powered by **Horizon's Journey 5 computing solution** in Feb 2023. The ADAS function will be provided as standard configuration for all Li Auto models.

NIO: Launching ES6, ET7 and EC7



ES6
Face-lifting
BEV SUV
396-554k RMB



ET7
Face-lifting
BEV Sedan
458-536k RMB



EC7
BEV Coupe SUV
488-578k RMB



NIO User as Volunteer

Comments

- NIO announced the face-lifting models **ES6 and ET7** which will be delivered in June 2023. And NIO exhibited EC7 which is newly launched on the NIO day in 2022.
- Besides new models, NIO also promised to set up **over 1,000 battery swapping stations and over 10,000 chargers in 2023**, which is doubling the size of its current battery swapping / charging network.
- NIO listed the **NIO users** who serve **as volunteers** in the Auto Show.

Xpeng: Launching SEPA 2.0 BEV platform and a pure electric SUV G6



SEPA 2.0
Newly launched
BEV Platform



G6
Newly launched
BEV SUV

Comments

- XPeng's announcement is an example of an EV business with **“digital DNA planning its technology roadmap”**.
- The foundation of smart EVs is built on **integrated electronics and software** that can be continually and frequently upgraded without changing the base hardware platform.”
- XPeng vehicles will succeed or fail based on whether the market assigns value to the unique user experience made possible with this software defined architecture

Great Wall Ora's risky "for the ladies" move



Comments

- As the only BEV brand of GWM, Ora has **focused on female customers** since its inception and continued with this theme at the Auto Show.
- GWM is mostly known for its full-size SUVs and pick-ups, which are typically considered as targeting male consumers, Ora brand **produces models tailored for females**.
- It is doubtful **whether targeting a specific gender is an effective strategy for consumer products** like vehicles, smartphones and PCs. Prior marketing efforts have proven that such an explicit tactic is ineffective as it is not inclusive of all buyer demographics.
- Ora announced as of now **75% of its customers are female**, while the average in EV is 34%. Ora sold 100k units in 2022, accounting for 1.5% in China NEV market.

Source: Desktop research, Automobility analysis

Volkswagen is competing with...Volkswagen



Comments

- Traditional carmakers (including legacy Chinese) think of making EVs as a **retrofit to their traditional cars** carrying over the same HMI and combustion engines (for EREVs), which is a mistake and reflects a **finance-driven carry-over mentality**. Slapping a vowel (most are using e- or i-) is symptomatic of this.
- EVs are tech and must be conceived as such. Tech features that are exclusive to the NEVs must be developed. **Architectures must be electronic and user experience rich in HMI and software-defined.**

Source: Desktop research, *Automobility analysis*

A PR “ice cream headache” comes for the Europeans on top of the presence of premium Chinese NEV competition



Comments

- BMW Mini's PR response about the ice cream incident made matters worse. But this is not the first time that foreign brands were tangled in negative news at the Auto Show. **Foreign carmakers feel like they are being targeted.**
- **Rising competitiveness of local OEMs** in the NEV market, with the **presence of several premium priced entries** in the market place **added pressure on premium carmakers.**
- Foreign brands are being attacked by emboldened competition across all price ranges. **A PR nightmare that further weakens the image of foreign brands among Chinese consumers** comes at the worst possible time.
- Foreign media was under-represented, and **press representation was decidedly local.** and **social media amplifies clickbait stories.**

Source: Desktop research, Automobility analysis

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BYD: Launching Seagull, Destroyer 07, Song L and U8



Seagull
Newly launched BEV
78.8-95.8k RMB



Destroyer 07
Newly launched PHEV
Undisclosed



Song L
Concept BEV
Undisclosed



Yangwang U8
BEV SUV
1,098k RMB

Comments

- All sea animal models in BYD's Ocean series are BEV, and all ship models are PHEV.
- BYD's Seagull would be the top-seller of NEV in months. As an entry level small BEV, Seagull provides **an upgrade solution** for those previous Wuling Mini EV customers with a slightly higher price.
- Yangwang U8 is **the most expensive** mass production model by **local OEMs**.

Geely: Launching Zeekr X and its Europe strategy



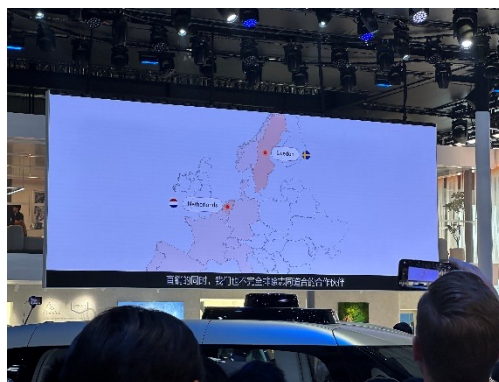
Zeekr X
Newly launched
BEV SUV
189.8-229.8k RMB



Zeekr 001
Pervious model
BEV Hatchback
300-403k RMB



Zeekr 009
BEV MPV
499-588k RMB



Zeekr Going EU Strategy

Comments

- As a luxury intelligent pure electric brand that was just established two years ago,, **Zeekr 001 became the best-selling pure electric car model above 300,000 RMB in China in 2022**, and Zeekr 009 became the best-selling luxury MPV model above 500,000 RMB after only 3 months of delivery.
- **Zeekr is expanding into Europe**, with its initial targets being the Netherlands and Sweden. Currently, it is only sold directly, but it is also considering establishing partnerships with dealers in the future.

Geely: launching Lynk & Co 08 and Galaxy L7



Lynk & Co 08
Newly launched
PHEV SUV



Lynk & Co
The Next Day
Concept Car



Galaxy L7
Newly launched
PHEV SUV



Comments

- The Lynk & Co 08 comes with "electricity" and announces the release of the **EM-P super-long-range electric power solution** based on the CMA Evo new architecture.
- Geely also brings the prototype concept car of Lynk & Co 08 called "The Next Day"
- Geely officially releases the intelligent cockpit of the Geely Galaxy L7, the "**Smart Love Cockpit**" which is equipped with the "8155 flagship cockpit chip + Geely Galaxy exclusive native intelligent cockpit system Galaxy N OS."
- The Smart Love Cockpit is a **super intelligent terminal** that combines "high appearance, dual computing power, easy operation, full sensory experience, and global FOTA." It is committed to meeting the whole family's beautiful yearning for intelligent travel and life.

GWM 5 sub brands: Haval, Wey, Tank, Poer and Ora



**Haval
PHEV SUV**



**Wey Blue Mountain
PHEV SUV**



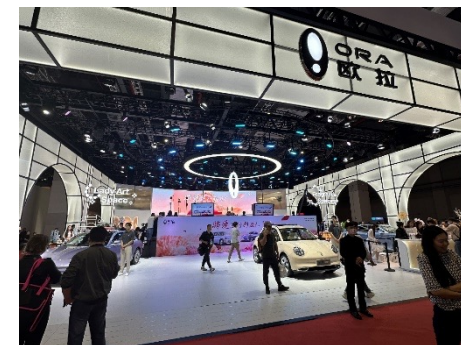
**Wey High Mountain
PHEV MPV**



**Tank 500
PHEV SUV**



**Poer
PHEV Pickup**



**Ora
BEV Hatchbacks**

GAC Aion: launching Hyper



**GAC Aion Hyper
Supercar**



**GAC Aion Y Plus
SUV**



**GAC Aion S Plus
Sedan**



**GAC Aion LX Plus
SUV**

Comments

- The **second BEV Brand of GAC AION, Hyper** has started receiving orders from the launching of Shanghai Auto Show
- Hyper's price ranges from 200k to 340k RMB, which is considered a **strong competitor to TESLA model 3**
- All models of the HyperGT series are equipped with the **second-generation magazine battery system safety technology** that was previously announced, and each model also has its own highlights to look forward to. For example, the 560 Seven-wing version priced at 245,900 RMB comes standard with the much-discussed "Wind Dance Rotating Wings." The so-called "Seven-wing" refers to four rotating wing doors and a three-stage tail wing, making the HyperGT the only GT sports car in the 300,000 RMB level with these two designs.

Other NEV products



**Hycan V09 Atelier
Concept Car**



Volvo EX90



Polestar 4



**MAXUS GST
Concept car
BEV Pickup**



**AITO M7
Previous model
PHEV SUV
289.8-379.8k RMB**

International companies have been setting more hydrogen R&D centers and production lines in China

Toyota setting the first overseas fuel cell plant in Beijing



- Toyota's fuel cell R&D center and production project has landed in Beijing and will be completed by the end of 2023 and put into mass production in 2024.

Bosch setting production lines of fuel cell parts in Wuxi



- Bosch and Wuxi sign strategic cooperation agreement to accelerate localization and commercialization of hydrogen fuel cells and commercial vehicle electrification.
- Bosch launched first production line of high-volume membrane electrodes assembly (MEA) in Wuxi in early 2023, and plans for local production of bipolar plates in 2025

Source: Desktop research, Automobility analysis

Fuel cell PVs in 2023 Shanghai Auto Show

Toyota Mirai
Launched in 2020



Toyota Corolla Cross
Concept Car



BMW i5
Launched in 2022



Hyundai N Vision 74
Concept Car



Hyundai NEXO
Launched in 2018



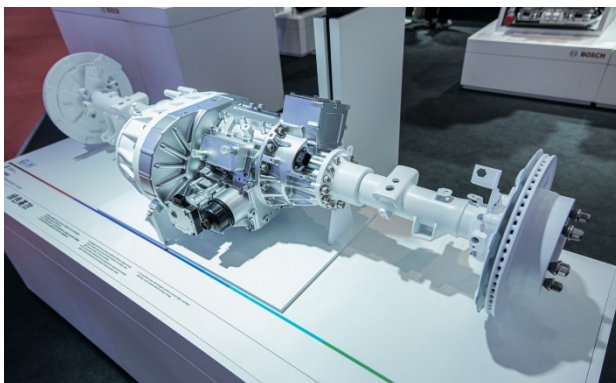
Changan S7
Launched in 2023



Source: Desktop research, Automobility analysis

Fuel cell systems in 2023 Shanghai Auto Show

Bosch's 190kw Fuel Cell Power Module



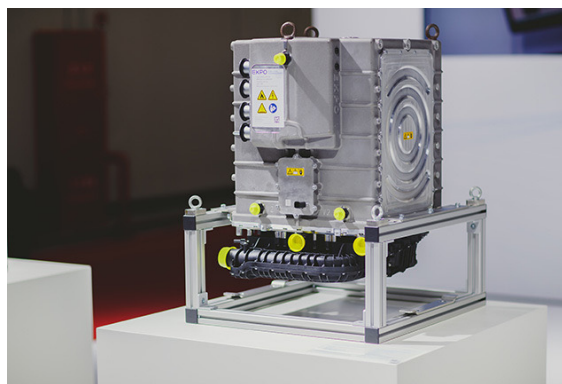
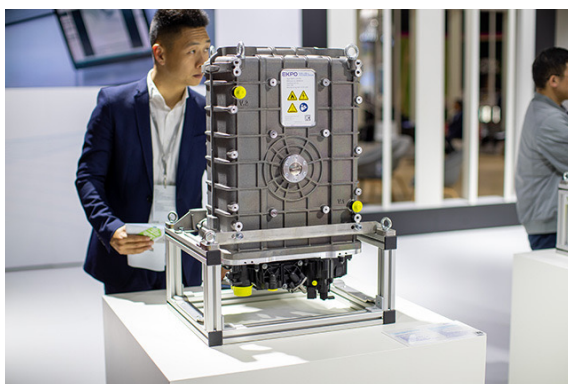
Plastic Omnium's Hydrogen Type IV Vessel



Comments

- Bosch launched its 190kw hydrogen power module to expand its portfolio. And a 250kw power module is under development.
- Plastic Omnium signed a joint venture agreement with Sheneng Group to produce and sell **high-pressure hydrogen storage systems** in Jan 2023. The pilot production line will complete in 2025, followed by the new gigafactory in 2026, with an annual capacity of 60,000 high-pressure hydrogen vessels.
- The JV of ElringKlinger and Plastic Omnium has released their fuel cell system solutions for PV, CV, railway and ships.

EKPO's Fuel Cell Systems



Source: Desktop research, Automobility analysis