About NIO

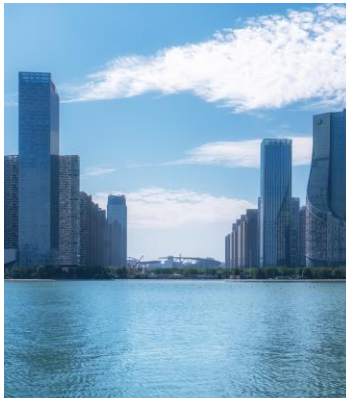
NIO was founded in November 2014. Drawing inspiration from the English phrase “A NEW DAY”, the brand name of NIO embodies the pursuit of shaping a sustainable and brighter future together.

NIO is the first car company listed on the NYSE, HKSE and SGX. NIO currently has two major brands under its umbrella: NIO and ONVO. Nine years into establishment, NIO is one of the leading companies in the global premium smart electric vehicle market.

Aiming to foster its own research and development capabilities for core technologies, NIO has developed NIO Full Stack, a collection of 12 technology domains. NIO has R&D centers and manufacturing facilities in Shanghai, Hefei, Beijing, Nanjing, Shenzhen, Hangzhou, Wuhan, San Jose, Munich, Oxford, Berlin, Budapest and Singapore. Its sales and service networks also have an expansive reach in over 300 cities in China, Norway, Germany, the Netherlands, Sweden and Denmark. NIO has eight smart electric models in its lineup, The first product of ONVO will be launched in September 2024.

A Global Smart EV Company

Shanghai
Global Headquarter
R&D Center of Mass-Production Vehicles



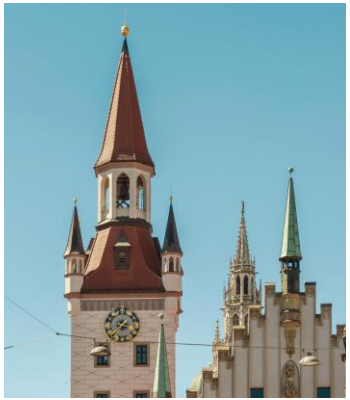
Hefei
NIO China headquarters
Advanced vehicle
Manufacturing center

Beijing
Global R&D Center of Software

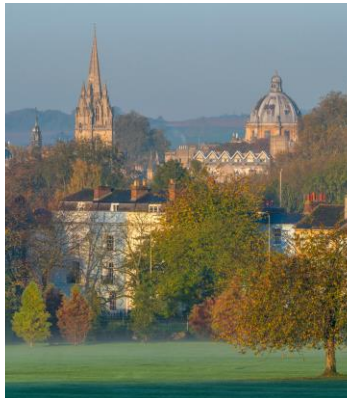
NanJing
Electric drive system
Manufacturing base

Berlin
NIO Europe Innovation Center

San Jose
NIO Autonomous Driving R&D Center



Munich
Global Design Center



Oxford
Advanced Engineering R&D Center

Budapest
R&D Center of NIO Power Products

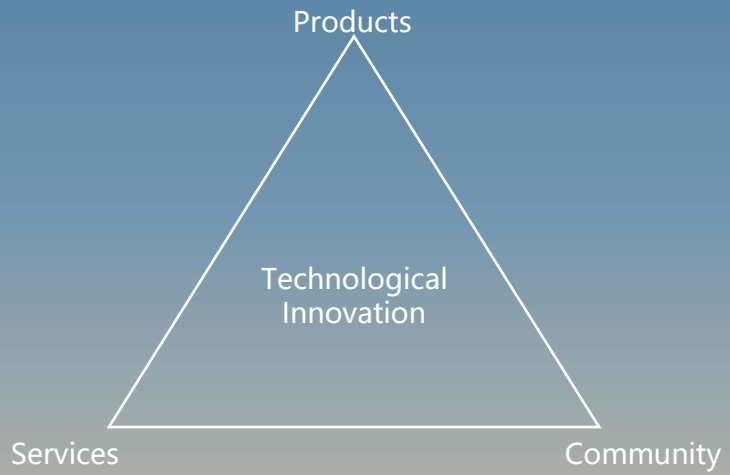

VISA
mouser.co
BELL
ion
Henkel
TAG
HEUER
QUALCOMM
NEXTEV
Formula E
Champion
2015
Inaugural FIA Formula E
Drivers' Championship

On May 12, 2017, NIO EP9 broke the lap record at the Nürburgring Nordschleife, Germany with a lap time of 6:45.90, joining the league of the world’ s fastest EVs.


On June 28, 2018, NIO delivered the ES8, its first production model, to users.
As of July 31 2024, NIO had delivered a cumulative total of 557,518 vehicles.

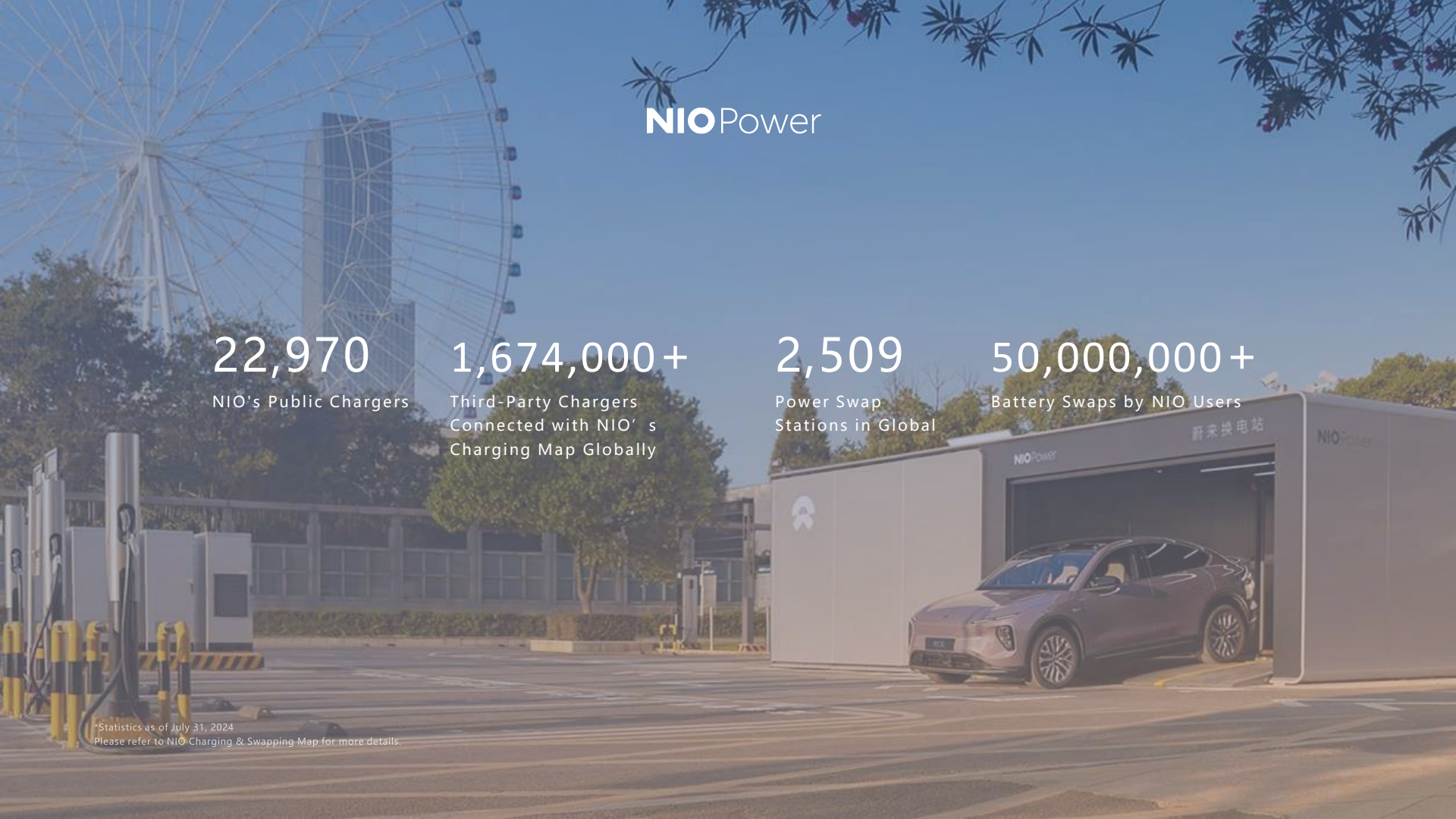
A Smart EV Company from China

Centering on technological innovation, we provide experiences beyond expectations for users with our products, services, and community.



RECHARGING BEYOND REFUELING

NIO Power



22,970
NIO's Public Chargers

1,674,000+
Third-Party Chargers Connected with NIO's Charging Map Globally

2,509
Power Swap Stations in Global

50,000,000+
Battery Swaps by NIO Users

*Statistics as of July 31, 2024
Please refer to NIO Charging & Swapping Map for more details.

NIO Power Swap Station 4.0

Power Swap Stations shared by multiple brands Compatible with different battery packs

23	480	-22%	60m²	1016	4
Battery Slots	Max. Daily Service Capacity (Swaps)	Less Time for Each Swap	Rooftop PV System	TOPS of Computing Power per Station	NVIDIA Orin X Chips

INNOVATIVE BATTERY SWAPPING TECHNOLOGY

9 advantages of NIO battery swapping

1 As fast as refueling

2 Go anywhere anytime without range anxiety

3 No need to get off the car in the fully automated process, easier than charging

4 Flexible battery upgrade
Smaller volumes for commuting and bigger volumes for long trips

5 Lower car purchase threshold with battery separated from the vehicle

6 Safer batteries for better experience during each swap

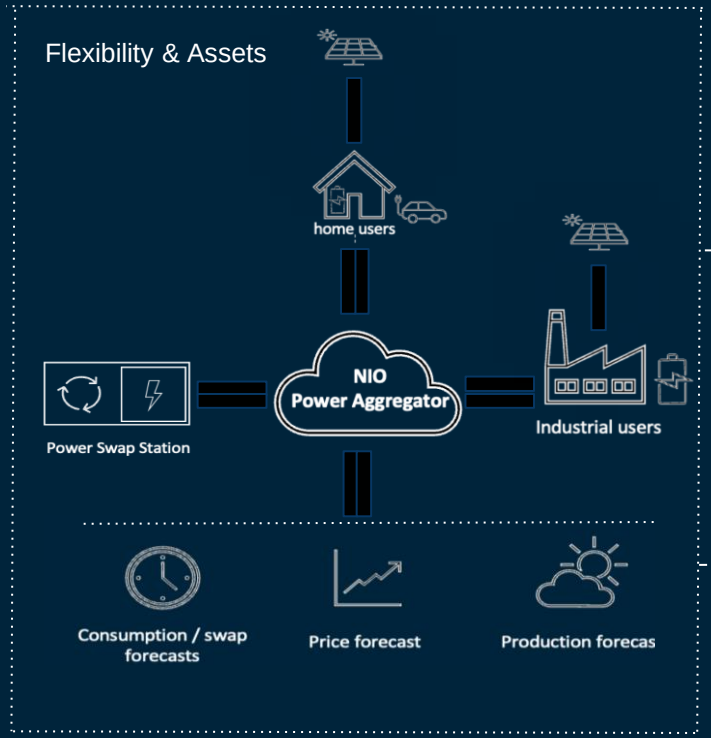
7 Faster than super charging with optimized charging current and longer battery life

8 Flexible disassembly
for easier battery recycling and reuse

9 Peak shaving and waste reduction from vehicle-grid interactions

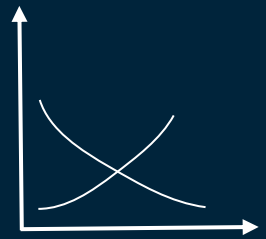
NIO Power Trading and Grid Solutions

Business Overview of NIO Power Trading and Grid Solutions



Power Trading

Grid Service



Energy market

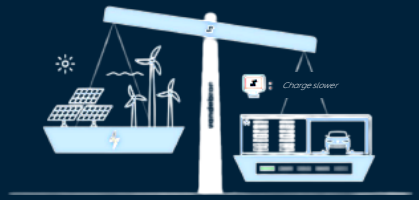
-Wholesale Trading

Grid Ancillary service market

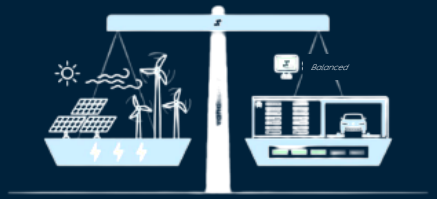
-Frequency regulation
-Voltage regulation
-Grid bottleneck management

Demonstration of Providing Balancing Services via Power Swap Stations

NIO cars swap empty battery to full one
at NIO Power Swap station



When there is **not enough sustainable energy** on the grid, the charging of the batteries is **delayed**



NIO power swap stations balance the energy grid by scaling up and down charging remotely.

In pilot phase

EU Power Trading and Grid Service Products

2023

- Denmark (FCR-D)

Smart Charging

2024

- Denmark (FCR-D)
- Germany (V2G, Wholesale Trading)
- Sweden (FCR-D)
- Netherlands (aFRR)

Smart Charging

2025

(All 5 EU countries)

- Denmark (FCR-D)
- Germany (aFRR, V2G, Bi-PUS3.0 Wholesale Trading)
- Sweden (Bi-PUS3.0 FCR-D)
- Netherlands (aFRR)
- Norway (FCR-D, Nodes Flex, Demand Response)

Smart Charging

NIO Power
Europe

- **56 Power Swap Stations**
- **22 Power Charger Stations**
- 600,000+ accessible 3rd party chargers

*As of 5th September, 2024 in Europe

Use Case: EU PSS Smart Charging

Optimize operational efficiency:

Nio collaborate with energy suppliers to access dynamic spot prices.

Infrastructure Excellence:

Forecasting the minimum fully charged batteries needed for effective swapping activities with improved algorithms.

Real-time Monitoring:

PSS offers real-time monitoring and instant power adjustment capabilities.

Market Success:

In principle, all PSS in Europe can enable smart charging mode, resulting in approximately 24% savings on electricity costs.

Smart Charging

Examples of a typical day ahead price profile

- Optimize the charging process according to Day-Ahead electricity price fluctuations to minimize costs
- The cloud can predict battery orders and create intelligent strategies
- Ensures optimal user power exchange experience
- Strategically shifts battery charging to cheaper times to minimize costs.

Use Case: FCR-D in Denmark

Robust FCR-D Services:

PSS provides Frequency Containment Reserve for Disturbance (FCR-D) service to the Danish grid with swift response times.

Infrastructure Excellence:

Significant software and hardware enhancements ensure optimal performance for FCR services.

Real-time Monitoring:

PSS features real-time grid frequency monitoring and instant power adjustment capabilities.

Market Success:

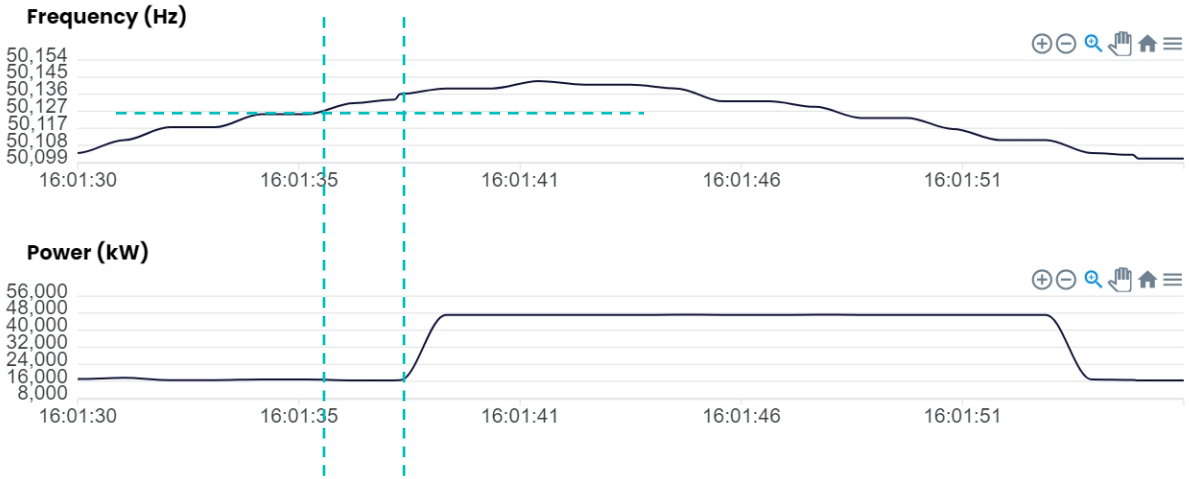
Successful entry into the Danish FCR-D market 2023.

Strategic Expansion:

In 2024 more PSS in Sweden will be operated under the FCR-D model.

NIOPower

FCR-D Operation



Examples of successful activations on 02.08.2024

- Reserve batteries monthly to guarantee the user's swapping experience.
- Bidding process in collaboration with third-party platform TrueGreen and the Nio's platform
- PSS dynamically adjusts its power charging response (below） in accordance with the fluctuations in the grid frequency (above)

Use Case: aFRR in the Netherlands

Robust aFRR Services:

PSS provides automatic Frequency Restoration Reserve (aFRR) service to the Dutch grid with swift response times.

Cloud solution:

all PSS are aggregated and coordinated by cloud to ensure aFRR service without influence on battery swapping.

Market Success:

Successful entry into the Dutch aFRR market in 2023.

Strategic Expansion:

Future exploration of the German market planned for 2024-2025.

aFRR Operation

- PSS is engaged by grid operators in instances of grid imbalance, requiring adjustments to the charging speed—either decelerating or accelerating, as needed.

August 21st 2024, the power swap station in NL Tilburg successfully completed its first aFRR downward bidding

Use Case: Wholesale Trading in Germany

Strategic Wholesale Integration:

PSS seamlessly integrates with wholesale trading, enhancing flexibility and efficiency.

Market Connectivity:

Direct connectivity to wholesale markets enables real-time power trading opportunities.

Market Dynamics Optimization:

PSS leverages advanced algorithms to navigate market dynamics, maximizing trading opportunities.

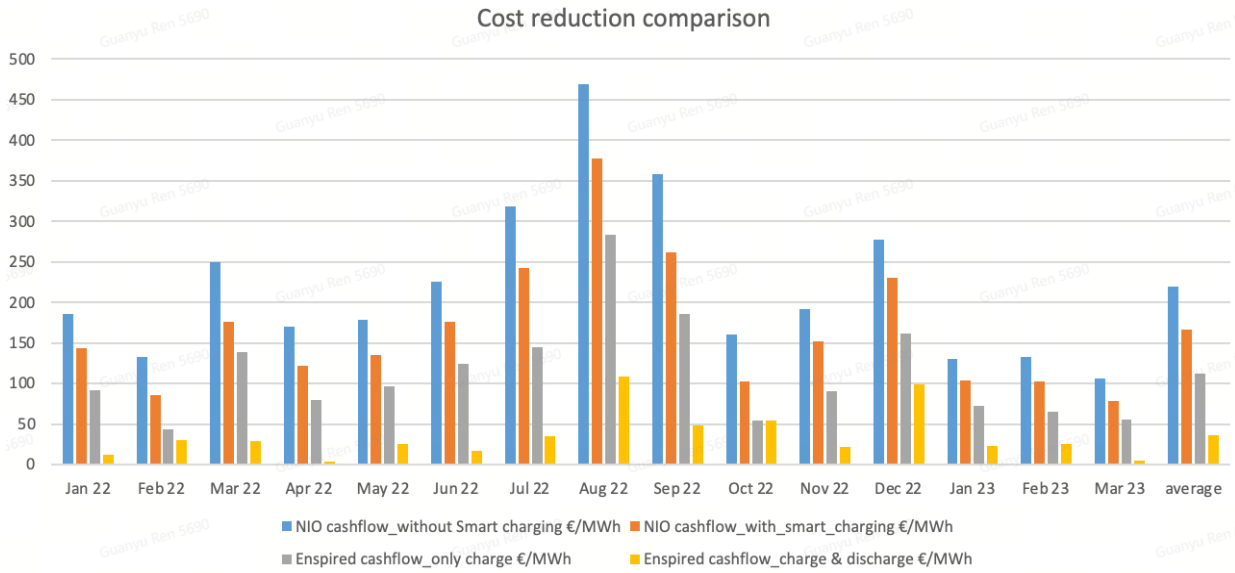
Risk Mitigation:

PSS mitigates trading risks through rapid response times and flexible power adjustment capabilities.

Integration with aFRR:

Possibility to combine with aFRR service in the future to maximize the revenues.

Use Case: Wholesale Trading in Germany



Based on a case study with 30 swaps daily

- NIO's smart charging, using 15-minute pricing data, can theoretically save up to 24%.
- Enspired's intraday trading algorithm can boost savings to up to 49%.
- Bidirectional power swap stations offer potential savings of up to 84%.

Use Case: Wholesale Trading in Germany

EPEX Spot Market Engagement / Optimized Charging Strategy / Arbitrage Trading Focus / Efficient Bidirectional PSS

Examples of successful trading test on 04.09.2024, cumulative traded volume 625 kwh

- Enspired's intraday trading algorithm integrates renewable energy generation forecasts with market price optimization.
- The dashboard displays the curves for day-ahead, intraday, and continuous prices, along with an imbalance price forecast for reference.
- Trades aim to occur in the lower price ranges within the forecasted window.