

Aachen Colloquium 2026

Advancing Future Mobility through Electrification and Battery Technology Innovation

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Hyundai Motor Group

Electrification Heritage

World-class electrification energy solutions enabling top-level safety and performance in eco-friendly vehicles.
Customer-centric electrification solutions across all vehicle segments.



HMG's Innovation Journey – Global Awards

HYUNDAI
MOTOR GROUP

Awarded Top 10 Engines for Hydrogen Fuel Cell Systems and Global Awards for Hydrogen Commercial Vehicles.
HMG recognized for innovation through global awards, including 4 straight “World Car of the Year” wins.

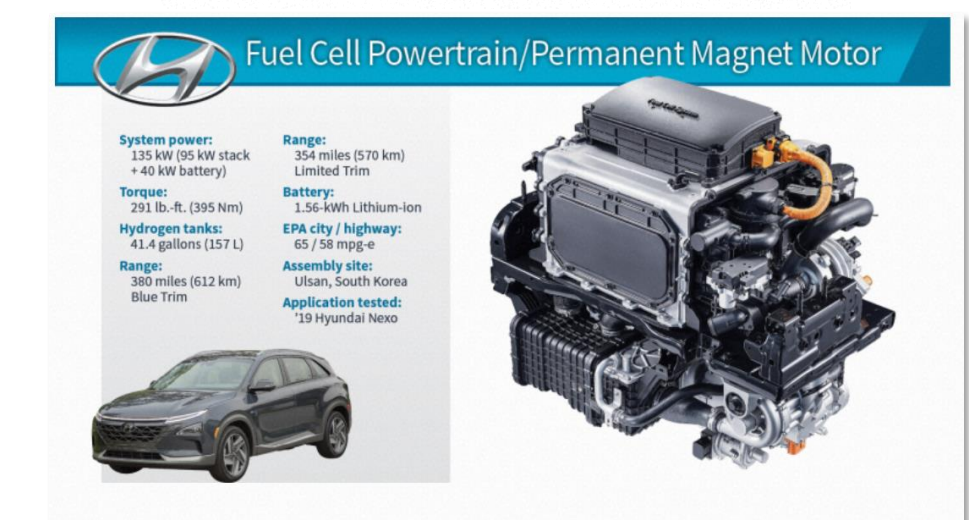


Awarded Top 10 Engines

WARDS
10 Best Engines & Propulsion Systems™



2015 Tusan ix



2019 NEXO

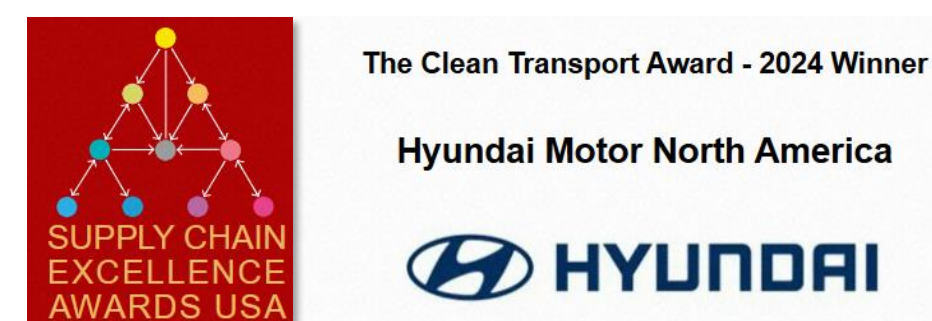
FCEV Global Awards



2020 International Truck of the Year – Innovation Award



2021 IAA Mobility Best Mobility Award (Alternative Energy)



The Clean Transport Award - 2024 Winner

Hyundai Motor North America

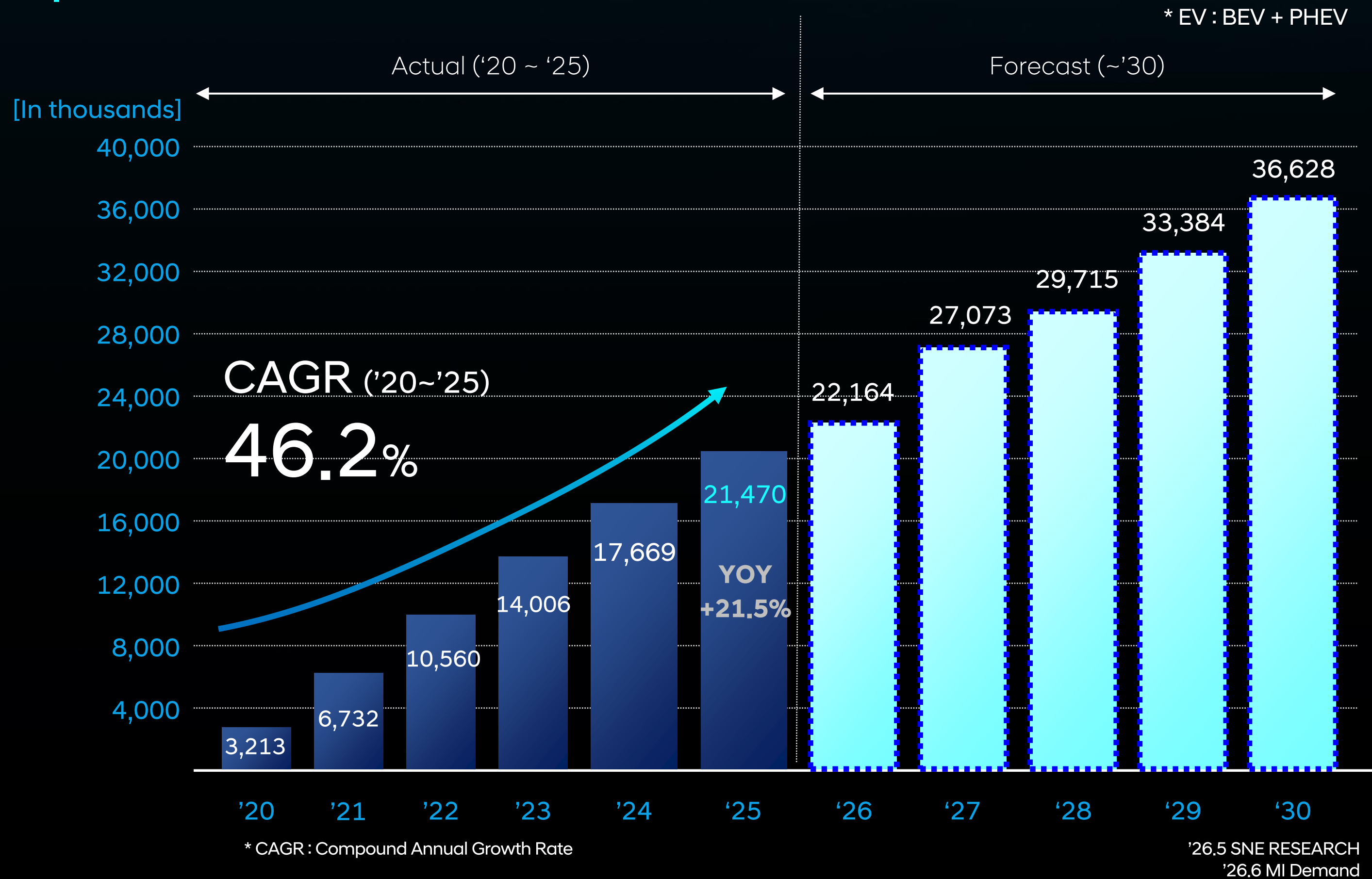
HYUNDAI

2024
Supply Chain Excellence Awards USA
-Clean Transport Award

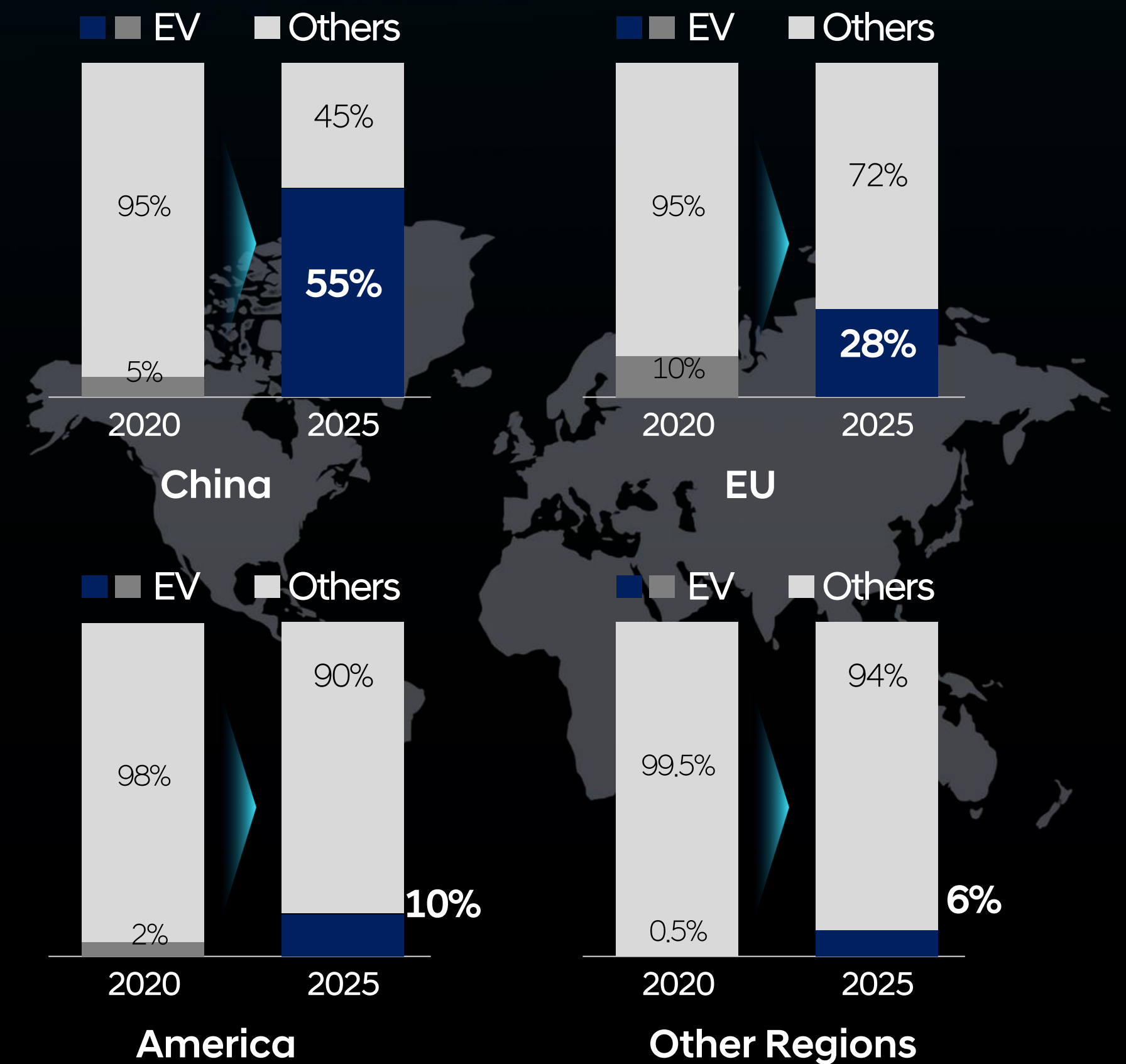
EV/Battery Market Trends

Global EV market topped 21M units in '25 (>20% share), expected to grow steadily to 36.6M by '30.
Developing regionally optimized EVs and batteries to address varying sales shares and consumer needs by region.

Global EV Sales Volume (~'30)



Global EV Sales Rate by Region ('20 vs '25)

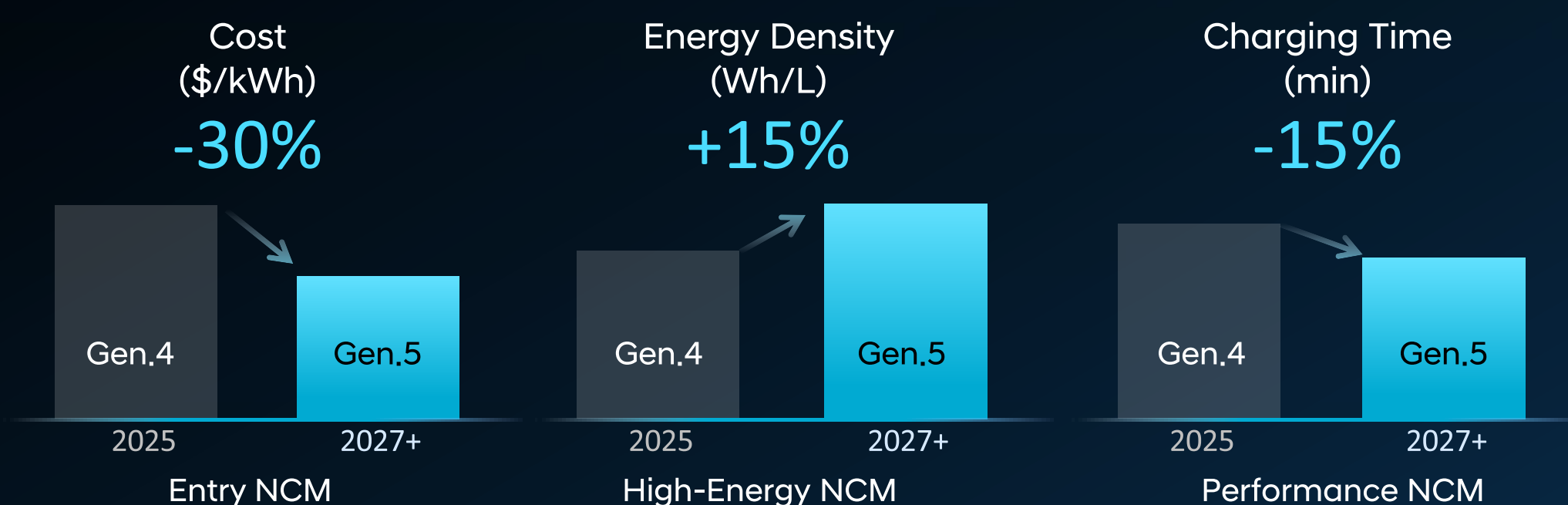
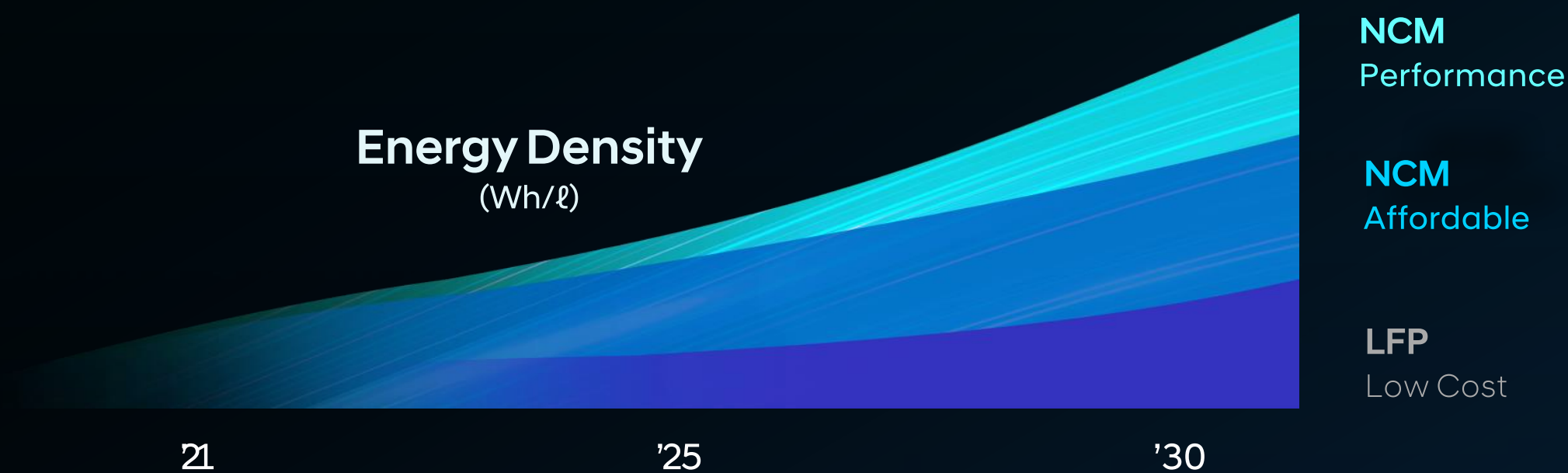


Battery Cell Technology Roadmap – HMG Competitiveness

Gen5 battery optimizes performance and cost by region/segment, improving EV marketability (materials/density/charging)
Proven durability and residual value based on results showing over 90% battery retention in 50,000 Ioniq 5s driven over 400,000 km

Enhance energy density

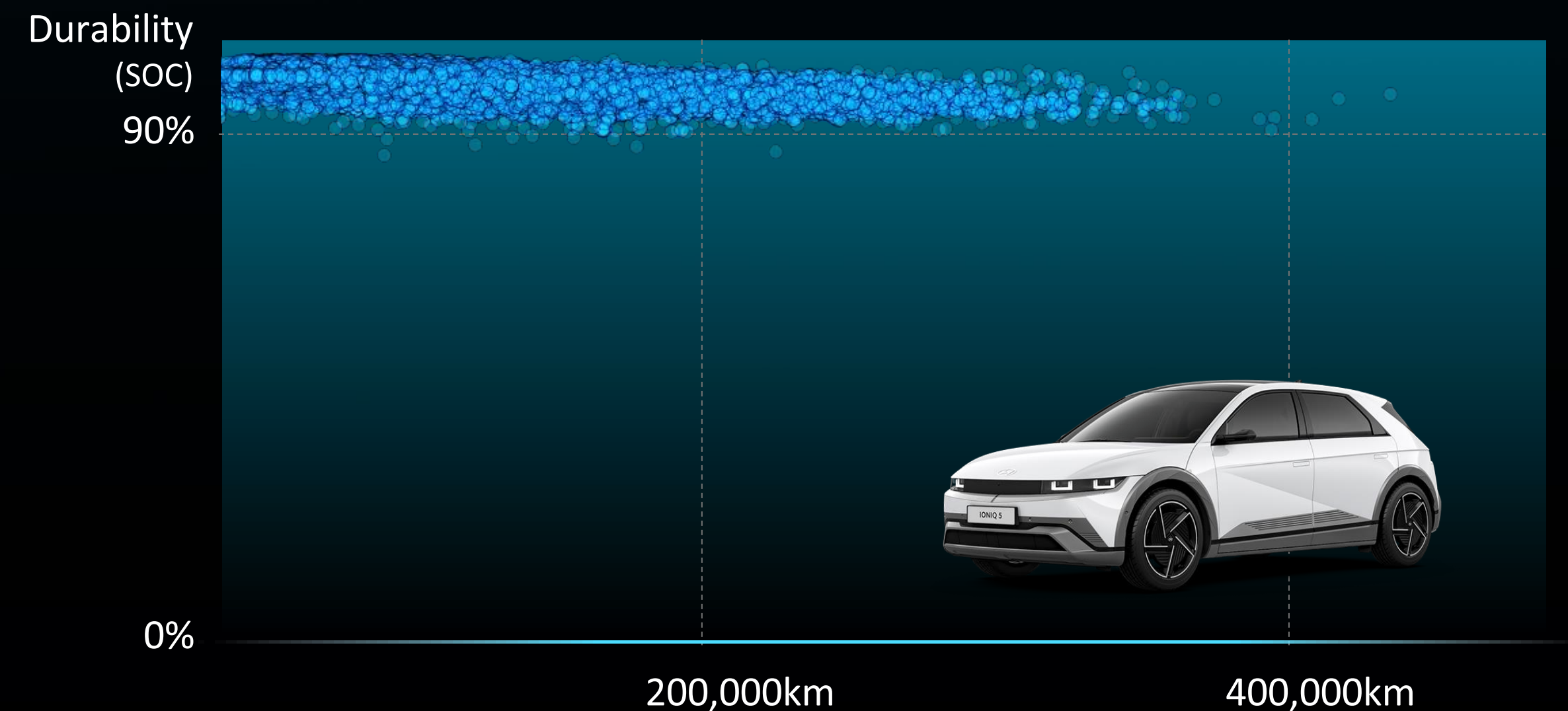
- Energy density will be improved by over 20% compared to the current level by 2030
- Diversify chemistries for various EV solutions



To enhance customer satisfaction by improving BEV total cost of ownership (TCO) and driving experience

Battery durability performance

Verification on 50,000 IONIQ 5 vehicles shows
more than 90% battery life retained even after 400,000 km of driving



High battery durability helps preserve residual value and lowers warranty costs

Battery Cell Technology Roadmap – In-house Design

Internalizing HMG batteries through gradual technological accumulation

Phase1. First in-house developed battery

SantaFe HEV



Detailed Specs

Cell	Type	Pouch
	Cathode material	NCM
	Manufacturer	SK ON (contract production)
System	Energy	1.49 kWh

Joint development based on in-house cell design + contract manufacturing by battery maker

- Mass-producibility of HMG design validated through battery maker development tests
- Achieves cost reduction and supply stability
- Lays the foundation for standardizing and internalizing design know-how

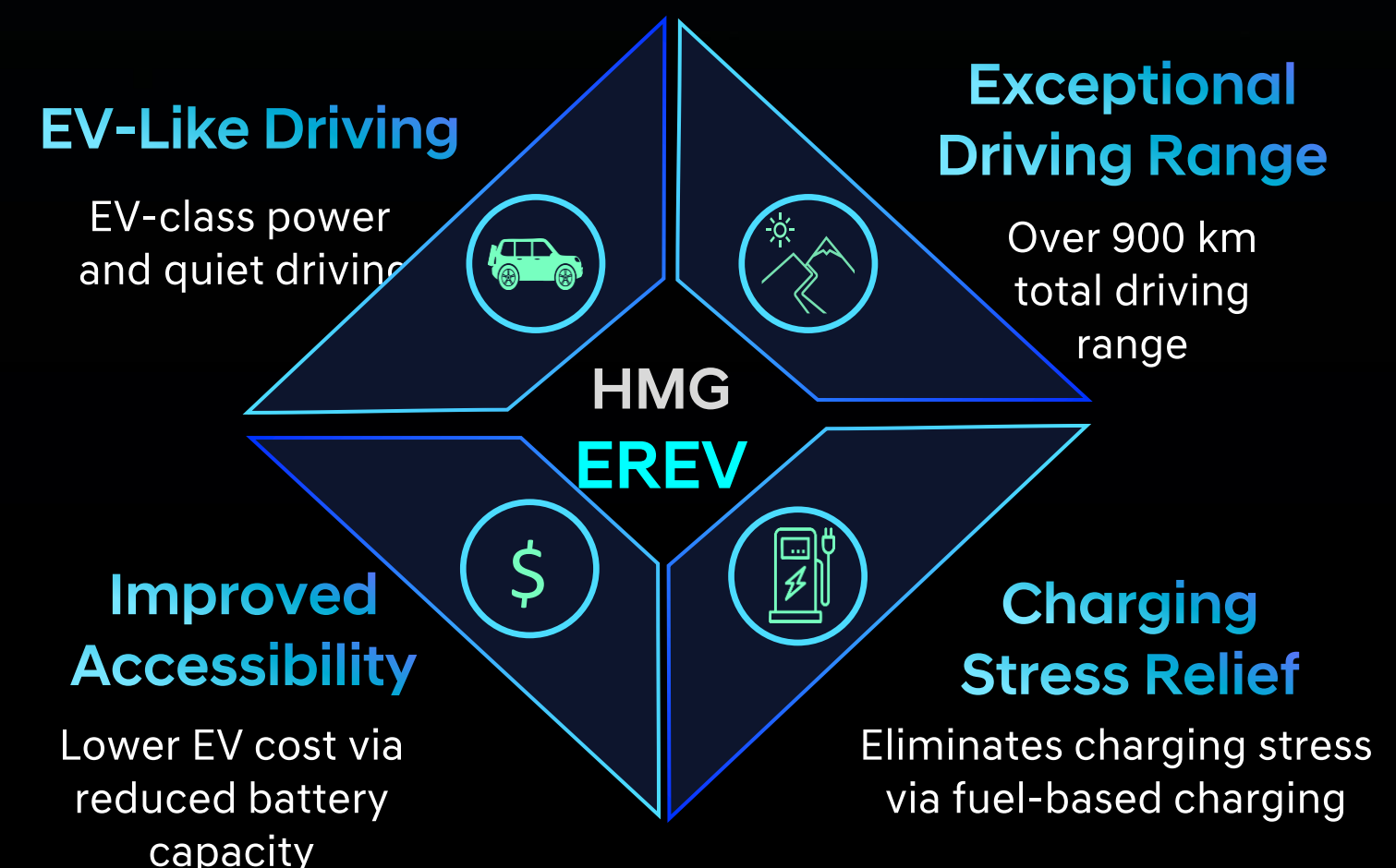
Phase2. In-house High-performance Battery

EREV



HMG high-performance cell

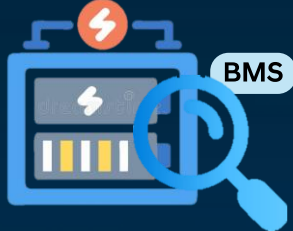
Using HMG-designed high-performance batteries enables **EV-level performance with less than half the battery capacity**



Battery System Technology Roadmap – BMS Tech

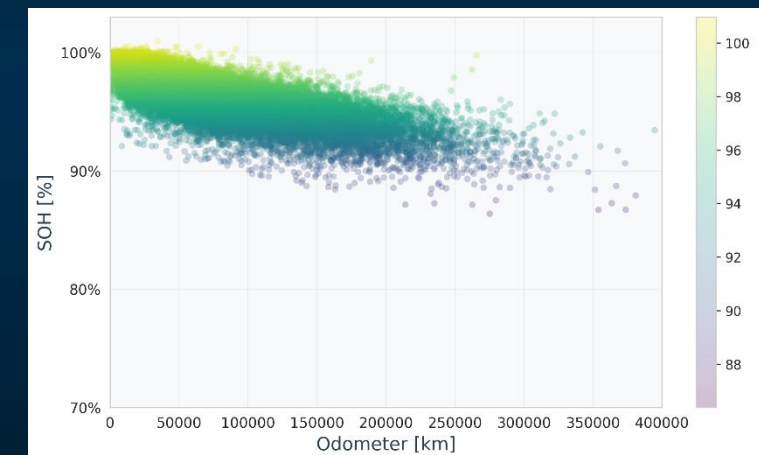
Focus on BMS tech centered on safety diagnostics and life management for long-term safe use without replacement
Internally strengthen safety and life control tech, and advance thermal/charging tech via startup collaboration

| BMS Safety Diagnostics Tech

Category	Technical Definition
Real-time Risk Diagnosis  (Advanced & Expanded Safety Diagnostics)	LV.1 Monitoring Battery Basic Characteristics
	LV.2 Precision Cell Short-Circuit Diagnosis
Potential Risk Diagnosis  (Pre-event Replacement) + Imminent Diagnosis (High Risk)  (Damage Minimization)	LV.3 Abnormality diagnosis based on battery physics models. → Potential Risk Diagnosis : Inducing proactive customer maintenance by detecting cell micro-shorts "days or weeks" before an event.
	LV.4 Application of dedicated cloud-based precision status diagnostic models.
	Event Alert Risk-Stage Fire Response Protocol : Imminent fire diagnosis. → Fire department reporting/dispatch through definitive diagnosis at the time of an event

| Battery Durability Tech

Systematize field battery life management and Battery Passport-based history tracking across diverse environments



- Proactive field battery life management based on real-use big data
- Strengthen field lifespan via durability-extending HW/SW

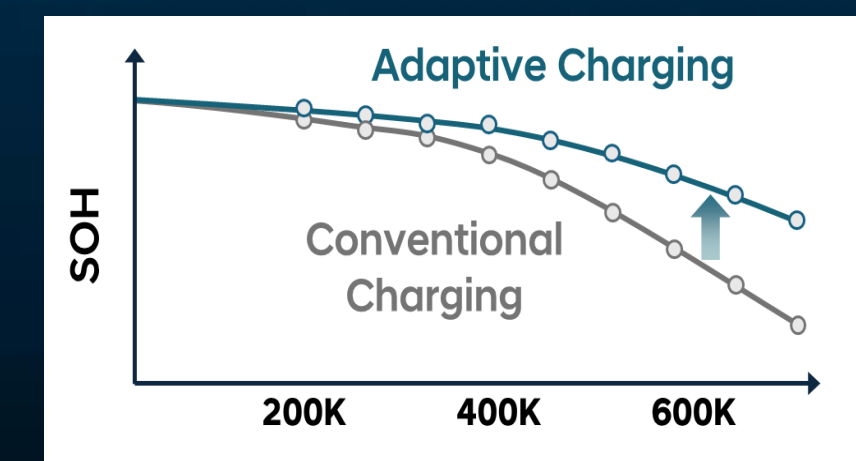
| Charging Performance Tech



E-GMP

- Long Range >500km
- Ultra-Fast Charging ~4min/100km
- High Performance ~3sec/0-100kph

18-min Global Top charging performance via proactive E-GMP 800V



Charging Performance & Lifespan Compatibility

Lead Global Top charging performance via innovative HW/SW
(simultaneously achieving long life)

Battery System Technology Roadmap – Battery Passport

Proactively record digital battery info for all EVs sold in 30 EEA countries ahead of Feb '27 EU Battery Passport.
Develop advanced lifecycle platforms (maintenance, finance) by establishing a blockchain-based 'Battery Data Hub'.

Battery Passport

① Secure Data & Build Platform



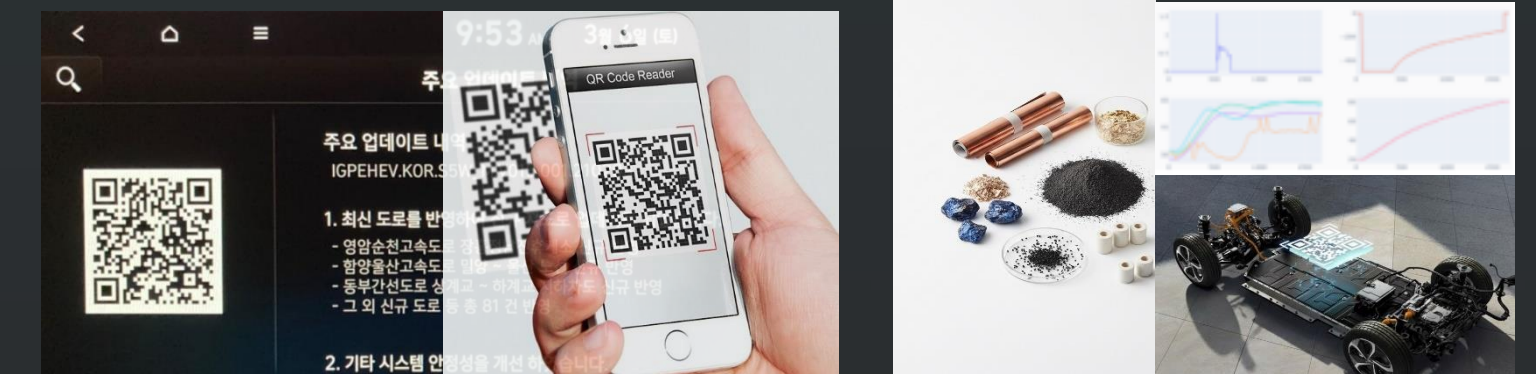
- ✓ Agreement on data collection via K-Battery Top 3 TFT
 - Safety TFT ('24.10~'25.8)
: Regulatory response & safety specs dev
- ✓ Establish dedicated R&D data platform for Passport data management

② Blockchain-based Service Dev



- ✓ Develop forgery-proof Passport via blockchain
- ✓ Develop premium services utilizing advanced battery info beyond regulations
 - Big data-based future battery condition prediction
 - Model-based battery safety diagnostic info
 - Battery Life Assist info

* Develop proprietary cloud-based pre-safety diagnostic service

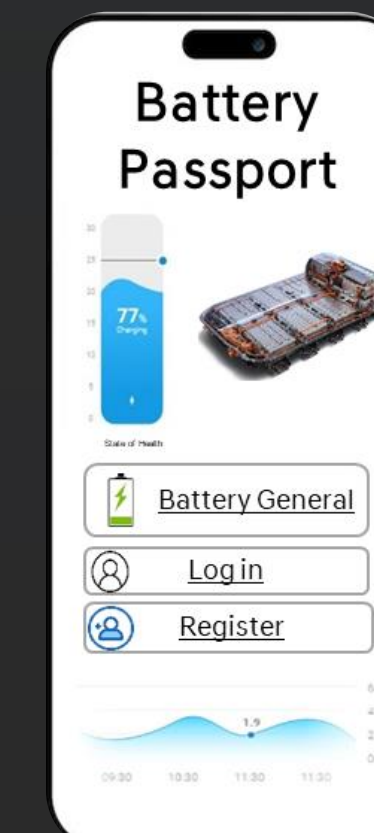


Raw MaterialVehicle Lifecycle Data

Login



Remaining life prediction
& 2 others



Specialized
Services



Beyond Technology and Centered on Experience,
**Driving Continuous Innovation
for Future Mobility Solutions**



BEV/HEV



FCEV



Robotics