



Next-Generation Mobility Initiatives

AISIN CORPORATION

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AISIN CORPORATION

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Group Philosophy

Inspiring “movement”, creating tomorrow



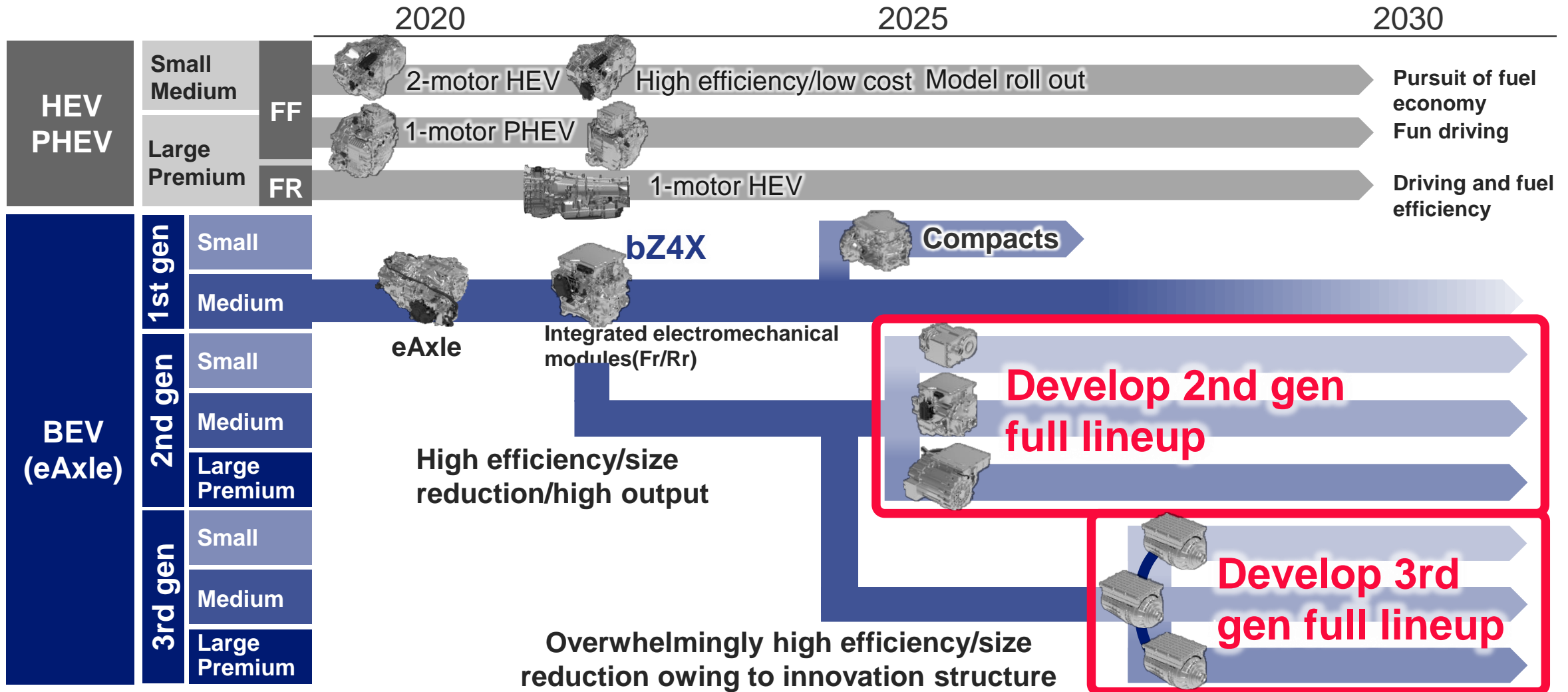
Initiatives to develop new powertrains and EV products and brakes to achieve carbon neutrality

Realize relief, comfortable, and convenient mobility, that inspires “movement,”

Provide customers worldwide with products that are kind to the global environment and people from zero-emissions plants at AISIN (power source/heat source/waste reduction, clean energy, resource recycling aimed at zero waste, etc.)

Leverage technological/manufacturing capabilities to create opportunities to change automobile manufacturing and the provision of value

Electric Drive Unit Lineup



2nd gen eAxle: Developing 3 types (small, medium, large/premium) in line with car size for mass production in 2025

3rd gen eAxle: Under upfront development with goal of market launch in 2027

2nd Generation eAxle

BEV (eAxle)
2nd gen

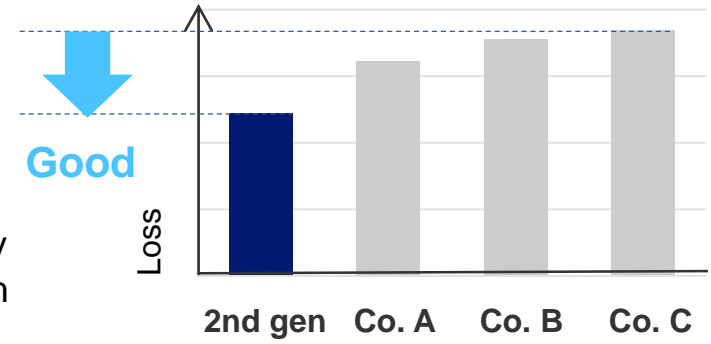
* Jointly developed product with BluE Nexus and Denso

Medium
Developed from 1st gen



High efficiency

- 30% loss reduction versus rivals (Gears/bearings/motor/inverter...)
- Increase power consumption efficiency approximately 15% in combination with aerodynamic device

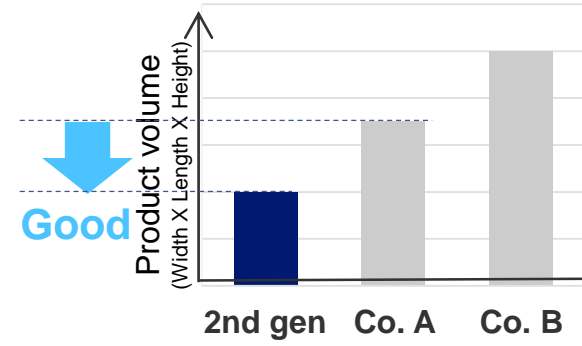


Small (incl. P4)
Added to lineup

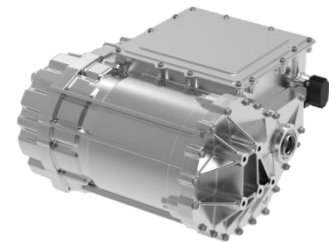


Size reduction

- Reduce product volume by 40% versus smallest body trend rival (Secure battery space/cabin space)
- 3rd gen.; Upfront release of 1/2 of technologies

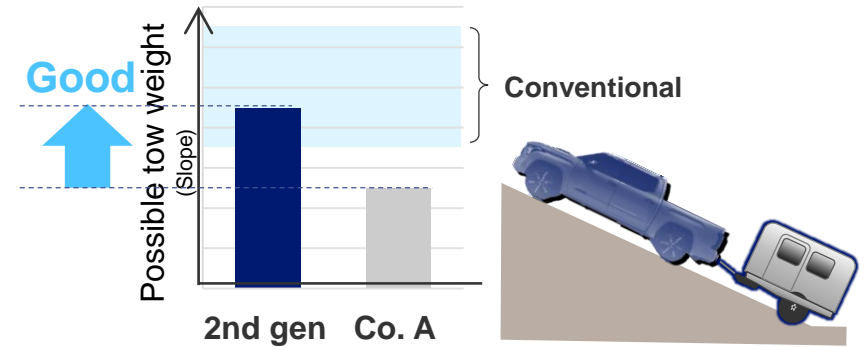


Large Premium
Added to lineup



High output

- Power performance is 2-times that of rival products of the same output classes (slope/tow)
- Strengthen motor cooling technology (compact/high output motor)



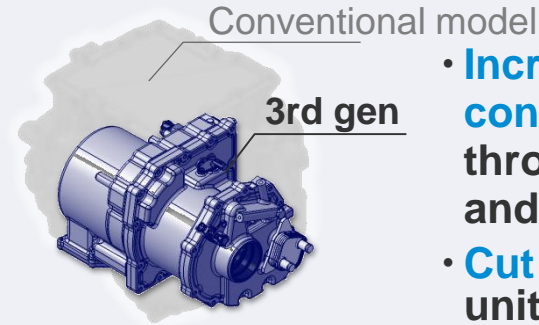
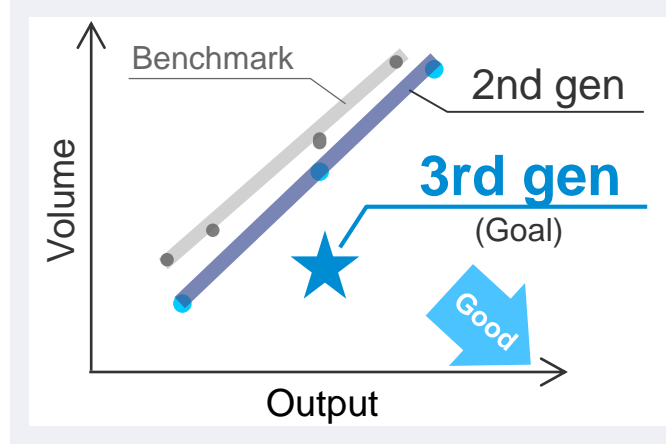
Development of full lineup for 2nd gen eAxle being implemented in line with plans

3rd Generation eAxle

Realize overwhelming high efficiency & size reduction via motor and gear train reforms

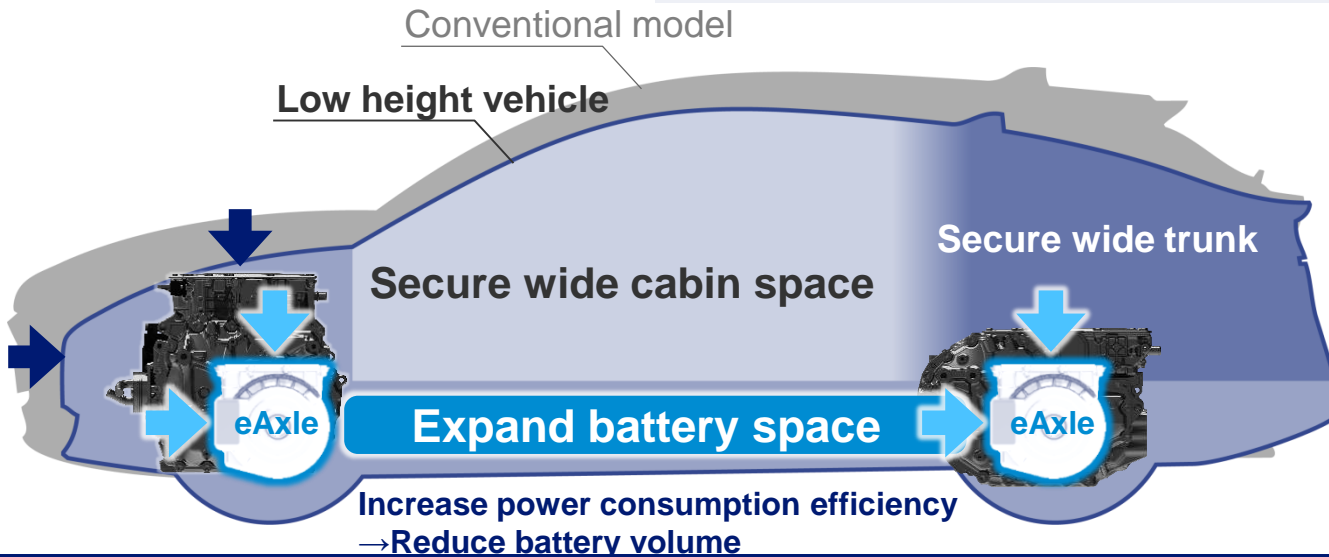


No.1 globally



- Increase power consumption efficiency through higher efficiency and size reduction
- Cut cost by standardizing units by vehicle model, and cutting materials costs

Realize half the volume



Under development for launch in 2027

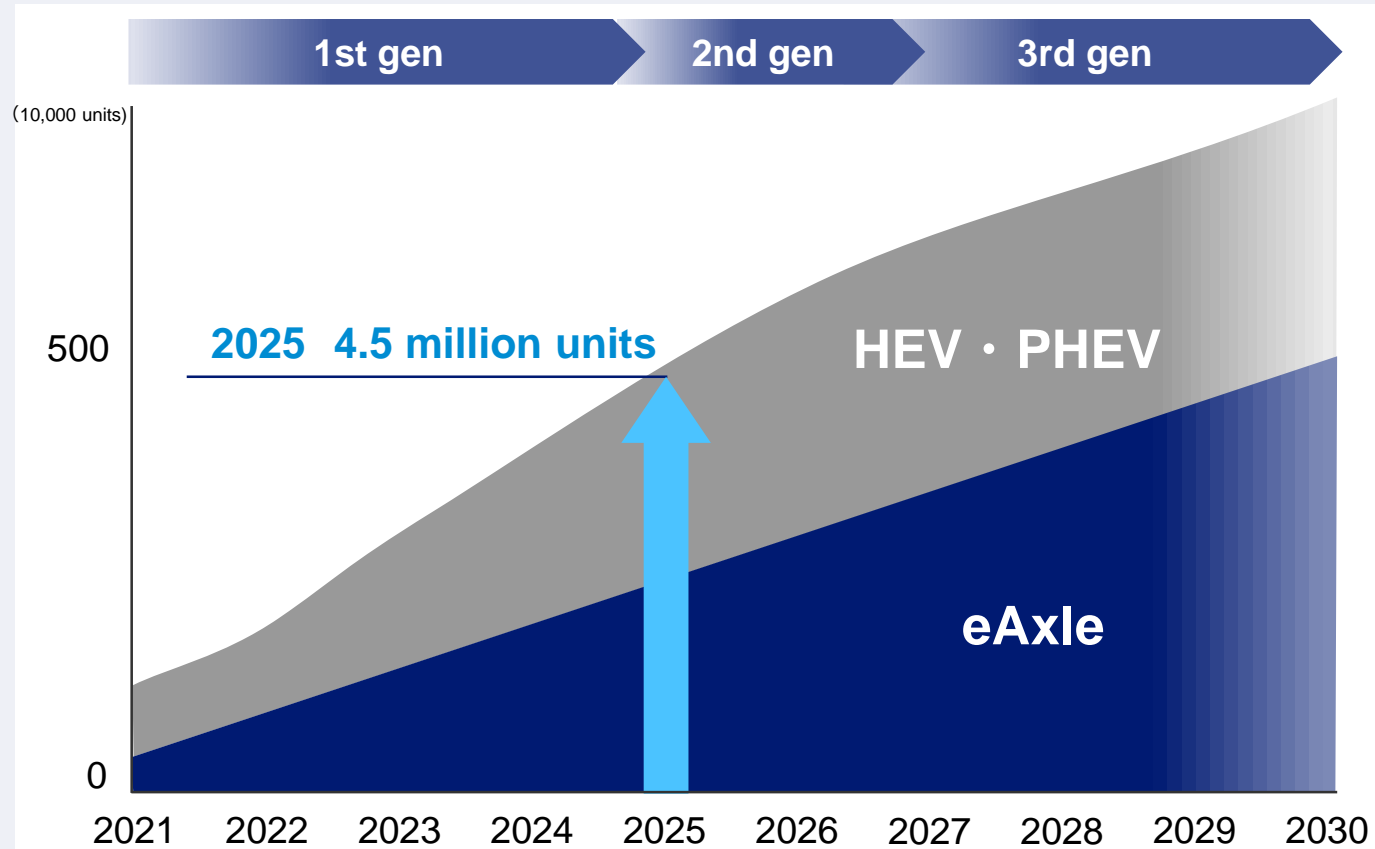
Plan to release some component technologies in advance

- High rotary motor technologies
- Highly strengthen gear technologies

Speed up development for launch in 2027, the period for the full-fledged launch of EVs

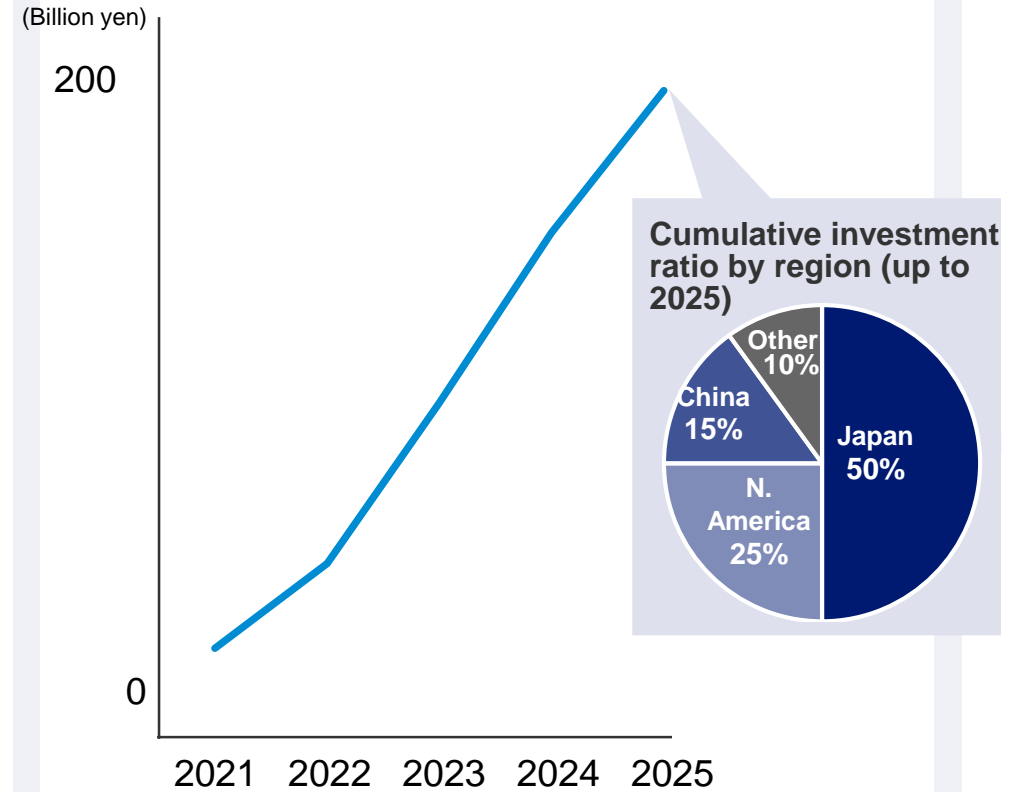
Electric Drive Unit Production

Electric drive unit production volume



Electrification investment plans (cumulative)

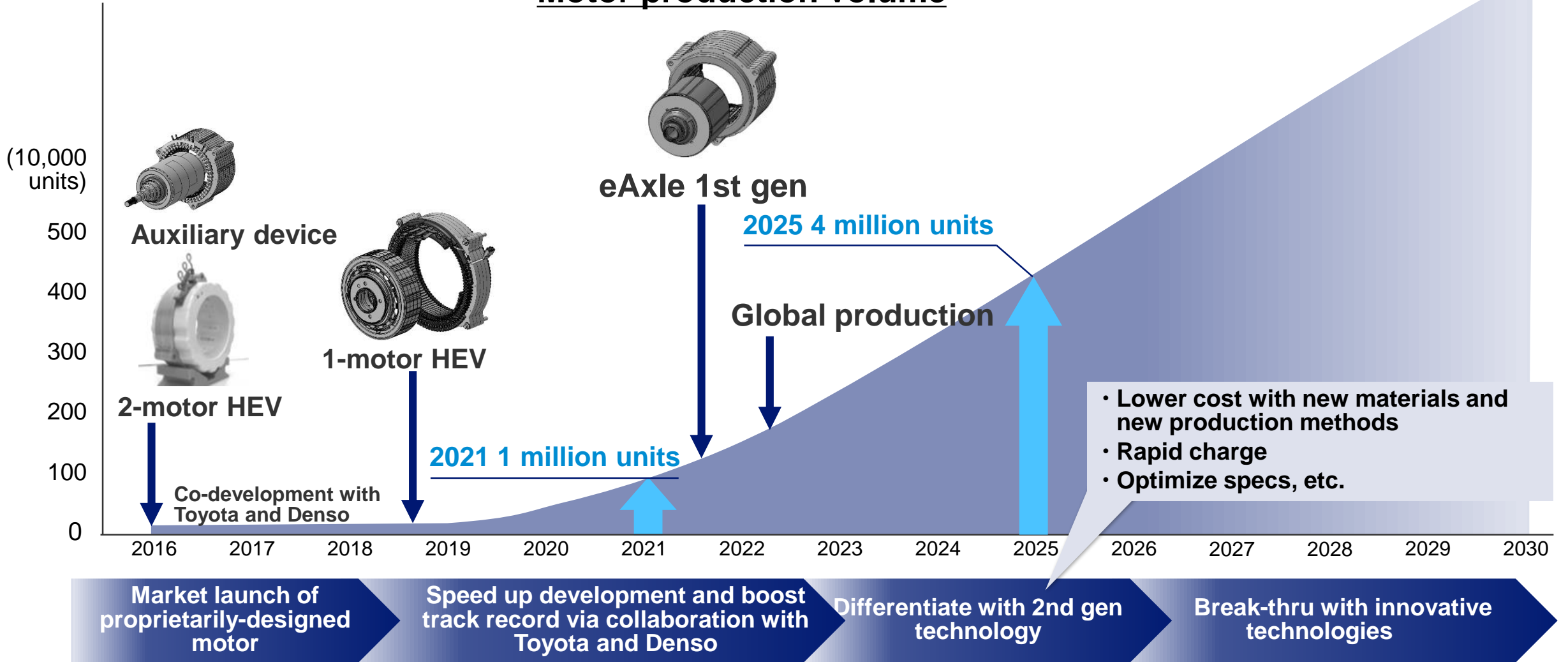
(Powertrain only, excludes brakes)



Implement systematic investment globally to achieve production of 4.5 million electric drive units in 2025

Motor Production

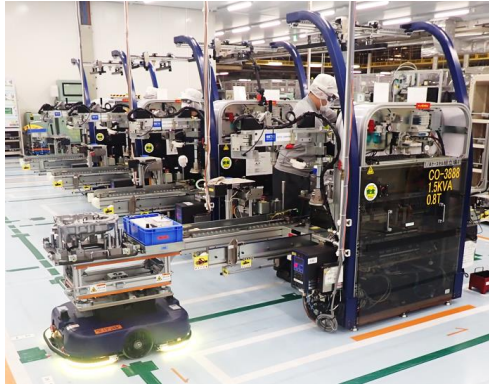
Motor production volume



Increase AISIN motor production 4-times in 2025 via advancements in electrification

eAxle Flexible Production Line

Cell assembly + AGV transports



Inverter



Rr80kw



Fr80kw



Fr150kw



Model 1



Model B



Robot assembly + tool change

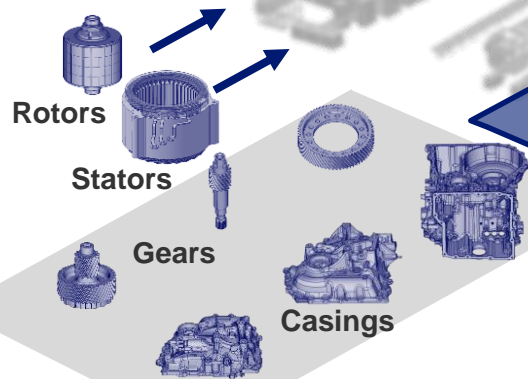


Main

Final

Assembly line

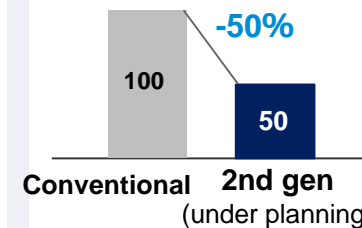
Convert assembly variable components to cell production
Mixed production of many models



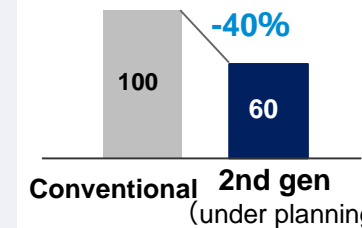
Machining line

Low investment by utilizing equipment of current AT production line

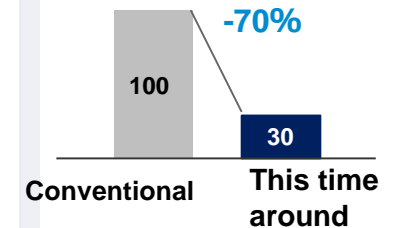
Capex



CO2 emissions



Additional model production preparation period



*AGV: Automatic Guided Vehicle

Currently operating flexible mixed product production lines of many models

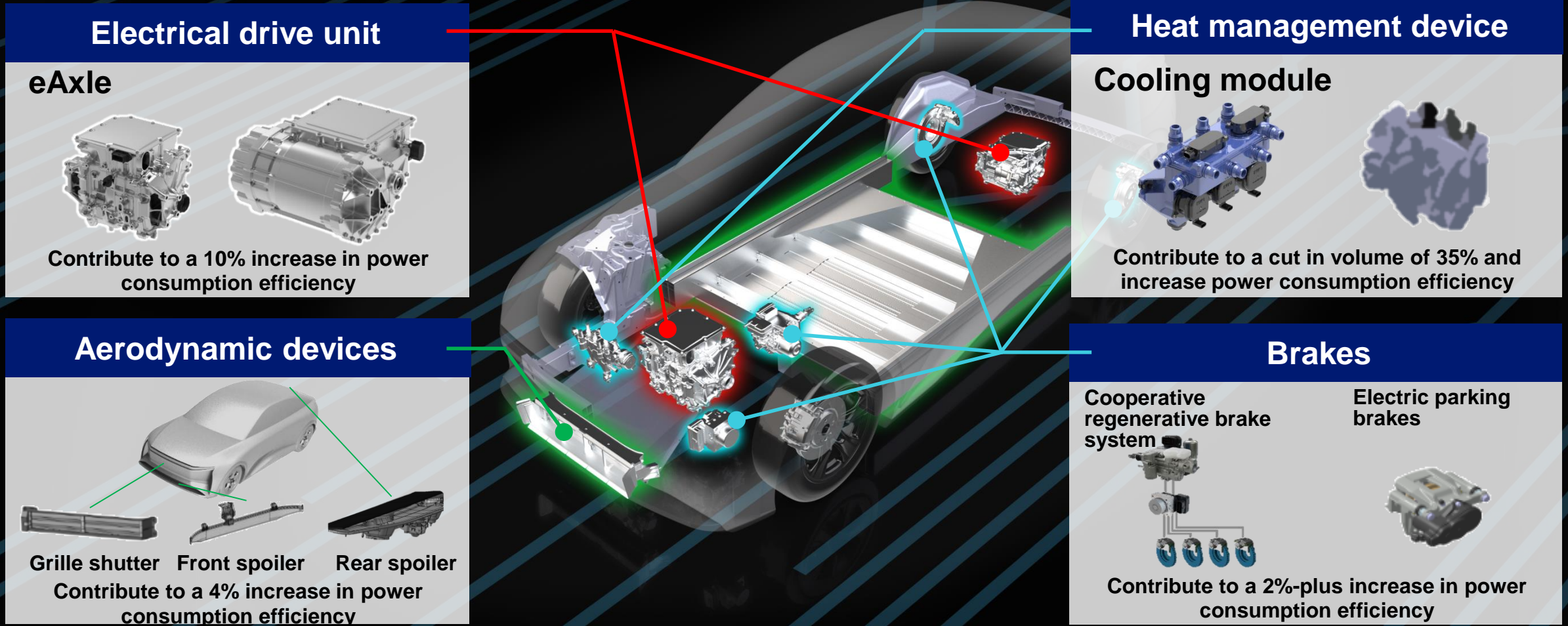
EV-related Product Roadmap

<p>eAxle</p>	<p>Size reduction (Volume -50%) Weight reduction (Mass -30%) (3rd gen)</p>	<p>2nd gen → 3rd gen → Improve attractiveness of products</p> <p>Expand lineup</p> <p>Reduce size/weight Miniaturize via innovative structure</p> <p>Innovative motor</p>
<p>Cooperative regenerative braking systems</p>	<p>Improve energy regeneration efficiency (2% increase in power consumption efficiency)</p>	<p>6th gen → 7th gen → Improve attractiveness of products</p> <p>4-wheel same pressure control Convert to on-demand front/rear wheel Independent control</p> <p>Innovative model</p>
<p>Cooling modules</p>	<p>Size reduction (Volume -30%)</p>	<p>Single product → Modularization/function integration → Further additional functions</p> <p>Compact/high efficiency electric water pump Cooling water switch valve Cooling module Next-gen cooling module</p> <p>Modularization with high-performance parts</p>
<p>Battery skeleton parts</p>	<p>Reduce weight by using aluminum (Mass -30%)</p>	<p>Single product → Expand new products</p> <p>Locker EA Battery cross Battery module Center plate End plate</p> <p>Incorporate peripheral parts</p>
<p>Aerodynamic devices</p>	<p>Boost efficiency of vehicle using a reduced Cd value (4% increase in power consumption efficiency)</p>	<p>Expansion of aerodynamic devices → Device collaboration</p> <p>Grille shutter Front spoiler Rear spoiler</p> <p>Front/rear cooperative aerodynamic system</p>

Speedy market launch of “high efficiency” & “compact” products

Mobility Field Electrification Initiatives

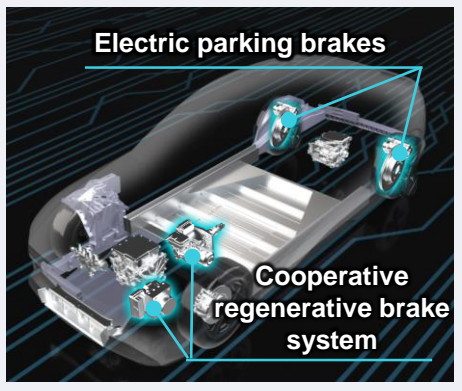
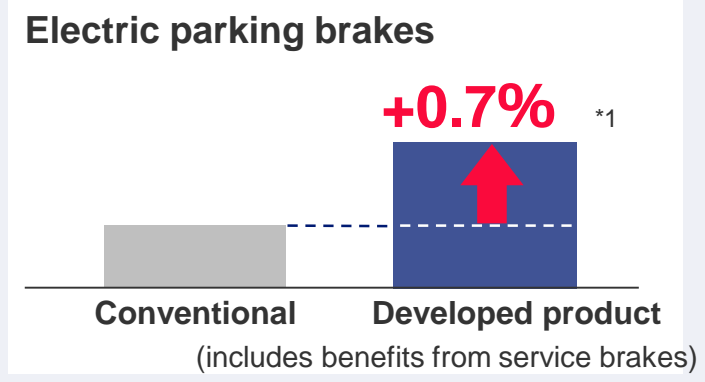
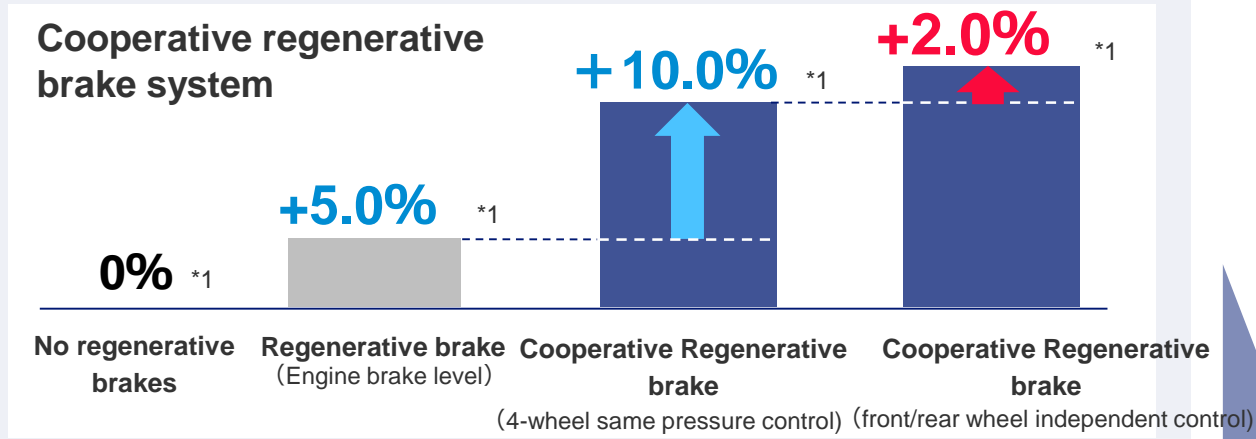
AISIN aims to contribute to an increase in power consumption efficiency of BEVs owing to new products that realize “high efficiency”



Complete setting of goal to increase power consumption efficiency by 15%-plus in the main part of 2025

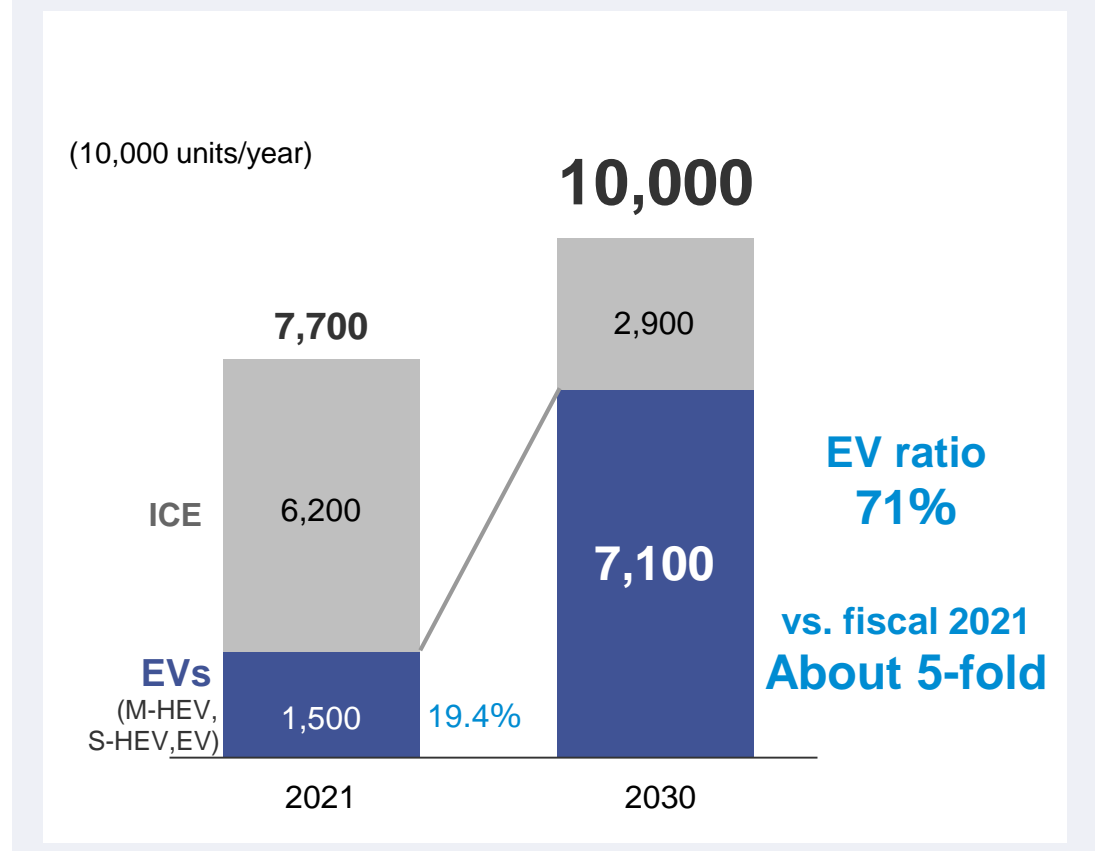
Increase Power Consumption Efficiency & Brakes

Contribution to power consumption efficiency



*1: WLTP

EVs market forecast



Prepared by AISIN based on various data

Contribute to EV market, which is estimated to grow, owing to cooperative regenerative brake systems and electric parking brakes that contribute to an increase in power consumption efficiency

Strengths of Cooperative Regenerative Brake System

Added value

High regenerative efficiency

Contribute to improvement of power consumption efficiency and driving distance

Strengths

- Increase power consumption efficiency 2%^{*1} using independent control for front/rear wheels (vs. 4-wheel same pressure control)

*1: WLTP

High performance

Good brake feeling

- Precision hydraulic brake pressure adjustment owing to use of brush-less motor
- Compensation for torque error when substituting regeneration and hydraulics
- Stroke simulator that creates rigidity

Front/rear wheel independent control

- Expand regenerative brake
- Vehicle attitude control

Conventional model (brake force (due to 4-wheel same pressure control))

New product: Brake force (due to front/rear wheel independent control)

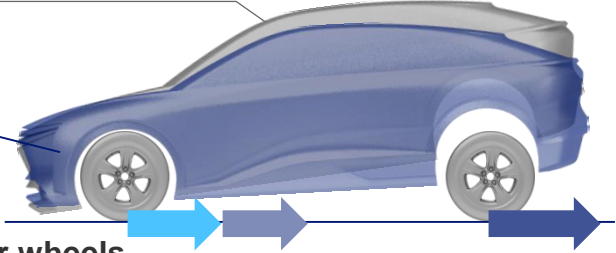


Image of brake force allocation on front/rear wheels

Conventional type: 4-wheel same pressure control

Front wheel regeneration	Front wheel pressure	Rear wheel pressure
Front wheel regeneration	Front wheel pressure	Rear wheel pressure

New product: Front/rear wheel independent control

Expand regenerative brake

High praise by market for comfortable brake feeling



Touch of the brakes is good

Applying the brakes is just right

Contribute to an improvement in EV driving distance owing to advances in control systems

Strengths of Electric Parking Brakes

—Service Brake Technologies that Contribute to BEVs

Added value

High efficiency

Contribute to improvement of power consumption efficiency and driving distance

Strengths

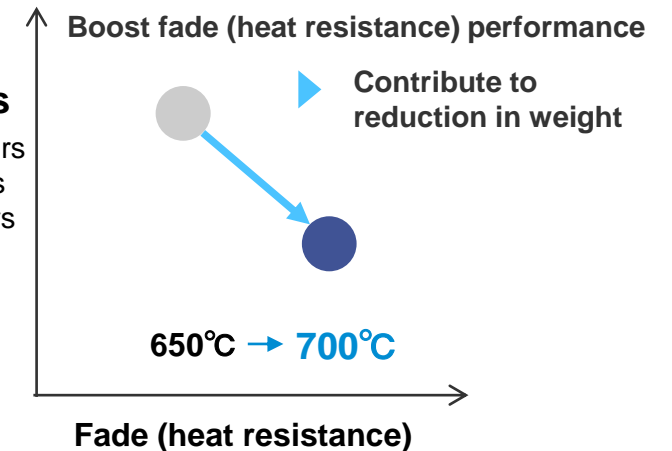
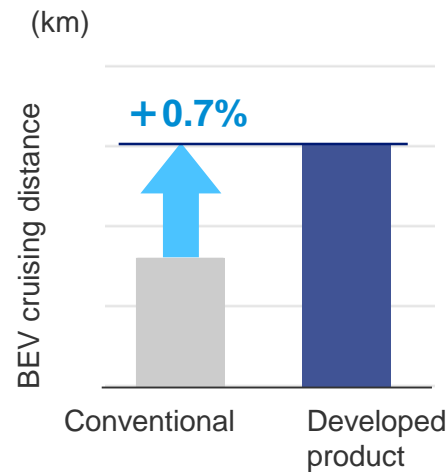
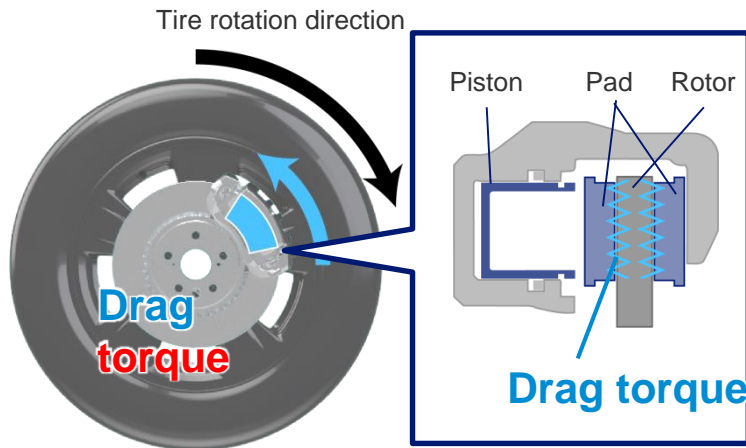
- Add/improve drag torque reduction function, Balance drag torque reduction and responsiveness

Light weight / compact

Contribute to carbon neutrality

- Improve fade performance by pursuing pad compound technologies

[Contribute to curbing a rise in brake size in tandem with a boost in volume due to electrification]

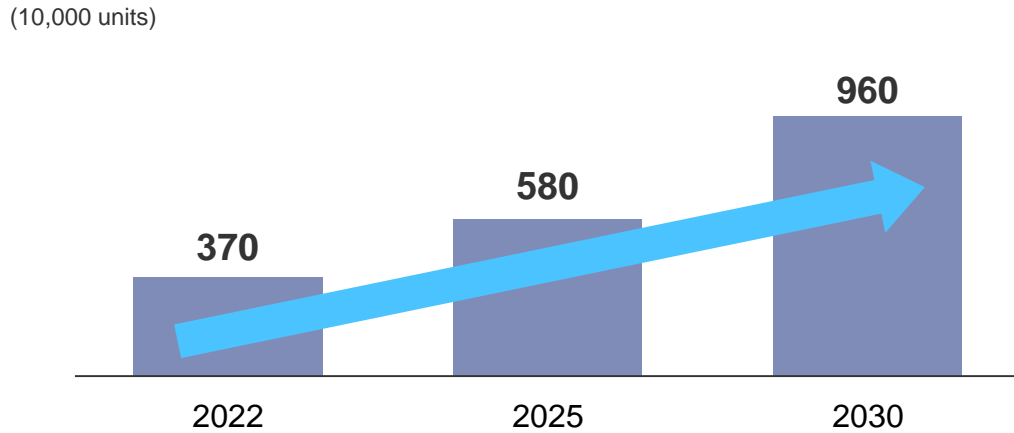


Contribute to the spread of EVs with ample technologies that support electrification

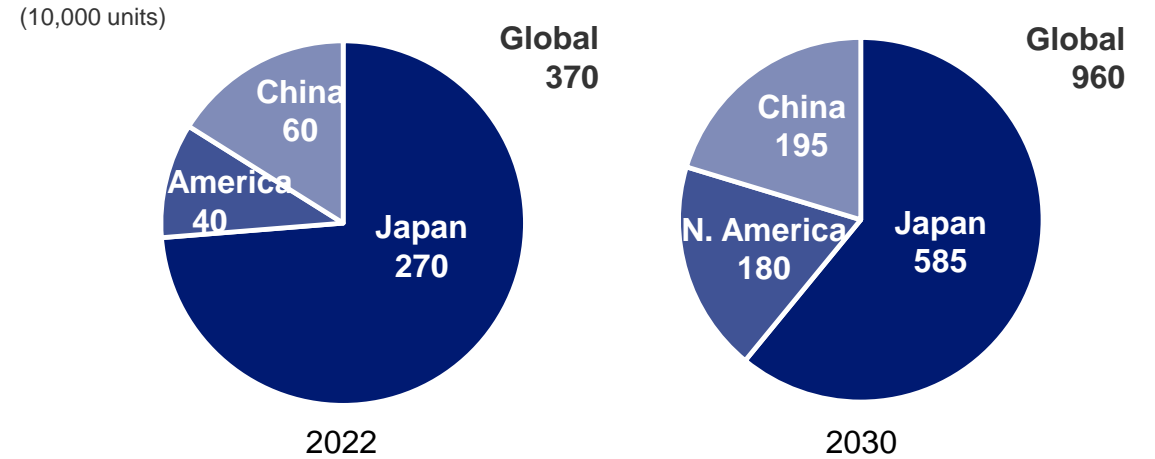
Production Volume Expansion

Production volume

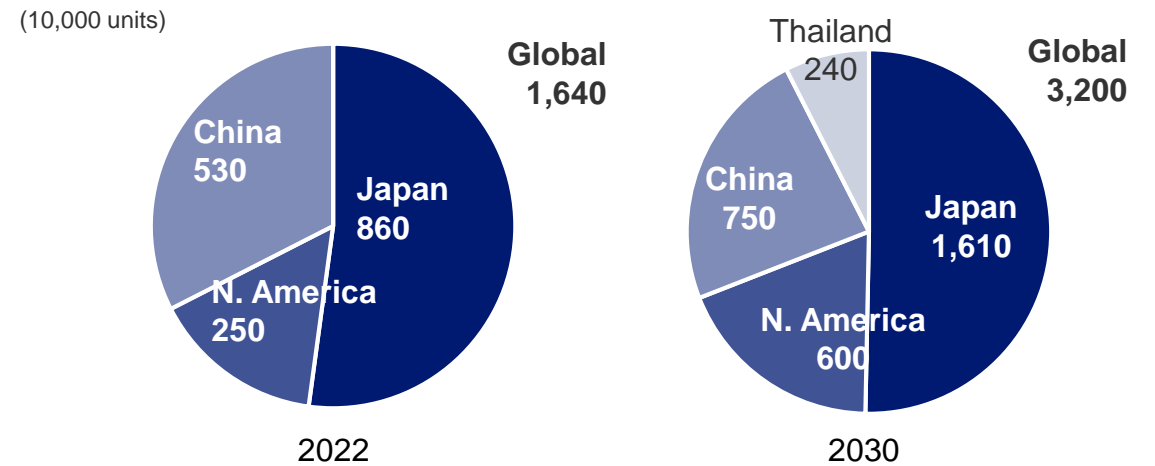
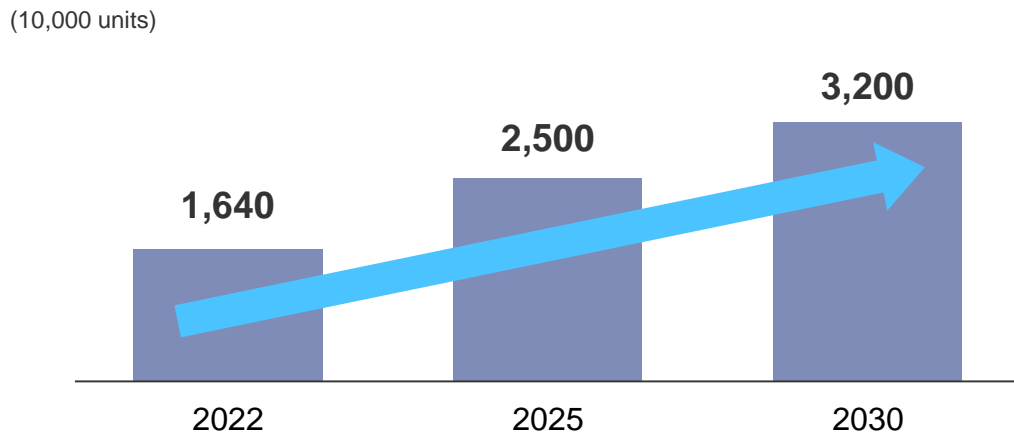
Cooperative regenerative brake system



Breakdown by region



Electric parking brakes



Rise in production volume and sales for both cooperative regenerative brake system and electric parking brakes

Corporate philosophy

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Provide customers worldwide with products that are kind to the global environment and people from zero-emissions plants at AISIN (power source/heat source/waste reduction, clean energy, resource recycling aimed at zero waste, etc.)

Leverage technological/manufacturing capabilities to create opportunities to change automobile manufacturing and the provision of value

Comfort/convenience

■ PSD system



■ PBD system



■ Electrically-assisted door



■ Side step



■ Sunroof



■ Pneumatic support system



Relief/convenience

■ DMS



■ IMS



■ Autonomous driving IPA



PSD: Power Sliding Door System
 PBD: Power Back Door System
 DMS: Driver Monitor System
 IMS: Incabin Monitor System
 IPA: Intelligent Parking Assist

System integration

Stress-free smooth entry

Large opening door system for easy getting on and off

■ Getting on and off safe for all



■ Door opening conforms to users

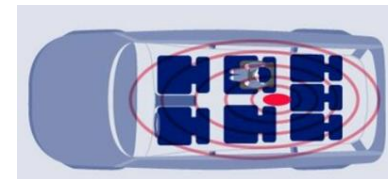


Safety support inside and outside the vehicle using sensing technologies

Confirm safety by the complex system using image recognition and radio wave

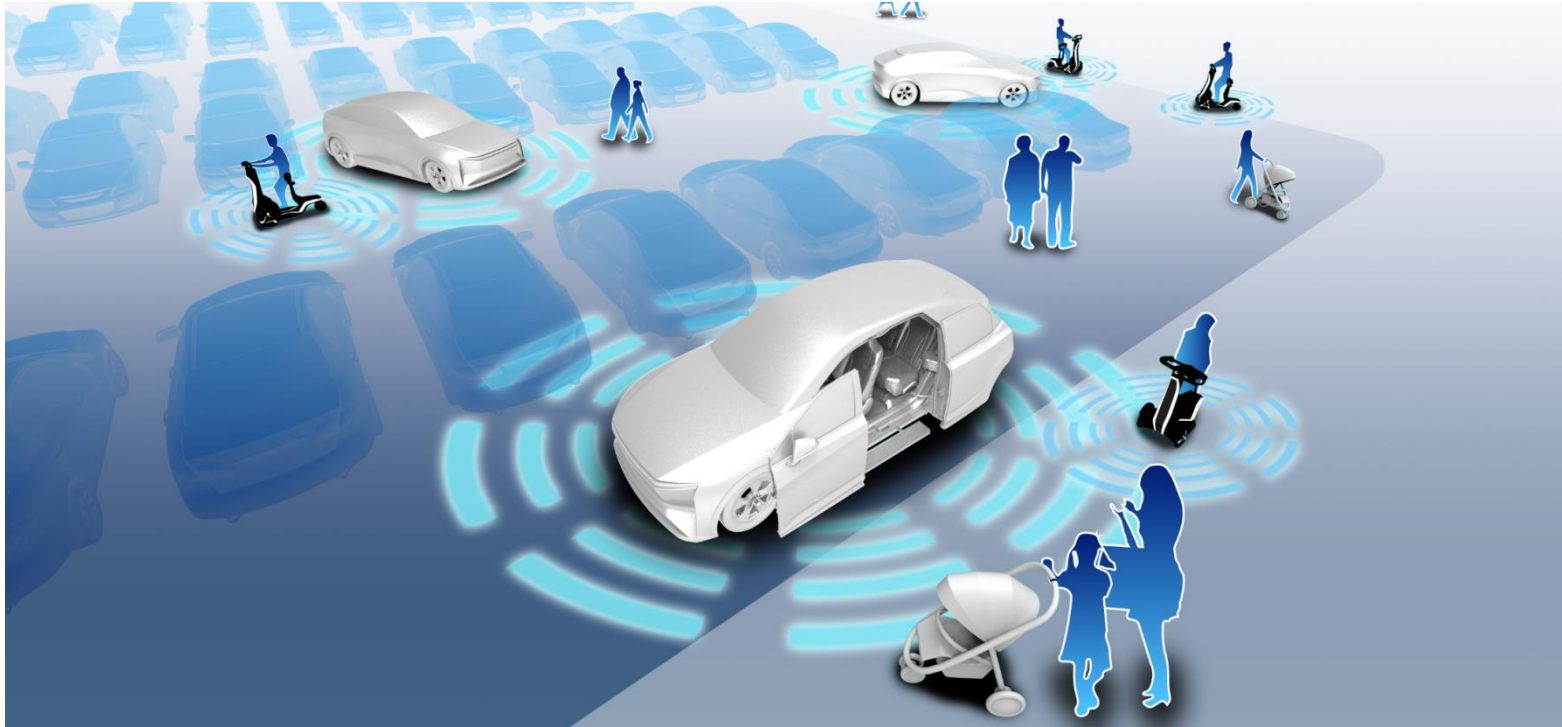
■ Monitor children in the cabin

■ Check surroundings, protect users getting on and off



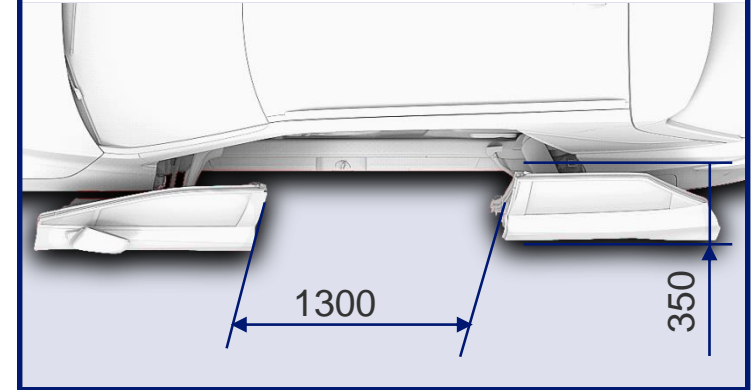
Provide services in line with changes in people's values and society

Stress-free Entry (Universal Design/Relief for Everyone)



Easy getting on and off in narrow spaces

Large opening door system



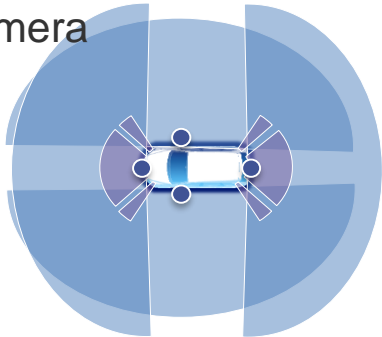
Forecast function in line with conditions

Sensing outside of vehicle



Confirm perimeter safety

Sonar & camera

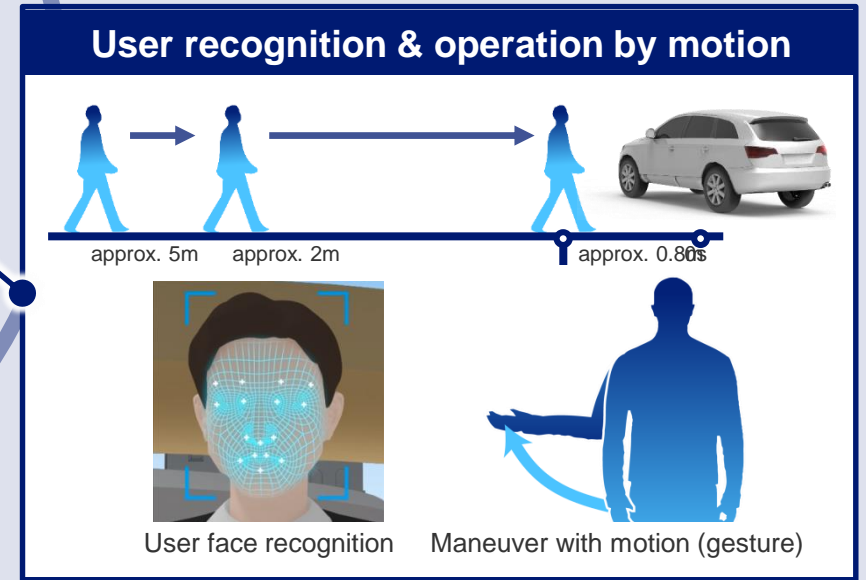
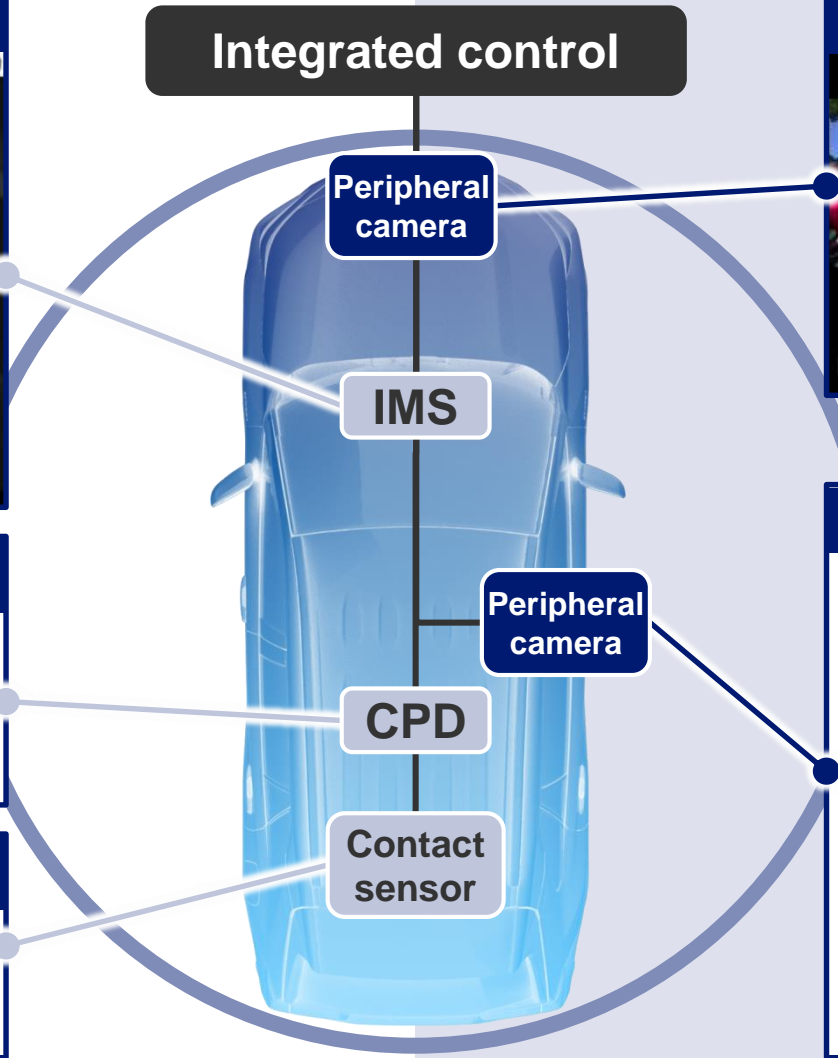


Operation-less check-in

Digital key system



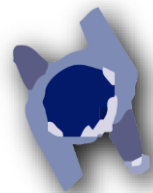
Sensing & HMI Technologies for Inside/Outside Vehicle



Support safe/relief mobility in combination with sensing technologies

Detect Child Left in Vehicle

In-cabin child detection, notification system (1 sensor)



Determines conditions in which child is left in car

After locking door, a sensor determines the conditions a child is left in the car



Notification a child has been left in the car

Notifies driver that a child has been left in the car by blowing the horn and flashing the hazards

In the event this situation is resolved, a notification is sent to the user's mobile phone



Reporting of a child left in a car

If a child continues to be left in a car, the emergency will be reported to the police and fire department



Develop Large Opening Door System

New Link Power Door (LPD)



Realize large opening, compact system

Link the perimeter monitoring system with the door opening/closing device

Deploy to SUV market, including overseas markets, such as China





Integrate power sliding door knowhow and sensor functions, deploy for new structure for SUVs

Initiatives for Relief, Comfortable and Convenient Mobility

Comfort/convenience

- PSD system 
- Pneumatic support system 
- Side step 
- Sunroof 
- PBD system 
- Electrically-assisted door 

Relief/convenience

- DMS 
- Autonomous driving 
- IMS 
- 

System integration

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Large opening door system for easy getting on and off

- Getting on and off safe for all 
- Door opening conforms to users 

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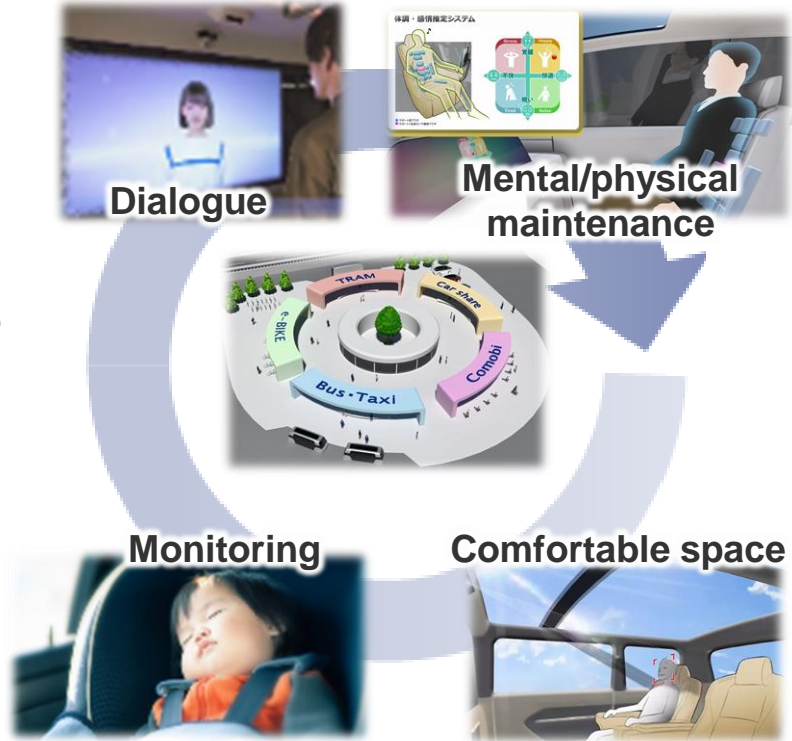
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- Monitor children in the cabin 
- Check surroundings, protect users getting on and off 

Solutions

Coexistence between people, mobility and city

Realize a society where anyone can enjoy stress-free mobility



Provide solutions that connect people, the city, everyday living and mobility experience