

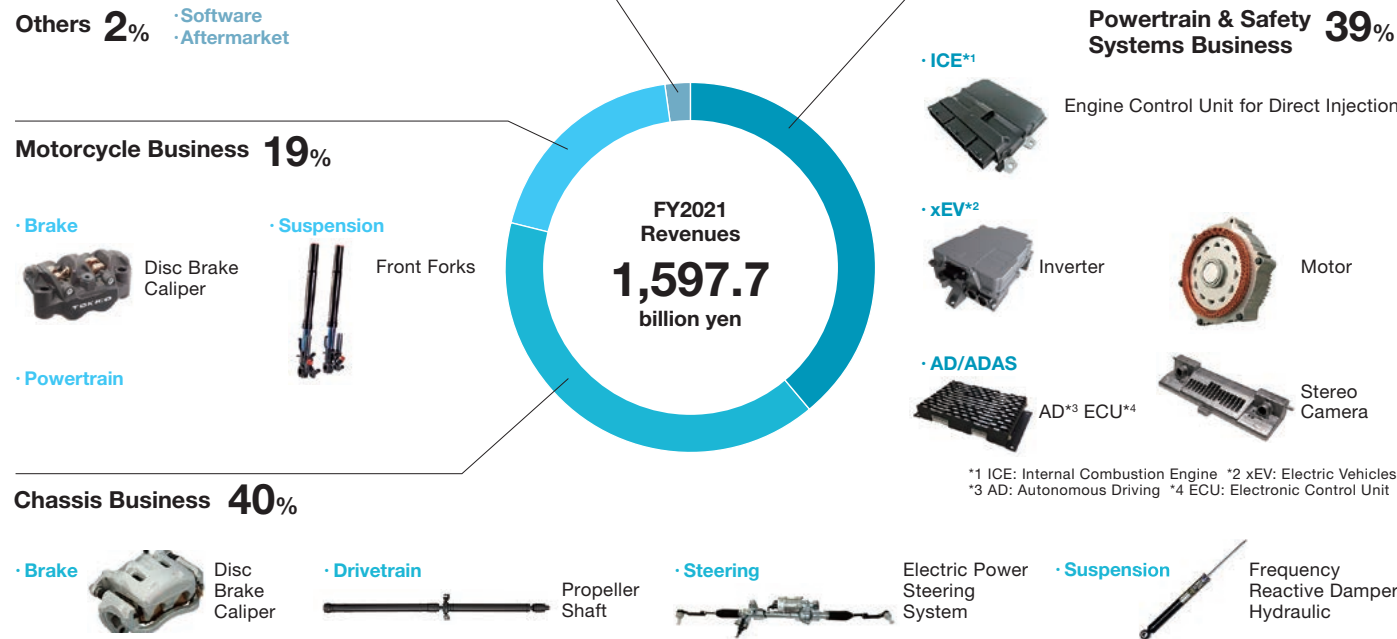
## Value Creation Initiatives — Strategies by Sector

# Hitachi Astemo

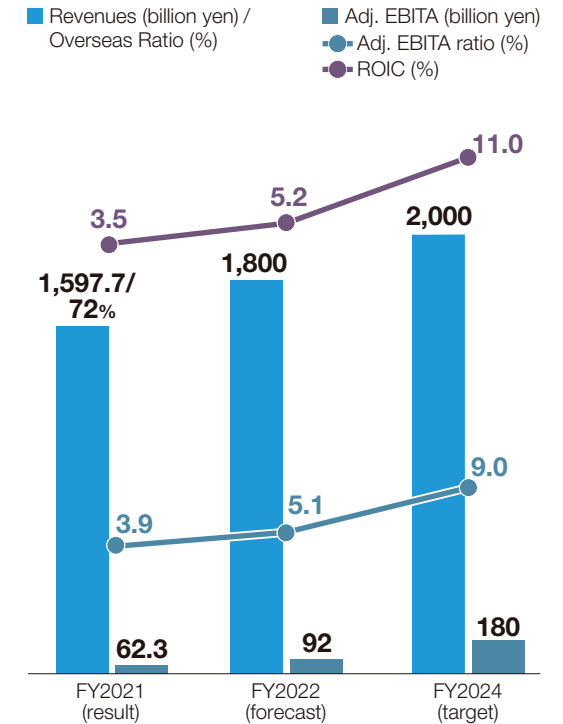
We will contribute to a sustainable society and improved quality of life by providing world-leading advanced mobility solutions that satisfy our customers



### Hitachi Astemo Business Structure



### Results and Forecasts



### Strengths

Regarding powertrain and safety systems, we leverage advanced inverter and motor technologies honed through years of market experience to develop highly efficient electric axles with integrated gearboxes. Further, to realize autonomous driving, we provide core advanced technologies such as sensing technologies centered on stereo cameras, electronic control units and control software. In the chassis field, we will realize integrated vehicle control solutions for next-generation mobility by leveraging Hitachi's strengths in electronic and electrified brake suspension and steering products to link and control them as a system. In the motorcycle field, where we boast the world's top market share, we will lead advances by providing system products for powertrains, suspensions and brakes, leveraging our advanced technological capabilities and experience, including integrated vehicle control, driver assistance and control technologies for EVs. We will establish Hitachi as a global mega-supplier for automobiles and motorcycles by combining the wisdom of our diverse 90,000 employees at 359 bases spread across 26 countries and regions. (As of July 2022)

### Mid-term Management Plan 2024: Vision

Hitachi Astemo aims to realize a sustainable society by providing cutting-edge mobility solutions. Specifically, we will provide environmental value by helping to realize a better global environment through highly efficient, internal-combustion engine and electric powertrain technologies that improve fuel efficiency and lower electricity costs. To create social value, we will improve safety and comfort through integrated vehicle control technologies, using autonomous driving (AD) and advanced driver-assistance systems (ADAS) and advanced chassis systems. In addition, we will utilize Lumada to advance mobility by realizing software-defined vehicles with in-vehicle software enabling advanced control, and over-the-air (OTA) update technologies for various control software. Through these efforts, we will create economic value totaling two trillion yen in revenues with an adjusted EBITA margin of 9% and ROIC of 11% by fiscal 2024.

## Hitachi Astemo Sector Growth Strategy

### Business Environment

As carbon neutrality efforts accelerate around the world, the automotive and motorcycle industries are undergoing a once-in-a-century transformation, with competition intensifying in the Connected, Autonomous, Shared, Electric (CASE) fields.

In response to these market changes, the ratio of internal combustion engines (ICEs), which have been the mainstream up to now, is expected to decline in the next few years amid a significant shift towards xEV-related products (motors, inverters and electric axles).

With demand for safe and autonomous driving technologies on the rise, vehicles are increasingly equipped with sensors that recognize the physical world to facilitate AD and ADAS. At the same time, advanced technologies that recognize the physical world are advancing through the use of infrastructure coordination systems that leverage communication technologies.

In the chassis area, EV and autonomous driving solutions are in demand for advanced vehicle behavior control systems, facilitating the electric control of brakes, suspension, steering and other components.

In the motorcycle sector, demand is expected to continue growing in Asia—including India, the largest motorcycle market in the world—while electrification demand is increasing due to heightened environmental awareness.

At the same time, there is an urgent need to stabilize production by overcoming increasingly complex risks such as semiconductor supply shortages and the impact of COVID-19 on the supply chain.

### Growth Strategy

To support CASE and increase market share, we will focus on developing AD and ADAS, advanced chassis and xEV-related products such as motors and inverters. For xEV-related products, we will invest 300 billion yen, including R&D expenses, by fiscal 2025 to ensure competitiveness. We will also leverage Hitachi Group R&D resources and engineering technologies possessed by Lumada and GlobalLogic to strengthen software development capabilities and create new advanced solutions for realizing software-defined vehicles.

We will contribute to improving QoL, realize a sustainable society, and strive to attain a leadership position as a global mega supplier. This will be achieved through digital solutions, improving safety and comfort mainly in the areas of autonomous driving and connected cars; green solutions that contribute to the global environment through electrification products and technologies that reduce emissions; and innovative solutions that anticipate the changes that will occur in the mobility field by 2050.

Regarding the creation of synergies from business integration\*, we will maximize corporate value through the integration and optimization of our product portfolio and footprint as well as through operational improvements. Although semiconductor shortages are expected to persist, we will take focused measures to ensure stable procurement and delivery, including the securing of long-term contracts with customers.

\*Hitachi Automotive Systems, Keihin Corporation, Showa Corporation, and Nisshin Kogyo Co. were integrated as Hitachi Astemo in January 2021.



## Business Strategy

The development of next-generation vehicle components (xEV, AD and ADAS, advanced chassis, next-generation motorcycles) is the mainstay of Hitachi Astemo's growth, thus we will prioritize investment in this area.

### Powertrains

With powertrains, the key will be to expand mass production of xEV motors and inverters and develop new technologies for more efficient and compact e-axes. In fiscal 2021, Mazda's first mass-produced electric vehicle adopted our motors and inverters. We also provide powertrain products to many customers, including China's Geely Automobile Group, which uses Hitachi inverters in its hybrid powertrains.

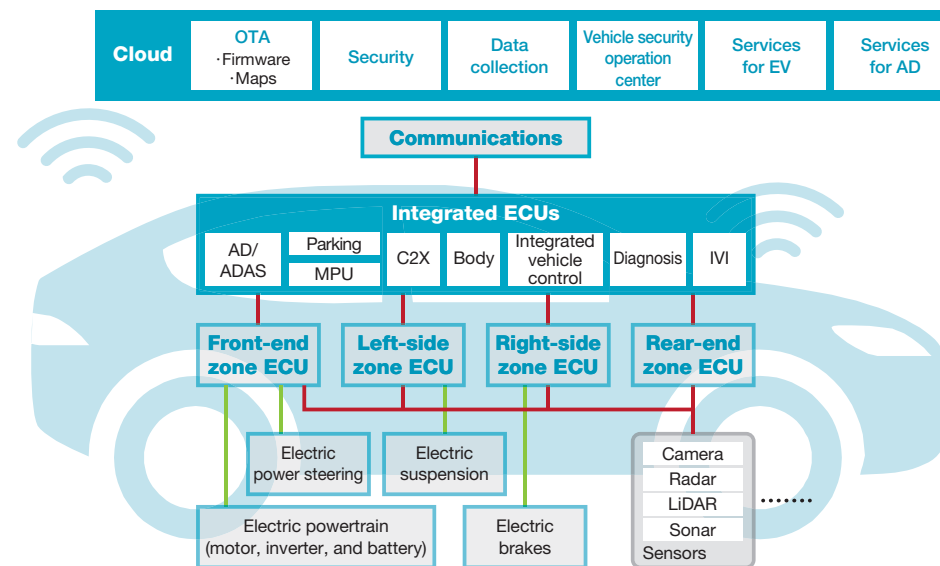
Hitachi Astemo has developed compact, high-output inverters that are easy to install, reduce power loss to enhance energy-saving performance, and achieve a 50% size reduction compared to our previous products. In fiscal 2019, we commenced mass production of the world's first high-voltage (800 V) high-power inverter for EVs utilizing Hitachi's proprietary direct water-cooled, double-sided cooling technology. Moreover, our motors—which take advantage of the advanced analysis technologies, structural designs, material developments, production technologies and motor control technologies cultivated within the Hitachi Group—achieve more than 1.2 times the output torque per magnet volume compared to the competition. Hitachi Astemo's strengths also lie in its ability to make e-axes smaller and lighter by utilizing model-based technologies in the optimized design of compact and lightweight e-axes integrating motors, inverters and gears.

In addition, we established Hitachi Astemo Electric Motor Systems to strengthen the mass production of motors, with mass production systems now operational in Japan, China and the United States. Hitachi Astemo will expand its product lineup, and together with the development of advanced technologies that include new materials and software and the strengthening of cost competitiveness, aims to capture the top market share in both motors and inverters.

### Safety Systems

Hitachi Astemo also leverages its strengths in the development of sensing and information processing systems required for realizing autonomous and connected vehicles. In fiscal 2021, Suzuki's new Wagon R Smile used our stereo camera with nighttime pedestrian detection capabilities. Honda's new Legend, a vehicle equipped with Level 3 autonomous driving launched in 2021, was equipped with an OTA-compatible electronic control unit for autonomous driving, developed by Hitachi Astemo. Leveraging Hitachi Group technologies, this autonomous driving system offers a one-stop solution, from data centers where software updates are distributed, to vehicle-side equipment.

Hitachi's OTA solution enables highly efficient and secure software updates leveraging its proprietary differential data update technologies and expertise in information security through wireless data communications. In linking this OTA solution with Lumada's digital solutions, it is possible to automatically update software based on optimal solutions derived from AI analysis of big data. For example, by collecting and analyzing real world information obtained from vehicle onboard control units and sensors from each system in multiple autonomous vehicles, it is possible to update the control software for safer autonomous driving. To promote advances towards software-defined vehicles, we are also promoting the transition from domain-type electrical and electronic (E/E) architecture, in which mechatronic control systems are separated for each of several major functions, to zone-type architecture, in which the vehicle is a single system. In the future, Lumada will be linked to driving and vehicle behavior data acquired from on-board control systems that can be used for predictive maintenance, advanced safety and comfortable driving, and personalized services that anticipate user needs.



## Chassis

To improve vehicle safety, it is important to advance chassis components that perform basic vehicle functions such as driving, turning and stopping. Leveraging strengths in the in-house development of brakes, suspension and steering systems, Hitachi Astemo contributes to realizing autonomous driving by converting these systems into electronic and electric devices, then linking and controlling them to integrally work in conjunction with AD and ADAS systems. Utilizing suspension system technologies that facilitate a comfortable ride and stability, we jointly developed a shock absorber with AISIN, which was adopted by Toyota's new Land Cruiser, unveiled in June 2021. For brake systems that improve vehicle safety and fuel efficiency, we offer a wide range of products, including a regenerative braking system compatible with electric vehicles. In the area of steering systems, our products provide a high level of responsiveness and operability to meet the electrification needs of automobiles as well as a wide variety of other applications.

## Motorcycles

One of Hitachi Astemo's pillars is products for small motorcycles, which are a mainstay of daily life in the Indian and Asian markets. We will respond to future increases in demand for advanced technologies, including the expansion of midsize motorcycles and electrification offerings. We will increase our share of the global market by leveraging Hitachi Astemo technologies and quality, providing products with specifications and cost competitiveness suited to market needs. Starting with integrated vehicle control technologies, we will leverage advanced technologies and a wealth of experience in driver-assistance and EV control technologies to contribute to advances in next-generation motorcycles that realize environmentally friendly vehicle safety, handling stability and ride comfort.

Specifically, we apply Hitachi Astemo technological expertise and promote technological innovations, including the electronic control of brakes and suspensions, and electronic fuel injection systems that comply with emission regulations around the world targeting a wide range of displacements, from small to large, and powertrain systems facilitating electrification. We will also develop suspension systems that provide high handling stability and riding comfort, braking systems that provide stable, reliable braking with a high level of safety and comfort, and driving support systems that contribute to the safety of motorcycles.

## Synergies from Business Integration

We are also accelerating the creation of synergies through the business integration of Hitachi Automotive Systems, Keihin, Showa and Nisshin Kogyo, which was completed in January 2021. With this integration, we will establish a solid management foundation through structural reforms

that include optimizing business locations and reducing procurement costs through centralized purchasing, efficiently allocating combined resources, integrating talent and fostering a new corporate culture while investing in higher-growth, higher-profit areas.

## Strengthening Software Development

Hitachi Astemo meets the needs of automakers around the world by incorporating optimal software in its globally deployed products and systems. As the car itself now functions as a high-performance computer, the performance of in-vehicle software is directly related to creating new value and safe autonomous driving technologies. In April 2019, Hitachi Astemo enhanced its software development capabilities with the establishment of the Software Division to make use of its software developers. Additionally, through the acquisition of in-vehicle equipment software developer seneos (Germany) in April 2020, we have strengthened our front-end engineering capabilities to facilitate efficient software development. Further, approximately 170 digital talent within the Hitachi Group have transferred to Hitachi Astemo to promote digitalization business. With Lumada at the core, we expect to realize synergies from GlobalLogic's engineering and software development capabilities.

## Investment Plan

We will invest approximately 300 billion yen, including R&D expenses, in xEV-related products by fiscal 2025, collaborating globally with Hitachi, Ltd.'s R&D divisions including use of their resources. As an example, in areas such as connected solutions, Hitachi Astemo will conduct R&D on the in-vehicle device side, while Hitachi, Ltd. will conduct R&D on the cloud side—effectively separating the areas of R&D and resource allocation.

## Risk Management

While EVs are expanding as part of efforts to realize carbon neutrality, ICEs are expected to shift from an upward to downward trend in the next few years. In response, we will optimize our portfolio with changes in the business environment while shifting resources, redeveloping and retraining the professional skills of our human capital over the long term as needed.

Regarding concerns about semiconductor supply shortages, we will secure long-term contracts with vehicle manufacturers for parts delivery and share Hitachi's long-term planning with them to mitigate risk of shortages.

For parts procurement risks due to pandemic-related regulations in the COVID-19 era, we will work with our global networks and supply chains to mitigate risks and overcome challenging conditions while minimizing adverse impacts.