

Feature Story

Mazda's "Direction of Future Frameworks" and Technologies that Enhance the Value of the Automobile

—A compass bearing on sustainable growth and a technology strategy for making car ownership a joyful and life-enriching experience—

In April 2018, Mazda announced the Direction of Future Frameworks as a compass bearing for fundamental initiatives aimed at sustainable growth.

Designating the next three years as the time to lay a solid foundation for strong growth from FY March 2022 onward, the document outlines Mazda's ambitions to develop and introduce next-generation products and new technologies; accelerate sales network reforms, especially in the U.S.; and forge alliances with Toyota Motor Corporation and other partners. Here we present an interview with Representative Director and Executive Vice President Kiyoshi Fujiwara, who talks about the Direction of Future Frameworks and the electrification and connectivity strategies woven into it.

	FY March 2013-2016 Structural Reform Plan Change of business structure by structural reforms	FY March 2017-2019 Structural Reform Stage 2 Qualitative growth & Brand value improvement
Product and R&D	<ul style="list-style-type: none"> • Launched 6 new Skyactiv (1st Generation) models  <p>CX-5: First model in new-generation lineup featuring Skyactiv Technology</p>	<ul style="list-style-type: none"> • Launch 6 new models and updated models • Skyactiv (2nd Generation) / next-generation design  <p>CX-5: First model in the new-generation lineup to undergo a major redesign.</p>
Brand and Sales	<ul style="list-style-type: none"> • "Right-price" sales and volume growth • Brand value enhancement  <p>Mazda Business Leader Development (MBLD) training focused on brand value management</p>	<ul style="list-style-type: none"> • Right-price sales / frontline innovation • New-generation showroom / dealer network restructuring • Customer retention  <p>New-generation dealer (Brand Space Osaka)</p>
Global production	<ul style="list-style-type: none"> • Cost improvement through <i>Monotsukuri</i> Innovation • Enhanced global production capacity (ASEAN / Mexico / Russia)  <p>New Mexico plant (MMVO) New Thailand plant (MPMT)</p>	<ul style="list-style-type: none"> • CX model production flexibility • Global swing production • Overseas plants production efficiency  <p>Hofu Plant (started crossover production to meet increasing global demand)</p>
Strengthen financial structure	<ul style="list-style-type: none"> • Profitable structure even in strong yen environment • Reinforced financial structure and returned dividend payment 	<ul style="list-style-type: none"> • Equity ratio: 45% or more • Payout ratio: 20% or more

—FY March 2025

Direction of Future Framework

Development and Introduction of Next-Generation Products & New Technologies

- Accelerate development of next-generation product technologies, including advanced internal combustion engines; electric, connectivity, and autonomous technologies; and next-generation KODO design
- Optimize product strategies in terms of customer needs, segment characteristics, profit, costs, etc., by dividing next-generation products into small and large architectures
- New product strategy will strengthen the business in the U.S. market, expand sales of CX models globally and improve net venue by strengthening high value-added products



Skyactiv-X next-generation gasoline engine



Next-generation design vision

Accelerate Sales Network Reforms

(Example of the United States)

- Promote qualitative/quantitative growth through higher brand engagement
- Increase investment in network reestablishment. ¥10 billion level in the first year (roughly ¥40 billion over the next four years)

Increase next-generation branded dealers to 300, mainly in 35 priority markets

Each next-generation branded dealer to sell an average of 1,000 units per year

Aim for repurchase rate of 55% in 35 priority markets

- Overhaul marketing strategy to enhance brand value
- Increase dealership investment in local marketing
- Improve customer experience through enhanced training and trade cycle management initiatives



Next-generation branded dealer in the U.S.

Successful Alliances

- Business and capital alliance with Toyota Motor Corporation: Joint manufacturing in the U.S., joint development of EV technologies, connectivity, complementary products, etc.
- Strategic collaboration with suppliers: Batteries, connectivity, advanced safety technologies, etc.



At a joint press conference, Mazda and Toyota announced plans for the construction of a new \$1.6 billion plant in Alabama, U.S., that will begin production in 2021 and employ some 4,000 people

Interview with the Executive Vice President

We're taking steady, concrete steps toward sustainable growth while also following our insatiable passion to enrich people's lives and society and bring about a more beautiful earth through the value found in cars.

Kiyoshi Fujiwara

Representative Director and Executive Vice President

Q: Would you provide an overview of future initiatives in product and technology development?

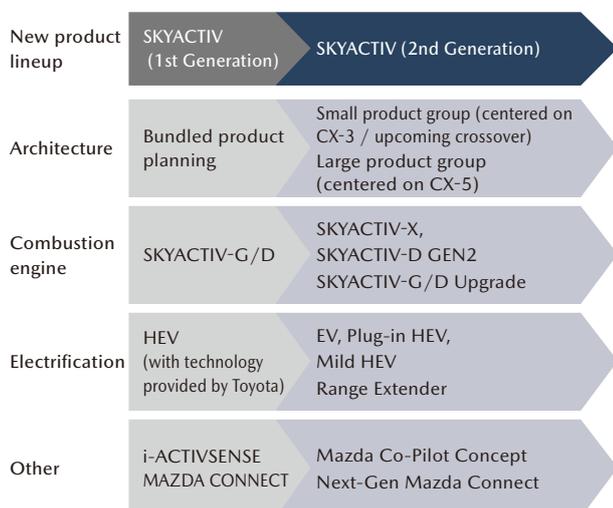
A: Mazda developed Skyactiv Technology, thoroughly improving the fundamental vehicle technologies that decide a car's basic performance, and began introducing new-generation models that feature the full range of these technologies, starting with the CX-5 in 2012. Skyactiv Technology and new-generation products delivered outstanding driving and fuel economy performance. In addition, through initiatives in *Monotsukuri* Innovation, such as common architecture and bundled product planning, under which optimized structures for each function are shared across models in different vehicle classes and deployed to all car lines, Skyactiv Technology and new-generation products have also supported increased efficiency in development and production and cost improvements, and driven growth in unit sales and structural reforms. Targeting the realization of "Sustainable Zoom-Zoom 2030," the long-term vision for technology development that we announced in August 2017, Mazda is moving forward with the development of next-generation technologies and design. Including the Skyactiv-X next-generation gasoline engine, these were unveiled at the 45th Tokyo Motor Show in October 2017. Products featuring next-generation design and technologies, including Skyactiv-X, will be introduced to global markets starting from 2019.

In regard to the Direction of Future Frameworks, we will aim to establish a highly competitive new lineup with the second generation of Skyactiv technologies. Specifically, to achieve further progress from the first generation, we will move on from the single architecture that we developed under the bundled product planning concept. We will divide our architecture into two product lineup categories — small products and large products. This will allow us to optimize our product strategy and the value our products deliver from such perspectives as customer needs, segment characteristics, profit, and costs. Furthermore, looking at our production capacity, which supports sales, we will strive to make better use of existing capacity, and will add the new U.S. plant, which is scheduled to start operations in 2021.

Architecture of SKYACTIV (2nd Generation)

Small products (CX-3/new crossover, etc.)	Large products (CX-5, CX-8, CX-9, etc.)
Further improve cost competitiveness & production flexibility	Enhance product competitiveness and brand value
Quickly respond to changes in demand for CX vehicles at each global production site	Improve net revenue by offering a wider variety of powertrains, including electrification

With these new product strategies, Mazda will expand global production of crossover models, improve net revenue by strengthening high-value-added products, and strengthen its business in the U.S. market. We will announce more details about these initiatives at an appropriate time.



Q. Please discuss the sales network reforms in the United States.

A. Looking back at our initiatives to date, over the two-year period from 2016 we worked to reestablish our sales network based on Mazda brand value management. The objective of these initiatives was to increase the quality of dealerships, so that our locations and staff create exciting venues that draw customers who look forward to engaging with products that they truly want. In the U.S. market, we implemented a conversion to strong dealers who endorse Mazda's brand value management, and began to establish next-generation branded dealers. In addition, we prioritized the establishment of the optimal sales network in 35 key markets. We will implement these initiatives and accelerate the construction of a U.S. sales network that can sell 400,000 units per year by 2021, when the U.S. plant will start operations. In these ways, we will advance quantitative growth over the medium to long term.

Q. What is Mazda's approach to alliances?

A. Mazda is promoting alliance strategies that foster optimal complementarity in the areas of product, technology, and regions, based on equal partnerships. In particular, in the development of next-generation technologies, in addition to strengthening our competitiveness through next-generation Skyactiv engines and other advances in the internal combustion engine, we also need to address a wide range of fields, such as electrification, autonomous driving, and connectivity. Our basic approach is to discuss with each potential partner whether we can forge a win-win relationship based on our relative strengths. We then pursue co-creation based on equal effort as equal partners, applying our own strengths in technology, development, and production processes, such as bundled product planning and computer modeling-based development. In a number of fields, we will aim to further deepen strategic alliances with Toyota and suppliers and realize win-win alliances. Of course, we will also advance collaboration with other partners.

Q. In the "Direction of Future Frameworks", what is your approach to Connected, Autonomous, Shared, and Electric (CASE) technologies, which are expected to transform the automotive industry?

A. The auto industry is said to be going through a once-in-a-century seismic shift. Mazda views this shift as an opportunity to create a new car culture. The trend toward CASE offers not only potential solutions to issues facing the earth and society but also a chance to make the automobile even more attractive to customers. This perspective is woven into the "Direction of Future Frameworks." We are taking a unique, human-centered approach to CASE to create and deliver a new lifestyle with cars and a new car culture that will truly enrich the lives of our customers.

In August 2017, we announced plans to begin testing in 2020 autonomous driving technologies currently being developed in line with our human-centered Mazda Co-Pilot Concept (see p.49), aiming to make the system standard on all models by 2025. And in October 2018, we announced our unique approach to battery-powered electric vehicles (EVs) and connectivity.



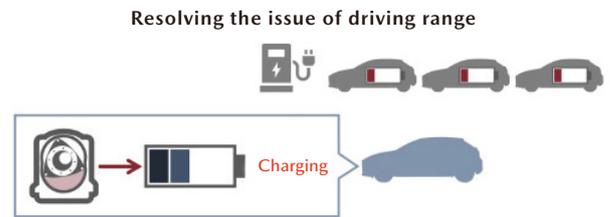
Q. What is Mazda’s strategy for EVs?

A. Mazda is not about to change the way we make cars, just because we are dealing with battery-powered EVs. Regardless of the era or the type of car, the philosophy behind all Mazda cars is to stay true to our higher cause. In other words, our cars and technologies must contribute to the earth and society, and they must be human-centered. We are committed to making cars that invigorate the mind and body and offering customers an enriching experience of car ownership. And our battery-powered EVs will be no exception. There are three concepts that lie at the heart of our EVs.

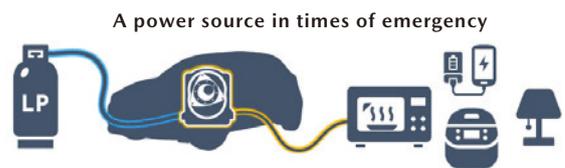
Firstly, the joy of driving. We define driving joy as the feeling of driving a car that accelerates, turns and brakes in a way that feels just right, like a tool you've been using for years. The interaction and the pleasure it brings makes you want to keep on driving forever. The car should be engineered to move in a way that conforms to the natural movements of the human body, so its motion feels natural to drivers and passengers, and the comfort and security they feel mean they want to keep going too. The design captivates you from the moment you lay eyes on it, and you never tire of looking at the car because its expression changes with the light and the surrounding environment. Owning, driving and spending time with the car offers a truly satisfying experience. That is what Mazda means by driving joy. One way we deliver driving joy with our battery EVs is through our unique G-Vectoring Control technologies (see p.125). These advanced technologies can control vehicle behavior whether the driver is pressing the accelerator or not, providing seamless and precise control even when the EV drives down a hill, for example. They will ensure even smoother linkage of the vehicle's lateral and longitudinal motion, making possible the kind of motion I spoke about earlier, which conforms to the natural movements of the human body. We believe this will allow us to achieve the Jinba-ittai driving feel that makes people feel one with the car.

Secondly, earth-and people-friendly technologies. When driving a battery EV, there is always the fear of running out of battery life. It would be great if charging stations were as common as gasoline stations today and charging took no longer than filling up the tank, but at this point in time, that is simply not realistic. We see a range extender that uses an engine to generate electricity as a people-friendly technology that removes much of the anxiety of driving an EV. Mazda

is developing a range extender with a rotary engine design. Because a rotary engine generates low vibration and noise, it won't encroach on the quiet and comfortable atmosphere for which battery EVs are known. A rotary engine also generates power through the revolving motion of the rotor, so it can be integrated with an electric motor, which has a similar rotational structure, to create a very compact unit. Using the rotary-powered range extender as a base together with different combinations of generators, batteries and fuel tanks enables us to offer plug-in, series and other kinds of hybrids. Such vehicles will have larger fuel tanks and use the engine more, but still help to reduce well-to-wheel carbon dioxide emissions in countries that rely heavily on thermal plants for power generation.

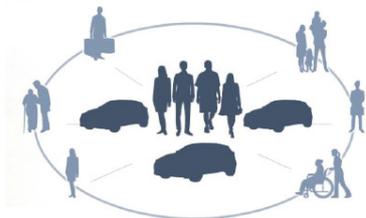


And thirdly, technologies that contribute to society. In recent times, numerous natural disasters have disrupted our energy infrastructure and seriously affected people's lives. Mazda is proposing a new way of helping people and contributing to society that uses the range extender's ability to generate electricity. The rotary engine's flexibility in accommodating a variety of fuel types means we can adapt it for use with CNG, LPG, hydrogen and other fuels. Electric vehicles with LPG-compatible range extenders could be used in disaster areas as mobile electricity supply vehicles. If, for example, a disaster causes power outages and a shortage of gasoline and diesel, the rotary-powered range extender could still supply electricity using widely-available and easy-to-transport LPG gas cylinders. Mazda hopes to create a new form of social contribution by sending such cars to disaster-affected areas and providing electricity to those in need. Mazda is developing its own EVs, entirely in-house, targeting market introduction around 2020.



Q. What is Mazda’s strategy for connectivity?

A. Mazda is proposing two value concepts through our connectivity technologies. The first, which all car companies want to offer, is simply the ability to enjoy digital convenience, safely, while in your car. The second is based on our human-centered development philosophy and is all about applying connectivity to provide an enriching lifestyle and experience of car ownership that energizes people physically and mentally. In today’s world, we are connected and empowered by having access to the Internet. Convenience has its drawbacks, however, and people are starting to want, at least temporarily, to be freed from their excessive dependence on digital tools. Again, Mazda wants to apply its human-centered approach to develop connectivity technologies that balance the convenience of a connected, digital society with real-world human interaction and connection. At Mazda, we want to connect the benefits of digital tools with the power of the automobile to expand the scope of people’s activities and make the journey itself something to be enjoyed. We think this fusion of the automobile and digital tools could help people reclaim and re-empower aspects of their humanity that were lost to digital overload by leading them back to real-world interactions with people and nature.

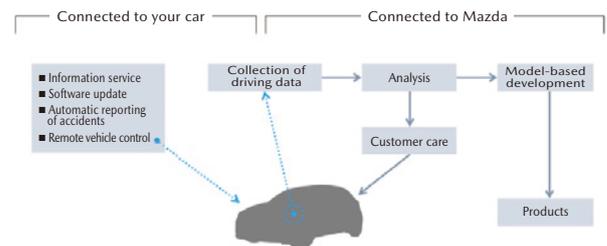


For example, people can drive their cars to depopulated areas and help others with limited options for getting around. While there, they may be inspired to take part in a depopulated community renewal project. Connectivity technologies thus enable users to encounter new places and new people. They can sign up for a volunteer project while driving and then participate and meet other volunteers when they get there. The benefits of their actions taken within the context of real human relationships can be broadcast through digital tools, with the vast digital society offering endless possibilities for making new connections. This is how we envision real-world activities that offer a digital detox combining with the power of the digital world to expand connections in a way that balances both. We would very much like to make such a world possible. We hope that creating such experiences will allow people to fully celebrate the joy of life.

Recent years have witnessed the dilapidation of public transportation systems in depopulated areas, and this has made it harder for the elderly and disabled to get around. We feel that the car and connectivity technologies can support activities that each of us can take part in to make a difference. Mobility by car is not only a way for people within a community to help one

another; it can also help make local communities more open to diversity. More interaction between cities and depopulated areas may lead to human resource development and the creation of new industries. Mazda will start testing a mobility service in Miyoshi, Hiroshima in October 2018 with an eye to ride-sharing services in the future. The initiative aims to improve the operational efficiency of a local mobility service operated by a non-profit organization, encourage participation and create added value to energize the local community.

We are also working on technologies that connect customers to their car and technologies that connect customers to Mazda. To build a stronger customer relationship and connection for our business in the future, we’ll be using connectivity technologies to drive business innovation. The connected car system that will form the basis of our connectivity will be a part of our upcoming next-generation product lineup. To ensure access to a broad range of accurate information, Mazda sees the development of the majority of onboard devices, communication platforms and IT systems as areas of cooperation, and we plan to make full use of our alliance with Toyota Motor Corporation.



Q. You mentioned your desire to contribute to the creation of a new “car culture.” Can you tell us more about that?

A. Everything Mazda makes -- EVs, connectivity technologies, even autonomous driving and car sharing -- everything we make must be true to our development philosophy, which puts the human being at the center of everything we do. We will adapt to this new world and deliver the joy, not only of driving but -- through our efforts to create a new car culture -- the joy of life itself. We envision people enjoying better health and well-being physically and mentally as the ability to share experiences and feelings enhances their overall level of emotional fulfillment.

Combining connectivity technologies with the range-extender’s ability to act as a power source provides the basic necessities of life -- off-grid access to electricity and 24/7 communication capability -- and combines them with the power of a car to expand the range of your activities. Mazda believes that this combination can encourage people to get offline, enjoy new experiences in nature and the pleasure of using a car, and truly feel the joy of life. That’s the kind of new car culture we hope to create. And it’s one we will pursue as part of our insatiable passion to enrich people’s lives and society and bring about a more beautiful earth through the value found in cars.