



We will create new value for future generations via the pursuit of technological innovation.

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Evolution Employing Digital Innovation

At Kawasaki Heavy Industries, the Corporate Technology Division has long been collaborating with each business segment to promote product development. In line with the FY2019 MTBP, we are striving to step up such collaboration with emphasis on dramatic innovation as part of a push to create new products and businesses aimed at meeting rapidly evolving market needs. We consider dramatic innovation essential to satisfying latent customer needs, helping resolve future issues, and creating solutions for future generations. I believe that much will be accomplished via breakthroughs in digital technologies. For example, we have positioned future energy systems, transportation systems and robotics as growth fields and are discussing the services we need to create. We are also striving to ensure that staff at the Corporate Technology Division and those at business segments share a common idea of the future products and businesses that will make it possible to deliver solutions. In this way, we are identifying technological targets that must be achieved in order to realize further advances.

In fiscal 2018, the Information Planning Center, formerly part of Head Office's Corporate Planning Division, was reassigned to the Corporate Technology Division and renamed the IT Strategy Planning Center. The Corporate Technology Division is now better positioned to accelerate efforts aimed at embodying our corporate slogan, "Changing Forward."

We expect digital innovation to help broaden our business fields. As a manufacturer, we have largely depended on earnings from assembly and production. Digital innovation, however, allows us to expand our scope of services to include operations previously undertaken by our customers.

We are now enhancing the value of our services through the provision of a comprehensive set of systems, rather than just products, and improved maintenance efficiency. For example, to enhance customer value in our garbage incinerator operation assistance service an AI-driven system analyzes images of the matter being incinerated and automatically calculates the volume of garbage needed for the desired output from the generator the furnace is feeding. We aim to upgrade this system to plan garbage supply

volumes based on market electricity demand.

By thus applying prediction and optimization technologies, we will help customers streamline their operations. This is how digital innovation works, and we believe our efforts to develop efficient facility management systems will contribute to the realization of greater goals, like the SDGs.

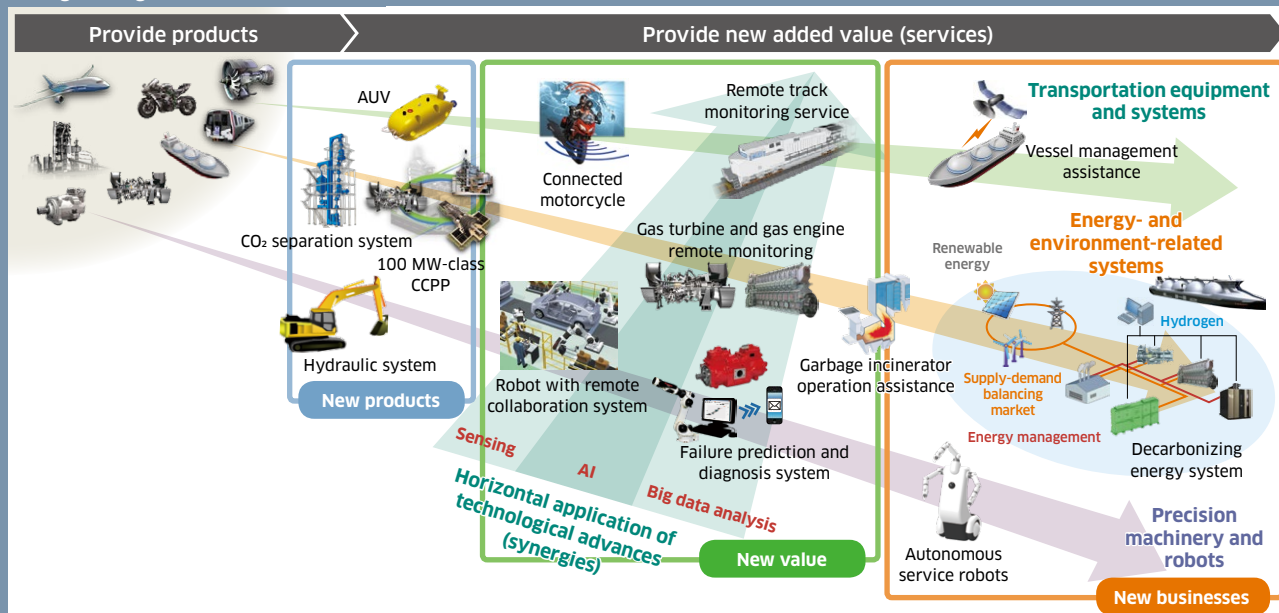
Preparing for the Emergence of a Hydrogen-Powered Society

After the Paris Agreement, signatory countries began pursuing the collective target of keeping the global temperature rise in this century to less than 2°C (ideally, less than 1.5°C) above pre-industrial levels. This agreement also aims to reduce emissions of greenhouse gases (GHGs), including CO₂, to virtually zero in the second half of this century. We are determined to fulfill our responsibilities as a corporate citizen in response to this international shift in focus from low-carbon to de-carbonization, which will bring with it new business opportunities. Accordingly, we are pushing ahead with various initiatives in preparation for the emergence of a society in which hydrogen-fueled clean energy is a major type of power.

The creation of the decarbonized society requires three factors. First, a robust power network must be built despite the intrinsic instability of the renewable energy supply. Our network-based remote facility operation systems will help adjust outputs from power generation facilities, such as gas engines and gas turbines, in response to changes in demand-supply status. Our technologies will thus benefit both the energy market and power suppliers.

The second factor is carbon recycling. We envision a new material chain that prevents the external release of CO₂ emissions and is nondependent on fossil fuels. Despite cost challenges, a growing number of customers are investing in such green energy solutions.

Finally, we believe that the promotion of clean energy will result in the creation of a society powered by hydrogen energy. Over a two-year period ended in fiscal 2018, we were engaged in the verification testing of "Kobe Smart Community." Specifically, we established a hydrogen cogeneration power generation facility on Kobe Port Island



using our gas turbine technologies to supply energy and heat to surrounding communities, confirming the safety and feasibility of the cogeneration system.

Plans call for carrying out technological verification associated with importing hydrogen from Australia in 2020. Australia boasts abundant, easily accessed reserves of brown coal that have long been underutilized due to transportation difficulties. To address this issue, we aim to establish a low-cost process for extracting hydrogen on site. Hydrogen can then be efficiently transported to Japan and utilized for power generation, other industrial purposes, or as a fuel for vehicles. As a number of major international events are expected to be held in Japan in 2020 and beyond, we will focus on introducing our blueprint for the hydrogen-powered society of the future to visitors from around the world.

Enhancing Manufacturing through Digital Innovation

We are engaged in process innovation aimed at enhancing operational efficiency. For example, taking advantage of digital innovation, we are striving to incorporate virtual reality (VR) and augmented reality (AR) technologies into our design and development operations.

Most recently, VR was utilized in the course of developing a new railcar in the Seibu 40000 series. Focusing on ensuring a barrier-free environment, we used a VR-supported design process to confirm freedom of movement within railcars for passengers with disabilities, thus reducing the time and money spent on prototype development.

Moreover, we have been introducing ICT/IoT technologies as part of the push to realize manufacturing reforms at our factories. For example, the Corporate Technology Division is working with the Aerospace Systems Company to promote the Smart-K project, which involves introducing robots at our Nagoya and Gifu facilities and establishing a cutting-edge, RFID*-driven product traceability management system. We expect these technologies to support timely decision making with regard to changes in production orders while optimizing facility operations.

* RFID (radio frequency identification): Wireless, automated recognition systems and technologies

The Corporate Technology Division Provides a Vision of the Future

Our matrix-type based operations maximize performance with fewer employees. Thus staff from the Corporate Technology Division can closely collaborate with staff in each business segment from the product planning stage onward and the allocation of resources can be optimized to meet various, often contradictory, development requirements. With multiple projects currently under way, specialists at the Corporate Technology Division are taking advantage of their technological expertise to promote product development at business segments.

Furthermore, matrix-based operations enhance our ability to realize synergies through the sharing of insights gleaned from past projects. For example, a recent project aimed at developing gas engines utilized combustion chamber flow and combustion analysis techniques developed through motorcycle development. This project supported the development of a highly efficient gas engine with world-leading performance in an extremely short period of time.

Conversely, the Ninja H2, a motorcycle boasting a supercharger, was developed via the application of high-speed rotating technologies originally utilized in gas turbines. In short, we are leveraging technological synergies in various ways to enhance project development efficiency.

The Corporate Technology Division's mission includes proposing products and services capable of resolving social issues and, to this end, envisioning the technologies it must create in the near future to identify solutions that will support future generations. To this end, in addition to in-house development, the division collaborates with startups, utilizing input from these and other open innovation initiatives being undertaken worldwide as endeavors to efficiently meet society's evolving needs.

Looking ahead, for the division to help Kawasaki Heavy Industries maintain sustainable operations, it will have to take on the kind of challenges that cannot be overcome by upgrading or optimizing existing products and strive toward technological breakthroughs and business model reforms. We are confident that we will overcome such challenges, create innovative products and new value, and satisfy the future needs of society.