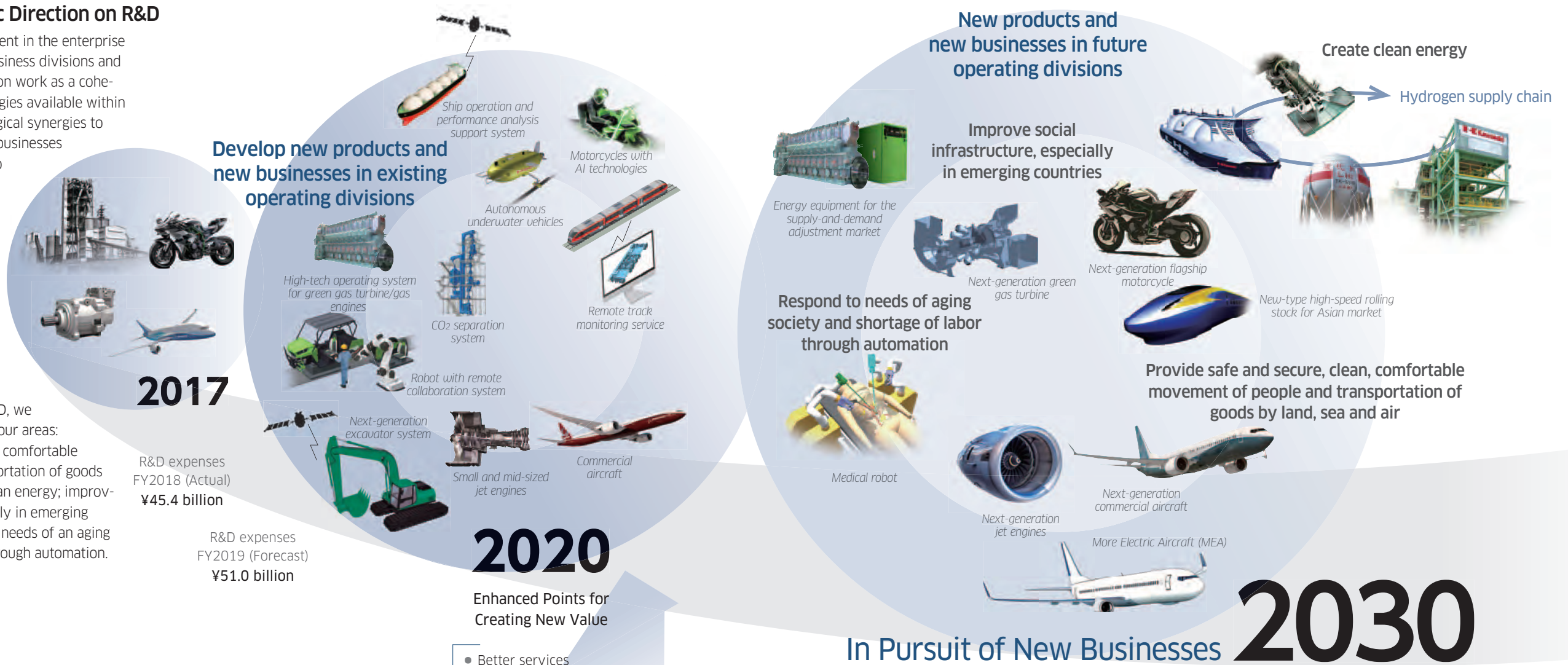


# Delivering Value to Society Through Our Evolving Technology

## Kawasaki Group's Basic Direction on R&D

To ensure sustainable improvement in the enterprise value of the Kawasaki Group, business divisions and the Corporate Technology Division work as a cohesive unit, concentrating technologies available within the Group and utilizing technological synergies to develop new products and new businesses with a competitive edge. We also strive for balanced R&D through new product and new business development as well as activities geared toward the creation of new products and new business for the future in each business division in addition to training and upgrading on basic technologies needed to realize these new products and new businesses.

Through this approach to R&D, we are creating value to society in four areas: providing safe and secure, clean, comfortable movement of people and transportation of goods by land, sea and air; creating clean energy; improving social infrastructure, especially in emerging countries; and responding to the needs of an aging society and shortage of labor through automation.



**2017**

R&D expenses  
FY2018 (Actual)  
¥45.4 billion

R&D expenses  
FY2019 (Forecast)  
¥51.0 billion

**2020**

**2030**

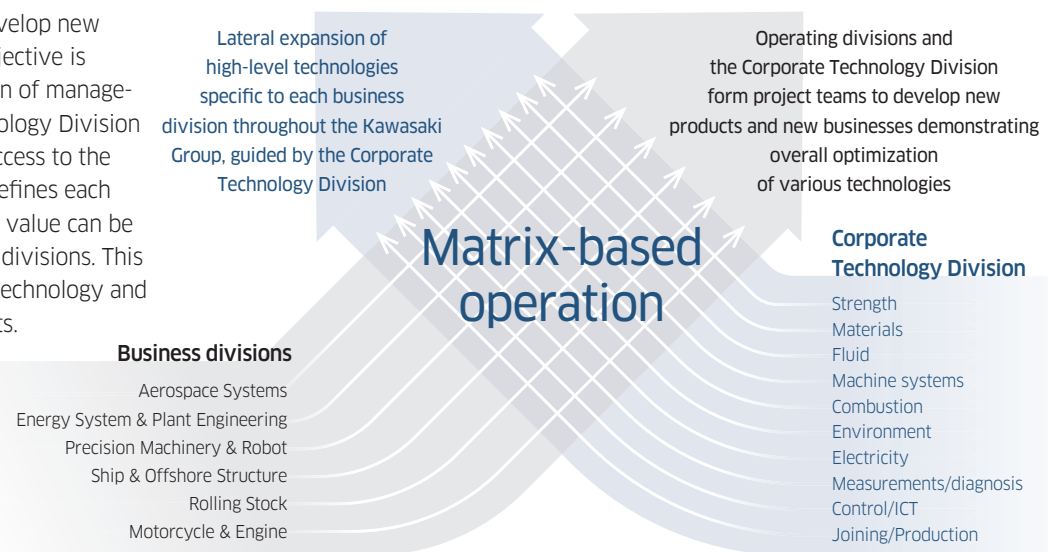
Enhanced Points for  
Creating New Value

- Better services
- System integration
- Enhanced *monozukuri* manufacturing capabilities
- Optimized development processes

## Framework for Creating Technological Synergies –Matrix-based Operation

Engineers from each business division and specialists in the Corporate Technology Division, who have expertise in various fields, form project teams to share issues and work together to develop new products and new businesses. The objective is always to achieve overall optimization of management resources. The Corporate Technology Division acts as an intermediary, facilitating access to the technological core competence that defines each business division so that the inherent value can be applied to products in other business divisions. This promotes multifaceted expansion of technology and demonstrates major synergistic effects.

We will utilize this matrix-based operation to create technological synergies throughout the Kawasaki Group and raise enterprise value even higher.



- Business divisions**
- Aerospace Systems
  - Energy System & Plant Engineering
  - Precision Machinery & Robot
  - Ship & Offshore Structure
  - Rolling Stock
  - Motorcycle & Engine

- Corporate Technology Division**
- Strength
  - Materials
  - Fluid
  - Machine systems
  - Combustion
  - Environment
  - Electricity
  - Measurements/diagnosis
  - Control/ICT
  - Joining/Production

## In Pursuit of New Businesses

### Topics: Demonstration Project for Hydrogen Co-Generation System (in Kobe, Japan)

Tapping hydrogen projects as a core business of the future, the Kawasaki Group has been actively engaged in the projects since fiscal 2010. We have already completed development of a high-pressure hydrogen trailer, a liquefied hydrogen container and a gas turbine using a mixed hydrogen combustion system, and marketing activities are now in progress. In addition, we are promoting development of hydrogen liquefaction equipment, a liquefied hydrogen carrier ship and liquefied hydrogen bases.

Also of note, Kawasaki and Obayashi Corporation commenced demonstration of a system—the world's first—to deliver heat and electricity in an urban area using a gas turbine fueled by pure hydrogen. As part of a project by the New Energy and Industrial Technology Development Organization, we conducted tests using a power generation system with a 1-MW-class gas turbine fueled by hydrogen and natural gas flexibly (hydrogen co-generation system). In these tests, the system supplied four neighboring public facilities with heat and electricity. Our efforts will be directed toward the verification of an optimized energy management system within local communities.

