

Furnishing highly efficient products and services to support key industries and areas

# Machinery, Equipment & Infrastructure

Machinery, Equipment & Infrastructure provides a wide range of products that form the foundation of industrial development, such as machine tools, material handling, construction machinery, and air-conditioning and refrigeration systems. As a manufacturer, MHI is applying its sophisticated technologies and expanding its areas of business to play a major role in infrastructure development in countries worldwide.



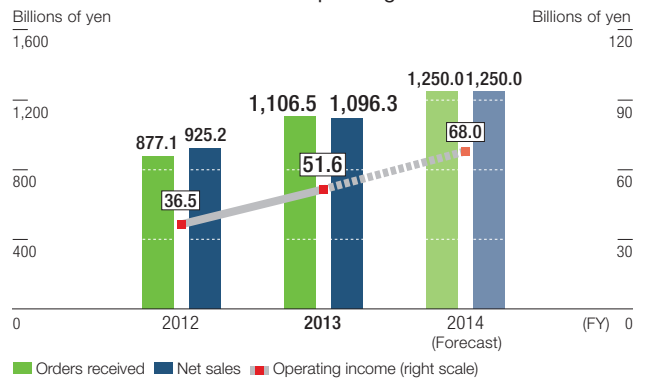
**We are working to boost profitability by building a portfolio that optimizes the scale and profitability of strategic business units (SBUs) and efficiently allocating business resources.**

**Kazuaki Kimura**  
Domain CEO,  
Machinery, Equipment &  
Infrastructure

## Fiscal 2013 in Review

April 2013 marked the launch of operations at Mitsubishi Nichiyu Forklift Co., Ltd., a consolidated subsidiary of MHI that integrates the forklift truck operations of MHI and Nippon Yusoki Co., Ltd. This new entity will enable us to take on larger orders for forklift trucks. During the year, orders increased for automobile turbochargers, centered on China and Europe. Orders also rose for air-conditioning equipment from China and compressors in the United States. As a result, in this domain orders received amounted to ¥1,106.5 billion and consolidated net sales came to ¥1,096.3 billion, both up from the previous fiscal year. Operating income also rose year on year, to ¥51.6 billion, benefiting from the impact of yen depreciation.

Orders Received / Net Sales / Operating Income



### Strategic Business Unit (SBU)

- Compressors
- Metals Machinery
- Environmental System
- Mechatronics Systems
- Industry and Precision Instruments
- Advanced Mechanical System
- Hydraulics & Machinery
- Other Equipment
- Turbocharger
- Automotive Thermal Systems
- Engine
- Material Handling Equipment
- Agricultural Machinery
- Air-Conditioning & Refrigeration
- Machine Tool



**SWOT Matrix**

<ul style="list-style-type: none"> <li><b>Turbochargers</b> Customer-based model in Europe, the world's largest market</li> <li><b>Engines</b> Diverse lineup, from small to medium and large engines</li> <li><b>Forklift trucks</b> Extensive product lineup of internal combustion trucks, electric trucks, and indoor distribution equipment</li> <li><b>Air-conditioning and refrigeration systems</b> Extensive product lineup</li> </ul>	<p>Strengths</p> <p><b>S</b></p> <p>Weaknesses</p> <p><b>W</b></p>
<ul style="list-style-type: none"> <li>Growth in demand in China, India, Southeast Asia, and North America</li> <li><b>Turbochargers</b> Expansion of emerging markets such as India and Brazil</li> <li>Shift to smaller, turbocharged engines against a background of environmental and fuel efficiency regulations</li> <li><b>Engines</b> Increased global demand for gas engines due to spread of low-cost shale gas</li> </ul>	<p>Opportunities</p> <p><b>O</b></p> <p>Threats</p> <p><b>T</b></p>

- Large number of low-share products compared with specialized manufacturers
- Turbochargers** | **Engines** Ability to respond to rapid business fluctuations
- Air-conditioning and refrigeration systems** Smaller business scale than specialized manufacturers
- Prominence of Chinese and South Korean companies
- Turbochargers** | **Engines** Continuation of impact from European economic crisis
- Economic slumps in emerging countries such as China and India
- Decline in unit prices of products due to commoditization
- Air-conditioning and refrigeration systems** | **Machine tools** Rise of manufacturers in emerging countries

**Basic Strategies**

- Reinforce production and sales in emerging markets in which such core industries are rapidly expanding, and aim to increase market shares and expand profitability
- Establish dedicated operating companies, form alliances and carry out mergers and acquisitions, and build world-class businesses by engaging in agile and flexible organizational management

**Operating Environment**

Against a backdrop of increasingly stringent environmental regulations on automobiles, around the world a growing number of vehicles powered by gasoline and diesel engines are being fitted with turbochargers to enhance their fuel efficiency. With the trend toward stricter environmental regulations slated to continue, this market is expected to continue growing.

Increased U.S. shale gas production has led to demand for compressors. Demand is also vigorous for gas-related plant equipment used in shale gas production, such as LNG shipping facilities, as well as for new petrochemical plants to produce ethylene. Compressor demand is benefiting from the ripple effect of expanding shale gas production, as these devices are used to compress the air and gases that related plants require to generate products.

**Initiatives for Growth over the Medium to Long Term**

In the Machinery, Equipment & Infrastructure domain, we offer a wide range of products targeted at such key industries as steel and automobiles and include iron and steel manufacturing machinery, compressors, and machine tools. We are working to reinforce production and sales in emerging markets in which such core industries are rapidly expanding and aim to increase market share and expand profitability. Through initiatives that reach across individual SBUs, this domain strives to generate synergies in production, sales, and on a host of other functional fronts. To accomplish this aim, we will cultivate human resources and extend our lineup of products that are capable of responding to the needs of diverse customers, markets, and business practices. We will also enhance our service networks and set up production bases that cater to the need for local production for local consumption.

To achieve agile and flexible organizational management, we will work actively to establish dedicated operating companies, form alliances, and carry out mergers and acquisitions in our aim to build world-class businesses.

**Key Projects**

Announcement	Delivery	Project
March 2014	—	Three Group Companies in Machinery and Steel Structures Businesses to Merge into Mitsubishi Heavy Industries Mechatronics Systems, Ltd.
January 2014	—	MHI and Hitachi to Collaborate on the Distributed Gas Engine Power Generation Systems Business in China
October 2013	—	MHI and Tokyo Gas Co., Ltd., Develop New 1,000 kW Gas Engine Cogeneration System

Announcement	Delivery	Project
October 2013	—	MHI Develops MEGASEG, Industry's First Portable Generator in the 2 kVA Class Fueled by Propane Gas (LPG)
August 2013	—	MHI Announces Plan to Boost Turbocharger Production Capacity Worldwide, Aiming for 10 Million Units/Year Production Structure
April 2013	—	MHI to License KU Gas Engine Technologies to ZGPT of China



## FOCUS

## Machinery, Equipment &amp; Infrastructure

## Turbochargers Increasing Acceleration and Contributing to Environmental Performance

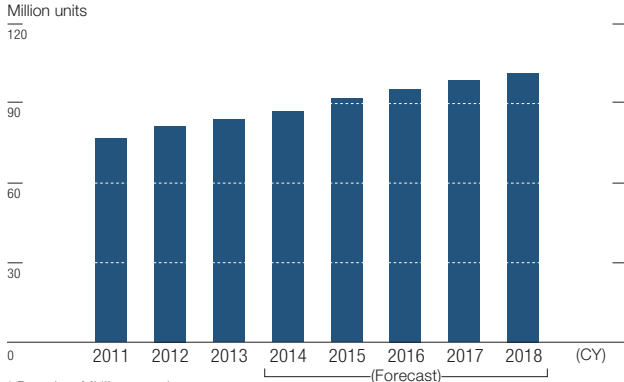
Around the world, fuel-efficiency regulations on automobiles are growing stricter. While demand for vehicles is rising, particularly in emerging markets, on the other hand automakers face the urgent task of meeting stiffer requirements. Under these conditions, expectations are growing for turbochargers, which boost the fuel efficiency of gasoline- and diesel-powered vehicles. MHI is contributing to better fuel efficiency through its efforts to develop high-performance turbochargers and promote them on a global basis.

### Backdrop

- Concern about environmental pollution as the number of vehicles in the world grows
- Increasingly stringent exhaust emissions going into place throughout the world

Global automobile production continues to rise. During the past decade, the number of automobiles manufactured each year has risen approximately 40%, to 90 million. Underpinning this growth are emerging countries, which are heightening in importance as production bases as well as consumer markets. In the past, the automotive industry hinged on advanced countries, but this focus is expected to continue shifting toward emerging markets. World automobile production is predicted to expand to around 100 million units per year by 2018. Meanwhile, emerging countries such as China and India are facing air pollution from automobile exhaust. As a result, countries around the world are adopting ever-stricter fuel-efficiency requirements, such as the Corporate Average Fuel Economy (CAFE) regulations in the United States. It is growing increasingly difficult for vehicles to get to market unless they deliver superior fuel efficiency. Accordingly, boosting fuel efficiency is of pressing importance for automakers the world over.

Worldwide Automobile Production (Vehicle Weight of 3.5 Tons or Less)

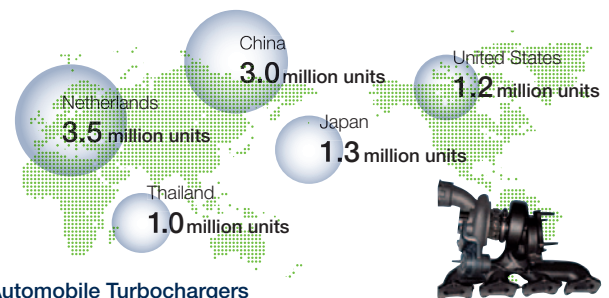


### Key Capital

- Core technologies for the development of high-performance turbochargers
- Global production system in place

Automakers are developing hybrid and electric cars in the interest of enhancing fuel efficiency. At the same time, market demand for turbocharged engines, especially gasoline engines, is increasing rapidly. Installing a turbocharger simultaneously reduces exhaust volumes and boosts performance compared with other engines in the same class, so smaller engines can be used. This combination contributes to substantially higher fuel efficiency. Turbochargers also curtail the amount of harmful substances contained in emissions, allowing gasoline and diesel vehicles to pass stricter fuel-efficiency regulations. However, developing high-performance turbochargers is no easy feat, as it requires the application of technologies capable of high-speed turbine rotation at elevated temperatures. MHI has cultivated the core technologies needed in automobile turbochargers through its work in aircraft engines and gas turbines. The Company has also earned a strong reputation among customers for the low failure rate of its products. MHI is building a global production system to meet the steady ongoing increases expected for turbocharger demand.

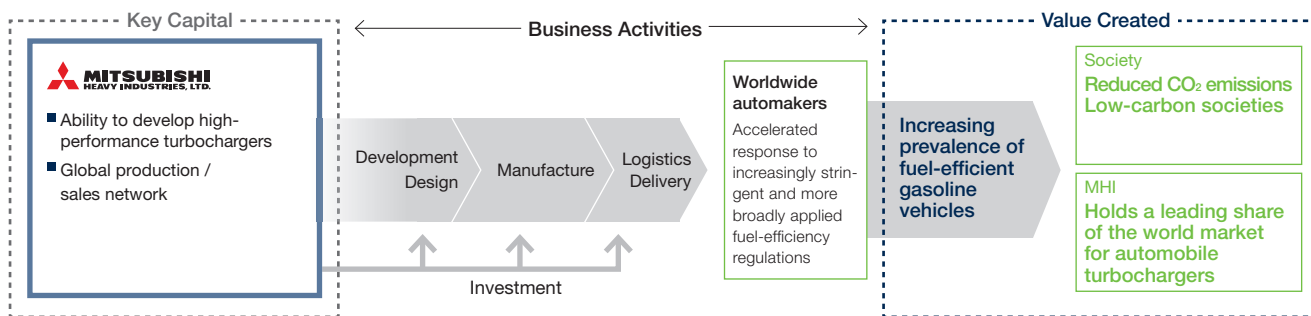
Global Turbocharger Manufacturing Structure (10 Million Units)



### Automobile Turbochargers

Automobile turbochargers are environmentally friendly products. These eco-products recover an engine's heat energy to boost thermal efficiency, curtailing fuel consumption (better fuel efficiency) and reducing the volume of harmful components in exhaust gases (lower pollution). Meanwhile, supplying compressed air boosts output (more power).





Strategy

- Augment turbocharger production capacity
- Develop next-generation turbochargers

Help to achieve a low-carbon society through growing global uptake of turbochargers

MHI is investing aggressively to build a worldwide structure capable of producing 10 million turbochargers per year. By investing a total of ¥15.0 billion in its overseas production bases, including a key component manufacturing facility in Thailand, by 2016 MHI expects to have in place a structure capable of manufacturing 10 million units per year. At the same time, to enhance cost competitiveness the Company aims to achieve a flexible production structure with four focal points—Japan, the United States, Europe, and Asia. Forthcoming innovations include a new-concept turbocharger that achieves the world’s highest level of efficiency and an electrically driven two-stage supercharging system (turbocharger) that will allow

further downsizing of gasoline engines. MHI is cultivating the market for such products. In addition, we are creating a locally responsive engine development support structure through which we will be able to respond to diverse market needs from nearby bases precisely and with short delivery schedules. Going forward, we will continue to strengthen these measures, making additional investments if necessary, to achieve our goal of garnering a leading share of the world market for automobile turbochargers. MHI aims to contribute to a low-carbon society by encouraging the spread of turbochargers, which can play a key role in improving fuel performance.

VOICE

**Cheryl Morphew**  
President & CEO,  
Johnson County  
Development Corp.  
Indiana State,  
United States



We had been working to attract an environmentally conscious company, so MHI’s establishment of a turbocharger plant in Franklin was a welcome occurrence.

The city of Franklin and Johnson County, Indiana, are delighted to have an MHI turbocharger production plant in our community. We strive to attract environmentally friendly companies and are extremely pleased about MHI’s new product technology that will manufacture turbochargers capable of reducing CO<sub>2</sub> emissions and fuel consumption in the environment.

We have had a long-standing relationship with the MHI Group for automotive parts business and look forward to building such a relationship for turbocharger.

Congratulations, and welcome to your new Franklin home!

