### Outline of Turbocharger Business

#### A favorable market climate
- Stricter environmental regulations in many regions have focused attention on turbochargers as eco-friendly devices
- Global turbocharger installations are set to surge

#### IHI’s competitive strengths
- Broad customer base and line-up
- Global production footprint
- Powerful Group technology platform

#### Expanding sales and profitability
- Securing stable sales and earnings from expanding, high-volume market
- Boosting sales and margins by prioritizing high-value-added offerings
Turbocharger Business Overview

Division Name: Vehicular Turbocharger Operations
Representative: Hiromu Furukawa, General manager and Executive Officer
Products: Vehicular turbochargers
Number of employees: 2,755 (on consolidated basis)

Turbochargers are vital for the Industrial Systems and General-Purpose Machinery business, representing nearly 40% of segment sales

<table>
<thead>
<tr>
<th>Subsidiaries</th>
<th>Entity Name</th>
<th>Acronym</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHI Turbo Co., Ltd.</td>
<td>ITJ</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>IHI Charging Systems International GmbH</td>
<td>ICSI</td>
<td>Germany</td>
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<tr>
<td>IHI Charging Systems International Germany GmbH</td>
<td>ICSG</td>
<td>Germany</td>
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<tr>
<td>IHI Charging Systems International S.p.A.</td>
<td>ITY</td>
<td>Italy</td>
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<tr>
<td>IHI Turbo America Co</td>
<td>ITA</td>
<td>U.S.A.</td>
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</tr>
<tr>
<td>IHI TURBO (THAILAND) CO., LTD.</td>
<td>ITT</td>
<td>Thailand</td>
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<tr>
<td>Wuxi IHI Turbo Co., Ltd.</td>
<td>WIT</td>
<td>China</td>
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<tr>
<td>Changchun FAWER-IHI Turbo Co., Ltd.</td>
<td>FIT</td>
<td>China</td>
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<tr>
<td>IHI Turbo Korea Co., Ltd</td>
<td>ITK</td>
<td>Korea</td>
<td></td>
</tr>
<tr>
<td>Clover Turbo., Ltd.</td>
<td>CTJ</td>
<td>Japan</td>
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</tr>
<tr>
<td>Hyundai WIA IHI Turbo Co., Ltd. (49% owned by IHI)</td>
<td>HWIT</td>
<td>Korea</td>
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</tbody>
</table>
Turbocharger Functions

**MECHANISM**

- Improving engine performance, conserving fuel, and purifying exhausts by delivering air at high pressures to engines
- Essential for diesel engines
- Installations rising in increasingly downsized gasoline engines to enhance fuel efficiency

**BENEFITS**

- Improving mileage by 20% while maintaining power/torque
- Recycling 10% of exhaust heat energy to help boost output
- Lowering particle emissions
- Easier acceleration
- Driving with less input

Turbocharger is eco-friendly device which supports various vehicle types to realize fuel economy
Market Climate
Implementation of stricter fuel economy standards in many regions is favorable for the turbocharger market

Source: The International Council on Clean Transportation
(1) Initial target enforcement year
(2) Year for achieving target
(3) Proposed target figure

Note: Figures in circle denote % improvement in fuel economy
Global Automobile Market Prospects

Statistics predict that conventional engines will remain mainstream for the time being.

Source: Third Party Research

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Annual installations of turbochargers should exceed 50 million units by 2020

Source: Third Party Research
### Regional Market Prospects

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>North America</td>
<td>24%</td>
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<tr>
<td>Europe</td>
<td>4%</td>
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<tr>
<td>China</td>
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<td>19%</td>
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<tr>
<td>Southeast Asia</td>
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<tr>
<td>Japan</td>
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<td>6%</td>
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</tbody>
</table>

Note: Figures in boxes denote CAGR

- **European market should continue to be the biggest market in the worldwide**
- **Turbocharger demand to gasoline engines should surge in North America and China remarkably**

Source: Third Party Research

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Introducing
IHI’s Turbocharger Business
IHI is one of major players with a global market share exceeding 20%
Our Customers

Passenger Vehicles (Japanese brands)
- TOYOTA
- DAIHATSU
- HONDA
- SUZUKI
- NISSAN
- SUBARU
- MITSUBISHI

Passenger Vehicles (Overseas brands)
- V W
- Audi
- Daimler
- Ferrari
- B M W
- FIAT
- Hyundai
- K I A
- Chrysler

Commercial Vehicles
- ISUZU
- HINO
- UD Trucks

Agricultural and Construction Machinery and Small Vessels
- YANMAR
- Kubota
- Mercury

IHI has been acquired good reputations from world wide customers
## Models Employing IHI Turbochargers

<table>
<thead>
<tr>
<th>Models</th>
<th>Features/Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passenger Vehicles (Overseas Brands)</strong></td>
<td>- Distributing in China and North America through collaboration with European customers</td>
</tr>
<tr>
<td>Volkswagen Golf</td>
<td></td>
</tr>
<tr>
<td><strong>Passenger Vehicles (Japanese Brands)</strong></td>
<td>- Contributing to improve fuel economy for light motor vehicles</td>
</tr>
<tr>
<td>Suzuki Wagon R</td>
<td>- Offering optimum turbochargers for pickup trucks</td>
</tr>
<tr>
<td>Isuzu D-MAX</td>
<td></td>
</tr>
<tr>
<td><strong>Commercial Vehicles</strong></td>
<td>- Satisfying high efficient, high reliable, regulation fulfillment and high performance altogether</td>
</tr>
<tr>
<td>Isuzu ELF</td>
<td></td>
</tr>
<tr>
<td><strong>Agricultural and Construction Machinery and Small Vessels</strong></td>
<td>- Offering simple and high performance turbochargers</td>
</tr>
<tr>
<td>Kubota V2403</td>
<td></td>
</tr>
</tbody>
</table>
Japan Advanced Technology Platform

IHI Turbocharger Sector

R&D Technology Center in Yokohama

- Expanding center for overall R&D activities
  - Deploying equipment for performance tests and for durability tests under high-pressure and high-temperature circumstance
  - Using engine bench and analytical technologies to develop turbochargers
- Collaborating with Corporate Research & Development
  - New product development through collaboration with Corporate Research and Development

IHI Turbo Co., Ltd.

Production facilities in Kiso and Tatsuno, Nagano Prefecture

- Leveraging sophisticated technologies to manufacture compressor impellers and other key components
- Developing production automation process and new manufacturing techniques such as balance modification technologies and other production method

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A Global Footprint

**Europe**
- ICSI/ICSG/ITY
  - R&D in Europe
  - Manufacturing and sales for Europe

**North America**
- ITA
  - Manufacturing and sales for North America
  - R&D, manufacturing, and sales for superchargers

**Korea**
- ITK/HWIT
  - Manufacturing and sales for Korea

**China**
- FIT/WIT
  - Manufacturing and sales for China

**Thailand**
- ITT
  - Manufacturing and sales for Southeast Asia
The mobilization of overall technological capability in IHI group
High synergies with aero engines business for high-speed rotation technology
Global R&D Capacity

Europe

- Matching market needs
- Developing commercial production know-how

- Securing high-value-added technologies from an advanced market
- Harnessing new technologies for European market vital for commercial production and global deployment
- Relationships with high-end European customers drives proposals and development to meet market and customer needs

Japan

- Developing fundamental and advanced technologies and new products

- Corporate Research and Development consolidates IHI’s platform technologies
- Developing advanced, high-value-added products by drawing on Group’s shared technology platform
- Long-term relationships with Japanese customers drives proposals and development to meet market and customer needs
- Driving creation and deployment of global production structure

Achieving to enhance turbocharger as high value-added product by promoting technology innovations in both Europe and Japan market
### High Value-Added Technology Development

#### Technologies

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Power Train</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gasoline</td>
<td>Diesel</td>
<td>Hybrid</td>
<td>Fuel Cell</td>
</tr>
<tr>
<td>1. Mixed Flow Turbine</td>
<td>○</td>
<td>○</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. Titanium Aluminum Turbine</td>
<td>○</td>
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<td>—</td>
</tr>
<tr>
<td>3. Ball Bearing</td>
<td>○</td>
<td>○</td>
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<td>—</td>
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<tr>
<td>4. VGS Turbo</td>
<td>○</td>
<td>○</td>
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<td>—</td>
</tr>
<tr>
<td>5. Two-Stage Supercharger</td>
<td>—</td>
<td>○</td>
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<tr>
<td>6. Electrical Assist Turbo</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>—</td>
</tr>
<tr>
<td>7. Electrical Compressor</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>8. Fuel Cell Vehicle Turbocharger</td>
<td>—</td>
<td>—</td>
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<td>○</td>
</tr>
</tbody>
</table>

Note: 「○」represents to aim technology applied for each power train.

### R&D Target

- Improving turbocharger performance to meet further advancement for downsized gasoline engine and diesel engine
- Further Improving mileage for hybrid vehicles
- Developing turbochargers for next-generation fuel cell vehicles
# Our High Technology Product

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>KEY FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Assist Turbo</strong></td>
<td>• Contributes to improve system and fuel efficiencies with the combination of turbocharger and motor</td>
</tr>
</tbody>
</table>
| **Electrical Compressor** | • Enables turbocharging with the use of motor only (does not require exhaust gas)  
• Contributes to improve fuel efficiency with securing installation flexibility by combining with turbochargers |
| **Fuel Cell Vehicle Turbocharger** | • Contributes to improve power generation efficiencies with optimum turbocharger to supply fuel cell batteries with clean air |
Business Strategy
Basic Direction

TURBOCHARGER PRODUCT CATEGORY SALES (IMAGE)

- Improve profitability by boosting sales from high added-value turbochargers
- Secure sales volume by capturing demands for fundamental product line-up steadily

『high functional and Added-Value Zone』
The development of high functional high added-value product line-up

『Volume Zone』
The expansion of fundamental product line-up
## Business Strategy Overview

<table>
<thead>
<tr>
<th>FOCUS</th>
<th>STRATEGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actions for higher performance requirement of engine system</td>
<td>✓ Expand high functional and high added-value product line-up</td>
</tr>
<tr>
<td>Actions for next-generation engine</td>
<td>✓ Participate fundamental development of customer engine aggressively</td>
</tr>
<tr>
<td>✓ Achieve to secure projects by demonstrating customer needs concretely</td>
<td>✓ Promote to develop electrical turbochargers and particular turbochargers for fuel cell vehicle</td>
</tr>
</tbody>
</table>

### High functional and Added-Value Zone

- Expand high functional and high added-value product line-up
- Participate fundamental development of customer engine aggressively
- Achieve to secure projects by demonstrating customer needs concretely
- Promote to develop electrical turbochargers and particular turbochargers for fuel cell vehicle
Business Strategy Overview (cont’d)

**FOCUS**

**Volume Zone**

- Actions for gasoline turbocharger demands in growing market

- Actions for diesel turbochargers in emerging markets

**STRATEGY**

- Penetrate market with IHI’s high technology/reputable brand name
- Acquire new customers by leveraging many track records in advance market
- Contribute to expand turbo vehicle sales in North America and China by Japanese and European customers
- Penetrate market by leveraging the relationship with Japanese and European customers that increase productions and sales rapidly in emerging Asian market with utilizing IHI’s global network
Regional Highlights

**Europe**
- Started supplying to high-end European customer

**China**
- Received order from European customer for gasoline engine turbocharger project

**Thailand**
- Received order from Japanese customer for pick-up truck project

**North America**
- Received order from European customer for a gasoline engine turbocharger project
- Launched commercial production of superchargers for North American customer

**Japan**
- Received orders from several customers for turbochargers for downsizing gasoline engines

**Korea**
- Received order from Korean customer for gasoline engine turbocharger project
Profitability Expansion Strategy

- **Group-wide R&D propulsion**
  - Strengthen group R&D operations
  - Strengthen further capability to meet customer request
- **Invest to strengthen product development**
  - Boost experimentation and evaluation capabilities

- **Heighten manufacturing techniques**
  - Improve productive efficiency while securing group common quality standards
- **Strengthen global procurement function**
  - Optimize procurement costs
- **Optimum global manufacturing facilities**
  - Streamline facilities operations and capital investments

- **Increase orders of high-performance, value-added products**
  - Improve overall profitability by increasing high-margin product orders
- **Strengthen after-market business**
  - Established after-market subsidiary

Realize to boost the profitability by implementing aggressive strategies throughout all turbocharger business activities
Accumulated sales record has broken through over 50 million units
Targeting continuous annual sales growth of more than 10%
Summary

- Continuous expanding market
- R&D competence and global production capability
- The accomplishment of business strategy

Continuous growth with achieving sales scale expansion and profitability improvement steadily

Contributing to improve IHI market value
Forward-looking figures shown in this material with respect to IHI’s performance outlooks and other matters are based on management’s assumptions and beliefs in light of the information currently available to it, and therefore contain risks and uncertainties. Consequently, you should not place undue reliance on these performance outlooks in making judgments. IHI cautions you that actual results could differ materially from those discussed in these performance outlooks due to a number of important factors. These important factors include political environments in areas in which IHI operates, general economic conditions, and the yen exchange rate including its rate against the US dollar.