General Machinery & Special Vehicle
Business Operation

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Senior Vice President,
General Manager,
General Machinery & Special Vehicle Headquarters
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The General Machinery & Special Vehicle (GM&SV) Headquarters strives to make a contribution to social infrastructure development and the environment and energy sectors through its wide range of products, from turbochargers and engines to industrial vehicles and special vehicles.

Main Products

<table>
<thead>
<tr>
<th>Turbochargers</th>
<th>Forklift Trucks (Material Handling Equipment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable capacity turbochargers for diesel vehicles</td>
<td>FD25 forklift truck</td>
</tr>
<tr>
<td>Variable capacity turbochargers for gasoline vehicles</td>
<td>ESR15N electric reach truck</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engines &amp; Equipment</th>
<th>Special vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4S Small-sized diesel engine</td>
<td>Type 90 tank</td>
</tr>
<tr>
<td>S6RG marine diesel engine</td>
<td></td>
</tr>
<tr>
<td>M1203-G diesel generator set</td>
<td></td>
</tr>
</tbody>
</table>

Breakdown of sales for FY2008 (consolidated)

- Turbochargers: 16%
- Forklift Trucks (Material Handling Equipment): 42%
- Engines: 27%
- Special Vehicles: 7%
- Others: 8%

Net Sales: 432.7 billion yen
1. Major downturn in business during FY2008 due to impact of global recession
2. Tough conditions set to continue in FY2009, with sales forecast at 320 billion yen and operating income expected to be down 14 billion yen
3. Emergency measures currently underway to bring about business recovery in spite of difficult conditions

Business environments for individual products

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbochargers</td>
<td>Considerable decline in demand due to auto manufacturers significantly adjusting and reducing production</td>
</tr>
<tr>
<td>Engines</td>
<td>Substantial decline in orders for small-sized engines for construction equipment due to customers scaling back on machinery</td>
</tr>
<tr>
<td>Forklift Trucks</td>
<td>Slump in demand in major markets in advanced nations (Japan, US and Europe), coupled with downturn in emerging markets (Russia, etc.)</td>
</tr>
</tbody>
</table>

Net Sales (consolidated)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales (Billion Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>308.3</td>
</tr>
<tr>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>474.4</td>
</tr>
<tr>
<td>2008</td>
<td>432.7</td>
</tr>
<tr>
<td>2009</td>
<td>320.0</td>
</tr>
</tbody>
</table>

Forecast for FY2009 (consolidated)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales</th>
<th>Operating Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>474.4</td>
<td>20.8</td>
</tr>
<tr>
<td>2008</td>
<td>432.7</td>
<td>-1.3</td>
</tr>
<tr>
<td>2009</td>
<td>320.0</td>
<td>-14.0</td>
</tr>
</tbody>
</table>

- Turkey
**FY2008 Summary and Priorities**

1. Factors responsible for business slowdown in FY2008

<table>
<thead>
<tr>
<th>Changes in business environment (factors)</th>
<th>Impact on performance (effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dramatic fall in demand due to impact of global recession</td>
<td>Hit hard by economic downturn in advanced markets</td>
</tr>
<tr>
<td>Appreciation of the yen (independent from other currencies)</td>
<td>Profits affected by foreign exchange losses and increased procurement costs</td>
</tr>
<tr>
<td>Soaring material costs</td>
<td></td>
</tr>
</tbody>
</table>

**Urgent need to establish a robust operating structure that is less susceptible to changes in the business environment**

(Need to lay foundations capable of ensuring steady profits)

2. Special measures in response to major changes in the business environment (implemented in FY2008, currently ongoing)

<table>
<thead>
<tr>
<th>Measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspension of selected production lines and application for employment adjustment subsidy</td>
<td>Postponement of non-urgent investments</td>
</tr>
<tr>
<td>Reassignment of personnel to sites with Ordered Goods</td>
<td>Comprehensive reductions in overtime and general expenses*</td>
</tr>
</tbody>
</table>

* General expenses: Business travel, communication costs, expense accounts, contract charges, printing costs, etc.
As the current downturn in the market is expected to continue for the time being, we intend to comprehensively cut costs to boost profits and implement product strategies with an emphasis on profitability to lay solid business foundations that will pave the way growth strategies in the future.

<table>
<thead>
<tr>
<th>Reducing costs</th>
<th>Pushing full steam ahead with Innovation Activities in Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Standardization/commoditization reform (MD* activities)</td>
</tr>
<tr>
<td></td>
<td>2. Product reliability reform</td>
</tr>
<tr>
<td></td>
<td>3. Supply chain reform</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Securing sales</th>
<th>Expanding service projects, focusing on needs in emerging countries and targeting the energy and environmental sectors</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Tackling the strong yen</th>
<th>Expanding production in emerging countries (Thailand, China, India) Actively stepping up overseas procurement so as to take advantage of the strong yen</th>
</tr>
</thead>
</table>

* MD: Modular Design
Market scenario after economic recovery (1)

**Market polarization**

- Chinese and other emerging markets are expected to get back on track towards rapid growth, creating a massive new market alongside existing advanced markets.

**Expanding network of bases**

(Majority global coverage via three-way network centered around Japan, the US and Europe)

(Increasing bases in emerging markets to create a multi-polar network)
**Future Business Environment** (Market Outlook 2)

Market scenario after economic recovery (2)

**Diversification of demand** (growing range of needs in line with market polarization)

- Increased demand for infrastructure development and in booming logistics sector in emerging markets
  (Renewed growth from existing sectors, including construction equipment, generators, marine power systems and materials handling equipment such as forklift trucks)
- Environmentally oriented products set to become mainstream due to tightening of environmental regulations in advanced markets

**Demand Portfolio**

- **(Price bracket) High End (Environmentally oriented demand)**
  - Forklift trucks: Vehicles made by Sagamihara Plant, MCFA and MCFE, indoor material handling equipment
  - Engines: Models compliant with emissions restrictions (Tier 4), etc.
  - Turbochargers: Models made by Sagamihara Plant, MTA (Thailand) and MEE

- **(Price bracket) Low End (Economic growth period demand)**
  - Forklift trucks: Vehicles made by MFD (Dalian, China)
  - Engines: Models made by MVDE (India), etc.
  - Turbochargers: Models made by SMTC (Shanghai, China) and MTA (Thailand)

- **Demand in advanced markets**
  - Environmentally friendly products

- **Future potential demand (advanced markets)**
  - Demand in emerging markets

**Future potential demand (emerging markets)**

**Existing products**

MFD: Mitsubishi Heavy Industries Forklift (Dalian) Co. Ltd.
MVDE: MHI-VST Diesel Engines
SMTC: Shanghai MHI Turbocharger Co. Ltd.

MCFA/E: Mitsubishi Caterpillar Forklift America / Europe
MTA: Mitsubishi Turbocharger Asia
MEE: MHI Equipment Europe
Future Growth Strategy
(Active Market Expansion and Optimum Use of Resources)

Preparations to increase production capacity and establish bases to deal with increased demand in the future are already underway. Even in the severe market situation, necessary resources are maintained, and initiatives to establish business operation structure to adapt with new market framework have started.

1. Market/product strategy (respond to market polarization and diversification of demand)

- Expand bases in emerging markets in order to increase incoming orders
  (Precisely catering to local needs and establishing a strong market presence)
- Launch environmentally friendly products in advanced markets without delay in order to increase market share
  (Reinforcing range of indoor material handling equipment, launching engines compliant with emissions restrictions)

2. Production/procurement strategy (establish new global operations aimed at maximum efficiency)

- Strengthen capabilities and reviewing division of roles at overseas production bases in order to establish an optimum production system
  (Breaking away from knock-down system so as to minimize foreign exchange risks and establishing a specialized production network)
- Reinforce procurement capabilities at overseas bases in order to establish a framework for cross-sourcing
  (Harnessing cost benefits of overseas procurement and implementing optimum global procurement)

Preparations are also underway to strengthen production capabilities at the Sagamihara Plant and establish new overseas production bases (Thailand (MTA), China (MFD), etc.). The foundations for a new global framework are more or less in place.

3. Technology/quality strategy (differentiate products through the provision of new value and develop next generation technology)

- Promote MD* as part of high efficiency product development
  (Offering extensive range of variations in line with needs)
- Improve product reliability
  (Providing the best possible quality on all markets)
- Develop next generation technology and launch new products in the environmental sector

* MD: Modular Design
We will implement emergency measures and a forward-looking growth strategy to lay the foundations for business recovery and increase production quickly and effectively in order to return the company to a growth scenario as demand recovers.
- Turbocharger demand is expected to recover from 2010 onwards due to the tightening of emissions and fuel efficiency restrictions

- Surge in demand expected in Asian markets (China, South Korea and India)
Development strategy
- Comply with emissions restrictions and develop high-performance gasoline turbochargers
  - Diesel: Two-stage, 2-way variable and electric power-assisted turbochargers
  - Gasoline: High exhaust temperature and variable turbochargers

Production strategy
- Establish three-way increased production framework at Sagamihara Plant, MEE and MTA
- Flexibly accommodate production in order to establish optimum global production

Procurement strategy
- Reinforce procurement capabilities at overseas bases in order to establish world’s lowest cost procurement
- Increasing percentage of local and overseas procurement so as to minimize foreign exchange risks

Sales

Production

Procurement

Accommodate supply and production of KD components

MHI Equipment Europe (MEE)

Shanghai MHI Turbocharger Co., Ltd., etc.

Mitsubishi Turbocharger Asia (MTA)

KYPC (technical partnership)

Mitsubishi Engine North America (MENA)

Production volume

Cartridges

Assembled units

FY2011 global production capacity

10,000 units

690

690

10,000 units

Cartridges

Assembled units

Production volume

40

220

250

140

Production volume

100

280

10,000 units

Production volume

300

50

Development, Procurement and Production

Business environments and major strategies for individual products

Major Turbocharger Business Strategy

Cartridge Turbocharger cross-section
Business environments and major strategies for individual products

Engine Market Trends and Sales Forecasts

[Industrial machinery and small-sized generators]
Small-sized engine market trends

**Market trends**
Unit: 10,000 engines

- Market to bottom out in 2009 and go into recovery from 2010 onwards
- Tier 4 regulations introduced

**Sales forecast**
Unit: 10,000 engines
- Establishing new sales channels in China and other emerging countries
- Exploiting ties with major OEM manufacturers based on Tier 4 regulations

[Medium and large-sized generators and marine engines]
Medium and large-sized engine market trends

**Market trends**
Unit: 1,000 engines
- Temporary market contraction
- Strong demand for power generation due to power shortages in emerging countries and strong marine demand due to increased transportation of resources

**Sales forecast**
- Exploiting ties with major OEM manufacturers based on Tier 4 regulations
- Developing new sectors to increase sales (overseas gas engine markets, etc.)
- Establishing new sales channels in China and other emerging countries

**Existing markets and customers**
- Power generation
- Marine

**New markets and customers**

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## Major Engine Business Strategy

### Global business expansion aimed at adapting to diversifying market needs through low costs, high quality and shorted lead time

<table>
<thead>
<tr>
<th>Region</th>
<th>Strategy and Key Points</th>
</tr>
</thead>
</table>
| **Europe**   | - **MEE (Europe)**: Develop the major OEMs in Europe (based on environmental regulations (Tier 4, hybrid power systems, etc.).)  
                - **MEA (France)**: Promote local procurement at European production bases (main medium-sized engine products (5Cs)) |
| **Asia**     | - **MHIES-A (China/Asia)**: Expand sales and develop new markets in Asia (catering to needs in growth markets in emerging countries).  
                - **MVDE (India)**: Promote local and overseas procurement, particularly at new plants (small-sized engine production plant completed in Nov 08) |
| **USA**      | - **MENA (North America)**: Exploit ties with major OEMs in North America (based on environmental regulations (Tier 4, hybrid power systems, etc.)).  
                - **MSA (Brazil)**: Exploit ties with new OEMs in South America (increasing sales to construction and agricultural machinery manufacturers) |
| **Middle East/Africa** | - **MVDE (China/Asia)**: Promote local and overseas procurement, particularly at new plants (small-sized engine production plant completed in Nov 08) |
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### Business environments and major strategies for individual products

- **Europe (advanced market)**
  - Active inquiry regarding environmental regulations (Tier 4), increasing modal shift
- **China/Asia (emerging market)**
  - Growing demand in all sectors (construction, agricultural, gen-sets, industrial)
  - OEM supplies to Chinese manufacturers moving into Russian market
- **Middle East/Africa (emerging market)**
  - Healthy market for gen-sets
- **India (emerging market)**
  - Increase in demand for construction equipment and agricultural machinery
  - Market growth on back of economic growth
- **South America (emerging market)**
  - Healthy demand for construction and agricultural machinery
  - Market growth on back of economic growth
### Major Engine Business Strategy (Development)

#### Catering to market needs

**Small-sized engines**
- Halve turnaround time by introducing MD production methods
  Aiming to cut installation and development costs as part of Tier 4 development

**Medium and large-sized engines and gen-sets**
- Cater to diversifying customer needs
  Large generation plant systems with small-sized standard specifications in response to demand for high-output products

**Compliance with environmental regulations**
- Develop core components
  Developing core emission reduction systems (black smoke filters, emission recycling) and air systems (turbochargers, etc.) using in-house technology in order to secure a competitive advantage
- Focus on OEM capabilities for industrial vehicles
  Capitalizing on strengths as a vehicle manufacturer to flexibly cater to a diverse range of needs for vehicles made by other companies

#### Next generation technology [hybrid power systems]

- Provide new markets with low cost, high efficiency power systems for the environmentally-friendly age
  Utilizing MHI's overall technical capabilities as a vehicle and component manufacturer, develop new power trains for industrial vehicles and hybrid system OEM vehicles

- Develop systems using components developed in-house
  Tier 4 compliant engines, lithium ion batteries, power electronic systems, motors and control technologies

- Take advantages of low noise, low fuel consumption and low life cycle cost technologies in response to environmental restrictions
  - Assisting engine torque and power by motor, one-level higher system performance is achieved
  - Motor-assisted downsized engines deliver better fuel efficiency
  - Reducing emissions and simplifying aftertreatment systems in order to achieve cost reductions

**MGS2000C gen-sets for Braintech (Brazil)**
(88 S16R gen-sets)

**Increased fuel efficiency**
- More power
- Downsizing

**Reduced CO₂ emissions**
- Reduced aftertreatment system costs
- Reduced noise
Business environments and major strategies for individual products

**Forklift Truck Market Trends**

**Market conditions and forecasts**

<table>
<thead>
<tr>
<th>Year</th>
<th>Emerging markets</th>
<th>Advanced markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>71.6 (15.3)</td>
<td>56.3</td>
</tr>
<tr>
<td>2006</td>
<td>82.4 (21.4)</td>
<td>61.0</td>
</tr>
<tr>
<td>2007</td>
<td>93.2 (27.4)</td>
<td>65.8</td>
</tr>
<tr>
<td>2008</td>
<td>92.6 (29.4)</td>
<td>63.2</td>
</tr>
<tr>
<td>2009</td>
<td>64.1 (22.0)</td>
<td>42.1</td>
</tr>
<tr>
<td>2010</td>
<td>69.8 (25.5)</td>
<td>44.3</td>
</tr>
<tr>
<td>2011</td>
<td>77.6 (28.7)</td>
<td>48.9</td>
</tr>
<tr>
<td>2012</td>
<td>84.7 (31.4)</td>
<td>53.3</td>
</tr>
</tbody>
</table>

**Internal combustion counterbalance (CB) forklift trucks**

- Up 30% (09 → 12)

**Electric counterbalance (CB) forklift trucks**

- Up 40% (09 → 12)

**Warehouse equipment**

- Up 35% (09 → 12)

Despite peaking in advanced markets, demand is still expected to increase in China and other developing markets.

Demand expected to recover, particularly in advanced markets.

Demand expected to recover, particularly in advanced markets, as with electric CB vehicles.
**Major Forklift Truck Business Strategy**

(Production, Procurement and Sales)

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1. **Targeting Chinese and other emerging markets**
   - Establish and reinforce sales and service network
     - Establish distributor network for locally-manufactured Chinese trucks (increasing number of distributors)
     - Set up distributors in new territories such as North Africa and Central Asia
   - Commence local production in China
     - Establish new plants (MFD), commence local production of internal combustion trucks in October 2009 and strengthen supply capabilities and cost competitiveness
     - MFD: Mitsubishi Heavy Industries Forklift (Dalian) Co. Ltd.

2. **Market strategy in advanced markets**
   - Further strengthen partnerships with Nichiyu and Rocla in order to cater to increasing demand for electric trucks and warehouse equipments
     - Enhance cost competitiveness through joint purchase
     - Promote joint development (electric CB trucks, order pickers for US market)
   - Integrate domestic sales network with Nichiyu
     - Harness full line-up of products to target new customer segments (April 2009 onwards)

3. **Production/procurement strategy**
   - Establish a cost competitive operating structure that is flexible to exchange rate fluctuations
     - Currently operating knock-down system originating from Japan
     - Harness global strengths and reinforce capabilities at individual bases to establish an optimum production and procurement system

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**Envisioned position**

Working in partnership with Nichiyu and Rocla, we are aiming to secure the number three position in the world market as a group, with an eye to securing the top spot in the future.
Launching world’s first hybrid forklift truck onto the market
Domestic supplies of 4-5t trucks to start before the end of the year, which is based on the latest internal combustion model

◆ Developing a hybrid power system combining MHI’s unique engines, power electronic equipment, controllers and lithium ion battery technology

◆ Maintaining the basic performance of existing vehicles responding to public demand for clean emissions, reduced noise levels and improve fuel efficiency (30% reduction in fuel costs)
Work is underway on the development of next generation tanks based on MHI’s unique advanced vehicle technology (going into mass production from 2010). We are also reinforcing our product competitiveness based on advanced technology built up in the field of large material handling equipment (motor graders, rocket carriers, automatic guided vehicles, etc.), in which technical differentiation is crucial to securing a share of the market.