

# Air-Conditioning & Refrigeration Systems Business Operation

**June 11, 2010**

Masahiko Arihara  
Senior Vice President,  
General Manager,  
Air-Conditioning & Refrigeration Systems Headquarters

 **mitsubishi HEAVY INDUSTRIES, LTD.**

# Contents

---

1. Products of Air Conditioning & Refrigeration Systems Headquarters
2. Summary of FY 2009
3. Prospects for FY 2010
4. Last Decade of Air Conditioning & Refrigeration Systems Operations
5. Planned Value of 2010 Business Plans
6. Business Strategy
7. Reform Process
8. Growth Process
9. Summary

# 1. Products of Air Conditioning & Refrigeration Systems Headquarters (1)

\* Both the sales and domestic-overseas ratios are based on FY2009 results (consolidated). The inner circle of the pie charts represent 2008 and the outer circle represents 2009.

## Air-conditioners (PAC/RAC)

### PAC

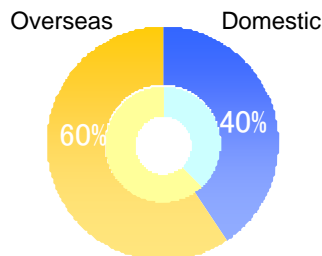


### RAC



[Global market size: 2009]  
approx. 8 trillion yen

Domestic-overseas  
sales ratio



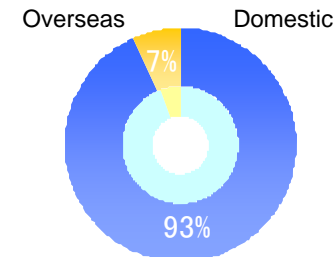
Mass-produced  
products

## Centrifugal Absorption Liquid Chiller (CALC)



[Global market size: 2009]  
approx. 0.2 trillion yen

Domestic-overseas  
sales ratio



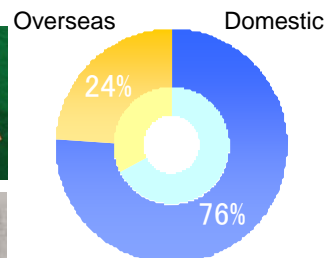
Made-to-order  
products

## Automotive thermal systems (CAC)



[Global market size: 2009]  
approx. 3 trillion yen

Domestic-overseas  
sales ratio



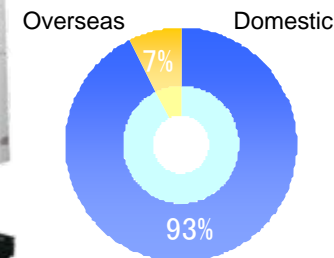
Made-to-order  
products

## Transport refrigeration units (TRU)



[Global market size: 2009]  
approx. 0.2 trillion yen

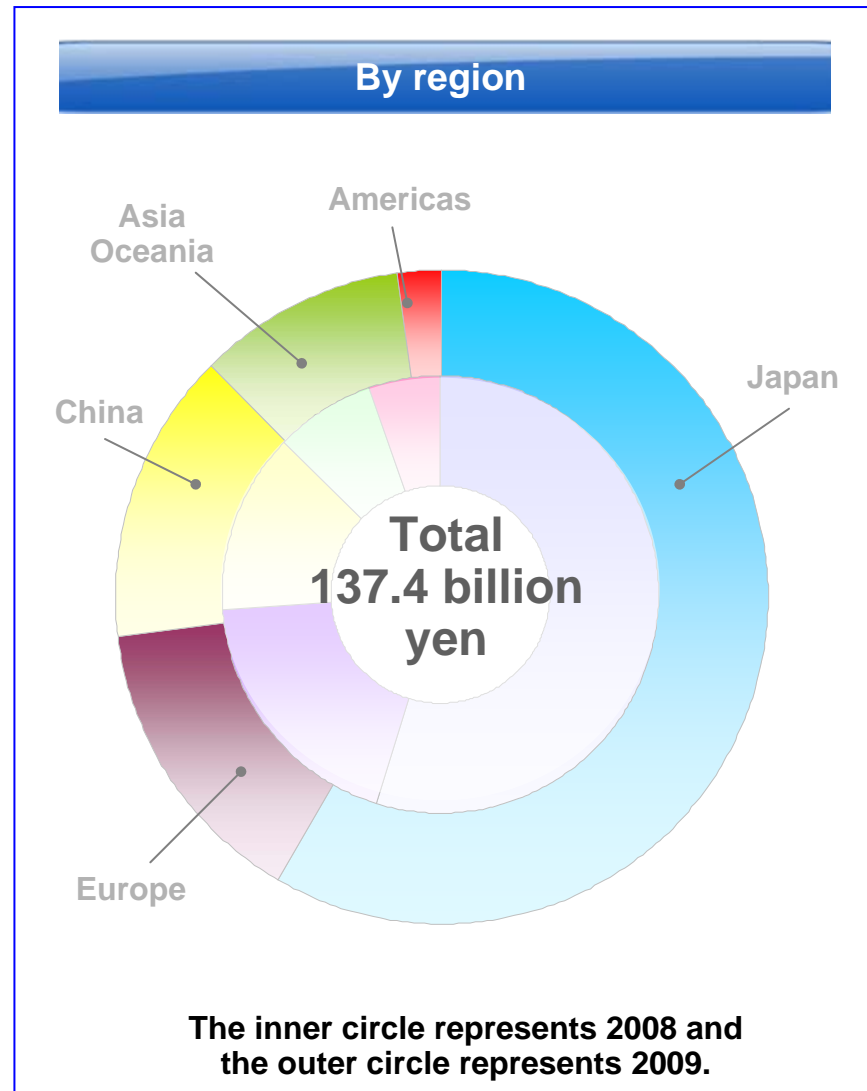
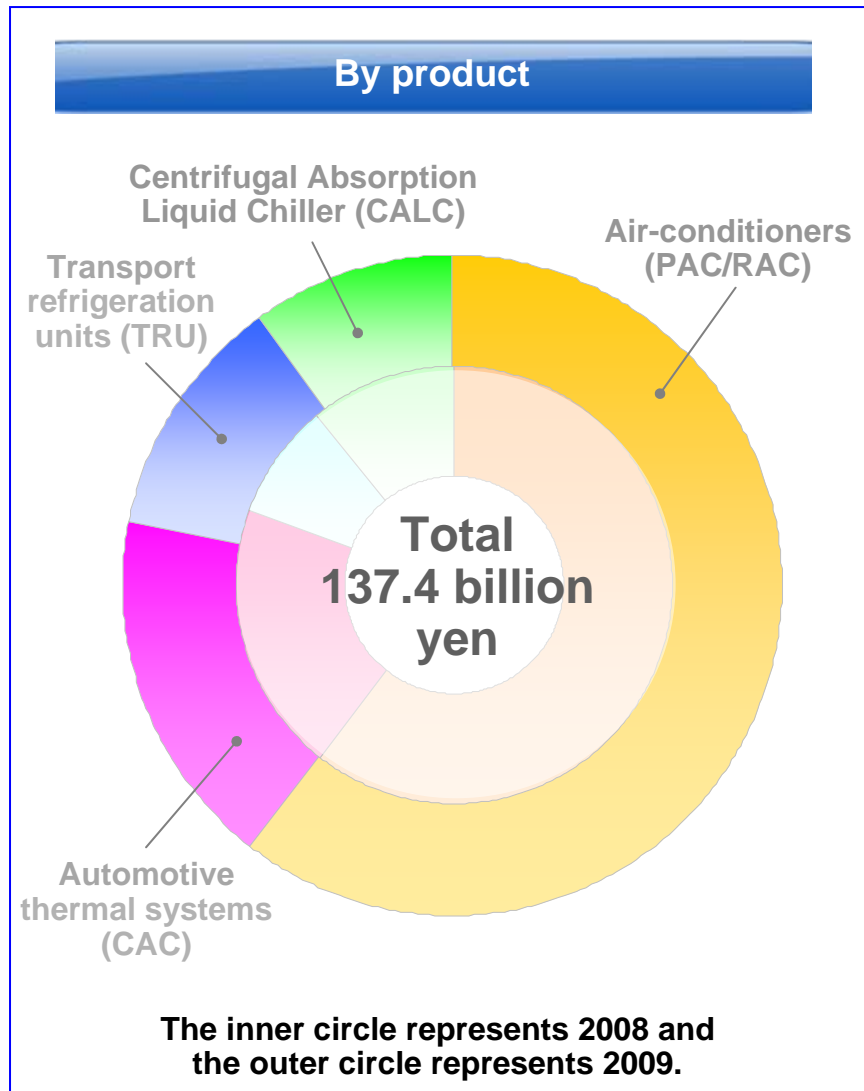
Domestic-overseas  
sales ratio



Mass-produced  
products

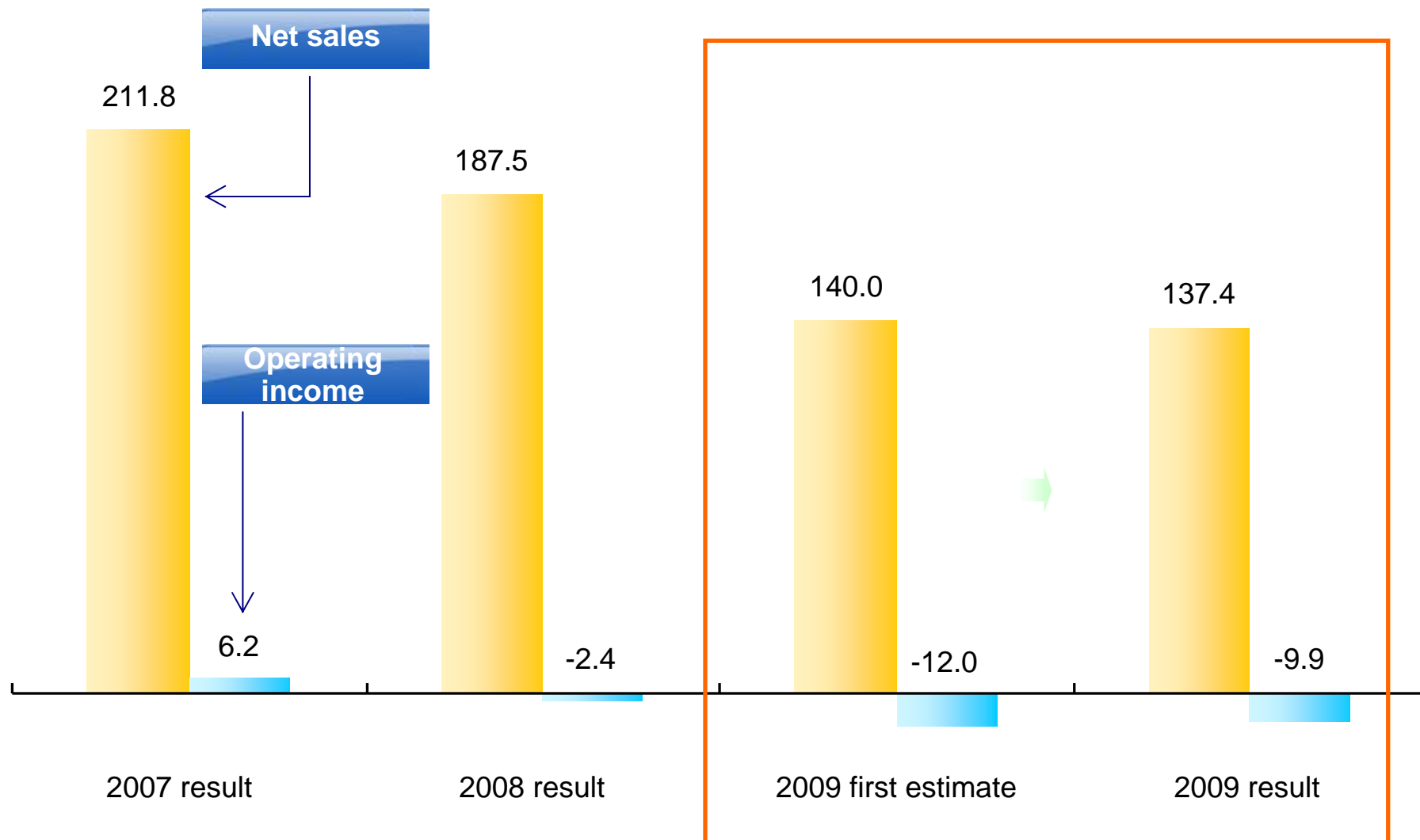
# 1. Products of Air Conditioning & Refrigeration Systems Headquarters (2)

## FY2009 Earnings for Air Conditioning & Refrigeration Systems Headquarters (consolidated)



## 2. Summary of FY 2009 (1)

(In billion yen)



## 2. Summary of FY 2009 (2)

### PAC/RAC

- ◇ While overseas demand began to recover, led by emerging countries, demand in Europe was still sluggish. Overall domestic demand was also low, due to a decline in housing starts and limited capital expenditure. Yet, MHI's exclusive sales network "K-POINT" opened with 50 dealers in China.

### CAC

- ◇ Sales decreased on continuing low production of auto manufacturers. Global auto manufacturer has awarded MHI Large volume program. Electric compressors for EV/HEV achieved a substantial increase to double the sales of the previous year.

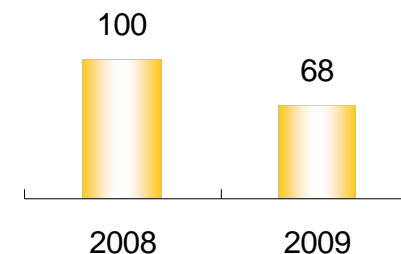
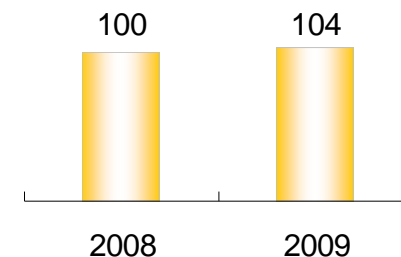
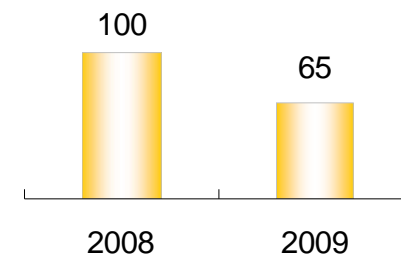
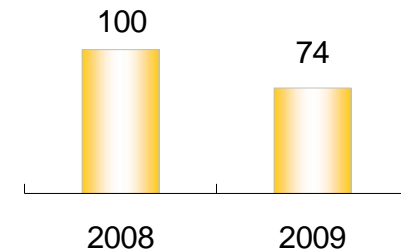
### TRU

- ◇ Domestic truck refrigeration unit (TRU) market grew from the previous year with the help of the truck subsidy system. MHI increased market share by introducing new products (maintaining the largest domestic market share), resulting in growth in year-on-year sales.

### CALC

- ◇ Limited investment by IT, semiconductor, and home appliance manufacturers due to the recession caused a considerable shrinkage in the domestic centrifugal chiller market. Net sales decreased despite MHI retaining the largest market share. Released ETW, the world's first centrifugal-driven "Water to Water Centrifugal Heat Pump (Heat Recovery Type)".

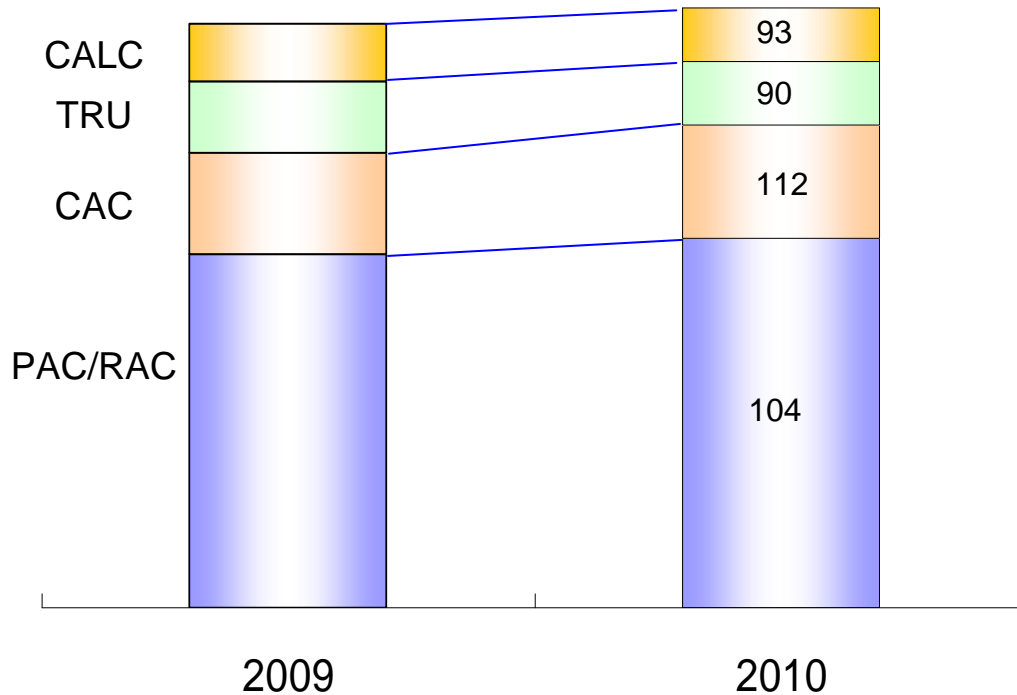
Sales index of 2009 when 2008 is 100. (results)



## 3. Prospects for FY 2010

### 2010 Consolidated Sales Forecast for Air Conditioning & Refrigeration Systems Headquarters

Sales index forecast for 2010 when 2009 is 100



#### ◇ Overall

While the TRU and CALC markets are expected to slow, an increase in MHI's sales of PAC/RAC through the rationalization of inventories in the market and an increase in CAC sales based on the recovery in production at auto manufacturers are expected, resulting in an overall year-on-year increase.

#### ◇ Air-conditioners

- In response to the increasing awareness to energy savings caused by tighter Environmental regulations in overseas markets, we will promote inverter driven products with high-performance products.
- A new company, MHIAS, will be established in China, where the recovery has been fast, and development of a new K-POINT sales network will begin.

#### ◇ CAC

- While automobile production appears to have passed its nadir, the pace of recovery varies among countries.
- Aiming at new business of QS compressor for high mileage cars and electric compressors for HEV/EV.
- Revenue increase by new program launches.

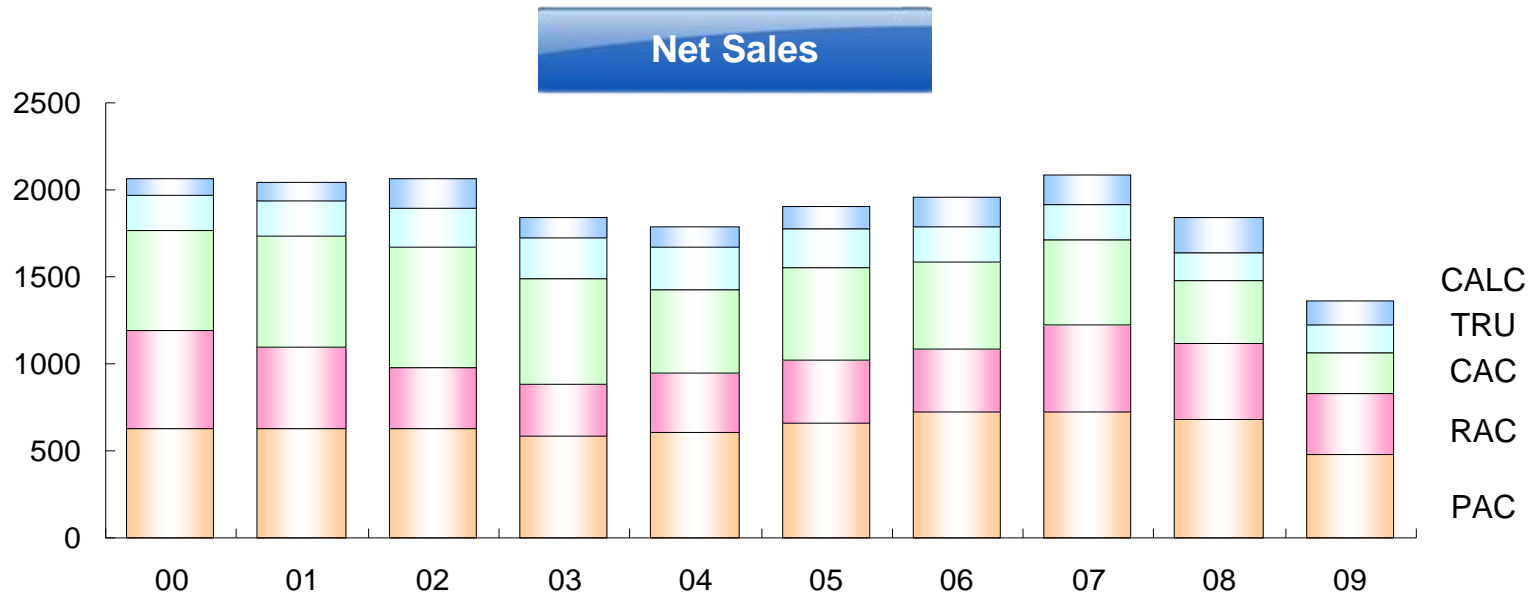
#### ◇ TRU

- New trucks complying with the new emissions control are released by truck manufacturers from June this year. The sales trend of trucks subject to the new emission control will be important.

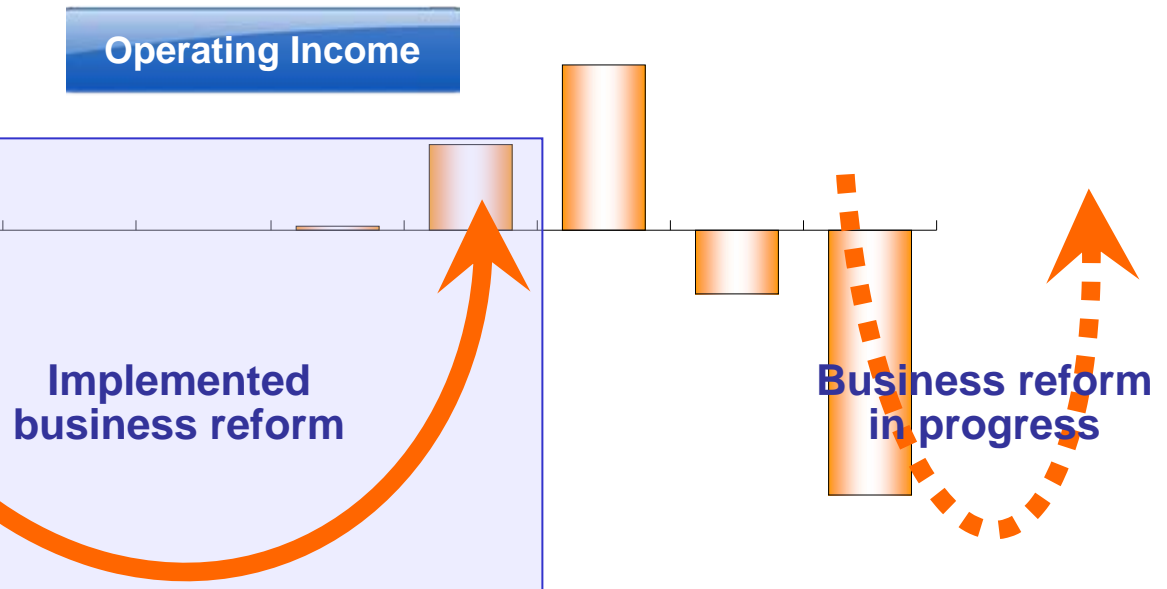
#### ◇ CALC

- Domestic investment is still sluggish and the market is expected to shrink even worse from the previous year.

# 4. Last Decade of Air Conditioning & Refrigeration Systems Operations (1)



- Scale back or withdraw unprofitable products.
- Convert fixed costs into variable costs by shifting production to overseas locations.
- Refine the range of products and develop the world's top product using limited capabilities.





# 4. Last Decade of Air Conditioning & Refrigeration Systems Operations (2)

## ✓ Business reforms between 2000 and 2006

Scale back or withdraw unprofitable products.

- Substantial reduction of RAC (room air-conditioners) for domestic mass retailers → Focus on overseas markets
- Withdrawal from the development of air-conditioner GHP (gas heat pumps) and low-temperature products → Specialize in EHP business
- Withdrawal from absorption chiller → Specialize in turbo chillers business
- Withdrawal from Marine Refrigeration Units → Specialize in Transport Refrigeration Units

Convert fixed costs into variable costs by shifting production to overseas locations.

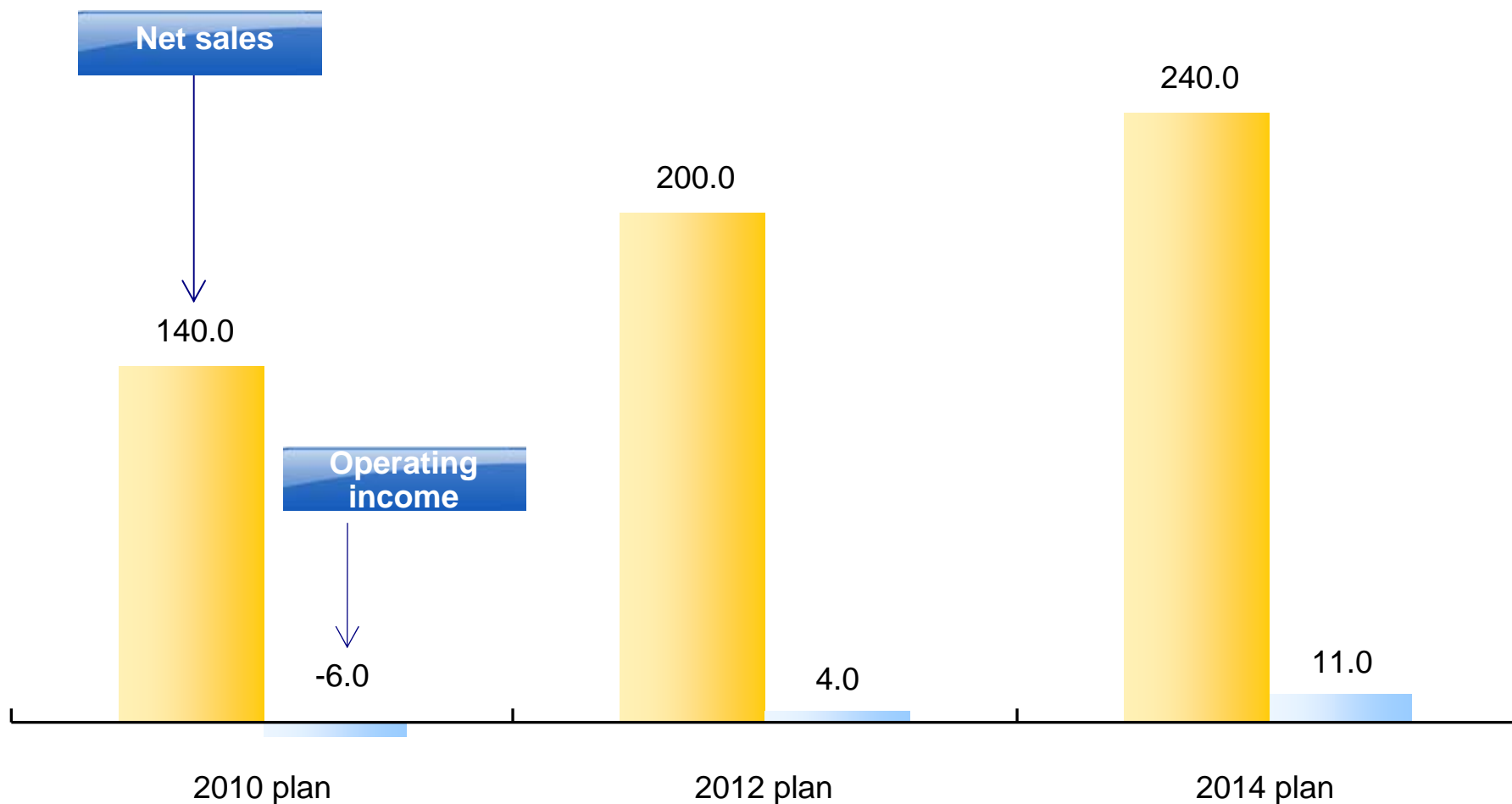
- Move production of RAC (room air-conditioners) from Japan to MACO (Thailand). → Shift 100% RAC production.
- Move the production of PAC (package air-conditioners) from Japan to MACO (Thailand) and MHAQ (China) → Shift approx. 90% of PAC production
- Achieve a cost structure resistant to strong yen

Refine the product range and develop the world's top product using limited capabilities.

- Develop the world's highest efficiency Centrifugal Chiller → Gain a market share exceeding 60%
- Small, light, and high-performance CAC (automotive thermal systems) scroll compressors (QS compressor) development → Leading scroll compressor manufacturer in the world
- CAC (automotive thermal systems) electric compressor development for EV/HEV → Become major player of CAC for EV/HEV in the world.
- Develop the world's highest efficiency Transport Refrigeration Units (TRU) sub-engine trailer units → Establish the number three position in the world as a TRU manufacturer.

## 5. Planned Value of 2010 Business Plans

(In billion yen)



## 6. Business Strategy

### ■ Basic Policy

- Taking advantage of the regulations for the global environment as a rare opportunity, globally promote the sales of high-performance, high-value added products that make a major contribution to environmental conservation, and develop a business that will play a role in MHI's energy and environmental business.
- To this end, as a niche manufacturer of air conditioning and refrigeration systems with a scale suited to its own management resources, MHI will work to acquire and maintain the position as, the dominant niche player in specific business domains.

### Reform process

- Convert fixed costs to variable costs using overseas facilities (reform of production structure).
- Shift from management based on sales/profit to a diversified management structure that includes B/S and C/F (adopt ROIC as a management indicator).

### Growth process

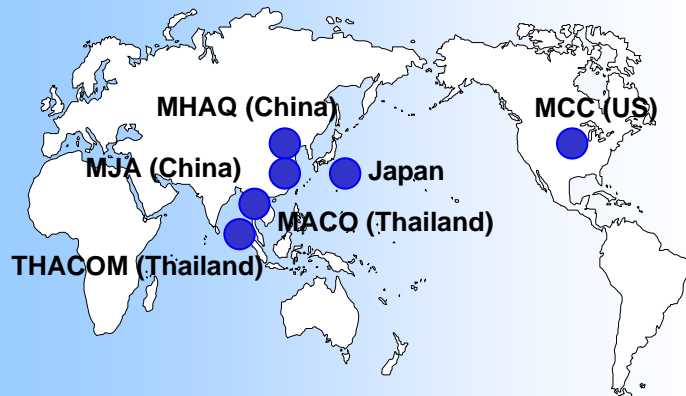
- To achieve a low-carbon society, enter the environment and energy fields (Air /Water to Water Heat Pump, CAC for EV/HEV), which are growing around the world.
- Change from independent management to cooperation with partners to accelerate business development and disperse business risks.

# 7. Reform Process

## ✓ Promoting reforms to optimize production and improve fund efficiency

### Reform of production structure

- Promoting the world's best production
  - Use overseas facilities that can flexibly respond to changes in demand.
    - Convert fixed costs to variable costs.
  - Improve production of air-conditioners at overseas facilities.  
(Global sourcing for MACO and China-regional sourcing for MHAQ)
  - Continue to increase the local sourcing ratio at overseas plants.
  - Partially outsourcing for spare parts supply.



### ROIC improvement

- Inventory reduction
  - Supply chain rationalization  
Build a system of direct delivery from overseas plants to distributor in each market.
  - Lead production through innovative activities in manufacturing in the entire company.  
Time reduction (MACO application of the Yatai system to TRU products).



- Fund efficiency improvement
  - Share investment with business partners by reconsidering the make-or-buy decisions.
  - Collect funds earlier by reducing lead-time.

The Yatai system: A production system which, in principle, one worker assembles a product in cell places, which gives flexibility on production schedule / production volume changes.

## 8. Growth Process (1) Heat Pumps

- ✓ Focus on air/water to water heat pump hot water supply systems and centrifugal chillers, which are currently niche but which will be growth products in the future.

### Heat pump hot water supply

European heat pump market



- High-performance products at the highest level offering a variety of applications from household to industrial use will be provided.
- MHI sells household heat pump hot water supply in Europe in cooperation with NIBE, a large local heater manufacturer. MHI also promotes collaboration with major power companies and local heat pump manufacturers.
- A dedicated sales team will be set up to increase heat pump sales. The group companies and power companies will implement collaborative projects.

### Centrifugal Chillers

Achieved COP7.0., the world's highest efficiency

400Rt, cold water 17°C/7°C

CALC overseas businesses



- In Europe, cooperative sales promotion with multiple partners will begin. Inquiries for MHI's Centrifugal Chillers are coming from overseas new clear power plants manufacturer.
- In Asia, the Singapore office will lead the effort to increase sales to serve the demand for chiller replacement through service activities to existing Japanese customers primarily.
- For customers who use the products for a relatively long period of time, MHI's high-efficiency units have an advantage in LCC evaluation compared with cheaper overseas products.  
LCC: Life Cycle Cost refers to the total cost including the initial cost and running cost.

\* Household Heat pump hot water supply system heats water by collecting heat in the air just like air-conditioners, which allows a substantial reduction in CO<sub>2</sub> from the conventional combustion water heaters and are therefore expected to experience rising demand as energy saving products.

# 8. Growth Process (2) Air Conditioning Operations

✓ Promote multi-function systems with high added value in the air-conditioner market of China, which is set to grow in the future.

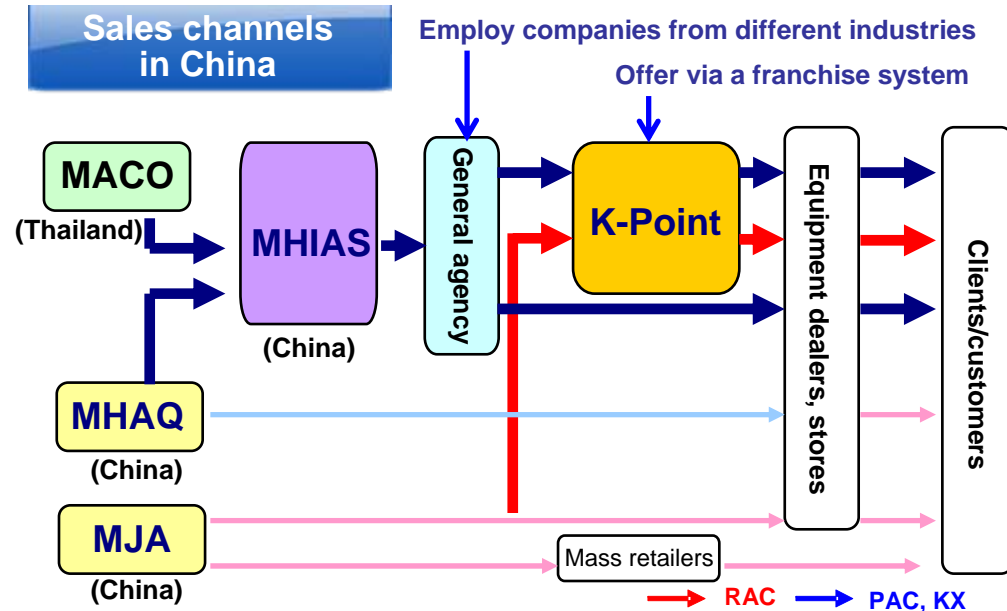
## Expand air conditioning operations in China

### Strengthen sales promotion [K-Plan] policy

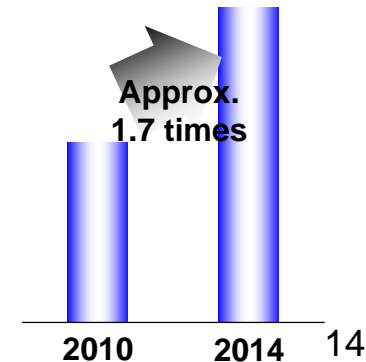
- Define high-end product strategy and establish brand strategy.
- Increase the number of exclusive dealers (K-Point) (200 locations by 2010).
- Increase the number of products for residential houses of the new affluent class, in addition to buildings and luxury homes.

### Establish a new AC & refrigeration company (May 2010 –)

- A comprehensive sales company that covers air-conditioners, including CALC, and TRU
- Adopt personnel and wage systems geared to local conditions in China.
- Employ a Chinese person as the general manager of organization



## Air-conditioner sales in China



# 8. Growth Process (3) Automotive Thermal System

✓ Promote the scroll type compressor (QS, electric driven) it is minority in automotive thermal systems, which growth is expected in the future.

## QS Compressors (Scroll)



- Addition of volume by the global compact car program of auto manufacturers.
- Expand into emerging countries in which an increase in new demand has been forecasted.

## Electric compressors (scroll)



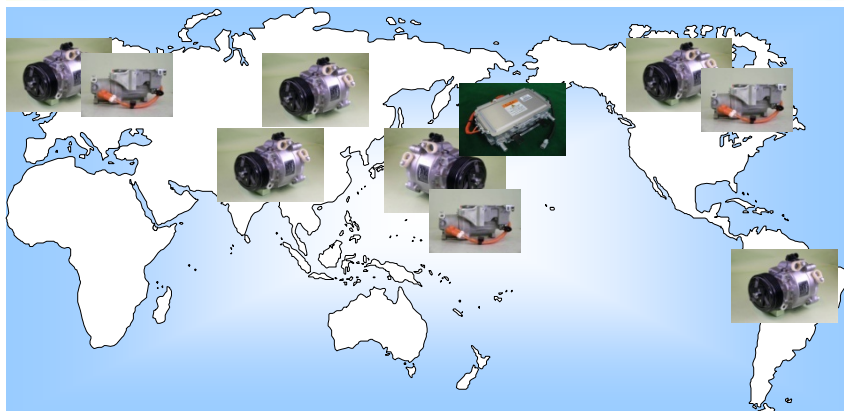
- Continuous support for existing customers to gain additional program and secure next programs.
- Obtain the business to major Auto manufacturers.
- Approach new auto manufacturers that plan to produce EV/HEV.

## Electric water heater



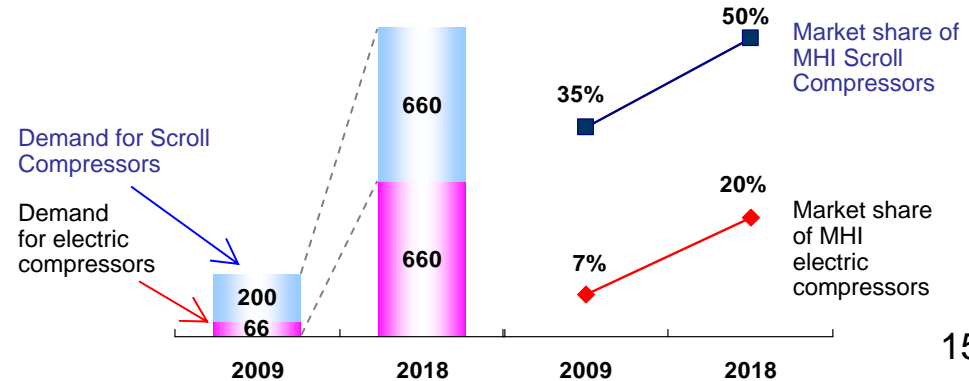
- Promote as an EV/HEV-compatible heating device together with electric compressors.
- Focus on development for small packaging, performance improvement, weight reduction, and cost reduction.

## Sales of MHI's automotive thermal systems



## Scroll Compressor market and MHI's share

Market forecast for CAC Scroll and electric compressors (MHI estimate)  
(Unit: 10,000 units)



## 9. Summary

- **Aim to be an AC and refrigeration manufacturer that plays a role in MHI's environment business and contributes to environmental conversation.**
- **Gain and maintain the dominant share as a niche player of appropriate size in specific fields.**

**Thank you very much for your attention.**





Our Technologies, Your Tomorrow

---

