Japan's Manufacturing Industry

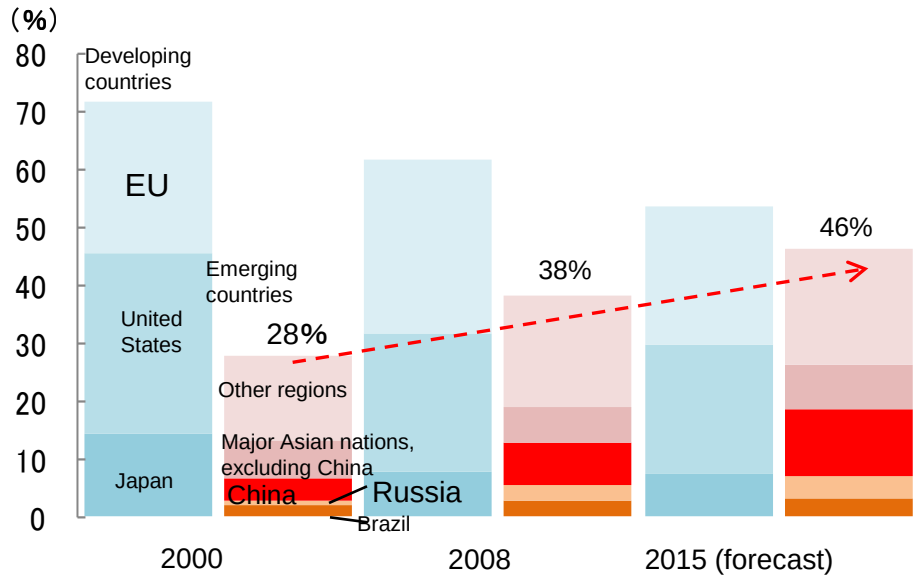
July 2010

Ministry of Economy Trade and Industry

◆ The Condition of Japan's Manufacturing Industries①

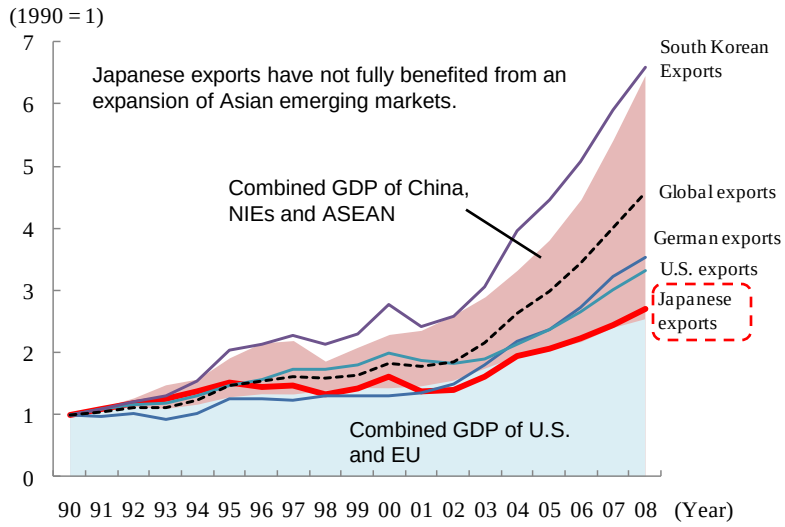
- A look at the situation of the global market shows that emerging countries have increased their share of the global GDP as a result of population growth and rising income. **Emerging countries have also increased their presence as both production bases and markets.**
- Although manufacturing industry has led the Japanese economy and has been responsible for 90% of Japan's exports, **Japan has not fully taken advantage of business opportunities in growth markets around the world.**

[Changes in Nominal GDP Share of World's Major Regions]



Remarks: On a U.S.$ basis. Major Asian nations/regions excluding China refer to ASEAN, India, South Korea and Taiwan.
Source: IMF, "World Economic Outlook Database, April 2010"

[Growth of Asian Emerging Countries and Increase in Value of Exports by Major Countries]

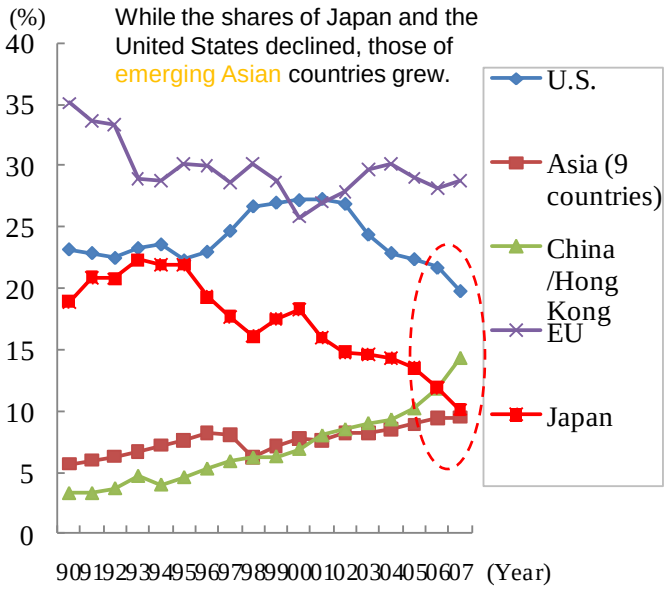


Source: IMF "World Economic Outlook"

◆The Condition of Japan's Manufacturing Industries ②

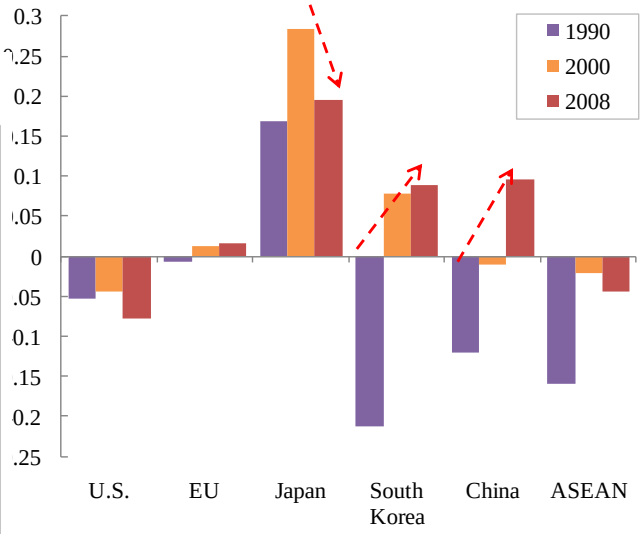
- **In China and other Asian countries, production is increasing** as they have adapted to the combination of various production technologies.
- With regard to intermediate goods, for which Japan is said to be maintaining a strong competitive edge, **South Korea and China have gradually been raising their competitiveness**, and their industrial infrastructures are becoming more advanced due to progress in the international division of labor.
- In addition, Japanese companies are encountering challenges such as severe competition with other Japanese companies, and technology leakage.

[Changes in the Competitiveness of Manufacturing Industries of Countries and Regions (changes in the share of total value added by manufacturing industries of countries and regions)]



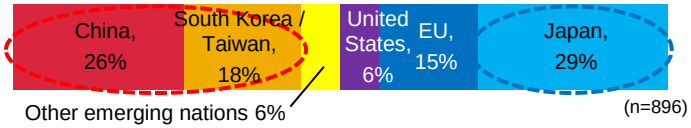
Source: U.S. National Science Foundation statistics

[Changes in the Export Specialization Index of Intermediate Goods]



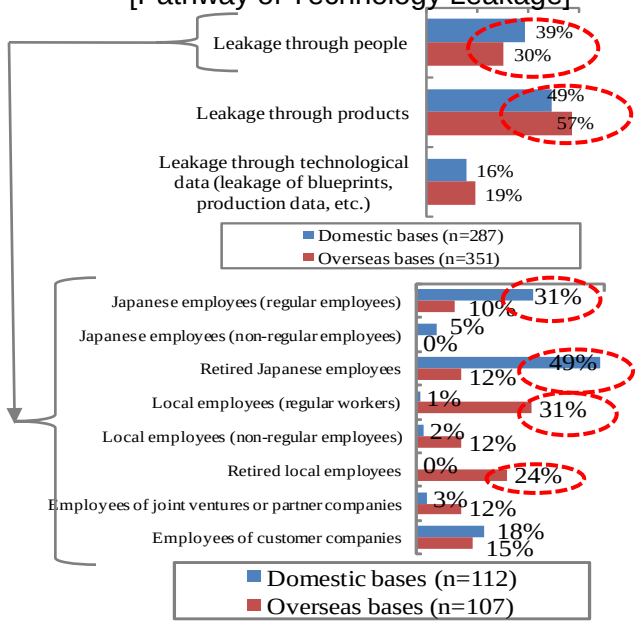
Remarks: Export specialization index＝(Exports of intermediate goods − imports／(exports of intermediate goods ＋ imports)
Source: Research Institute of Economy, Trade and Industry, "RIETI-TID 2009"

[Biggest competitors in emerging markets]



Source: Survey by the Ministry of Economy, Trade and Industry (January 2010)

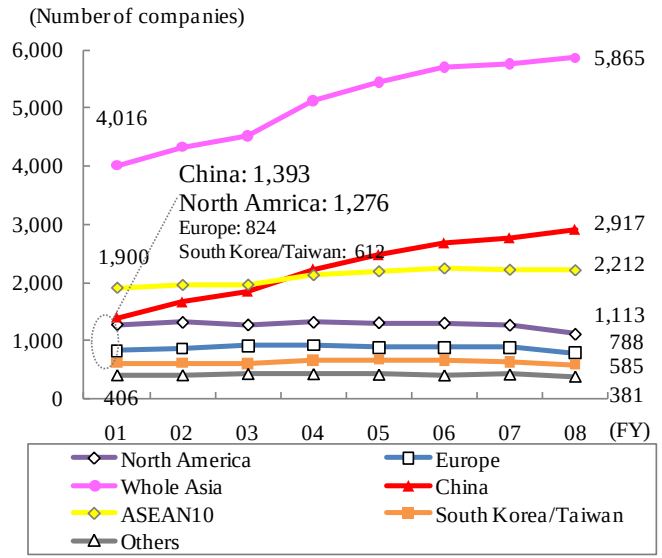
[Pathway of Technology Leakage]



◆The Condition of Japan's Manufacturing Industries ③

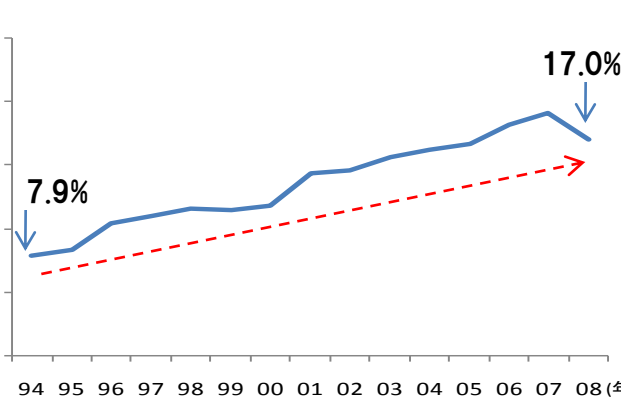
- Regarding our country as a manufacturing base, due to the development of emerging countries, maturation of the domestic market and the relative rise of domestic production costs, **Japanese companies have been accelerating overseas operations , increasing overseas production percentages and manufacturing jobs have been decreasing.**
- As this trend continues, it may harm Japan's economic growth, breaking employment and technological clusters.

[Changes in Number of Japanese Companies' Local Subsidiaries (manufacturing sector)]



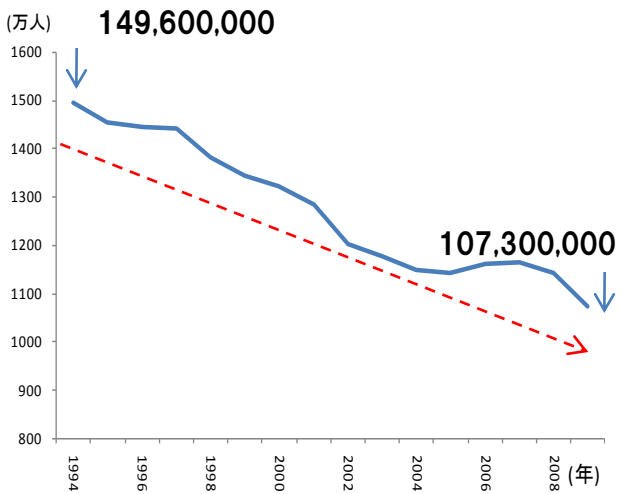
Source: METI, "Basic Survey of Overseas Business Activities"

[Overseas production percentage]



Source: METI, "Basic Survey of Overseas Business Activities"

[Manufacturing jobs]



※ only regular employment

Source: Labor force survey

◆Future Direction and Action Plan for Japan's Manufacturing Industries I

Future Direction for Japan's Manufacturing Industries

Japan's manufacturing industry needs the following in order to continue leading the economy:

- **Demand from emerging nations**, which are growing swiftly and suddenly
- **A strengthened industrial base for Japan's manufacturing industry, in order to ensure that the country's position can be strengthened and maintained as a supply base for high-level parts and products.**

Action Plan I – Ensuring demand from emerging nations

- **Ensure demand from emerging nations**, which are the new frontier of growth.

①Upgrading of development and production systems for products aimed at emerging markets, and support for creation of sales channels

- Strategy for introducing products optimized to the needs of local markets
- Development of brand in emerging country markets
- Utilization of financial support such as JBIC, NEXI
- Public/private sector partnerships to enable planning/promotion of social infrastructure development

②Work on improving profitability

- Prevention of technology leaks (raise awareness within companies, etc.)
- Strategic standardization (black boxes for core technologies, multi-purpose components and open interfaces, etc.) in support of reformation of business models

◆Action Plan for Japan's Manufacturing Industries II

Action Plan II – Strengthening the industrial base for Japan's manufacturing industry

- Japan's manufacturing industry needs to maintain its position as a center for domestic research and product development, as well as a manufacturing location for high-level components and products, and to continue to accumulate both employment and technical ability so as to continue to provide high added value. In order to do this, it is vital that we **strengthen the industrial base of the manufacturing industries**.

①Upgrade the domestic competitive environment

- Review corporate taxes based on international standards, and improve the competitive environment through a research and development tax system, etc.
- Appropriate response to the problem of global warming, with consideration given to international competitiveness

② Measures to increase profitability through improvements to Japanese corporations' excessive competitiveness

- Complete overhaul of support strategies for business restructuring, co-habitation, consolidation, etc., based on an understanding of the reality of globalization.
- Support for strategic standardization and other improvements to business models
- Prevention of technology leaks (increased knowledge of business confidentiality management policies, reorganization of claims procedures, improved corporate awareness, etc.)
- Strategic and effective intellectual property rights within companies

③Development and strengthening of next-generation growth industries

- Prioritized distribution of domestic resources in support of technical development and rollout of next-generation growth industries, etc.
- Promotion of activities to attract companies engaged in next-generation growth industries (subsidies for land acquisition, etc.)
- Industrial support for social needs such as environmental and ageing society issues (systems reform, fiscal support, etc.)

High-level products and components

◆ High-level products

① Vehicles

② Aircraft

③ Robots

◆ High-level components

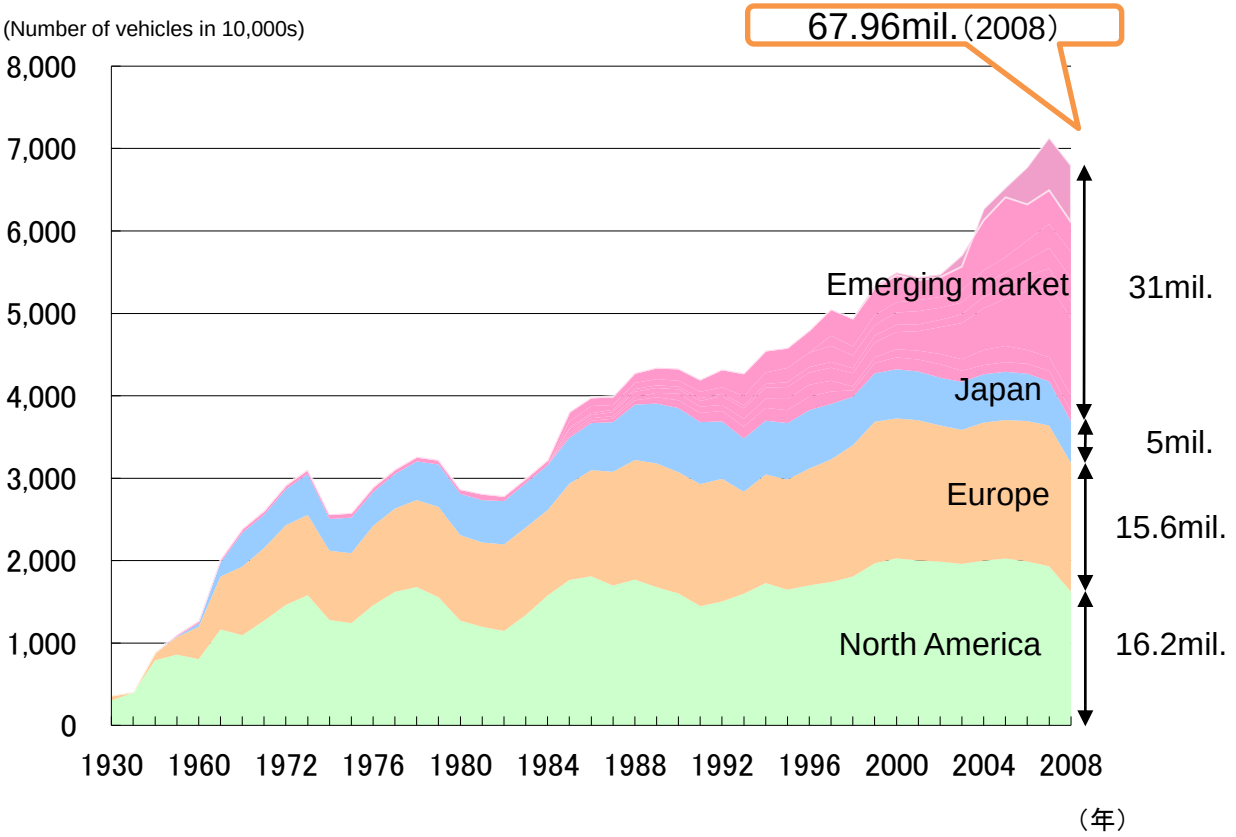
④ Fine Chemicals

⑤ Carbon Fiber

◆ Vehicle industry

- Japan's technical strength is widely recognized and Japan's auto companies sell globally, especially in emerging countries. **Japan's auto companies maintain about 30% global market share.**
- As trends toward green vehicles has been accelerated in developed markets, we formulated the Next-Generation Vehicle Plan 2010.

【World market】



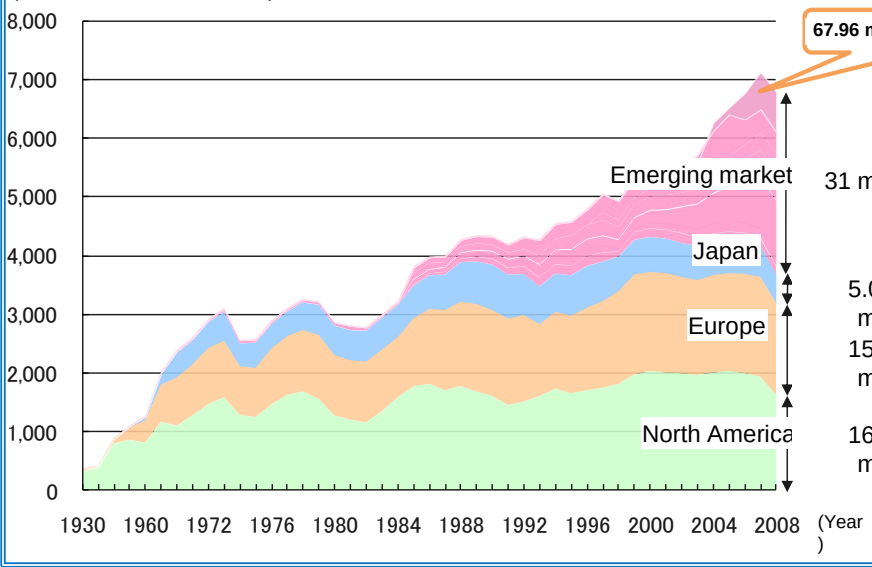
【The transition of world market share】

	2004	2005	2006	2007	2008
Japan	30.1%	30.8%	31.0%	31.3%	32.0%
Europe	12.3%	13.1%	16.1%	19.6%	23.5%
U.S.	28.9%	28.2%	26.7%	25.6%	23.1%
China	3.5%	3.7%	4.3%	5.0%	5.4%

Next-Generation Vehicle Plan 2010 (Outline)

Structural change in the auto market

- Rapid growth of emerging markets and trends toward green vehicles in developed markets



(2) Emerging markets
- Increase in the vehicle-buying population, along with economic development

31 mil.

(1) Developed markets
- Mature, stable markets
- Diversifying users and social needs

5.08 mil.
15.6 mil.
16.2 mil.

Emergence of ultra-low-price vehicles

Trends toward greater fuel efficiency Potential need to use different-power trains for different markets

External factors affecting the auto industry

Great changes in the competition environment
- Alliance based on environmental technology

Energy constraints
- High oil prices in the medium-to-long term

Global warming prevention
- Target of reducing GHG by 25% from the 1990 level by 2020

New industry
- Making EVs and batteries the growth driver

Six Plans

	Overall plan	Batteries	Rare metals	Infrastructure	Systems	International standards
Targets	next-gen. vehicle development and production	Secure battery R&D and technology	Secure rare metals and build resource recycling systems	Install 2 mil. normal chargers & 5,000 quick chargers	vehicles with systems (smart grid, etc.)	strategic international standardization
Action plan	• Set diffusion targets (for 2020/2030) - Next-generation vehicles account for up to 50% in 2020 - Advanced eco-friendly - vehicles (next-generation vehicles + eco-friendly conventional vehicles) account for up to 80% in 2020 • Diversify fuels • Higher-value-added parts • Promote the siting of low-carbon industries	• Improve performance of lithium-ion batteries • Develop post-lithium-ion batteries • Achieve economies of mass production by promoting EVs • Create an environment for secondary use of batteries	(Upstream) • Strategically secure rare metals (Middle course) • Develop batteries and motors free of rare metals (Downstream) • Establish battery recycling systems	• Build infrastructure intensively and systematically during the market preparation phase - Mainly in EV/PHV towns • Pave the way for full-scale diffusion - Compile EV/PHV town best practice handbook - Collaborate with the private sector (CHAdeMO Association)	• Create new business models in EV/PHV towns. • Verify systems through the Next-Generation Energy and Social System Demonstration program. • Promote international standardization and business development based on the verification results	• Establish international standards for battery performance and safety evaluation methods. • Establish international standards for charging connectors/systems. • Enhance public-private organization for standardization. • Develop human resources for standardization
		Battery R&D Target (set in 2006)	Resource Strategy Roadmap	Infrastructure Development Roadmap		International Standardization Roadmap

Next-Generation Vehicle Plan 2010 (Diffusion Projections for 2020 and 2030; Government Targets)

Diffusion projections by type of vehicle (with private-sector efforts)

- Diffusion projections assuming private-sector efforts (scenario where auto makers make the utmost efforts to improve fuel efficiency and develop next-generation vehicles) were made.
- Next-generation vehicles will account for less than 20% of new vehicle sales in 2020 and 30-40% in 2030.

	2020	2030
Conventional vehicles	**80% or more**	**60 - 70%**
Next-generation vehicles	**Less than 20%**	**30 - 40%**
Hybrid vehicles	10 - 15%	20 - 30%
Electric vehicles Plug-in hybrid vehicles	5 - 10%	10 - 20%
Fuel-cell vehicles	Miniscule	1%
Clean diesel vehicles	Miniscule	- 5%

Diffusion targets by type of vehicle (government targets)

- The government has set diffusion targets to pursue for each type of vehicle for accelerating the spread of next-generation vehicles.
- Next-generation vehicles should account for up to 50% of new vehicle sales in 2020.
- To achieve this target, the government should provide effective incentives.

	2020	2030
Conventional vehicles	**50 - 80%**	**30 - 50%**
Next-generation vehicles	**20 - 50%**	**50 - 70%**
Hybrid vehicles	20 - 30%	30 - 40%
Electric vehicles Plug-in hybrid vehicles	15 - 20%	20 - 30%
Fuel-cell vehicles	- 1%	- 3%
Clean diesel vehicles	- 5%	5 - 10%

Necessity of advanced eco-friendly vehicles

Expected model changes	• Only 1-2 changes expected by 2020
Secure international competitiveness	• Continued dominance of conventional vehicles in international, especially emerging, markets.
Risk for auto makers	• High risk involved in focusing on specific technologies, due to variations in diffusion projections
Higher costs arising from the use of advanced technologies	• Even if green vehicles are available, whether to buy them depends on users.
Effects of eco-friendly-vehicles subsidies and tax breaks	• Apr. 2009: Eco-vehicles account for 42.5% (next-generation vehicles 5.7%) • Feb. 2010: Eco-vehicles account for 73.1% (next-generation vehicles 9.3%)

The government seeks to make advanced eco-friendly vehicles account for 80% of new vehicle sales in 2020, provided that effective policy support is offered.

Advanced eco-vehicles ("post-eco-vehicles")

Next-generation vehicles

HV, EV, PHV, FCV, CDV, CNG, etc.

+

Future conventional vehicles whose eco-friendly features are excellent in light of the technical standards of the time

Next-Generation Vehicle Plan 2010 (Roadmap)

Battery R&D Targets (set in 2006)

	2006	Improved battery (2010)	Advanced battery (2015)	Innovative battery (2030)
	Small EVs for power companies	Commuter EVs for limited use High-performance HVs	Commuter EVs for general use Fuel-cell vehicles Plug-in HVs	Full-fledged EVs
Performance	1	1	1.5-fold	7-fold
Cost	1	1/2	1/7	1/40
Development structure	Led by private sector	Led by private sector	Government-industry-academia collaboration	Universities & research institutes

(1) Development of advanced lithium-ion batteries (FY 2007-2011)

· Aim to improve the performance, and reduce the cost, of lithium-ion storage batteries as the power source of hybrid and electric vehicles.

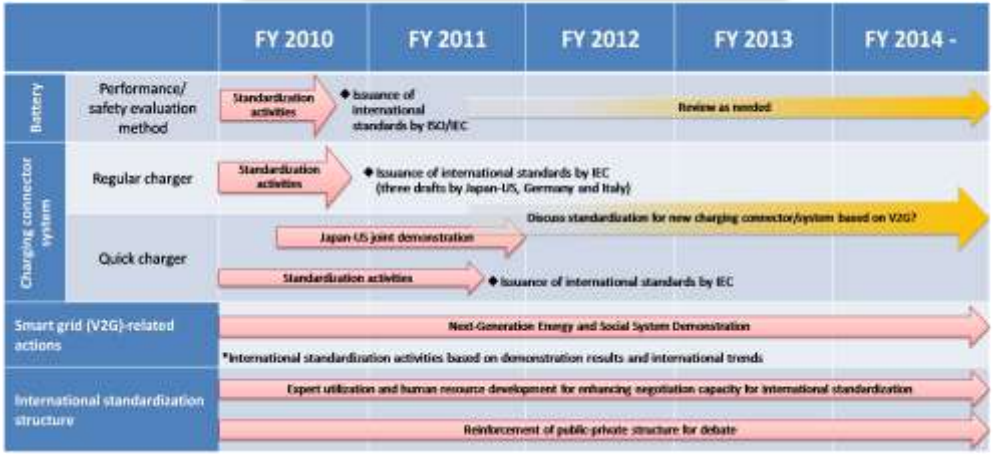
· FY 2010 budget: ¥2.48 billion (FY 2009 budget: ¥2.61 billion)

(2) Development of innovative batteries (post-lithium-ion batteries)(FY 2009-2015)

· Aim to elucidate the reaction mechanism of the storage battery through comprehensive joint studies by government, industry and academia ,and become the front-runner in post-lithium-ion battery development.

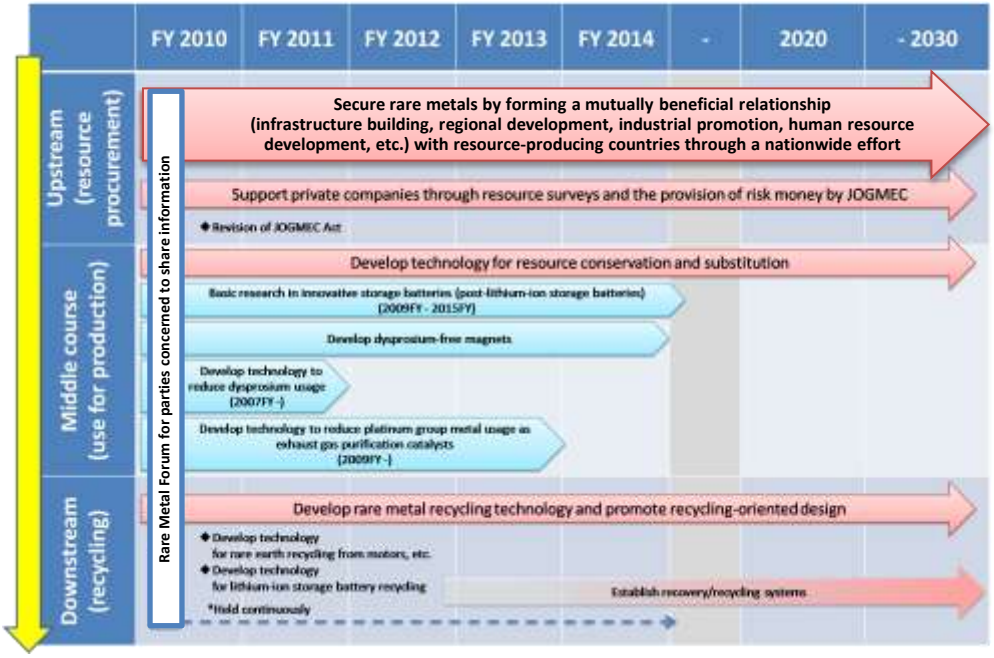
· FY 2010 budget: ¥3 billion (FY 2009 budget: ¥3 billion)

International Standardization Roadmap

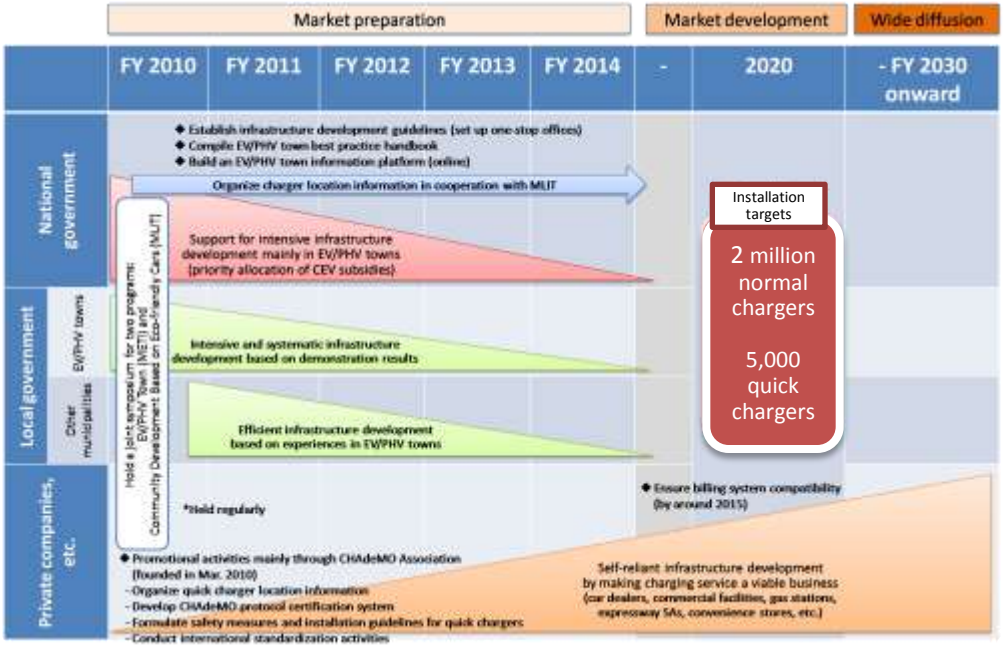


* Need for flexible actions according to international trends and technical development

Resource Strategy Roadmap

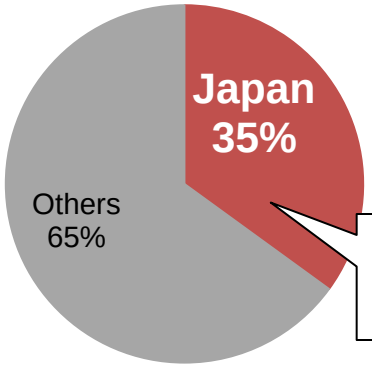


Infrastructure Development Roadmap



◆ Aircraft

①Japanese manufacturers account for **35%** in the new B787 construction, which is **the most fuel-efficient** aircraft of its type in the world.



Mitsubishi Heavy Industries
Kawasaki Heavy Industries
Fuji Heavy Industries etc.

②Taking charge of the **Main Wing**

・1st time for Boeing to outsource the **Main Wing** of a passenger plane

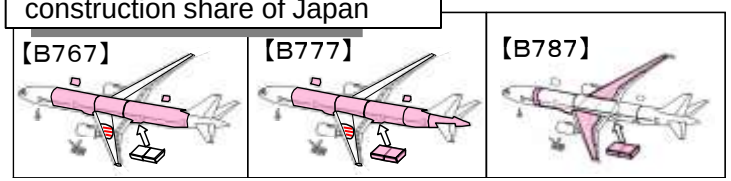
Cf.1) B787

- **20% increase** in fuel efficiency compared to B767 by drastic decrease in weight, using carbon fiber composites in 50% of the aircraft.
- firm orders for 866(May 2010) are the fastest-selling pace in the history of the airliner.

Cf.2) Transition of Construction Share of Japanese Manufacturer

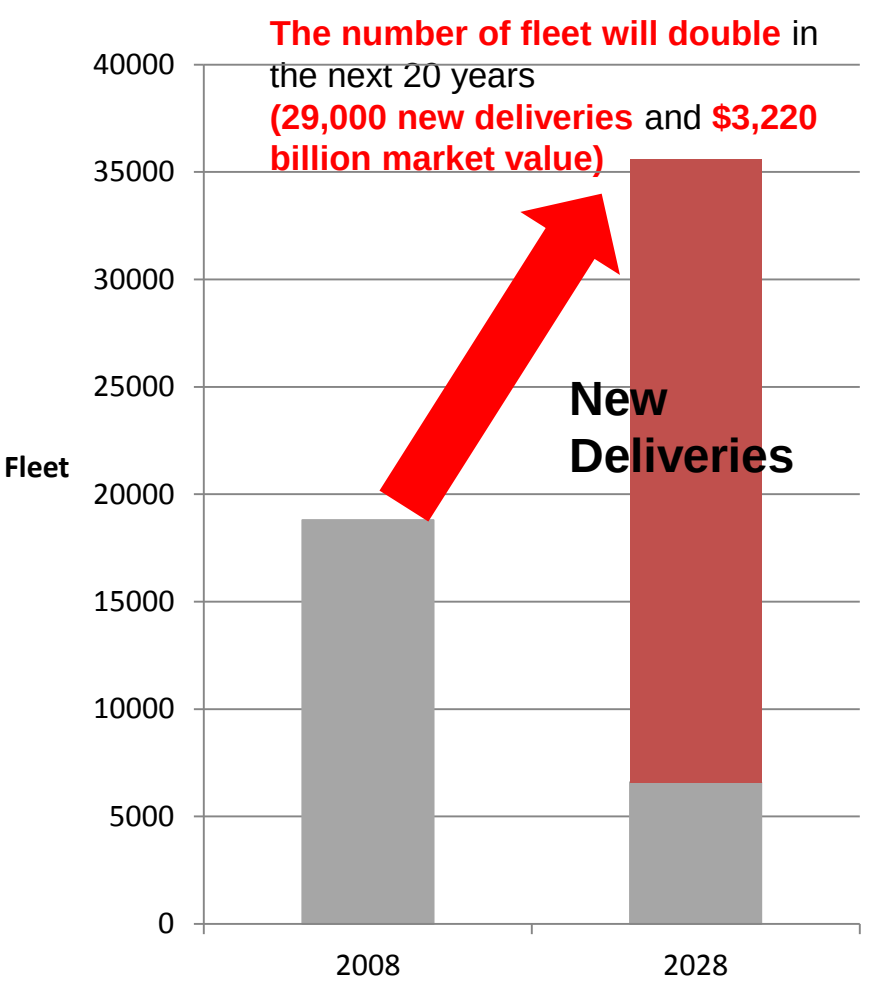
- Steady Increase in Construction Share (B767：15%→B777：21%→B787：35%)

construction share of Japan



29,000 new deliveries and **$3,220 billion market value** from 2008 to 2028 in the passenger plane market

Transition of the number of world passenger plane

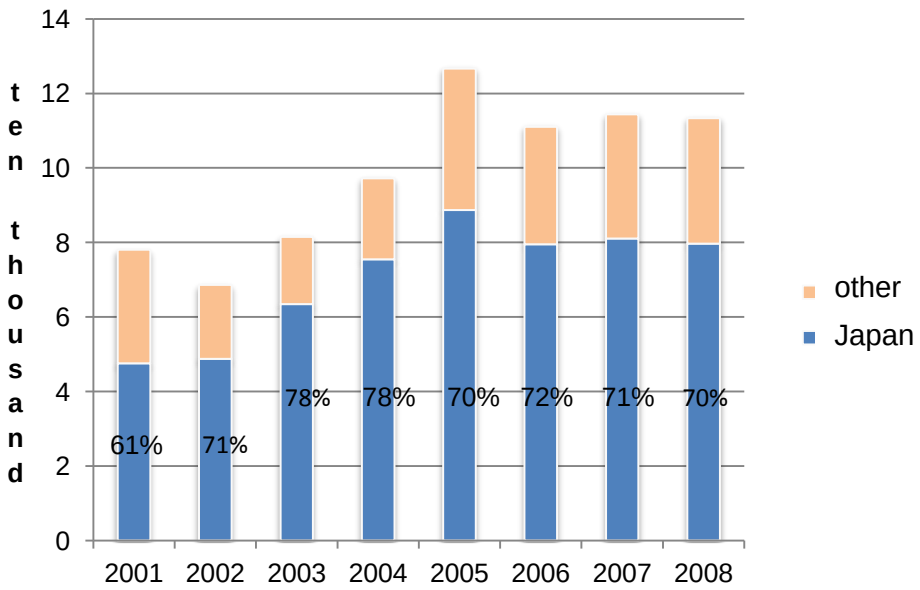


Source: 2009 June, "Current Market Outlook 2009-2028", Boeing

◆ Robots

- Robot production has reached an almost industrial level . Based on shipments, **Japan's robot makers have more than 70% of the global market .**
- Due to declining labor forces, increases in workloads and demands to improve quality of products &/or services, it is highly expected that next-generation robot technology will improve both industrial productivity and the quality of life of people.

Global shipments of industrial robots



Source：Japan Robot Association, IFR SD「World Robotics 2009」

○Life and wellness area

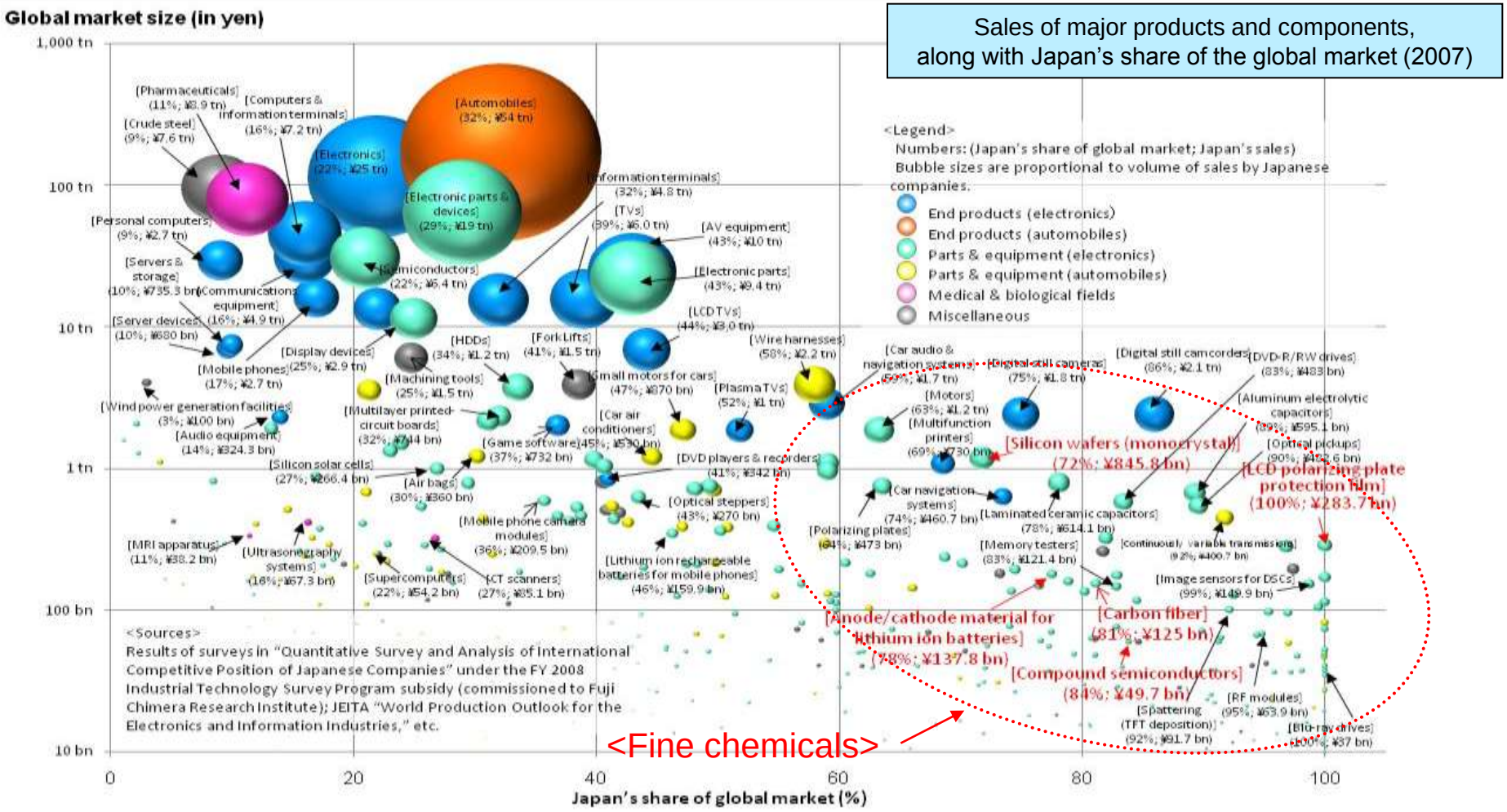
○Public and disaster prevention area

○Manufacturing area

- Robot production is now a 700 billion-yen market & the value will increase to 2.9 trillion-yen in 2020 and 9.7 trillion-yen in 2035.

◆Fine Chemicals

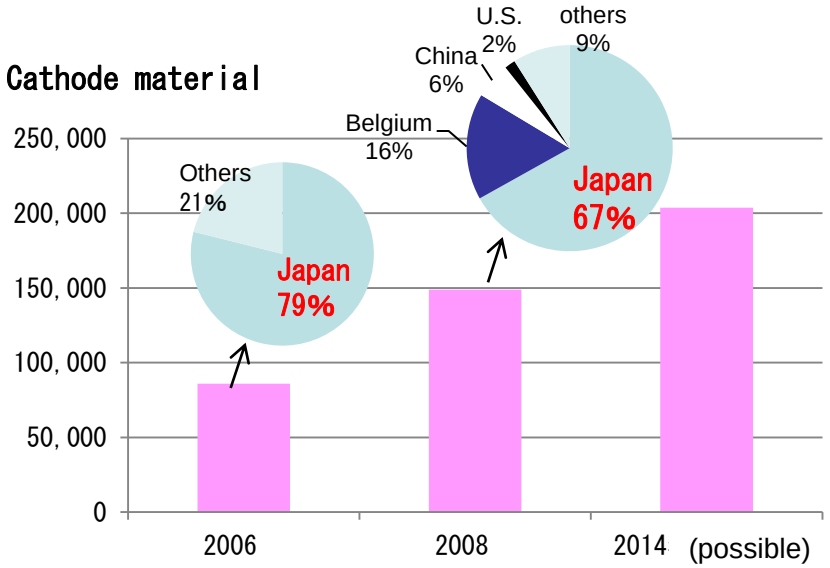
- Japan's chemical companies maintain large shares in the chemical material market, which is itself growing rapidly with technology innovation. Although each market is not so big, maintaining strong shares in each core materials market brings the Japan's fine chemical industry strong competitiveness. For example, Japanese companies has a huge share in each lithium-ion battery component market.

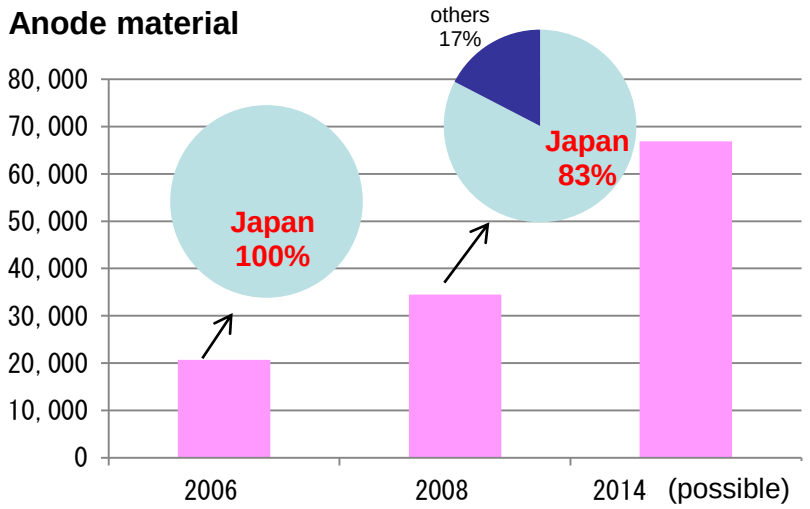


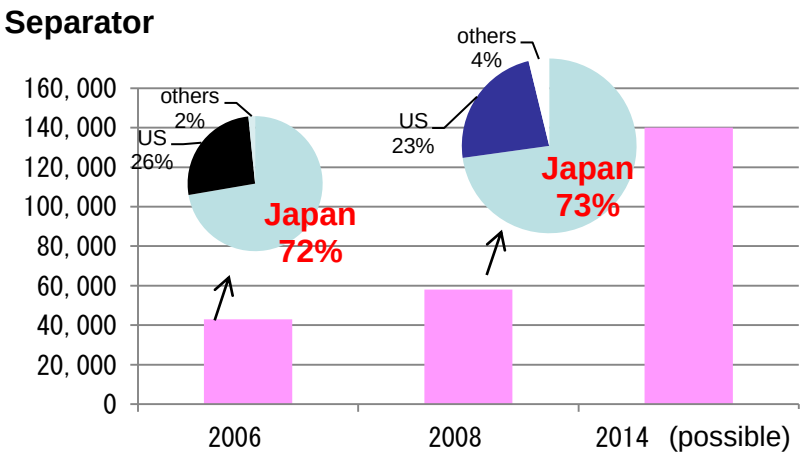
◆Fine Chemical

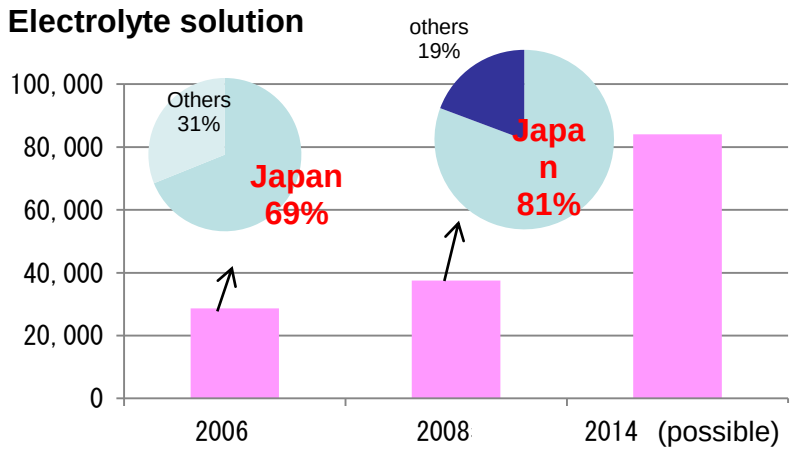
【Lithium-Ion Battery Components】

Global production（millions of Yen）
Share of the global market









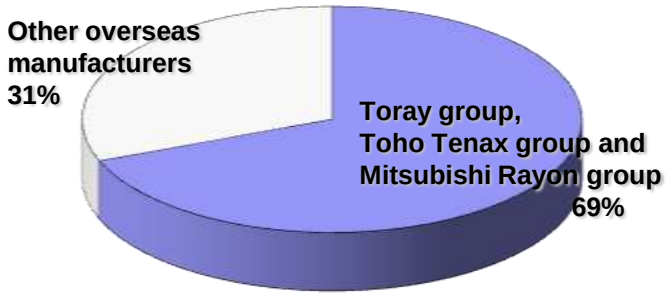
（Source）2007 2010 Battery Market ：
Comprehensive Survey for Current Aspect FUJI KEIZAI Co.,Inc
and Estimation by Chemicals Division, METI

◆ Carbon fiber

➢ **Japanese enterprises maintain international competitiveness for high-value-added materials such as carbon fiber and aramid fiber** It is necessary to expand the market of these high-value-added materials in the future.

①World market share of carbon fiber

Japanese manufacturers represent about 70% of the market.



②Market transition of carbon fiber

As is lightweight and tough, the market will increase especially for industrial use.