

Sticking to Monozukuri and Global Top Strategy



Advanced Development and Planning Center (Tenri, Nara)

March 3, 2008
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Production Technology Development Group

Outline



1. Overview

2. Only-one/Spiral strategy

3. Corporate vision and global strategy

4. Study thoroughly Monozukuri

5. Sticking to Monozukuri



Since 1912

Sincerity and Creativity

is our business creed.

All development activities

are originated from customer's viewpoint.

*Create products that will be imitated
by the competitors*

is the wisdom of *Tokuji Hayakawa*.



Overview

- Founding 1912
- Capital Stock 204,675 million yen (as of September 30, 2007)
- Employees 51,300 (as of September 30, 2007)
【Japan】 30,300 【Overseas】 21,000
- Manufacturing Bases (as of December 1, 2007)
【Japan】 10 【Overseas】 24
- R&D Bases (as of December 1, 2007)
【Japan】 27 【Overseas】 5
- Overseas Sales Subsidiaries 28 (as of December 1, 2007)

Achievement

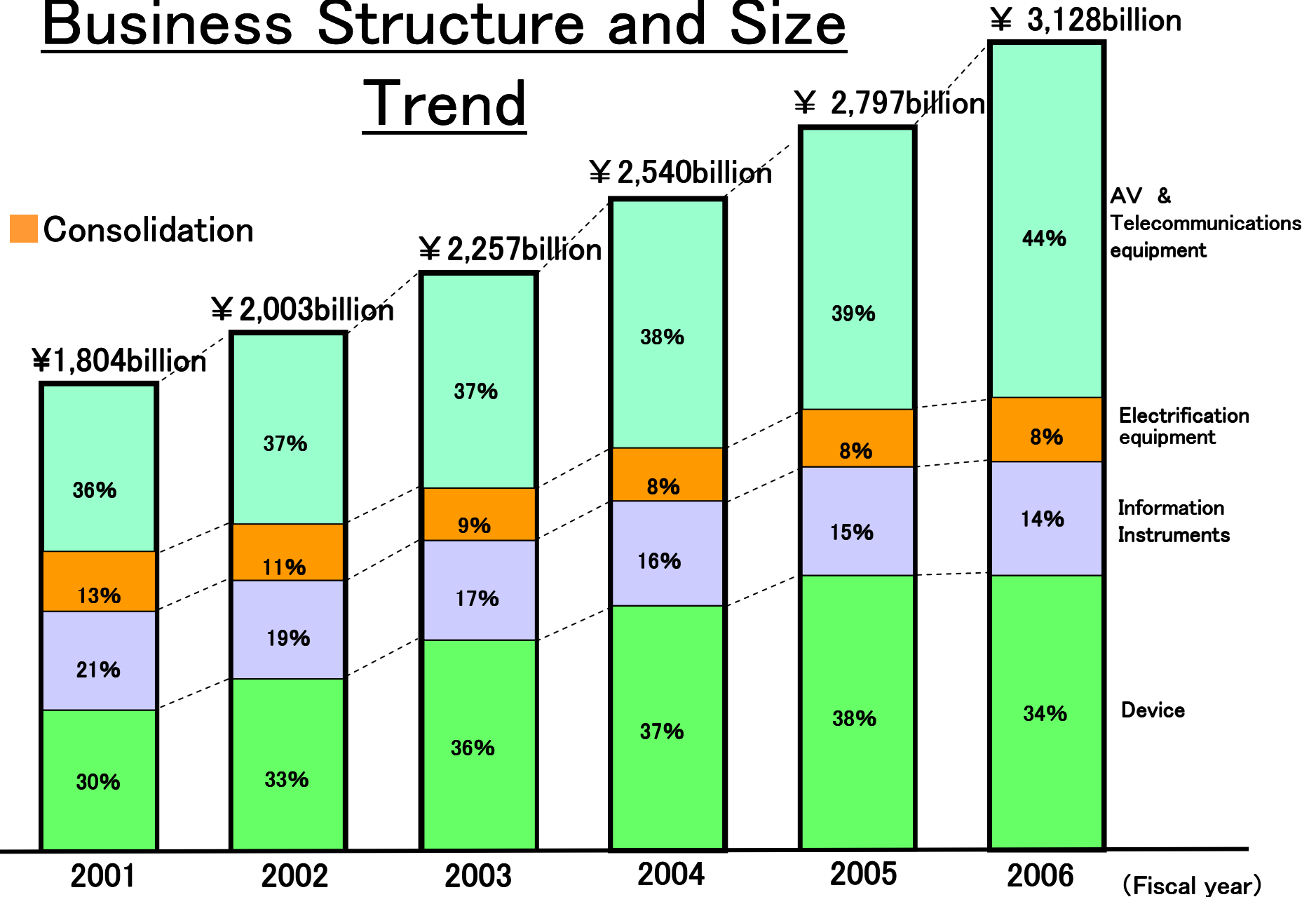
Consolidation

(Unit: billion yen)

Fiscal Year		2003	2004	2005	2006	2007 (Forecast)
Sales		2,257	2,534	2,797	3,128	3,400
Operating Profit []:Margin		121 [5.4%]	151 [5.9%]	163 [5.9%]	187 [6.0%]	190
Current Profit		112	141	151	171	175
Export Ratio	Japan	50.7%	52.4%	49.9%	48.8%	—
	Overs eas	49.3%	47.6%	50.1%	51.2%	—

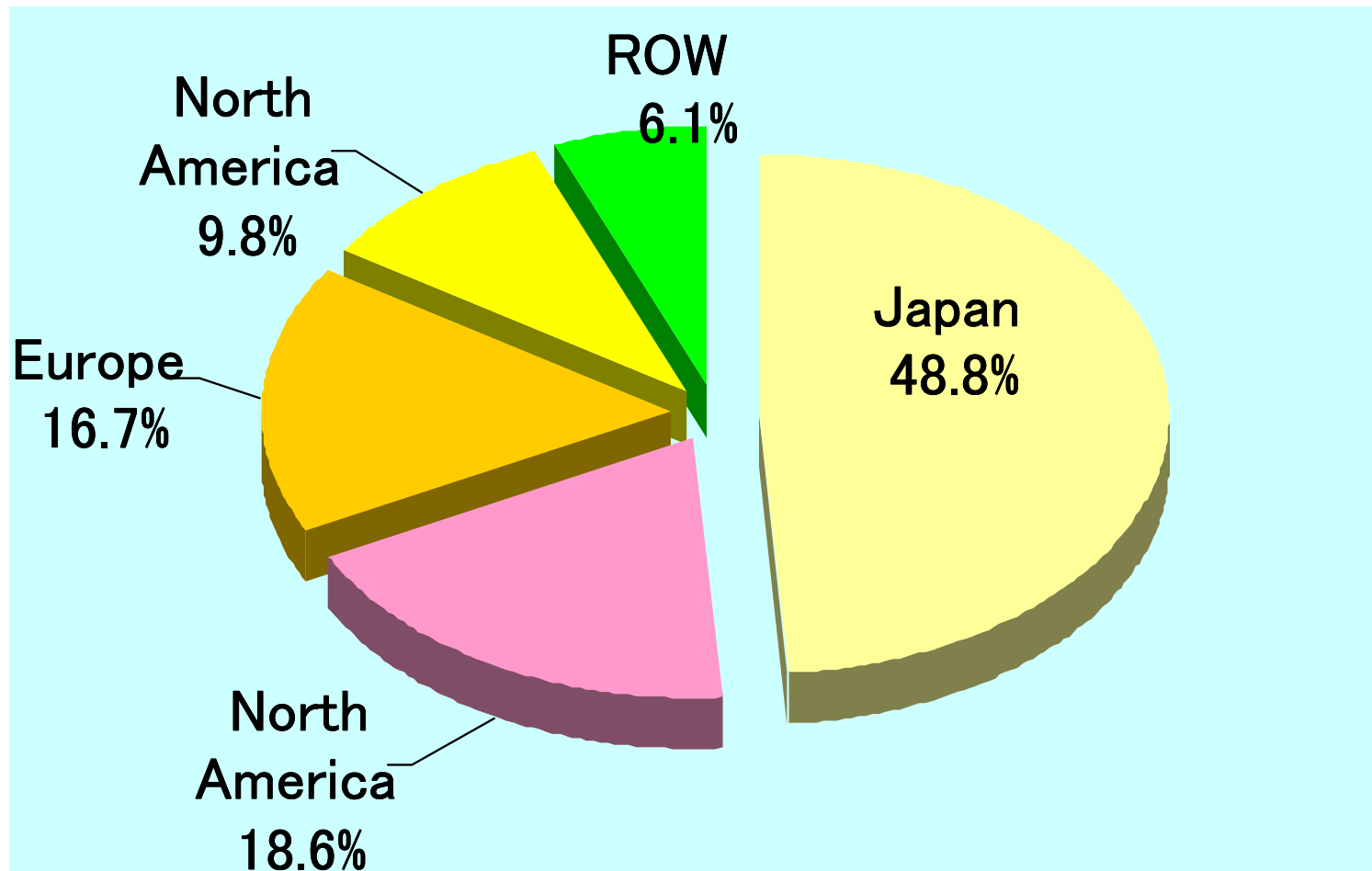
Business Structure and Size

Trend

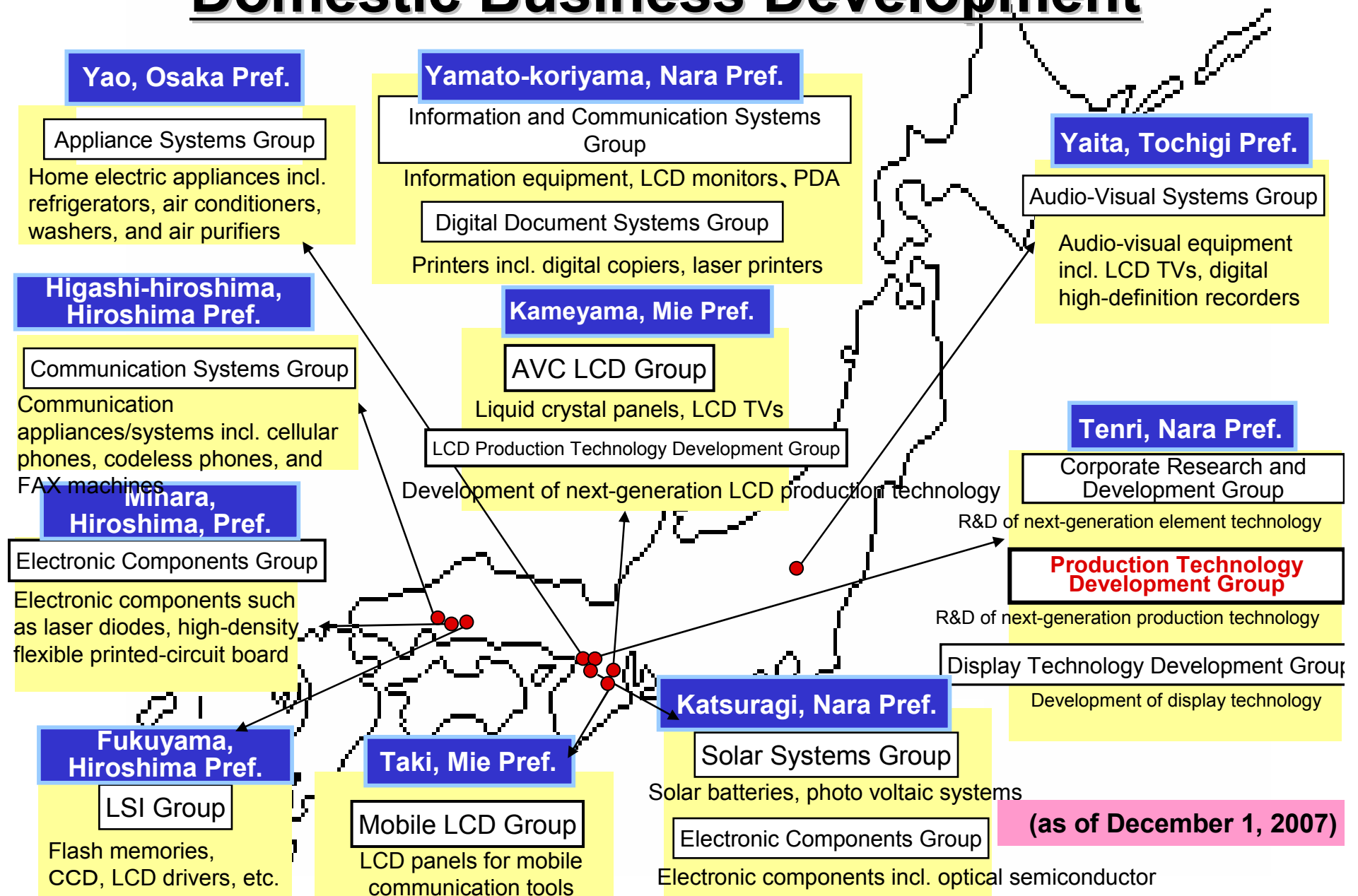


Regional Sales Ratio

■ Fiscal Year 2006



Domestic Business Development

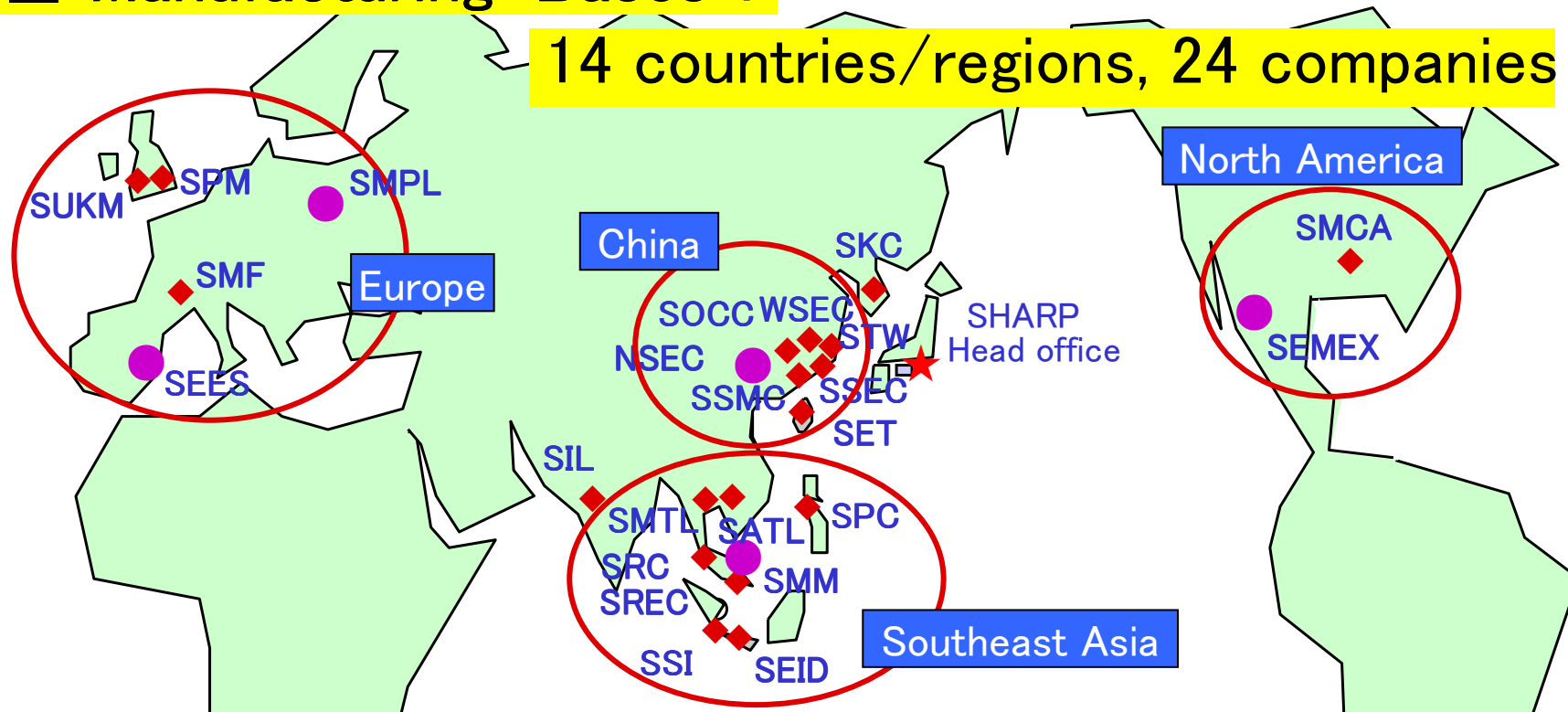


(as of December 1, 2007)

Overseas Business Bases

Manufacturing Bases :

14 countries/regions, 24 companies



● Overseas business operations **[Total] 25 countries/61 regions**

◇ Sales subsidiaries: 28 companies in 23 countries

◇ R&D company and parts supplier: 1 company in 1 country

◇ R&D bases: 5 companies in 4 countries

◇ Finance company/Representative office : 3 companies/offices in 2 countries

(as of December 1, 2007)

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Gene of Originality



1915 Mechanical pencil



2002 Large-size LCD TV "AQUOS"



1927 Crystal radio set

*The World's first, Japan's first
Products*



1993 Zaurus



1953 TV receiver



1992 LCD ViewCam



1962 Microwave oven



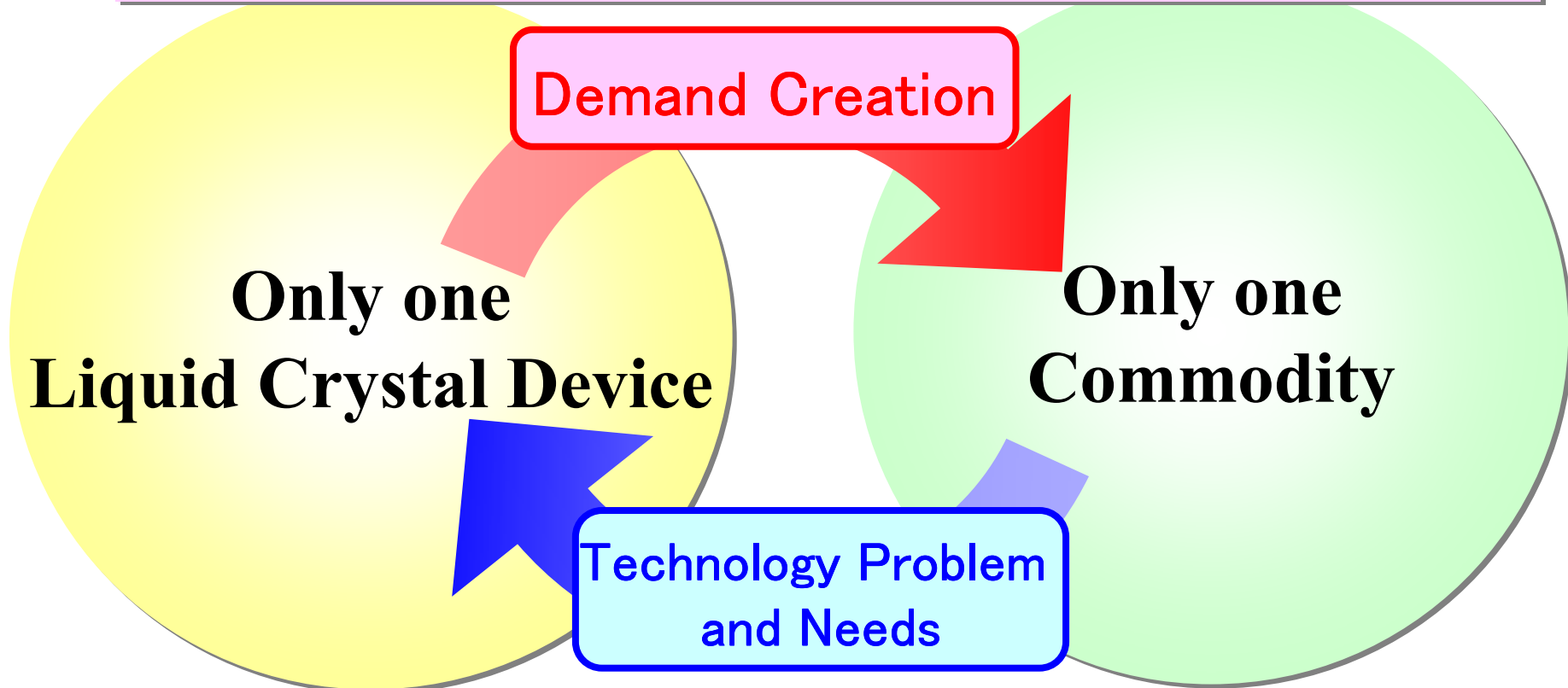
1964 Electronic calculator

Some of the Examples of Market Leading Products



“Spiral Growth” regarding LCD

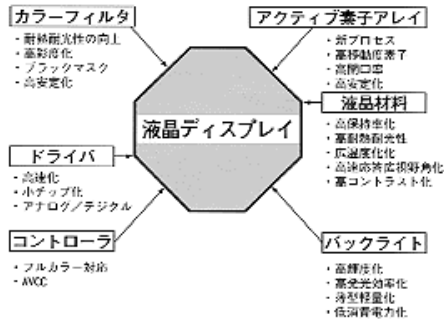
“LCD technology with new features” generates “innovative new products.”



“Product innovation” promotes the development of “LCD with new features.”

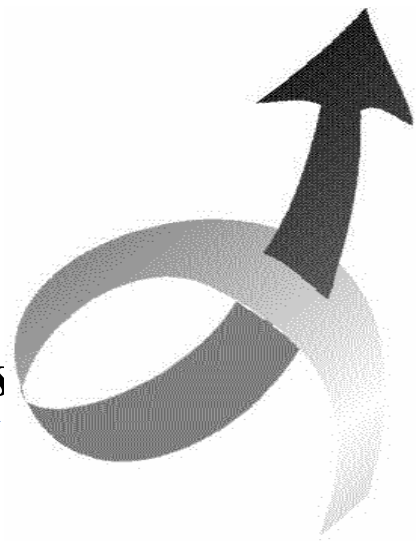
Upward Spiral of Technology, Commodity, and Device

Example of
Liquid Crystal Technology



Essential components
(Only one Device)

Demand-creating products
(Only one Commodity)



- System Panel
- Plastic Liquid Crystal
- Touch Input Panel

Essential technology
(Only one Technology)

- Technology for large panel production
- High-aperture-ratio array design
- System designing
- Optical design

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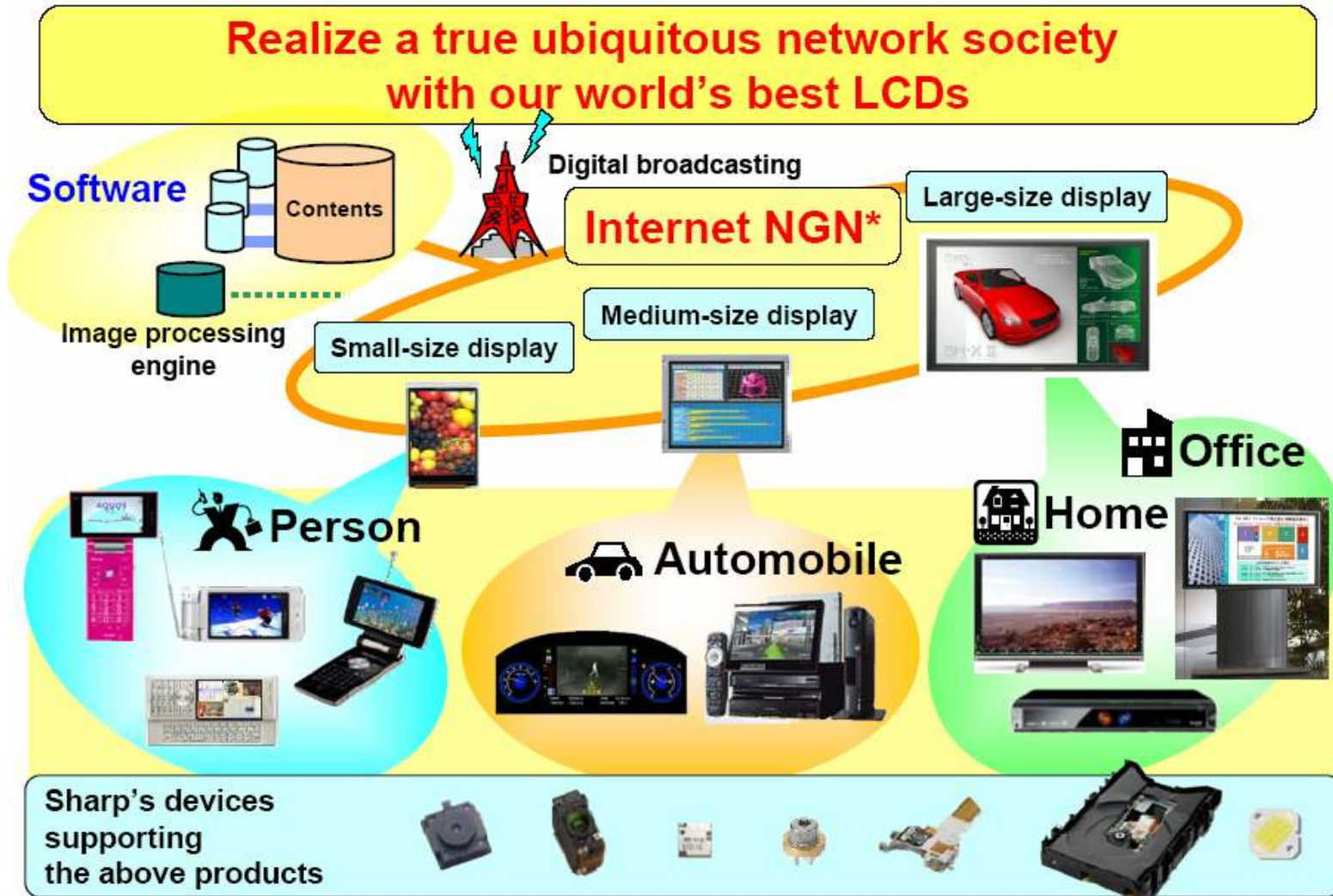


3. Corporate vision and global strategy

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Concentration in Core Competencies (1)



*NGN(Next Generation Network)

Concentration in Core Competencies (2)

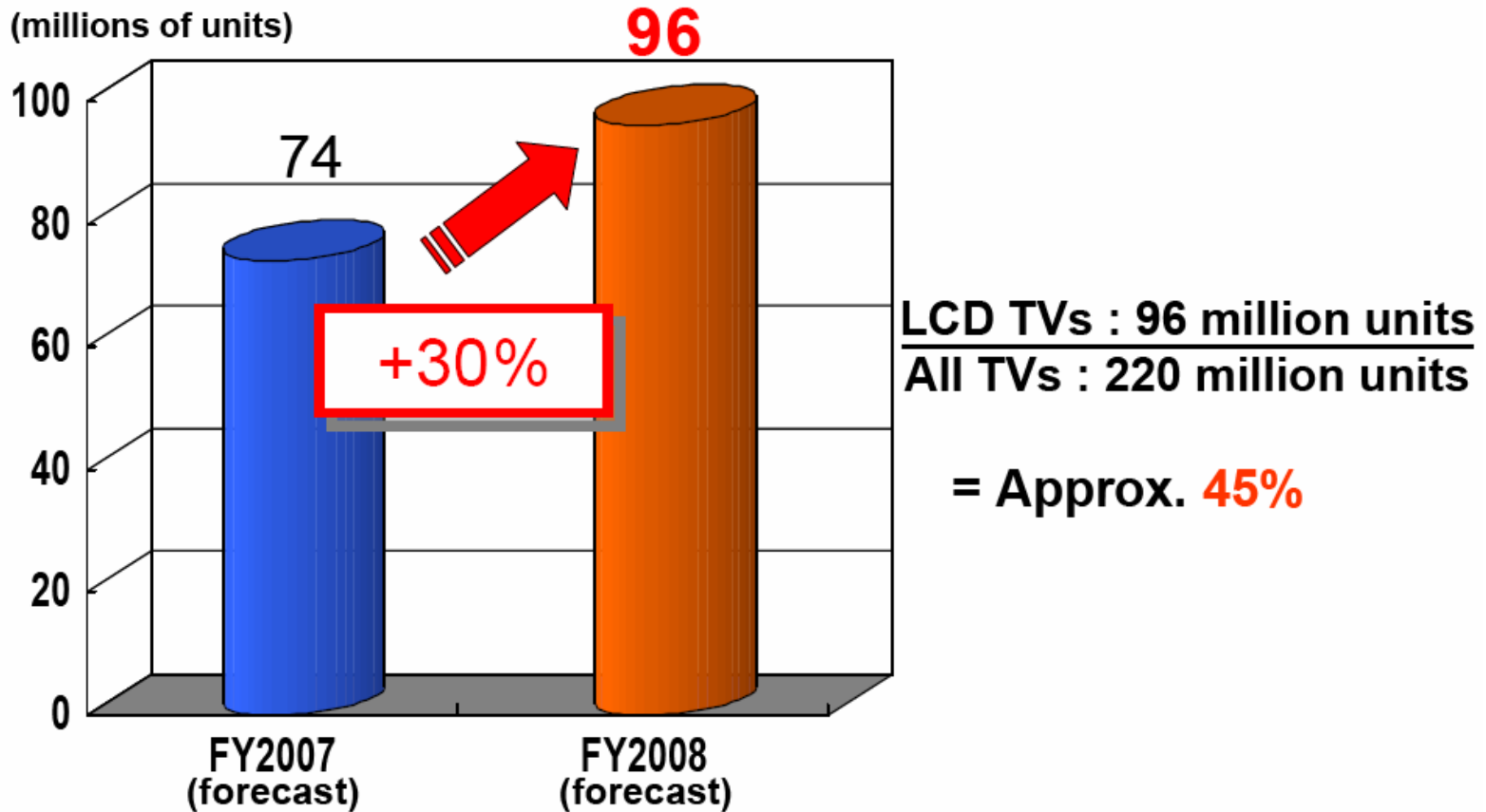
Contribute to society by environment and health-related business with energy-saving and energy-creating equipment as the core



LCD TVs and Large-size LCDs



Worldwide LCD TV Demand



LCD TVs account for nearly half of TV demand in FY2008

(Source : Sharp)

New LCD Technology



65-inch TV (Prototype)

- **Thickness :**
 - 20 mm (display section)
 - 35 mm (thickest part)
- **Bezel :**
 - 25 mm (top)
 - 25 mm (sides)
- **Contrast :**
 - 100,000:1
- **Annual power consumption :**
 - 200 kWh/year

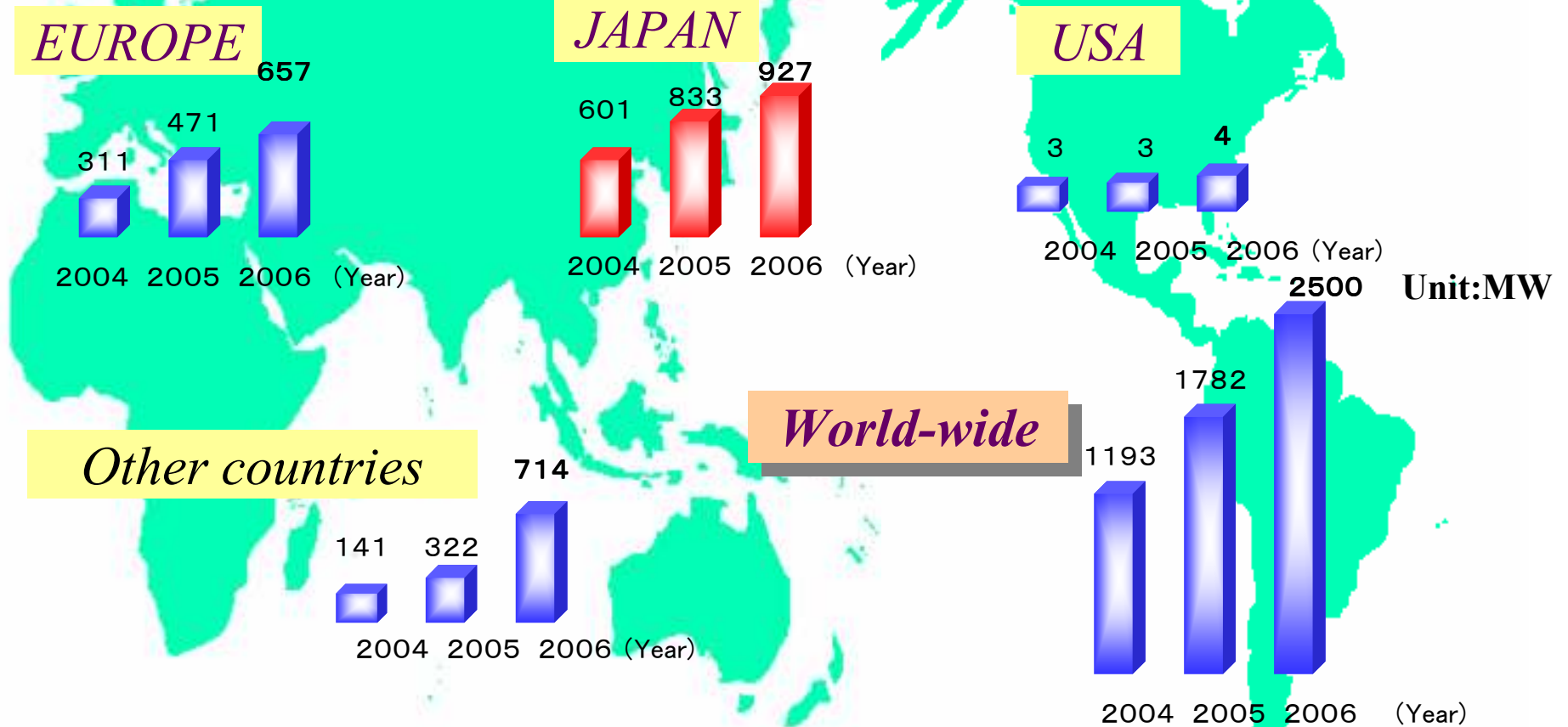
52-inch TV (Prototype)

- **Thickness :**
 - 20 mm (display section)
 - 29 mm (thickest part)
- **Bezel :**
 - 20 mm (top)
 - 25 mm (sides)
- **Contrast :**
 - 100,000:1
- **Annual power consumption :**
 - 140 kWh/year

Photovoltaic Power Systems

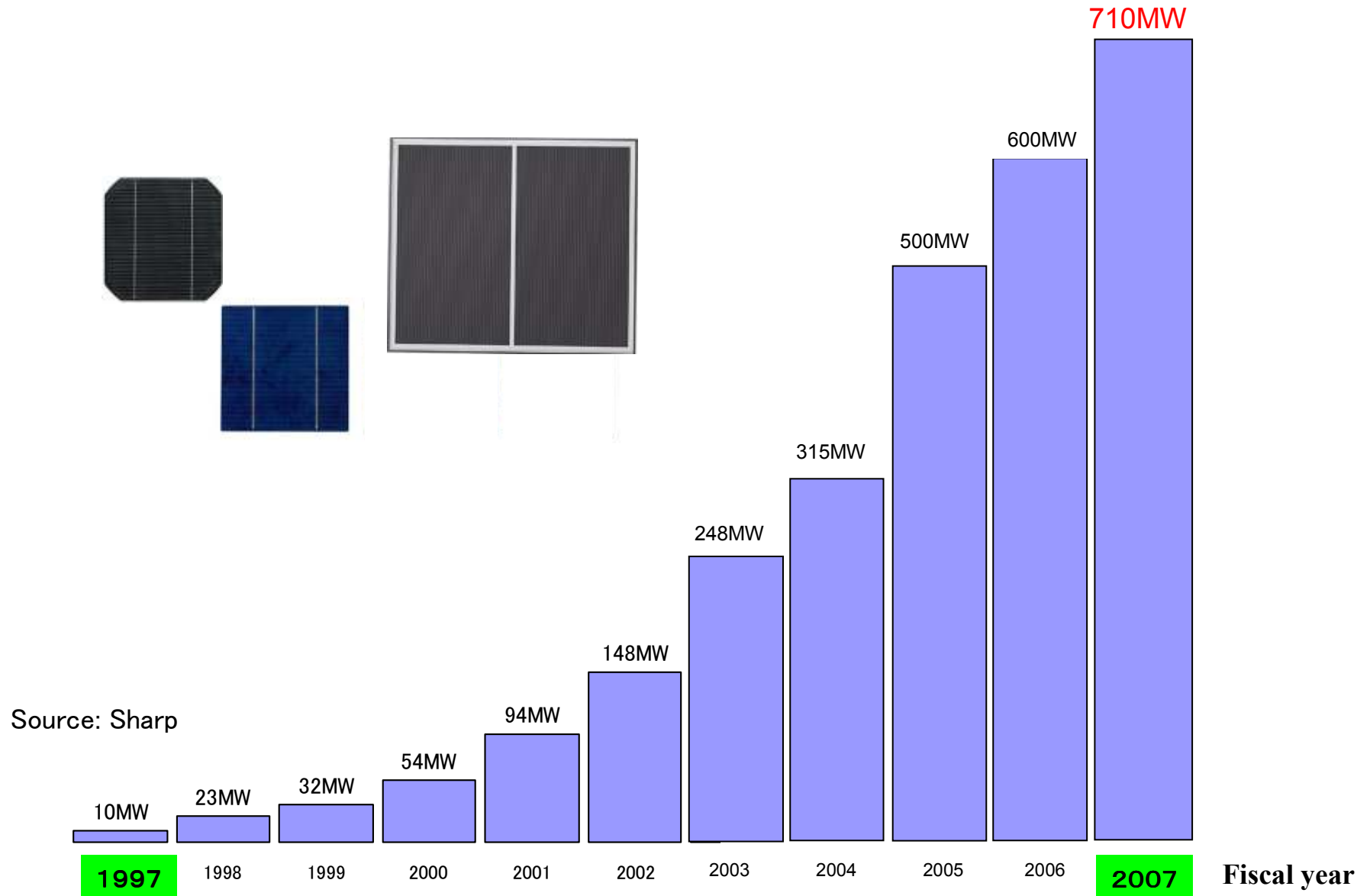


World Production of Solar Battery



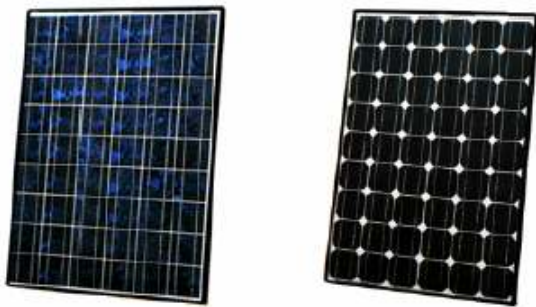
Source : PVNews March 2007

Production Capacity of Solar Batteries



Capacity Enhancement of Solar Cells

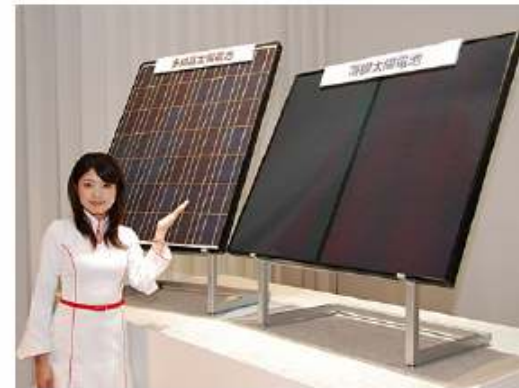
Crystalline type



● Procurement of silicon materials

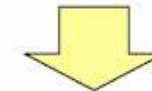
- In-house production
(Started full-fledged production in Autumn 2007)
- Stable external procurement

Thin-film type



● Enhancement of production capacity at the Katsuragi Plant

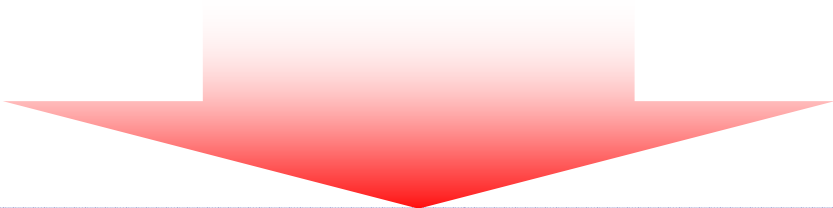
Current : 15 MW/year



Oct. 2008 (plan) : **160 MW/year**

Strengthen Measures for Global Environmental Protection

**“Leading environmentally-friendly company”
Corporate vision
“Company without global-warming burden in 2010”**



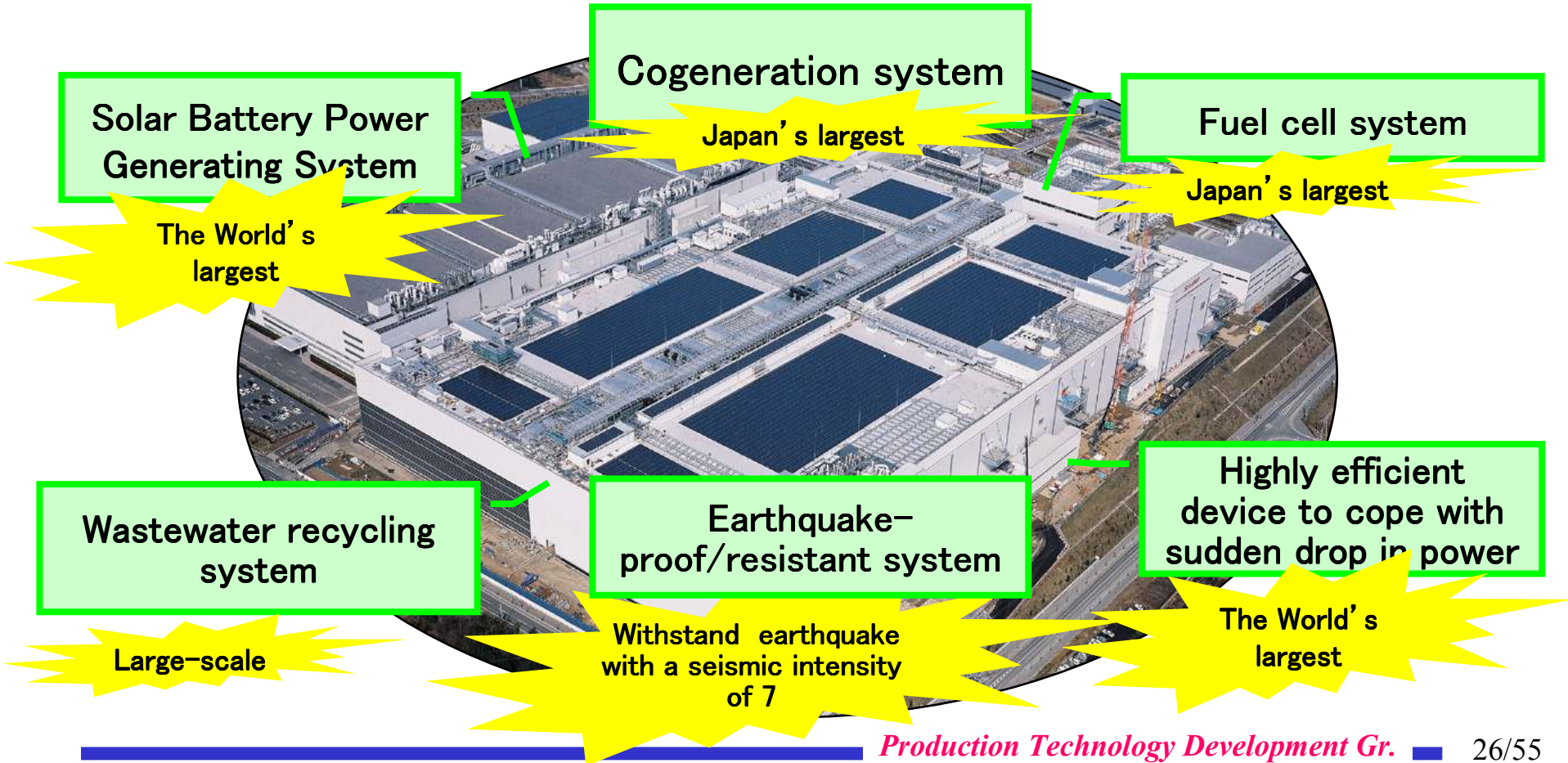
**Environmentally-sound “Monozukuri” based on
technologies producing /saving energy
Solar battery/LCD**

Super-green Factory “Kameyama”

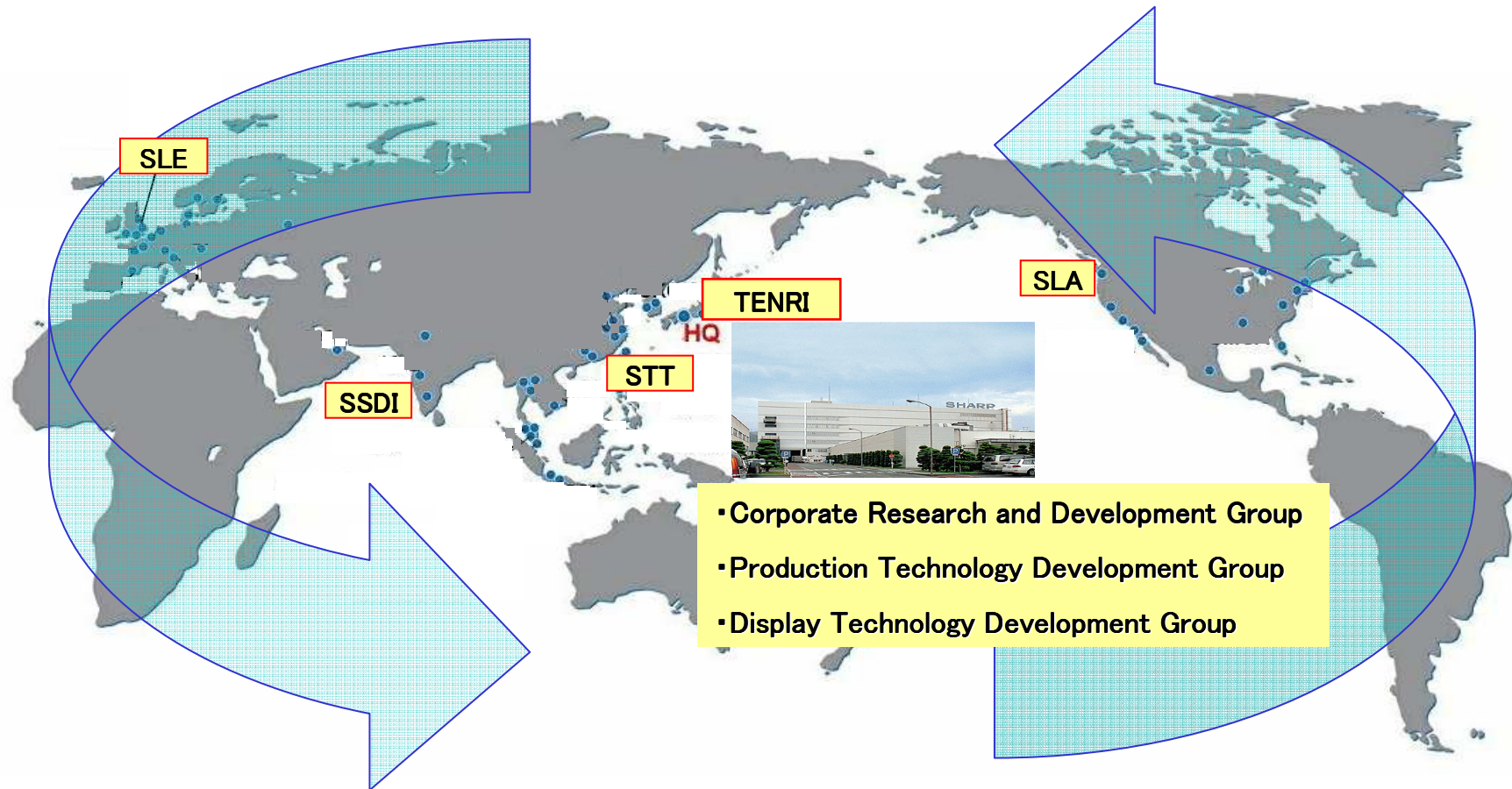
Environmentally conscious

Response to disasters

Supplies one-third of total electricity used in the No. 2 Plant

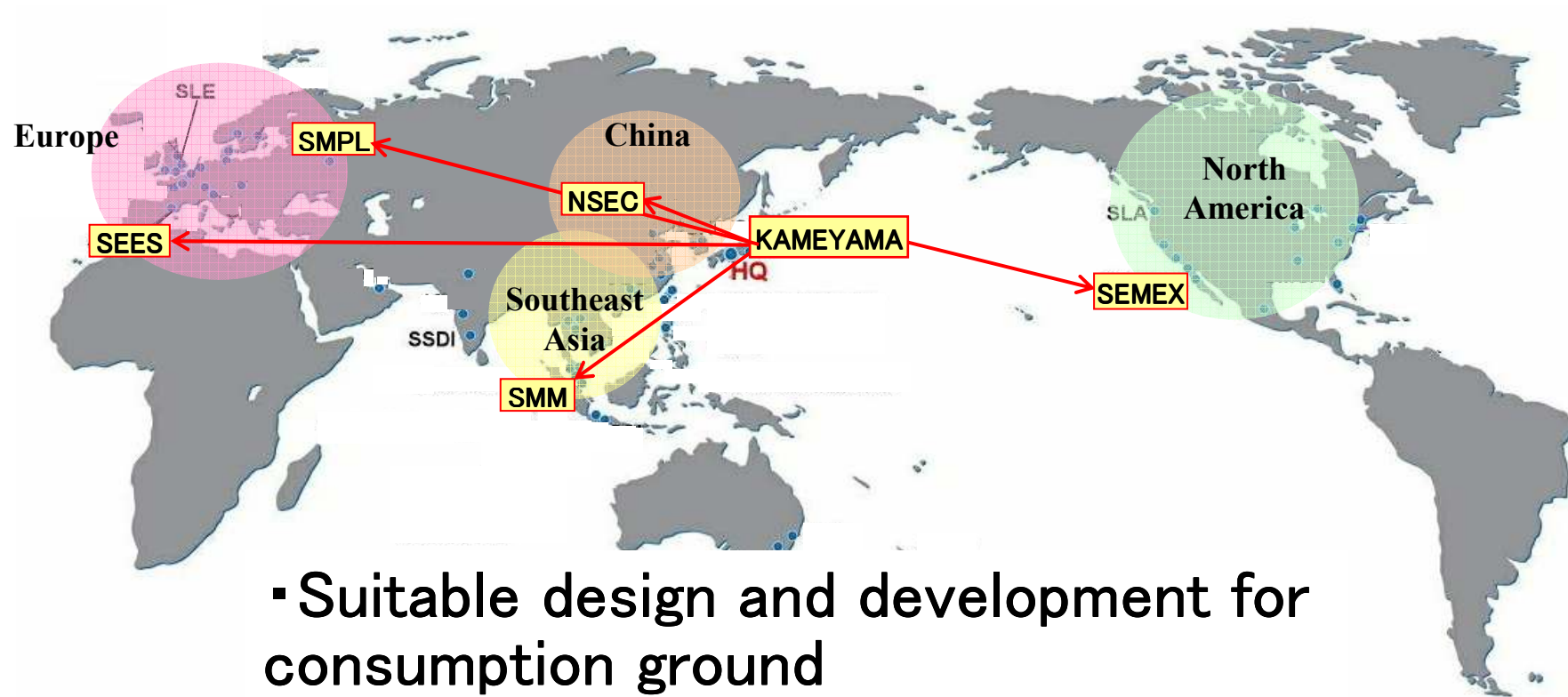


Global System of Development




Global Network for LCD TV Production Covering 5 Major Regions

(Japan, North America, Europe, China, Southeast Asia)



- Suitable design and development for consumption ground
- Production base near consumption ground

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Study thoroughly Manufacturing

- ◆ Reconsider **the manufacturer's principle** to contribute to society through *Monozukuri*. Make all-out efforts to **create SHARP's Only one Commodity** that can **not only offer new life styles to but also satisfy customers worldwide.**
- ◆ The manufacturer's mission is to produce and satisfy customers **unique products** and satisfy customers with them.
To achieve this, we need technologies not only for product development, but also for production.

Evolution of Large-scale LCD TV and Production Technology

R-Series
(Kameyama model)

AQUOS



LC-46RX1W



LC-52RX1W



LC-57RX1W



LC-65RX1W

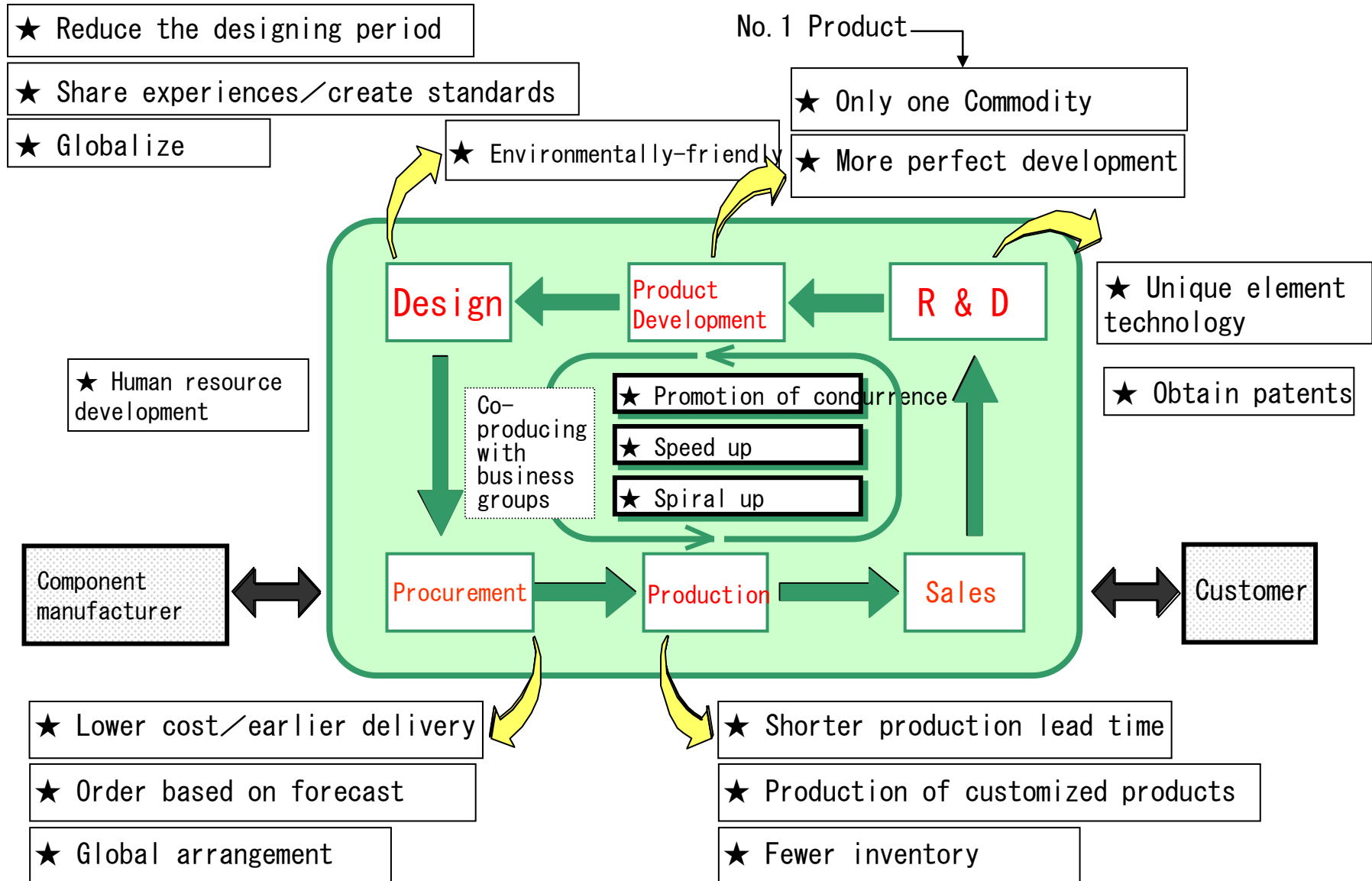
Evolution of Liquid Crystal Technology

- Speed-up
- High Viewing Angle
- Color Reproduction

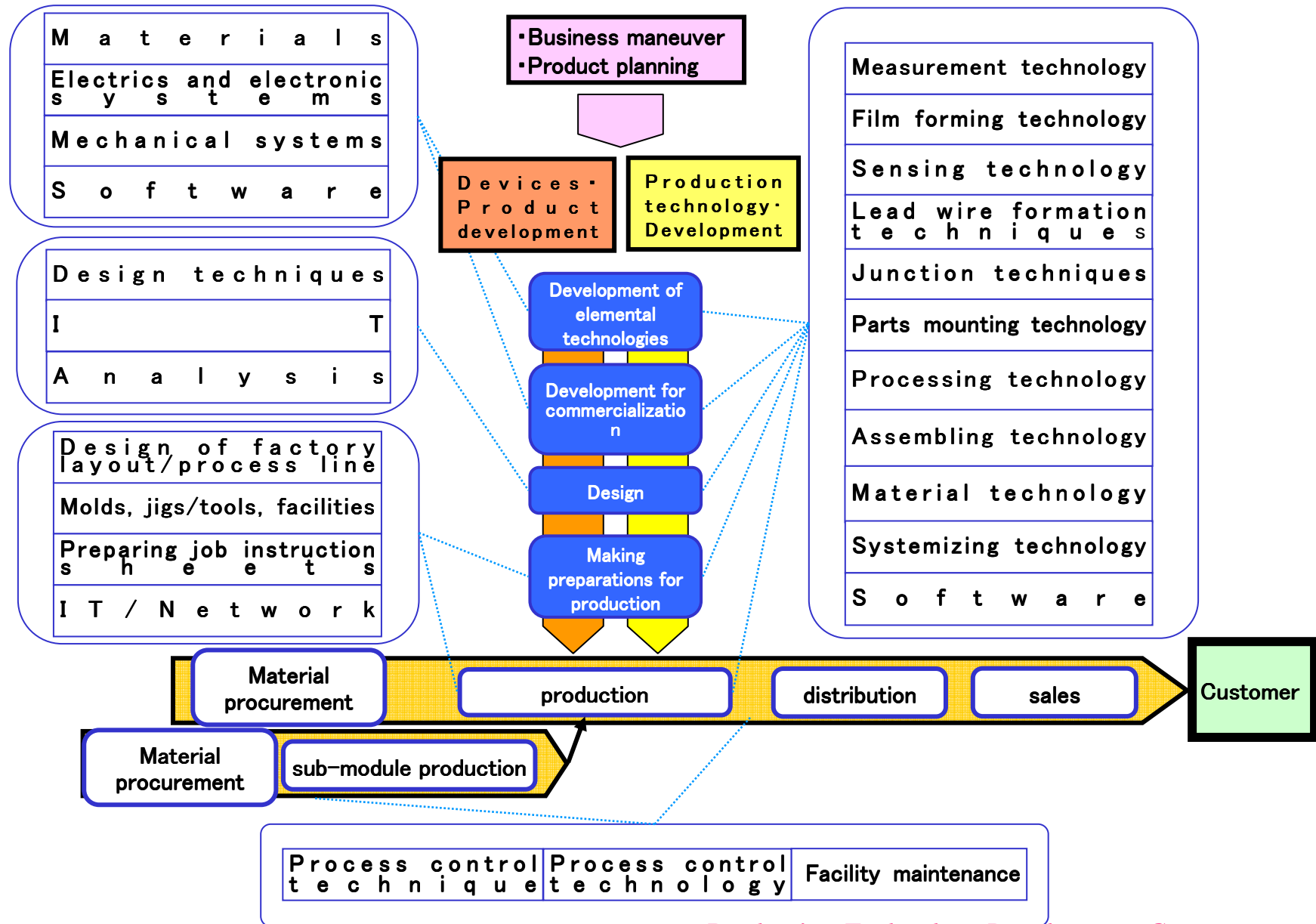
Evolution of Production Technology

- Enlargement
- Low Cost

Flow of Monozukuri

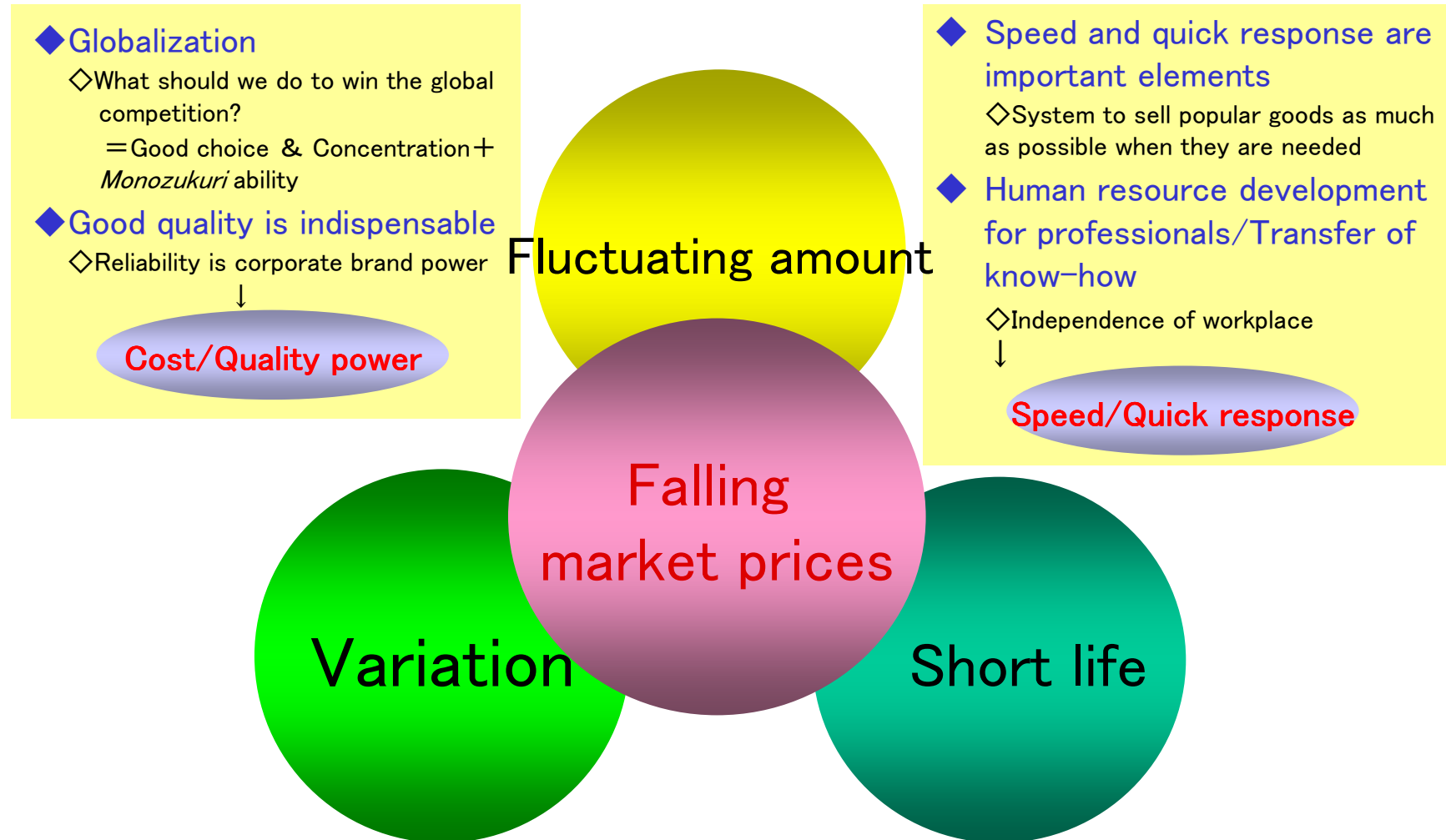


Value Chain and Necessary Technological Group



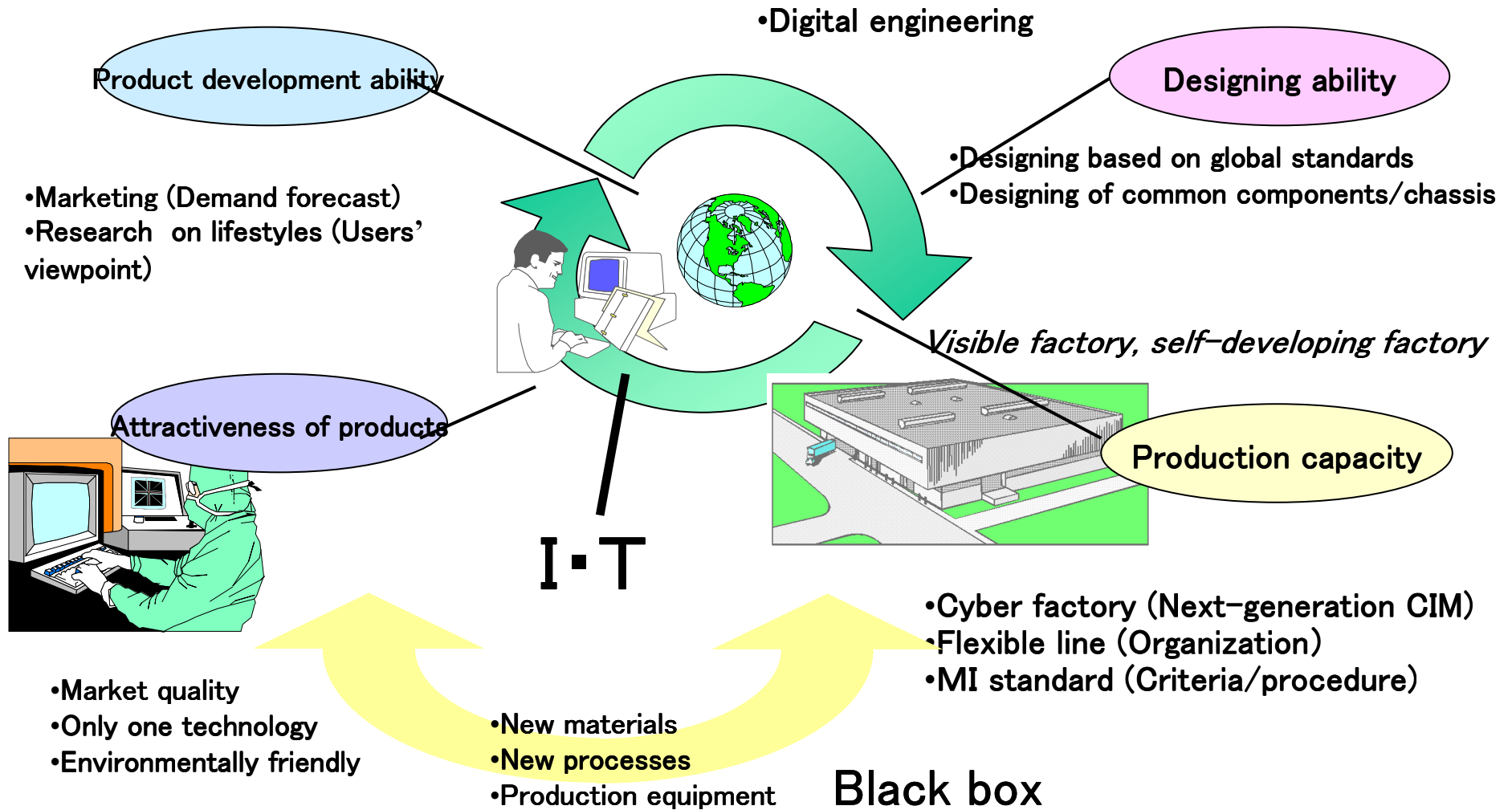
Our environment for Monozukuri

3 major changes + Substantial drop in market prices



SHARP's Monozukuri

Real-time business management based on our global network



Factory utilizing IT

Before deciding the layout of production facilities in the plant, confirm the best location and production capacity by using 3D computer simulation, which can display images of the plant as if its system was actually running.

Virtual image of the production process created by the simulation model

Visible/Observable/Checkable system for the plant

Change of inventory in the stock by hour

Lead time

Quality control system

Data for processing

System for analyzing data

Data for inspection

Quality information

- Current yield
- Expected improvement

New Process, Production Equipment

- ◆ Develop production methods for process innovation.
- ◆ Yields increase cost directly. Vertical startup is indispensable.
- ◆ Feedback effectively a large amount of operation data.
- ◆ Establish production systems that are not dependent on people
(Utilize robots, use machines for inspection)
- ◆ It is necessary to establish reliable production lines in the overseas bases.

Training System to Transfer Skills

■ Monozukuri Expert System

◆ Purposes

- Development and creation of new Only one skills
- Training for successors and transfer of expertise
- Self development and improvement of own skills as a master

◆ Trainees

Employees who have outstanding skills and are able to teach their skills in the company offices/factories, suppliers' factories in Japan, and overseas production bases



Monozukuri Seminar

Training for Professional Designing Engineers



Knowledge = Base

Idea = Inspiration

Persistence/Action



- Select a level
- Group training

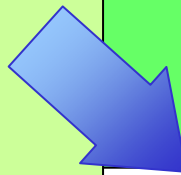
- Structure designing/on-the-job training
- Electricity and electronics-related designing/ on-the-job training
- Software development / on-the-job training
- QC on-the-job training
- Applied mathematics, statistics

Smooth and efficient transfer of skills and expertise

- Select people Face to face

•3-dimensional design

On-the-job training, addressing practical issues



Development of *solution-type* human resources

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Sticking to Monozukuri

- Brush up the company's "unique strength"
 - Make something that doesn't exist in the world
 - Make steady efforts for development

- Make use of the "teamwork"

- Confirm whether the product is competitive or not

SHARP

“Unique Strength” and “Teamwork”

Vertical Integration of Devices and Products

Original Feature Commodity



CCD/CMOS
Imajar

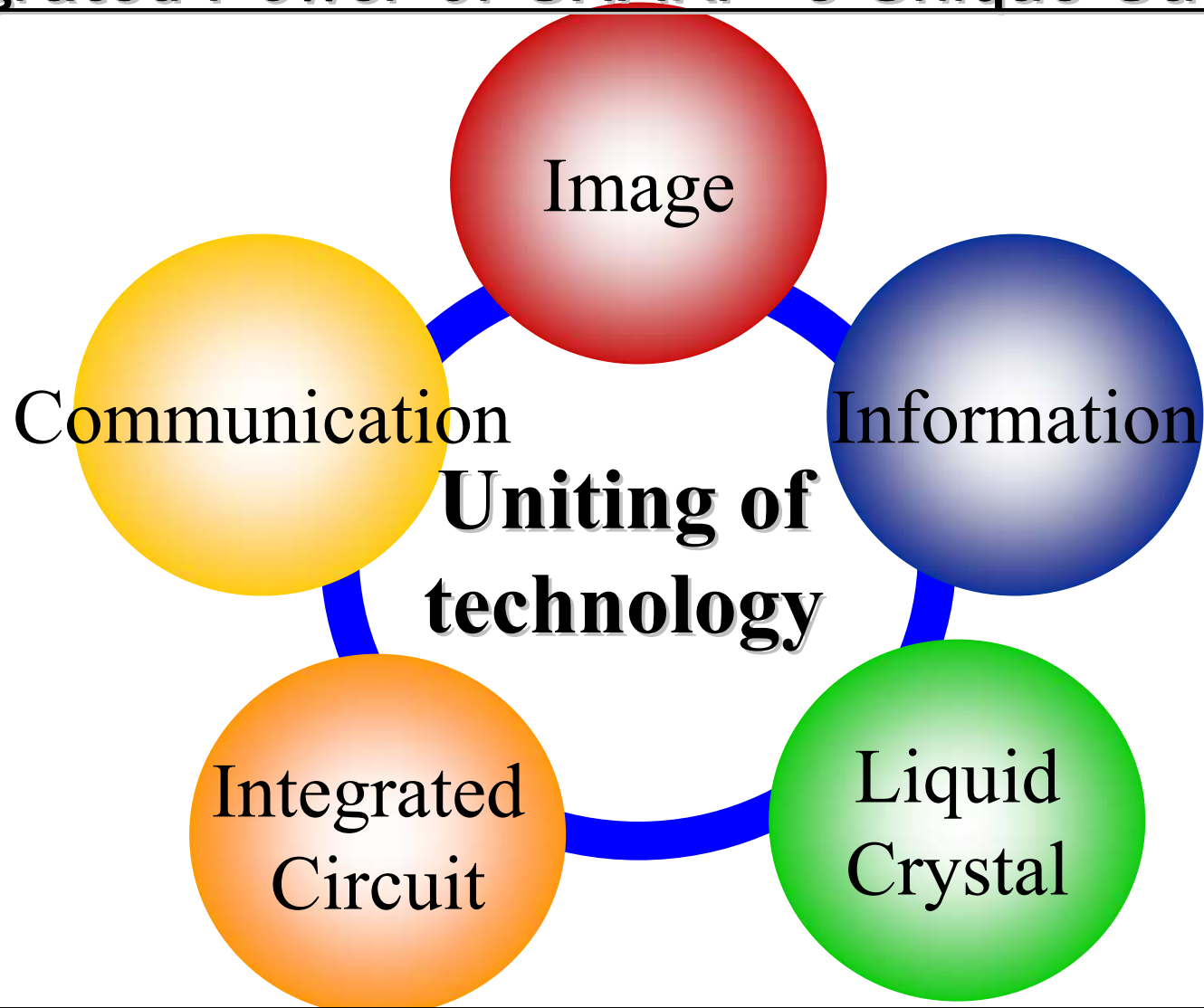
Unique device

Flash memories

Liquid Crystal

Optical device

Integrated Power of SHARP's Unique Strengths



The wall of the organization is exceeded, and the synergy effect is improved.

Make Use of Integrated Power of Individual Groups

Project Team for Quick Action

A team for product development, consisting of the best people for the project from different groups/departments. The team's mission is to commercialize SHARP's original products based on the company's unique technologies, as soon as possible.

○Merits in the business process:

- (1) It enables selective use of various resources such as human resources and budget (cost of head office) to focus on key projects.
- (2) It promotes *concurrent* development of element technology, components, and products.

○Development period: Basically, about 1 year or 1 and a half years

○Assignment in the organization: Project team under the president's direct control

○Since this system started in 1977, the number of working teams has always been more than 10.

Each project member's ID card has a golden mark, which indicates the person is a member of a project team. The gold implies the color of the executive's ID mark.



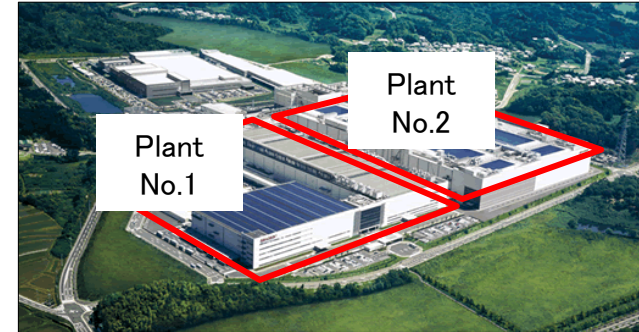
《Successful results in recent years》

- Large screen digital high-vision LCD TV
- Dual view LCD/ *VeilView* LCD
- *Blu-ray* Disc recorder for hard disk and DVD
- Photovoltaic power system for residential use
- Products with bacteria elimination ion
- Recycling technology to reuse waste plastics for materials of home electric appliances



Position of Domestic Device Factories

- ① High-value added core device -- creating products
- ② Super-short-term production for quick delivery = Reduction of total LT
- ③ Monozukuri know-how/human resource bases



Kameyama Plant
(Vertically integrated/
Large LCD + TV)



Katsuragi Plant
(Solar)



Mihara Plant
(Compound semiconductors
/ADF board)



Mie Plant
(Medium-and-small-sized
LCD)



Increase Competitiveness with state-of-the-art Monozukuri (Kameyama Plant No. 1 · No. 2)

TV Plant

Plant No. 2



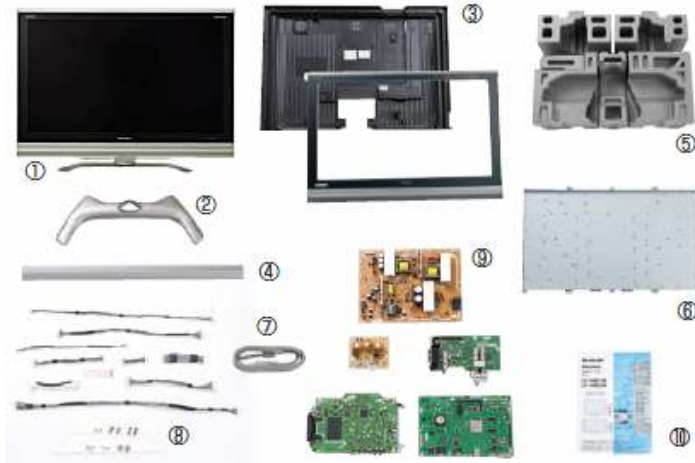
Plant No. 1

Operation time	January, 2004	August, 2006
Substrate size	Mother glass of 6 th generation (1,500mm × 1,800mm) ※ Can be cut into 8 panels of 32-inch type, or 6 panels of 37-inch type	<u>The world's largest mother glass of 8th generation (2,160mm × 2,460mm)</u> ※ Can be cut into 8 panels of 40-inch type, or 6 panels of 50-inch type
Production capacity	60,000 pieces/month	60,000 pieces/month (90,000 pieces a month are scheduled by the end of 2008)
Feature	<ul style="list-style-type: none"> • <u>The world's first complete production line</u> including all processes from production of panels to assembling of TV parts. • Put everything about unique technology and production know-how into <u>black box</u> • Use newly-developed <u>ink-jet color filter</u> (Plant No. 2) 	

Approach Case to Environmental Leading Company

◆ Super-green Factory “Kameyama”

◇ Full-scale implementation of environmentally conscious approaches, including designing for recycling and use of green materials



◇ Wastewater processing facilities that can recycle 100% of wastewater



◇ “Producing energy” in the factory producing “energy-saving” products



【See-through photovoltaic module】

◇ In-house power generators producing about one-third of total electricity used in the factory



【Cogeneration system】

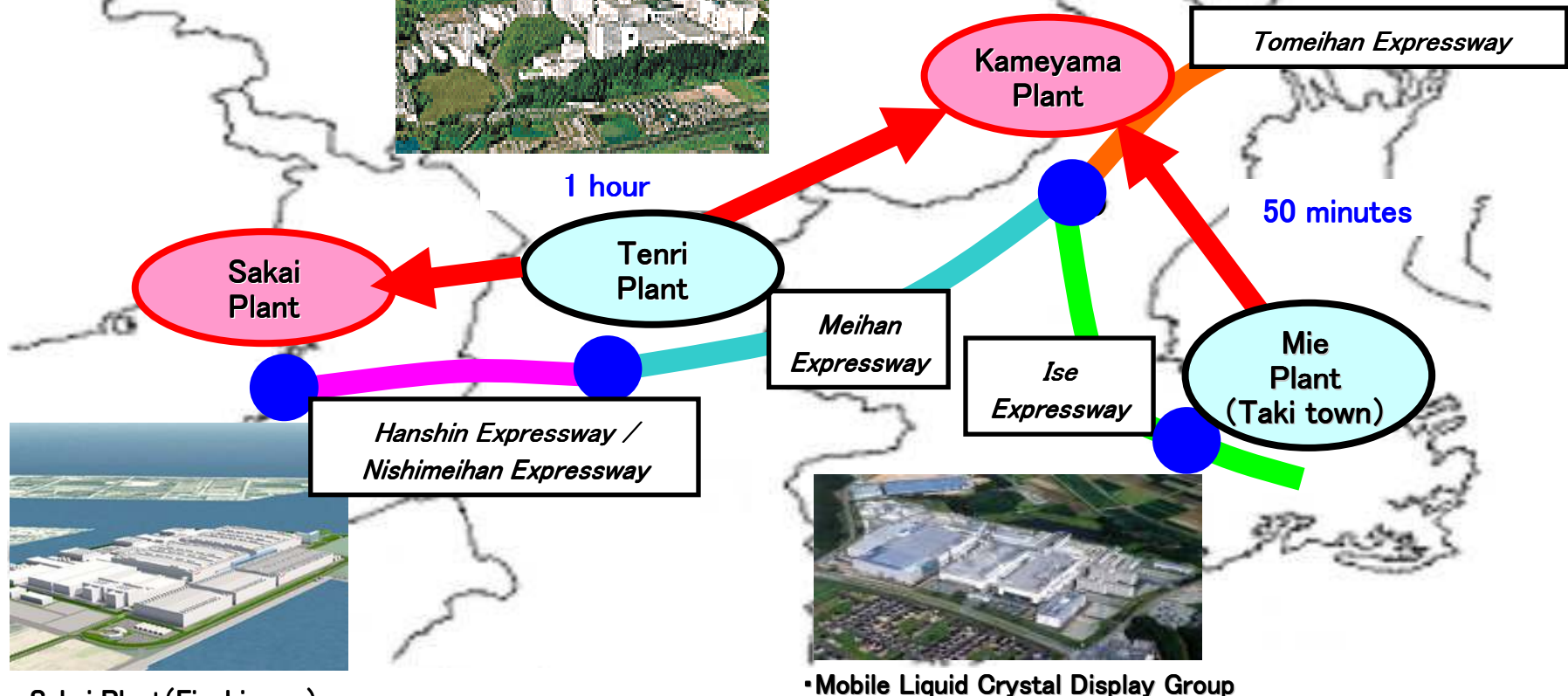
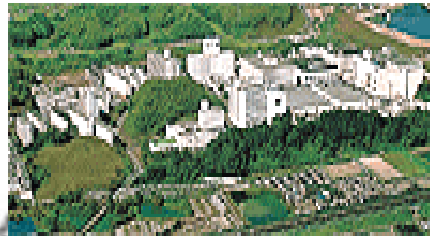
Combining LCD Monozukuri Technologies

Geographical convenience facilitates consolidation and development of state-of-the-art technologies

- AVC Liquid Crystal Display Group
- LCD Production Technology Development Group



- Production Technology Development Group
- Display Technology Development Group



•Mobile Liquid Crystal Display Group

“Sakai” Outline of Manufacturing Complex for the 21st Century (1)



New factory (Final image)



G10 generation mother glass



Under construction
(Many crane arms)

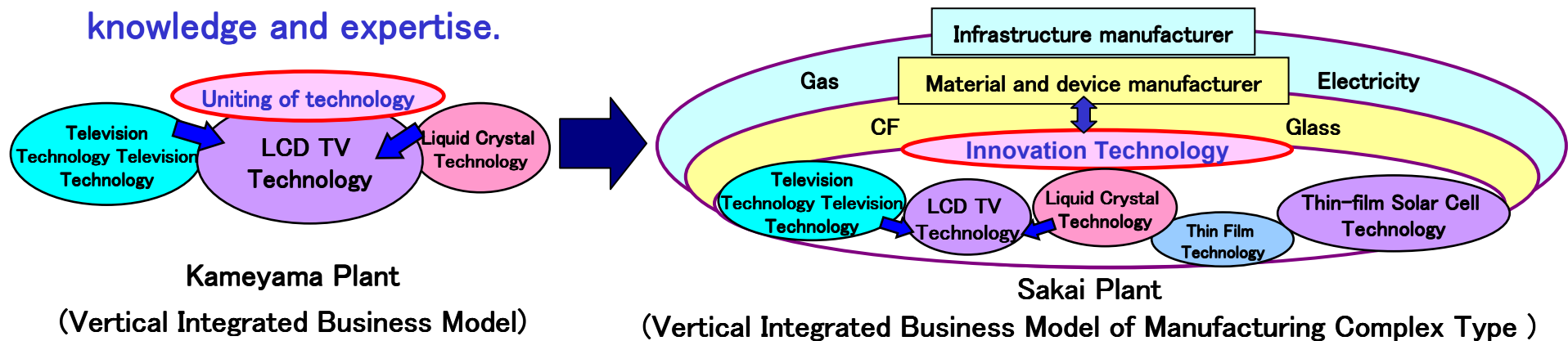
- **Location** : Sakaihama District of Sakai City, Osaka Prefecture
- **Site Area** : 1.27 million m²
- ✳️ **LCD Panel Plant**
 - **Amount of Investment** : Approx. 380 billion yen (including land acquisition costs)
 - **Start of Operations** : By March 2010
 - **Main Products** : LCD panels for large-screen LCD TVs in the 40-, 50- and 60-inch classes
 - **Glass Substrate Size** : 2,850 mm x 3,050 mm (10th generation)
 - **Input Capacity** : 72,000 substrates per month
(initial capacity at start of operations: 36,000 substrates per month)
- ✳️ **Solar Cell Plant**
 - **Start of Operations** : By March 2010
 - **Production Item** : Thin-film solar cells

“Sakai” Outline of Manufacturing Complex for the 21st Century (2)

① The vertically integrated business model created at the Kameyama Plant moves further upstream in the supply chain and achieves a vertically integrated model that transcends company borders.

✓ Sharp is inviting relevant infrastructure and material and equipment manufacturers to construct their plants on the site. ( THE KANSAI ELECTRIC POWER CO., INC. , CORNING , DNP , TOPPAN etc)

✓ Sharp engineers to work closely with their counterparts in leading material and equipment manufacturers, thus giving rise to new technical innovations through shared knowledge and expertise.



② Establishing of state-of-the-art liquid crystal panel factory and thin-film solar cell factory as an annex using horizontal progressing thin film technology

Summary

<For Monozukuri> :

It is important to share excellent skills and expertise, and combine/further enhance them together.

<To win the global competition> :

We must promote selective use/concentration of management resources, and enhance competitiveness by maximizing our technological strengths and Monozukuri power.

END