Medium-term Business Plan
“Project 2020＋”
Progress in 2016; Tasks and Strategies for 2017

December 13, 2016

SHOWA DENKO K.K.

Hideo Ichikawa, President & CEO

Kohei Morikawa, Managing Corporate Officer & CTO

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I. ″Project 2020＋“ Progress in 2016

i. Cost reduction and financial results

ii. Measures taken for each business

iii. M&A, R&D

II. ″Project 2020＋“ Tasks and strategies for 2017

i. Business environment forecast

ii. Image of 2017 results, cost reduction, capital investment, and financial strategy

iii. Message from new CEO

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Revised performance forecast for 2016

(Billions of yen)

	2015 actual results	**2016 * forecast (August)**	**2016 ** revised forecast**	Increase from Aug. forecast	2016 “Project 2020＋”
Net sales	781.0	**670.0**	**670.0**	0.0	810.0
Operating income	33.7	**30.0**	**36.0**	+6.0	36.0
Ordinary income	32.2	**23.0**	**30.0**	+7.0	—
Profit attributable to owners of parent	1.0	**9.0**	**12.0**	+3.0	20.0

*Announced on August 9, 2016

**Announced on December 13, 2016

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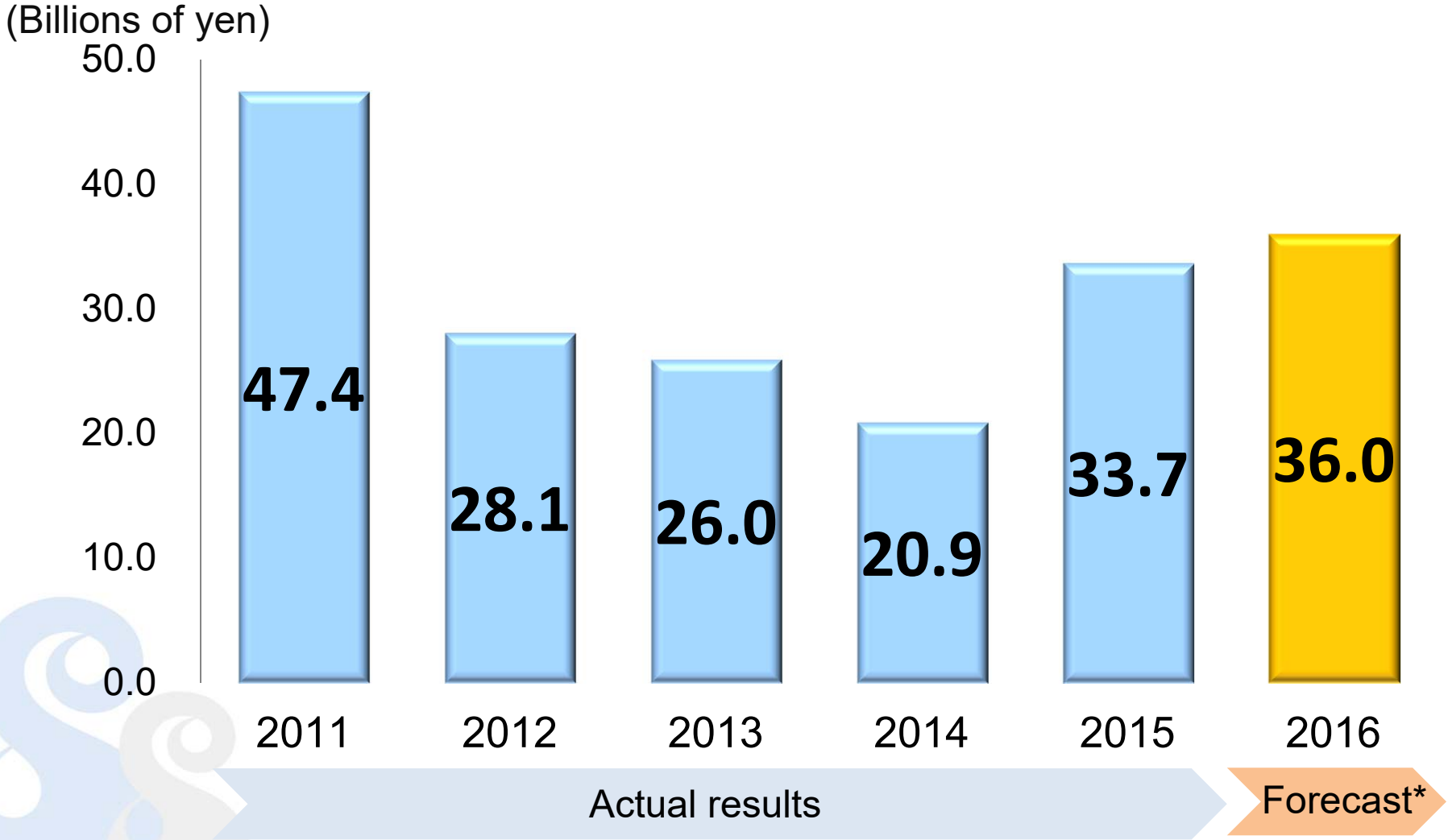
Operating income (2011-2016)

Carried out structural reforms ⇒ 2016 operating income will be ¥36 billion



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Cost reduction results

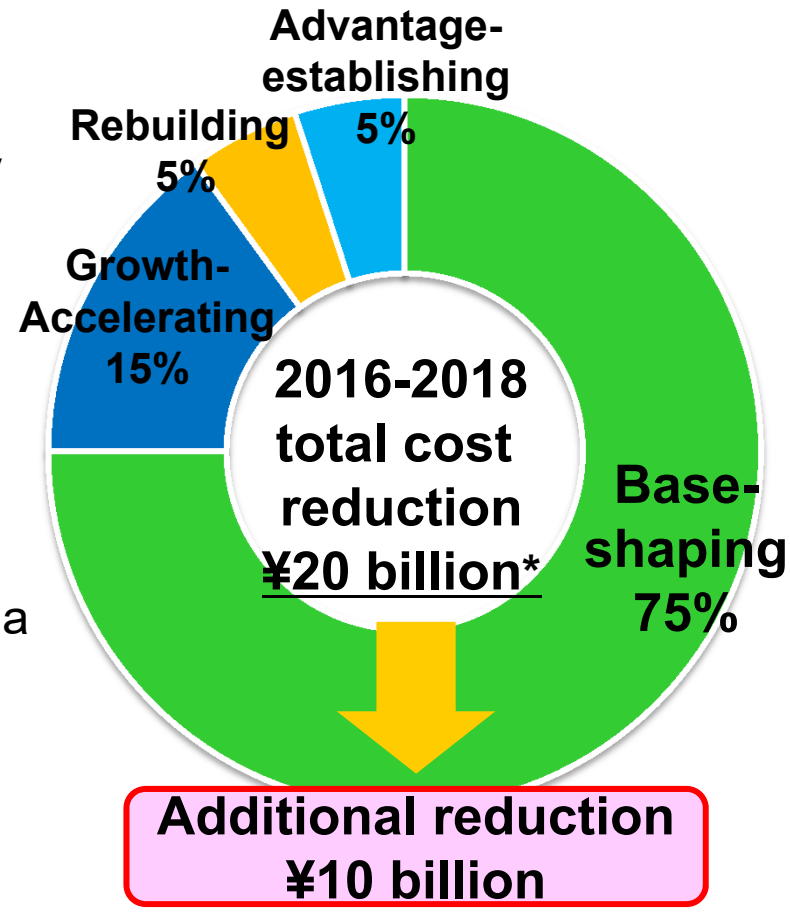
2016 revised target: ¥13 billion. Added ¥6 billion mainly in Base-shaping

2016-2018 total: ¥20 billion ⇒ ¥30 billion

2016 cost reduction measures

Base-shaping

- HD media: Streamlined production capacity (30→20M/month), Integrated operation of media section and substrate section
- Graphite electrodes: Streamlined Omachi's capacity, Reduced fuel & material cost
- Petrochemicals: Improved unit energy consumption
- Basic chemicals: Increased ratio of used plastics as raw material to produce ammonia
- Aluminum: Reduced variable costs. Improved unit raw material consumption



*Announced on Dec. 11, 2015

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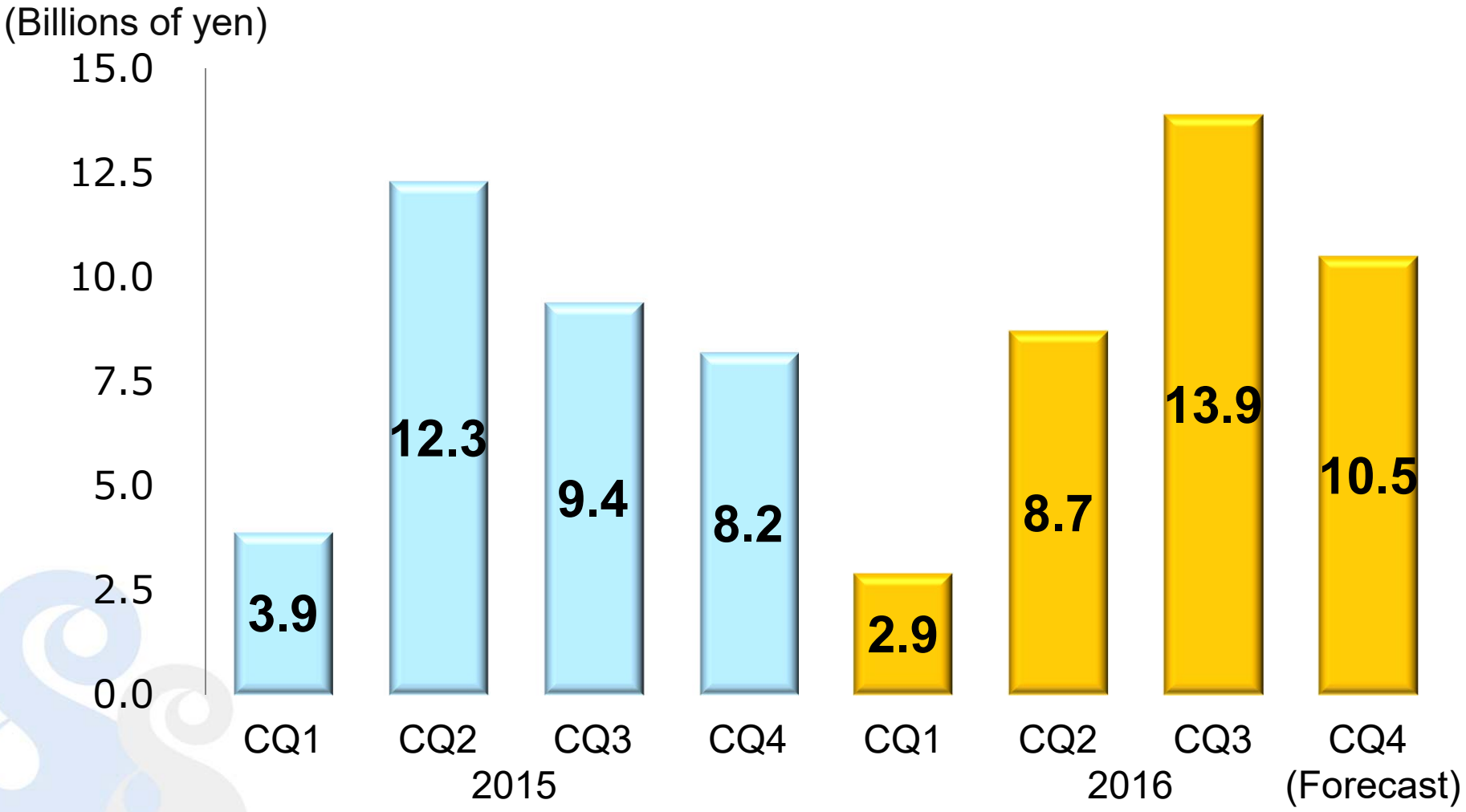
Quarterly operating income (2015-2016)

Effect of cost reduction efforts became apparent in and after 3Q 2016
→We expect increase in operating income



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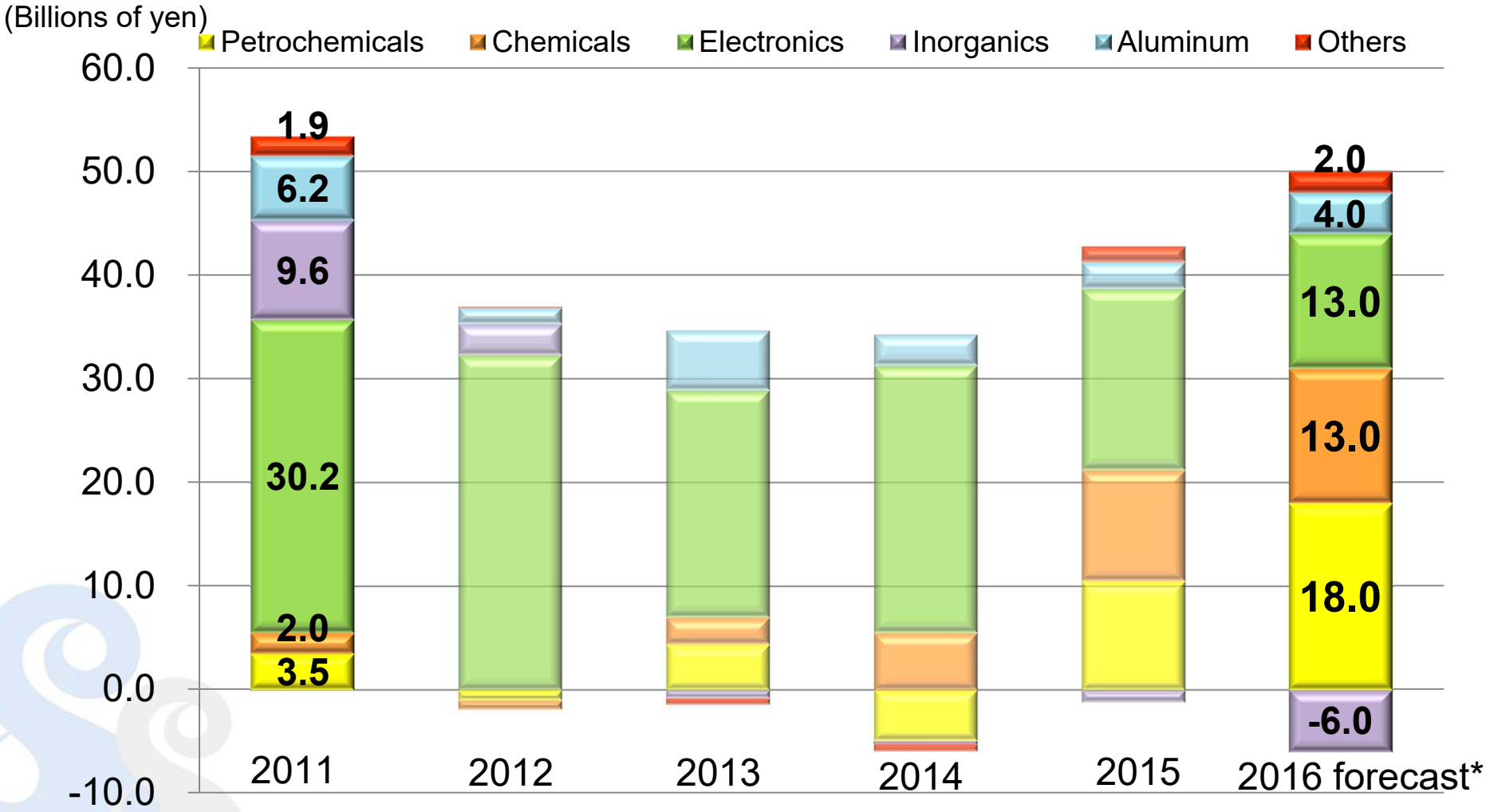
Operating income by segment (2011-2016)

Earnings structure is improved to be well balanced



*Announced on December 13, 2016. **The total does not match consolidated operating income since Adjustment is not included.

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“Project 2020＋” Overall strategy

Strengthen the Group strategically to achieve sustainable growth

- **Push up profitability of existing businesses through renewal of business models**
  - ✓ Maximize operating income and cash flows
- **Expansion and creation of individualized businesses**
  - ✓ Expansion of the scales of individualized businesses
  - ✓ Early manifestation of research results
  - ✓ Make the best use of M&A and partnership with other companies
  - ✓ Find growth opportunities overseas
- **R&D strategy**
  - ✓ Concentrate management resources on R&D to strengthen existing businesses and their peripheral fields
  - ✓ Create next-generation businesses/themes by making best use of open innovation and M&A

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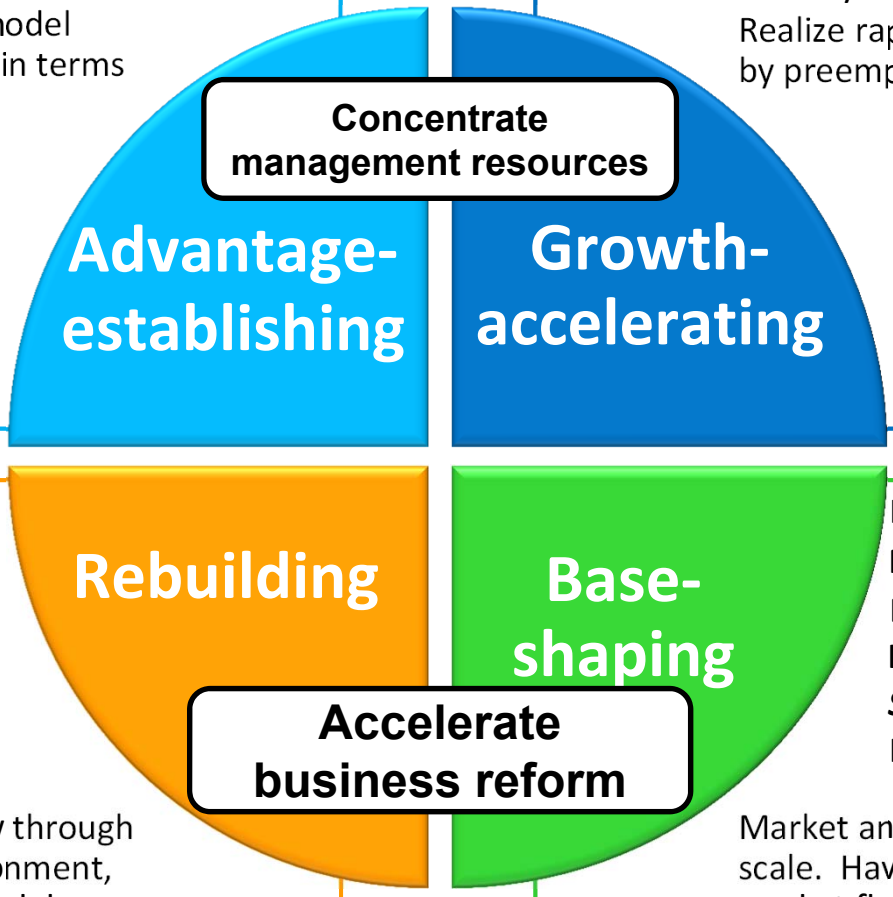
Strategy for each business portfolio

Accelerate improvement of business portfolios



To cope with prospective market growth, establish business model with competitive advantage in terms of business and technical development.

LIB materials

SiC epi-wafer for power devices

Actively take strategic measures. Realize rapid expansion of business by preempting market growth.

High-purity gases for electronics

Functional chemicals

Aluminum cans

Rare earths

Ceramics

Aluminum specialty components

Increase profit and cash flow through rebuilding of business environment, profitability and business model.

HD Graphite electrodes

Petrochemicals

Basic chemicals

Industrial gases

***Shotic*™**

High-purity aluminum foil

Market and business have certain scale. Have more power to resist market fluctuation, and make stable profit and cash flow.

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Measures taken in 2016

Additional measures were taken in order to increase earning power of the Group

- **Base-shaping: Executed structural reforms**
  - ✓ HD media: Streamlined production capacity. Thorough cost reduction
  - ✓ GE: Self-help cost reduction effort. Replaced hydropower plants
    Decided to acquire SGL GE
  - ✓ Petrochemicals: Consolidated polypropylene business
  - ✓ Shotic™: Decided to integrate bases in Malaysia and Singapore
- **Growth-accelerating: Deployed globally, centering on Asia**
  - ✓ High-purity gases for electronics: Capital investment at home and abroad
  - ✓ Functional chemicals: Expanded business for infrastructure and cars
  - ✓ Aluminum cans: Have been deeply cultivating Vietnamese market
- **Advantage-establishing: Expanded capacities to meet market growth**
  - ✓ LIB materials: Expanded production capacity
  - ✓ SiC epitaxial wafer for power devices: Started mass production of 6 inch wafers and high-quality wafers

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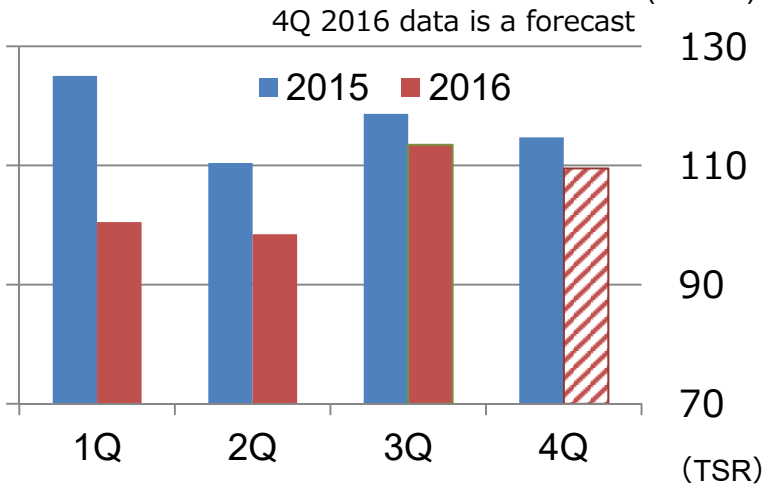
HD media (1) Base-shaping

Demand for HDD stabilized, Shipment for data center use increased

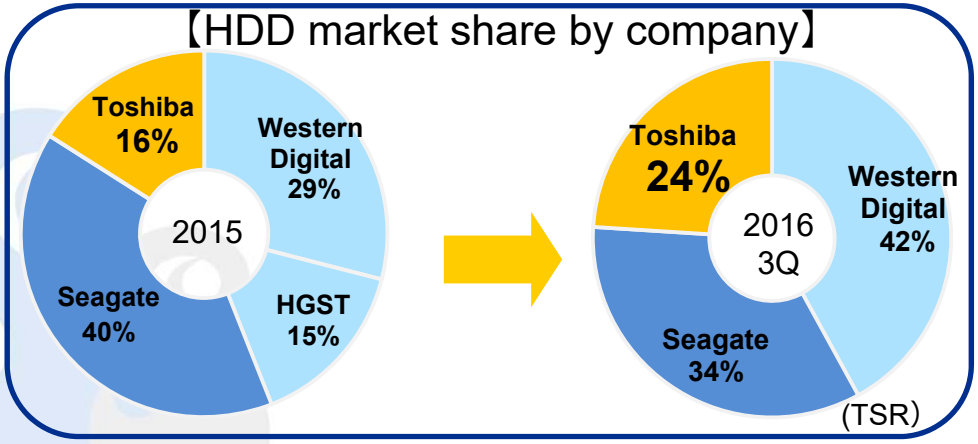
In 2H, HDD market is stronger than August forecast

- TAM of HDD in 2H 2016: up12% from 1H
  - ✓ Sharp decline in PC shipment was stemmed
  - ✓ Demand for external HDDs and game machines increased
  - ✓ Market for data center use is rapidly expanding ⇒Demand for HDDs for near-line servers in 2016 will increase 15% from 2015
- Changes in HDD makers' market shares ⇒Toshiba increased its share

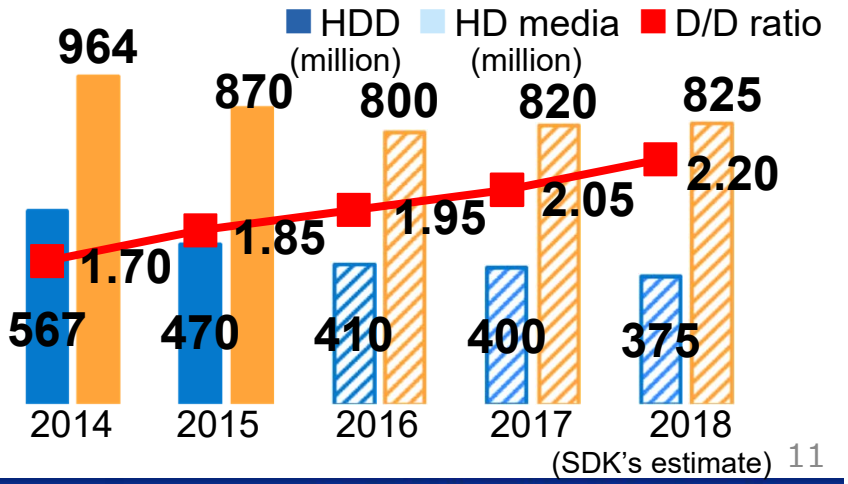
【Quarterly shipment of HDDs】



【HDD market share by company】



【Shipment of HDD/HD media】



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HD media (2) Base-shaping

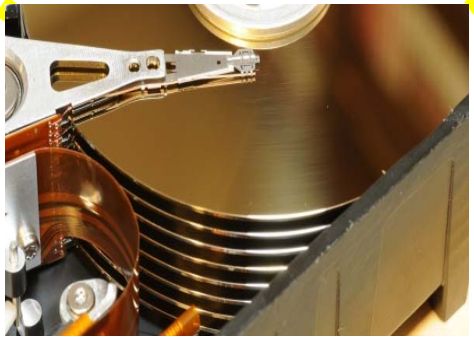
Streamlined production capacity, Pursue “Best-in-Class”

- Executed major cost reduction. 2016: Reduced ¥7 billion
  - ✓ Streamlined production capacity (30M⇒20M/month)
  - ✓ Reduced clean room floor space and concentrated production into highly efficient lines
  - ✓ Reduced work force and improved efficiency of R&D
- Integration of operation of substrate section and media section completed in all bases
- Developed leading-edge media for near-line HDDs→Increased ratio of aluminum media
- Developed leading-edge media
  - ✓ 2.5-inch media 1TB/platter
  - ✓ 3.5-inch media 1.5TB/platter

Data center



Near-line HDD



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Graphite electrodes (1) Base-shaping

We maintain top quality in the world and technical advantage, and pursue cost competitiveness

- Optimized production system
  - ✓ Omachi: 60kt/year→Reduced to 42kt/year
    Replaced hydropower plants
  - →Omachi and US base will operate at full capacity
- Executed thorough cost reduction to acquire cost competitiveness
  - ✓ In “Project 2020+”, cost reduction target is ¥6 billion (2015 vs 2018)
    ⇒We added cost reduction of ¥2 billion
- Additional measure: Decided to acquire SGL GE*
  (Acquisition is planned to be completed by mid 2017)



*SDK′s acquisition of the shares of SGL GE is subject to the approval of the relevant authorities under the applicable competition laws of the relevant countries and other preconditions.

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Graphite electrodes (2) Base-shaping

Graphite electrodes: We will pursue synergy effect of integrated operation of production bases in Japan, US and Europe

【Production bases of SDK and SGL GE】



We will realize a leading graphite electrode company with the top scale, quality and cost competitiveness in the world

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Graphite electrodes (3) Base-shaping

We will integrate graphite electrode business assets of SDK and SGL GE, and realize synergy effect

- Measures to realize synergy effect after acquisition of SGL GE
  - ✓ Improve cost competitiveness by adopting best practices
  - ✓ Reduce fixed costs through integration of administrative sections
  - ✓ Establish optimum global supply chain
  - ✓ Establish powerful brand with superior product quality through integration of technologies
  - ✓ Optimize the whole process of graphite electrode production, from procurement of materials to shipment of graphite electrodes as final products

Cost reduction in SDK's GE business: ¥8 billion (2015 vs 2018)

＋

Cost reduction through integration of GE businesses of SDK and SGL: ¥6 billion

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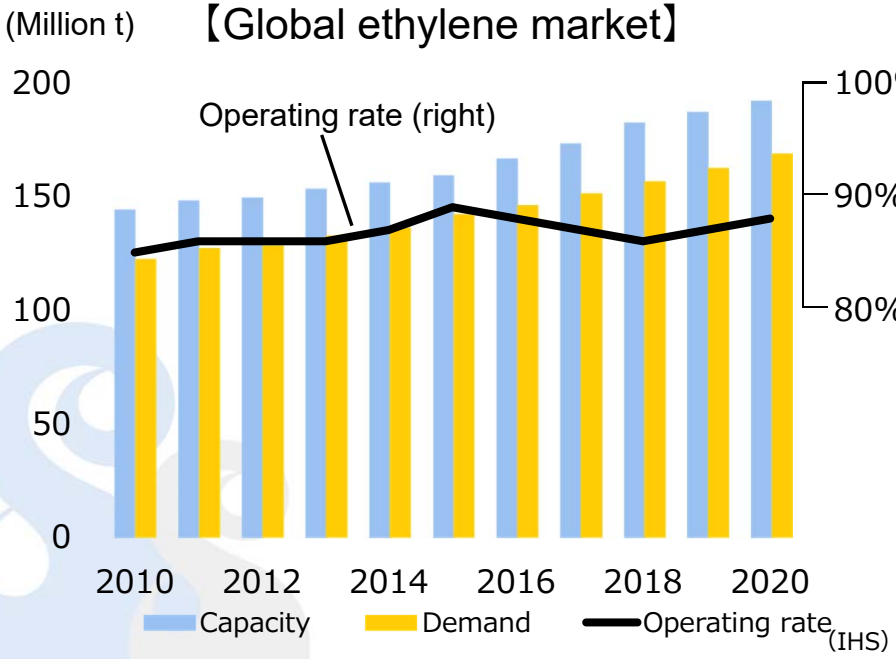
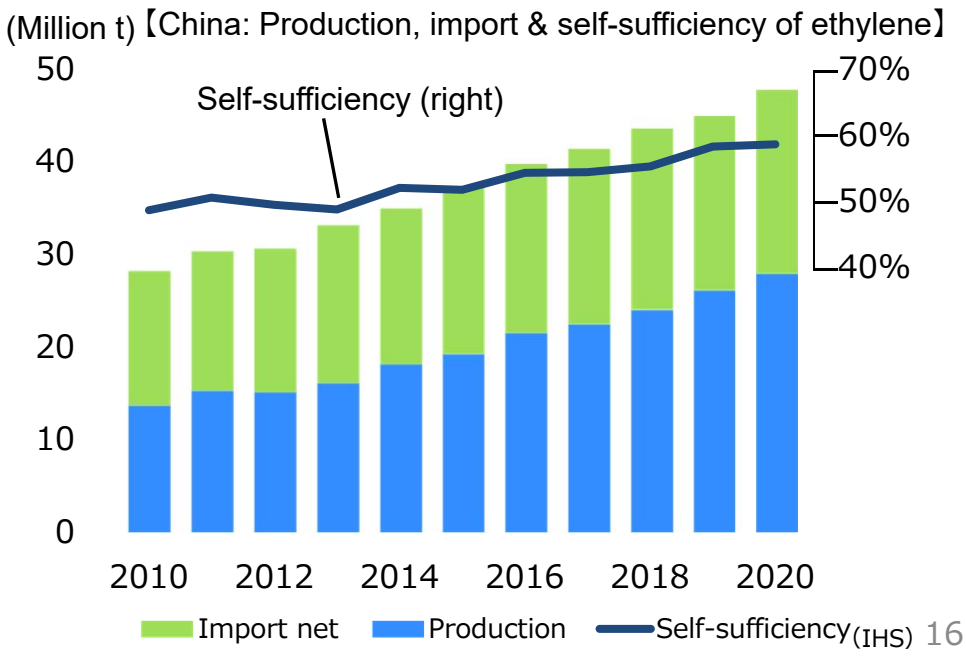
Petrochemicals

Base-shaping

Continued safe and stable operation→Stable profit

- Tight supply-demand situation in ethylene market continues
- Through improvement in productivity with advanced catalysts, organic chemicals business achieved stable profit
- Reinforced derivatives business + Consolidated polypropylene business
- Promoted intraregional cooperation with other companies (oil refining companies, iron manufacturing companies)





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High-purity gases for electronics

Growth-accelerating

Accelerated business expansion in global scale

- Establishing global SCM system
- Started sales in the US
  Decided to establish sales bases and warehouses in the US
- Expanding production capacity
  - ✓ Expanded BCl_3, Cl_2 production
  - ✓ Considering M&A
- Developed super-high-purity solvent



High purity gases for electronics

Product	Use	2015	2016	2017
NH_3	Film forming	Expansion (China, Taiwan)	Increasing demand for 3D NAND	
N_2O	Film forming	Expansion (Japan) New (Korea)		
HBr	Etching	Expansion (Japan)	Demand shifts from film forming gas⇒ etching gas	
Cl_2	Etching	Expansion (Japan) New (Taiwan)	Expansion (Japan)	
Fluorine-based gas	Etching		New (Japan, Singapore) Expansion (Japan)	
Infra-structure		Expansion (Taiwan, Singapore)	New (Japan, US) Expansion (Korea)	

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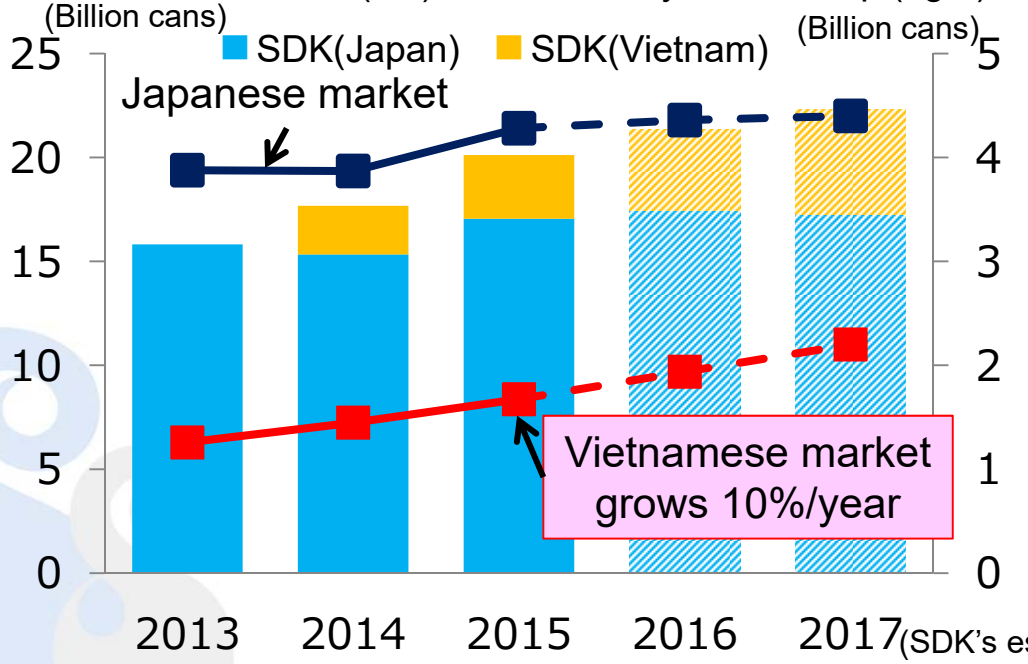
Aluminum cans

Growth-accelerating

Stable domestic market＋Growing Vietnamese market
We are taking new measures in both markets

- Vietnam: Started to mass produce sleek cans, Considering re-expansion of can and can end production lines
- Japan: Developed printing technology for small-lot multiple-design can labels with photogravure quality

【Aluminum can market (left)・Production by SDK Group (right)】





Sleek cans



Sample cans with ink-jet printing

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Functional chemicals

Growth-accelerating

Strengthened businesses in growing fields and promoted business structure reform

- Strengthened businesses in growing fields
  - ✓ Established the Group's second BMC production base in China
  - ✓ Started OEM production for manufacturers in ASEAN region
  - ✓ Developed new product for infrastructure (non-styrene vinylester resin aqueous emulsion)
  - ✓ Cosmetic materials: Formed business alliance with a leading specialty chemicals distributor in Europe
- Promoted business structure reform
  - ✓ Decided to terminate production and sale of Bionolle™

【BMC products and SDK Group's bases】



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Lithium ion battery (LIB) materials

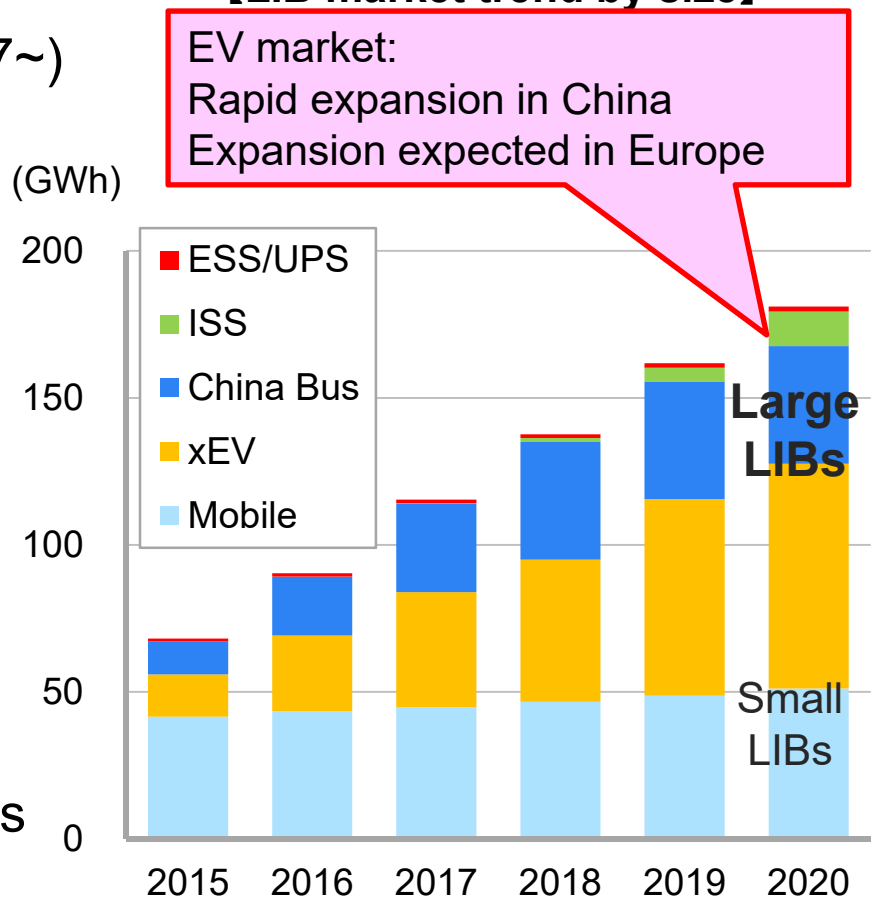
Advantage-establishing

SHOWA DENKO

We are increasing market shares in materials for large-capacity high-quality LIBs, and accelerating commercialization of R&D results

- Strengthening organization
  Advanced Battery Materials Division ('17~)
- Expanding capacity, R&D
  - ✓ SCMG™(anode material):
    Expanded Omachi (→1500t/y)
    Started outsourcing production in China
    Developing Si graphite-electrode composite anode materials
  - ✓ VGCF™ (conductivity enhancer):
    Expanding Kawasaki (→300t/y in 2017)
  - ✓ SPALF™ (aluminum laminate film):
    Improving productivity
    Developing thinner film ahead of markets
  - ✓ SDX™ (carbon-coated Al foil):
    Steadily outsource production in China

【LIB market trend by size】



(Research by B3 Corp., SDK's estimate)

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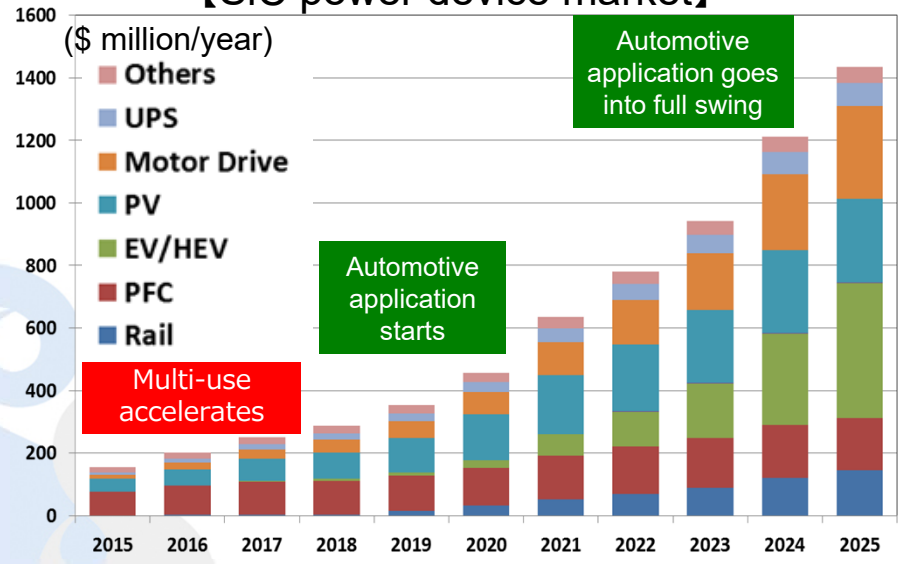
SiC epitaxial wafer for power devices

Advantage-establishing

We are accelerating supply of high-grade SiC epitaxial wafer to contribute to practical implementation of all SiC power devices

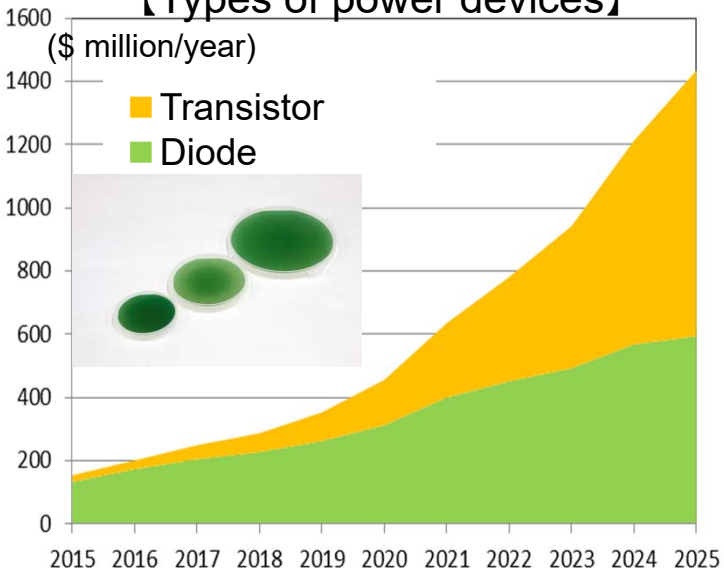
- Market:
  - ✓ Diode (SBD): Market rapidly expands. Applied to Railway cars, EV charger, etc.
  - ✓ Transistor (MOSFET): Improvement in reliability of epi-wafer accelerates practical implementation. Adoption of 6-inch wafer rapidly expands.
- SDK: Establishing overwhelming quality superiority
  ⇒Our market share continues to expand

【SiC power device market】



(Edited by SDK, based on “Power SiC 2016” by Yole Développement)

【Types of power devices】



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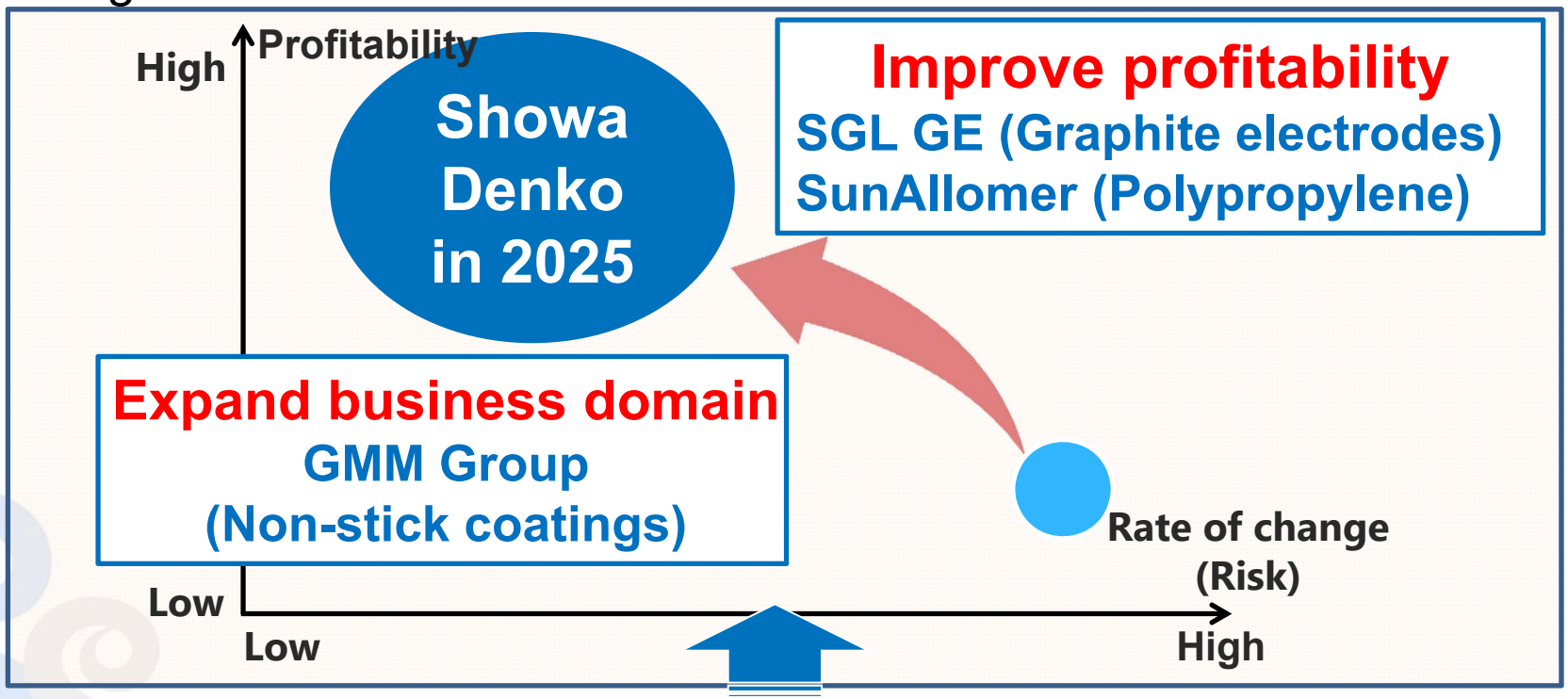
Strengthening business through M&A

We reform business portfolio

- Improve profitability of existing businesses
- Expand business domain: Explore new business opportunities in 5 target market domains



Establish business platform that maximizes synergy faster than ever

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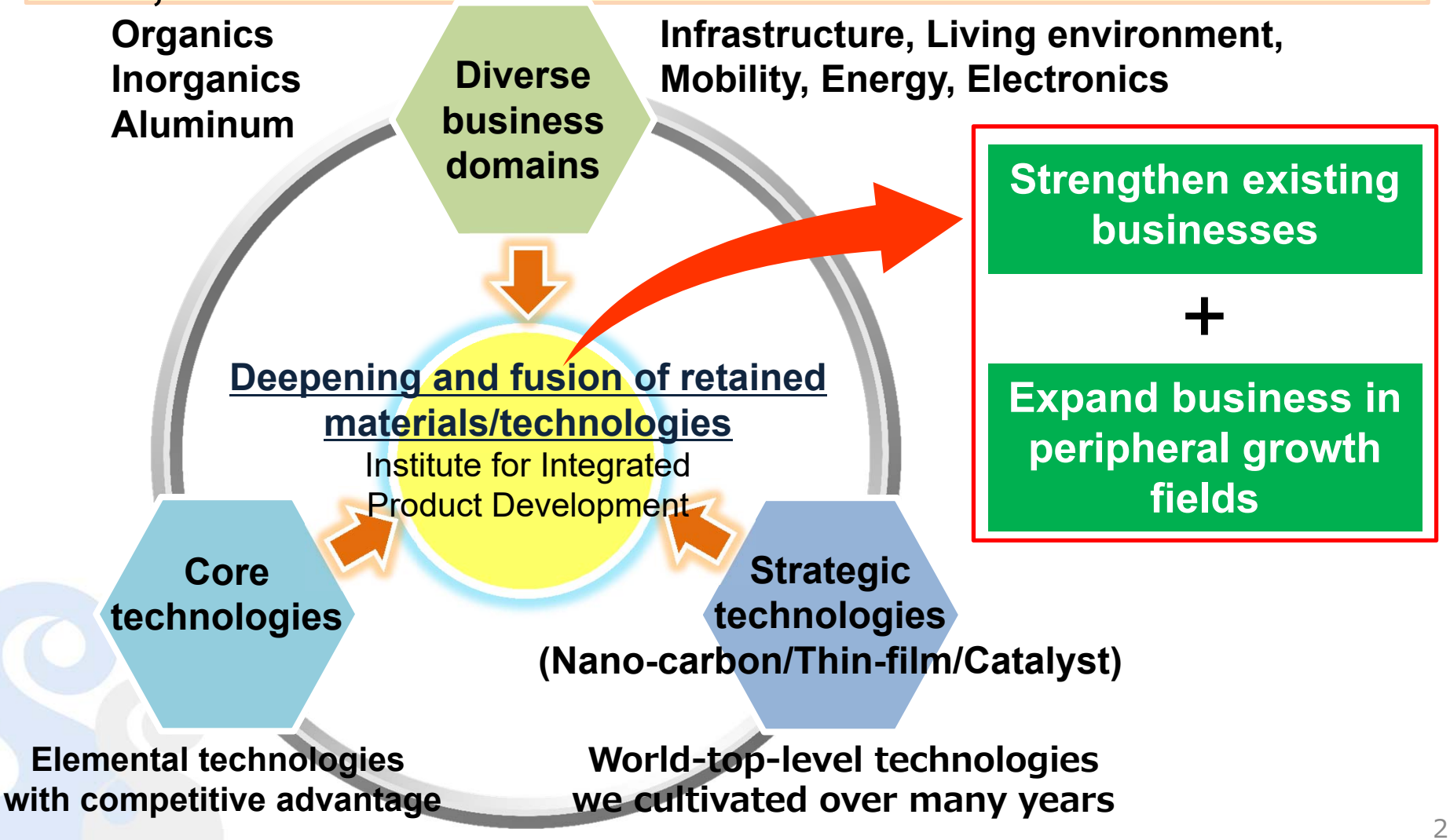
R&D results (1)

Fuse various needs into cross-divisional themes, deepen them, and offer new value



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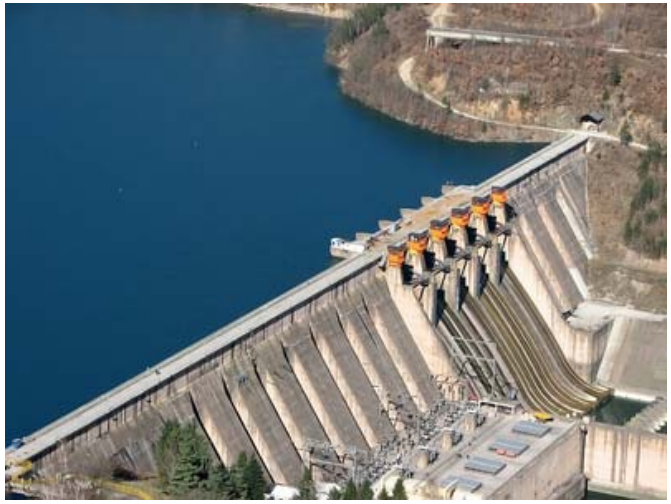
R&D results (2) (Strengthening existing business)

Progress in development of infrastructure repairing materials
→Realization of profit is expected in 2018

- Technical requirements for repairing materials
  Workability and durability in cold area (low-temperature curing) and on wet surface (wet curing),
  Short construction period, Emergency repair, Easy application,
  Contribution to reduction of total construction cost
  ⇒We market our vinylester resin to the field of public works







Images of applications: Dam, road, bridge for the Shinkansen, etc.

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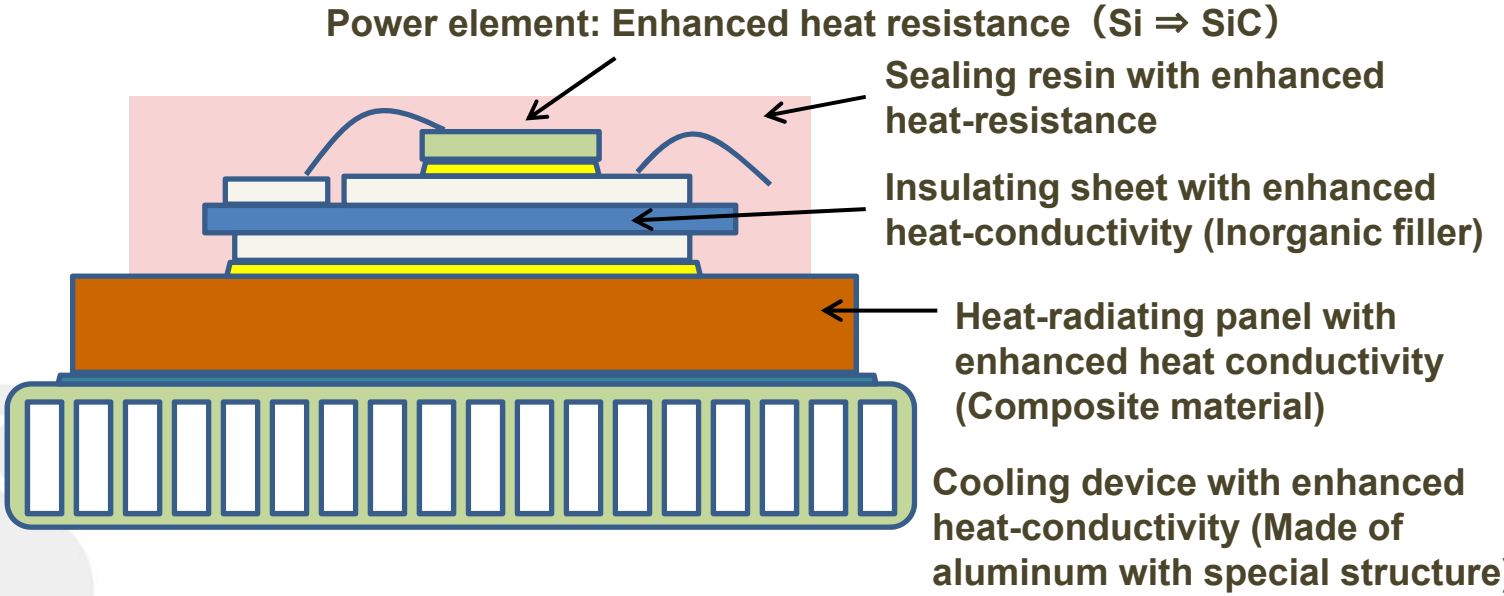
R&D results (3) (Cultivating peripheral growth fields)

We not only develop materials but also offer solutions

- We improve performance of materials in pursuit of better heat-radiating solution
- We offer solutions utilizing multi materials including aluminum, resins, and ceramics
- We develop high-performance heat-radiator
  →We successfully developed heat radiation structure for power devices in a joint project with Osaka University



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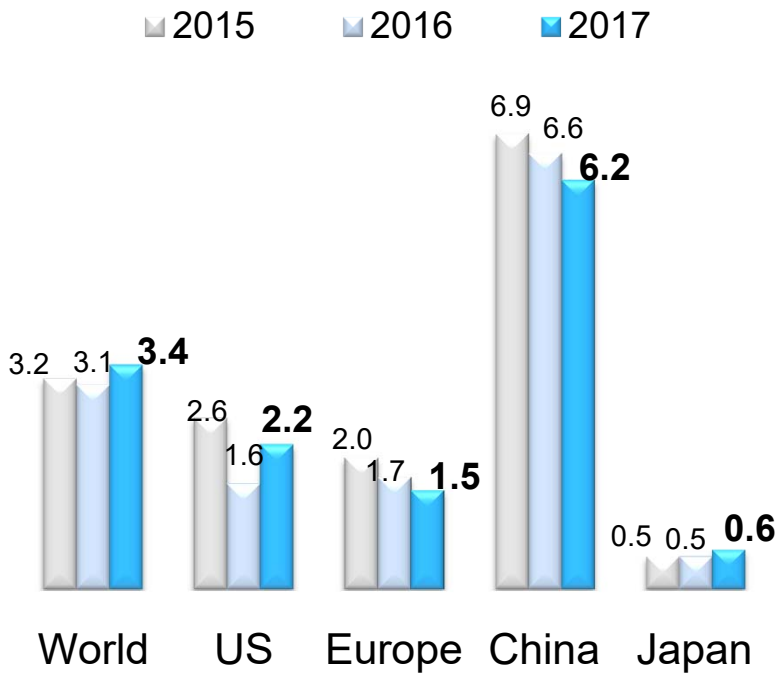
Global business environment

Political uncertainty increases → into the “VUCA” world

- Japan: Mild growth
  - Corporations cultivate markets for high-value-added goods and services
- US: Promotes stimulative measures
  - Reduction in corporate tax rate
  - Protects and strengthens domestic industries
- Europe: Mild growth
  - Schedule, conditions and impact of Brexit will be gradually clarified
  - Risk of political turmoil
- China: Stable growth, 5-6%/year
  - Expansion of EV & PHEV markets
- ASEAN: Returns to growth of 5%/year

【Real GDP growth rate】



(IMF: World Economic Outlook, October 2016)

- Exchange rate: ¥100/$
- Crude-oil prices: $40～60/bbl.

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Tasks and strategies for 2017

Accelerate overseas business expansion (in Asia, Europe, and North America)

☐ Achieve further progress in Growth-accelerating and Advantage-establishing businesses

- ✓ High purity gases for electronics:
  Establish supply system to cope with expansion of semiconductor and flat display markets
  Supply individualized products that take advantage of our strong points
  Expand business through “discontinuous” measures and enter the North American market
- ✓ Functional chemicals: Expand business in China, ASEAN and India
- ✓ Aluminum cans: Strengthen business in the Vietnamese market
- ✓ LIB materials: Expand business by utilizing stepped-up facilities
- ✓ SiC epitaxial wafer for power devices: Re-expand production capacity

☐ Early integration of graphite electrode business with SGL GE

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Image of 2017 results and cost reduction

(Billions of yen)	2016 revised forecast	2017 image*	2017 Project 2020＋
Net sales	**670**	**700**	850
Operating income	**36**	**37**	50
Profit attributable to owners of parent	**12**	**19**	-
Exchange rate (¥/$)	¥108/$	¥100/$	¥115/$
Japan-made naphtha (¥/kl)	¥32,600/kl	¥35,300/kl	52,000/kl

*Effect of acquisition of SGL GE is not taken into account

☐ Cost reduction plan

Cost reduction of ¥10 billion in 2017, centering on Base-shaping businesses

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2017 capital investment plan

’16-’18 capital investment: ¥130 billion→ Careful program selection

Invest aggressively to strengthen Growth-accelerating businesses

- Major capital investments in Growth-accelerating and Advantage-establishing businesses

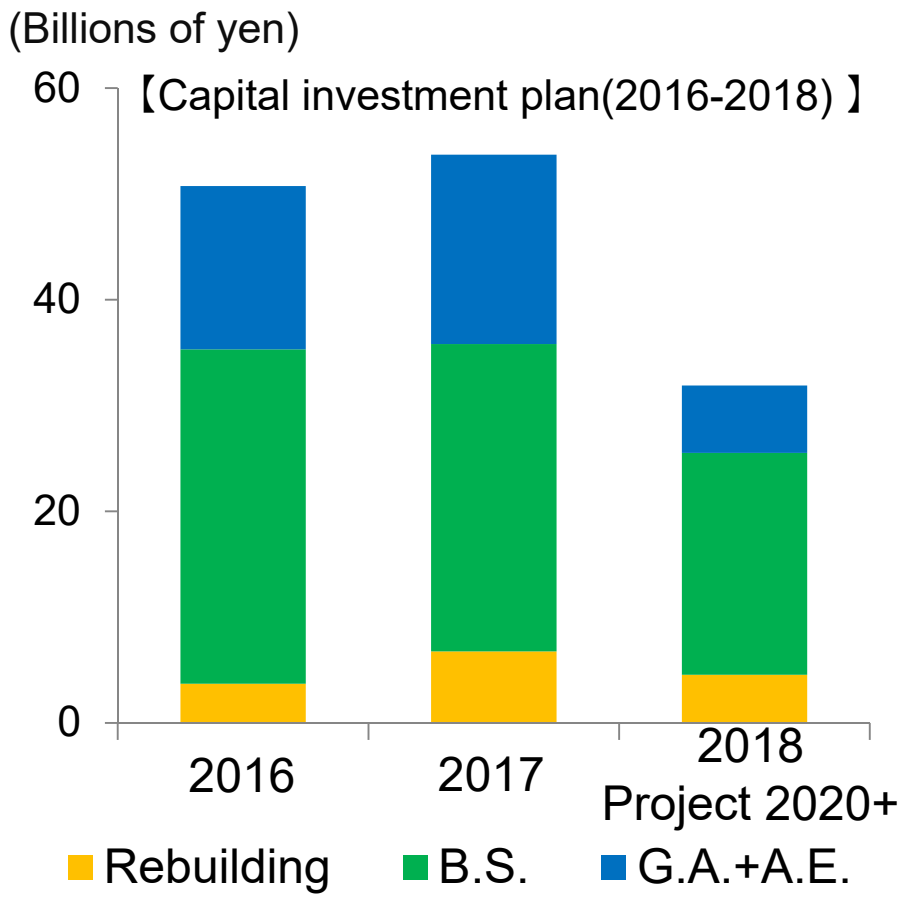
✓ High-purity gases for electronics:
- Expand etching gas production capacity
- Newly establish super-high-purity solvent plant

✓ Functional chemicals:
Considering establishment of new plants in ASEAN and India

✓ Aluminum cans:
Re-expand facilities in Vietnam

✓ LIB materials: Expand VGCF™ plants

✓ SiC epitaxial wafer for power devices:
Expand production capacity



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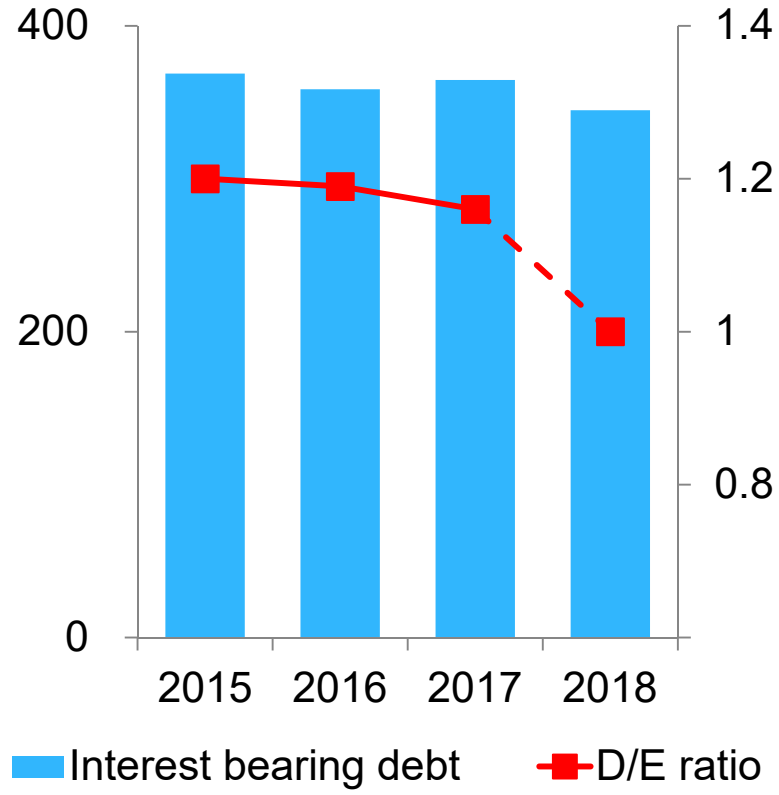
2017 financial strategy

To achieve D/E ratio of 1.0, promote efficient use of assets

- Cover expenditure resulting from acquisition of SGL GE by efficient use of assets, etc.
  - ✓ Reduce inventory through management of cash conversion cycle
  - ✓ Careful selection of capital investment through management of return on invested capital

  ⇒Achieve D/E ratio of 1.0 by the end of 2018
- Promote constructive dialogue with shareholders

【Interest bearing debt and D/E ratio】



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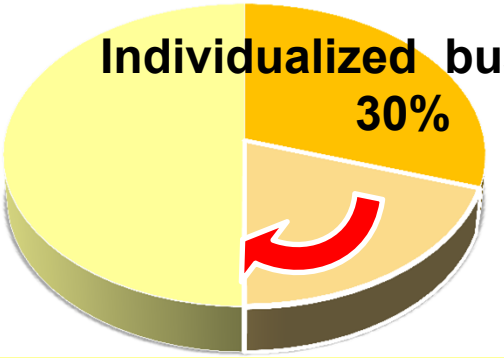
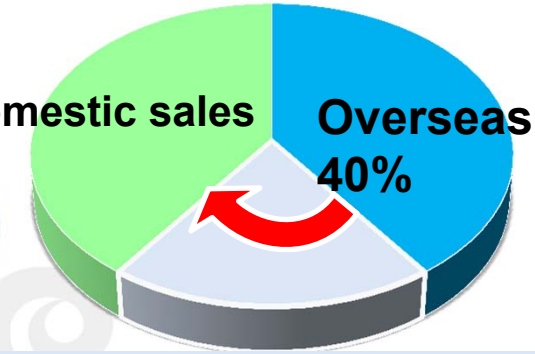
Target image of the Showa Denko Group in 2025

We aim to have business structure with less rate of change in profitability through expansion of individualized businesses and profitability improvement

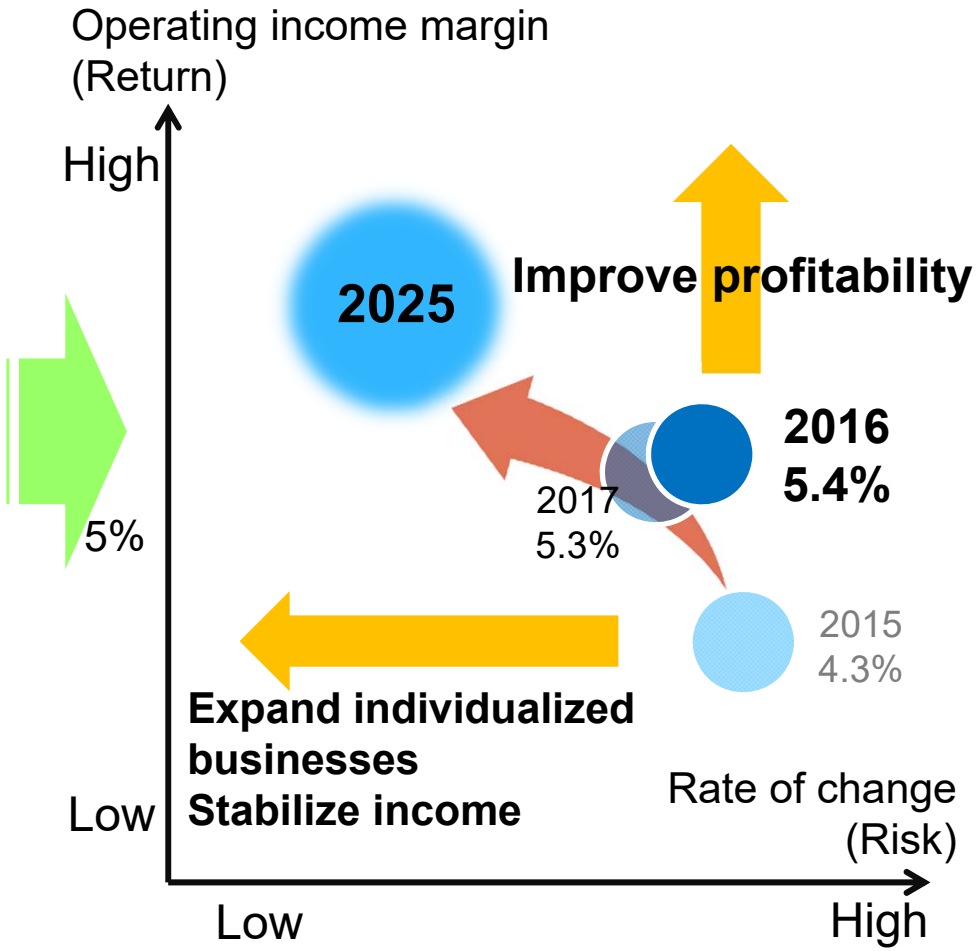


Aiming to make individualized businesses* occupy 50% of net sales

*Businesses with sustainable high-level profitability and stability



Aiming to make overseas sales occupy 60% of net sales



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Social contribution of the Showa Denko Group

We offer high value-adding “products × technology × services” to 5 market domains

Intensive accumulation and dispatch of information

Mitigating environmental burden
Resource recycling



Infra-structure

Electronics



Living environment



Mobility





Energy

Safety/Security
Industrialization of agriculture

Improving resource efficiency
Utilizing alternative energy
Efficient use of electricity
Diversifying energy sources

Safety/Security
Enhanced durability
Emission control
Improving fuel efficiency

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Message from new CEO

SHOWA DENKO K.K.

＋Let’s have Steady Desire for Knowledge, and

＋Let’s start the game with Speedy Daring Kickoff!

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Toward 2020
and beyond,
Let each of us add
new value.



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Notes

Performance forecast and other statements pertaining to the future as contained in this presentation are based on the information available as of today and assumptions as of today regarding risk factors that could affect our future performance. We will announce our consolidated performance forecast for 2017 when we disclose 2016 consolidated financial results.

Actual results may differ materially from the forecast due to a variety of risk factors, including, but not limited to, the economic conditions, costs of naphtha and other raw materials, demand for our products, market conditions, and foreign exchange rates. We undertake no obligation to update the forward-looking statements unless required by law.

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