



MITSUI KINZOKU

(Mitsui Mining & Smelting Co., Ltd. TSE5706)

2019 - 2021 Medium-Term Business Plan

Transformation for Sustainable Growth

May 14, 2019

2016–2018 outcomes (1)

Engineered Materials

- | | |
|---------------------|--|
| Functional powders: | Started boosting capacity to produce copper powder and tantalum oxide |
| Copper foil: | Launched MicroThin™ (ultra-thin copper foil for HDIs) onto market ahead of schedule; boosted capacity to produce the product |
| Catalysts: | Finished boosting capacity to produce automotive catalysts; gained new clients as a result |
| R&D: | <ul style="list-style-type: none">• Developed next-gen products (e.g., solid electrolyte for ASSB, HRDP®)• Started working with external organization to develop products with growth potential |

Engineered powders (right: copper powder)



Ultra-thin copper foil MicroThin™



100% share of HDI market

Automotive catalysts



We penetrated the market in 2015

2016–2018 outcomes (2)

Metals

Metals: Boosted capacity to collect and process recycled raw materials

Copper: Addressed Caserones' technical issues in an effort to get the copper mine operating stably

Other: Finished renovating hydropower station

Automotive Parts

- Expanded sales of Chinese brands
- Mexico plant expanded to key North America location

Recycled raw material



Lead ingots recovered by smelting recycled materials



Latches for car doors



15% share of global side door latch market

Issues identified in 2016–2018

Engineered Materials

- Must organize efforts to accomplish strategy for further growth
- Must determine timing and scale of capex for MicroThin™ and tantalum oxide

Metals

- Metals: Must continue developing technologies for recovering valuable metals to boost capacity to collect and process recycled materials
- Copper: Must make Caserones mine profitable

Automotive Parts

- Must secure large business (our efforts to approach the US Big 3 were ultimately unsuccessful)
- Must improve cost competitiveness

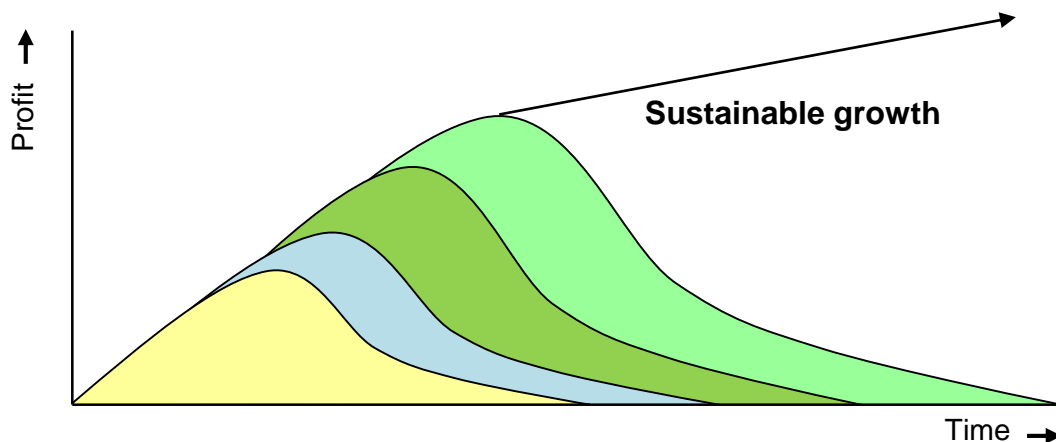
Corporate

- Must meet growing public demand for ethical and sustainable business (SDGs, reform work practices, digitalize)
- Little progress made in improving financial structure

Vision for 2024

By 2024, we want to be a company that continually creates and develops growth products and businesses in our three core business segments (Engineered Materials, Metals, and Automotive Parts)

Continual corporate entrepreneurship

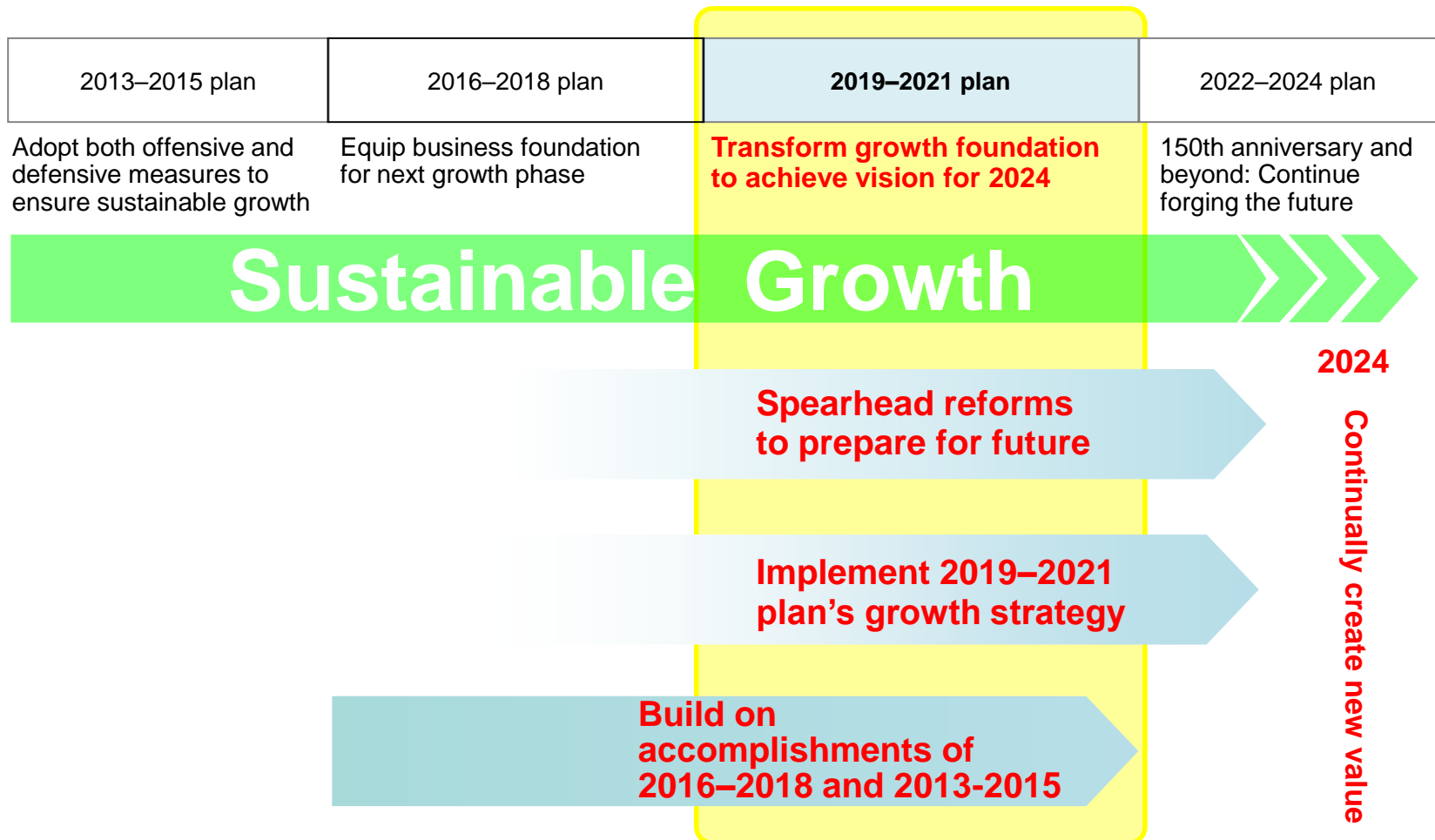


- By continually creating growth products and businesses, we will enable corporate growth and enhance corporate value.

**To enable continual corporate entrepreneurship,
we must transform our growth foundation**

Context

The 2019–2021 plan is part of the run-up to achieving our vision for 2024



CSR management

In 2016–2018, we developed a foundation for CSR management

In 2019–2021, we will aggressively address global social concerns through our business and strength of ESG management.

- Enhance corporate value and achieve sustainable growth
- Contribute toward sustainable global economy

2016–2018 Medium-Term Business Plan

- Develop foundation for CSR management
- Implement basic CSR model

Establish CSR policy
Update behavioral guidelines
Establish CSR committee
Define materiality
Establish human rights policy

2017

Start human rights due diligence
Establish policy on conflict minerals
Update eco action plan
Establish group-wide procurement policy
Start project to reform work practices

2018

Establish supply chain committee
Start promoting CSR in supply chains

2019

2020

2021

2019–2021 Medium-Term Business Plan

- Strengthen ESG management
- Aggressively develop CSR
- Address global social and environmental concerns
- Contribute toward SDG efforts
- Engage in Society 5.0 concept

Address global social and environmental concerns

We will leverage our group's expertise (our 'material intelligence'), as well as our business units' individual strengths, to address the global challenges to sustainable development.

Segment strategies for 2019–2021

Engineered Materials

- Functional powders for electronics: Grow the business
- Automotive catalysts: Prepare for mass production
- Copper foil: Promote 5G-related products
- Develop next-gen products

Metals

- Boost capacity to process recycled raw materials and stabilize the processing operation
- Start operation of hydropower station

Automotive Parts

- Develop door lock parts and win orders
- Promote smart factory model



In each business, we will promote sustainability, facilitate innovation, create employment, and contribute to global economic growth. We will balance economic growth with ecological sustainability, and promote employees' safety and wellbeing.



We will develop and supply green materials as well as products that support mobility and electronics industries. Our knowledge of nonferrous materials makes us ideally placed to contribute to industry around the world.



In each business, we will promote sustainable resource use by improving product yield and collection rates and by continuing our efforts to smelt recycled materials. Alongside this, we will carefully control chemical substances and reduce the amount of waste we produce.



Because our businesses are energy intensive, we will step up efforts to save energy and cut our carbon emissions. We will promote sustainability in our value chain, implementing measures to mitigate or adapt to climate change.

● 2019-2021 Sales by Segment

(Unit: Billion yen)

	2018 Results	2019 Plan	2020 Plan	2021 Plan
Engineered materials	165.5	180.0	207.0	212.0
Metals	166.6	162.0	166.0	163.0
Automotive parts and components	104.0	99.0	100.0	104.0
Affiliates coordination	126.9	123.0	131.0	134.0
Adjustment	- 65.3	- 64.0	- 64.0	- 63.0
Total	497.7	500.0	540.0	550.0

● 2019-2021 Ordinary incomes by Segment

(Unit: Billion yen)

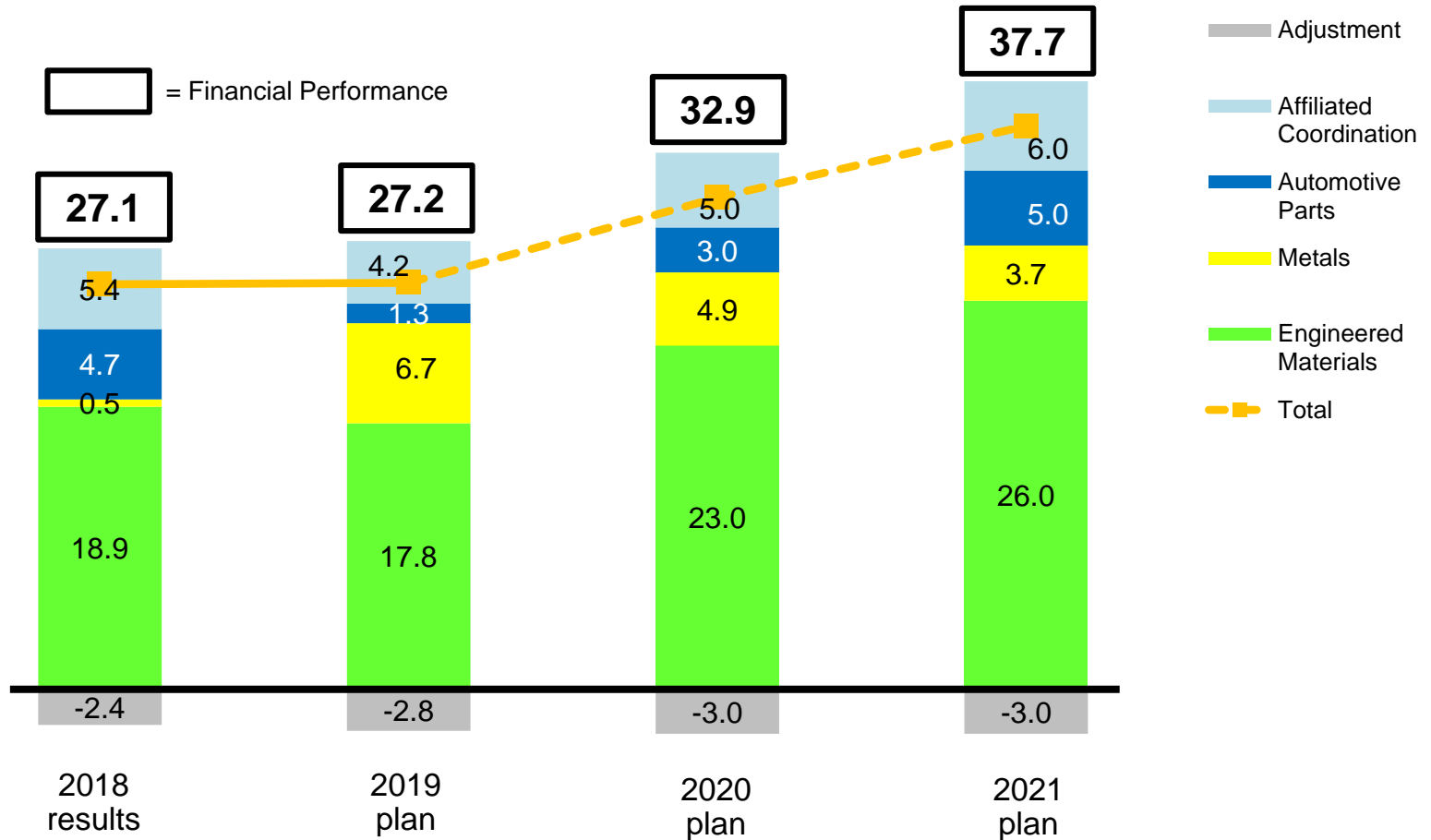
	2018 Results	2019 Plan	2020 Plan	2021 Plan
Engineered materials	16.6	17.8	23.0	26.0
Metals	- 6.0	5.5	4.0	3.0
Automotive parts and components	4.7	1.3	3.0	5.0
Affiliates coordination	4.9	4.2	5.0	6.0
Adjustment	- 2.4	- 2.8	- 3.0	- 3.0
Total	17.8	26.0	32.0	37.0

KPIs

	2018 result	2021 target
Ordinary income (Billion yen)	17.8	37.0
Shareholders' equity ratio	32.5%	40%
ROE	2.8%	10%
Assumptions		
Zinc price (\$/t)	2,746	2,400
Copper price (¢/lb)	296	295
Yen to dollar (¥/\$)	111	110

Trends of Financial Performance (except Inventory factors)

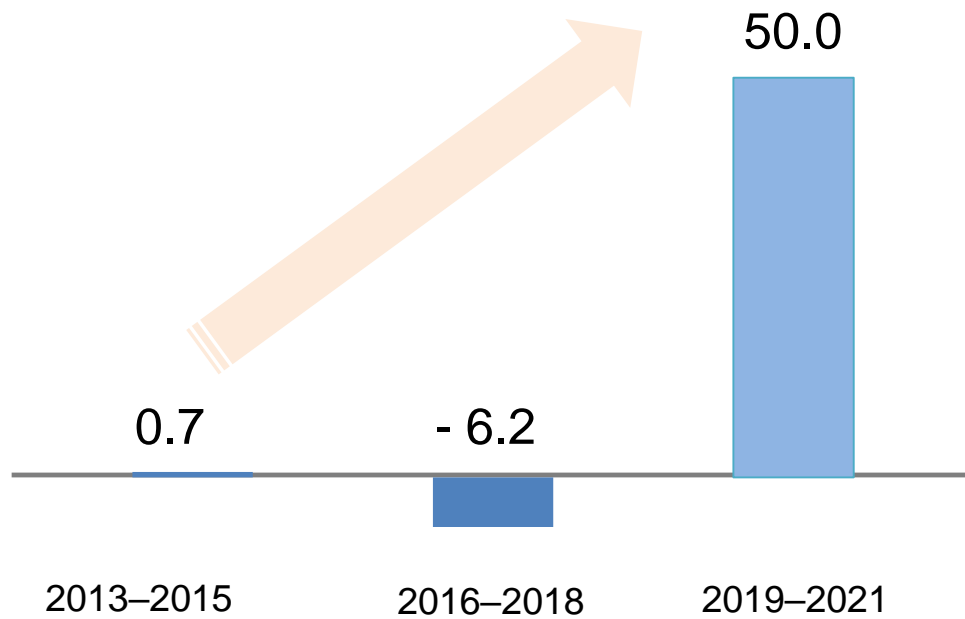
(Unit: Billion yen)



We expect free cash flow to enter the black during the 2019–2021 term.

Free cash flow trends

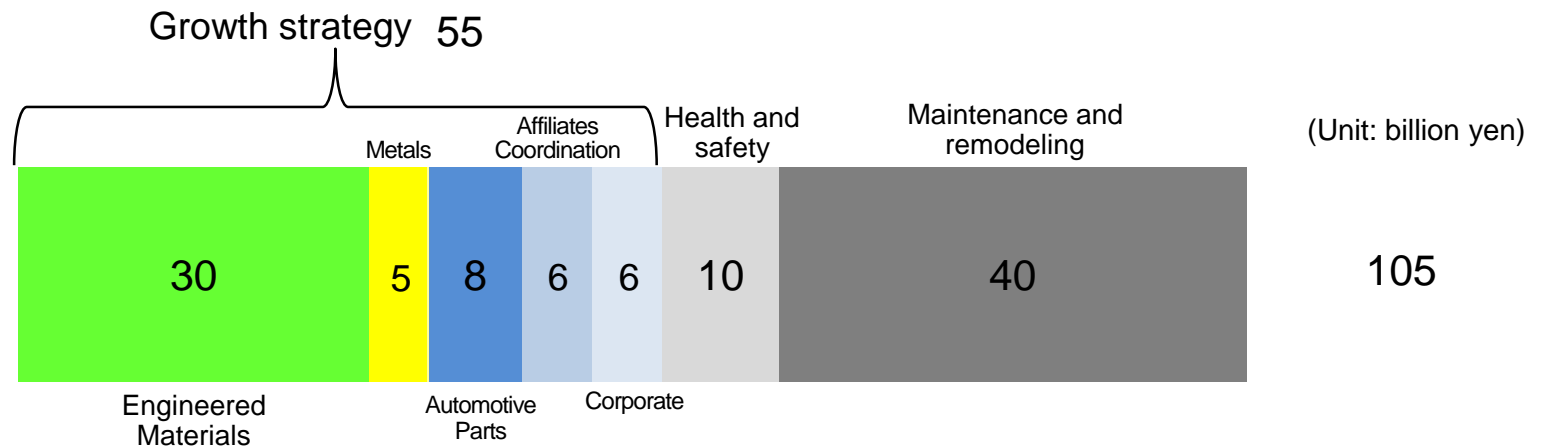
(Unit: Billion yen)



- Maximize cash flow with eye on asset efficiency
- During the plan’s term, a decline in metal prices and increase of depreciation will help improve operating cash flow

In the 2019–2021 term, there will be a total Capex of ¥105 billion, and a total investment of ¥55 billion mostly in Engineered Materials.

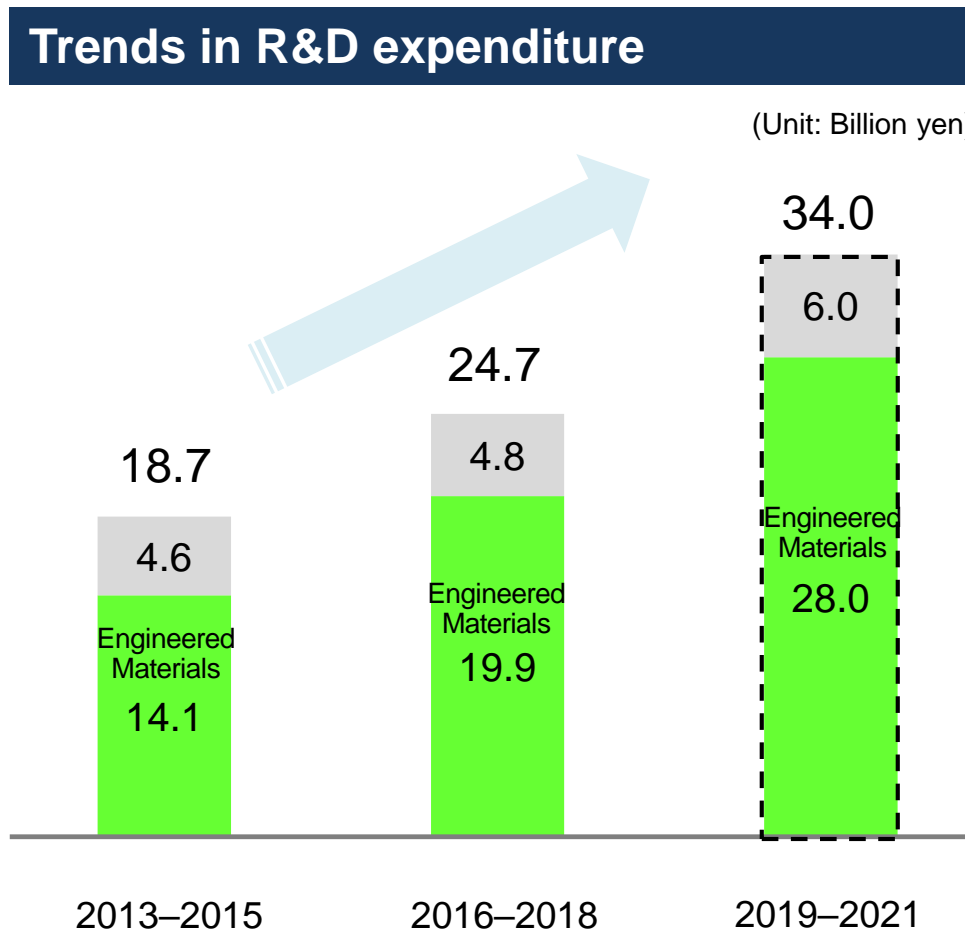
Capex in 2019–2021



Breakdown of key capital expenditures

Engineered Materials	Automotive Parts	Affiliates Coordination, Corporate
<ul style="list-style-type: none"> • Copper powders for MLCCs • Automotive catalysts • Solid electrolytes for ASSBs • Smart factory model 	<ul style="list-style-type: none"> • Footing for sales expansion • Insourcing and automation • Product development 	<ul style="list-style-type: none"> • Die casting • Digitalization

In the 2019–2021 term, we will continue to raise the level of R&D expenditure. The largest increase will be in Engineered Materials.



In the 2019–2021 term, dividends will be paid to shareholders according to the dividend policy announced on May 9, 2018.

Dividend policy (as announced on May 9, 2018)

- We will aim for a consolidated dividend payout ratio of 20%.
Prioritizing sustainable and stable dividends, we will aim for a dividend on equity of 2.5%.

Forecasted dividend per share

	2018	2019	2021
Dividend per share	¥70	¥70	TBA

*Dividends will be adjusted to reflect progress in strengthening business foundation and reforming financial structure.

Business strategy for 2019–2021

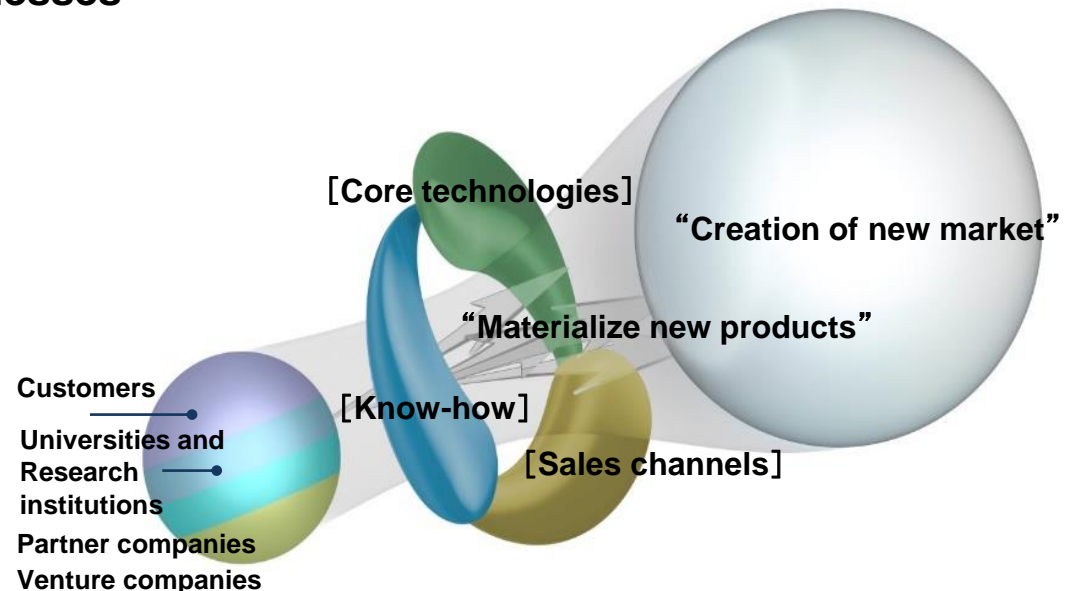
Reform growth foundation to prepare for a **market co-creation approach**

- Take steps to create new businesses
- Create mechanism for further growth

● Take steps to create new businesses

Co-create new markets

- First, **co-create** spaces with external forces (**markets**), such as clients
- Next, link the external forces with the segment's assets (core tech, expertise, sales channels) to create new products and markets



Operation-level action plans

Business	Action plan for 2019–2021
Functional powders	<ul style="list-style-type: none"> • Promote to 5G affiliates • Expand abrasives
Catalysts	<ul style="list-style-type: none"> • Maintain share in motorcycle market • Strengthen marketing and R&D in automotive market
Copper foil	<ul style="list-style-type: none"> • Promote to 5G affiliates • Promote MicroThin™ for HDI and non-smartphone affiliates.
PVD materials	<ul style="list-style-type: none"> • Improve competitiveness and market share of ITO and IGZO

Engineered powders (right: copper powder)



Electro-deposited copper foil for high-frequency circuit boards (an affiliate's 5G product)



The smooth surface displays the fruit in exquisite resolution

In 2020, we will make a full start in marketing 5G-related products

5G roadmap

2017 2018 2019 2020 2021 2022 2023 2024 2025 ····

3 GPP

Specs for 5G parts determined

5G commercialization process

5G 1st step: High speed, large capacity, low latency
To be developed using existing 4G/LTE

5G filling specs to be determined

5G 2nd step: Simultaneous connection, low latency
To be developed based on filling specifications

5G growth sectors

Preparing infrastructure -2020

Installation of systems and equipment for rolling out 5G

- Communications infrastructure

Commercialization (implementation phase)

-2025

Roll-out of 5G-powered products and services

- Communications infrastructure
- IoT devices

Commercialization (roll-out phase)

2025-

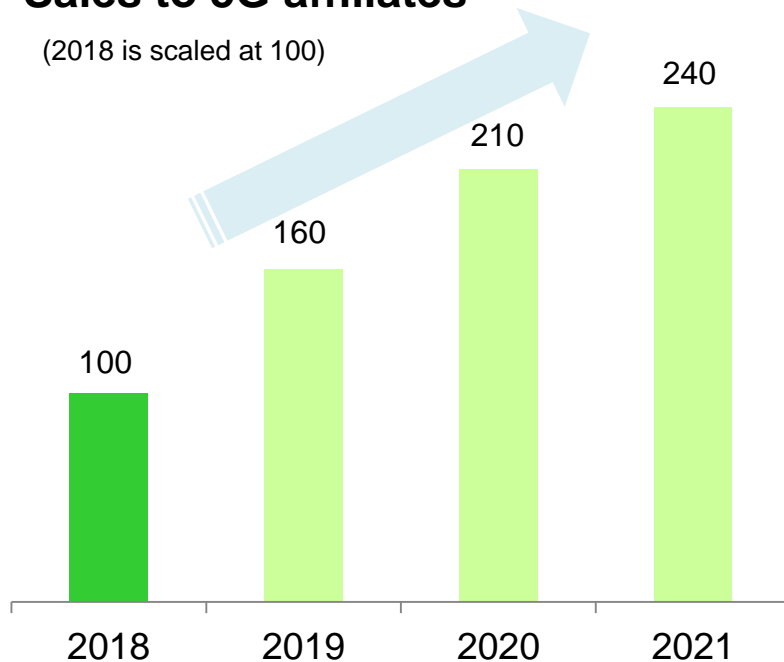
Development of new 5G-powered businesses

- IoT devices
- 5G-powered new businesses

The commercial roll-out of 5G will make electronics high-frequency compatible and more advanced. This development will increase demand for products such as copper foil and copper powder for MLCCs.

Sales to 5G affiliates

(2018 is scaled at 100)



Examples of our 5G-compatible products

- Functional powders
 - Copper powder for MLCCs
 - Tantalum oxide for surface acoustic wave filters
- Copper foil
 - Electro-deposited copper foil for high-frequency electronics
 - MicroThin™
- Ceramics
 - Kiln tools for firing MLCCs.

In the 2019–2021 term, we expect net sales to increase 2.4 fold compared to 2018. We will expect further growth after 2022 because of 5G 2nd step (5G filling specifications) .

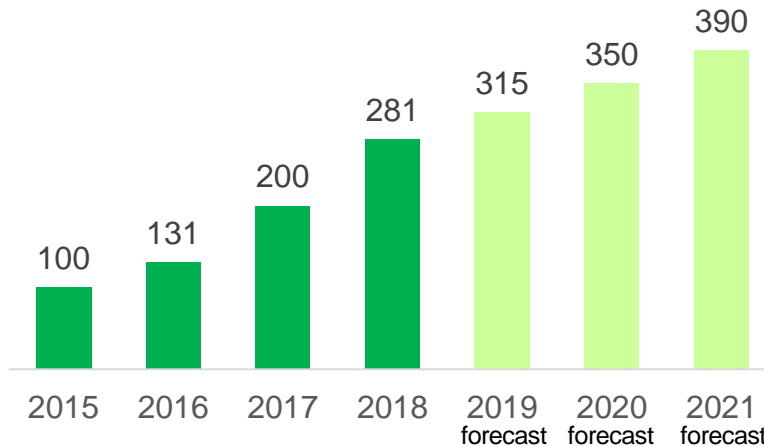
Business strategy for 2019–2021

Maintain largest share of motorcycle market and achieve stable supply to four-wheeler market.

Develop technology through which we can expand our share in the automotive market in 2022–2024.

Sales projections: Automotive catalysts

(volume for 2015 scaled at 100)



- Automobile-related sales volume is increasing as expected.
- We finished boosting production capacity. We will consider further increases while maximizing operating rate.
- EVs will start making a dent in the market in 2025 and gain a 7% market share by 2030.
→ For the time being, there will be minimal impact on our catalyst operation.

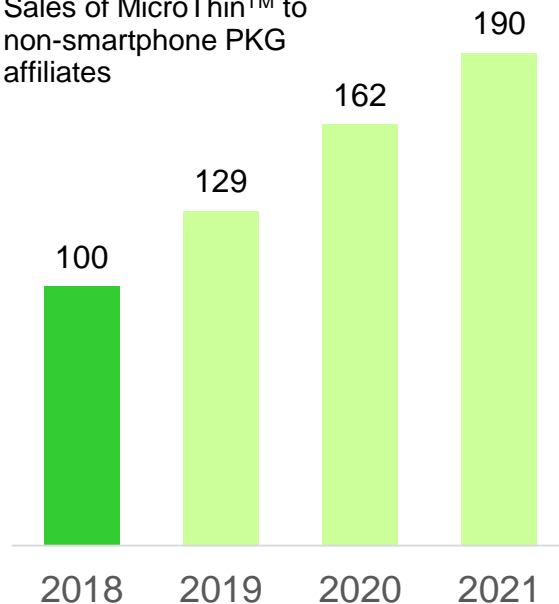
In 2019–2021, R&D and depreciation expenses will continue to rise.
→ The catalysts operation will start contributing to revenue from in the 2022–2024 term.

Business strategy for 2019–2021

- 5G affiliates: Market MicroThin™ among non-smartphone PKG affiliates, and promote electro-deposited copper foil for high-frequency electronics affiliates
- Market MicroThin™ among Chinese smartphone makers
- Strengthen marketing and engineer collaboration to accelerate product development

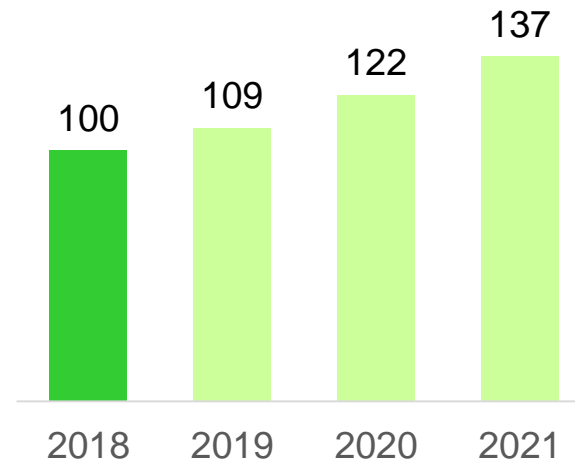
Sales to 5G affiliates (2018 is scaled at 100)

● Sales of MicroThin™ to non-smartphone PKG affiliates



Applications: Data center, GPU

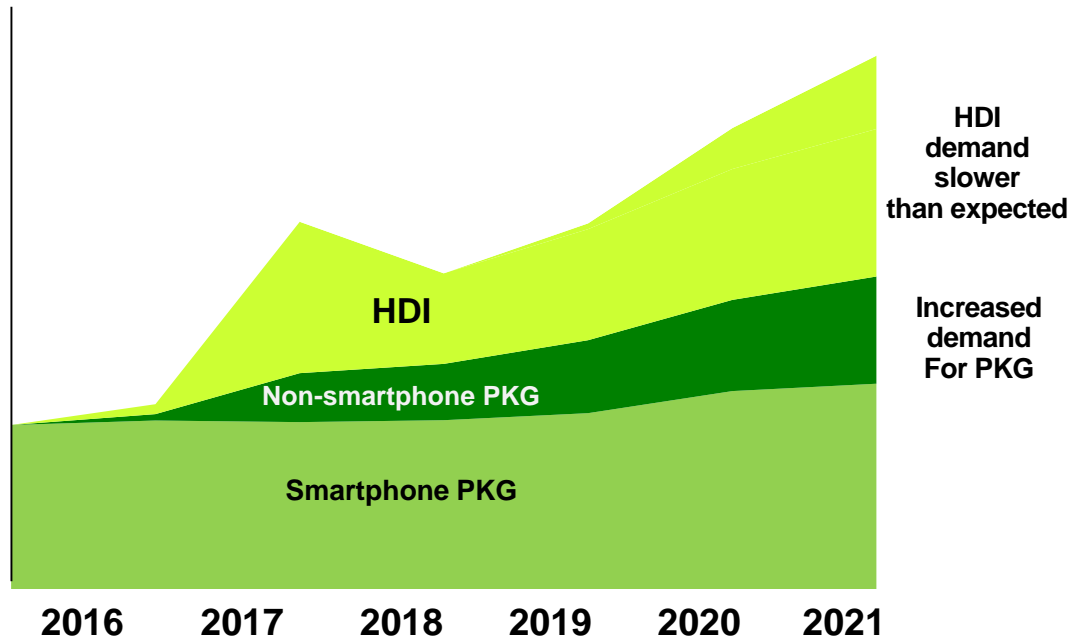
● Sales to 5G affiliates of electro-deposited copper foil for high-end smartphones



Applications: Server, router, base station

Demand for MicroThin™ continues to grow among both HDI and PKG makers

Demand projections for MicroThin™ (as of March 2019)



● HDI:

Demand dipped in 2018 due to falling smartphone sales. However, demand will pick up again in 2019 due to:

- An increase in 5G-compatible high-end smartphones
- An uptake among Chinese clients

● PKG:

Demand for non-smartphone PKGs (e.g., external memory, GPUs*) has risen markedly.

Business will remain brisk, with progress in 5G pushing up demand for modules.

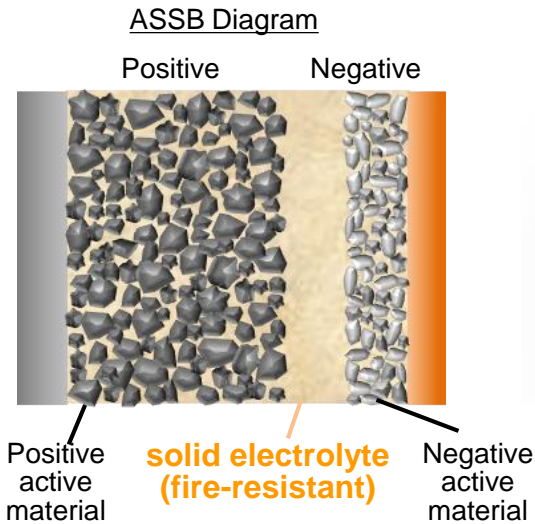
• HDI: High Density Interconnect

• PKG: Package substrates

* GPU: Graphics Processing Unit

Progress in developing next-gen products

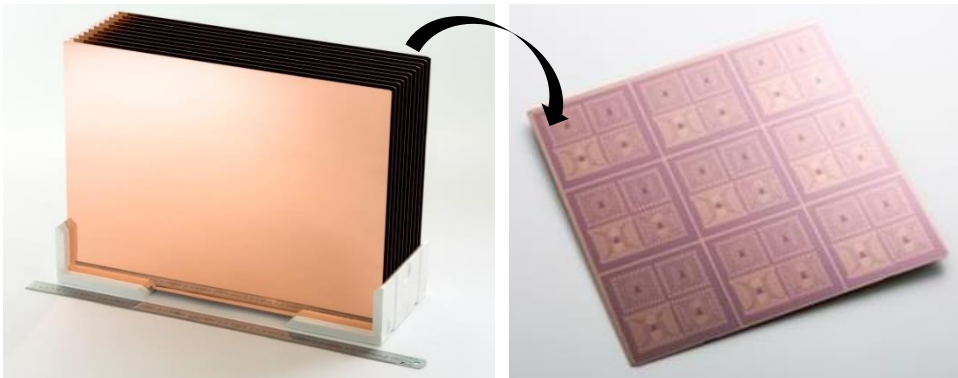
Solid electrolyte for All-Solid State Batteries (ASSBs) (November 24, 2016, press release)



LIBTEC's ASSB (Lamicelle)

- We will examine a pilot branding program to improve quality and prepare for mass production.
- We will also develop ASSB-compatible positive and negative electrodes / cathodes.
- We will work with ASSB makers to strengthen development and establish a production process in order to bring ASSBs to market as early as possible.

HRDP®: Next-gen ultra-fine circuit material (January 25, 2018, press release)



HRDP®

Ultra-fine circuit formed by HRDP®
(line/space ratio = 2/2)

- Product is being sampled among electronics makers
- We will work with Geomatec to prepare for mass production by 2021

Business strategy for 2019–2021

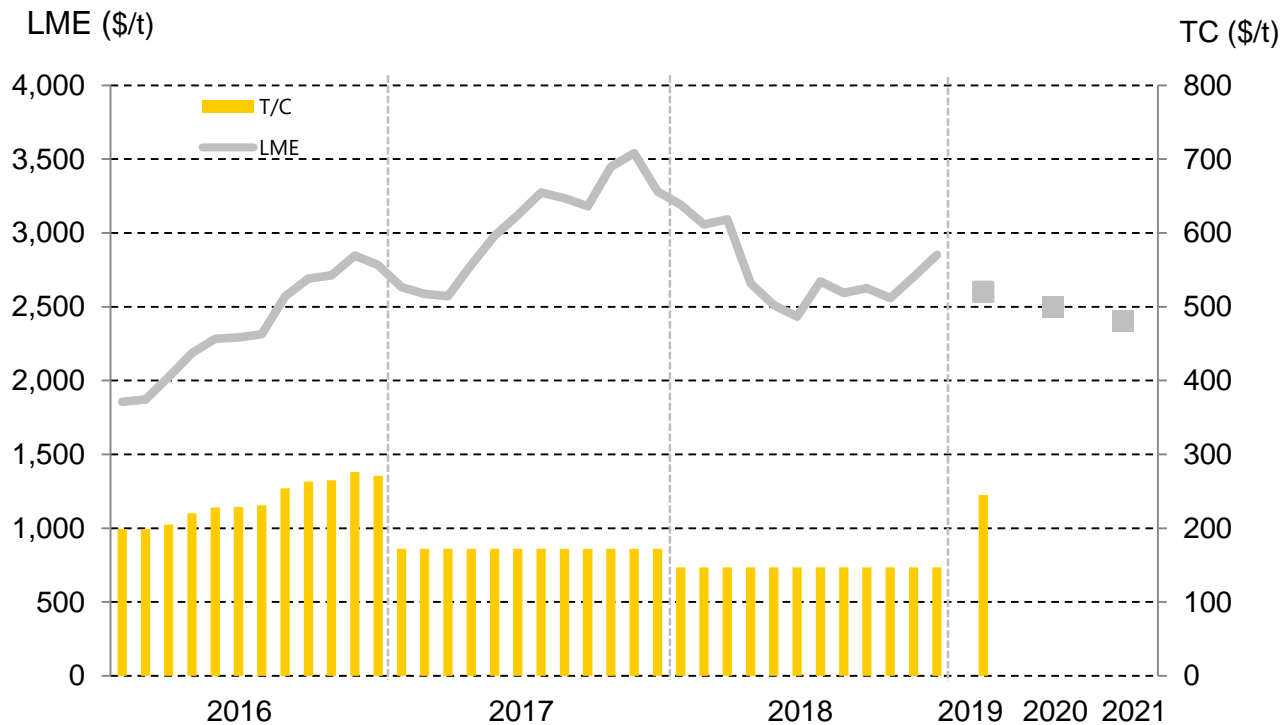
To achieve our 2024 vision, we will develop the smelting of recycled materials and stabilize operations to yield revenue.

Action plan for 2019–2021

Business	Outcomes of 2016–2018 term	Action plan for 2019–2021
Metals & Recycling	<ul style="list-style-type: none"> • Increased processing of recycled materials (including lead) • Start operation at Kamioka hydropower station 	<ul style="list-style-type: none"> • Increase processing of recycled raw materials • Develop smelting tech • Collect PGMs more efficiently
Copper Business Strategic	<ul style="list-style-type: none"> • Improved Caserones copper mine’s operating rate and yield rate 	<ul style="list-style-type: none"> • Help further improve mine’s operation

Zinc has been in undersupply since 2016, but it will shift to oversupply. Accordingly, we have projected that zinc prices will fall during the 2019–2021 term.

● Trends in zinc price (LME) and treatment charge (TC)

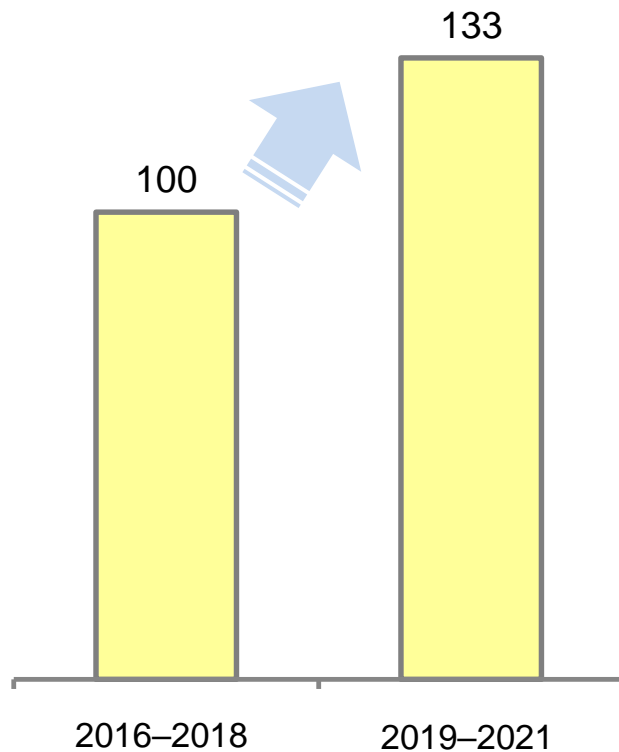


Reference

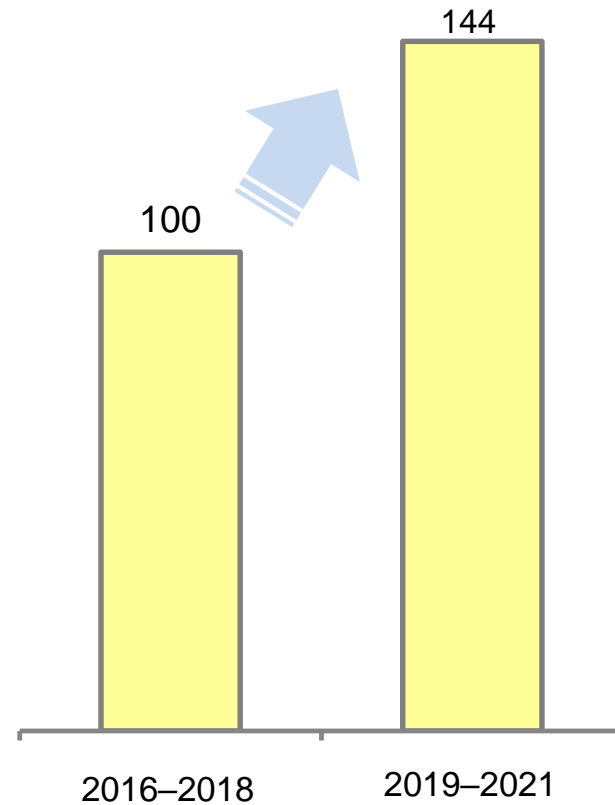
TC	203 \$/t	172 \$/t	147 \$/t	245 \$/t
Benchmark	2,000 \$/t	(-)	(-)	2,700–3,000 \$/t

In the 2019–2021 term, recycled materials will be processed, and secondary products produced, to a greater extent than they were in 2016–2018.

● Recycled lead processing

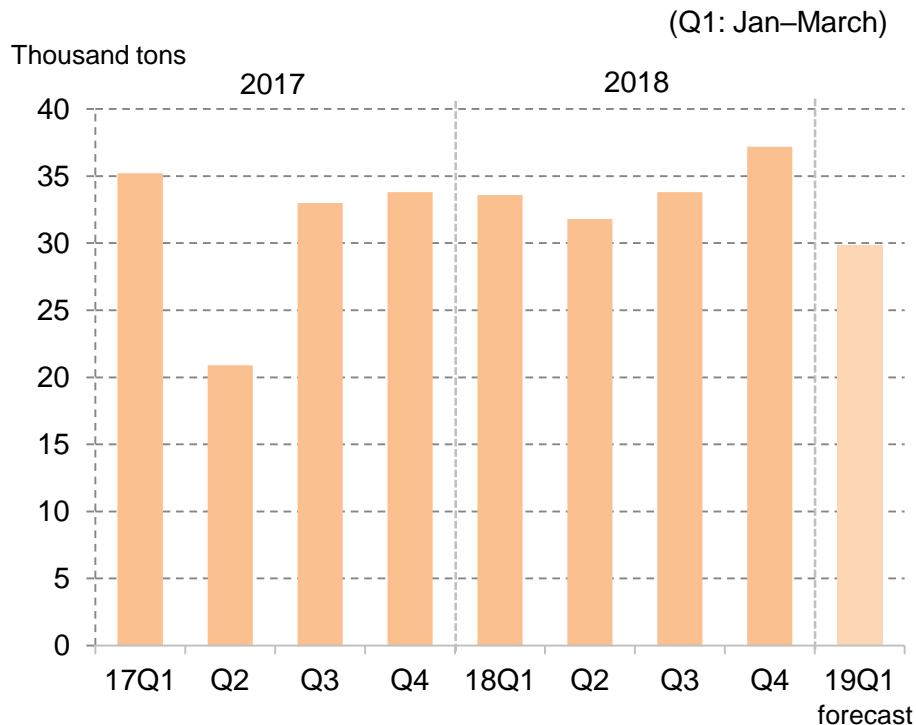


● Lead secondary product production

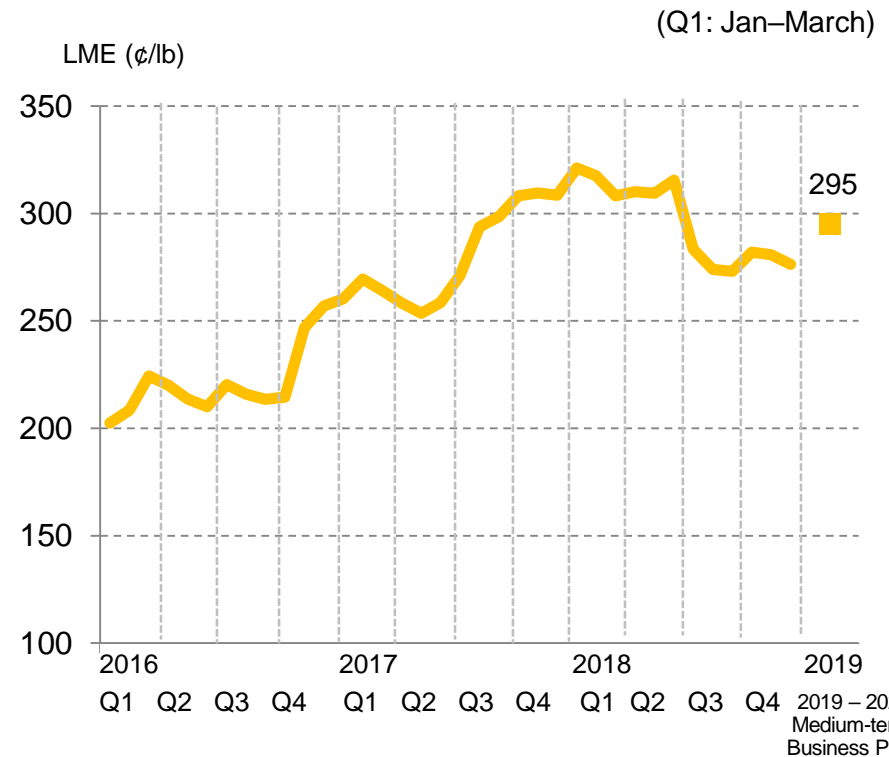


There were no weather problems in 2018, and the mine’s output improved. We will continue to stabilize operations and improve output. We will also keep up our efforts to reduce costs.

● Production trends (copper)



● Trends in Copper Price (Jan 2016 to Dec 2018)



Business strategy for 2019–2021

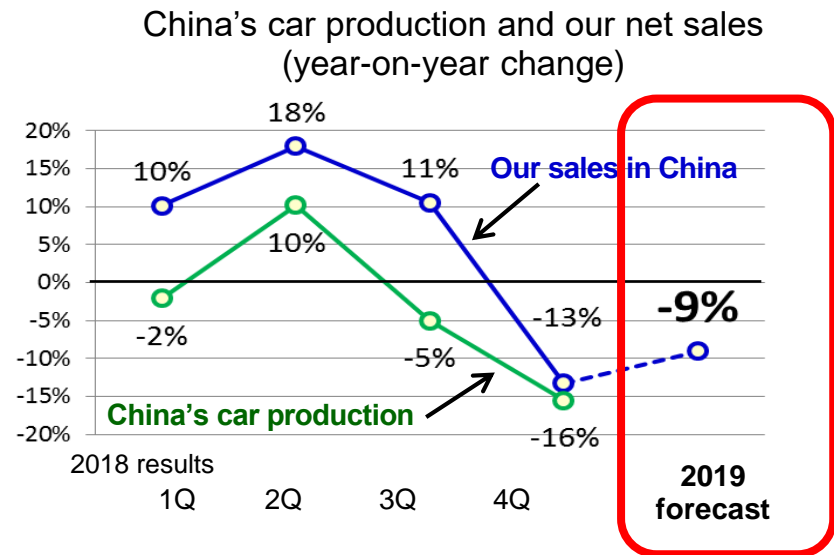
With a view to future growth, we will continually enhance quality and cost competitiveness to improve margins, and focus on winning major business deals

Action plan for 2019–2021

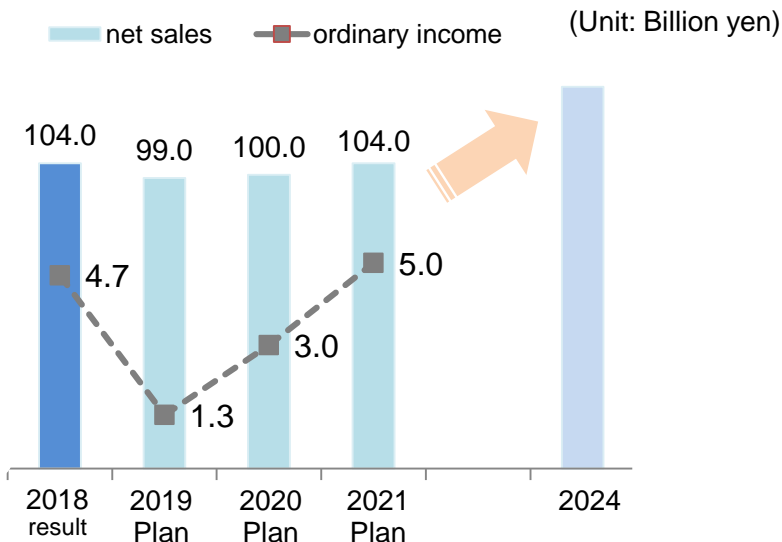
Key challenges	Action plan for 2019–2021
<p>Win major clients → Secure business for 2022 and beyond</p>	<ul style="list-style-type: none"> • Marketing and product development teams will work together to improve quality of design • Develop automotive mobility products • Expand business in Europe; launch Morocco office (scheduled for January 2020)
<p>Improve cost competitiveness → Achieve 2019–2021 plan's goals Prepare foundation for 2022 and beyond</p>	<ul style="list-style-type: none"> • Improve productivity through digitalization • Improve quality of mass-produced products • Cut wasteful spending

Business conditions

- Sudden downturn in the China's automotive market will put a dent in net sales
- US-China trade friction:
 - US imposed additional tariff on China's automobile imports
 - US steel prices have soared and remain high



Net sales and ordinary income in 2019–2021



- Marketing efforts in 2016–2018 failed to yield major business, so the segment has poor growth prospects in 2019–2021.
- Efforts to improve cost competitiveness in 2019–2021 will help us achieve the 2021 plan.

The 2019–2021 plan includes the slogan:
“Transformation for Sustainable Growth to achieve future vision.”
Under this slogan, we will undertake the following actions:

Corporate management action plan

Management with capital efficiency	Use ROIC to measure each segment’s performance in addition to conventional indicators
Digitalization	Improve productivity, promote smart factory model, etc.
Work style reform	Adapt to shrinking labor pool (provide diverse and inclusive workplace, promote employee wellbeing)

Support the business units and improve corporate value

KPIs for 2019–2021 plan (for reference)

(Unit: billion yen)

	2018 result	2019 target	2020 Target	2021 Target
Net sales	497.7	500.0	540.0	550.0
Operating income	18.2	26.0	32.0	37.0
Ordinary income	17.8	26.0	32.0	37.0
Profit (loss) attributable to owners of parent	4.7	17.0	20.0	23.0
Free cash flow (2019-2021)	-	-	-	50.0 (2019-2021 total)
CAPEX (2019-2021)	-	-	-	105.0 (2019-2021 total)
Equity Ratio	32.5%	34.5%	-	40%
ROE	2.8%	9%	-	10%
D/E Ratio	1.15	1.07	-	0.7

Assumptions underlying 2019–2021 plan (for reference)

		2018 result	2019 projection	2020 projection	2021 projection
Zinc price	(\$/t)	2,746	2,600	2,500	2,400
Lead price	(\$/t)	2,123	2,000	2,000	2,000
Copper Price (Jan-Dec)	(¢/lb)	296	295	295	295
Indium price	(\$/kg)	280	220	220	220
Forex	(¥/\$)	110.9	110	110	110

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