

(Securities code: 6728)

Business Results

FY2018 (July 2018–June 2019)

August 8, 2019
ULVAC, Inc.

◆ **Disclaimer regarding forward-looking statements**

Forward-looking statements of the company in this presentation are based on information that was available at the time these documents were prepared.

ULVAC's customers in the flat-panel display (FPD), semiconductor, and electronic parts industries face challenges due to the rapid pace of technological advances and fierce competition.

There are a number of factors that directly and indirectly impact performance, such as the global economy; fluctuations in exchange rates; market conditions for FPDs, semiconductors, electronic parts, and raw materials; and trends in capital expenditures.

Consequently, actual net sales and profits may vary substantially from the projections included in this presentation.

◆ **Data included in the documents are stated as follows:**

(All figures are stated on a consolidated basis unless otherwise noted.)

Yen values: Rounded to the nearest 10th of the unit stated.

Percentages: Rounded to the nearest 10th after yen values are rounded.

Abbreviations of accounting periods:

1Q to 2Q (cumulative): First and second quarter consolidated cumulative period

2Q: Second quarter consolidated period

Overview of Consolidated Business Results

□ FY2018 Consolidated Business Results

- **Orders Received: ¥218.5 billion (-10% year-on-year)**
 - Declined year-on-year mainly due to the postponement of investment plans by semiconductor memory manufacturers
- **Net Sales: ¥220.7 billion (-12% year-on-year)**
 - Declined year-on-year mainly due to the postponement of investment plans by semiconductor memory manufacturers
- **Operating Profit: ¥23.8 billion (-33% year-on-year)**
 - Exceeded forecast despite decline year-on-year mainly due to lower net sales

□ FY2019 Consolidated Earnings Forecast

- **Net Sales: ¥205.0 billion (-¥60.0 billion vs. medium-term business plan)**
- **Operating Profit: ¥22.5 billion (-¥15.5 billion vs. medium-term business plan)**

□ Goals for FY2022 (no change)

- **Aim for net sales of ¥300.0 billion and an operating profit margin of 16%.**

Summary of FY2018 Consolidated Business Results

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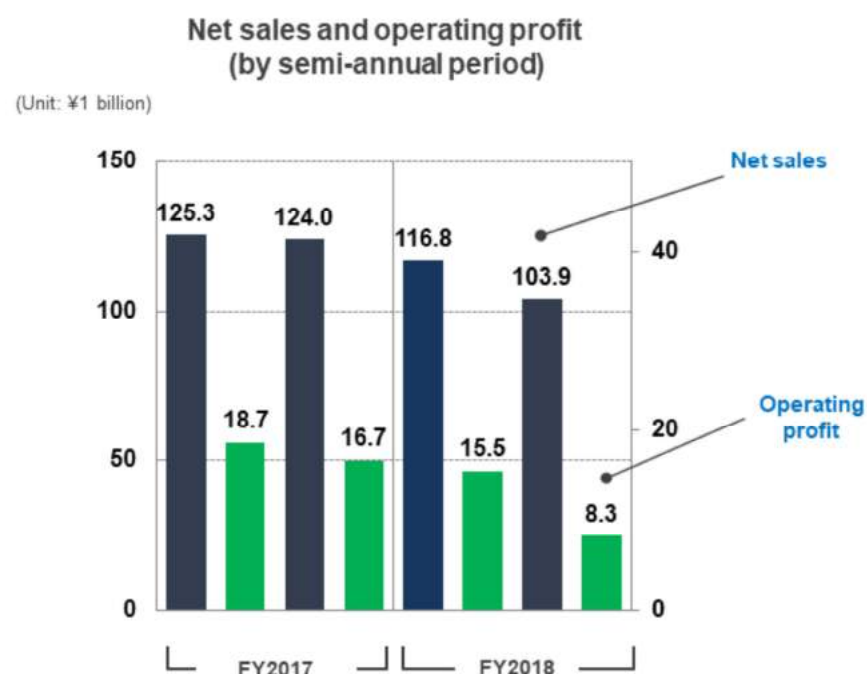
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Overview of FY2018 Consolidated Business Results

- **Orders received and net sales:** declined year-on-year mainly due to the postponement of investment plans by semiconductor memory manufacturers
- **Operating profit:** Exceeded forecast despite decline year-on-year mainly due to lower net sales

(Unit: ¥1 billion)

	June'17	June '18		
	Result	Forecast	Result	YoY (Changes)
Orders received	243.0	225.0	218.5	-24.4 -10.1%
Net Sales	249.3	225.0	220.7	-28.6 -11.5%
Operating Profit	35.4	23.5	23.8	-11.5 -32.6%
Ratio	14.2%	10.4%	10.8%	- 3.4 pt
Net Income	35.9	17.5	18.7	-17.2 -48.0%
Ratio	14.4%	7.8%	8.5%	- 5.9 pt



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Both orders received and net sales declined year on year mainly due to postponement of investment in semiconductor memory and did not reach the forecast.

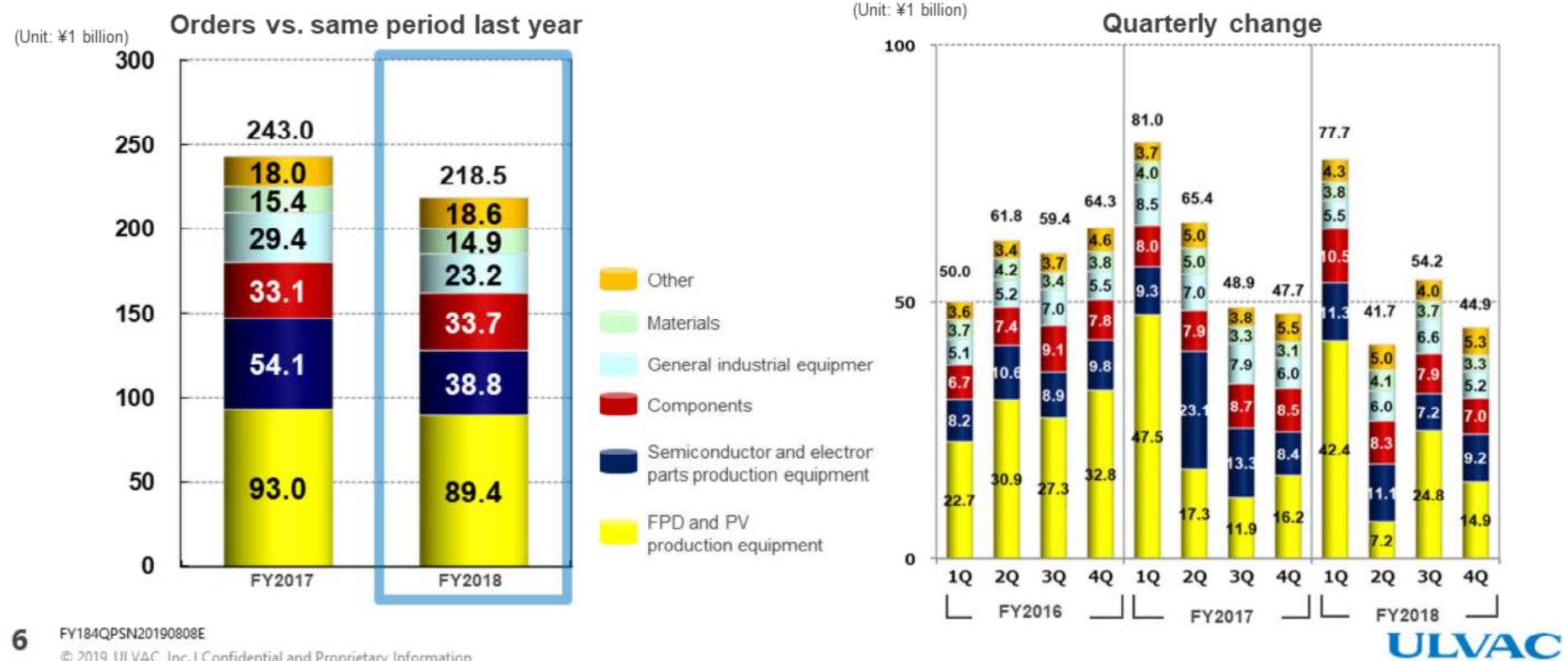
The failure to achieve the forecast was due to a shift to the next period of additional investment related to LCDs for large-screen TVs and semiconductor-related investments.

Operating profit also declined year on year mainly due to the lower net sales, but exceeded forecast.

In addition to operating profit of 15.5 billion yen in the first half, it was 8.3 billion yen in the second half. This is due to the impact of the decline in net sales and the allowance for doubtful accounts of a total of 28 billion yen.

Overview of FY2018 Consolidated Business Results (Orders received by segment)

- **FPD and PV production equipment:** incoming orders of LCD production equipment for large-screen TVs and OLED production equipment for smart phones in China contributed to the ongoing high level of orders received
- **Semiconductor and electronic parts production equipment:** declined year-on-year mainly due to the postponement of investment plans by semiconductor memory manufacturers



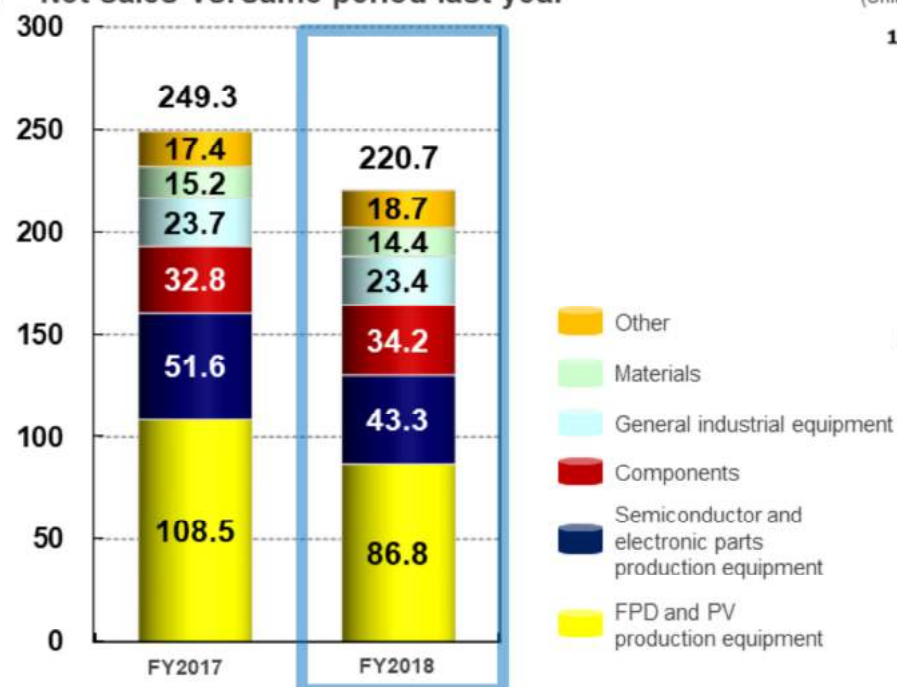
In terms of orders received by segment, incoming orders of LCD production equipment for large-screen TVs and OLED production equipment for smart phones in China contributed to the ongoing high level of orders received in FPD/PV, although it declined year on year.

Sales of semiconductors / electronics decreased year on year due to postponement of investment in semiconductor memory.

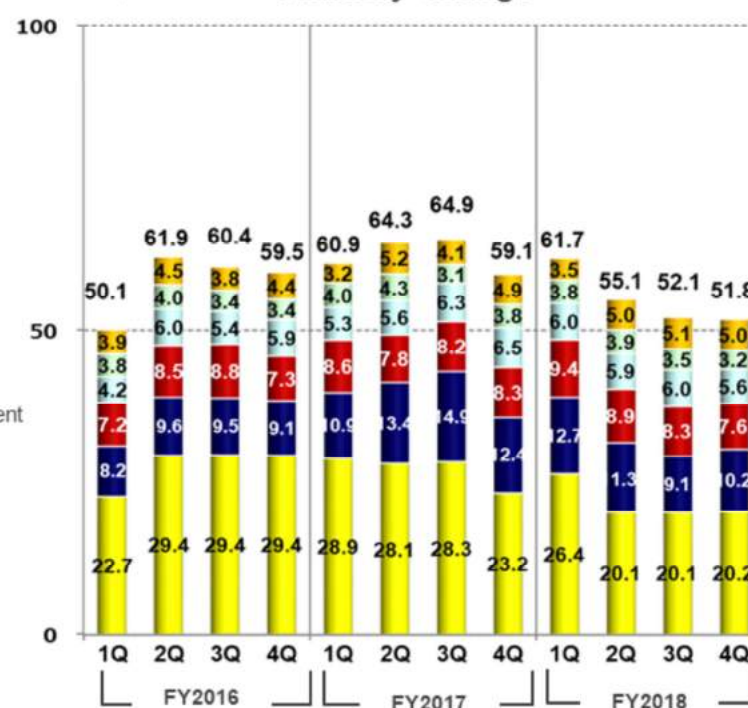
Overview of FY2018 Consolidated Business Results (Net sales by segment)

- FPD and PV production equipment: net sales declined year-on-year despite the contribution of orders received for LCD production equipment for large-screen TVs and OLED production equipment for smart phones in China
- Semiconductor and electronic parts production equipment: net sales declined year-on-year mainly due to the postponement of investment plans by semiconductor memory manufacturers

(Unit: ¥1 billion) Net sales vs. same period last year



(Unit: ¥1 billion) Quarterly change



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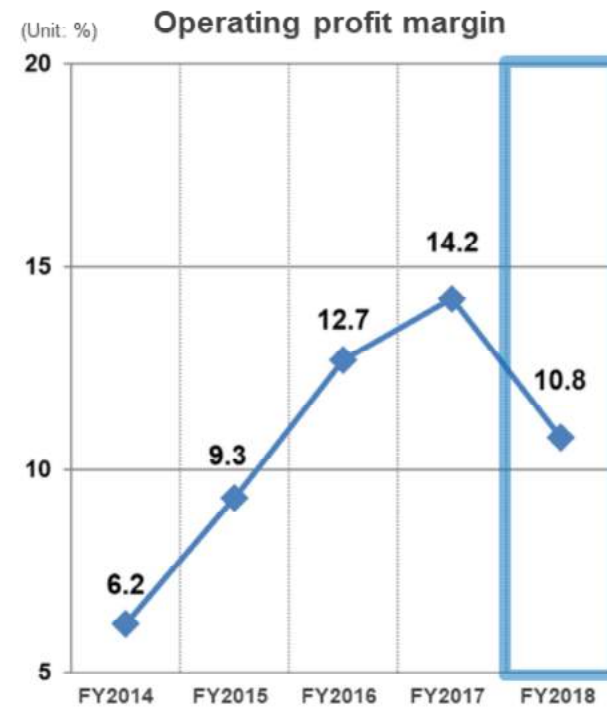
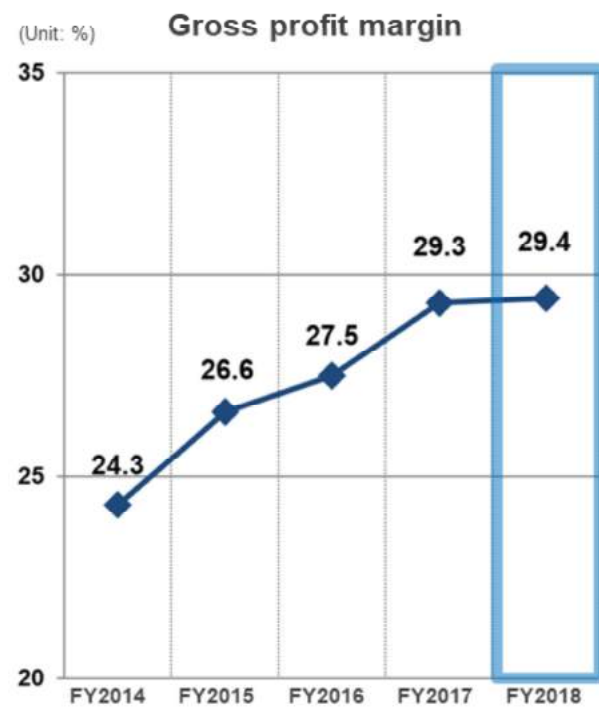
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In terms of net sales, FPD / PV sales declined year on year, although the incoming orders of LCD production equipment for large-screen TVs and OLED production equipment for smart phones in China contributed. Net sales of semiconductors / electronics decreased year on year due to the postponement of semiconductor memory investment.

Overview of FY2018 Consolidated Business Results (Profit margins)

- The gross profit margin remained high, while the operating profit margin declined mainly due to lower sales and higher administrative and sales expenses



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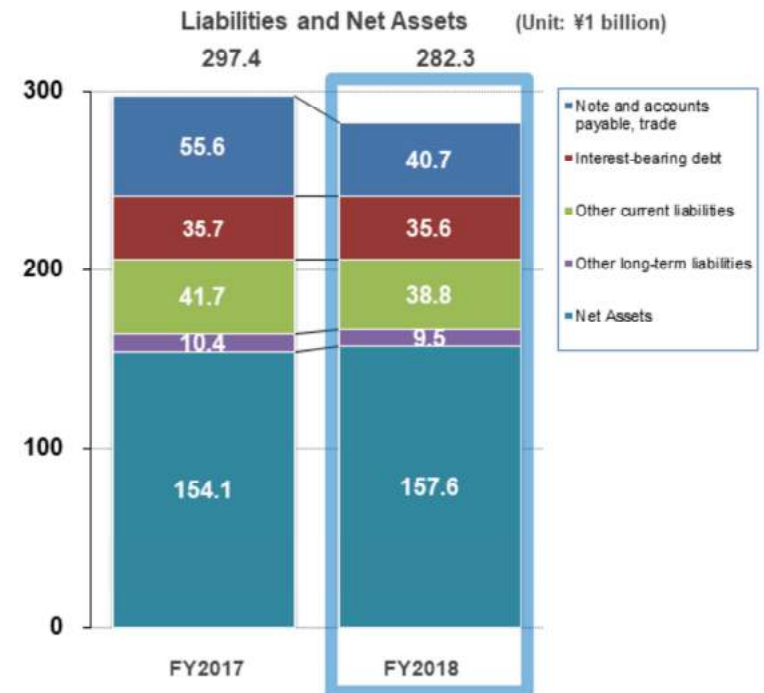
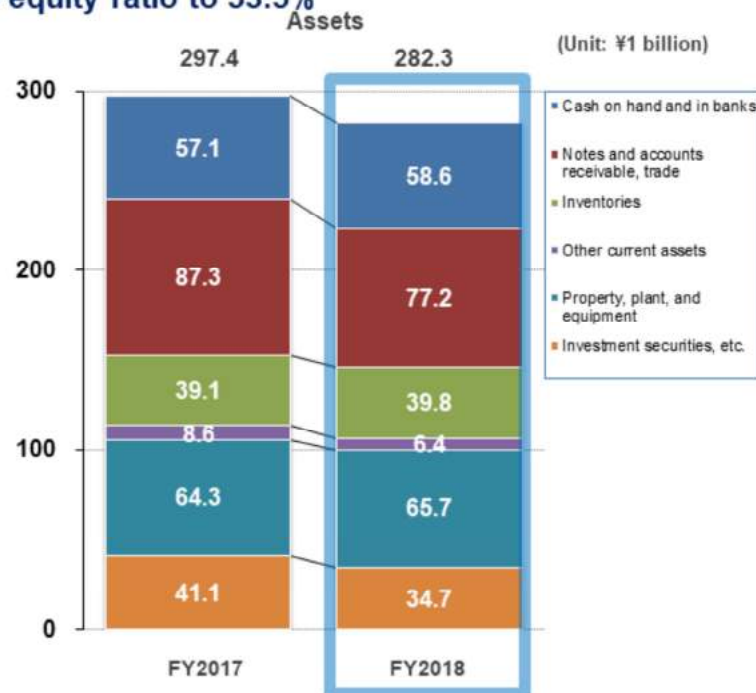
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Gross profit margin remained high.

The decline of operating profit margin was due to (1) the impact of sales declines and (2) an increase in SG & A expenses.

Overview of FY2018 Consolidated Business Results (Consolidated balance sheet)

- Notes and accounts receivable declined by ¥10.0 billion, and notes and accounts payable declined by ¥14.8 billion
- Net assets increased by ¥3.5 billion, and total assets decreased by ¥15.1 billion, which improved the equity ratio to 53.5%



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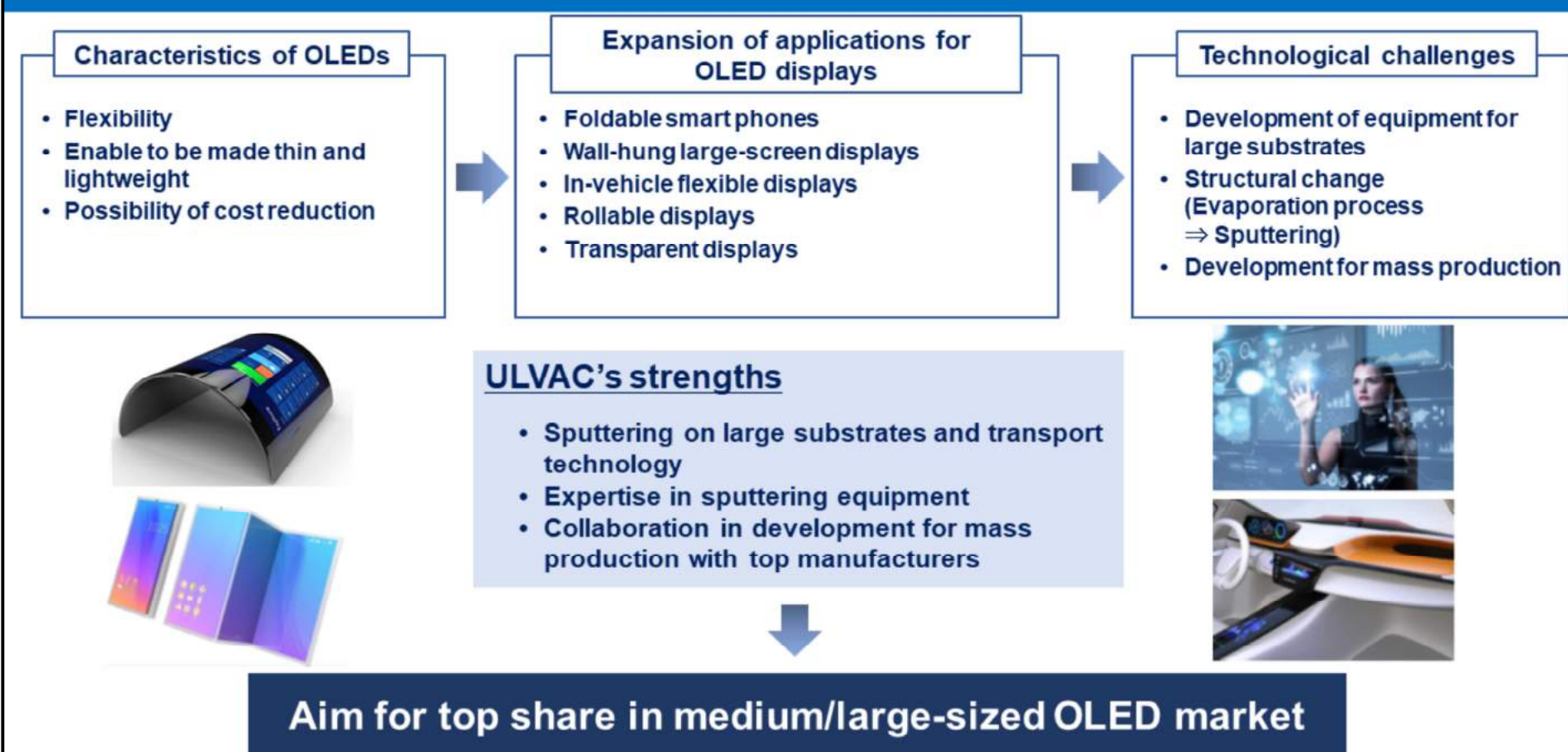
* Partial Amendments to Accounting Standard for Tax Effect Accounting* (ASBJ Statement No. 28, Feb. 16, 2018) was adopted at the beginning of the first quarter. Figures for the prior consolidated fiscal year were restated after retrospective application of said accounting standard.

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Regarding the balance sheet, the equity ratio improved to 53.5% due to an increase in net assets of ¥ 3.5 billion and a decrease in total assets of ¥ 15.1 billion.

Business Environment and FY2019 Consolidated Earnings Forecast

FPD Market Environment: Expanding business opportunities by shifting to OLEDs (1)



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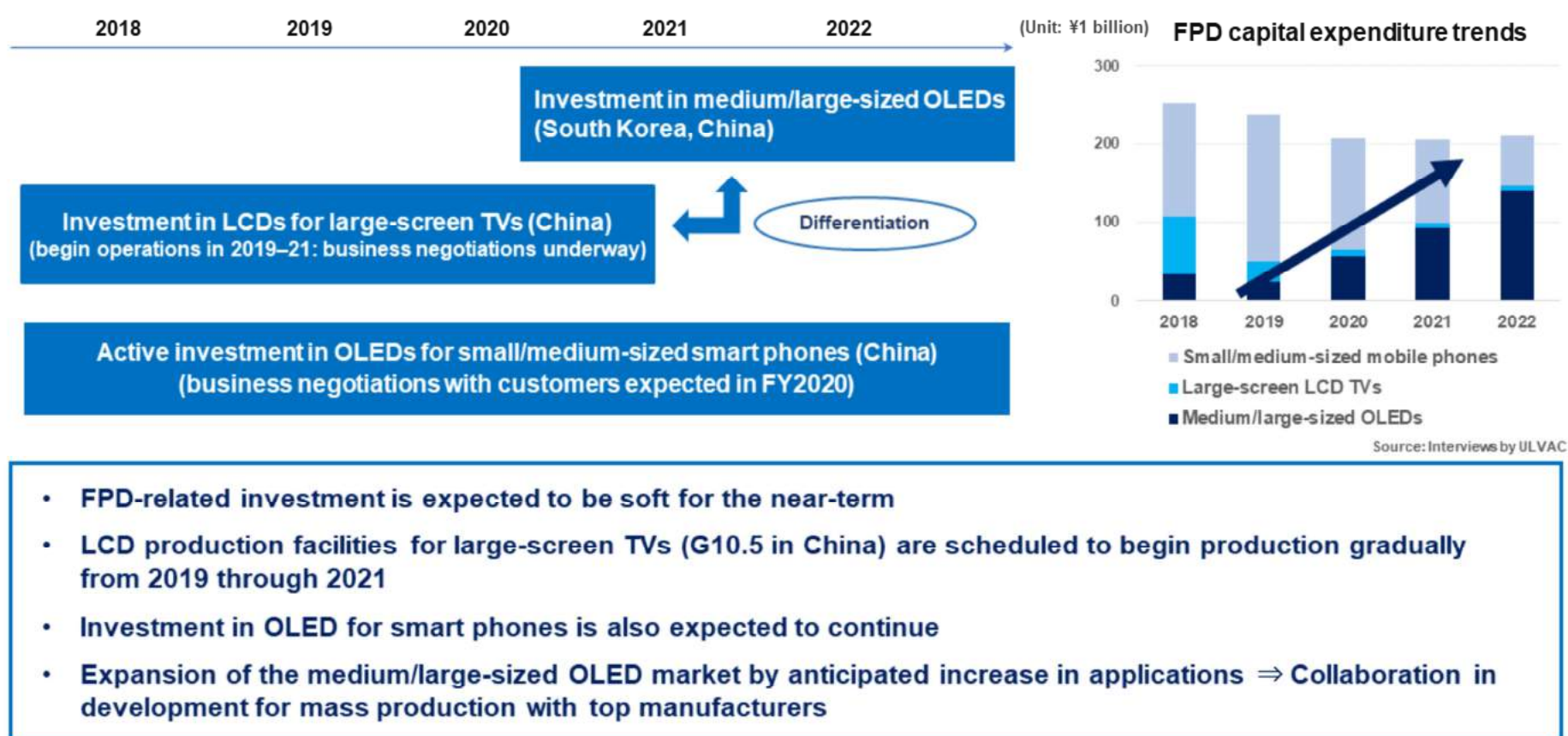
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With the expansion of applications for organic EL and OLED displays, we believe that the medium and large OLED panel market will grow significantly.

Utilizing the flexible, thin and light features of OLED, it is expected to expand into a wide range of applications such as foldable smartphones and wall-hung displays, In-vehicle flexible panels, rollable displays, and transparent displays. .

In order to realize these, the equipment for large substrates such as G10.5 is essential. ULVAC has strengths as a top runner in sputtering and transport technology for large substrates to aim the top share in the medium and large OLED market.

FPD Market Environment: Expanding business opportunities by shifting to OLEDs (2)



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LCD production facilities for large-screen TVs in China is scheduled to start operation from this year to 2021, and the investment will be continuing. Although the large-scale negotiations has been completed, net sales will continue to contribute.

Investment in OLED for smartphones is expected to continue, but there is a high possibility that business negotiations related to investment by our customers who are panel manufacturers will be next year.

We will collaborate with top manufacturers in development for mass production to expand the medium and large-sized OLED market by anticipated increase in applications

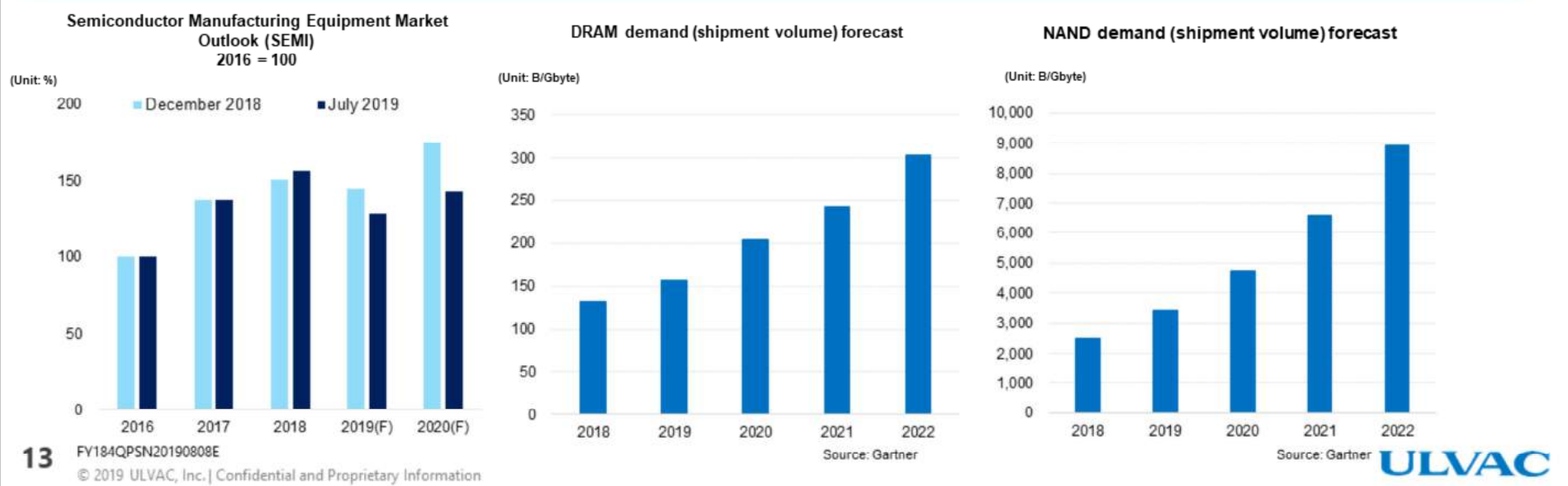
Although FPD-related capital investment has been weak recently, we believe medium- and large-sized OLEDs will drive growth in the future.

In order to create the next business opportunity, we would like to make full use of ULVAC's strength to develop medium- and large-sized OLED production equipment.

Semiconductor Market Environment: Memory

Memory market

- Active investment by memory manufacturers in 2017 to 2018 ⇒ Oversupply and significant price declines
- Postponement of investment by memory manufacturers from the end of 2018 ⇒ Investment is not expected to fully resume until 2020 or later due to high-tech trade friction between the US and China (Investment in 2019 to 2020 is forecast by SEMI to be lower than in 2018)
- Growth in DRAM and NAND demand (memory capacity) ⇒ After realization of the smart society, the current forecast may be exceeded



Memory manufacturers made active investments from 2017 to 2018, resulting in excessive supply and prices that had soared sharply dropped.

For this reason, the memory manufacturers postponed investment from the end of 2018, but due to the recent high-tech friction between the US and China, the full-scale resumption of investment is likely to carry over to next year.

On the other hand, demand for DRAM / NAND bit bases is growing, and we believe that investment will resume and become more active as memory manufacturers begin to approach current supply capabilities.

As 5G is realized and established, the smart socialization is in full swing, and various application developments are started simultaneously in various applications, demands that far exceed the current bit-based forecasts will be generated, and capital investment corresponding to this will increase.

About this item, CEO Iwashita will give you some future information later.

Semiconductor Market Environment: Logic

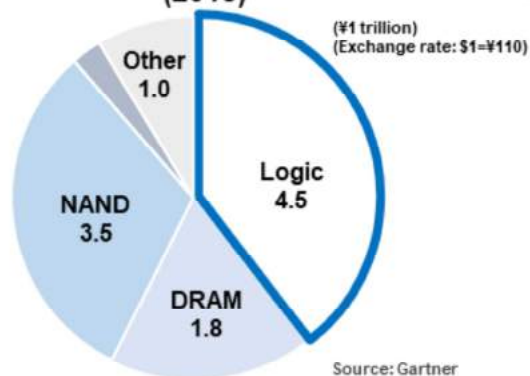
Logic market

- Investment on par with that for memory (DRAM and NAND)
- Logic-related investment is stable (¥4.4-4.7 trillion)
- Future growth is expected for advanced miniaturized products ⇒ Focus on capital expenditures (Advanced miniaturized products will not be fully developed until 2020 or later)

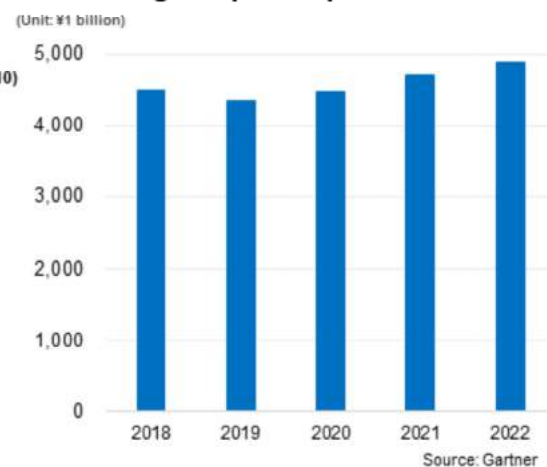
Success in entering the logic field

- Two major manufacturers rated us higher than the competitors in the sputtering process required for miniaturization in EUV process ⇒ Certified as standard equipment
- Grow by expanding business to logic foundry manufacturers who are pursuing miniaturization

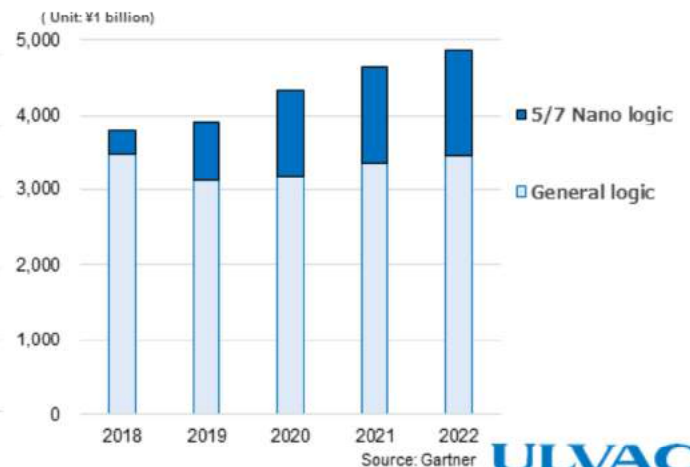
Semiconductor capital expenditure amount (2018)



Logic capital expenditures



Demand forecast



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The logic market is the same size as NAND / DRAM and its investment is relatively stable.

In the last year, ULVAC was selected by two major manufacturers in the logic field for the sputtering process, which requires miniaturization due to EUV adoption.

The future growth in the logic field will be mostly miniaturized cutting-edge products, ULVAC was certified as the first supplier last year in an important process of these miniaturizing cutting-edge products. We intend to grow by expanding to logic and foundry manufacturers who are pursuing miniaturization.

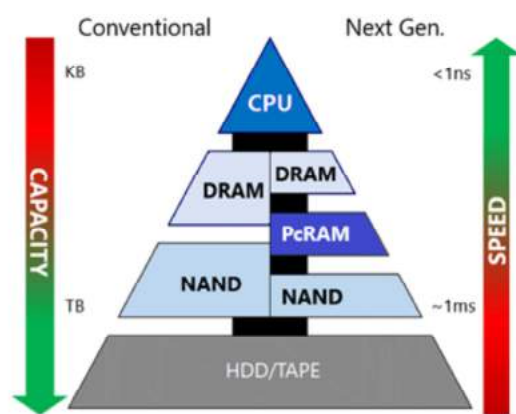
Semiconductor Market Environment: New non-volatile memory (PCRAM)

New non-volatile memory market

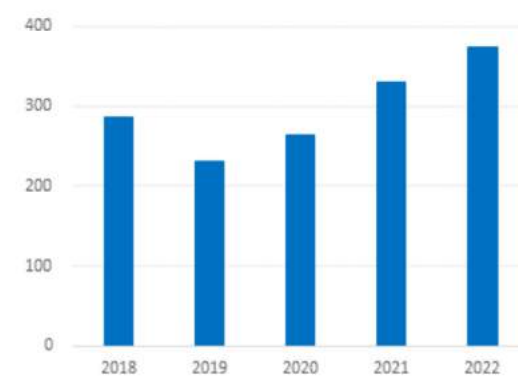
- Memory positioned between NAND and DRAM in that it 1) has a faster processing speed than NAND, and 2) unlike DRAM, it is non-volatile (memory is preserved even if power supply is cut)
⇒ Contributes to high-speed processing of big data and energy conservation
- PCRAM can be used to replace DRAM-based DIMMs on servers. Other applications will also be developed.

ULVAC's strengths

- ULVAC is the only equipment supplier to enable mass-produced film deposition system for PCRAM
- Providing equipments to several major leading manufacturers at mass production level
- Supporting the development for next-generation products of manufacturers as a partner



(Unit: ¥1 billion) Emerging memory total investment forecast



Note: Emerging Memory includes MRAM, ReRAM, PCRAM, etc.
Source: Gartner 2018

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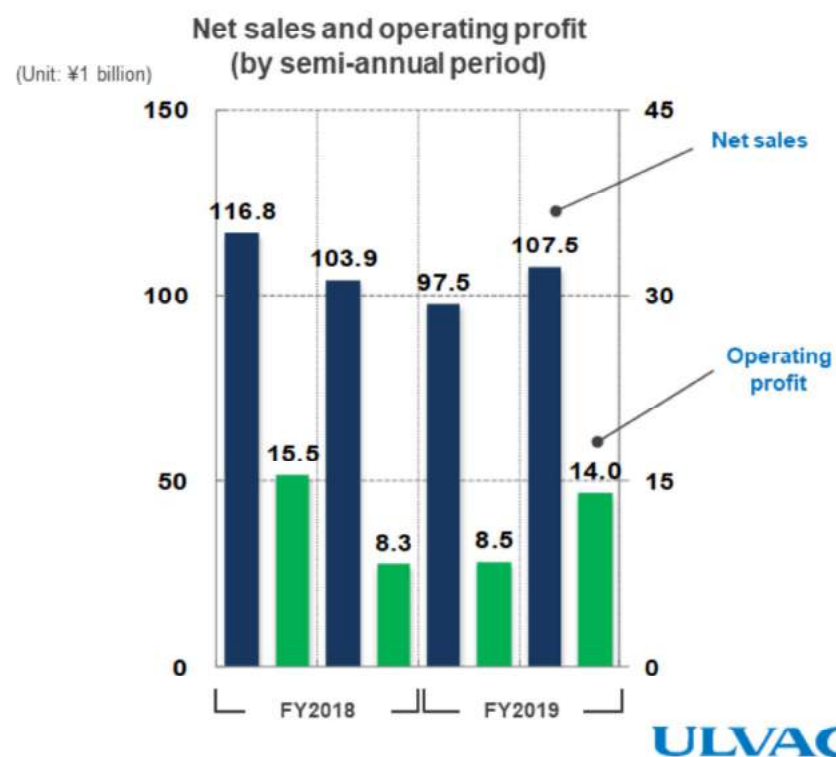
New non-volatile memory is faster than NAND and can retain its memory even when the power is turned off unlike DRAM. It is a memory positioned “between NAND and DRAM”. Its larger capacity than DRAM contributes to speedy processing of information and low power consumption. ULVAC is the only equipment supplier to enable mass-produced deposition system for PCRAM in several major leading manufacturers. PCRAM will respond to demand for replacement from “DRAM-based DIMMs” for servers. In addition, the development of applications for automobiles and smartphones is advancing, and the market is expected to expand in the future, including the application of AI to neuromorphics.

As our customer, the semiconductor manufacturers, have just been cultivating demand for the past one to two years, logic and PCRAM will not contribute significantly to ULVAC's business in an instant. However, we are confident that the future will surely become a major pillar of ULVAC. In 2022, we aim to double the sales of the entire semiconductor by expanding into new fields and rebalancing (1) conventional NAND / DRAM memory and (2) Logic & PCRAM to be about half the weight.

FY2019 Consolidated Earnings Forecast

- Net sales are expected to decrease year-on-year to ¥205.0 billion (¥60.0 billion vs. medium-term business plan) due to a decline in FPD-related investment
- Operating profit is expected to decrease to ¥22.5 billion (¥15.5 billion vs. medium-term business plan) in tandem with the decrease in net sales

(Unit: ¥1 billion)	FY2018 Results	FY2018 Forecast		
		1st Half	Full Year	Change YoY
Orders Received	218.5	98.6	206.0	-5.7%
Net Sales	220.7	97.5	205.0	-7.1%
Operating Profit	23.8	8.5	22.5	-5.6%
Ratio	10.8%	8.7%	11.0%	+0.2pt
Net Income	18.7	6.0	15.5	-17.0%
Ratio	8.5%	6.2%	7.6%	-0.9pt



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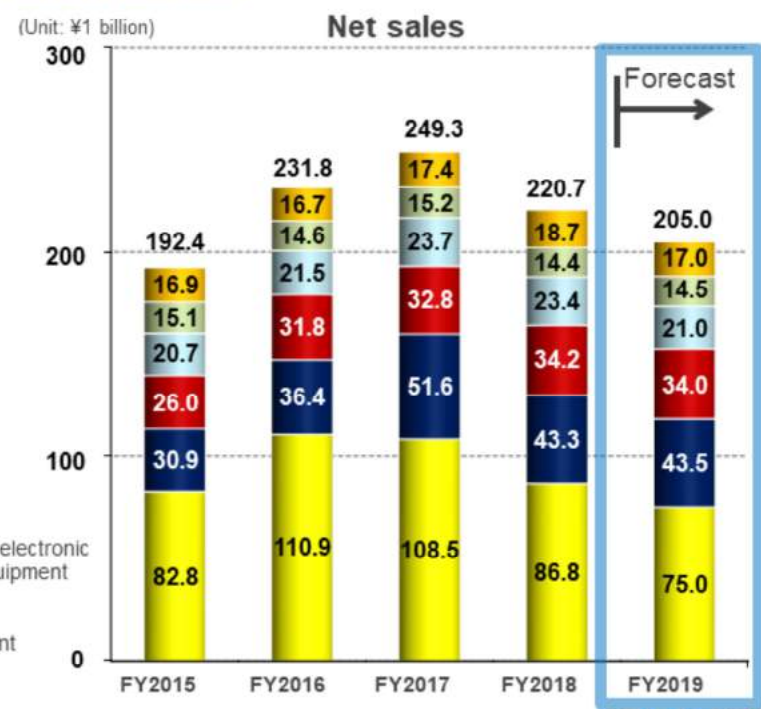
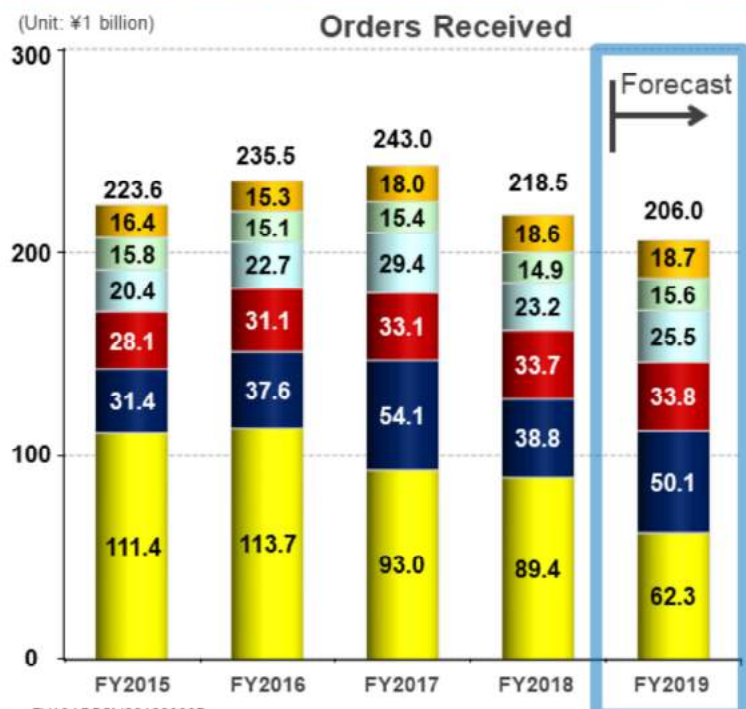
FPD-related investment has settled down, and net sales is expected to decrease year on year to 205 billion yen.

This is a negative 60 billion yen compared to the target of 260 billion yen in the final year of the medium-term management plan.

Due to the decrease in net sales, operating income is expected to be ¥ 22.5 billion, a decrease of ¥ 15.5 billion from the planned target.

FY2019 Full Year Consolidated Earnings Forecast (Orders Received and Net Sales by Segment)

- In FPDs, business talks regarding large-screen TV LCD production equipment have slowed, and the OLED investment plans for smart phone by our customers are most likely to be postponed to FY2020, so FPD-related orders received and net sales are both expected to decline as
- In semiconductors and electronics, both orders received and net sales are expected to increase owing to the resumption of investment in semiconductor memory anticipated in the second half



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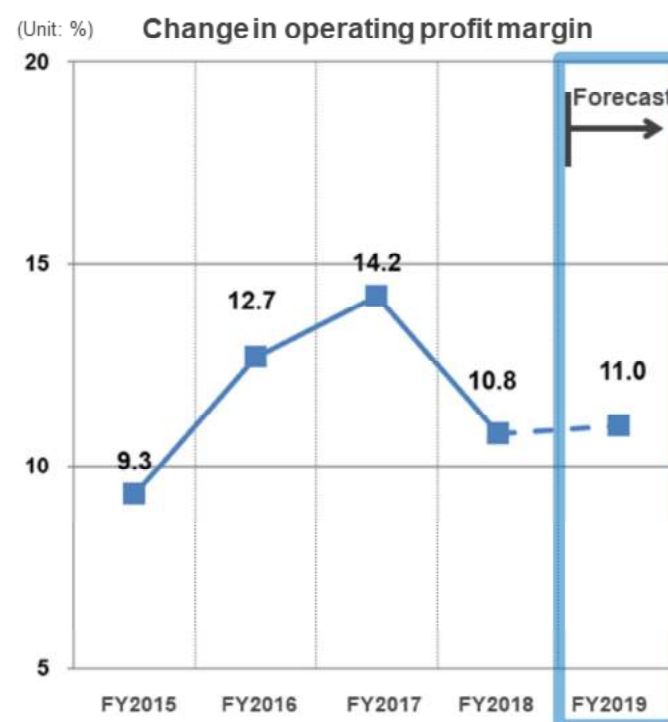
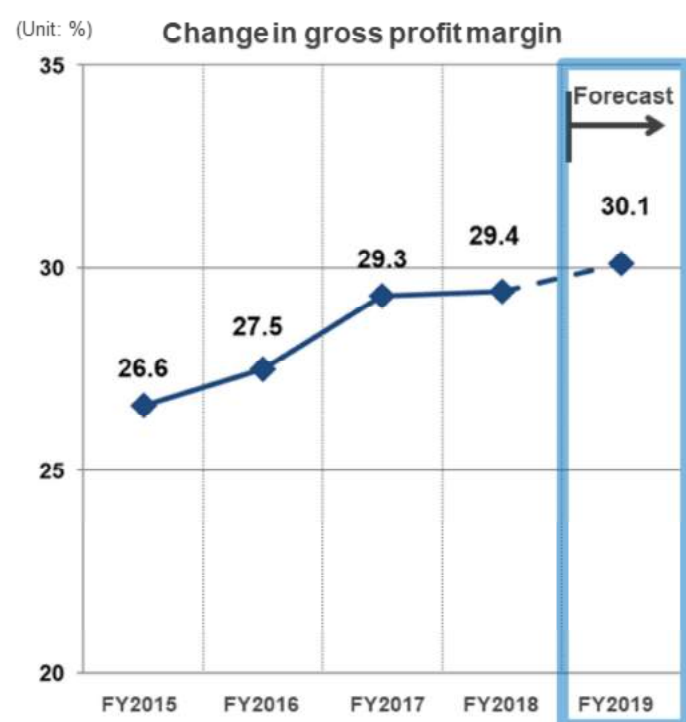
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In FPD-related fields, business negotiations for LCD manufacturing equipment for large-sized TVs have slowed, and our customer investment plan for OLEDs for smartphones is likely to be in the FY2020.

In semiconductor electronics, orders and sales are expected to increase in the second half due to the resumption of semiconductor memory investment anticipated to occur in the same term.

FY2019 Consolidated Earnings Forecast (Profit Margins)

- The gross profit margin is forecast at 30.1% and the operating profit margin at 11.0%



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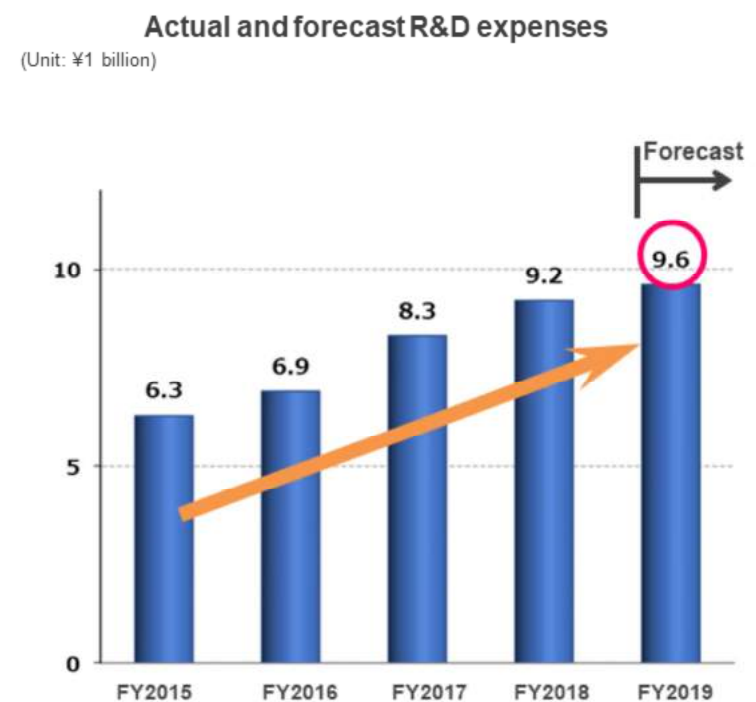
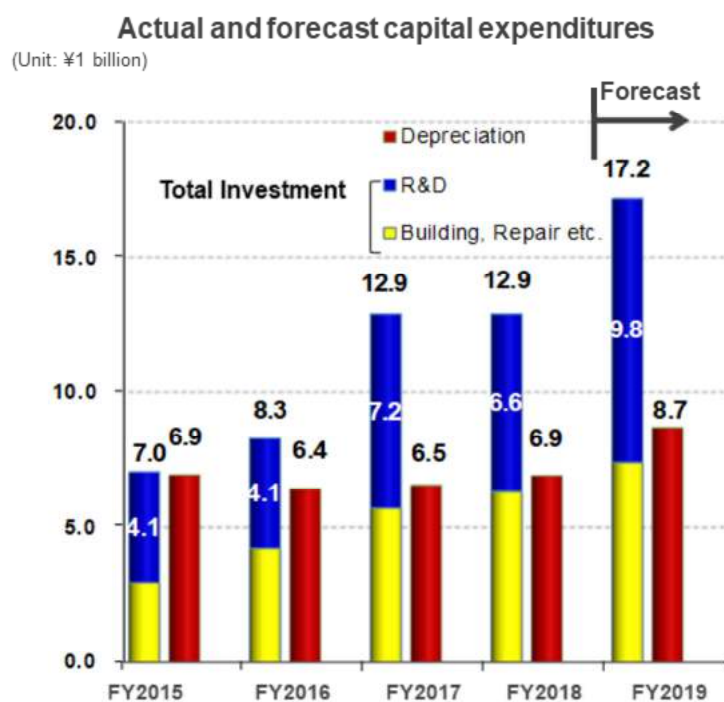
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The gross profit margin is expected to improve to 30.1% and the operating margin to 11.0%.

FY2019 Consolidated Earnings Forecast (Progression of Capital Expenditures and R&D Expenses)

- R&D investment (R&D capital expenditures + R&D expenses) was ¥50.0 billion in the medium-term business plan and is forecast to be more or less in line with the plan



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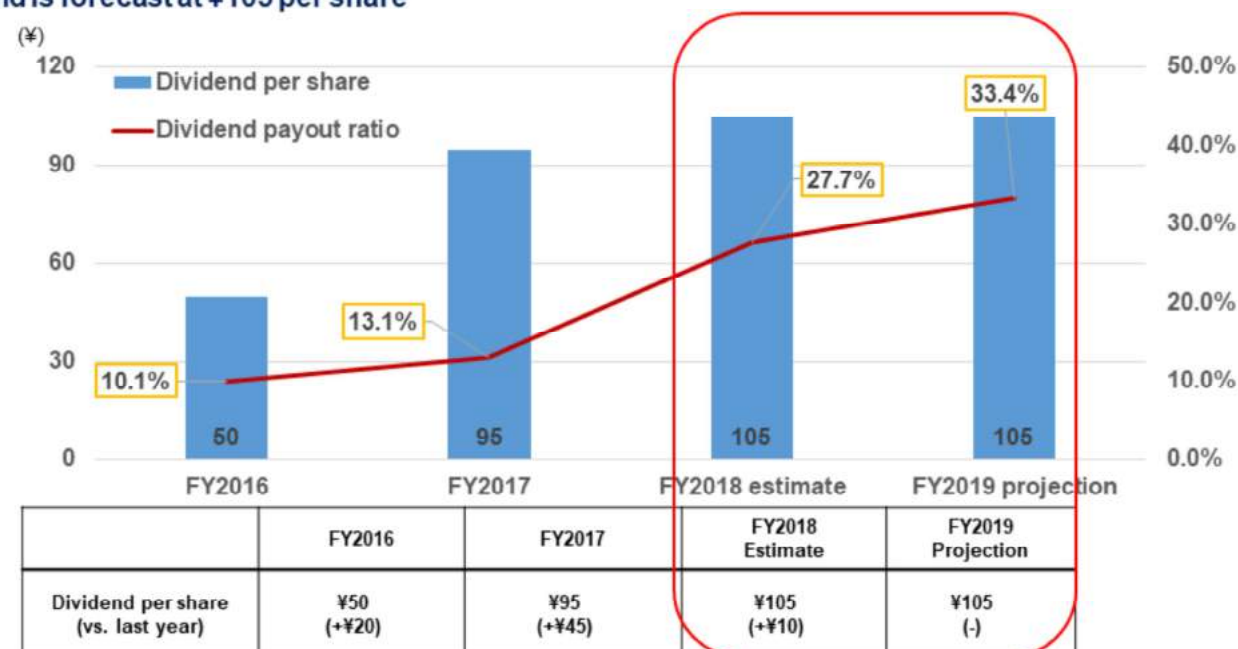
R & D investment (capital investment for R & D + R & D expenses) was planned to be 50 billion yen in the medium-term management plan, and it is almost as planned.

We are making development investments mainly in the business fields in which future growth is anticipated, such as Medium-to-large OLED, roll-to-roll deposition equipment for battery, logic and new nonvolatile memory, communication devices for 5G and power devices etc.

FY2019 Consolidated Earnings Forecast (Year-end Dividend)

Dividends are implemented giving full consideration to factors such as expansion of the financial base for further investment in growth, consolidated performance each year, and dividend payout ratio.

- The FY2018 dividend is ¥105 per share (up by ¥10), in line with the forecast
- The FY2019 dividend is forecast at ¥105 per share



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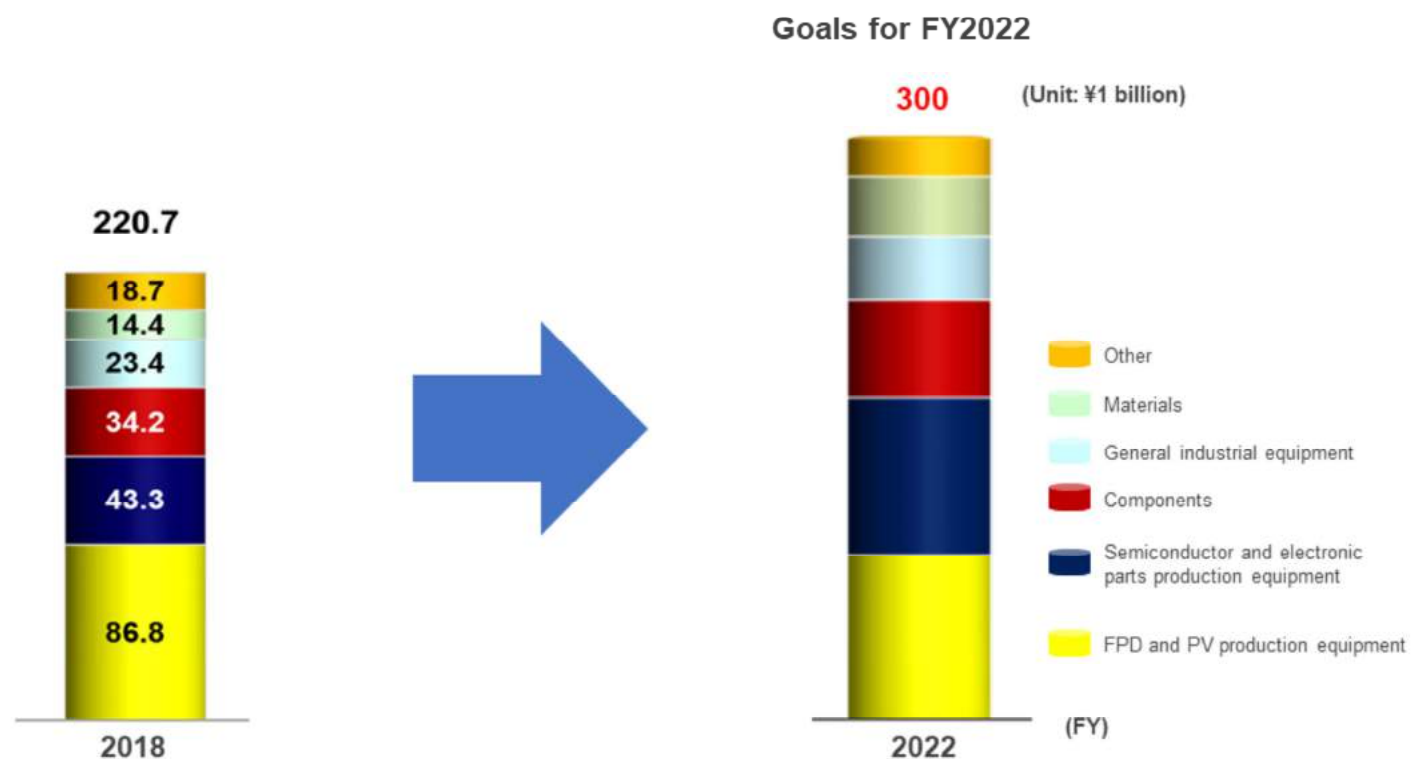
Dividends will be paid in consideration of the expansion of the financial base for further investment in growth, the consolidated performance and dividend payout ratio of each fiscal year.

The dividend for FY2018 is expected to be consulted at the general meeting of shareholders in September, which is 105 yen per share as expected.

This year's dividend is also expected to be 105 yen.

Goals for FY2022

Aim for net sales of ¥300.0 billion and an operating profit margin of 16% in FY2022 (no change)



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There are no changes to the target for net sales of ¥ 300 billion and operating margin of 16% in FY2022.

Currently, orders and sales are unstable as FPD investment is in a period of replacement, semiconductor memory investment has been delayed due to a temporary reaction, and the influence of the US-China trade friction. However, if we take a little long view, huge business opportunities, such as the growth of semiconductor electronics and the expansion of OLED panel applications due to the smart society, will coming soon.

ULVAC's Growth Strategy

Smart society: Shift to electronics in every industry

Global social problems: population expansion, aging population, concentration in cities

Shortage of
medical care

Shortage of food
and water

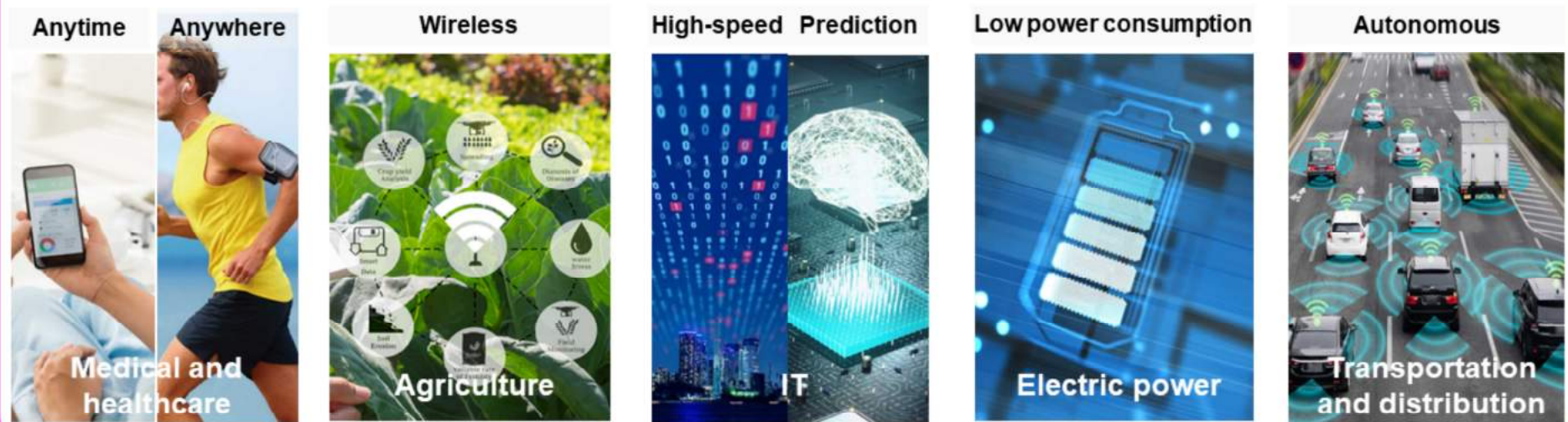
Shortage of energy

Traffic
congestion

Changes in the
natural environment

Technological solutions

Smart society



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The world is experiencing an accelerating phenomenon of population growth, aging and population concentration in cities.

This is a global issue involving all industries, and the cure is to enable the smart society through discontinuous evolution of technology transforming all industries by digitalization.

To support the realization of a smart society, data processing at high speed and low power consumption using innovative semiconductors and electronic devices, high-speed wireless communication, high-performance sensing, independent power supply and energy-saving power technologies are required, and the fusion of these technologies (integration) is also important.

Technology for enabling a smart society = Growth market

Applications



Smart systems



ULVAC's growth markets!!

Growth markets (key technologies)

Semiconductors (memory & logic), new non-volatile memory, MEMS, Sensors, Communication devices, Power devices, Li-ion batteries (LIB), Advanced packaging, OLED displays, Solar panels

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This page illustrates the relationship between the smart society and ULVAC.

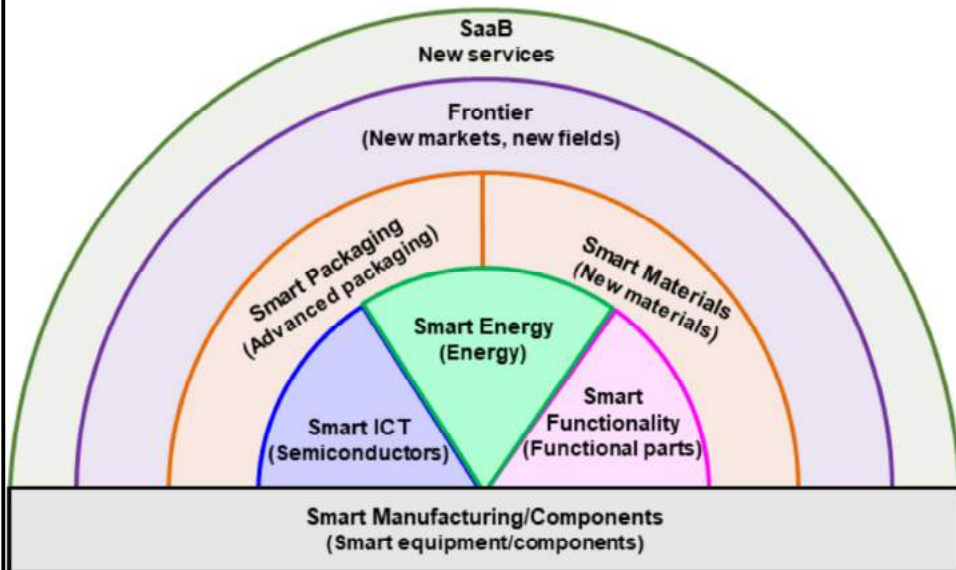
We can already feel the Smart society within our everyday life, and the evolution of technology in this "APPLICATIONS" group has made remarkable progress.

The industries and application fields that are currently experiencing rapid growth are exactly those described here, and the technologies and industries that realize the electronization of all industries are growth markets.

ULVAC possesses key technologies essential for key devices, of the expected growth markets.

Creating growth markets (key technologies): ULVAC's technology strategy

**Growth markets ⇔
technology strategy**



	Field	Description
3	Smart ICT (Semiconductors)	Semiconductor logic, Memory, Communication devices
	Smart Functionality (Functional parts)	MEMS sensors, Displays
	Smart Energy (Energy)	Power devices, Li-ion batteries (LIB), Solar panels
2	New Packaging (Advanced packaging)	Heterogeneous integration
	New Materials (New materials)	Environmentally friendly materials, Quantum dots
1	Smart Manufacturing/Components (Smart equipment/components)	Cyber security, Digital transformation, Digital twins, Components
F	Frontier (New markets, new fields)	Neuro-computing, Quantum computing, Biomedical
S	SaaS (Service as a Business)	New services

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The following three key factors is essential for the growth of ULVAC with the smart society, and these factors is also the strengths of ULVAC.

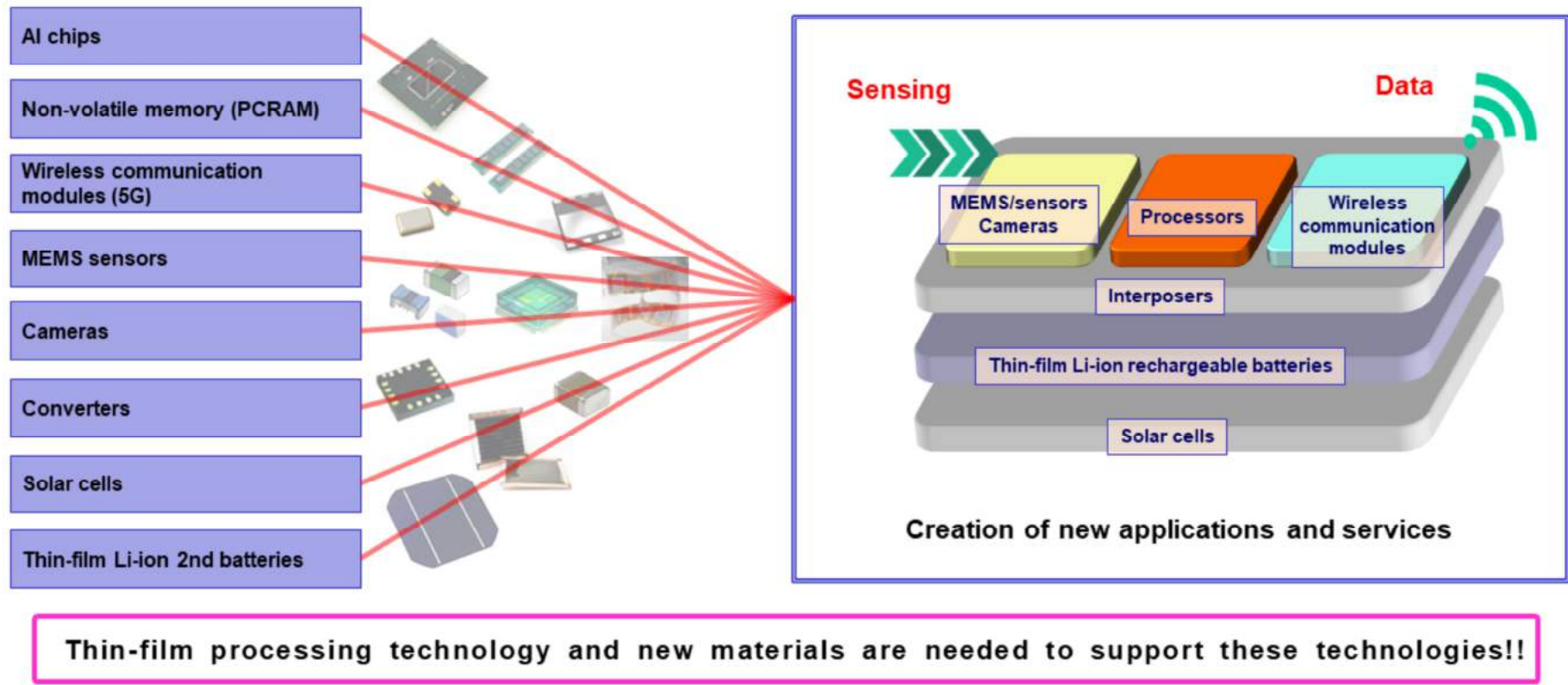
1. To possess competitive superior technologies and products that meet the requirements of key devices in growing markets.
2. Fusion of various technologies and to have a wide range of technologies, product lineups and platforms that meet integration requirements.
3. Possess a global strategic technology and business collaboration that can follow the speed of technological evolution in growth markets, own technologies that can be deployed in high-growth regions such as China and possess mass production supply chains.

The chart on the left shows ULVAC's technology strategy for the growing market of the smart society.

In particular, IoT, AI, and autonomous driving require new devices, and such key devices requires mass production technologies for the leading-edge semiconductors, communications, MEMS sensors, power devices, batteries, and displays. In addition, new materials and new packaging (integration) technologies needs to be utilized. Also, new services such as components necessary to enhance the performance of manufacturing equipment and digital transformation, as well as initiatives for cyber security, are necessary.

Based on this strategy, ULVAC is developing technologies and products, strengthening global collaboration, and developing regional supply chains and preparing for the growing markets within the smart society.

ULVAC's technical advantage: Integration of core technologies (semiconductors, electronic device, energy, packaging)



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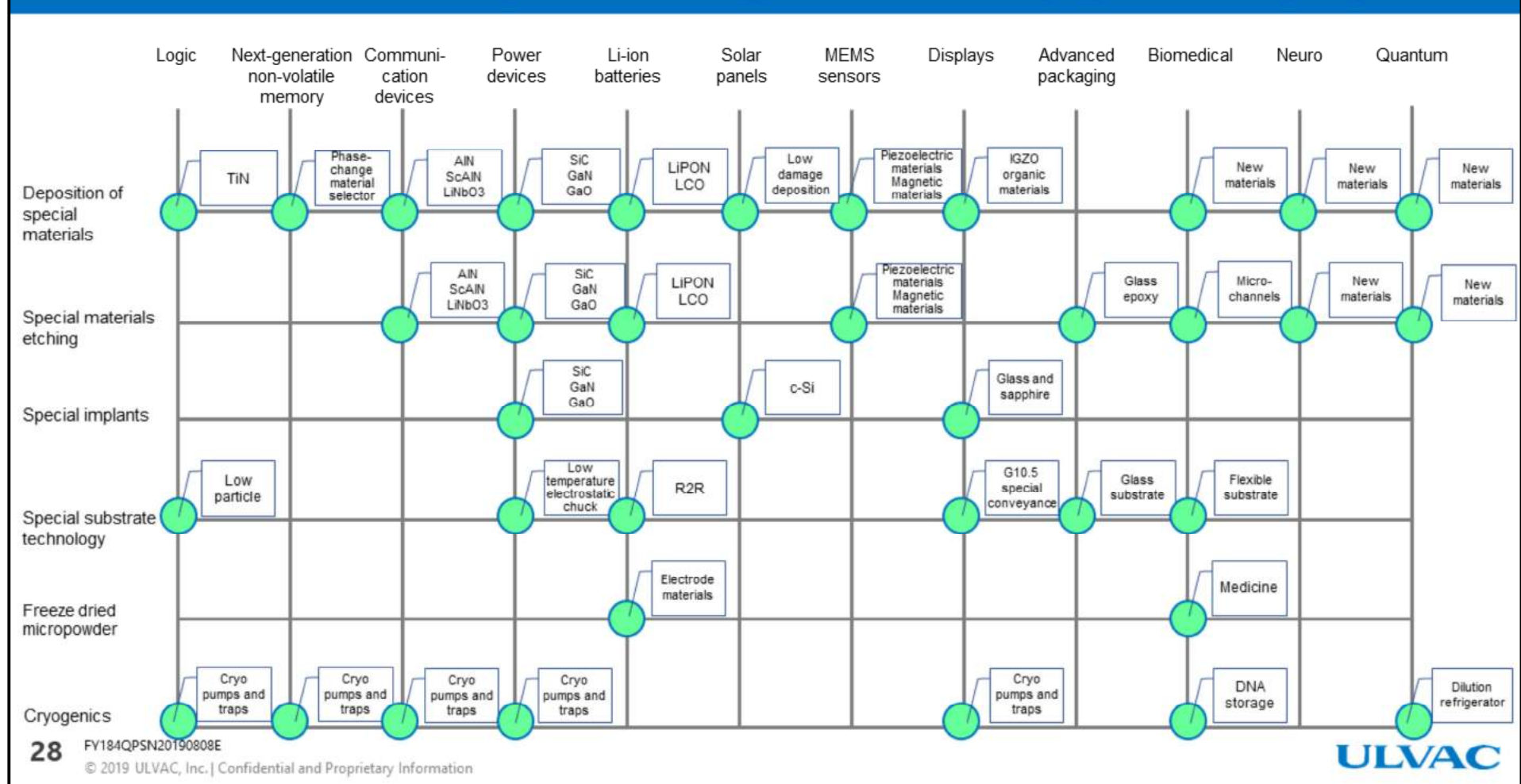
The chart shows examples of next-generation edge devices for users and terminals that are required in large quantities in the smart society.

What is unique is that various devices are integrated into one package.

An example case will be sensing data based on semiconductor, communication, and MEMS technologies will be calculated and decided by its own, then only necessary data is transmitted to the cloud. Charging and battery replacement can be eliminated by installing a power source that integrate a lithium secondary battery and a solar panel (independently driven).

Ulvac's major advantage is the ability to provide a wide range of technology coverage as an one stop platform, including technologies to handle microdevice to very large-substrates, various film deposition and processing technologies in realizing these integrated devices.

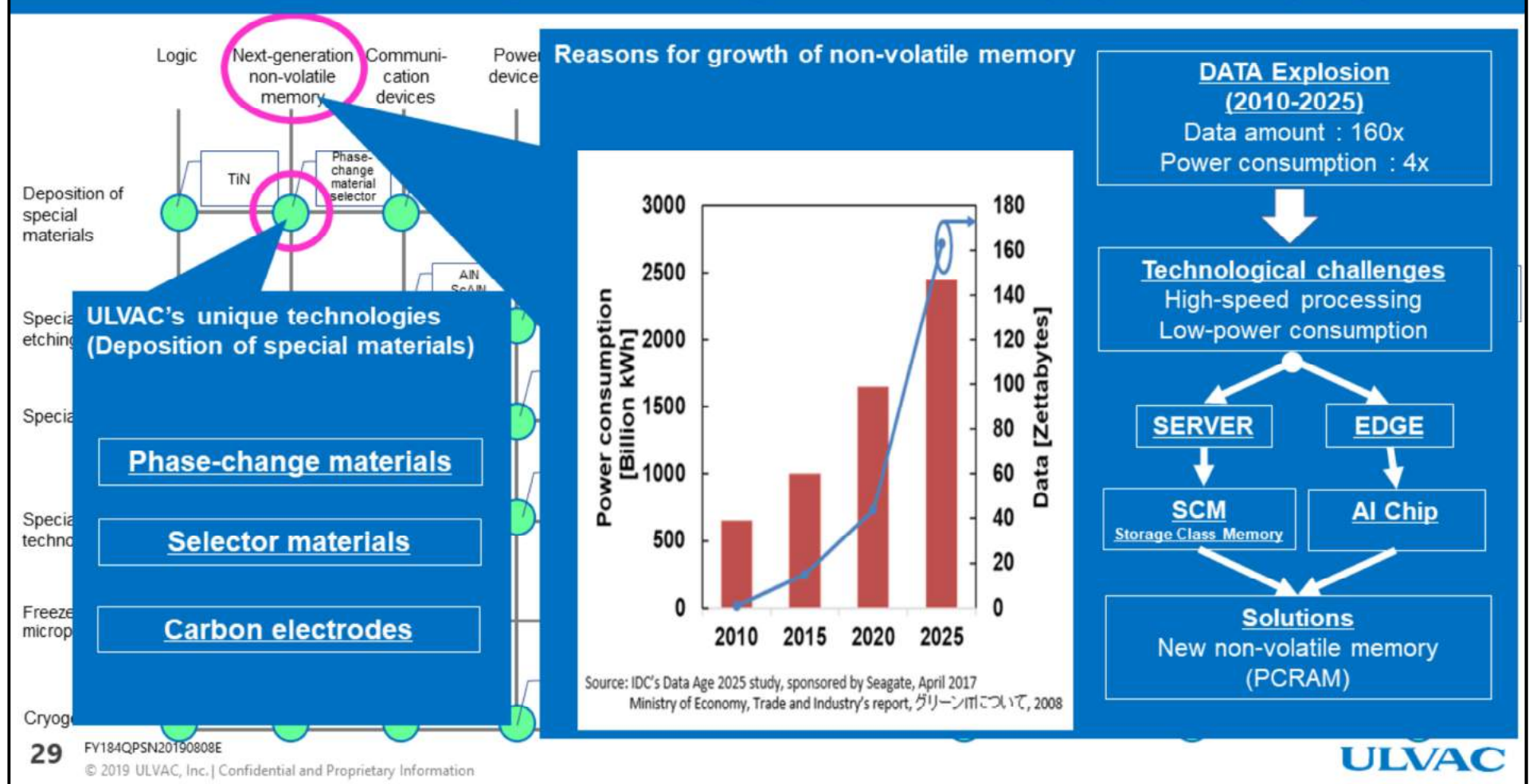
ULVAC's technical advantage matrix for growth markets (key technologies)



The matrix expresses the growth markets in a smart society on the horizontal axis and the advantage of ULVAC (differentiator) technology on the vertical axis. The green dots indicate the interface between growth markets and ULVAC's advantage technologies and show ULVAC's strong ability to capture business in these growing markets.

A specific example is listed on the next page.

ULVAC's technical advantage matrix for growth markets (key technologies)



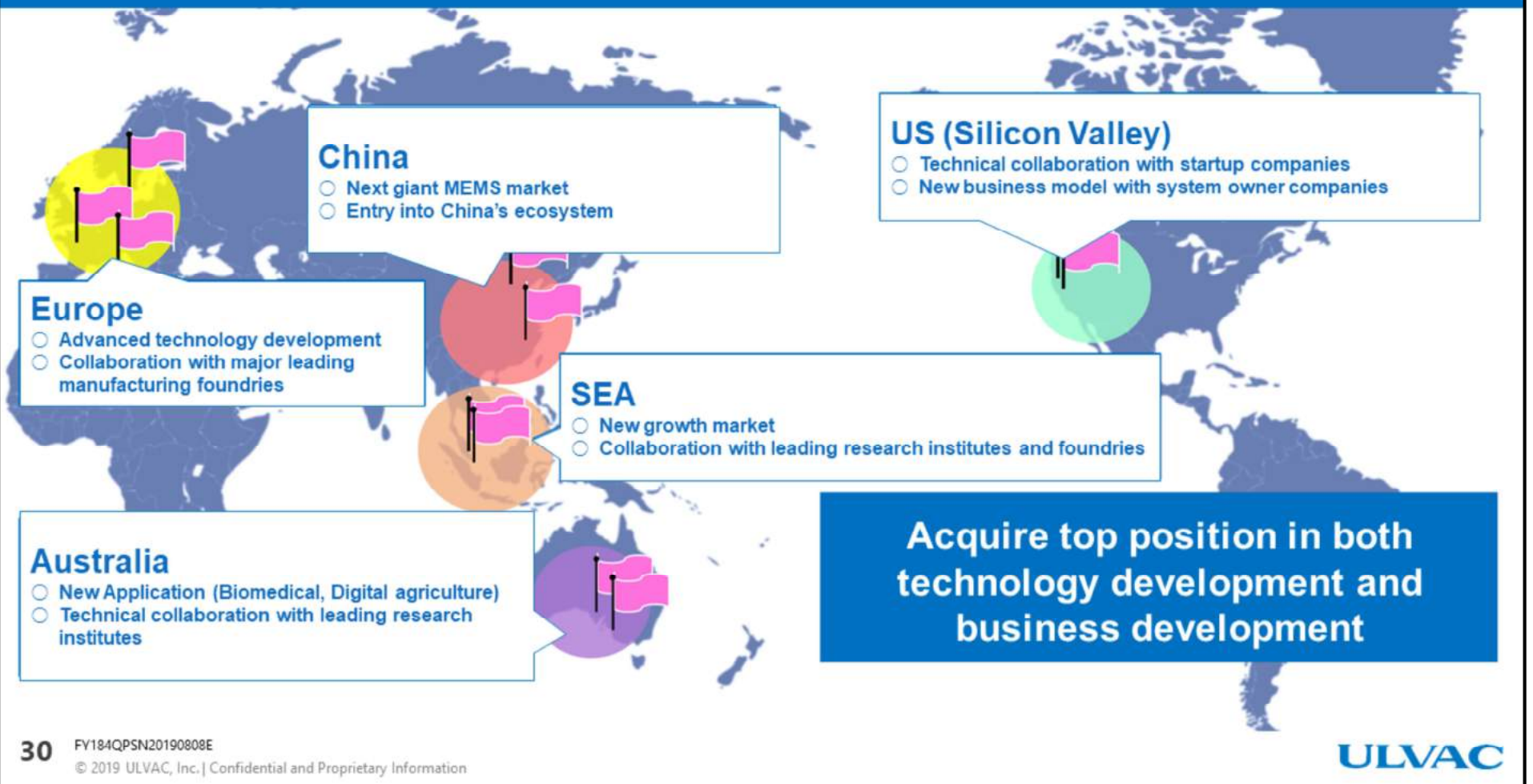
This section introduces the semiconductor memory field as a specific example.

The volume of data generated worldwide will increase by 160 times (data explosion), and the power consumption needs to be technically solved for the sustainable growth of human and the society.

The technical solution requires high-speed processing, low power consumption, and implementation of AI. New non-volatile memory (New NVM) such as PCRAM is a powerful solution used as storage class memory (SCM) within the cloud, and in addition, is a leading candidate for AI memory at the Edge.

ULVAC is the global leader and the only equipment company enabling 3D type PCRAM at a mass production level. Such results come from a 25year development history, holding many special key technologies within the PCRAM field.

ULVAC's strategic collaborations in PiezoMEMS



ULVAC is in active collaboration both in technological and business development.

As an example, this page shows ULVAC strategic collaboration in the PiezoMEMS field which is the most growing market area within the MEMS.

By collaborating with; several major leading European companies that have advanced device technologies and are major mass production manufacturers, leading research institutes and foundries in China and Southeast Asia , and core companies in Silicon Valley that are technology users and other regions, we are recognized as a leader in both technology and business development.

ULVAC's geographic structure

**Local production systems, supply chains, and networks
built in individual expanding markets and regions**



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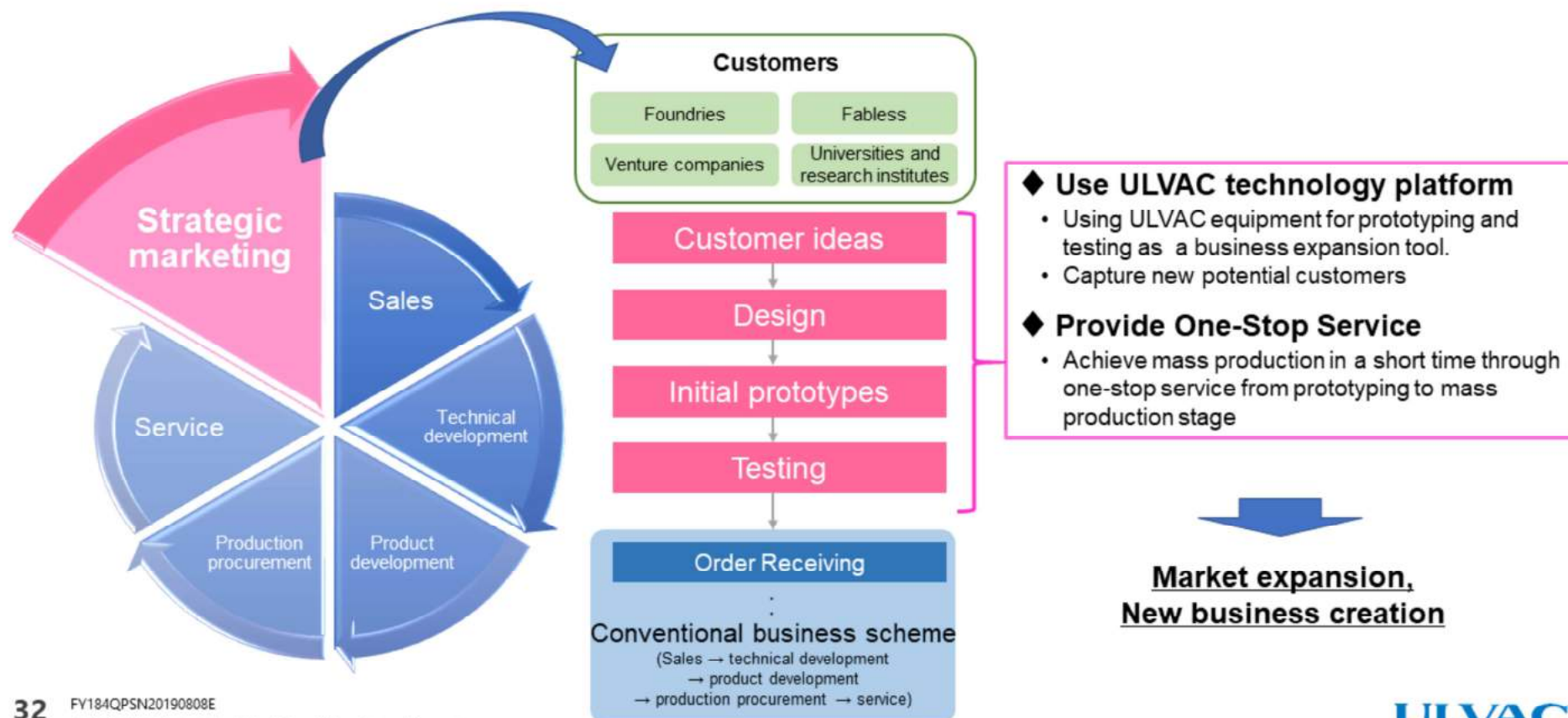
ULVAC

This figure shows the high-growth regional strategy. In China and other high-growth regions, we are strengthening not only technology collaboration but also building our own supply chain and factories to manufacture equipment and customer service (CS).

ULVAC currently holds seven large factories located globally. In China, we built our own manufacturing supply chain and strengthening our customer service on a global basis. ULVAC is prepared to correspond to the high-growth regional markets

Realizing new value: SaaS (Service as a Business)

Attract new customers by using ULVAC's wide technical coverage, strengthen marketing



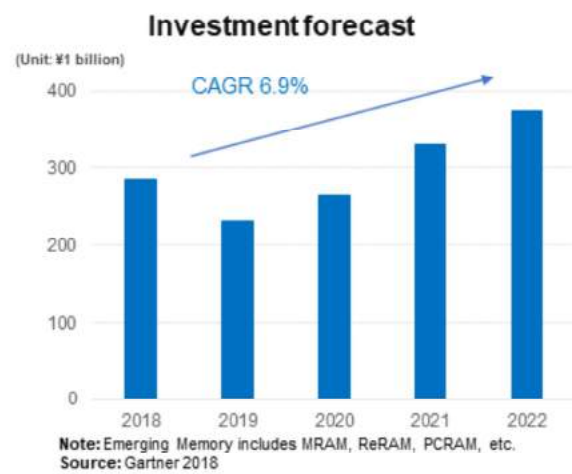
To provide new value, ULVAC will offer a platform utilizing ULVAC's wide range of technologies to support initial verification of new devices and materials for customers.

Customers will be able to carry out from prototype to verification of production in one stop, enabling cost saving and intellectual property preservation.

Benefit for ULVAC will be; Acquire new potential customers, early access to new technologies and business development through prototype services (increase in income). Additionally, expanding equipment sales through acquisition of production POR equipment status data. Expectations can be high both from Technology and Business perspective.

ULVAC wide range of technologies and a strong development will enable significant contributions to future growth.

New non-volatile memory: PCRAM



Semiconductor production equipment

Characteristics and market growth

- Focus on PCRAM and other non-volatile memory, which have the characteristics of both DRAM (faster processing speed) and NAND (memory preserved even when the power supply is cut), in order to increase processing speed and conserve energy
⇒ expectations for future expansion
- Based on the technology strategy and market development of manufacturing leaders using ULVAC equipment, the market will expand by responding to requests for higher data capacity and low latency through 5G and IoT over the medium-term

ULVAC's strengths

- Being the only sputtering system supplier to enable mass-produced film deposition for PCRAM, we have provided mass production results to several manufacturers and work in partnership to support the development for their next-generation products

Growth strategy

- Based on our one and only mass production experience, we can work in partnership with IC manufacturers to support the development for their next-generation products while striving to improve productivity

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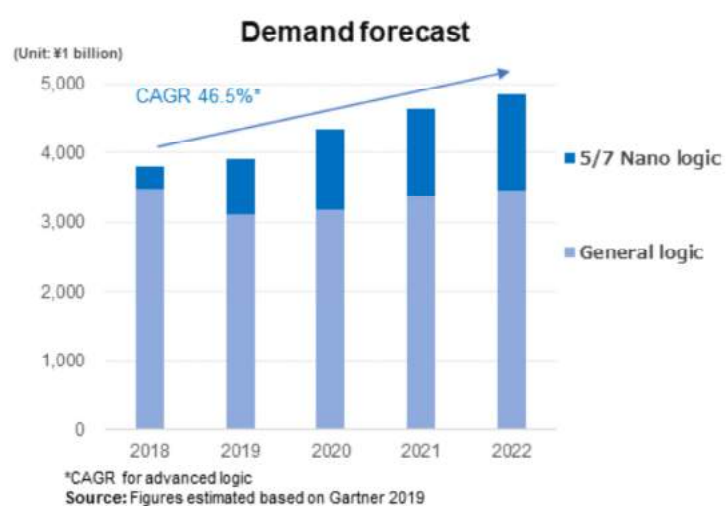
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For your reference

Logic



Characteristics and market growth

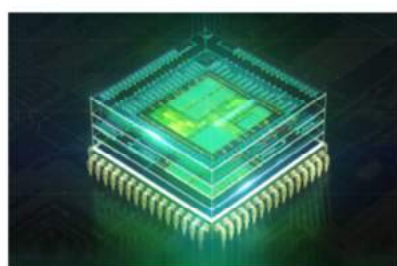
- Logic market maintains at a stable size of CAPEX
- Adoption of EUV lithography will accelerate mass production of advanced miniaturized products
⇒ Boost up the mobile and AI fields
- Start of investment in the mass production of advanced miniaturized products

ULVAC's strengths

- Two major companies have decided to adopt ULVAC's equipment as standard solution in key processes of miniaturization through EUV lithography (Highly rated by Easy-to-combine processes, stable, competitive in CoO,* etc..)
- *CoO: Cost of Ownership

Growth strategy

- Support next-generation development toward expanding mass production and further miniaturization, and also promote to increase more solution



Semiconductor production equipment

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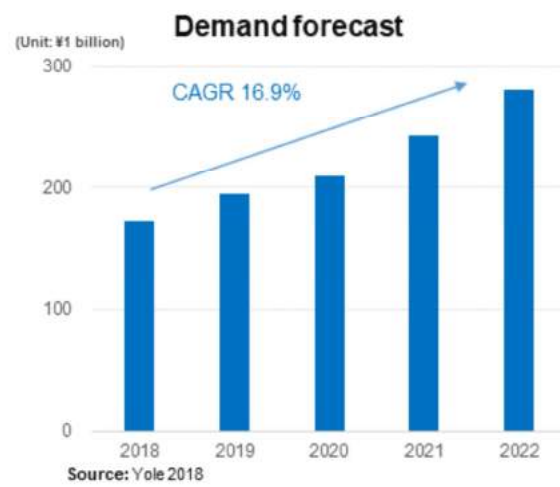
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MEMS sensors



Characteristics and market growth

- Expansion of market for VR/AR, microphones, LIDAR, and other sensors to support 5G/smart society
- Anticipated expansion of applications and markets by raising the performance and lowering the cost of MEMS devices used in sensors

ULVAC's strengths

- Achieved low-temperature process using PZT sputtering equipment
 - ⇒ Enable PZT thin-films on CMOS
 - ⇒ Enable development and production of high-performance MEMS devices

Growth strategy

- Leverage our PZT-MEMS sputtering equipment technology, which we launched ahead of our competitors
- Capture market share by using the advantage being the first development, mass production supplier working with major research institutes and manufacturers in Europe and Asia
- Support next-generation process development



PZT-MEMS production equipment

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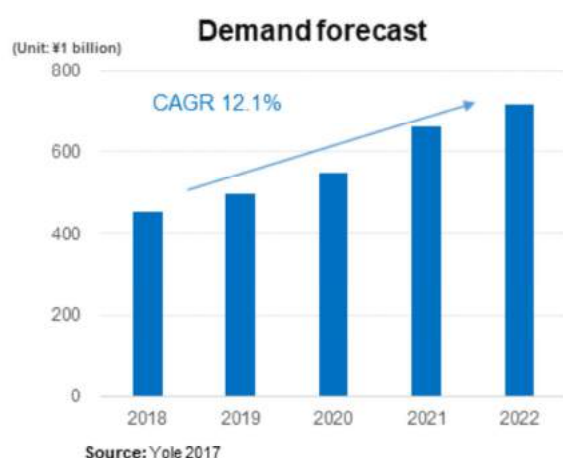
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Power Devices



SiC power device production equipment

Characteristics and market growth

- Increase in Si-IGBT production expected mainly for Japanese automobiles
- Increase in market entries by Taiwanese, Chinese, and South Korean manufacturers (China particularly is moving in the direction of domestic-made products: currently around 5%)
- In China and Europe, demand for SiC for replacements in electric vehicles is expected starting around 2023

ULVAC's strengths

- Si-IGBT experience in Japan (more than 100 units for sputtering of 200 mm mass production line (backside))
- Maintain a share of nearly 50% in stable high-temperature injection technology for SiC implants

Growth strategy

- In addition to the existing 200 mm sputtering equipment, we will add 300 mm to the development lineup to maintain and increase our share
- Ion injection increases incoming orders by promoting equipment that is cost-effective due to in-house sourcing of ions, 300 mm-compatible equipment, and by installing Si-IGBT mass production lines

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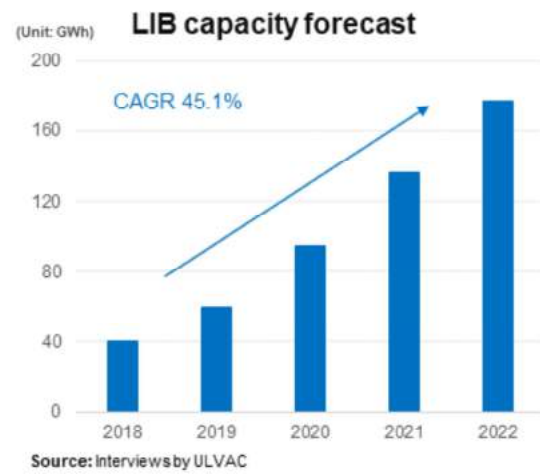
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Next-generation Li-ion Battery



RTR Li-ion battery production equipment

Characteristics and market growth

- In-vehicle LIB demand: 40 GWh in 2018 \Rightarrow 177 GWh in 2022
- The challenge is to increase the running distance of electric vehicles (EV)
 \Rightarrow Need to increase in-vehicle LIB capacity, reduce size and weight, develop quick recharging capability, etc.
- Solution: Focus on lithium metal thin film (vacuum evaporation using RTR*) as a negative electrode material for next-generation LIBs

ULVAC's strengths

- Collaboration with leading companies, universities, and research institutes
 \Rightarrow Establish RTR*-type metal lithium evaporation technology
- Developing and testing mass production manufacturing with leading companies (use experience in two-sided deposition for LIBs)

*RTR (Roll to roll: ULVAC's market share is over 90% in RTR evaporation equipment for in-vehicle high-capacity capacitors)

Growth strategy

- Support the advancement of mass production for leading global battery manufacturers using technology experience of RTR evaporation and RTR metal lithium evaporation (two-sided deposition equipment)

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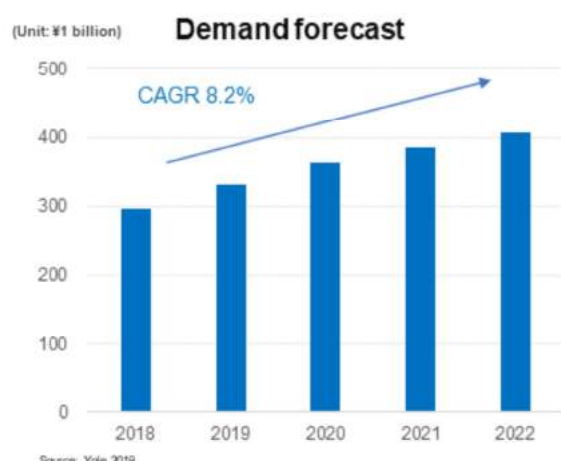
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Advanced packaging (heterogeneous packaging)



Advanced packaging production equipment

Characteristics and market growth

- Development of diverse chip packaging (heterogeneous) and fan-out solutions for smaller and more precise sensors, communication devices etc. ⇒ Expansion of the packaging market
- In addition to investment of increased production in the WLP* market, PLP* production equipment construction for mass production and cost reduction as well as the technological revolution will expand the market

ULVAC's strengths

- Certified ashing equipment used in the world's largest foundries for the descum etching process
- Use of PLP* to demonstrate technical ability in panel deposition developed through FPD deposition experience

*WLP: Wafer Level Packaging (conventional)

*PLP: Panel Level Packaging, which makes large-scale high volume manufacturing possible

Growth strategy

- Multifaceted development based on experience in the world's largest foundries
- Promote PLP-compatible development with leading manufacturers by using FPD deposition technology
- Realize mass production and cost reduction for WLP solutions
- Meet customer needs by recommending processes and equipment solutions for ashing, etching, and sputtering

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ULVAC vacuum technology contributes to many industries and applications



Automobile
自動車



Semiconductor
半導体



Flat Panel Display
フラットパネルテレビ



Photovoltaic
太陽電池



Food Processing
食品



Aircraft
航空



Bio
バイオ



Smart Phone
スマートフォン



Magnetic Device
磁気デバイス



Home Appliance
家電製品



Aerospace
宇宙産業



Pharmaceutical
医療・薬剤



Wearable/VR
ウェアラブル/VR



Power Device
パワーデバイス



MEMS Device
MEMS デバイス



Architectural Glass
建材・スマートガラス



Optical
光学



Flexible
フレキシブル



Packaging Materials
パッケージング



Next Generation Light
次世代照明

Vacuum technology /
for manufacturing
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