【Speakers】

Participants	As of June 8, 2022	As of July 1, 2022
Tetsuo Tsuneishi	Corporate Director, Chairman of the Board	Retired
Toshiki Kawai	Representative Director, President & CEO	Representative Director, President & CEO, Corporate Officer
Sadao Sasaki	Representative Director, EVP & GM GM of Development & Production 1st and 4th Division, GM of Corporate Production Division	Representative Director, SEVP & GM, Corporate Officer GM of Development & Production 1st Division, GM of Corporate Production Division
Yoshikazu Nunokawa	Corporate Director, EVP & GM GM of Global Business Platform Division, Finance	Corporate Director, Chairman of the Board of Directors
Seisu Ikeda	Corporate Director, SVP & GM GM of Account Sales Division	Corporate Officer, EVP & GM GM of Account Sales Division
Yoshinobu Mitano	Corporate Director, SVP & GM GM of SPE Business Division	Corporate Officer, EVP & GM GM of SPE Business Division
Takeshi Okubo	SVP & GM GM of Global Sales Division	Corporate Officer, EVP & GM GM of Global Sales Division, GM of Field Solutions Business Division
Hiroshi Kawamoto	VP & GM, Tokyo Electron Miyagi	VP & GM Deputy GM of Global Business Platform Division, GM of Finance Unit
Yohei Sato	ATSBU GM	ATSBU GM
Noritaka Yokomori	Deputy GM of Corporate Innovation Division, DX	Deputy GM of Corporate Innovation Division, DX

Moderator: Koichi Yatsuda - VP, IR Department

Now, it's time for us to start the Tokyo Electron Medium-Term Management Plan Briefing. Thank you very much for your participation today despite your busy schedule. I am Koichi Yatsuda of the IR Department, acting as a moderator of today's session.

This will be our sixth Medium-term Management Plan briefing, but the first in three years. This year, we have generated a new Medium-term Management Plan, and each person in charge will explain the contents of the plan, including its strategies.

Prior to the presentations, let me explain the flow of today's briefing. For the agenda and the participants from Tokyo Electron, please refer to the presentation materials for this briefing posted on our website. You will hear a 2 hour and 15-minute presentation with a 5-minute break in between. After all presentations, we will have a question and answer session. Questions will be answered by today's participants.

This briefing is being delivered simultaneously in two languages, Japanese and English, using two Zoom channels. However, all the presentations will be given in Japanese with English subtitles. As we recently announced via email, if you wish to listen to audio only, you may do so by phone. But, if you wish to view English subtitles of the presentations or ask questions, please use the app on your PC or mobile device.

In addition, since this briefing is intended for institutional investors and analysts, we will take questions from institutional investors and analysts only. We will post the video of this briefing in Japanese and English on our website within a couple of days, so please access our website if necessary.

First, the CEO, Tony Kawai, will give a presentation on "The New Medium-term Management Plan".

The New Medium-term Management Plan

Toshiki Kawai - Representative Director, President & CEO

Good afternoon. I am Tony Kawai of Tokyo Electron Limited. Thank you for joining us today at the Medium-term Management Plan briefing.
As the importance of semiconductors rise due to the development of IC Technology, the Semiconductor Production Equipment (SPE) market is growing to the next stage. I will review our activities and achievements, then explain the newly generated Medium-term Management Plan to realize our growth potential.
Now, I would like to go on to the presentation.

Agenda: Slide 5

Here is the agenda. To highlight some of our activities, I will first go over the Medium-term Management Plan that targeted FY2024 and our major achievements. This will be followed by an explanation of the business environment and new Medium-term Management Plan.

FY'22 Financial Highlights: Slide 6

This shows the highlights of FY2022, reviewed in the financial announcement on May 12th. As business in the segments we focused on progressed our strategy, we reached new records by generating net sales of 2 trillion, 3.8 billion yen, gross profit margin of 45.5%, operating income of 599.2 billion yen, and operating margin of 29.9%. Also, ROE was 37.2%, which also significantly surpassed the Medium-term Management Goal of 30% or more.

Progress on the Medium-term Management Plan: Slide 7

As a result, we have achieved the Medium-term Management Plan financial model that was announced in 2019, setting the operating margin and ROE target based on net sales two years ahead of the original timeline.

Major Achievements and Initiatives on the Medium-term Management Plan: Slide 8

This is due to the technical experience we have nurtured over the years, solid trust from our customers, and because our employees were able to demonstrate their challenging spirit. In 2021, we experienced approximately +60% year-on-year growth, greatly outperforming the WFE growth of +42%. At the same time, we grew our share in the WFE market. By creating high value-added, one-of-a-kind products, we succeeded in increasing market share and expanding SAM, contributing to these results to build a greater future. Another large factor is that we have continued growth investments, with over 40 billion yen spent on R&D expenses, every year for the past 3 years. All of these results were achieved because of everyone's support. Thank you very much for all of your support.

Agenda: Slide 9

Next, I will explain the business environment, followed by the New Medium-term Management Plan aiming for further growth and increasing corporate value.

Spread of IoT · AI · 5G and Accelerating the Digital Shift: Slide 10

Now, digitalization in the world is progressing with the spread of IoT, AI, 5G, and so on. But this is just the beginning. The world is currently pushing firmly ahead with the implementation of ICT and DX, as well as taking action to realize a carbon-free society in order to build a strong and resilient society in which economic activities do not stop under any circumstances.

World Data Traffic: Slide 11

Reflecting on the past, the 1990s were called computer-centric, in which personal computers were driving the market. We then entered the mobile-centric 2000s, when smartphones drove the market. Today, the world has become data-centric, and world data traffic is expected to increase at an annual rate of 26% and will be 10 times the current level by 2030.
In addition to Bits, which refers to conventional computers such as PCs and servers, we expect to see further advances in computing, such as Qubits, which refers to quantum computing, and Neuron, which mimics the movement of the human brain.
As a result, if data volume continues to increase at an annual rate of 26% after 2030, it is expected to be 100 times the current level by 2040.

Outlook for the Semiconductor Market: Slide 12

With this accelerating transition to a data-driven society, semiconductors, which support the foundation of this transition, are becoming even more important. In 2021, the semiconductor market exceeded US $500 billion for the first time. In 2030, the semiconductor market is expected to more than double its current size to over US $1.35 trillion, and is expected to continue to expand further as demand grows due to the synergistic effects of "products and value," and the emergence of various products and services in conjunction with the development of ICT.

WFE Market: Slide 13

Accordingly, the WFE market was approximately US $90 billion in 2021. In 2022, the market is expected to expand by nearly 20% due to further growth in demand for devices for data centers. We expect the market to grow further in the future due to the evolution of ICT, DX, decarbonization, electric vehicles, autonomous driving, and post-5G.

The New Medium-term Management Plan: Slide 14

During this time of such great growth opportunities, as shown here, we have set new financial targets of over 3 trillion yen in net sales, over 35% in operating margin, and over 30% in ROE by FY'27 as the new Medium-term Management Plan aiming for world-class profits. As a manufacturer, we will strive to outperform the market growth and further develop the company while aiming for an operating profit of over 1 trillion yen.

Material Issues: Slide 15

In order to achieve the targets of the new Medium-term Management Plan, we will further refine our material issues, which consist of four items. We will strive to build "product competitiveness" by continuously creating next-generation products with high added value, "customer responsiveness" as the sole strategic partner based on relationships of absolute trust with customers, "higher productivity" to pursue operational efficiency, and "a solid management foundation" to support our business activities.

Continue to Invest Aggressively on R&D: Slide 16

In particular, we will aggressively invest in R&D to create next-generation products that have high added value and that the world has never seen. We have invested approximately 600 billion yen in R&D over the past five years, and plan to invest more than 1 trillion yen over the next five years starting from FY2023.

Further Increasing Corporate Value: Slide 17

So far, as shown on the left side of this slide, I have discussed key measures to achieve our new financial goals of world-class sales and operating margin and ROE.
We will also strengthen our sustainability initiatives, including safety, quality, compliance, engagement, and risk management and security, as shown on the right side of this slide. We are committed to "offensive and offensive management," with our defenses as our strengths.

Won the Grand Prize Company in the Corporate Governance of the Year® 2021: Slide 18

In January of this year, we were awarded the Grand Prize Company in the "Corporate Governance of the Year 2021" competition sponsored by the Japan Association of Corporate Directors. As shown in the feedback on the right side, our aggressive stance on ESG, along with our aggressive stance to achieve our financial targets, were highly evaluated.

TEL's Corporate Principles: Slide 19

In response to these growing social expectations and evaluations of our company, we have redefined our Corporate Philosophy, which consists of our Mission, Vision, and Values.
Our Corporate Philosophy is our Mission, and it expresses the purpose of TEL’s existence and its mission in society.
The Vision represents the key priorities for realizing the Corporate Philosophy. We have also sublimated the attitudes, codes of conduct, and values that each and every employee value into "TEL Values," which form the basis of all of our activities.
We have now formulated a new Vision for the year 2030.

New Vision: Slide 20

The new Vision is shown here in bold: "A company filled with dreams and vitality that contributes to technological innovation in semiconductors.”
The three sentences below explain what we hope to achieve in this one line.

- Pursuing technological innovations in semiconductors that support the sustainable development of the world.
- Realizing medium- to long-term profit expansion and continuous enhancement of corporate value by leveraging our expertise to continuously create high value-added, leading-edge equipment and technical services.
- Striving to realize our Vision through engagement with our stakeholders along with the concept that “our corporate growth is enabled by people, and our employees both create and fulfill company values”.

In addition, our corporate message, "Technology Enabling Life," expresses our Corporate Philosophy.

TSV : TEL’s Shared Value (TEL’s CSV): Slide 21

This new Vision is based on the concept of CSV: Creating Shared Value.
CSV is the concept of creating social and economic value by leveraging corporate expertise to solve social issues, thereby enhancing corporate value and achieving sustainable growth.
As semiconductors continue to grow in importance as an indispensable element in the "development of a dream-inspiring society," we will continue to develop our business activities based on the concept of TSV: TEL's Shared Value, which is to contribute to technological innovation in semiconductors.

Our Approaches to Social Issues: Slide 22

This slide shows how we will create social value through our business activities. Today, there are many social issues that need to be resolved for the sustainable development of the world. These include disparities in education, health, and medical care; urbanization and associated transportation issues; global warming and extreme weather. Various technologies and solutions are expected to solve these social issues. And in semiconductors which are indispensable for the technological evolution, greater capacity, higher speed, higher reliability, and lower power consumption are being demanded even more. By pursuing technological innovation in semiconductors, we will strive to create social value as well as short-, medium-, and long-term profits and continuous enhancement of corporate value.

Vision & New Medium-term Management Plan: Slide 23

This is a summary of what I have explained today. We will work on the goals to realize our Vision for 2030 and aim to achieve the Medium-term Management Plan as the halfway point of the Vision.

Approaches to Sustainability: Slide 24

This is the E-COMPASS initiative for the entire supply chain, which we have already announced. We are working on this from the three main perspectives of:

- contributing to higher performance and lower power consumption of semiconductors;
- improving environmental performance of our semiconductor production equipment; and
- improving green performance of our own business activities.

Laser Edge Trimming: Ulucus™ L (Released on June 8): Slide 25

One of the E-COMPASS initiatives is our new product, “Ulucus L,” a laser edge trimming system that was released today on June 8. Ulucus L combines high environmental and process performance with high-precision laser processing control that reduces DIW (deionized water) consumption by more than 70% compared to conventional methods, according to our calculations. We will continue to contribute to the technological innovation of semiconductors by creating unique, one-of-a-kind equipment that only we can create.

Medium-term Environmental Targets for 2030: Slide 26

In addition, regarding the Medium-term Environmental Targets for 2030, we set the following goals:
For products, reducing CO_2 emissions per wafer by 30%.
At our facilities, reducing total CO_2 emissions by 70% and increasing the ratio of renewable energy use to 100%.
Along with these goals, we had previously announced our long-term goals for 2050, but in order to further strengthen our environmental activities, we have now revised them to realize net zero.

Net Zero: Slide 27

With respect to net zero emissions, we will work to achieve net zero for Scopes 1 and 2 by 2040, and for Scope 3 by 2050. Mr. Sadao Sasaki, who will take the stage later, will explain the details.

Safety First: Slide 28

As a manufacturer, "safety" is of utmost importance in our business activities. In terms of TCIR, which indicates the number of workplace incidents per 200,000 work hours, we have maintained a world-class safety level of less than 0.5, and in FY2022, the rate was 0.3. We will aim to reduce the rate to 0.1 or less in FY2027 by further promoting safety awareness and continuous improvement activities.

No title: Slide 29

It is our employees who are involved in all of our business activities and realize sustainable growth. Based on the belief that "Our corporate growth is enabled by people, and our employees both create and fulfill company values," we will continue to promote initiatives around the key themes of engagement, career, retention, work-life balance, and diversity and inclusion based on the TEL Values, our code of conduct.

Key Indicators for Continuous Corporate Value Enhancement: Slide 30

So far, I have explained our environmental, safety, employee engagement, and other initiatives that are essential to our sustainable growth. We have established key indicators for the continuous enhancement of our corporate value. We plan to include this information in our Integrated Report to be issued in August 2022. We will share this information with all our stakeholders and promote our activities.

Technology Enabling Life: Slide 31

As a leading semiconductor manufacturing equipment maker, we have an increasingly important role to play in the further development of society as the digital shift accelerates. We are committed to achieving the goals of our Medium-term Management Plan, which I explained today, by creating high value-added, leading-edge equipment and providing reliable services, and by earning the trust of our customers and other stakeholders based on the provision of such equipment and services.
That concludes my presentation. Thank you very much.

Review of the Previous Medium-term Management Plan and Financial Strategy for the New Medium-term Management Plan

Hiroshi Kawamoto - Tokyo Electron Miyagi Limited VP & GM, BS Division

Hello everyone. My name is Hiroshi Kawamoto, and I will be in charge of the Finance Unit starting July 1. Currently, I supervise the corporate division at Tokyo Electron Miyagi Ltd., which is a TEL manufacturing facility. Previously I was in charge of the finance and corporate strategy departments at Tokyo Electron Ltd. I am sure that I will have more opportunities to meet you all in the future, and I look forward to it.
Anyway, today I would like to talk about "the review of the previous Medium-term Management Plan and the financial strategy of the new Medium-term Management Plan.

Overview: Slide 33

Here is the agenda. First, I would like to review the previous Medium-term Management Plan. In that context, I will discuss our performance and results of our growth investment over the past five years. For a slightly longer time span, I will also look back on our sales and operating income, market capitalization, and net assets in light of the changing trends in the semiconductor production equipment market in which we participate. After that, I will discuss our financial strategy for achieving our new Medium-term management plan. Finally, I will discuss our shareholder return policy.

Review of the Previous Medium-term Management Plan: Slide 34

Here is the comparison of the financial model for the previous Medium-term Management Plan with the full-year results for the previous fiscal year that ended on March 31, 2022.
As you can see, net sales reached 2 trillion yen in FY2022, and we were able to achieve the Medium-term Management Plan, which was formulated in 2019, two years ahead of the original schedule.
We believe that the following three factors contributed to our achievement two years ahead of the original schedule.
First of all, we were able to execute our business strategy in a flexible manner. Our basic strategy continues to be focusing on areas where we can leverage our strengths and provide high value-added products and services, and although we were subject to travel restrictions from the beginning of 2020 due to the spread of COVID-19, we were able to conduct sales activities, startup equipment, and provide services without delay, through close communication with our local subsidiaries. In addition, to strengthening our local response capabilities, we increased the number of expatriates from Japan, and worked to improve the skills of our local engineers.
Secondly, we continued growth investment even during periods of market adjustment. In the fiscal year that ended on March 31, 2020, our sales decreased due to the adjustment of the semiconductor production equipment market. However, in preparation for the market growth we anticipated in the following fiscal year and beyond, we increased our R&D expenses and CAPEX compared to the previous fiscal year. As a result, we acquired new PORs and had sufficient production capacity, which enabled us to increase our market share in all our semiconductor production equipment in CY2021.
Finally, we must not forget, our close communication and collaboration with our partners. Despite the worldwide component shortage in CY2021, the WFE market grew significantly; in fact, it grew by 42%. During this period, we worked with our partners to increase production and facilitate the procurement of components, and, as a result, our performance significantly outperformed the market growth.

Performance of Growth Investments Made Over the Past Five Years: Slide 35

Next, I would like to talk about our growth investment over the past five years.
First, let me start with our investment in production capacity expansion. The production capacity of the Miyagi plant has doubled due to the new logistics building which started operations in February 2018 as well as the start of the automated warehouse in June 2018. The production capacity has doubled in the Tohoku plant and increased 1.5 times in the Yamanashi plant through the operations of the production buildings.
Next, I will discuss other growth investment, such as R&D expenses. In November 2018, Developing Building No.2 in the Miyagi plant began operations. In November 2020, we opened the TEL Digital Design Square in Sapporo to strengthen our DX promotion activities. Furthermore, in October 2021, the Miyagi Technology Innovation Center began operations to innovate production technology and collaborate with suppliers.

Thus, we have made aggressive growth investment over the past five years, which we believe has contributed significantly to production expansion, acquisition of PORs, R&D expenses, and productivity improvements in operations.

Trends in Net Sales and Operating Income: Slide 36

Here are the changes in sales, operating income, and operating margin since the fiscal year that ended in March 1991. One thing I would like to mention here is that until the early 2000s, the so-called silicon cycle caused an imbalance between supply and demand in semiconductor capital investment. However, since then the silicon cycle has been reduced and the supply-demand balance has been relatively stable. The financial crisis and the European debt crisis that occurred between 2007 and 2009 triggered a macroeconomic slowdown that restrained semiconductor manufacturers' CAPEX but since then there has been no significant decline in semiconductor capital investment, and our net sales and operating income have increased steadily. In the fiscal year that ended on March 31, 2020, semiconductor manufacturers adjusted their CAPEX slightly. Our analysis indicates that this was not a halt in investment to increase production capacity due to over-investment, but rather an adjustment commensurate with demand. In this environment, as I mentioned earlier, we have aggressively invested in anticipation of future demand. As a result, our R&D expenses for the past five years totaled more than 600 billion yen. Because of this, in the previous fiscal year that ended on March 31, 2022, we were able to achieve our Medium-term Management Plan, which was formulated in 2019, two years ahead of the original schedule.

Trends in TEL's Market Capitalization and Total Net Assets: Slide 37

The graph here shows our market capitalization and net assets since the beginning of 2010.
We understand that our aggressive growth investment in recent years, such as R&D and production capacity expansion, as well as non-financial values that do not appear on the balance sheet such as securing talented human resources and collaboration with customers and suppliers for next generation technologies, were evaluated by the stock market. This resulted in the significant growth of market capitalization compared to net assets. We intend to continue growth investment, aiming to increase both shareholder value and corporate value.
That brings me to the end of my review on the past. On the next slide I will discuss our financial strategy for achieving the new Medium-term Management Plan.

Financial Strategy to Achieve the New Medium-term Management Plan: Slide 38

The graph on the left shows the financial model that Mr. Kawai, the CEO explained earlier. From the current fiscal year ending on March 31, 2023, we need to increase net sales by more than 650 billion yen and operating income margin by more than 4.5 %. Let me list the four financial strategies necessary to achieve the new financial model and to "continuously create high value-added leading-edge equipment and technical services" as stated in our new vision.
The first is to increase production capacity in anticipation of market growth. In the previous Medium-term Management Plan, we were able to increase production capacity effectively. During the current Medium-term Management Plan, we will continue to enhance production capacity at the appropriate time.
Next is the allocation of R&D expenses, in which we plan to invest more than 1 trillion yen over the next five years. I think this could be called development portfolio management. We will discuss and make decisions at the Corporate Officers' Meeting and the Quarterly Review Meeting to optimize the allocation of R&D expenses, taking into consideration the value to be created by development activities.
We anticipate that CAPEX to increase production capacity and R&D capabilities will amount to more than ¥400 billion over the next five years. In addition, the promotion of DX has recently become an important factor in increasing corporate profits and productivity. As I mentioned earlier, we have also opened a base in Sapporo to promote DX. We have identified the following three areas as the major items to be improved: Firstly, profitability improvement of Advanced Field Solutions. This has two benefits; it contributes to increasing the added value of the equipment itself. It also optimizes equipment utilization rates and production yields at customer sites. Secondly, the efficiency of R&D activities through Materials Informatics, etc. Finally, the efficiency of sales activities and administrative operations; in other words, the reduction of the ratio of SG&A expenses to sales. We will consider the investment ratio for DX promotion while taking economic effects into consideration. Lastly, we will optimize fixed costs in consideration of business scale and activities. The semiconductor production equipment market in which we participate is a very fast-growing and rapidly changing market. Focusing on short-term profits and

squeezing fixed costs may prevent operations from functioning properly. So instead, we will optimize fixed costs from a mid-term perspective.

Shareholder Return Policy: Slide 39

Finally, our shareholder return policy. In the new Medium-term Management Plan, there is no change from the previous Medium-term Plan. We will pay a dividend of 50% of net income attributable to owners of parent. In addition, we will flexibly consider share buybacks.

Total Returns with Respect to FCF: Slide 40

To make it easier to compare our shareholder return policy with that of our overseas peers, we have calculated the total return ratio on free cash flow from the fiscal year that ended on March 31, 2016 when we increased the dividend payout ratio to 50%. Thus, the total return ratio on a free cash flow basis is generally above 70%, which is equal to or better than that of our overseas peers. We will continue to return profits to our shareholders through growth.

Summary: Slide 41

This is the summary of my presentation. I'm not going to do an in-depth summary of all of the material we have covered today. Instead, please take a look at the final summary slide, which has all of the key points on it. Thank you very much.

Procurement and Manufacturing Strategy

Sadao Sasaki - Representative Director, EVP & GM, Development & Production, Corporate Production Division

Hello everyone. My name is Sadao Sasaki and I am in charge of Tokyo Electron's Development & Production Division.

We would like to sincerely thank all of our stakeholders for their kind support: Slide 43

First of all, I would like to thank all of our stakeholders for your continued support and patronage. Today, I would like to explain our procurement and production innovations as well as our major efforts to reduce environmental impact as the semiconductor industry becomes increasingly important due to the accelerating shift toward a digital data-driven society.

Major Domestic Production Sites: Slide 44

We have four major manufacturing sites in Japan located in Iwate, Miyagi, Yamanashi, and Kumamoto prefectures, and we continue to provide high-quality semiconductor production equipment to semiconductor manufacturers around the world on time. In recent years, due to the continuous expansion of the semiconductor market, all of our plants have been operating at full capacity, and we are currently working to build a system to increase production throughout our entire supply chain through various measures to improve productivity.

Need for Production Innovation: Slide 45

Let me explain our production innovation efforts in more detail.
Since last year, we have faced three major challenges in the areas of procurement and production. The first is to increase production capacity. The second is a shortage of personnel to start up the equipment. The third is a component shortage. Among these, the shortage of local start-up personnel due to overseas travel restrictions during the pandemic was a serious issue. We have responded in the last two years by accelerating the localization of start-up personnel and improving remote start-up capabilities.

Continuous Production Innovation in Pursuit of Safety, High Quality and High Reliability: Slide 46

These are the main themes of our production innovation. To drastically improve this issue, we have been developing one-touch start-up functions for equipment for several years. It usually takes about 3 weeks to 3 months for start-up depending on the type of equipment. We have been proactively reducing the time. As shown in the bar chart, the current 3,000 hours of equipment start-up time can be reduced to 1,500 hours, a reduction of over 50%, through (1) the autonomous equipment (equipped with AI), (2) automatic setup function, (3) automation of inspections, etc. Currently, several thousand engineers are working around the world to start up equipment. This one-touch start-up function is expected to significantly reduce man-hours, increase efficiency, improve start-up quality, reduce the number of accidents, and contribute to a more appropriate work-life balance for those involved.

Efforts to Utilize TEL PLM-DX and Improve Productivity and Efficiency: Slide 47

Next, I will explain our DX initiatives. TEL is currently promoting company-wide activities to centralize manufacturing BOM/master information from development, design, and production to start-up of the equipment. This will improve the efficiency of the production line, significantly shorten the time from development to mass production of new products, increase MRP (Material Resource Planning) processing capacity up to 10 times, maximize production capacity and production leveling, and we plan to gradually double our current production capacity within three years.

Build a Sustainable Supply Chain: Slide 48

There is one more procurement challenge. Pandemic and geopolitical risks have caused supply chain disruptions, and establishing a sustainable supply chain is one of our key management issues. Based on fair and transparent relationships and solid trust with our suppliers, we hold TEL Partners Day for our primary supplier meetings as well as production update briefings twice a year at all of our plants. More than 300 suppliers participate in these meetings. We conduct an annual CSR/BCP assessment based on the industry code of conduct. From this year, we have added environment-related items to the assessment survey items to commend and recognize the results of our environmental impact reduction activities.

Procurement BCP and Proactive Procurement Activities: Slide 49

In addition, the timely supply of semiconductor production equipment is very important to deal with the shortage of semiconductors. We aim to build a strong and reliable supply chain through three main proactive procurement activities. We aim to procure parts in advance for a period of two years, and total inventory volume will be reduced while ensuring just-in-case inventories. We are working closely with our customers to secure the supply of semiconductors for our equipment in order to deal with the semiconductor shortage, and we are making sincere efforts to secure unallocated production capacity while promoting the visualization and streamlining of commercial distribution. With regard to geopolitical risks, we are promoting the multi-sourcing of parts production countries. We appreciate your continued understanding and cooperation.

Efforts toward Reducing Environmental Impacts: Slide 50

To change topic, I would like to explain our efforts to reduce environmental impact, which have been attracting more and more attention in the world recently.

Responsibilities as an Industry-Leading Company: Slide 51

We recognize that it is very important responsibility to work toward solutions to the problems of global environmental impact. Last year, we established E-COMPASS, a supply chain initiative focused on the environment, with the aim of achieving a balance between digital and green. Through the collaboration with our customers, semiconductor manufacturers, and our partners through our business activities, we hope to powerfully drive the entire industry toward the realization of a carbon-free society.

Milestones for CO_2 Emission Reductions toward Net Zero Emissions: Slide 52

We aim to achieve "Net zero" emissions by 2050. As for our own emission reductions in Scope 1 & 2, we have introduced a rate of 100% renewable energy usage at all of our global sites this year, aiming to achieve "Net zero" emissions by 2040. As for emission reductions outside of our Group under Scope 3, we will push forward with technological development to make our products more energy efficient, and aim to reduce CO_2 emissions from the use of products by 30% and GHG use by 20% in 2030 compared to 2018, and a further 50% reduction in emissions from the use of products in 2040. We have already begun working with several semiconductor manufacturers to contribute to the development of technologies for higher performance and lower power consumption of semiconductors, and to more actively promote energy saving in facility equipment and process development using GHG alternative gases. These environmental technologies will also be introduced in legacy semiconductor production lines.

E-COMPASS Activities Towards Scopes 1, 2 and 3: Slide 53

This page summarizes the main activities in Scopes 1/2/3. In the first, supply logistics, we are promoting a modal shift, and also aim to eventually adopt electric or H_2-powered heavy-duty trucks and ships. I think it is important to develop practical applications. I have high expectations for this. Second is the trends in international environmental laws and regulations, with the number of laws and regulations rapidly increasing each year. We are working to minimize business risks by identifying future trends as early as possible and responding proactively. Furthermore, we will promote environmentally hazardous substance-free equipment and provide environmentally friendly equipment. We are also building an information sharing system for parts containing banned substances, which will be useful to everyone in the industry. In the third area of development of equipment with proactive environmental performance, we will share a 10-year roadmap for environmental technology and specify environmental performance that reduces environmental impact in product specifications. We also plan to take the opportunity to share the results of these activities after next year's TEL Partners Day.

E-COMPASS Activities Towards Scope 3: Slide 54

Finally, in Scope 3 activities to reduce CO_2 emissions from the use of products, we have established 10 themes for equipment technologies and 7 priority environmental fields. We will accelerate joint development throughout the entire supply chain and invest more aggressively in environmental development. We are also aiming to reduce environmental impact to "Net zero" and to contribute to society as an environmentally advanced company by working together with the entire industry to solve environmental technology issues.

Summary : Slide 55

I have now explained our pursuit of production innovation and our main efforts to reduce environmental impact. Thank you very much.

SPE Business Strategy

Yoshinobu Mitano - Corporate Director, Senior Vice President and General Manager, SPE Business Division

Hello everyone. My name is Yoshinobu Mitano and I am in charge of SPE business.
Today, I would like to talk about the strategy of our SPE business.

Overview: Slide 57

Here is an overview of today's presentation. First of all, I will discuss the WFE market and technological requirements by application. Next, I will explain our technology roadmap, focusing on areas relevant to the new Medium-term Management Plan period. After that, I will discuss the target and opportunities of the SPE business, followed by our development efforts. I will summarize the presentation at the end.

WFE Market and Technological Requirements by Application: Slide 58

First, let me explain the WFE market and technological requirements by application. The 2021 WFE market was about $92B and is expected to exceed $100B in 2022. We expect the WFE market to grow even more toward 2026. In terms of technology, further scaling and higher layer counts for logic/foundry, NAND and DRAM will continue to be required to reduce manufacturing costs, lower power consumption and enhance processing performance.
Next, I will discuss the technology roadmap for each application. Dr. Sekiguchi explained the technology roadmap for each device at our IR Day last year. Today, I will focus on the technological changes that will occur during the period of the new Medium-term Management Plan.

Logic Technology Roadmap: Slide 59

Here is the technology roadmap for logic. 3nm node N3 for logic will begin production this year, 2022, and further scaling will continue thereafter, with the 1.4nm node N1.4 expected to be in mass production by 2026. In 2030, scaling is expected to progress to the 0.7nm node. The transistor structure is also expected to shift from the Fin structure to the GAA structure and then to the CFET structure. Thus, in logic, scaling will progress with structural changes. To achieve this, various new technologies and structures will be introduced, such as backside PDN and CFET, as well as EUV, which is currently being adopted for scaling. Although the CFET structure is not expected to be introduced during the period of the new Medium-term Management Plan, we believe that this period will be important preparatory time for the adoption of our technology for CFET.

NAND Technology Roadmap: Slide 60

Next, here is the technology roadmap for NAND. 160 to 190 layer node is the major production node for NAND in 2022. By 2026, the number of layers is expected to increase to 350 to 400 layers.
Furthermore, the number of layers is expected to exceed 500 by 2030.
To achieve this, a variety of technological changes are expected, including an increase in the number of tiers, changes in WL metal materials, changes in the integration of peripheral circuits, and higher integration per unit area by bonding wafers together.
The current roadmap assumes that many of these changes will occur during this new Medium-term Management Plan period.

DRAM Technology Roadmap: Slide 61

Finally, I would like to talk about the technology roadmap for DRAM. Further 2D (two-dimensional) scaling of DRAM will continue beyond 2022. In this 2D scaling, capacitor manufacturing processes are particularly critical, and various new technologies will be adopted in etch, deposition and cleaning.
While 2D scaling will continue until around 2026, we expect a shift to 3D DRAM with a 3D structure after 2027. In 3D DRAM, scaling will be driven by vertical stacking instead of 2D scaling driven by lithography, similar to the transition from 2D to 3D NAND. This is expected to result in increased film deposition and etch intensity, among other things. As with logic, the adoption of new structures will not occur during the new Medium-term Management Plan period, but the peak of development for 3D DRAM is expected to come during the new Medium-term Management Plan period.
As shown above, logic, NAND and DRAM continue to require various technological innovations. In order to capture these technological changes as business opportunities for our company, we are working on the development of new equipment and processes.

SPE Segment Sales Target and Business Opportunities: Slide 62

Next, I will discuss the business environment in the SPE business. In logic/foundry, patterning is becoming complex and the co-optimization between unit processes is increasingly required. High-NA EUV lithography is expected to be applied in volume production to achieve further scaling. In addition, as explained in the previous slide, transistors will shift from the Fin structure to the GAA structure, and backside PDN will be adopted for the interconnects layer. We have wafer bonding equipment which will contribute to the realization of backside PDN.
As for NAND, the stacking of 3D NAND is progressing further, and the number of layers will increase to 300, then 500 in the future. This will require high aspect ratio etch, high productivity sacrificial film removal, and atomic-level deposition technology for 3D structures. We have etch systems and ALD deposition systems to meet these technological requirements. For DRAM, the technology to suppress RC delay in wiring and capacitor formation technology for further 2D scaling are required. Many of our etch, deposition and cleaning systems have already been adopted for DRAM capacitor formation. We will provide new products and solutions to achieve further scaling.
As for SPE new equipment sales, they were 1,499.0 billion yen in FY2022. For FY2027, the final year of our new Medium-term Management Plan, we aim to outperform the market growth and achieve sales of more than 2,300.0 billion yen.

Development Efforts: Slide 63

Next, I will explain our development efforts to capture the business opportunities introduced so far.
As the technological challenges of scaling increases, in addition to the mass production generation of N, development and evaluation of four generations - N+1, N+2, N+3 and N+4 - are simultaneously underway in leading-edge logic and memory. In addition, each generation undergoes more than two years of development and evaluation at the customers' fab before going into mass production. In order to continue such development and evaluation with semiconductor manufacturers, high technology development capabilities, engineering resources, and a strong financial base are required for semiconductor production equipment makers. We work with our customers to align long-term technology roadmaps and develop and evaluate technologies up to four generations into the future with our customers. In the evaluation process, we demonstrate equipment and process performance on the customer's structured wafer in the customer's environment at an early stage. In this way, we reliably create high value-added products and win POR.

Strengthen R&D Capabilities: Slide 64

In order to tackle the kind of development I mentioned earlier, it is essential that we strengthen our development capabilities. We have further strengthened our development capabilities in order to promote the simultaneous 4-generation developments and evaluations for the leading-edge memory and logic/foundry. In the past two years, we have established the Miyagi Technology Innovation Center and the TEL Digital Design Square. In addition to that, new research and development buildings are planned to start operations between 2023 and 2025: the R&D building in Yamanashi for deposition systems, gas chemical etch systems, and corporate R&D; the R&D building in Kumamoto for coater/developer and cleaning systems; and the R&D building in Miyagi for etch systems. We will further strengthen our development capabilities to create high value-added products that contribute to technological innovation in semiconductors.

Increase in New Product Sales Composition Ratio: Slide 65

In this way, we will strengthen our development capabilities and increase the sales composition of new high value-added products. The graph here shows the outlook for the progress of new product penetration. The graph uses deposition systems for leading-edge logic/foundry as an example. We plan to increase the sales composition of new products every year. This increase in the sales composition of new products will lead to a steady increase in sales, profit and market share.

Increase Environmental Performance: Slide 66

In addition, environmental performance is becoming an increasingly important aspect of equipment performance. We are developing equipment with the concept that environmental performance = equipment performance. The example shown here is a cleaning system. Compared to existing products, the new product has significantly improved environmental performance.

Increase Efficiency of Equipment Start-up: Slide 67

Finally, I would like to discuss our efforts to improve the efficiency of our equipment start-up process.
We are currently experiencing a significant increase in new equipment sales, and with that increase comes an ever-increasing number of different resources needed, including field engineers, for equipment start-up. We are not only increasing our resources, but also working to make them more efficient. Specifically, we are optimizing inspection items during equipment start-up, automating inspections, expanding online support, and utilizing DX network tools, automatic tools, and other tools. We are working to further enhance customer satisfaction and productivity by significantly increasing the efficiency of equipment start-up.

Summary: Slide 68

Here is a summary. As technology continues to evolve in both logic and memory, our business opportunities will continue to expand. In such markets, we will create added value by co-optimizing our broad product portfolio and providing solutions. In addition, we will conduct simultaneous 4-generation developments and evaluations with our customers to develop higher value-added products and ensure POR acquisition. To this end, we will further expand and strengthen our development capabilities. At the same time, we will utilize DX and AI to shorten equipment start-up time, thereby improving customer satisfaction, increasing productivity, and effectively utilizing resources.
This concludes my presentation. Thank you very much.

Backend Business Strategy

Activities for the Development of Wafer Bonding Process

Yohei Sato - ATS BUGM

Hello everyone. My name is Yohei Sato and I am in charge of the ATS Business Unit. Today, I would like to present our back-end business strategy.
The main purpose of back-end technology in semiconductor manufacturing was originally to protect the physical and electrical properties of the semiconductor chip itself and to interconnect chips. Also, the function of "Fan Out," as it is called, is required to reduce the electrode pitch for chip connection. On the other hand, the 3D bonding technology I am introducing today is expected to further improve and evolve the performance of the chip itself and the system as a whole. We will provide an overview of this technology and our contribution.

Semiconductor Technology Node and Bump Pitch: Slide 70

This slide shows a log plot for technology nodes in the semiconductor process and electrode pitch in packaging technology. The vertical axis shows the pitch and the horizontal axis shows the year. As you know, technology nodes in the semiconductor process have been scaling down in accordance with Moore's Law. On the other hand, although there are various packaging technologies available, the pitch of electrodes in mounting has been shrinking very slowly because it assumes connection to substrates. TSV for silicon-to-silicon connection has been introduced, but it uses micro-bump connection, which has limitations in pitch reduction.

Semiconductor Technology Node and Bump Pitch: Slide 71

In contrast, the introduction of bonding technology, which I am introducing today, significantly reduces the pitch of device electrode connections and enables interconnection of devices with ultra-multiple electrodes. In addition, the introduction of bonding technology in the semiconductor manufacturing process itself is also advancing development to improve device performance.

Application of Wafer Bonding: Slide 72

This is a typical example where the bonding technology is being considered. The CMOS image sensor on the left is already utilizes the bonding technology in mass production. For full-scale mass production, the second from the left is 3D NAND, in which memory cells and peripheral circuits are bonded together. In Logic, utilization of the bonding technology is under development for backside PDN (backside wiring). The one on the far right is called “die disaggregation”, which is an advanced integration approach in which each IP block of the SoC is manufactured using an optimal process in the different wafers, and then made into individual chips called “chiplets”. Since the SoC is manufactured in different wafers, overall chip costs are expected to be reduced through yield improvement and cost optimization for each node. Furthermore, if the connection pitch can be reduced, parallel connections can be made at multiple points, resulting in faster devices with lower power consumption, and smaller device size.
Thus, the introduction of bonding technology is being considered in many areas. Today, we will explain the applications and merits of this technology to 3D NAND and Logic backside PDN, both of which are currently under accelerated development.

Wafer Bonding Application for 3D NAND: Slide 73

In 3D NAND, development to increase the number of stacked layers is progressing. The current structure is shown on the left side. To reduce the device footprint, the peripheral circuit is formed first and memory cells are continuously formed on the top of the peripheral circuit. On the other hand, as the number of layers increases, the risk of deterioration of the peripheral circuit increases due to the thermal budget issue. As a solution to this problem, the bonding structure on the right side has been developed and is applied. With this bonding process, the peripheral circuit and memory cells are manufactured on separate wafers. Therefore, the manufacturing process for each can be optimized independently, and high-speed transistors can be used in the peripheral circuit. In addition, since the wiring length between the peripheral circuit and memory cell can be reduced, high-speed NAND devices are expected to be realized. Furthermore, in the integrated wafer manufacturing process for the current structure, the long manufacturing lead time from the peripheral circuit to memory cell stacking is an issue. The bonded

technology enables parallel wafer manufacturing of each wafer, thereby shortening the TAT.

Wafer Bonding Application for Logic Backside PDN: Slide 74

Next, I will talk about Logic devices and the backside interconnect technology called backside PDN. The current structure is on the left. The signal lines and power lines are formed on the front side of the wafer. With scaling advances, the line width and pitch of signal lines become narrower. On the other hand, the power lines are reaching the limit of their margin for voltage drop, making it difficult to further reduce line width. Therefore, the technology called backside PDN on the right side is the key. In this technology, signal lines are formed on the front side and power lines are formed on the back side by utilizing bonding technology. This enables the line width of the power lines to be maintained. Thus, the device footprint can be reduced while at the same time avoiding voltage drops in the power lines due to the reduced line width. It is also possible to improve transmission quality by reducing leakage current. Thus, as a driver for further scaling, bonding technology is attracting a great deal of attention in device manufacturing.
In this bonding process, as shown in the upper right of the figure, the device wafers with transistors and signal lines and the bulk wafers are bonded together. At first glance, it appears that the bulk wafers are simply bonded as is, but since the power lines are formed from the backside later, the distortion during bonding must be kept to a few nano-orders of magnitude to keep it within the range where exposure compensation is possible. This is called distortion, and its reduction is a technical requirement placed on the equipment. We are working to achieve this goal by taking our knowledge of the front-end process, optimizing the bonding process, and mastering the chuck control technology.
Thus, the introduction of bonding technology, i.e., technology to bond semiconductors vertically, has led to the development of devices with higher performance and a smaller footprint.

Our Proposal for Wafer Bonding Process: Slide 75

I will now explain the wafer bonding process. Since there are a variety of device types used, we will use a simplified process diagram. In the wafer bonding process, there are wafer processes before and after the wafer bonding process. Therefore, in this process, it is important to have a platform with front-end level cleanliness and integration with the pre-bond and post-bond processes. We have developed and mass-produced the Synapse™ Si wafer bonding system, which plays a central role in this bonding process, utilizing our technology and experience in front-end process equipment. The necessary steps in this wafer bonding process include plasma treatment to form dangling bonds on the bonding surface, pure water cleaning to impart OH groups, and high-precision alignment and bonding to bond the top and bottom wafers together. This is followed by annealing to strengthen the bond. In the wafer bonding process, one side of the wafer must be thinned to a point that allows for the next wafer process. During the thinning process, chipping of the wafer edge during processing is a problem. To prevent this, it is essential to remove the wafer edge before thinning. This process is called edge trimming. The edge trimming process is usually associated with dust emission during edge trimming and the quality of the trimmed area. These are very critical for device yield. We propose laser trimming equipment that can overcome these issues.

Wafer Bonding System: Slide 76

We would like to introduce some of our products for the bonding process. First is the wafer bonding system, Synapse™ Si. This equipment combines a high-productivity platform cultivated in our front-end processes with plasma control, cleaning, and high-precision technologies. Wafer bonding equipment requires high-accuracy alignment technology for increasingly narrow-pitch microelectrodes. In addition, the bonding surface must be void-free and highly reliable. Synapse™ Si is an integrated system that combines plasma, cleaning, and alignment bonding modules to achieve high reliability and productivity.

Laser Trimming System: Slide 77

This is the Ulucus™ L, a new laser trimming system, which was released today. This is an edge trimming system required in the wafer bonding process. It is an integration of super-clean technology and laser control technology based on the latest platform applied in our front-end process equipment.

Laser Trimming System: Slide 78

The wafer bonding process is preceded and followed by the front-end process, so clean technology of the equipment is important. We are committed to innovating the wafer bonding process as an eco-solution by introducing this laser technology as a trimming system as well as a wafer bonding system, which is

the core of the process. Please take a look at the video of the Ulucus L laser trimming system released today.

Summary - For the Development of Wafer Bonding Process: Slide 79

Last but not least, the introduction of the bonding technology introduced today will accelerate performance evolution at the advanced device and system level. In this regard, bonding is a key technology for next-generation devices. Leveraging the technology and experience we have accumulated in the front-end process, we have today released the Ulucus™ L for wafer edge trimming in addition to Synapse™ Si for bonding. We will continue to promote further research and development of equipment for full-scale mass production of the bonding process by taking advantage of our comprehensive capabilities. Thank you very much.

Account Strategy

Seisu Ikeda - Senior Vice President and General Manager, Account Sales Division

Hello everyone. This is Seisu Ikeda from the Tokyo Electron Account Sales Division. Thank you very much for your valuable time today. I would now like to present Tokyo Electron's account strategy.

Agenda: Slide 81

Here is today's agenda.

- Technology exchange and roadmap co-creation with customers
- Demand forecast for 24+ months
- Customer satisfaction survey (CSSP: Customer Satisfaction Survey Program)

First, I would like to talk about the "Technology exchange and roadmap co-creation with customers".

Framework for co-creation of technology roadmap from N to N+4: Slide 82

In order to create "next generation products" needed by our customers, Tokyo Electron is engaged in technology exchange and roadmap co-creation with our customers in parallel over multiple generations from the current generation (N) to the next four generations (N+4). We have been able to reflect information from customers and develop our own technologies with an eye to the future by receiving information from our customers on future prospects for semiconductor device technology trends, structures and designs, equipment performance required for each generation, sample wafers for high-precision evaluation, and customer expectations of manufacturing schedules. Through TEL's development capabilities, including component technologies, we propose new functions and materials; all of planning, designing, and manufacturing of equipment and processes to achieve performance targets; maintenance of the evaluation environment, and provide feedback on the results. By establishing such a close communication system with our customers, we continuously create high value-added “Next Generation Products” as the best partner of our customers.

Collaboration with Customers: Meet Tech Requirements for Several Generations: Slide 83

This slide shows the process of collaboration with our customers. In order to respond to the simultaneous technical requirements from the current generation (N) to the next four generations (N+4), we are working on the co-creation of generation-specific roadmaps from the feasibility study phase of the concept to the end of mass production. As shown in this slide, based on our diverse application technologies, we share with our customers a sequence of initial studies, wafer demonstrations, delivery of development tools, determination of process conditions, start of mass production, and proposals for improvement and modification of mass production equipment. This is done so that we can continue to provide the technical information, development results, and solutions that our customers expect in a timely manner whenever issues arise.

Demand Forecast for the Next 24+ Months: Slide 84

Next, let’s look at the “Demand forecast for 24+ months”. We conduct the “Demand forecast for 24+ months " to ensure a proactive procurement strategy and smooth delivery to our customers. This initiative is aimed at ensuring sufficient parts and materials and production leveling to meet customer delivery deadlines, eliminating additional workload for manufacturing and start-up engineers in the event of delivery delays, and improving safety, quality, and productivity. Traditionally, we have compiled multi-year investment roadmaps for each major account and combined them with our macro-market analysis. From around the beginning of 2021, we have shared the concept and expected effect of the initiative mentioned earlier with our customers in order to further improve the accuracy of this activity, considering environmental changes caused by the recent materials shortage. We are now able to receive detailed equipment installation plans from our customers on a frequent and regular basis. Our own WFE forecast is incorporated into the customer’s equipment installation plans over 24 months, and the latest accurate information is disseminated to TEL's domestic plants through accounts and BUs, and then the information is promptly provided from each plant to the supply chain and suppliers.

Demand Forecast for the Next 24+ Months – Operation Outline: Slide 85

This page graphically describes this activity. As an operation outline, we update both the investment map and the WFE forecast every six months based on our own market analysis. In addition, we ask our clients to update their forecasts once or twice a month, so that we can make more accurate demand forecasts.

The period covered by our clients' forecasts used to range from 9 to 12 months, but now it is for more than 24 months. This allows the BUs/factories to do well-planned procurement for sufficient parts and materials to ensure production leveling.

Purpose, Positioning, and History of Customer Satisfaction Survey: Slide 86

Next, I will explain the customer satisfaction survey called the TEL CS Survey. Tokyo Electron conducts an annual customer satisfaction survey (TEL CS Survey) and uses the evaluations for our continuous improvement. The purpose of this survey is to serve as a fixed-point observation of customer satisfaction and to conduct objective analysis to understand the strengths and weaknesses of our products and accounts, as well as any problems and issues. Next, it is positioned as one of the important pieces of reference data to measure the direction of activities for improvement and corresponds to the "C" part of the company-wide improvement PDCA shown in the figure on the right. In terms of the history of our activities, this survey started with the Clean Track BU in 2003, was expanded to all the divisions of semiconductor manufacturing equipment in 2014, then to the flat panel display (FPD) manufacturing equipment division and overseas subsidiaries in 2016, and is now being conducted company wide as the TEL Customer Satisfaction Survey Program, abbreviated to CSSP. The current customer coverage rate is over 90%, excluding those customers who have conducted their own supplier assessments.

CSSP (Customer Satisfaction Survey Program) Operation: Slide 87

In the operation of the CSSP, customers at more than 250 locations around the world are surveyed once a year at the same time with specific questions designed to lead to our improvements at the working level. Examples of questions include: for the sales division, ease of communication, understanding of requests and problems by the sales staff, solution proposals, and ability to implement them; for plants, equipment lead time, performance/functionality, technical development capabilities, and speed of response; and for the service division, awareness of safety standards, adherence to safety procedures, and field support capabilities. Customers are asked to select one of four response options: "very satisfied (4 points)," "satisfied (3 points)," "unsatisfied (2 points)," or "very unsatisfied (1 point). The passing line is defined as the average score of all customers who responded to each question, and the average score must be at least "Satisfied (3 points)" for all items. The information obtained from these surveys is analyzed by category; business unit (product), account (customer), and function (software, development, etc.), and the results are shared with relevant departments such as sales, equipment/plants, and service to take actions for improvement. We are also making improvements in all aspects of the survey methodology, including questions, analysis methods, and overall management of CSSP activity.

CS Survey KPI Results for All TEL Products (2021 vs 2022): Slide 88

In FY2022, 1,459 customers (76.1% of the total) responded to CSSP, far exceeding our target of 60% and up +5.9% from the previous year. We achieved our overall goal of an average score of "Satisfied (3 points)" or higher for all questions answered, an improvement of 3.3% from FY2021. For the customers who responded with the “Red Flag”, very unsatisfied (1 point), we promptly responded to the customer and took the first actions within 42 days after the survey. We are engaged in improvement activities at an early stage across the entire survey. The entire company will continue to work together to promote customer-centered improvement activities.

To further improve customer engagement: Slide 89

Through these activities, TEL aims to further improve its technical, sales, and support capabilities. In FY2021, we were honored to receive the highest awards from a number of our customers. We would like to thank our customers for their high evaluation of our activities, and we will continue to further enhance customer engagement to ensure TEL's continued growth and increase corporate value. Thank you all for your attention.

Field Solutions Business Strategy

Takeshi Okubo - Senior Vice President and General Manager, Global Sales Division

Hello, I'm Takeshi Okubo. I'm now in charge of the Global Sales Division, and responsible for all regions including Japan, Europe, America, Asia, and new customers. From July, I will be in charge of the Field Solutions BU.

Rapidly Growing Investment in Mature Generation: Slide 91

As you are all aware, the semiconductor production equipment market is expanding, and the proportion of investment in mature generation, or legacy nodes, has been increasing in recent years, accounting for about 30% of the total market, and about 40% of non-memory investment.
We have renewed our equipment for 200mm wafers, which was discontinued in the past, by incorporating the technology we have cultivated in our current 300mm equipment.
In addition, there is a growing need for power semiconductor manufacturing equipment, especially in the in-vehicle market, such as electric vehicles (EVs).
We have also seen a dramatic increase in opportunities to provide services such as the replacement of consumable parts, repairs, maintenance, and cleaning for equipment that we have delivered in the past. We have also received many requests for modifications to improve equipment uptime.

Equipment for Mature Generations: Slide 92

Although there used to be a lot of used equipment available for the legacy node market, the remarkable rise in demand for semiconductors in recent years has depleted the amount of used equipment and finding used equipment on the market has become extremely difficult. In order to replace aging equipment and to meet emerging customers' demand for equipment for legacy nodes, we have reintroduced to the market new models of 200mm wafer-compatible equipment that we previously manufactured and sold, such as thermal processing equipment, coater/developers, and etch systems, that use the latest technology and materials to dramatically improve productivity. In addition, our SiC epitaxial deposition systems for power semiconductors, which are experiencing remarkable growth, have been well received by our customers, especially for EV in-vehicle applications. Further growth is expected in the future from the perspective of reducing environmental impact.

Field Solutions: Slide 93

The parts and service business, which is at the heart of field solutions, is a stable business that is necessary as long as equipment continues to operate, such as the replacement of consumable parts and maintenance. As semiconductor technology becomes more sophisticated, equipment becomes more complex, and customers are less likely to purchase parts and services from third parties. We think that our customers understand that choosing genuine parts and our unique services is a shortcut to stabilizing the operation of their equipment. The number of install-based equipment exceeds 80,000, with over 5,000 units delivered last year. All of these are the "seeds" that lead to the field solutions business, and this number continues to grow. We are required to propose and provide more effective and efficient services.

Advanced Field Solutions: Slide 94

Therefore, we are developing various solutions to meet the needs of our customers and society, centering on TELeMetrics™, which utilizes DX, data and digital technology. We collect data for each piece of equipment, monitor its operating status, and perform predictive maintenance. By compiling a database of support and trouble history and centrally managing them to accumulate knowledge, we strive to improve work efficiency and provide customers with faster, higher quality services. In particular, TELeMetrics™ and smart glasses have enabled us to provide cutting-edge and sustainable support by remotely connecting local field engineers and Japanese factories, even in extremely challenging environments such as the travel restrictions imposed by Covid pandemic lockdowns. From the perspective of BCP (Business Continuity Plan), we are also working to further strengthen logistics to ensure a stable supply of equipment and parts. In addition, we are focusing on enhancing our services on a global basis. We have developed a program to improve the technical skills of our more than 4,000 field engineers worldwide, and have established a group-wide skills management system.

Summary: Slide 95

The current bottleneck is still the lack of supply of devices such as power, analog, SOC, microcontrollers,

sensors, and system-on-chip for the automotive and industrial markets, and we will strengthen sales to customers to invest in expanding their manufacturing capacity. Taking advantage of the industry's largest installed base, TEL will respond to customer needs through modifications for upgrading, production capacity improvement, and renewal of equipment that has been discontinued. In addition, we will use the latest DX technology to promote advanced field solutions, including predictive maintenance, remote support for start-up and trouble-shooting, and other services. The most important thing is to strengthen the front line, and by developing highly skilled front-line engineers, we can correctly understand the problems and issues that exist in the field and promptly feedback real customer needs to the product development process. This will result in high value-added products, and we believe that by becoming unique and the sole partner in this way, we will win even more trust from our customers.
That concludes my talk. Thank you very much for your attention.

Introducing TEL's DX Activities and Our Ideal State

Noritaka Yokomori - Deputy GM of Corporate Innovation Division, DX

Good afternoon, everyone. I am Noritaka Yokomori and I'm in charge of promoting Tokyo Electron Digital transformation. I would like to present our DX activities and our aim for the future.

TEL DX Vision: Slide 97

First of all, we have this DX Vision. Let me read it out aloud. "A global company where all employees drive enterprise value creation sustainably through activities such as value addition and efficiency improvements by leveraging digital technology." The point is that all DX activities are a means to create corporate value. When implementing DX activities to improve operational efficiency, we do not simply digitize existing operations, but first define our "To Be image". We then proceed with the necessary business innovation and, if necessary, the development of digital tools to support that transformation. In this sense, I believe that DX activities can also serve as a "trigger" for business innovation for the creation of corporate value.

TEL DX Grand Design: Slide 98

This is the grand design of TEL's DX activities as a whole. As I will repeat, DX activities are a means and a trigger for achieving TEL's vision and corporate management plan. The grand design is that DX activities shown in the lower part of the figure support and promote the four material issues for achieving our mid-term plan: "Solid management foundation," "Higher productivity across the entire business," "Product competitiveness," and "Enhancement of customer responsiveness." The structure of our DX activities itself is largely two-story: the first floor is the infrastructure for promoting DX activities, including the development of digital skills, fostering cultural literacy, and governance and platforms that facilitate the use of data. The second floor is DX application development, which supports value creation of customers and group-wide business innovation by utilizing these infrastructures. The core of the second floor is applications that support the management foundation, followed by applications that support DX activities in development, production and the field, and finally, applications that utilize data on a large scale across divisions.

Steps of DX Activities: Slide 99

Next, I would like to explain the steps for DX activities. Basically, all DX activities are conducted in accordance with these four steps. In the development of digital tools that support the value creation for customers, the first step is to recognize the situation using sensors, etc., then to diagnose and analyze single or multiple pieces of data by linking them together, and based on the analysis results, to make future predictions and control the system. In addition, by repeating this cycle, the analysis and control model is repeatedly learned and evolves as it undergoes development and improvement activities. The steps for DX activities for group-wide business innovation are similarly a cycle of first understanding and visualizing the current situation, drawing a To Be image, which is the ideal image, then planning the necessary business innovation and digital tools to support it, and finally implementing them. By repeating this cycle, the steps of improvement and innovation are carried out, and the process evolves. These DX activities contribute to the speed of product development and product start-up, that is, the time-to-market, at the customer's site. DX activities are also conducted to improve yield and utilization rates in mass production, in other words, to contribute to overall equipment efficiency. At our own sites, DX activities are conducted in all phases of the product life cycle, from planning to development, production, and customer sites. This accelerates the time-to-market, reduces product costs, improves profitability, and extends lifetime value.

Relationships between Projects in DX-related Developments: Slide 100

This page explains the relationship between the various projects in our DX-Digital technology development. Our DX-Digital technology development is divided into four major categories: DX foundation, application development for capital efficiency and management foundation, equipment foundation development, and value-added application development.
The relationship between these four areas is that DX activities aimed at improving the DX foundation and our capital efficiency will increase efficiency, but rather than reducing the resources and budgets, the time created by improving the quality and speed of work through these activities can be used to develop the foundation development of higher value-added products and value-added applications for creating

customer value, thereby promoting the creation of corporate value.

DX Engineer Training Plan: Slide 101

Now, let me introduce our DX activities project in detail.
First of all, in the area of skill improvement and human resource development, which is a part of the infrastructure, we divide DX engineers into several categories based on their roles and conduct appropriate training for each of them.
First, data science skills are defined as the skills to understand the latest AI technologies and the latest information from academia on mathematical science and computation, and to use those skills to create our corporate value. We are working to enhance these skills mainly at our renovated Sapporo office in Hokkaido, TEL Sapporo Digital Design Square.
Next, data engineering skills, which are the skills of engineers who have knowledge of our products and processes to develop and embed algorithms developed by data scientists for our products, processes, and internal operations. We are working to enhance these skills at our Business Units, plants, each customer site, and each of our local subsidiaries.
Finally, business planning skills are the ability to understand essential issues, define appropriate problem-solving approaches, and link these to corporate value creation activities both internally and externally. We will work to enhance this capability in the corporate division first, and then in each business unit and plant.

Example Activity 1 – Increasing Productivity of Equipment: Slide 102

Next, I would like to introduce five examples of application development using digital technology.
First of all, we would like to introduce an example of an application for Etch systems, one of our core products, which requires periodic maintenance by opening the process chamber. A "seasoning," which is a conditioning of the Etch chamber, is required before production wafers are processed. In the past, customers had to determine the number of wafers to be processed for seasoning based on their past experience. After a seasoning is operated by processing some wafers for seasoning, wafers for qualification are processed to confirm if the Etch chamber is well-seasoned before production wafers are processed.. In such an operation, customers often used more dummy wafers for seasoning than required, or, on the other hand, they had to go through the seasoning process twice as a result of using too few seasoning wafers.
In order to address this problem, we have developed a technique to estimate radical density in the plasma from the optical emission spectroscopy (OES), which has enabled our customers to process product wafers as soon as the seasoning is completed. In consequence, we have succeeded in delivering this new technique for our customers' mass production.

Example Activity 2 – Increasing Operation Cost of Equipment: Slide 103

Next, I would like to introduce an application of digital technology to our Coater/Developer, Clean Track™, which we have maintained a market share of approximately 90% for many years. Clean Track™, which coats and develops photoresist, is attached to exposure systems in the lithography process, which projects semiconductor circuits. The photoresist must be coated on the entire surface of a 300 mm wafer with a uniformity on the order of Å (angstrom). 1 Å equals 0.1 nm, or 1/10,000,000 of 1 mm. The diameter of a hair is about 0.05 mm, so it is 1/500,000,000 the size of a hair.
In order to coat photoresist with such precise control with the minimum necessary amount of highly expensive chemicals, we use machine learning to control the pumps and valves used for the chemicals, as well as the wafer rotation speed, while monitoring the state of photoresist discharge.

Example Activity 3 – Increasing Productivity of R&D: Process Informatics: Slide 104

Next, I would like to introduce the application results of productivity improvement in the R&D. This is a sample of Gate all around (GAA), which is expected to be adopted by Logic customers in the future. The black area is Si, and the surrounding area is Ti-ALD formed by plasma ALD. In actual process development, about 10 parameters such as plasma power, pressure, time, gas type, gas time, flow, and number of ALD cycles must be adjusted simultaneously in order to satisfy multiple performance requirements such as film thickness, coverage, and damage.
The left side is the result of human conditioning, and the right side is the result of machine learning.
As you can see, the left side shows plasma damage and insufficient coverage. The process condition on the right, which was calculated by machine learning based on the experimental data obtained by

engineers, shows less damage and better film coverage.

Example Activity 4 – Improving Overall Equipment Effectiveness: Slide 105

The fourth example is the use of a knowledge management system to improve overall equipment efficiency. We have accumulated more than 20 years of knowledge from field work reports and our experiment reports, which we use to investigate the causes of problems at our customers' sites.
For example, the time from the occurrence of a problem to the investigation of its cause, which used to take several days regardless of the skill level of the engineer, is now being resolved within the same day, in many cases.
Such knowledge is also used semi-automatically in FMEA during equipment and function development to prevent further problems in the field.

Example Activity 5 – Increasing Productivity of Operations: Slide 106

The last example of Digital technology application is a chatbot, which is an example of an application to improve internal business efficiency. We have already introduced chatbots in the legal, finance, and human resources departments. Each system is being used by more than100 people or more each month, and the automated responses are improving the quality of work by reducing man-hours.

No Slide

Now, I would like to introduce our future vision and what we are aiming for by utilizing digital technology, which extends from the use of data inside equipment at customer sites to the use of data globally.
First, the RF power and various gas flow rates inside the equipment are recognized and visualized by the primary sensor for each component, and the state of each component is recognized → analyzed → controlled → learned and evolved in an iterative cycle to ensure stable operation as required, and to be controlled autonomously.
Next, the physicochemical phenomena such as the plasma state and wafer temperature that each component is trying to produce are monitored by secondary sensors, and the correlation with each component is also recognized and controlled.
Then, the results of the wafer process are predicted by process simulation and monitored by a tertiary sensor named the process fingerprint sensor, which observes the results of the process. The goal is to create a state in which each physicochemical phenomenon is simultaneously controlled based on the information from the tertiary sensors, and the control model and process simulation are also automatically learned.
Once all of these technologies are completed, we believe that it will be possible to reverse this flow in the future. In other words, we believe that if we input a request for a process result, the physicochemical phenomena that will lead to that process result will be deduced, and the current state of each component will be understood, creating a state in which the movement of each component is controlled. We also believe that this process simulation technique can be applied to OPC for Mask design.

Digital technologies such as wireless communication and wireless power supplies will enable unit and equipment designs that are free from the limitations of wiring that we have been facing, and will enhance productivity per unit area for our customers. And to save manpower in the clean room, maintenance work that has been performed by humans will be performed by automated robots as much as possible. All equipment information is sent to the fleet server, which performs inter-equipment coordination control to match the customer's production and power savings plans.
When human intervention is required for troubleshooting or upgrading equipment, work procedure information is displayed on Smart Glass or tablets, and work history is automatically traced. The individual status of each piece of equipment and TEL manuals are shared with the customer in encrypted form on a shared private cloud to ensure quality control of parts and just-in-time delivery of parts. In addition, work and experiment reports are accumulated in TEL's knowledge management system and utilized for future CIP development and FMEA during product development. This information is then shared with customers in the private cloud, and is used for their own troubleshooting and equipment operation.
By analyzing information from all over the world, we expect to be able to forecast future demand, utilize the information for factory production planning, and make proactive proposals such as OEE improvements.

All of the digital technologies I have introduced today will help our customers improve process performance, quality, wafer productivity, time to market, and the environment.
Thank you very much.

New Board of Directors Structure and the Corporate Officer System

Tetsuo Tsuneishi - Corporate Director, Chairman of the Board

I am Tetsuo Tsuneishi, Chairman of the Board of Directors. I would like to take a few minutes to explain Tokyo Electron's governance structure and the effectiveness of the Board of Directors, as well as the Corporate Officer System that we plan to introduce after the passage of the resolution at the Annual General Meeting of Shareholders on June 21.

Corporate Governance Framework (Audit & Supervisory Board System): Slide 108

Our present governance structure is as shown in the diagram on this slide. The three important roles and responsibilities of the Board of Directors are listed in our Corporate Governance Guidelines. They are:
1. Establishing management strategy and vision
2. Making major operational decisions based on strategic direction
3. Engaging in constructive, open-minded debate

Regarding these three important roles and responsibilities, I believe that TEL's Board of Directors, including the Nomination Committee and Compensation Committee, is highly effective and functions appropriately to fulfill its role of supervising management decision-making and execution.
Last year, Tokyo Electron was honored from among 2,200 companies listed on the First Section of the Tokyo Stock Exchange as the Grand Prize Company in the Corporate Governance of the Year® 2021 program sponsored by the Japan Association of Corporate Directors.
Such high evaluation from an external organization is also a result of the frank, useful and effective exchange of opinions and active participation at board meetings by Tokyo Electron's internal and outside directors and corporate auditors. Among these people, I believe that the contributions of our outside directors and outside corporate auditors are also very significant.

Outside Directors Video message: No slide

Now, I would like to take this opportunity, with the investors and many others involved with capital markets in attendance today, to listen to some messages from our four outside directors. Each of them will deliver a one-minute video message on the theme of "How you can contribute to improving TEL's corporate value from your position."

<Charles Lake – Outside Director>

My name is Charles Lake and I serve as an outside director. Tokyo Electron has approved a new medium-term management plan and announced its new vision – TEL's Shared Value (TSV). Technology Enabling Life - and TEL creating shared value - is an effective strategic framework to enhance TEL's corporate value over the medium to long term.
The Corporate Governance Code requires the Board of Directors of Prime Market-listed companies to have "free, open, and constructive discussions" when making important management decisions. To this end, the formulation of the Medium-term Management Plan and TSV involved robust "free, open, and constructive discussions," inside the Boardroom and outside, among Directors and executive management. TEL has also announced additional reforms to further advance its corporate governance.
In a society where change is accelerating, TEL's corporate governance reforms are important for achieving even faster decision-making and more agile operational execution.
I believe that TEL will continue to challenge itself and evolve to become the world's No. 1 company. This is indeed the beginning of an exciting era.

<Michio Sasaki – Outside Directors>

My name is Michio Sasaki, one of TEL's Outside Directors. As an outside director, I believe that I can use my experience to monitor and advise on the priorities and optimal balance within each strategy of management, human resource development, and governance strategy, based on the new Medium-term Management Plan to go from world-class to world-leading, with a focus on profit growth and speed with high-quality and high value-added product development and services.
To ensure the success of the new Corporate Officer system, I would like to supervise the appropriate transfer and balance of authority to accelerate the speed of management decision making. I also consider it important to monitor DX and security measures based on my experience of participating in the management strategies of IT companies. In addition, as chairman of the Nominating Committee, I will be in charge of selecting candidates who can lead to continuous growth for the next generation and their

development plan from a fair and neutral standpoint.
With the above, I would like to contribute to TEL's medium- to long-term growth and the enhancement of corporate value. Thank you very much.

<Makiko Eda – Outside Directors>

I'm Makiko Eda, one of the Outside Directors. Semiconductors are becoming more and more important these days, and I would like to contribute to the growth of our company from the standpoint of my experience in this industry. Semiconductors are products that will shape the future, and it is essential to invest strategically while imagining the future world.
For Tokyo Electron's further growth, the Board of Directors actively discusses innovation and human resource development necessary for medium- and long-term growth. Diversity and inclusion, which especially includes the ability to incorporate factors like gender, global, and generation, will be the source of the company's growth, and I would like to firmly support the promotion of such diversity and inclusion. The industry is global and dynamic.
As an outside director, I intend to contribute to our sustainable value enhancement through prompt and appropriate decision-making, including geopolitical factors, as a top global company.

<Sachiko Ichikawa – Outside Directors>

My name is Sachiko Ichikawa, one of the Outside Directors. I am honored to have the opportunity to deliver a message to investors today.
I believe that one of the roles of an outside director is to supplement the Board of Directors with the investors' perspective. Providers of capital are very interested in growth potential as well as profitability. The words "long-term strategy," "timeline," and "alternative scenarios" come up frequently in our board meetings. This is because we are not only overseeing the current year's operations, but also looking more broadly and further into the future. I believe that the results of proactive investments are shaping the current high performance of the company.
In the age of VUCA, the future is becoming harder to predict, and in the age of ESG investment, investors' evaluation points are changing rapidly. Because we live in an era in which forecasts are difficult to make, it is necessary to improve the ability to make forecasts and to develop countermeasures in case forecasts are off. In this sense, the role of outsider directors is becoming even more important.
I will continue to make every effort to achieve success with the Board of Directors that will enable us to seize opportunities and demonstrate our capabilities. Thank you very much.

Outside Directors as of June 8, 2022: Slide 109

What did you think? I hope that the video messages have provided you with a better understanding of our outside directors' thinking and the contributions they make to TEL. As Mr. Charles Lake will be retiring at the June 21 shareholders' meeting, I would like to express my sincere gratitude for his significant contributions and useful advice and proposals over the past six years.

Corporate Governance Framework (Audit & Supervisory Board System): Slide 110

Next, I would like to introduce the Corporate Officer System, which is scheduled to be introduced after the Annual General Meeting of Shareholders on June 21, as well as the background to its introduction and its role. First, I would like to examine the current situation from a macro perspective. We are now in an era of ultra VUCA, and this includes geopolitical issues. As Ms. Ichikawa mentioned in her video, unprecedented changes are occurring in the business environment and operations on a daily basis, including the rapid evolution of digital technology, the COVID pandemic and armed conflict in some areas.
At Tokyo Electron too, we are experiencing major changes with the unprecedented rapid growth of the semiconductor industry, including semiconductor production equipment, due to the technological transition represented by AI, Big Data, IoT and 5G, and the rapid development and spread of digital transformation.
In an environment where rapid change is spurring intensified competition, collaboration and technological advancements, I believe it will be essential to make management decisions more quickly and accurately than ever and to execute operational decisions with greater agility. In order to realize faster and more precise decision-making, we will introduce the Corporate Officer System.

Corporate Governance Framework (Audit & Supervisory Board System): Slide 111

At the Corporate Officers Meeting, which will be the highest decision-making body for operational

execution, the seven Corporate Officer members, including the CEO, will exchange opinions and engage in discussions on equal terms as the CEO and make important decisions in a timely manner.
The Corporate Officers Meeting will also enable its members to share important decisions with each responsible department simultaneously and promptly, and to increase the power of operational execution through stronger collaboration, thereby realizing dynamic and agile operational execution. The other major objective for this system is to better clarify the roles and responsibilities of the Board of Directors and the operational execution side. As I mentioned, by strengthening the operational execution side and transferring appropriate authority from the Board of Directors to the operational execution side, the Board of Directors will be able to enhance its supervisory function and establish a system that allows it to focus on medium- to long-term management issues and growth strategies, which are becoming increasingly important.
Furthermore, all Corporate Officer members on the execution side will participate in Board of Directors meetings and be able to provide explanations and opinions on matters related to discussions and resolutions at such meetings.

Corporate Governance Framework (Audit & Supervisory Board System): Slide 112

In other words, the introduction of this system is a measure to strengthen and optimize the three functions of "In-depth discussion of medium- to long-term growth strategies," "Supervision of business execution," and "Decision-making on business execution," and is intended to further promote growth-oriented Group management on a global basis, as well as to realize the expansion of short-, medium- and long-term profit and continuous corporate value enhancement in an era of ultra VUCA. I believe the new structure is a reform that will strengthen governance of both the Board of directors and operational execution.
And with that, I would like to conclude my explanation of Tokyo Electron’s governance structure, the effectiveness of the Board of Directors, and the introduction of the Corporate Officer System.

Finally: No Slide

Finally, on a personal note, I will be stepping down from my position after the Annual General Meeting of Shareholders on the 21st, leaving me with only two weeks. Looking back, I am very happy to have been with Tokyo Electron for 46 years since I joined the company in 1976, and I am very pleased that we have been able to grow so much thanks to your great support. I would like to take this opportunity to express my deepest gratitude to all of you for your support and heartwarming encouragement to me personally and to our company. Thank you very much.
I understand that the current semiconductor industry-related market is on the threshold of a period of further significant growth. We will work as One Team to achieve the goals of the new Medium-term Management Plan, aiming for even greater growth in corporate value.
Thank you very much for your continued support.