Tokyo Electron Medium-term Management Plan

June 8, 2022
Forward Looking Statements

- Disclaimer regarding forward-looking statements
  Forward-looking statements with respect to TEL’s business plan, prospects and other such information are based on information available at the time of publication. Actual performance and results may differ significantly from the business plan described here due to changes in various external and internal factors, including the economic situation, semiconductor/FPD market conditions, intensification of sales competition, safety and product quality management, intellectual property-related risks, and impacts from COVID-19.

- Processing of numbers
  For the amount listed, because fractions are rounded down, there may be the cases where the total for certain account titles does not correspond to the sum of the respective figures for account titles. Percentages are calculated using full amounts, before rounding.

- Exchange risk
  In principle, export sales of Tokyo Electron’s mainstay semiconductor and FPD production equipment are denominated in yen. Although some sales and expenses are denominated in foreign currencies, the impact of exchange rate fluctuations on profits is negligible.

FPD: Flat panel display
Medium-term Management Plan Briefing 2022  Program and Participants

- Presentation 4:00pm ~ 6:10pm
  - The New Medium-term Management Plan
  - Review of the Previous Medium-term Management Plan and Financial Strategy for the New Medium-term Management Plan
  - Procurement and Manufacturing Strategy
  - SPE Business Strategy
  - Backend Business Strategy: Activities for the Development of Wafer Bonding Process
  - Account Sales Strategy
  - Break (5 min)
  - Field Solutions Business Strategy
  - Introducing TEL™’s DX Activities and Our Ideal State
  - New Board of Directors Structure and the Corporate Officer System
- Q&A Session 6:10pm ~ 6:45pm

### Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>As of June 8, 2022</th>
<th>As of July 1, 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetsuo Tsuneishi</td>
<td>Corporate Director, Chairman of the Board</td>
<td>Retired</td>
</tr>
<tr>
<td>Toshiki Kawai</td>
<td>Representative Director, President &amp; CEO</td>
<td>Representative Director, President &amp; CEO, Corporate Officer</td>
</tr>
<tr>
<td>Sadao Sasaki</td>
<td>Representative Director, EVP &amp; GM</td>
<td>Representative Director, SEVP &amp; GM, Corporate Officer GM of Development &amp; Production Division, GM of Corporate Production Division</td>
</tr>
<tr>
<td>Yoshikazu Nunokawa</td>
<td>Corporate Director, EVP &amp; GM Global Business Platform Division, Finance</td>
<td>Corporate Director, Chairman of the Board of Directors</td>
</tr>
<tr>
<td>Seisu Ikeda</td>
<td>Corporate Director, SVP &amp; GM Account Sales Division</td>
<td>Corporate Officer, EVP &amp; GM GM of Account Sales Division</td>
</tr>
<tr>
<td>Yoshinobu Mitano</td>
<td>Corporate Director, SVP &amp; GM SPE Business Division</td>
<td>Corporate Officer, EVP &amp; GM GM of SPE Business Division</td>
</tr>
<tr>
<td>Takeshi Okubo</td>
<td>SVP &amp; GM Global Sales Division</td>
<td>Corporate Officer, EVP &amp; GM GM of Global Sales Division, GM of Field Solutions Business Division</td>
</tr>
<tr>
<td>Hiroshi Kawamoto</td>
<td>VP &amp; GM, Tokyo Electron Miyagi</td>
<td>VP &amp; GM Deputy GM of Global Business Platform Division, Finance</td>
</tr>
<tr>
<td>Yohei Sato</td>
<td>ATSBU GM</td>
<td>ATSBU GM</td>
</tr>
<tr>
<td>Noritaka Yokomori</td>
<td>Deputy GM of Corporate Innovation Division, DX</td>
<td>Deputy GM of Corporate Innovation Division, DX</td>
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CORP IR / June 8, 2022
The New Medium-term Management Plan

June 8, 2022

Toshiki Kawai
Representative Director, President & CEO
Agenda

- Business Highlights
  - Progress on the Medium-term Management Plan
  - Main Achievements

- New Medium-term Management Plan
  - Business Environment
  - Overview of the New Medium-term Management Plan
Net sales, gross profit margin, operating margin and ROE reached record high
Progress on the Medium-term Management Plan

Announced on May 2019

<table>
<thead>
<tr>
<th></th>
<th>Financial Model (by FY'24)</th>
<th>FY’22 Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales</td>
<td>¥1.5T ¥1.7T ¥2T</td>
<td>¥2T 3.8B</td>
</tr>
<tr>
<td>OP margin</td>
<td>26.5% 28% &gt;30%</td>
<td>29.9%</td>
</tr>
<tr>
<td>ROE</td>
<td>&gt;30%</td>
<td>37.2%</td>
</tr>
</tbody>
</table>

Reached our financial model 2 years ahead of schedule
Major Achievements and Initiatives on the Medium-term Management Plan

- **Outperformed the market.** Increased WFE* market share
- **Significant progress was made in acquiring PORs and introducing new products and functions** through high value-added products that only we can make

【Our latest main products】

<table>
<thead>
<tr>
<th>Deposition</th>
<th>Coater/developer</th>
<th>Etch</th>
<th>Cleaning</th>
<th>Wafer prober</th>
<th>Wafer bonder</th>
<th>FPD Etch</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT333™</td>
<td>LITHIUS Pro™ Z</td>
<td>Episode™ UL</td>
<td>CELLESTA™ Pro</td>
<td>Prexa™</td>
<td>Synapse™ Si</td>
<td>PICP™ Pro</td>
</tr>
</tbody>
</table>

- **As planned, invested over 400 billion yen on R&D expenses over the past three years.** Continue investing for future growth

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*WFE: WFE (Wafer fab equipment): Wafer fab equipment refers to the production equipment used in front-end production and in wafer-level packaging production.*

CORP IR / June 8, 2022
Agenda

- Business Highlights
  - Progress on the Medium-term Management Plan
  - Main Achievements

- New Medium-term Management Plan
  - Business Environment
  - Overview of the New Medium-term Management Plan
The world is currently pushing firmly ahead with implementing 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

Explosive increase in data traffic

CAGR 26% (2020-2030)

Source: Omdia

*Zettabyte: 1 Zettabyte = 10^21 byte, 1 Zettabyte is said to be "the number of sand grains on sandy beaches around the world"
Outlook for the Semiconductor Market

Growing to more than double by 2030

>$1.35 trillion

Source: 1990-2021 (WSTS) 2022-2030 (IBS, May 2022)

Growth in the semiconductor market is projected to surpass $1.35 trillion by 2030, with a significant increase in value from services compared to products. The graph illustrates the transition from products to services, with a jump in value from $555.9 billion in 2021 to projected growth in 2030. Key drivers include data centers, smartphones, and services for consumers and industry.
WFE Market will grow further with progress of digitalization and evolution of semiconductors.
The New Medium-term Management Plan : Financial Targets

<table>
<thead>
<tr>
<th>Financial Targets (by FY’27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales</td>
</tr>
<tr>
<td>≥ 3 trillion yen</td>
</tr>
<tr>
<td>OP margin</td>
</tr>
<tr>
<td>≥ 35%</td>
</tr>
<tr>
<td>ROE</td>
</tr>
<tr>
<td>≥ 30%</td>
</tr>
</tbody>
</table>
Toward short-, medium- and long-term profit and continuous corporate value enhancement
Continue to Invest Aggressively on R&D

More than 1 trillion yen planned for 5 years from FY’23

About 600 billion yen

Continue active investment in growth to create high value-added next-generation products
Further Increasing Corporate Value

Aiming for world-class operating margin and ROE ≥ 30%

Offence & Offence

- Safety
- Quality
- Compliance
- Engagement
- Risk management & Security

Management Foundation

Product Competitiveness

Customer Responsiveness

Higher Productivity
Won the Grand Prize Company in the Corporate Governance of the Year® 2021

Sponsored by the Japan Association of Corporate Directors / Released on Jan. 12, 2022

Feedback (Evaluation points for TEL)

- Approach to increase earning power and aggressive style to pursue profits
- Aggressive ESG (efforts to enhance corporate value through both Offence and ESG)
- Actions to increase employee engagement
- System to evaluate representative directors
- Operating rhythm to make governance more solid
- Communication with outside directors through the Board of Directors and offsite meetings
TEL's Corporate Principles

Corporate Philosophy
The purpose of TEL’s existence and its mission in society
We strive to contribute to the development of a dream-inspiring society through our leading-edge technologies and reliable service and support.

Vision
Top priorities to be addressed to realize the Corporate Philosophy
A company filled with dreams and vitality that contributes to technological innovation in semiconductors.

TEL Values
Attitudes, codes of conduct, and values to be observed by each employee
Pride/Challenge/Ownership/Teamwork/Awareness
New Vision

A company filled with dreams and vitality that contributes to technological innovation in semiconductors

Tokyo Electron pursues technological innovation in semiconductors that supports the sustainable development of the world. We aim for medium- to long-term profit expansion and continuous corporate value enhancement by utilizing our expertise to continuously create high value-added leading-edge equipment and technical services.

Our corporate growth is enabled by people, and our employees both create and fulfill company values. We work to realize this vision through engagement with our stakeholders.
TSV : TEL’s Shared Value (TEL’s CSV)

CSV (Creating Shared Value)
The concept is to create social and economic value by leveraging corporate expertise to solve social issues, thereby enhancing corporate value and achieving sustainable growth.

New Vision : A company filled with dreams and vitality that contributes to technological innovation in semiconductors

• Pursue technological innovation in semiconductors that supports the sustainable development of the world
• Continuously create high value-added leading-edge equipment and technical services
• Medium- to long-term profit expansion and continuous corporate value enhancement
• Engagement with our stakeholders

Realization of Vision = Creating Shared Value in TEL
Our Approaches to Social Issues

Sustainable development of the world / Diversification of values and happiness

Technologies
- Higher speed communication (5G/6G)
- Cloud/Edge Computing
- AI
- IoT
- AR/VR/MR

Solutions
- Online/Metaverse
- AI diagnosis/Prevention/Robots
- Smartification
- EV/Autonomous driving/MaaS

Semiconductors
- Logic
- Memory
- Power
- Analog
- Sensors
- Displays

Pursue technological innovation in semiconductors:
- Larger capacity
- Higher speed
- Higher reliability
- Lower power consumption

Higher definition
Flexible
Lower power consumption
Aiming to achieve the Medium-term Management Plan by FY'27 with a view to realizing Vision in 2030
## Approaches to Sustainability

**E-COMPASS**

Environmental Co-Creation by Material, Process and Subcomponent Solutions

<table>
<thead>
<tr>
<th>Semiconductors</th>
<th>Products</th>
<th>Business activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribute to technological innovation for higher performance and lower power consumption of semiconductors</td>
<td>Offer the Best Products and Best Technical Services</td>
<td>Improve green performance</td>
</tr>
<tr>
<td>• Leading-edge technology contributes to a lower power consumption society</td>
<td>• Improve environmental performance of semiconductor production equipment (Productivity per unit area and hour, equipment utilization, quality, material consumption, recycling, etc.)</td>
<td>• Reduction of CO₂ emissions at plants and offices</td>
</tr>
<tr>
<td>• Accelerating environmental technology innovation</td>
<td>• Environmentally Hazardous Substance-Free</td>
<td>• Reduce and recycle packaging materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reduce environmental impact during procurement and logistics</td>
</tr>
</tbody>
</table>

Promoting technological innovation of semiconductors and reducing environmental impact of semiconductor manufacturing throughout the supply chain as an industry leader.
Released a new model equipment with environmental and process performance that only TEL can manufacture for the backend process where further technological evolution and market expansion are expected.

- **Edge trimming equipment for semiconductor’s 3D Packaging**
  - Achieve high precision, high quality cutting and high productivity by laser control processing
  - The equipment platform is based on LITHIUS Pro™ Z, which is highly reliable and productive.
  - Reduces the amount of DIW* consumption by 70% or more compared to conventional method**

* DIW: Deionized water, ** TEL estimates
As a leading corporation in environmental management, Tokyo Electron works actively to conserve the global environment. We will realize net zero by proactively promoting the reduction of environmental burden of both our facilities and products. We strive to contribute to the development of a dream-inspiring society by providing evolutionary manufacturing technologies that effectively reduce the power consumption of electronic products.

Medium-term Environmental Targets for 2030

CO₂ Emission Reduction Goal

**Products**
- **30% Reduction**
  - Per wafer (compared to 2018)

**Plants and Offices**
- **70% Reduction**
  - of total emissions (compared to 2018)
  - Reduce energy consumption by 1% YoY at each plant and office (per-unit basis)
  - **Ratio of renewable energy 100%**

Long-term Goal (2050)
Net Zero

Scope 1 & 2  
To be achieved by 2040

Scope 3  
To be achieved by 2050
Safety First

Safety Goals (by FY’27)

TCIR ≤ 0.1

TCIR: Total Case Incident Rate.
The number of workplace incidents per 200,000 working hours
Corporate growth is enabled by **people**, and our employees both create and fulfill company values.
Key Indicators for Continuous Corporate Value Enhancement

- Net sales/Operating margin/ROE

- Initiatives for Net Zero
  - Products/Plants and offices/
    Reduction of CO₂ emissions from logistics, etc.

- Stakeholder Engagement
- Safety
- Risk Management
- Governance
Technology Enabling Life
Review of the Previous Medium-term Management Plan and Financial Strategy for the New Medium-term Management Plan

June 8, 2022

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

- Review of the previous Medium-term Management Plan and results
  - Execution of growth investments made over the past five years
  - Trends in net sales and operating income
  - Trends in TEL's market capitalization and total net assets (start of 2010 onward)

- Financial strategy to achieve the new Medium-term Management Plan

- Shareholder return policy
Review of the Previous Medium-term Management Plan

Achieved the financial model of 2 trillion yen in net sales two years ahead of schedule

- Dynamically executed business strategy to address changing circumstances
- Continued growth investments even during periods where the market is undergoing adjustment
- Close communications and collaborations with partner companies

<table>
<thead>
<tr>
<th></th>
<th>FY2022 (Actual)</th>
<th>By FY2024 (Plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales</td>
<td>2,003.8</td>
<td>1,500.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,700.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,000.0</td>
</tr>
<tr>
<td>Gross profit</td>
<td>911.8</td>
<td>650.0</td>
</tr>
<tr>
<td>Gross profit margin</td>
<td>45.5%</td>
<td>43.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>43.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44.5%</td>
</tr>
<tr>
<td>SG&amp;A expenses</td>
<td>312.5</td>
<td>252.0</td>
</tr>
<tr>
<td>SG&amp;A expenses to sales ratio</td>
<td>15.6%</td>
<td>16.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14.5%</td>
</tr>
<tr>
<td>Operating income</td>
<td>599.2</td>
<td>398.0</td>
</tr>
<tr>
<td>Operating margin</td>
<td>29.9%</td>
<td>26.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;30.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;30.0%</td>
</tr>
<tr>
<td>ROE</td>
<td>37.2%</td>
<td>&gt;30%</td>
</tr>
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</table>
Performance of Growth Investments Made Over the Past Five Years

Invested on increases in production capacity, enhancement of development capabilities, advancement of DX, and partnerships with suppliers.
Trends in Net Sales and Operating Income

As cycles have reduced, aggressively continue growth investments even during periods of adjustment.

**Fiscal Years (FY)**

- **1991**
- **1992**
- **1993**
- **1994**
- **1995**
- **1996**
- **1997**
- **1998**
- **1999**
- **2000**
- **2001**
- **2002**
- **2003**
- **2004**
- **2005**
- **2006**
- **2007**
- **2008**
- **2009**
- **2010**
- **2011**
- **2012**
- **2013**
- **2014**
- **2015**
- **2016**
- **2017**
- **2018**
- **2019**
- **2020**
- **2021**
- **2022**
- **2023 (E)**

**Net Sales (Billion Yen)**
- **1991**: 2,003.8
- **1992**: 2,350.0
- **1993**: 29.9%
- **1994**: 30.5%
- **1995**: -10%
- **1996**: 0%
- **1997**: 10%
- **1998**: 20%
- **1999**: 30%
- **2000**: 40%
- **2001**: 50%
- **2002**: 60%
- **2003**
- **2004**
- **2005**
- **2006**
- **2007**
- **2008**
- **2009**
- **2010**
- **2011**
- **2012**
- **2013**
- **2014**
- **2015**
- **2016**
- **2017**
- **2018**
- **2019**
- **2020**
- **2021**
- **2022**
- **2023 (E)**

**Operating Income (Billion Yen)**
- **1991**: 91
- **1992**: 92
- **1993**: 93
- **1994**: 94
- **1995**: 95
- **1996**: 96
- **1997**: 97
- **1998**: 98
- **1999**: 99
- **2000**: 00
- **2001**: 01
- **2002**: 02
- **2003**: 03
- **2004**: 04
- **2005**: 05
- **2006**: 06
- **2007**: 07
- **2008**: 08
- **2009**: 09
- **2010**: 10
- **2011**: 11
- **2012**: 12
- **2013**: 13
- **2014**: 14
- **2015**: 15
- **2016**: 16
- **2017**: 17
- **2018**: 18
- **2019**: 19
- **2020**: 20
- **2021**: 21
- **2022**: 22
- **2023 (E)**

**Operating Margin (%)**
- **1991**: 25.0%
- **1992**: 30.5%
- **1993**: 40.0%
- **1994**: 50.1%
- **1995**: 60.0%
- **1996**: 70.0%
- **1997**: 80.0%
- **1998**: 90.0%
- **1999**: 100.0%
- **2000**: 110.0%
- **2001**: 120.0%
- **2002**: 130.0%
- **2003**: 140.0%
- **2004**: 150.0%
- **2005**: 160.0%
- **2006**: 170.0%
- **2007**: 180.0%
- **2008**: 190.0%
- **2009**: 200.0%
- **2010**: 210.0%
- **2011**: 220.0%
- **2012**: 230.0%
- **2013**: 240.0%
- **2014**: 250.0%
- **2015**: 260.0%
- **2016**: 270.0%
- **2017**: 280.0%
- **2018**: 290.0%
- **2019**: 300.0%
- **2020**: 310.0%
- **2021**: 320.0%
- **2022**: 330.0%
- **2023 (E)**

**Key Factors**

- **Financial crisis in Asia**
- **64M DRAM oversupply**
- **IT bubble crash**
- **Excessive logic foundry investment**
- **World financial crisis**
- **Memory oversupply**
- **Effects of European debt crisis, slowdown in emerging markets**
- **Weak demand for PC, mobile**

**Adjustments**

- **4M DRAM oversupply**
- **2003.8 Billion Yen**
- **30.5% Operating Margin**
- **2,350.0 Billion Yen (E)**
Trends in TEL's Market Capitalization and Total Net Assets (Starting from 2010)

Start of 2010 through end of 2021:
- Market capitalization x9.6
- Net assets x2.4

Tuesday, January 4, 2022
Record high market capitalization
¥10,756.3B

June 3, 2022
Closing price basis (PBR x7.0)

Market value added

Non-financial capital:
- Intellectual capital
- Manufacturing capital
- Human capital
- Social capital
- Natural capital

Net assets
- ¥1,347.0B

Market capitalization
- ¥9,426.3B
Financial Strategy to Achieve the New Medium-term Management Plan

- Increase investment into production capacity in anticipation of market growth
- Allocate more than 1 trillion yen in R&D expenses over the next five years (development portfolio management)
  - Development of new products in the leading-edge generation
  - Integration that enhances added value of products
  - Component research, expansion of fundamental technologies, and exploration of new areas
- Consider DX advancement investment ratios in light of economic effects
  - Increases to added value of equipment and profitability of advanced field solutions
  - Optimization of R&D activities
  - Optimization of sales activities and admin work
- Optimize fixed costs based on scope of business and business activities
Shareholder Return Policy

**Dividend per share**

<table>
<thead>
<tr>
<th>Year</th>
<th>Dividend per share (Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY'18</td>
<td>624 yen</td>
</tr>
<tr>
<td>FY'19</td>
<td>758 yen</td>
</tr>
<tr>
<td>FY'20</td>
<td>588 yen</td>
</tr>
<tr>
<td>FY'21</td>
<td>781 yen</td>
</tr>
<tr>
<td>FY'22</td>
<td>1,403 yen</td>
</tr>
<tr>
<td>FY'23(E)</td>
<td>1,678 yen</td>
</tr>
</tbody>
</table>

**TEL shareholder return policy**

- **Dividend payout ratio:** 50%
- **Annual DPS of not less than 150 yen**
- We will review our dividend policy if the company does not generate net income for two consecutive fiscal years
- **We will flexibly consider share buybacks**

No change to shareholder return policy
Total Returns with Respect to FCF

(Billion yen)

- Income (expenditure) from issuance or sale of shares (acquisition of treasury stock)
- Paid dividends
- Rate of return to shareholders with respect to FCF (record date basis)
Summary

- Achieved financial model from the previous Medium-term Plan (scenario of 2 trillion yen in net sales) two years ahead of schedule
  - Dynamically executed business strategy to address changing circumstances
  - Continued growth investments even during periods where the market was undergoing adjustment
  - Had close communications and collaborations with partner companies
  - As cycles have reduced, aggressive growth investments even during periods of adjustment were well-received by the stock market, resulting in significant growth to market capitalization compared to net assets

- Key financial strategies to achieve the new Medium-term Management Plan
  - Increase investment into production capacity in anticipation of market growth
  - Allocate more than 1 trillion yen in R&D expenses over the next five years properly (development portfolio management)
  - Consider DX advancement investment ratios in light of economic effects
  - Optimize fixed costs based on scope of business and business activities

- No change to shareholder return policy, return profits to shareholders through growth
Procurement and Manufacturing Strategy

June 8, 2022

Sadao Sasaki
Representative Director, EVP & GM,
Development & Production, Corporate Production Division
We would like to sincerely thank all of our stakeholders for their kind support

- **Need for Production Innovation (Procurement/Manufacturing)**
  - Build production operation with high productivity
  - Build a sustainable supply chain

- **Efforts toward reducing environmental impacts**
  - Activities toward Scopes 1, 2 and 3
  - Activities toward total net zero CO₂ emissions
Major Domestic Production Sites (As of April 1, 2022)

Yamanashi: Near full-utilization

Kumamoto: Full-utilization (increasing production)

Iwate: Full-utilization (increasing production)

Miyagi: Full-utilization (increasing production)

Continue to provide high-quality semiconductor production equipment to semiconductor manufacturers all over the world according to required deadlines
Need for Production Innovation (Procurement/Manufacturing)

- Build production operation with high productivity
- Build a sustainable supply chain

1. Production capacity increases
2. Insufficient start-up personnel
3. Parts shortages
Continuous Production Innovation in Pursuit of Safety, High Quality and High Reliability

- Build a production system able to quickly respond to market changes
- Shorten time from new product development to mass production
- Shorten production lead times: Achieve 100% module shipment
- Utilize DX and automation in manufacturing, and expand automated warehouse
- **Significantly reduce equipment start-up time (One-touch start-up)**
  - Reduce start-up time up to 75% (primary target), One-touch (final target)

Expected outcome from shorten start-up time
- Enhance productivity and start-up quality
- Reduce accident risks
- Optimize resources and the work-life balance

Conventional ➔ after production innovation
Efforts to Utilize TEL PLM-DX and Improve Productivity and Efficiency

- Improve core system
  - Production leveling < 12 months
  - MRP processing capability for procurement increased 10-fold

- Introduce PLM-DX and BOM concept
  - Enhance production capability up to 2 times within 3 years
  - Minimize manufacturing lead time
  - 3-fold increase in design efficiency
  - Reduce new product development period by half

“Shift Left” production plan toward the business scale of 1 trillion-yen procurement

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**PLM** Design Digitalization

**ERP** Procurement Planning Digitalization

**MES** Manufacturing Digitalization

**BOM** Bill of Material

**BOP** Bill of Process

PLM: Product Lifecycle Management
ERP: Enterprise Resource Planning
MES: Manufacturing Execution System

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CORP IR / June 8, 2022
Build a Sustainable Supply Chain

- Fair and transparent relationships and reliable trust relationship with our business partners
  - Implement CSR/BCP assessments based on industry codes of conduct
  - Share knowledge in such areas as safety, quality, the environment and compliance

E-COMPASS

Applaud environmental impact reduction activities, adding environmentally related items to assessment studies

- Reduce CO₂ emissions and the amount of energy usage
- Introduce renewable energy
- Promote resource conservation
- Promote waste reduction and recycling
- Promote activities for reducing the environmental impact of logistics

Production trend briefings twice a year (procurement amount ratio: 90%)

Partners Day once a year (procurement amount ratio: 65%)
Procurement BCP and Proactive Procurement Activities

- **Mid- and long-term forecast**
  - Promote “Shift Left” procurement strategy
  - Build BCP system resilient to procurement difficulty

- **Oversee whole supply chain from upstream to downstream**
  - Visualize and grasp risks

- **Early procurement of parts**
  - Ensure inventory exchange flexibility among factories
  - Inventory reductions in total

- **Secure semiconductor devices**
  - Ensure inventory exchange flexibility among factories
  - Visualize and streamline distribution channel
  - Collaborate with semiconductor makers
  - TEL can be a customer of our customers

- **Parts and Suppliers**
  - Identify and analyze risk parts
  - Multi sourcing of producing countries
  - Standardization, centralization and decentralization of parts
  - Measures to secure capacity for us

- **Measures for procurement BCP**
  - Early procurement for long term
  - Ensure inventory exchange flexibility among factories
  - Inventory reductions in total

- **Safety stock**
  - Inventory liquidity

- **Visualize supply chain**

- **Risk management on business partners**
  - Strengthen partnership

- **Strong and reliable supply chain**
  - (Raw materials, parts, processing and assembly)
Efforts toward Reducing Environmental Impacts
Responsibilities as an Industry-Leading Company

Digital (ICT/DX) × Green (Decarbonization)

ICT: Information and Communication Technology
DX: Digital Transformation of societies and business models, etc.

E-COMPASS
Environmental Co-Creation by Material, Process and Subcomponent Solutions

TEL will forcefully lead the entire industry toward the realization of a decarbonized society
Milestones for CO₂ Emission Reductions toward Net Zero Emissions

**Scopes 1 & 2**
- TEL emissions
- **Our sites**
  - 70% reduction
  - 100% Renewable Energy
- *Total Emissions (compared to 2018)*
- Reduce energy usage (per-unit basis) at all sites by 1% over previous year

**Scope 3**
- Emissions of companies other than TEL
- Develop environmentally friendly equipment, also for legacy fabs

**Products**
- **Our sites**
  - 30% reduction
- **Products**
  - 50% reduction
- **GHG reductions**
  - 20%
- **Modal shift Joint delivery ratio**
  - 10%
- **More efficient use of environmentally friendly packaging**
  - 50%

**Cooperation with semiconductor manufacturers**
- Energy efficiency-enhancement
- Move to energy-conserving facility equipment
- GHG reductions (process development)

**Net Zero**
- Renewable Energy
- Net Zero

**RE* Semiconductor Factories**
- Energy conservation/creation
- Recycling
- Alternative energy
- RE adoption
- Emissions trading

2018 2020 2030 2040 2050

*RE: Renewable energy
E-COMPASS Activities Toward Scopes 1, 2 and 3

Strengthen partnerships: Pursue industry-wide sustainability

1. Reduce the environmental impact of procurement logistics
   - Realize logistics with minimized environmental impacts
   - CO₂ Emissions During Distribution
     - Current
     - 2050

2. Equipment free of environmentally harmful substances
   - Abolish TEL-designated prohibited substances before they begin to be regulated
   - Disseminate information on hazardous substance regulations to all partners
   - Regulations Start
   - Time Line

3. Proactive development of environmental technologies for equipment
   - Use environmental technologies to accelerate manufacturing technology innovation
   - Industry Green Performance
     - Current
     - 2050

Prepare system (awards, etc.) for publishing business partner achievements after this fiscal year’s TEL Partners Day
Accelerate technological innovation to create new, more-competitive equipment environmental technology

What We Aim For

Common Goals

- Promote modal shift
- Reduce the environmental impact of packaging materials
- Adoption of electric/H₂ trucks (requested)
- Abolish prohibited substances before they begin to be regulated
- Create a system for sharing information on part that contain prohibited substances (as defined in parts specifications)
- Reduce the number of sheet metal product and cable assembly product studies by half
- Efforts with joint development partners
  - Share 10-year environmental technology roadmap
  - Set environmental performance standards for reducing environmental impacts in product specifications
  - Degree of achievement with respect to, or number of product types achieving, environmental specifications on a product-by-product basis
**E-COMPASS Activities Toward Scope 3**

We are targeting "net zero" to reduce environmental impact, and aim to solve environmental technology issues through industry-wide collaboration and to contribute to society as a member of among environmentally advanced companies.

### 10 technical sector themes and 7 environmentally important sectors

<table>
<thead>
<tr>
<th>Products and Technology</th>
<th>Environmental Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heaters</td>
<td>Energy</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>Water</td>
</tr>
<tr>
<td>Pumps</td>
<td>Warming substances</td>
</tr>
<tr>
<td>Chemicals</td>
<td>Chemical</td>
</tr>
<tr>
<td>Chillers</td>
<td>Exhaustible resource</td>
</tr>
<tr>
<td>CO₂ emission</td>
<td>Substances of environmental concern</td>
</tr>
<tr>
<td>Footprint</td>
<td>Utilization of waste energy</td>
</tr>
</tbody>
</table>

#### Together with all of You
- Share environmental information about products
- Share goals for enhancing environmental performance
- Share 10-year roadmap for environmental technology

#### Support from TEL
- Accelerate joint development with supporting companies
- Joint development investments in supporting companies*

*We will invest when we deem it necessary.
Summary

- **Pursuit of production innovation (Procurement/Manufacturing)**
  - Reduce burden on site by One-touch equipment start-up
  - Utilize TEL PLM-DX to double production capabilities
  - Achieve production leveling and stabilization through proactive procurement

- **Efforts toward reducing environmental impacts**
  - Scope 1/2: Utilize renewable energy across the board
  - Total net zero CO₂ emissions: Through the collaboration with semiconductor manufacturers and supply chain, we will realize RE semiconductor factories, environmentally friendly equipment and GHG reductions
SPE Business Strategy

June 8, 2022

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

- WFE Market and Technological Requirements by Application
- Technology Roadmap
- SPE Segment Sales Target and Business Opportunities
- Development Efforts
  - Strengthen R&D Capabilities
  - Increase in New Product Sales Composition Ratio
  - Increase Environmental Performance
  - Increase Efficiency of Equipment Start-up
- Summary
WFE Market and Technological Requirements by Application

Technological Requirements

- Logic/foundry:
  - Scaling along with structural changes
    - Reduction in manufacturing cost per transistor
    - Lowering power consumption
    - Higher performance

- NAND
  - Increasing the layer counts
    - Reduction in manufacturing cost per bit

- DRAM
  - Scaling to realize
    - Reduction in manufacturing cost per bit
    - Lowering power consumption
    - Higher performance
**Logic Technology Roadmap**

<table>
<thead>
<tr>
<th>Year of HVM (20k/month)</th>
<th>2018</th>
<th>2020</th>
<th>2022</th>
<th>2024</th>
<th>2026</th>
<th>2028</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Node</strong></td>
<td>N7</td>
<td>N5</td>
<td>N3</td>
<td>N2</td>
<td>N1.4</td>
<td>N1</td>
<td>N0.7</td>
</tr>
<tr>
<td><strong>Device</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poly pitch (PP)</td>
<td>56</td>
<td>48</td>
<td>45</td>
<td>42</td>
<td>39</td>
<td>36</td>
<td>33</td>
</tr>
<tr>
<td>Min. MP [nm]</td>
<td>40</td>
<td>28</td>
<td>22</td>
<td>20</td>
<td>18</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Cell height (CH)</td>
<td>240 (2Fin)</td>
<td>210 (2Fin)</td>
<td>176 (2Fin)</td>
<td>120 (NS)</td>
<td>90 (NS)</td>
<td>64 (CFET)</td>
<td>48 (CFET)</td>
</tr>
<tr>
<td>Density (a.u.)</td>
<td>1</td>
<td>1.73 (vs. N7)</td>
<td>1.53 (vs. N5)</td>
<td>1.81 (vs. N3)</td>
<td>1.65 (vs. N2)</td>
<td>1.75 (vs. N1.4)</td>
<td>1.67 (vs. N1.0)</td>
</tr>
<tr>
<td>PP x CH x DTCO*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scaling booster</td>
<td>EUV</td>
<td>SDB**</td>
<td>Dipole eWF</td>
<td>Backside PDN</td>
<td>Heterogeneous channel</td>
<td>2D material</td>
<td></td>
</tr>
</tbody>
</table>

Aiming for 1.6-1.8x increase in logic density along with pitch scaling, DTC and scaling booster

Assume new knob will be created in each node

* DTCO: Design technology co-optimization
** Single Diffusion Break, *** Self Align Gate Contact

## NAND Technology Roadmap

**Source:** TEL estimates

<table>
<thead>
<tr>
<th>Year of HVM (20k/month)</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack (~1.6x/3years)</td>
<td>128L</td>
<td>16x~19xL (176)</td>
<td>22x~25xL (240)</td>
<td>28x~32xL (304)</td>
<td>35x~4xxL (368)</td>
<td>41x~45xL (440)</td>
<td>5xxL (512)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tier</td>
<td>1 or 2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2 or 3</td>
<td>3</td>
<td>3 or 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical pitch</td>
<td>50~55nm</td>
<td>45~55nm</td>
<td>40~50nm</td>
<td>35~45nm</td>
<td>35~45nm</td>
<td>35~45nm</td>
<td>35~40nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory height</td>
<td>7~8μm</td>
<td>8.5~10.5μm</td>
<td>10~12.5μm</td>
<td>11~14μm</td>
<td>13.5~17μm</td>
<td>16~20.5μm</td>
<td>18.5~21μm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel</td>
<td>Poly Si grain CIP</td>
<td>incl. MILC Si*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WL metal</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>Mo</td>
<td>Mo</td>
<td>Mo</td>
<td>Mo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#of memory holes b/w slits</td>
<td>9</td>
<td>9</td>
<td>9~24</td>
<td>14~24</td>
<td>19 or 24</td>
<td>19 or 24</td>
<td>19 or 24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peri. CMOS (In general)</td>
<td>Under array or Next array</td>
<td>Under array or Bonding</td>
<td>Under array or Bonding</td>
<td>Under array or Bonding</td>
<td>Under array or Bonding</td>
<td>Under array or Bonding</td>
<td>Under array or Bonding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MILC Si: Metal-induced lateral crystallization silicon
# DRAM Technology Roadmap

**Year of HVM (20k/month)** | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027~28 | 2029~30
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
F* [nm] | 16 | 15-14 | 13-12 | 12-11 | ≤10 | <10 | 6F²
Cell / Peri. layout | 3D

*Feature size: STI hp along WL = STI hp / cos(21°)*

**Patterning** | 193i SAQP, DP (+ EUV)

**Pillar cap. A.R. Capacitor** | ZAZ CIP

**Peri. CMOS** | Poly SiON

Alternative: STO etc.

**M. Popovici (imec) et al. IEDM 2018**

Schematic by TEL

Source: TEL estimates

CORP IR / June 8, 2022
SPE Segment Sales Target and Business Opportunities

Business Opportunities

- **Logic/foundry**
  - Increase patterning complexity requires co-optimization between unit processes
  - Adoption of High-NA EUV lithography
  - Adoption of GAA and backside PDN

- **NAND**
  - 3D NAND layer counts reach more than 300 layers
  - High aspect ratio etch, high productivity sacrificial film removal and atomic-level deposition on 3D structure

- **DRAM**
  - Technology to suppress RC delay in wiring
  - Capacitor formation technology for further scaling

SPE New Equipment Sales Target ($B)

- Coater/developer
- Etch
- Deposition
- Cleaning
- Wafer prober
- Others

FY2022: 1,499.0
FY2027: ≥ 2,300.0
Development Efforts

Simultaneous 4-Generation Developments

- Align long-term technology roadmap with customers
- Simultaneously develop and evaluate technologies up to 4 generations ahead
- Demonstrate process performance on customer structured wafers at customer’s environments at early stage
  → Create high value-added products and acquire PORs
Strengthen R&D Capabilities

Yamanashi R&D building
Deposition system, gas chemical etch system, corporate R&D
(Completion scheduled for spring 2023)

Kumamoto R&D building
Coater/Developers, surface preparation system
(Completion scheduled for fall 2024)

Miyagi R&D building
Etch system
(Completion scheduled for spring 2025)

Miyagi Technology Innovation Center
Etch system
(Began operation in Oct. 2021)

TEL Digital Design Square
DX, Software
(Began operation in Nov. 2020)
Increase in New Product Sales Composition Ratio

Deposition system sales for advanced logic/foundry customers

The proportion of high value-added products will increase. Contribute to enhancing sales, profits and market share.

*New products: Products newly adopted from N+1 generation
## Increase Environmental Performance

### Cleaning system

<table>
<thead>
<tr>
<th>Productivity (WPH/system)</th>
<th>Tool footprint (m²)</th>
<th>DIW Consumption (K ton)</th>
<th>DIW supply &amp; waste Management Cost (¥M)</th>
<th>Power Consumption per wafer (kWh/wafer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Products</td>
<td>-52%</td>
<td>-30%</td>
<td>-30%</td>
<td>-46%</td>
</tr>
<tr>
<td>New Products</td>
<td>×2.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Environmental performance = equipment performance  
Further enhance environmental performance
Increase Efficiency of Equipment Start-up

Equipment start-up time (hour)

- Conventional
- After increasing efficiency

-50%

Measures:
- Optimize inspection items and automate inspection
- Expand online support
- DX network tool
- Automatic tool

Further enhance customer satisfaction and productivity
Summary

- Business opportunities are expanding along with the technological innovation in both logic and memory
- Provide added value through co-optimization of our wide range of products
- Create high value-added equipment and acquire PORs through 4-generation simultaneous developments and evaluations with our customers
- Enhance and strengthen development capabilities
- Enhance customer satisfaction and productivity by shortening equipment start-up times using DX and AI
Backend Business Strategy:
Activities for the Development of Wafer Bonding Process
June 8, 2022

Yohei Sato
BUGM
ATS BU
Introduction of wafer bonding technology accelerates further reduction of pitch
Introduction of wafer bonding technology accelerates further reduction of pitch
## Application of Wafer Bonding

<table>
<thead>
<tr>
<th>Device</th>
<th>CIS</th>
<th>NAND</th>
<th>DRAM</th>
<th>Logic</th>
<th>Disaggregation / Chiplets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacking Device</td>
<td>BSI</td>
<td>3D NAND</td>
<td>HBM</td>
<td>3D DRAM</td>
<td>Backside PDN</td>
</tr>
<tr>
<td></td>
<td>Sensor</td>
<td>Cell</td>
<td>DRAM</td>
<td>Cell</td>
<td>Logic</td>
</tr>
<tr>
<td></td>
<td>Memory</td>
<td>+</td>
<td>DRAM</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Logic</td>
<td>+</td>
<td>Logic</td>
<td>+</td>
<td>Logic</td>
</tr>
<tr>
<td></td>
<td>(Sensor</td>
<td>Memory</td>
<td>Logic</td>
<td>(Sensor</td>
<td>Memory</td>
</tr>
<tr>
<td>Bonding</td>
<td>W-W Cu Hybrid</td>
<td>W-W Cu Hybrid</td>
<td>D-W Cu Hybrid</td>
<td>W-W Cu Hybrid</td>
<td>Ox Fusion</td>
</tr>
<tr>
<td></td>
<td>3 µm</td>
<td>1 µm</td>
<td>40 µm</td>
<td>1 µm</td>
<td>Sub µm (nTSV)</td>
</tr>
<tr>
<td></td>
<td>→1 µm</td>
<td>→0.5 µm</td>
<td>→25 µm</td>
<td>→0.5 µm</td>
<td>Sub µm (nTSV)</td>
</tr>
<tr>
<td>3D I/O Pitch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Expanding adoption of wafer bonding technology for next-generation devices**

---

**Source:** TEL
Wafer Bonding Application for 3D NAND

Current structure

- Peripheral circuit performance deteriorates due to exposure to high temperature during memory cell manufacturing
- Long interconnects wiring

New structure

- Peripheral circuit is manufactured on the separate wafer and bond to the memory cell wafer
  - higher peripheral circuit performance
  - shorter TAT* process
- Shorter interconnects wiring

* TAT: Turnaround time
Wafer Bonding Application for Logic Backside PDN

Current structure

Backside PDN: Power Delivery Network

- Power BEOL (Backside)
- Signal BEOL (Front side)
- Bulk Si Wafer bonding
- Bonding surface
- Reverse
- Backside thinning

Pursue further scaling without the power wiring bottleneck
Our Proposal for Wafer Bonding Process

**Pre-Bond**

1. **CMP**
2. **Bonding**
3. **Trimming**
4. **Grinding**
5. **Cleaning**

**Post-Bond**

1. **CMP**
2. **Wafer Process**

**Synapse™ Si**

- **Upper Wafer:** Plasma activation, DI water treatment, Alignment and bonding
- **Lower Wafer:**

**Ulucus™ L**

- **Laser Edge Trimming**

**Bonding Accuracy (Total Overlay)**

- **Before:**
- **After:** <75nm

**Edge Trimming Quality**

- **Before:**
- **After:**
Wafer Bonding System

Synapse™ Si

- Integrate high productivity platform cultivated in the front-end process with plasma, cleaning and high-accuracy bonding modules
  - high productivity (uptime ≥ 90%)
  - alignment accuracy $3\sigma \leq 50\text{nm}$

High productivity and stable operation are realized at mass production fabs
Contribute to our customers to realize the future of "3D integration"
Laser Trimming System

Ulucus™ L (New release)

- Edge trimming on bonded wafer
- Latest platform utilizing super clean technology from the front-end process, with the integration of laser control technology

Laser technology realizes high accuracy and quality trimming processes, and environment-friendly capability through the reduction of DIW usage.
Laser Trimming System

Revolutionize wafer bonding process with laser technology
Enhance yield and significantly reduce the use of DIW in the edge trimming process

Higher Accuracy
Enabling narrower trimming width

Smooth Sidewall
Less damage, Better yield

Higher Throughput
High productivity, Reliability

Save Water
Reducing DIW to 70% or more
Summary - For the Development of Wafer Bonding Process

- Introduction of wafer bonding technology accelerates performance evolution at the leading-edge and system level.

- Utilizing technology and experience gained in front-end process, we launch Ulucus™ L for wafer edge trimming, in addition to Synapse™ Si for wafer bonding.

- By utilizing our comprehensive strengths, we promote research and development for the adoption of wafer bonding process for mass production.
Account Strategy

June 8, 2022

Seisu Ikeda
Senior Vice President and General Manager
Account Sales Division
Agenda

- Technological exchanges and joint roadmap development with customers
- Demand forecast for the next 24+ months
- Regarding the Customer Satisfaction Survey (CS Survey)
Framework for co-creation of technology roadmap from N to N+4

**Customer**
- Technology trends of semiconductor devices, outlook for device structure and design
- Required performance for each generation
- Sample wafers for high accuracy evaluation
- Expected timeline

**TEL**
- Proposal on new function and materials through concept consideration and feasibility study with customers
- Equipment, process proposal, design and manufacturing to achieve required performance
- Build evaluation environment
- Output to meet customers’ requirements

As the best partner for our customers, continuously create high value-added next-generation products
Collaboration with Customers: Meet Tech Requirements for Several Generations

Simultaneous collaboration for the generations from N to N+4 with customers
Objectives: Proactive procurement strategies and smooth delivery to customers

Expected outcomes:
- By ensuring sufficient materials and realizing production leveling, meet customers’ required delivery time
- Enhance safety, quality and productivity by eliminating additional load on our production and start-up engineers in case of delivery delays

Difference from conventional approach

【Conventional】 Compile multi-year investment roadmaps for major customers, and combine with our macro-market analysis. We independently forecast medium-term WFE, which is then reflected in the production plan at our plants

【Current】 Since early 2021, in response to changes in the environment due to recent component shortages, our customers agreed to provide their plans for equipment procure on a more frequent and regular basis. By combining our WFE market forecast with the customers’ plans, we can provide our supply chain and suppliers with latest and accurate forecast
### Demand Forecast for the Next 24+ Months – Operation Outline

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>① TEL’s forecast and WFE outlook</strong></td>
<td><strong>① TEL’s forecast and WFE outlook</strong></td>
</tr>
<tr>
<td><strong>② Update cycle of Customers’ forecast</strong></td>
<td><strong>② Update cycle of Customers’ forecast</strong></td>
</tr>
<tr>
<td><strong>③ Customer information</strong></td>
<td><strong>③ Customer information</strong></td>
</tr>
</tbody>
</table>

#### TEL’s forecast and WFE outlook
- Investment Map update
- WFE update
- WFE update
- WFE update

#### Update cycle of Customers’ forecast
- Company A / update once a month
- Company B / update twice a month

#### Customer information
<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>Now</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Up to 9 months</td>
<td>Up to 24 months</td>
</tr>
<tr>
<td>Company B</td>
<td>Up to 9 months</td>
<td>Up to 24 months</td>
</tr>
</tbody>
</table>

By forecasting demand for the next 24+ months, we can secure sufficient components by planned procurement, and production leveling.
Purpose, Positioning, and History of Customer Satisfaction Survey (CSSP: Customer Satisfaction Survey Program)

- **Purpose:** Observation of customer satisfaction
  - Conduct objective analyses to understand product and account strengths, weaknesses, problems and issues

- **Position**
  - Important reference for measuring direction of improvement activities
  - The "C" part of the company-wide improvement PDCA
  
  Note: CS surveys are also required under ISO regulations

- **Activity history**

<table>
<thead>
<tr>
<th>Year</th>
<th>CS Survey</th>
<th>CTBU</th>
<th>Korea subsidiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Survey coverage**

- >90%

**Plan to include new products**

*Customers who conduct their own supplier assessments are not included in this survey*
CSSP (Customer Satisfaction Survey Program) Operation

- Target customers: 250 sites (number of locations/fabs as units)
- Questions/inquiries:
  - Sales: Ease of contact, how well sales comprehends requests and issues, and its ability to propose and execute resolutions, etc.
  - Equipment/plants: Equipment lead times, performance and functions; development and technical capabilities and speed, etc.
  - Service: Awareness of safety regulations, compliance with safety procedures, on-site support capabilities, etc.
- Answer options: "Very satisfied: 4 points," "Satisfied: 3 points," "Dissatisfied: 2 points," and "Extremely dissatisfied: 1". Choose one out of the four
- Passing line: Achieve at least “Satisfied” as an average value for all items after calculating per-question scores for all customers who answered the question
- Actions with respect to items that require improvement: Immediate follow-up with customers who provided “Extremely dissatisfied (Red Flag)” responses. Improvement, etc. of items falling below the passing line described above
CS Survey KPI Results for All TEL Products (2021 vs 2022)

1. Customer response rate (Goal: At least 60%)

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2022</th>
<th>YoY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,412 person (70.2%)</td>
<td>1,459 person (76.1%)</td>
<td>+47 person (+5.9%)</td>
</tr>
</tbody>
</table>

2. Customer Satisfaction Survey results (Goal: Achieve at least 3 points out of 4 points)

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2022</th>
<th>YoY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>96.7% (29/30)</td>
<td>100% (30/30)</td>
<td>+3.3% (+1 questions)</td>
</tr>
</tbody>
</table>

3. Response rate to "Extremely dissatisfied (Red Flag)" (Goal: Resolve within a month)

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2022</th>
<th>YoY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio of resolution within a month</td>
<td>93.4%</td>
<td>94.8%</td>
<td>+1.4%</td>
</tr>
<tr>
<td>Response ratio as of Feb. 22 (day 42)</td>
<td>97.3%</td>
<td>100%</td>
<td>+2.7%</td>
</tr>
</tbody>
</table>

Exceeded the passing average of 3 on all questions (for the first time since the start of this survey in 2014)

Response ratio to Red Flag has improved
To further improve customer engagement

Intel
Outstanding Supplier Award
Evaluation points
- Safety
- Quality
- Capacity

TSMC
Excellent Performance Award
Evaluation points
Providing leading-edge technological solutions across multiple processes by leveraging our strength in having an extensive product lineup

Customer A
Best in Value Award

Customer B
Best Partner Award

Customer C
Best Partner Award

Other top prizes

Continue to enhance customer engagement and improve TEL's corporate value
Field Solutions Business Strategy

June 8, 2022

Takeshi Okubo
Senior Vice President and General Manager
Global Sales Division
Rapidly Growing Investment in Mature Generation

- Equipment
  - Reengineered equipment for 200mm wafer
  - New equipment for power devices

- Parts, repair and services
  - Parts replacement
  - Overhaul, cleaning, renewal
  - Repair, maintenance, relocation

- Modification
  - Performance enhancement
  - Process change, productivity enhancement
  - Modifications to software, hardware

With the expansion of investment in mature generations, a wide range of business opportunities are growing.
Equipment for Mature Generations

- Reengineered equipment for 200mm wafer
  - Thermal deposition systems, coater/developer, etch systems, etc.
  - Sales expansions not only for replacement demand of existing customers, but also for emerging customers

- Equipment for power devices
  - Equipment for SiC wafer, 300mm etch system
  - Respond to rapid growth in demand for power devices, such as for automotive

By integrating our technological assets with new technologies, improve productivity and reduce impact on the environment
Field Solutions

- Parts and repair
  - Predictive maintenance for parts deterioration
  - Appropriate parts inventory management and prompt delivery

- Services
  - Providing “comprehensive contract type” services that encompass everything from equipment delivery to after-care maintenance
  - Proposing solutions that address customer demands and maximizing equipment utilization rates

- Modification
  - Productivity improvement
  - Yield improvement

SAM* is expanding with 82,000 installed base currently and increasing by approx. 4,000 to 6,000 units each year

*SAM: Served available market
Advanced Field Solutions

**TELeMetrics™**

- Monitoring data on individual equipment
- Knowledge management and accumulation of problem case studies

**Remote Support**

- Minimization of downtime through predictive maintenance of equipment
- Remote support that enables prompt response even under travel restrictions

**Strengthen Global System**

- Provision of support that takes advantage of time differences
- Parts management and delivery through advanced logistics
- Engineer training program

Proposing solutions with high added value centered around “TELeMetrics™” that utilize DX
Summary

- Expand sales for equipment for mature (legacy) nodes
- Deploying solution business based on installed base
- Development and promotion of advanced Field Solutions
  - Providing leading-edge and sustainable support that utilizes the latest technology, such as DX
  - Development of remote maintenance support and training tools
- Enhancing the front-lines engineers and capabilities
  - Continuous skill improvement for field engineers

Support customers to maximize their business operations through services with high added value
Introducing TEL’s DX Activities and Our Ideal State

June 8, 2022

Noritaka Yokomori
Deputy General Manager, DX
Corporate Innovation Division
The tide of DX ripples throughout the industrial world as a whole, and the semiconductor industry is no exception. It is positioned as a part of the solution toward further demands for die miniaturization and layering.

DX activities are ultimately a method and an opportunity to realize sustainable creation of corporate value. We have defined the image we must achieve (our “To-Be Image”) in order to realize transformation.
TEL DX Grand Design

**TEL Vision**
A company filled with dreams and vitality that contributes to technological innovation in semiconductors

**TEL Medium-term Management Plan**
Achieving the Financial Model in TEL’s Medium-term Management Plan
- Net Sales ≥ 3 trillion yen
- Operating Margin ≥ 35%

**The 4 Materialities**
Product Competitiveness
Customer Responsiveness
Higher Productivity
Management Foundation

**TEL DX Vision**
A global company where all employees drive enterprise value creation sustainably through activities such as value addition and efficiency improvements by leveraging digital technology

**DX Application**
Innovative enhancement of materiality through DX activities that connect PLM steps
- Development
- Manufacturing
- Field

**DX Business Platform**
Enhancing the Management Foundation through digitization and digital technology
- Skill Development
- Consciousness and Culture
- Data Governance and Platform
Steps of DX Activities

**Product Innovation**

1. Consciousness
2. Analysis
3. Control
4. Learning and Evolution

**Business Reforms**

1. A Rendering of Our Current State
2. A Rendering of Our Ideal State
3. Implementation of Business Reforms and Digital Tools
4. Learning and Evolution

DX in Contributing to Customers’ Value Creation

- A: Shorter time to market
- B: Lower production cost
- C: Higher profitability
- D: Extended lifetime value

DX in Raising Capital Efficiency

- A: Shorter time to market
- B: Lower production cost
- C: Higher profitability
- D: Extended lifetime value

Solving issues of a higher dimension through digital transformation
Through a DX foundation and DX that improves capital efficiency, we will improve the quality and speed of our work, and transition toward a use of time that creates even greater value.
DX Engineer Training Plan

The ability to understand and utilize knowledge of information science, such as cutting-edge information processing, artificial intelligence and statistics.

The ability to realize a form of data science that meaningfully contributes to TEL’s creation of corporate value, and to practice and operate data science in a manner that fits our purposes.

The ability to organize issues and their backgrounds, derive solutions, and connect them to our business.

Utilizing data and digital technology in our day-to-day business operations in order to optimize our business operations and create added value.

Engaging in planned training to foster personnel who can capitalize data science in TEL’s business.
Example Activity 1 – Increasing Productivity of Equipment: Improving Utilization of Etch Equipment

Seasoning at the right time with endpoint detection

Feedback from the sensor provided an appropriate understanding of chamber conditions and improved utilization of equipment

*ISSM 2020, from “Seasoning Optimization by using Optical Emission Spectroscopy,” published by the Company
Example Activity 2 – Increasing Operation Cost of Equipment: Reducing Chemicals of Coater/Developer

Monitoring of chemical discharge status using image processing technology

Automatic film thickness adjustment function

Monitoring of chemical coverage of interior of surfaces using image processing technology

<table>
<thead>
<tr>
<th>Dispense Volume</th>
<th>X ml</th>
<th>Y ml</th>
<th>Z ml</th>
<th>A ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judgement</td>
<td>Passed</td>
<td>Passed</td>
<td>Failed</td>
<td>Failed</td>
</tr>
<tr>
<td>Wafer image by WIS</td>
<td><img src="image" alt="Wafer images" /></td>
<td><img src="image" alt="Wafer images" /></td>
<td><img src="image" alt="Wafer images" /></td>
<td><img src="image" alt="Wafer images" /></td>
</tr>
</tbody>
</table>

Contributed to customer operation costs and the environment by using machine learning
Example Activity 3 – Increasing Productivity of R&D:
Process Informatics

Results with recipes created by engineers:
- Pattern collapse/deformation
- Lack of coverage

Results using machine learning:
- No damage
- Excellent coverage

3 week-evaluation

1 day-evaluation

Source: Tokyo Electron Technology Solutions Limited / Tokyo Electron Limited

Achieved good step coverage with no pattern deformation in the ALD process by machine learning
Example Activity 4 – Improving Overall Equipment Effectiveness

Using the Knowledge Management System to reduce the time taken to resolve problems and improve equipment operation rates

- Reduce the number of inquiries, man-hours spent on inquiries
- Share know-how to resolve issue of tasks becoming too personalized, train younger employees

- Make it possible to answer using choices or free input
- If chat-bot cannot provide an automated answer, make it possible to use the system to engage in inquiries
- Realize a smarter system by analyzing user histories and adding FAQs

Reduced the number of man-hours spent by employees answering questions with introducing chat-bots in multiple departments
New Board of Directors Structure and the Corporate Officer System

June 8, 2022

Tetsuo Tsuneishi
Corporate Director, Chairman of the Board
Corporate Governance Framework (Audit & Supervisory Board System)

As of June 8, 2022

<Framework (Excerpt)>

Management & Supervision

- Nomination Committee
- Compensation Committee

Board of Directors

Management & Supervision

- Business execution
  - Corporate Senior Staff
  - Collaboration

Representative Director, President & CEO

Audit & Supervisory Board

- Audit
- Proposal & Report
- Supervision/Appointment or Dismissal
Outside Directors as of June 8, 2022

Charles Ditmars Lake II
Chairman and Representative Director, Aflac Life Insurance Japan Ltd.
President, Aflac International Incorporated

Michio Sasaki
Director and Vice President, SHIFT Inc.

Makiko Eda
Chief Representative Officer, World Economic Forum Japan

Sachiko Ichikawa
Partner, Tanabe & Partners
Statutory Auditor, The Board Director Training Institute of Japan
Corporate Governance Framework (Audit & Supervisory Board System)

As of June 8, 2022

<<Framework (Excerpt)>>

Management & Supervision

Nomination Committee → Report → Board of Directors

Compensation Committee → Report → Board of Directors

Business execution

Corporate Senior Staff

Collaboration

Representative Director, President & CEO

Proposal & Report → Supervision/Appointment or Dismissal

Audit

Audit & Supervisory Board

Audit

The era of ultra VUCA

Sharp growth of the semiconductor market

Need to improve the quality and speed of decision making in both “Management & Supervision” and “Business execution”
Corporate Governance Framework (Audit & Supervisory Board System)

On and after June 21, 2022 (TBD)

<Framework (Excerpt)>

Management & Supervision

Nomination Committee

Report

Compensation Committee

Report

Proposal & Report

Supervision/ Appointment or Dismissal

Business execution

Corporate Officers

Representative Director, President & CEO

Corporate Officers Meeting

Audit

Audit & Supervisory Board

Audit

The era of ultra VUCA

Sharp growth of the semiconductor market

Need to improve the quality and speed of decision making in both “Management & Supervision” and “Business execution”
Corporate Governance Framework (Audit & Supervisory Board System)

On and after June 21, 2022 (TBD)

Management & Supervision

- Nomination Committee
- Compensation Committee

Board of Directors

Business execution

Corporate Officers

Representative Director, President & CEO

Corporate Officers Meeting

Audit & Supervisory Board

The era of ultra VUCA

Sharp growth of the semiconductor market

Need to improve the quality and speed of decision making in both “Management & Supervision” and “Business execution”

Strengthen and optimize 3 functions:
1) In-depth discussion of mid- to long-term growth strategies
2) Supervision of business execution
3) Decision-making on business execution

Accelerate “proactive management”

Growth of short-, mid-, and long-term profits

Increase corporate value continually

Growth of short-, mid-, and long-term profits

Increase corporate value continually

In-depth discussion of mid- to long-term growth strategies

Supervision of business execution

Decision-making on business execution