Fluid Machinery & Systems Business

Overview of the Fluid Machinery & Systems Business
The Fluid Machinery & Systems Business supplies standard pumps, large-scale pumps, custom pumps, compressors and turbines, and chillers and cooling towers as its mainstay products. Standard pumps are used in water supply and drainage in buildings and factories and for circulating warm and cold water in air-conditioning equipment. Large-scale pumps see application in water purification plants and pumping stations. Custom pumps are employed by oil plants and power plants. Compressors and turbines are utilized in oil and gas transportation and refining processes. Chillers and cooling towers are primarily used in the air-conditioning equipment of large-scale commercial facilities and factories.

The operations of the Fluid Machinery & Systems Business have continued since our founding. In these operations, we take advantage of an approach toward customers founded on passion and dedication, the technological prowess we have harnessed over the years, the sales agent network we have cultivated in the domestic and overseas S&S operations, and regional stability in social and industrial infrastructure needs.

Risks and Opportunities

Strengths of the Fluid Machinery & Systems Business
- Fluid, numerical analysis, material, analytical, and other fundamental technologies cultivated over the years
- Propensity at developing highly efficient, high-quality, and highly reliable products
- Sophisticated insight, technologies, and skills
- Diverse, global employee base
- Global sales agent network and S&S system
- Partnerships with associates

Business Model of the Fluid Machinery & Systems Business

<table>
<thead>
<tr>
<th>Business Policies</th>
<th>Inputs</th>
<th>Business Activities</th>
<th>Outputs</th>
<th>Outcomes</th>
<th>Value Created with Customers</th>
</tr>
</thead>
</table>
| Action Policies for Addressing Material ESG Issues | Intellectual Capital | Manufacturing | Products | • Standard pumps
• Custom pumps
• Compressors and turbines
• Chillers, etc. |
| Action Policy 2 | Organizational Capital | Planning, consultation, and design | Service and support |
| Action Policy 3 | Human Capital | Development and design | Upgrades
• Operation
• Inspection
• Repair |
| Principal Measures of E-Plan 2019 | Social and Relationship Capital | Modification | Repair |
| • Improve profitability through business structure reforms
• Expand domestic and overseas S&S operations |

Market Forecast
- Operating Environment Outlook
- Business Activities
- Financial Capital
- Natural Capital
- Relationship Capital
- Human Capital
- Social and Relationship Capital
- Organizational Capital
- Intellectual Capital
- Natural Capital

Points
- Operating Environment Outlook
- Strengths of the Fluid Machinery & Systems Business

Initiatives for Accomplishing Targets for the Fiscal Year Ending December 31, 2019, and Results

Action Policy 1
KPI: Reduction of product electricity consumption during operation
Achieve 10%–15% reduction in electricity consumption of newly launched products during operation by the fiscal year ending December 31, 2019
- Major Outputs
• Pumps and chillers with low electricity consumption
• Reduction of CO2 emissions from social and industrial infrastructure
- Major Outputs
• Reduced product lives
• Prevention of malfunctions and halted operations
- Major Outputs
• Stable operation of social and industrial infrastructure

Numerical Targets of E-Plan 2019 (Consolidated)

Operating income to sales ratio 8.5% or more
- Pumps Business 8.0% or more
- Compressors and Turbines Business 11.0% or more
- Chillers Business 7.0% or more

Operating Income / Operating Income to Sales Ratio

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Pumps Business</th>
<th>Compressors and Turbines Business</th>
<th>Chillers Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017/12</td>
<td>7.0% or more</td>
<td>11.0% or more</td>
<td>7.0% or more</td>
</tr>
<tr>
<td>2018/12</td>
<td>8.0% or more</td>
<td>11.0% or more</td>
<td>8.0% or more</td>
</tr>
<tr>
<td>2019/12 Plan</td>
<td>8.5% or more</td>
<td>11.0% or more</td>
<td>8.0% or more</td>
</tr>
</tbody>
</table>
Message from Company President

Drastic Structural Reforms for Transforming the Fluid Machinery & Systems Business

As a mainstay business since our founding, the Fluid Machinery & Systems Business has led the development of the EBARA Group. The history of our business could be said to be a history of giving form to the Founding Spirit of “Netsu to Malo” (Passion and Dedication). Throughout this history, we have proceeded to further hone our industry-leading technologies while approaching customers with passion and dedication. However, we have also found ourselves overtly bound by past successes. Meanwhile, the expansion of our business has grown the vertical hierarchy of our organization, creating concern for the segmentation of our operations.

To address these issues, we have revised our human resources systems, placing particular focus on manager awareness reforms to encourage managers to maximize the skills of their subordinates and the performance of the divisions. In the standard pumps business, we have been working to improve operating efficiency through initiatives such as the consolidation of operating procedures conducted during the period of the previous medium-term management plan as well as the curtailing of our product lineup, which has been reduced from 70,000 items to 7,000 items. These initiatives have contributed to a noted increase in profitability. The globalization of the Fluid Machinery & Systems Business is accelerating. When dealing in products that are market-oriented, an area we are currently focusing on. By minimizing product downtime resulted from malfunctions, we can support the stable operation of social and industrial infrastructure and thereby contribute to the realization of a safe, more secure, and resilient society. In Japan, we will grow our business opportunities by offering integrated service proposals which are energy-saving, thereby creating added value and lowering the end user’s operation costs. Meanwhile, products and services that minimize energy and resource consumption will be of utmost importance to our future success in energy-conscious China and Europe. We therefore plan to move forward with research and development while also expanding our range of solutions.

Shift from Technology-Oriented to Market-Oriented Approach

It is important for us to broaden our perspective beyond products to look to the product value that they contribute in order to seek means of delivering value to society from the same perspective as customers. In light of this reality, I believe that the United Nations Sustainable Development Goals (SDGs) provide hints to be gleaned with regard to a market-oriented approach. If the Fluid Machinery & Systems Business is able to learn from trends seen around the world from a perspective framed in the SDGs and reflect its findings in product development and marketing, I am confident that we will be able to provide even greater value to society. Our employees boast high levels of technical skill and are also ambitious and dedicated in their studies. I hope to provide these employees with an environment that inspires them to tackle new challenges without fear of failure.

Significant Business Opportunities Presented by Demographic Trends and Energy Demand

Nobuharu Noji
President
Fluid Machinery & Systems Company
Environmental Plants Business

Overview of the Environmental Plants Business

Waste production is decreasing as a result of population decline and rising recycling awareness. Meanwhile, the waste treatment facilities constructed during prior periods of massive consumption are aging, and the inefficient operation of these facilities is placing pressure on the finances of local governments.

The Environmental Plants Business is tasked with supporting the efficient operation of waste treatment facilities in conjunction with changes in waste volumes and is also responsible for repairing and reforming aged facilities so that they can be operated over the long term with smaller environmental footprints. At the same time, this business transforms waste treatment facilities into regional power supplies by utilizing the heat from waste incineration to generate electricity. By providing such waste treatment facilities capable of coexisting in harmony with local communities, the Environmental Plants Business helps realize cleaner and more comfortable communities.

Initiatives for Accomplishing Targets for the Fiscal Year Ending December 31, 2019, and Results

**Action Policy 1**: KPIs: Electricity generated at waste treatment facilities, electricity generated from biomass

Increase volume of electricity generated at waste treatment facilities with power generation capabilities managed by the Group to more than 700,000 MWh and electricity generated from biomass to more than 1,700,000 MWh by the fiscal year ending December 31, 2019

**Expected Outcomes**

- Generation of electricity at waste treatment facilities
- Generation of electricity from biomass
- Development of regional power supplies
- Local production and consumption of electricity

**Action Policy 2**: KPI: Expansion of S&S operations

Increase number of waste incineration facilities EBARA is contracted to manage in Japan to 100 by the fiscal year ending December 31, 2019

**Expected Outcomes**

- Highly efficient waste treatment services
- Extended facility lifespans
- Reliable provision of waste treatment services
- Reduction of facility construction and reconstruction expenses (reduction of financial burden of local governments)

**Numerical Targets of E-Plan 2019 (Consolidated)**

- Operating income to sales ratio 11.0% or more
Broader and Deeper Involvement in Operation with Safety and Reliability as Top Priority

Atsuo Ohi
President
Environmental Engineering Company

Expansion of Scope of Services to Ensure Ongoing and Stable Earnings After Construction

The corporate philosophy of EBARA Environmental Plant Co., Ltd., the company responsible for the Environmental Plants Business, is to “contribute to the realization of a sustainable society through the provision of superior solid waste treatment technologies and services.” Based on this philosophy, we provide services that span from the design and construction of facilities which run safely and add value to the residents in the surrounding communities to their reliable operations.

Recently, we have seen a rise in the number of local governments endeavoring to inform the community about their efforts to utilize heat produced during waste incineration processes, to recycle waste, and to contribute to the accomplishment of the United Nations Sustainable Development Goals in addition to other proactive initiatives. These developments are directing an increasingly diverse range of expectations toward EBARA, and we are working to improve our proposal capabilities to meet these expectations.

We also plan to expand our efforts to provide value matched to the waste treatment facility lifecycle. In the past, it was common for waste treatment facilities to be dismantled and rebuilt after 15 to 20 years. However, technological progress has recently given rise to technologies for incineration furnaces that can continued to be operated over a period of more than 50 years, lengthening the timetable used for scheduling repairs and reconstruction. Also, while it was often the case in the past that an entire facility would be rebuilt when it aged, now customers are increasingly adopting maintenance approaches that allow for facilities to be used longer by replacing only the most heavily aged equipment or introducing cutting-edge equipment. We intend to uncover customer needs and expand the scope of our services so that we can incorporate such technological advancements and remain involved in the operation of facilities for longer periods after their construction. For example, should a local government find itself charged with the operation and maintenance of a facility, we can be contracted to perform these duties on their behalf. Well versed in equipment and facilities, we are able to provide long-term value through proposals that reduce running or maintenance costs or extend facility lifespans. As of December 31, 2017, we were contracted to conduct operation and maintenance of approximately 85 facilities, and we aim to raise this number to 100 in the near future. Furthermore, we can use the electricity generated using the heat produced during waste incineration to power the facility or sell said electricity to return profits to local governments. The act of recycling waste to make energy for invigorating communities is congruent with our mission.

Long-Term Contributions to Communities Driven by Ongoing Growth of EBARA

Raising cost awareness is a pressing task. Making long-term contributions to communities requires that EBARA also be able to achieve ongoing growth. For this reason, all employees must recognize that lowering costs and increasing earnings are fundamental to social contributions. A truly beneficial technology is one that can realize both high quality and low costs. Quality is already deeply rooted in the EBARA psyche; the next step will be to entrench cost awareness.

However, if we focus too much on operation and maintenance services promising stable profit margins, we run the risk of our facility construction capabilities diminishing. It is our facility construction capabilities that enable us to realize high-quality operation and maintenance services. Accordingly, we aim to strike a balance between facility construction and services while establishing frameworks that allow us to generate sufficient earnings through services alone.

Incorporating Internet of Things and artificial intelligence technologies is also an important task. We are therefore examining the possibility of utilizing these technologies to develop frameworks and services for monitoring daily facility operations to prevent malfunctions and other occurrences with the potential to suddenly halt operations. Looking ahead, we hope to incorporate external insight and technologies and to engage in the development of state-of-the-art technologies through collaboration with external partners.

Creation of Social Value through Business

Waste Treatment Facility Contributing to a Low-Carbon Society and to the Lives of Community Members

Construction of the Funabashi Hokubu Incineration Plant in Funabashi City, Chiba Prefecture was completed in April 2017, and one year has passed since it was turned over to the city. This plant is comprised of two facilities: the Funabashi Meguru Plant, a high-efficiency waste-to-energy facility, and Funabashi Meguru Spa, which will utilize the waste heat produced by the Funabashi Meguru Plant. A corporate group represented by EBARA Environmental Plant has been contracted to construct the facility and provide operation and maintenance management services over a 15-year period after its construction.

The Funabashi Meguru Plant can incinerate 3,810,000 tons of household waste (approximately 300,000 people’s worth) a day and use the heat produced in this process to generate 8,800 kW of electricity (enough to power roughly 18,000 homes), thereby contributing to society with renewable energy. This generation capacity represents a high level of efficiency that is six times greater than that of the previous facility, and the facility itself uses approximately 35% less electricity than its predecessor. Through this facility, we will contribute to the realization of a low-carbon society that uses less fossil fuel.

Funabashi Meguru Spa neighbors the Funabashi Meguru Plant and utilizes the heat produced through its high-efficiency waste-to-energy generation process in hot spring and other bathing facilities. These facilities provide a venue for health improvement and for exchanges among Funabashi’s citizens with around 100,000 individuals visiting each year.

In this manner, the Environmental Plants Business contributes to community-rooted waste treatment operations and the realization of a recycling-oriented society through the construction and operation of waste incineration plants.
Precision Machinery Business

Overview of the Precision Machinery Business

Semiconductors are present in various articles that are part of our daily lives, including computers, smartphones, digital appliances, and automobiles. Chemical mechanical polishing (CMP) systems and dry vacuum pumps, mainstay products in the Precision Machinery Business, are indispensable to the manufacture of semiconductors. Although primarily used to produce semiconductors, dry vacuum pumps are also utilized when manufacturing LCD panels, solar cells, and other items.

A principal strength of the Precision Machinery Business is the speed it has cultivated through its efforts to take part in and support the product development activities of customers in various industries. Armed with this speed, we will contribute to the evolution of the digital society to make our lives richer and more comfortable.

Business Strategies

Precision Machinery Business

Initiatives for Accomplishing Targets for the Fiscal Year Ending December 31, 2019, and Results

Action Policy KPIs

- **Action Policy 1**: KPI: Reduction of product electricity consumption and greenhouse gas emissions during operation
  - Achieve 15%–20% reduction in electricity consumption in comparison to 2017 models. (Dry vacuum pumps and CMP systems) by the fiscal year ending December 31, 2019
  - Major Outcomes: Energy-efficient dry vacuum pumps and CMP systems
    - Gas abatement systems capable of limiting greenhouse gas emissions
    - Reduction of greenhouse gas emissions from semiconductor manufacturing
  - Major Outcomes: Reduction of greenhouse gas emissions from semiconductor manufacturing

Numerical Targets of E-Plan 2019 (Consolidated)

Operating income to sales ratio 12.0% or more

Bar graph: Operating income (left scale)
Line graph: Operating income to sales ratio (right scale)
Message from Company President

Enhancement of Product Competitiveness and Business Foundations to Capture Business Opportunities

Masao Asami
President
Precision Machinery Company

Business Opportunities and Future Policies

The spread of IoT, AI, and automated driving technologies is expected to cause the scale of the semiconductor market to double from the ¥40 trillion seen in 2016 to ¥80 trillion. Similarly, the semiconductor manufacturing equipment market has the potential to grow from its current scale of ¥4 trillion to ¥7 trillion. China is accountable for roughly half of semiconductor demand, and aggressive capital investment is being conducted in this country in response to the announcement of a government policy of realizing self-sufficiency for 70% of the semiconductors used in China by 2025. This situation presents a significant business opportunity for EBARA. Conversely, we must be mindful of the risk of lagging technology development diminishing our competitiveness or resulting in our production capacity being insufficient for catering to demand, which could lead to a loss in our market share that would take time to recover. In securing a market share, it is crucial for us to develop products and technologies that boast high performance and that also contribute to cost reductions by using less energy or space. In addition, responding to the growing demand will require us to bolster EBARA’s production capacity while implementing initiatives across the supply chain. For example, we are stepping up overseas procurement activities to address the difficulty in securing certain components as one facet of our ongoing efforts to optimize procurement systems on a global scale.

The Precision Machinery Business has announced its goal of capturing the leading global share in the markets for its mainstay CMP systems and dry vacuum pumps. In addition, we aim to create new businesses and products with the potential to become a third pillar of operations in order to expand sales, improve profit margins, and thereby grow the earnings of the EBARA Group. We have no intention of focusing only on the robust demand seen in the present. Rather, we intend to conduct management with a view to three to five years in the future. It was for this reason that we began holding discussions among all members of the management of the Precision Machinery Business, including the presidents of relevant subsidiaries, about the future of this business. Through these discussions, we will take a proactive approach toward charting our future course while identifying the issues expected to be faced by customers, markets, and society over the medium-to-long term.

Commitment to Speed and Thorough Support

In the Precision Machinery Business, we see our mission as contributing to the development of advanced scientific and technology fields through the swift provision of unparalleled products and services to the semiconductor industry and other customers around the world, which share the requirements for their manufacturing infrastructure. It can be expected that Internet of Things (IoT), artificial intelligence (AI), and automated driving technologies will continue to evolve going forward. Semiconductors are indispensable to these technologies, and we hope to contribute to a brighter future together with customers operating in such fields by aiding these customers. Ongoing technological progress is the lifeblood of the semiconductor industry, and customers in this industry constantly face fierce competition at the forefront of technological development. As the pace of development is swift, we are expected to make proposals with equal speed while addressing customer input. Through the process of working together with our suppliers to respond to the demanding requirements of customers, we have honed our own capabilities and fostered a culture that prioritizes above all else, a commitment to thoroughly supporting customers. This commitment, which arises from our Founding Spirit of “Netsu to Makoto” (Passion and Dedication), has earned us a reputation as a reliable partner and has thus created a wider range of business opportunities for us. As the leader of the Precision Machinery Business, I will continue to communicate to employees our mission and commitments which include the newly determined materiality, KPIs, initiatives taken to achieve the targets of the KPIs, and their connection and importance to our day-to-day business. We also aim to strategically address the United Nations Sustainable Development Goals. Based on these goals, we will help improve the value of customers’ production lines while expanding the lines of products we offer in the Precision Machinery Business. I anticipate that these efforts will naturally increase our industry presence and subsequently induce greater evaluations of EBARA Group’s corporate value.

Creation of Social Value through Business

Receipt of Award for “Excellent Performance” from TSMC

The Precision Machinery Company develops cutting-edge semiconductor manufacturing and peripheral equipment and supplies this equipment primarily to semiconductor manufacturers. We also support customers in developing new products and improving productivity, thereby helping customers achieve success in these areas.

Our contributions as a CMP system supplier have won high evaluations from world-leading semiconductor manufacturer Taiwan Semiconductor Manufacturing Co., Ltd. (TSMC), which is headquartered in Taiwan. TSMC recognized the Company with an award for “Excellent Performance” in December 2017 out of reflection of this high evaluation. From among TSMC’s more than 700 suppliers, twelve companies received awards in 2017. This marks the sixth consecutive year and the eighth time overall that EBARA has received the award.

Technologies are constantly progressing in the semiconductor industry. Companies like TSMC that stand at the forefront of technological innovation are developing unprecedented technologies that have never been put to practical application before. One reason behind our selection for this award was the strong, ongoing support we provide as a development partner to TSMC and other semiconductor manufacturers in its bid to help build a better future.

Global Network (As of June 30, 2018)

| EBARA Precision Machinery Europe GmbH | Support bases 12 | Overhaul bases 1 |
| Xian Ebara Precision Machinery Co., Ltd. | Support bases 1 | Overhaul bases 1 |
| Shanghai Ebara Precision Machinery Co., Ltd. | Support bases 3 | Overhaul bases 1 |
| Ebara Precision Machinery Taiwan Incorporated | Support bases 7 | Overhaul bases 1 |
| EBARA Technologies, Inc. | Support bases 7 | Overhaul bases 2 |
| EBARA Field Tech. Corporation | Support bases 9 | Overhaul bases 1 |