Review of Operations

Automotive Batteries

In the Automotive Batteries business segment, we manufacture and sell automotive, motorcycle and industrial lead-acid batteries. We operate in 37 locations in 17 countries worldwide, particularly in Asia, including Japan, China, Thailand and Indonesia. With the rapid adoption of fuel-efficiency technologies for eco-friendly cars, such as start and stop cars and hybrid vehicles, this segment is working to develop high-performance, high-quality batteries for these vehicles and to release them into the market.

Japan

- **Net Sales by Segment (millions of yen)**
- **Operating Income (millions of yen) Operating Income Ratio (%)**

Overseas

- **Net Sales by Segment (millions of yen)**
- **Operating Income (millions of yen) Operating Income Ratio (%)**

Increased due to the contribution from Panasonic Corporation’s domestic lead-acid batteries business, which was acquired at the end of the second quarter of the fiscal year under review.

The primary reason for the increase in operating income in Japan was the contribution from start and stop vehicle lead-acid batteries, which are comparatively more profitable than other products. These batteries sold well on the back of strong demand. Although there was a steep increase in the price of lead, the raw materials for lead-acid batteries, we were able to offset this impact by rationalizing product design and manufacturing operations, enabling segment income to increase substantially over the previous fiscal year.

Outside of Japan, the Automotive Batteries segment posted year-on-year decreases in both sales and income. Net sales fell ¥20,788 million to ¥170,613 million and operating income declined ¥898 million to ¥10,460 million.

Although sales of automotive lead-acid batteries were up in China and Southeast Asia, sales in this segment decreased overall mainly due to the considerable impact of the yen depreciation on exchange rates. Similarly, operating income declined because of exchange rates. If we examine the results on a local currency basis, however, both sales and income actually increased compared with the previous fiscal year.

Financial results and key initiatives in fiscal 2016

In Japan, the Automotive Batteries segment performed extremely well overall in fiscal 2016, ended March 31, 2017, with both sales and income increasing year on year. Net sales rose ¥16,612 million to ¥67,599 million, while operating income before the amortization of goodwill jumped ¥2,385 million to ¥5,677 million.

The main reason for the increase in net sales was the substantial contribution of growing sales of batteries for new vehicles that are compliant with the European Norm (EN). In the past, we mainly manufactured and sold batteries that were compliant with Japanese Industrial Standards, but sales of EN-compliant batteries have increased markedly in recent years, since we began supplying them to Toyota Motor Corporation. We were able to respond to this new demand ahead of our competitors in Japan because the Group’s operations overseas had already been manufacturing and selling EN-compliant batteries. Another factor underlying the sales increase was growth in sales of new and replacement lead-acid batteries for start and stop vehicles. Sales also

**Panasonic Corporation’s lead-acid battery business acquired through a share purchase**

In fiscal 2016, GS Yuasa International Ltd. purchased 55% of the outstanding shares of Panasonic Storage Battery Co., Ltd., based on a share transfer agreement concluded with Panasonic Corporation for acquiring their lead-acid battery business. GS Yuasa International made Panasonic Storage Battery a consolidated subsidiary (now renamed GS Yuasa Energy Co., Ltd.).

With the acquisition of this business, as soon as possible GS Yuasa International will strive to increase the global market share for lead-acid batteries through synergistic effects. This synergy will include rationalizing manufacturing operations by using production technologies across the Group and restructuring operations to speed up development in response to diverse requests for product development. GS Yuasa Energy will continue to manufacture Panasonic brand lead-acid batteries, and Panasonic will sell these products through the same sales channels as before.

Panasonic has developed advanced technologies for lead-acid battery business, particularly for technical development, as well as manufacturing technology and quality control. The GS Yuasa Group will use these outstanding capabilities throughout global operations to ensure steady growth by boosting earnings in established businesses and by cultivating new businesses.
Outlook for fiscal 2017

In fiscal 2017, we do not foresee any major changes in the Automotive Batteries segment in Japan compared with fiscal 2016. We expect sales volume to reach record-high levels due to growing sales of EU-compliant batteries for new vehicles as well as new and replacement lead-acid batteries for start and stop vehicles, which are highly profitable products. Therefore, segment sales and income are forecast to continue increasing from the levels recorded in fiscal 2016.

At the same time, segment sales and income are forecast to increase substantially outside Japan. Having secured the number one market share for automotive lead-acid batteries in Asia, we intend to promote sales of these products in particular in the Middle East, North Africa and Europe. Sales campaigns will be carried out by the Turkish company Inci GS Yuasa Aki Sanayi ve Ticaret Anonim Sirketi, in which GS Yuasa International acquired a stake in 2015, along with three sales offices being set up in the United Arab Emirates, Ukraine and Egypt. We have already transferred three employees to Inci GS Yuasa and will send more to provide sales and technical support so that the company can quickly begin supplying products to Japanese automakers operating in the region.

Similarly, with the acquisition of Panasonic’s international lead-acid battery business, we will conclude agreements for taking over their industrial lead-acid battery factory in China in the third quarter of the current fiscal year as well as their automotive lead-acid battery factory in Thailand as soon as all procedures are completed.

In addition, the GS Yuasa Group was reorganized, effective from April 1, 2017. Our goal is to create a “one stop” organization for customers doing business globally. By applying the expertise we have gained in Japan to operations around the world, we anticipate positive effects, including higher quality and a stronger potential for earnings.

Taking all of these factors into consideration for our fiscal 2017 forecasts for the Automotive Batteries segment, we forecast that net sales will increase by ¥17.4 billion year on year to ¥285 billion in Japan and by ¥17.4 billion to ¥188 billion overseas. Operating income is forecast to remain at the ¥5.7 billion level in Japan and increase ¥0.8 billion to ¥11.3 billion overseas.

Progress under the Fourth Mid-Term Management Plan

By the final fiscal year of the Fourth Mid-Term Management Plan, we are aiming for net sales of ¥186 billion in Japan and ¥230 billion overseas as well as an operating income ratio of 10% in Japan and 7% overseas.

In Japan, we expect the price of lead, the main raw material for lead-acid batteries, to remain higher than the assumed amount in the plan: ¥270,000 per ton. Although higher lead prices can be reflected in the selling prices of batteries for new vehicles, that cannot be done for replacement batteries, so we announced an increase in sales prices of 10%, effective from June 2017. At the same time, achieving an operating income ratio of 10% will not be easy, but in order to reach that target we will work to make high-performance, high-quality, low-cost products while increasing our market share for high-added-value batteries.

Outside Japan, our target for net sales by the final year of the plan has become challenging because the initially forecasted exchange rate have been revised. Specifically, an exchange rate of ¥115 to the US dollar was assumed under the plan, but we now expect the rate to be around ¥105 to the dollar in the current fiscal year. The impact of that revision on financial results would be around 10% in strictly yen to dollar terms (which we recognize cannot be calculated simply since the Group’s global operations are concentrated in Asia). Despite the revision, however, what we need to do going forward has not changed, so we intend to steadily implement the strategies set at the time of formulating the Fourth Mid-Term Management Plan. Accordingly, we will investigate business growth initiatives after preparing to integrate Panasonic’s international lead-acid batteries business, promote business in untapped markets to increase our global market share, take steps to boost earnings and strengthen the foundations of established operations, and pursue opportunities for mergers and acquisitions as a way to increase the scale of the Group’s operations.

Message to stakeholders

I want the GS Yuasa Group to be a group of companies that amazes and impresses customers. I also want our customers to feel confident that their problems can be solved by us. Therefore, we are developing the human resources needed for such a group of companies. Our employees will be able to

Fiscal 2016 Highlights

New production plant under construction in Tianjin will boost production capacity for automotive lead-acid batteries

In fiscal 2016, GS Yuasa is building a new production plant for the Tianjin GS Battery Co., Ltd. subsidiary to manufacture automotive lead-acid batteries in China. Scheduled to begin operations in the summer of 2018, the new plant is being built in Tianjin’s Nangang Industrial Zone. With an area of 180,000 square meters, the plant site will be the largest in the GS Yuasa Group.

In China’s steadily growing automobile industry, demand for start and stop vehicles and fuel-efficient cars is projected to increase sharply due to the adoption of stricter exhaust gas emission regulations. In response, the production of high-performance lead-acid batteries for eco-friendly vehicles will be increased at the new plant, which will be equipped with the GS Yuasa Group’s latest technologies and production equipment. In addition, manufacturing at Tianjin GS Battery’s existing plant in Tianjin will be transferred and centralized at the new plant to streamline and increase efficiency. Consequently, the new plant will have an annual maximum production capacity of eight million units, allowing Tianjin GS Battery to eventually double the latest net sales. The total investment in the plant is approximately ¥17.5 billion.

In China, the GS Yuasa Group will continue working to promptly respond to customers’ needs, while bolstering the system for supplying automotive lead-acid batteries in anticipation of growing demand.

Overview of Tianjin GS Battery Co., Ltd.

<table>
<thead>
<tr>
<th>Company name</th>
<th>Tianjin GS Battery Co., Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of establishment</td>
<td>November 11, 1991</td>
</tr>
<tr>
<td>Capital</td>
<td>US$ 54.6 million</td>
</tr>
<tr>
<td>Ownership share</td>
<td>GS Yuasa International Ltd. 80% Tianjin BENEFO Machinery Equipment Group Co., Ltd. 20%</td>
</tr>
<tr>
<td>Business activities</td>
<td>Manufacture and sale of automotive lead-acid batteries</td>
</tr>
<tr>
<td>Location</td>
<td>Huanghui Road, Tianjin Economic-Technological Development Area, Tianjin, China</td>
</tr>
<tr>
<td>New plant</td>
<td>Gangdá Road, Nangang Industrial Zone, Tianjin Economic-Technological Development Area, Tianjin, China</td>
</tr>
<tr>
<td>Annual production capacity</td>
<td>Up to 4 million units Up to 8 million units</td>
</tr>
</tbody>
</table>

GS YUASA REPORT 2017
**Industrial Batteries and Power Supplies**

The Industrial Batteries and Power Supplies business segment helps ensure the safety of advanced information-based societies by providing power supplies and industrial batteries for back-up electrical power supplies used in buildings and other parts of the infrastructure, including mobile phone base stations, water and sewage plants and power plants. This business segment also helps protect the global environment by supplying industrial lithium-ion batteries, storage batteries for forklifts and other electrically powered vehicles, as well as power conditioners for photovoltaic power generation and energy-saving lighting equipment for roads and tunnels.

**Review of Operations**

In fiscal 2016, ended March 31, 2017, the Industrial Batteries and Power Supplies segment posted a decrease in sales and an increase in income compared with the previous fiscal year. Specifically, net sales were ¥72,765 million, a slight decrease of ¥2,039 million, while operating income was ¥8,702 million, up ¥641 million from the previous year.

**Financial results and key initiatives in fiscal 2016**

In fiscal 2016, ended March 31, 2017, the Industrial Batteries and Power Supplies segment posted a decrease in sales and an increase in income compared with the previous fiscal year. Specifically, net sales were ¥72,765 million, a slight decrease of ¥2,039 million, while operating income was ¥8,702 million, up ¥641 million from the previous year.

**Outlook for fiscal 2017**

In fiscal 2017, our main goal is to maintain the momentum of the segment’s financial results from fiscal 2016. While it is essential to achieve this goal in the short run, the current fiscal year is an important time for laying the groundwork for cultivating new markets for industrial lithium-ion batteries and for launching full-fledged initiatives for growth as we work toward achieving our targets in fiscal 2018, the final fiscal year of the Fourth Mid-Term Management Plan. We are improving cooperation between divisions to share the know-how we have developed in the automotive lithium-ion batteries business and to expand operations worldwide.

**Progress under the Fourth Mid-Term Management Plan**

By the final fiscal year of the Fourth Mid-Term Management Plan, we are aiming for net sales of ¥90 billion and an operating income ratio of 13%. As I explained in connection with our outlook for fiscal 2017, we are carrying out a number of initiatives for achieving these targets.

The GS Yuasa Group has world-leading development strengths and product lineups in the industrial lithium-ion battery industry. Nevertheless, unlike our rivals in the lead-acid battery industry, our competitors in this industry are major international electrical device manufacturers. Therefore, we are currently focusing on improving our cost competitiveness in particular. It will be important to reduce costs while also increasing sales volume, and I believe that implementing a plan-do-check-act (PDCA) cycle will be necessary for finding a good balance between those objectives.

In the global market, we are working to expand business for both lead-acid batteries and industrial lithium-ion batteries. Since industrial products need after-sales service, we will strive to broaden our service capabilities in the future, particularly at the Group’s production plants, sales offices and service centers in Southeast Asia, Europe and the United States.

**Message to stakeholders**

As the director in charge of this segment, I place the utmost importance on two main missions. The first is ensuring quality. The importance of quality is not simply limited to the quality of our products. Instead, I consider five aspects of quality: product quality, including our workmanship and servicing; the quality of our sales when we deliver products to customers; perceived quality, meaning how our products are judged by consumers in the marketplace; environmental quality, which we pursue with environmentally friendly products and manufacturing processes; and social quality, meaning our corporate social responsibility, as well as compliance and adherence to public expectations of fundamental business norms.

The second mission is to bolster competitiveness. While always comparing GS Yuasa with competitors and keeping in mind the perspective of customers, I intend to raise the visibility of our improvement initiatives aimed at realizing sustainable growth and to make our organizations more responsive and proactive.

Looking ahead, although we can expect the market to change and competition to heat up, we will work to expand business by doing our best to systematically ensure quality and by bolstering our competitiveness.
Automotive Lithium-ion Batteries

The Automotive Lithium-ion Batteries business segment manufactures and sells lithium-ion batteries for electric cars as well as hybrid and plug-in hybrid vehicles. All of these are attracting attention as environmentally friendly automobiles.

Review of Operations

Weakness
- Possibility of accidents at the production stage and accidents involving unsafe or defective products
- Depletion of raw materials and rising prices
- Insufficient capital

Opportunity
- Widespread adoption of eco-friendly vehicles
- Increasingly strict fuel consumption regulations
- Growing market for industrial applications

Strength
- Cutting-edge research and development
- Technologies for ensuring the safe design of high-capacity lithium-ion batteries
- Skilled human resources and business partners
- A 100-year history as a specialized manufacturer of storage batteries

Threat
- Business partners are needed for expanding operations due to the large scale of the business
- Lack of human resources for mass production
- Weak footing in North America

In fiscal 2016, the Automotive Lithium-ion Batteries business segment posted net sales of ¥39,305 million, up ¥992 million year on year. This segment became profitable for the first time, with operating income rising ¥612 million from a loss in the previous fiscal year.

For a new business like lithium-ion batteries, securing profits after operations have reached a certain scale is seen as a sound approach. Nevertheless, in fiscal 2017, we set the goal of making the business profitable within two years and implemented measures for achieving that objective. Those actions were based on the idea that if profits could be generated from the current scale of the business, when operations expanded beyond that point, the business would continue to contribute profits. Therefore, during those two years, we focused on rationalizing the purchase of raw materials, reducing other outlays, improving yields to boost productivity, centralizing operations of production lines and ensuring that the production lines could operate flexibly. As a result, we were able to achieve profitability based on that plan. At the same time, Lithium Energy Japan worked to increase sales in Europe, while Blue Energy Co., Ltd. boosted sales by winning contracts for batteries to be installed in new car models, including the Honda Freed hybrid minivan and the Honda Accord Hybrid. As a result, both companies contributed to segment sales.

Achieving profitability in this segment had an enormously positive effect: it significantly boosted the morale of all employees and motivated everyone to pursue further growth and success throughout our operations.

Outlook for fiscal 2017

In fiscal 2017, we have already completed plans for supplying batteries to automakers for various vehicle models. Therefore, while winning new orders contributes substantially to sales, manufacturing and supplying products according to those plans will be more important in terms of our outlook for net sales in the Automotive Lithium-ion Batteries segment. Therefore, we intend to closely monitor our plans every month to make sure that no serious deviations occur.

Our target for operating income in fiscal 2017 is ¥1.0 billion. Recognizing that there is still room for cutting costs, we have been continually making improvements, while pushing ahead with measures for achieving this target.

Given the strong interest today in industrial applications of lithium-ion batteries, the operating environment for this business is promising. Therefore, to explore how the highly competitive lithium-ion batteries that we have developed for vehicles can be used in industrial applications, we are conducting studies in close cooperation with the GS Yuasa International Ltd.’s Industrial Batteries & Power Sources Business Unit, which has an excellent track record and experience spanning many years.

Financial results and key initiatives in fiscal 2016

In fiscal 2016, ended March 31, 2017, the Automotive Lithium-ion Batteries segment posted net sales of ¥39,305 million, up ¥992 million year on year. This segment became profitable for the first time, with operating income rising ¥612 million from a loss in the previous fiscal year to ¥46 million.

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Progress under the Fourth Mid-Term Management Plan

Our target for the operating income ratio is 5% by the fiscal year ending March 31, 2019, the final fiscal year of our Fourth Mid-Term Management Plan. In addition to cutting costs, we are implementing aggressive sales programs, including price negotiations with customers, to achieve that target. To reach our target for net sales by the final fiscal year of the plan, we are striving to increase orders not only for automotive products but also industrial products. At present, we are researching and developing high-energy-density products, while seeking orders starting from 2021 and later, when the use of electric vehicles is projected to be in full swing.

Automotive lithium-ion batteries have a very long service life, retaining about 80% of their capacity even after 10 years. Therefore, in cooperation with automakers, it is essential to study ways to reuse those batteries for other applications after they are no longer in vehicles. Although recycling lithium-ion batteries is now regarded as difficult, we believe it will be necessary to establish recycling methods by the time electric vehicles are widespread.

Message to stakeholders

The GS Yuasa Group has mainly handled lead-acid batteries up to now, but to continue growing sustainably over the long term, we will need to expand the lithium-ion batteries business to a similar scale as the lead-acid batteries business, establishing it as a second pillar of our business. As the director in charge, my biggest role is to move forward with the plan we formulated for that purpose.

Just as the lead-acid batteries business set up a global network of production plants concentrated in Japan and other Asian countries, the automotive lithium-ion batteries business will also look to establish plants in regions where demand is high. Furthermore, since profits are generated differently from lead-acid batteries, we will create a new model for securing income and expanding the business so that we can contribute to consolidated results.
Financial results and key initiatives in fiscal 2016

In fiscal 2016, ended March 31, 2017, the Other Businesses segment posted a decrease in sales and a more substantial operating loss than the previous fiscal year. The main factors underlying the decrease in sales were the absence of shipments of batteries for manned submersible vessels and submarines in the fiscal year, and a temporary drop in sales of batteries for aircraft, satellites, rockets, and military equipment as development projects came to an end, putting mass production on hold. The operating loss worsened mainly due to the decrease in sales and increased company-wide expenses resulting from higher costs for the research and development of next-generation batteries. The segment results include sales from GS Yuasa Technology Ltd.'s specialized battery business and corporate expenses that are not allocated in all segments.

As a result of the factors above, net sales were ¥9,324 million, down ¥781 million compared with the previous fiscal year. Further, the operating loss after adjustments of corporate expenses and other items posted in the previous fiscal year fell a further ¥463 million to ¥700 million.

Outlook for fiscal 2017

In fiscal 2017, we expect net sales to increase and the operating loss to improve in the Other Businesses segment. The main reason for this forecast is a sales contribution for lithium-ion batteries for submarines, which began in March 2017. The Company began developing these batteries in the 1990s and concluded a contract in fiscal 2015 with the Acquisition, Technology & Logistics Agency of Japan’s Ministry of Defense to supply products to the first submarine equipped with lithium-ion batteries. In October 2016, we built a specialized production plant in Kusatsu, Shiga Prefecture, and began manufacturing these batteries in March 2017.

Considering all the factors above, we are forecasting net sales of ¥16,000 million in fiscal 2017, a year-on-year increase of ¥470 million. We also expect the operating loss to move toward profitability.

Progress under the Fourth Mid-Term Management Plan

Under the Fourth Mid-Term Management Plan, our goals for this segment are to expand the scale of the specialized battery business as well as provide the best performing, highest quality products that can withstand harsh environments, ranging from deep sea to space.

Now, in the second year of the plan, we are going ahead as planned with manufacturing lithium-ion submarine batteries, and working to expand this business segment internationally by taking advantage of the Japanese government’s recent policy of easing restrictions on exporting arms, after a long period of banning weapon exports. We are striving to reach our target of ¥18 billion in net sales by the final fiscal year of the plan.

Message to stakeholders

The Company now organizes businesses based on three product groups—automotive batteries, industrial batteries and power supplies, and automotive lithium-ion batteries—while specialized batteries for submarines, aircraft, satellites, rockets, and other types of equipment are categorized as Other Businesses. In the future, I hope to increase total sales of batteries for aircraft, satellites, rockets, and military equipment to the ¥50 billion mark and establish an independent business separate from the Other Businesses segment. One plan for achieving that goal involves a shift to electric aircraft. Changing from the current system of engines powered by fossil fuels to batteries and electric motors would dramatically increase demand for batteries. Therefore, we will work to release even higher performance and higher quality products so that customers come to recognize GS Yuasa batteries as key components of aircraft.

GS Yuasa’s lithium-ion cells installed in the International Space Station following shipments from December 2016

The high-performance lithium-ion cells for use in space that are developed and manufactured by GS Yuasa Technology Ltd., a subsidiary of GS Yuasa International, have been adopted for the batteries in the International Space Station (ISS). The cells were first delivered to the ISS in December 2016. Featuring high energy density and a long service life, these cells are optimally designed for the space station, which requires highly efficient charging and discharging. Compared with the cells previously installed in the ISS, GS Yuasa Technology’s cells have about three times more energy density per unit of mass, allowing the same performance as the 48 batteries previously used to be achieved by 24 batteries—half the number. The new batteries are being delivered to the ISS in four shipments by the Kounotori H-II Transfer Vehicle operated by the Japan Aerospace Exploration Agency. (More information is available on the agency’s website: http://is.aspace.jaxa.jp/en/0/news/batteries_loaded.html)

GS Yuasa Technology develops, manufactures and sells battery cells and power sources for specialized applications, and has been supplying high-performance, high-quality batteries for sea, land, air and space, environments ranging from ocean depths of 6,500 meters to 36,000 kilometers above the earth. Into the future, the company intends to continue developing projects for space by developing and manufacturing high-performance lithium-ion cells.