Summary of the Material Sector Business Briefing, held on September 8, 2016

Asahi Kasei Corp.

Note: The forecasts and estimates mentioned in this document are dependent on a variety of assumptions and economic conditions. Plans and figures depicting the future do not imply a guarantee of actual outcomes.

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Presentation

[Material Sector (Overall)]

P3: Asahi Kasei Group configuration from Apr. 2016

Kobayashi: In April 2016 the holding company functions of Asahi Kasei, and the operating company functions of Asahi Kasei Fibers, Asahi Kasei Chemicals, and Asahi Kasei E-Materials were merged, and we restarted as an operating holding company.

We consolidated three business categories of Fibers, Chemicals, and Electronics into a new Material sector.

P4: Financial performance by segment (1)

With respect to the details of our net sales by segment in FY 2015, the Material Sector accounted for 52% of the total net sales, the Homes Sector for 33%, and the Health Care Sector for 15%.

P5: Financial performance by segment (2)

FY 2015 results for the Material Sector were net sales of about 1 trillion yen and an operating income of about 80 billion yen. However, FY 2016 forecasts for both net sales and operating income are slightly lower than for the previous year. The main causes of lower revenues are the impact of stronger yen in the electronics business and the increased amortization of goodwill and other intangible assets, etc., related to the acquisition of Polypore International, LP.

P7: History of portfolio transformation

When considering how far Asahi Kasei has come, we have to go back to when Asahi Fabric Co., Ltd. was established in 1922. After our company was established, we were the first in Japan to chemically synthesize ammonia, and then we developed our fibers business. During the pre-World War II period we were a part of the Nicchitsu *zaibatsu*, but when the *zaibatsu* were dissolved after the war, we went independent in terms of capital and restarted as Asahi Chemical Industry Co., Ltd. in 1946.

In the 1950s we established a joint venture with Dow Chemical and entered the petrochemical field. After that, we continued to grow by diversifying into many other businesses, such as acrylonitrile (AN), synthetic rubber, construction materials, housing, medical devices, pharmaceuticals, and electronic materials.

For about ten years from 1990 our net sales and operating income were both stagnant, so during that period we advanced "selection and focus," thereby discontinuing many unprofitable businesses.

In October 2003, we adopted a configuration of a holding company and core operating companies. Although there were difficult times caused by the global financial crisis that followed Lehman’s collapse, and the appreciating yen, up until FY 2015 our business functioned successfully under the holding company and core operating companies configuration with net sales of approximately 2 trillion yen and operating income between 150 and 160 billion yen.

P8: Connecting technology, business, and human resources

The strengths of Asahi Kasei are in the fact that our three business sectors have strong presences within their own fields, and that we are able to connect these three sectors to demonstrate the comprehensive power of our Group.

Although the percentage of our overseas net sales is 35% in FY 2015, it is 50% if our housing business is excluded, which is a domestic business.

P10: Organization of Material business sector

The Material business sector is made up of six strategic business units, or SBUs (Fibers & Textiles, Petrochemicals, Performance Polymers, Performance Materials, Consumables, and Separators), Asahi Kasei Microdevices Corporation which has continued in the form of a core operating company, and Asahi Kasei Advance Corporation which provides our Group with a trading company function.

P11: Main products of Material sector (1)
P12: Main products of Material sector (2)

If businesses with high earning power were Major League baseball players, then Bemberg cupro fiber in our Fibers & Textiles SBU would be one of them because of its history of 85 years, and it is the only business of its kind in the world and has high earning power. Another Major League player would be nonwoven fabrics that include Eltas spunbond, which is used in disposable diapers, and Lamous artificial suede.

In the Petrochemicals SBU, AN is not profitable every year, but is usually profitable every other year, so that averages out to make it a Major League player. Petrochemicals also includes Asahi Kasei Mitsubishi Chemical Ethylene Corporation, our joint venture with Mitsubishi Chemical Corporation to operate an ethylene center, and PS Japan Corporation, our joint venture with Idemitsu Kosan Co., Ltd. in the polystyrene business.

In the Performance Polymers SBU, our synthetic rubber business would be batting third in a Major League lineup. Moreover, engineering plastics would be batting fifth, so that the Performance Polymers has star Major League players.

The Performance Materials SBU has an overall operating margin of about 15% making it a highly profitable business unit. Ion exchange membranes have an especially high profitability, so it is the equivalent of a Major League player. Other businesses with high earning power are the performance coating materials such as Duranate HDI-based polyisocyanate, the functional additives such as Ceolus microcrystalline cellulose which are used as an additive in pharmaceuticals and food, and the electronics materials business with products for smartphones and cell phones.

In Consumables SBU, our kitchen products of which Saran Wrap cling film is the most well-known are especially strong. This business also produces many products for convenience stores and continues to grow.

The Separators SBU would be a Major League cleanup batter. Asahi Kasei Microdevices Corporation, our electronic devices business, is developing its sensor business centering on the Hall elements for rotation control sensors.

P13: Basic policy and strategic focus

The basic policy in the Material sector is to enhance profitability of established businesses, and achieve synergies among various businesses in order to produce better results.

Specifically, we are targeting the automotive-related business, and are conducting unified marketing that consolidates our automotive products from our various business units and affiliates.

Another policy is our regional strategy, and we have established Asahi Kasei Europe GmbH in Dusseldorf, Germany. This company will be our cornerstone for promoting unified marketing related to automotive products, and it will advance integration among businesses within the Material sector.

P14: FY 2018 target and FY 2025 outlook

Our outlook for FY 2025 is separated into our earnings-base businesses and our performance-products businesses in our presentation material. Fibers is currently doing well with net sales of about 130 billion yen and an operating margin of about 10%. We believe we can expand this business maintaining the current level of operating margin. Our Consumables business centered on Saran Wrap cling film has sales of about 80 billion yen, and an average operating margin of about 15%. We plan to maintain this operating margin and expand this business, too. Petrochemicals has net sales of about 300 billion yen but its operating margin stays at about 5%. Under the current business conditions it may be possible to improve the operating margin slightly, and we hope to keep volatility to a minimum. Combining these three businesses gives us an average operating margin of about 8%. These earnings-base businesses will not grow dramatically, but we believe that they can maintain their current operating margins.

The goals for our Material sector are to increase net sales by about 65% in the next ten years, and to double our operating income. The driving force behind that growth will be our automotive-related, battery-related, and health care-related businesses. The health care-related businesses here refers to the health care-related materials handled by our Material sector, and is different from the Health Care sector for Asahi Kasei as a whole. We also hope to expand the performance products in our existing businesses.

In this way, we categorize our businesses into three groups, and pursue growth. The automotive-related and battery-related businesses are our core businesses, and we will describe them in greater detail in this business briefing.

P15: Strategic focus: automotive-related business (1)
P16: Strategic focus: automotive-related business (2)

Excluding the separator business, our automotive-related business currently has net sales of about 100 billion yen and it is expected to expand to about 300 billion yen in FY 2025. Many of our business units are involved in automotive-related products, such as battery separators and synthetic rubber for fuel-efficient tires. In the electronics business, we handle various sensors and audio LSIs for automotive applications, and products related to automatic driving. Fibers makes materials for automotive upholstery and air bags. Because we have a wide range of products from fibers to electronic devices, such as sensors, our plan is to aggressively expand in the automotive field by demonstrating our comprehensive strength through those products. Based on this thinking, we established the Automotive Marketing Department in April 2016.

P17: Strategic focus: global strategy by region (1)

Asahi Kasei Group's net sales are 65% domestic and 35% overseas. The breakdown of the overseas net sales is East Asia 16% which includes China, and China accounts for 10% of the overseas net sales. Net sales of ZOLL have expanded rapidly in the United States, so that the Americas now account for 10%. In FY 2016, with Polypore consolidated on a whole-year basis, net sales in the Americas are expected to grow a little further. Net sales in Europe were about 80 billion yen and still small, but we believe that there is a great deal of growth potential. We would also think about growth potential in India.

In Material sector, overseas net sales account for about 50% of Material's total, and Material sector's businesses account for a high percentage of the group's overseas net sales in other regions than North America.

P18: Strategic focus: global strategy by region (2)
P19: Strategic focus: global strategy by region (3)

The specific measures for each region are summarized in the briefing material, and page 19 especially focuses on Europe. Net sales by the Asahi Kasei Group in Europe are about 700 million euros (about 80 billion yen). Our businesses there are automotive-related, health care-related, and other materials which include fibers and photopolymers. Each of these accounts for about one third of our net sales in Europe. We are currently conducting activities to try to triple our net sales for automotive-related products.

P20: Strategic focus: growth in healthcare applications

The Health Care sector of the Asahi Kasei Group includes pharmaceuticals, medical devices, and critical care, and net sales total about 300 billion yen. In addition to this, the Material sector also has businesses related to medical devices and pharmaceuticals, such as Ceolus, and acetonitrile which is a solvent for pharmaceutical manufacture. Moreover, in the field of packaging material of pharmaceuticals, latex used to improve the barrier of packaging material is also growing. There is also material for medical fluid bags in the field of material for medical-related applications. In addition to these, in the field of hygiene materials related to health care, we have UVC LED business (deep ultraviolet light-emitting diodes) being developed for sterilization, and spunbond nonwoven material used for disposable diapers and the like.

The health care-related business of the Material sector is currently about 40 to 50 billion yen, and is planned to expand.

P23: Investments under "For Tomorrow 2015"

The mid-term management initiative "For Tomorrow 2015" which was launched in FY 2011 made strategic investments a total of 1 trillion yen over five years. Half of the strategic investments were made to reinforce existing businesses, and the other half were made for non-linear growth. The investments made for non-linear growth included those for acquiring Crystal IS for the UVC LED business, and large acquisitions such as acquisition of ZOLL and Polypore. Many of the investments for existing businesses were made in the Material sector.

P24: Investment for growth in the Material sector

I would like to describe the investments made in the Material sector. The unification of naphtha crackers in petrochemicals was completed by integrating Mitsubishi Chemical's naphtha cracker and Asahi Kasei's into one. Accompanying this, we closed several production facilities. Although it costed about 20 billion yen, because of this consolidation we now have a stable petrochemical business structure that is not affected by fluctuations in the market.

P25: Financial and capital strategy

For the Group overall we are planning on making investments that will total about 700 billion yen over the next three years. About 350 billion yen of this will be used to reinforce existing businesses, and the other 350 billion yen will be for non-linear growth, including M&A. Most of the 350 billion yen to be invested in existing businesses will be for the Material sector, including investments for the Separators SBU centering on Hipore lithium-ion battery (LIB) separator. With respect to investments for non-linear growth, we plan to make investments including M&A, especially in the Health Care sector.

[Performance Polymers SBU]

Yoshida: The Performance Polymers SBU has two main businesses: one is the synthetic rubber business, and the other is the engineering plastics business. Our presentation will be divided into these two businesses.

P4: Outline of medium-term strategy

The Performance Polymers' mid-term strategy is three-pronged. The first is to expand our businesses with high profitability globally, not depending only on Japan and the rest of Asia. We hope to expand in Europe, North America, China, and ASEAN.

The second is synthetic rubber-related. We have already been emphasizing the expansion of our S-SBR (solution-polymerized styrene-butadiene rubber) business for fuel-efficient tires, and plan to continue to expand this business.

The third is to expand our engineering plastics business, more specifically in the automotive field. To date, we have worked together with many Japanese automobile manufacturers, and we hope to expand our business into Europe.

The graph at the bottom of page 4 shows our sales growth plan. We plan to double our FY 2015 sales in ten years. Sales for the Material sector as a whole are planned to increase about 1.6 to 1.7 times, but the Performance Polymers hopes to beat that and act as the engine for the Material sector.

P5: Main products

Our synthetic rubber business includes S-SBR for high performance and fuel-efficient tires, and also elastomers which are increasingly being used for medical fluid bags, etc.

There are four main products in our engineering plastics business: Leona polyamide (PA) 66, Tenac polyacetal, Xyron modified polyphenylene ether, and Thermylene polypropylene (PP) compounds which is growing mainly in the United States.

P6: Global bases (production, sales, and R&D sites)

As you can see in the top map, from the point of view of bases our presence in Europe is still weak.

The bases shown in yellow are those that have been opened in the past year. The Alabama Plant is our second compound facility in the United States; we established a sales company in Mexico; and in Asia we recently opened a computer-aided engineering (CAE) facility in Vietnam. With respect to Asahi Kasei Europe, until recently our engineering plastics business was based in Belgium, but because we will be focusing on supplying automotive products, we have opened a new facility in Dusseldorf, Germany.

P8: Synthetic rubber & elastomer products

As the briefing material shows our synthetic rubber business has a number of products, but we will center our presentation on automotive-related products because they are the focus of the Material sector. Our key technologies in the synthetic rubber business are functionalization, high molecular weight, and hydrogenation, which we believe are our strengths.

P9: S-SBR

S-SBR stands for solution-polymerized styrene-butadiene rubber. The main use for this material is in the tread (contact surface) of tires. The part of tires that comes in contact with the road not only has a major effect on mileage, but it also is related to braking performance (wet grip) which affects safety.

There are two types of S-SBR: emulsion-polymerized SBR, or E-SBR, and S-SBR. We produce S-SBR which features a high degree of polymer structure design flexibility. Currently, sales of this material are expanding for both fuel-efficient tires and high-performance tires.

P10: Tire structure

Our S-SBR is used in tire treads. The performance and tread compound design required by tire manufacturers have changed these last ten years. One major change is compounding with silica in addition to carbon black filler in order to improve fuel efficiency. S-SBR works well with silica, and this has helped improve the performance of our products.

P11: Trends impacting S-SBR demand

Various regulations on tires have been introduced around the world. In addition to Japan, South Korea, and Europe, China has also begun a labeling system with three criteria from September 2016 as a voluntary system. It is said that Brazil and the United States will follow suit.

Another point of interest is the labeling regulations in Europe. The labeling regulations were started in 2012, and moves toward making them stricter from November 2016 are proceeding. As a result, the even higher demands have been placed on our synthetic rubber from tire manufacturers.

P12: Growth of S-SBR market for tire

This page shows the demand forecasts for the overall global SBR market for tires from 2010 to 2025 for both general purpose E-SBR and S-SBR. From 2010 to 2015 S-SBR has been growing at an annual rate of 9%, and is forecast to continue to grow at an annual rate of 7% to 8%. Although the overall market is growing, our sales far outpace the growth in demand. We are predicting that this trend will continue.

P13: S-SBR business growth strategy

As page 13 shows, our S-SBR business strategy is based on both technological development and expanding our supply capacity.

P14: Technology for fuel-efficient tires

When functionalized S-SBR is used, the interaction with silica is very good. When compared with regular S-SBR, there is less energy loss due to movement of free polymer chain ends. You can see how functionalized S-SBR has better silica dispersion by looking at the TEM (Transmission Electron Microscope) images.

P15: Technical advantages of Asahi Kasei's S-SBR

Our technical advantages in S-SBR are based on our ability to manufacture synthetic rubber with superior functionalization and high molecular weight. This allows us to improve in a balanced manner the four performance elements that tire manufacturers are demanding; i.e., fuel efficiency, wet grip, wear resistance, and handling stability. Recently our customers are especially focused on improving wear resistance, which we believe is one of our continuous-process SBR’s features.

P16: Proactive expansion of supply capacity

In 2012 our domestic production capacity was 140,000 tons/year, but today when we add the Singapore Line 1 and Line 2, our capacity is now 240,000 tons/year. We are currently studying further reinforcement and expansion toward 2020.

P18: About our engineering plastics business

In examining our engineering plastics business by process, it starts with synthesizing monomers into polymers. Although we have some sales of polymers, most of them go into compounding processes in order to increase their added value. Compounding processes include adding other polymer, glass fiber, and flame retardants, etc. These processes meet the needs of our customers and improve the added value of our products.

P19: Engineering plastics business growth strategy

Our main target is automotive applications. We intend to cope with demand for vehicle weight reduction, expand our business in Europe, and conduct proposal-type development of applications by utilizing our capability of developing superior grades and our strength in CAE technology.

P20: Engineering plastics sales growth plan

Our engineering plastics sales growth plan toward FY 2025 sees us more than doubling our sales from FY 2015. We hope to be the engine that expands the business of the Material sector. In addition, the automotive applications portion of sales volume accounts for 54% to 55%, and we hope to increase that even more in the future.

With respect to sales by region, we are especially planning to expand sales of our polymers and compound products in China from FY 2015 to FY 2018. Currently, sales in Europe and the United States appear large; although the scale in the United States is relatively large, the scale in Europe is very small. How we can expand in these areas is one of the tasks that we face.

P21: Strengths by material (1)

Here I would like to describe the four plastics that we make.

The first, Leona PA 66, is plastic with a good balance of heat resistance, strength, and rigidity. Moreover, we have several types of polymer technologies. We will use these lineups to further expand their use in automotive applications.

The next is Tenac polyacetal which is mainly used in the interiors of automobiles, such as seatbelt buckles and inside door handles. These components require low volatile organic compound (VOC). Restrictions requiring the use of low VOC material have even been put into place in China. The Tenac low VOC grades emit one-tenth of the formaldehyde of conventional general-purpose products, and that is one reason for its rapid growth.

P22: Strengths by material (2)

When Xyron modified polyphenylene ether is alloyed with PA, its chemical resistance is improved. It also has excellent electrical properties and dimensional stability. The use of this plastic for battery cases is especially growing.

The final plastic is Thermylene PP compound. We do not manufacture PP itself, so we procure it from outside. Currently, we are producing 100,000 tons/year of Thermylene in the United States, where we have the top market share of a compound that adds short glass fiber (GF) to PP.

P23: Strengths in computer-aided engineering (CAE)

Of the technologies that are helping the engineering plastics business to grow, I would like to discuss CAE technology. When an automobile manufacturer comes to us asking to reduce the weight of metal parts, we first design the plastic part with a computer. We run simulations to see which plastic and which design will provide the best solution for reducing weight while meeting the specifications. The illustration shows an example of success in 60% weight reduction compared to metal. There is another example of success in 70% weight reduction. We will continue to use this CAE technology to satisfy customer needs.

In order to reinforce our CAE technology, in June 2016 we established a new company in Vietnam to be our CAE center. Our customers say that our CAE technology is superior to our competitors, though also say that our shortcoming is that our lead time is too long. Although our competitors can handle customer requests in about a week, we require four weeks, so we have reinforced the human resources involved with this work in Vietnam. Within a year we plan to reduce our current lead time of four weeks to one week.

P24: Roadmap for expanding business bases

I would like to describe our roadmap for assuring expansion of our engineering plastics business.

Up until recently we only had one plant in the northern United States to cover both the United States and Mexico, but in February 2016 we established the second compounding plant in Athens, Alabama, in the southern United States. We are currently considering local compounding in Mexico.

With respect to Europe, we need to reinforce our business in order to expand there. To that end, we established Asahi Kasei Europe as our European headquarters, which started operation in April 2016. Additionally, we plan to open a technical center in December 2016. We hope to gradually enrich this facility, so that in the medium term

it not only is a technical center, but also serves as a base for conducting various research and development. We are also planning construction of a local compounding base.

We have been taking various measures in China since before. We have been improving our technical center and sales offices, and we are considering opening a technical center in Guangzhou in the next year or two. After that, we will expand the capacity of our compounding bases to steadily expand our business.

As for ASEAN and India, we have established a CAE center in Vietnam. We are planning to establish a technical center in Thailand and a local compounding base in India in the next year or two.

P25: Sales office in Mexico
P26: Second compounding plant in the U.S.

With respect to the aforementioned measures, Asahi Kasei Plastics Mexico established in 2015, and the compounding plant built in the United States, are described on page 25 and 26, respectively. In addition to a plant with a capacity of 100,000 tons/year, which we already had in Michigan, we started operation of the Athens plant with a capacity of 30,000 tons/year in February 2016. The background is, because automobile production bases in the United States are gradually moving from the north to the south, we had to meet the demand trends of our customers.

[Separators SBU]

Takayama: I would like to describe the current situation regarding the Separators SBU and its future strategy.

P2: Separators SBU

The Separators SBU is made up of the Planning & Coordination and Battery Material Division of Asahi Kasei Corporation that handle Hipore (LIB separator), and Polypore International, LP in the United States that acts as the headquarters for Celgard (LIB separator) and Daramic (lead-acid battery separator). I am currently the President of the Separators SBU and President of Polypore.

P3: Overview of Polypore

Polypore was added to the Asahi Kasei Group on August 26 last year, and is a company with a global presence. However, the scale of the company itself is not that big and it does not necessarily have sufficient research and engineering capabilities, so we hope that synergy will be created by working together with Asahi Kasei.

P4: Battery separator business overview

It has been a year since we acquired Polypore and we are currently integrating technology and marketing. The separator business is highly dependent on technology, and marketing is important because the customer base is very diverse. We are conducting comprehensive marketing with the three brands: Hipore, Celgard, and Daramic.

For the time being we will expand the business for each of these brands by themselves. However, in the future, automobiles equipped with both LIB and lead-acid batteries are a distinct possibility. So, as the only company in the world dealing with separators for both types of batteries, we shall collect related information while improving our understanding of battery management systems, and try to pursue synergy between LIB and lead-acid battery separators.

P5: Technology innovation

Here we have summarized our activities in the year after our acquisition of Polypore. This illustration is organized by dry process, wet process, and coating, and by technology and product. Coated separators are the mainstay of LIB separators for automotive applications. Lead-acid batteries involve technologies of the separators themselves and various peripheral technologies. When these are broken down and the "Innovation" column is examined, we can see that various technologies are involved, such as multi-layer separators, dry-process coated separators, and wet-process coated separators. These are color coded into green and yellow, with the green categories being where Asahi Kasei and Polypore are strong, and the yellow categories being the ones we have been focusing on this past year.

Product development is also extremely important for Daramic. However, because of its scale, Polypore by itself did not always have sufficient infrastructure for that development. Asahi Kasei has been proactively using its basic electrochemistry technology, analysis technology, and engineering technology, yielding major results for new product.

P6: Technology innovation and business transformation (1)

There were no dry-process coated separators, even for Celgard. Although it was not yet finished, when we acquired Polypore it was building its own coating line in the United States. After we acquired Polypore, we offered our own expertise for the coating line, and had our engineering and research personnel work at Polypore to successfully start the coating line in the United States ahead of schedule. Coated Celgard products are ready for mass production. We have also applied the Asahi Kasei coating line to make dry-process coated Celgard products and have shipped commercial samples to customers.

Another major effect is the synergy in wet-process separators. Celgard has a wet-process factory in South Korea, and the sequential stretch process was used instead of the simultaneous stretch process for Hipore. In other words there is a difference in stretching methods. Hipore is stretched vertically and horizontally at the same time, but Celgard in South Korea is stretched vertically and then horizontally using the sequential stretch process. This makes it possible for us to make a product with features that are different from Hipore.

P7: Technology innovation and business transformation (2)

We are also focusing on Daramic. Asahi Kasei did not have a lead-acid battery separator business; however, we do have knowledge about various chemical reactions, and manufacturing and engineering know-how about similar fields. Asahi Kasei members have joined with their counterparts at Polypore for the past year to improve analysis and simulation related technology, and to provide engineering support to improve processes.

For example, analysis of Daramic's composition, internal structure, and defects had not been fully satisfactory. We used the analytical ability of Asahi Kasei's Analysis & Simulation Center to analyze various problems and new products. The structure of pores in lead-acid batteries is important, and until now the pore structure was controlled for the use of each product, but since joining hands with Asahi Kasei more detailed analysis became possible.

There are also examples in which our engineering team improved processes. Shape processing is conducted to the surface of Daramic, so that there are ribs (narrow ridges) on its surface. In order to stably provide customers with products with a regular shape, the Asahi Kasei engineering team made improvements based on simulations, such as process development.

Not limiting ourselves to product analysis and improving processes, we also looked at the raw materials as part of the business. Daramic uses ultrahigh molecular weight polyethylene (PE). Asahi Kasei has an ultrahigh molecular weight PE named Sunfine, but it had never been used for Daramic. In expanding high function PE in the same Material sector, Asahi Kasei will consider using Sunfine for Daramic and for what kinds of products it is best suited. We believe that using a new high function material for Daramic can be a stepping stone to create a new product that the competition does not have.

With respect to cooperation in the sales and technical services fields, Asahi Kasei has established sales and technical services teams to sell Daramic in the Japanese market. Many of our Japanese customers are global leaders in their fields, so by having them adopt Daramic, global expansion will be possible. Until now Daramic did not have a strong presence in the Japanese market, but it is about to increase its sales.

P8: Technology innovation and business transformation (3)

I would now like to discuss the measures being taken by Polypore headquarters.

Polypore was a listed company when it was acquired, so it had considerable corporate functions. During the past year we reduced the administrative overhead by about half, by reducing personnel and other means.

Because it is a company operating on a global scale, it has competent IT systems to control operations around the world, and it also has many legal and financial experts. We believe that we can effectively use these assets within the Asahi Kasei Group.

However, because the scale of the company itself was small, it did not have a strong purchasing position. In the future, it will be possible to reduce raw material and logistics costs by utilizing Asahi Kasei's scale. Moreover, we are also reinforcing links with Japanese equipment manufacturers that have relations with Asahi Kasei for capital investment.

P9: Characteristics of our separator business: Both lead-acid and lithium-ion (1)

This and subsequent pages explain our company's strengths, and how we plan to expand the separator business. Basically, they are based on the three points shown here. For both lead-acid batteries and LIB, we are the pioneer in the separator market, the technological leader, and the top supplier based on our supply capacity.

P10: Characteristics of our separator business: Both lead-acid and lithium-ion (2)

Asahi Kasei prides itself in being a pioneer in separators for both lead-acid batteries and LIB. We are the first company in the world to mass produce the present battery separators.

With regard to lead-acid battery separators, Daramic business was founded in 1930. Up until 1972 there were only paper and rubber separators for lead-acid batteries, but in that year the Daramic business commercialized a PE separator for the first time in the world.

Asahi Kasei released a LIB separator in the early 1990s, but Celgard business also started to supply separators during the early years of LIB in the 1990s. About the same time Celgard was commercialized using PP, and Hipore was commercialized using PE.

P11: Characteristics of our separator business: Both lead-acid and lithium-ion (3)

The important technologies for the separator business are product technology, production technology, and evaluation technology.

The required performance of both lead-acid batteries and LIBs are changing rapidly, so product technology is necessary to design products that can keep up with these changes.

Production technology is also important. We have improved our technology for better productivity. For example, with respect to wet-process LIB separators, we believe that Hipore has the highest production volume and production efficiency per line in the world. With respect to dry-process separators, it goes without saying that Celgard has the world's highest production efficiency. The same is true for Daramic. We believe that this high technological ability will play a direct and major role in future investment efficiency for expanding our capacity.

P12: Characteristics of our separator business: Both lead-acid and lithium-ion (4)

With respect to customer segmentation in the battery industry, we place customers in three categories: global leaders, regional leaders, and other global customers. For instance, with regard to our lead-acid battery separator business we have facilities around the world, so that we have strong relations with regional leaders. In addition, we also have relations with global leaders, so we are expanding our business by carefully handling both our global leader and regional leader customers.

With regard to our LIB separator business, our production facilities are basically in Asia and the United States as our main customers are located there. We have both global leader and regional leader customers for LIB separators, but the regional leader customers in China are gaining strength. The information that we can acquire from these customers and the kinds of products that we provide, are important. Because the main clients for Hipore and Celgard are different, we are in a unique position to acquire information from customers for both.

P13: Characteristics of our separator business: Both lead-acid and lithium-ion (5)

To summarize, the important things are how the markets are moving, and acquiring the technological needs of customers from each class as quickly as possible. Based on that information we can make products using the technology that we have accumulated over the years. The word “technology” in this context could be replaced with engineers, because both Asahi Kasei and Polypore have engineers with over twenty years of experience in these fields. When these engineers hear the customer demands, they can immediately and accurately understand how the product should be made.

Production technology is just as important. In the separator business stable quality is a strong requirement, and cost competitiveness is also extremely important. We will continue to improve our production technology on a daily basis, and base our business growth on that improvement.

P14: History of Hipore

This is a simple history of the wet-process separator Hipore. As a pioneer we started research in the 1970s, and in the 1990s we started supplying product and saw our rise to prominence.

P15: History of Celgard

Celgard also started research in the 1970s, and entered the LIB market in the same 1990s.

P16: History of Daramic

Daramic released the world's first PE separator in 1972, and has been improving its products since then.

P17: Global operations

During the past year I have traveled to our facilities around the world, visited our customers around the world together with our sales people from Polypore, and have really felt the strength of their global operations. With Asahi Kasei's Hipore, we only had production and R&D facilities in China, South Korea, and Japan, but we have added the United States, Southeast Asia, India, and Europe to those, so that I feel just how global we have become in every facet of business.

P18: Characteristics of our lithium-ion battery separator business

With respect to coatings for LIB separators, both Hipore and Celgard were conducting these processes independently, but recently we have been developing business that includes partners dedicated to coatings. Previously, we coated Hipore products ourselves and then supplied them to customers. Since we have acquired Polypore, it has become possible to coat Hipore on the same coating line as Celgard. Furthermore, it is also possible to supply the base film to a coating partner, and have the partner provide the optimum coating and then supply the product to our customers.

In addition, since we now have dry-process base film, Asahi Kasei can coat it to provide to our customers with quality assured by Asahi Kasei. Additionally, the coating line that was recently set up in the United States with the technical support of Asahi Kasei is starting to process products.

P19: Lithium-ion battery separator manufacturing processes

P20: Lithium-ion battery separators

Recently there are several types of coatings used: those that apply a ceramic layer, those that apply organic coating for adhesiveness, and those that apply both.

P21: Lithium-ion battery separator for EDV applications

Actual batteries for automotive applications come in many shapes, such as cylindrical, prismatic, and pouch cells; and there are many different requirements depending on the form factor of the battery, such as wet process or dry, with or without coating. By committing to developing every combination, Asahi Kasei is aiming to have its products adopted by all types of batteries.

P22: LIB separator demand growth and capacity expansion

This page shows our forecasts for market growth, and our plans for increasing capacity.

In the spring of 2016 there were reports that the Tesla Model 3 received many orders. Based on this, various automobile manufacturers have been making aggressive requirements. Asahi Kasei has decided to expand production to 600 million m^2/year in 2018, and it is considering increasing production to 1.1 billion m^2/year in 2020.

P23: Asahi Kasei's LIB separator strengths and strategy

The strength of our dry-process separator is cost competitiveness. The investment efficiency in expanding capacity is also high. Compared with wet-process separators, dry-process separators have an overpowering advantage, so that they are able to provide low-cost products for rapidly growing markets. However, there is still room to improve their performance, so we will accelerate improvement of performance by adding design technology from Hipore.

With respect to our wet-process separators we have an advantage in that we have relations with all the global leaders. We must use this advantage to quickly understand their various “advanced” demands and provide enhanced products that meet them. We must also further increase our production capacity to land big programs.

P24: Lead-acid battery structure

This illustration shows the general structure of a lead-acid battery, and this thick separator is Daramic.

P25: Daramic markets and applications

This page shows the overall market for Daramic. The ways lead-acid batteries are used are changing, because many recent automobiles have a function to automatically switch off the engine at traffic lights and other brief stops, and lead-acid batteries are also being used for golf carts and forklifts. Lead-acid batteries are entering a period of technological innovation.