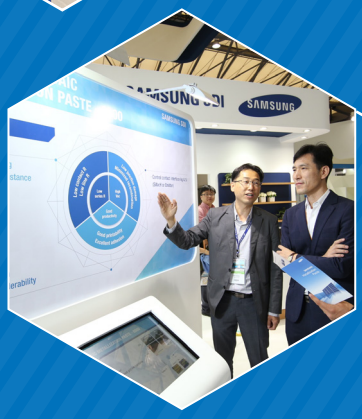
Samsung SDI
High Material Issue

Samsung SDI's report focuses on the issues that have high business impacts with great social attentions as a result of the materiality assessment. In 2016, we have identified eight high material issues.

High Material Issue	Overall Materiality Rank	Social Interest Rank	Business Impact Rank	Page
Securing market leadership and new market development	1	2	1	22
Reinforcing product safety evaluation and management	2	1	3	26
Forecasting and responding to fluctuations in the future market	3	5	2	30
Compliance with laws and global anti-corruption principles	4	8	4	34
Building up workplace safety	5	12	5	36
Enhancing R&D competency	6	10	6	40
Sustainable supply chain support and management	7	4	11	42
Energy reduction and utilization of renewable energy	8	7	9	48



2016 KEY Output (yoy)

Revenue
KRW 5,200.8 billion
(yoy 5% increase)

Quality management engineer certificate
29%
(yoy 18% increase)

Punishment from corruption inspection
42 people
(decrease by 1 person)

Employee injury rate
0.40
(yoy 14.9% decrease)

Patent Register
11,886
(yoy 10.7% increase)

S-Partner Certificate
91 Companies
(increase by 1 company)

Energy Saving
1,093TJ

* Number of injury / Total labor hour X 1,000,000

High Material Issue 01

Securing market leadership and new market development

Small-sized Li-ion Battery Business Overview

Samsung SDI's Battery Business Division develops and sells cylindrical, prismatic, and polymer batteries. It is expanding the business horizon as rapid growths in emerging markets have led to a higher demand for IT devices and the increasing use of eco-friendly applications. Samsung SDI is taking the lead in the market with its excellent technologies.

IT devices

Polymer batteries for IT devices, with a slim and compact design compared to cylindrical and prismatic batteries, can have an extended run-time and a shorter charge time (75% charged in 30 minutes). Samsung SDI enhanced the battery design and quality verification in its development stage to take by taking into account the product safety and hours of use.

Power devices / EV

Samsung SDI's lithium-ion battery is strong, endurable and safe, providing excellent product quality suited for power plants and electric vehicles. High-output cylindrical cells used in power tools are dominating the market with the world's leading capacity of 3.0 Ah (18650: Cylindrical, 18mm in diameter and 65mm in height) and output of 35A (21700: Cylindrical, 21mm in diameter and 70mm in height). Samsung SDI's continuous innovation will reinforce capacity and improve charging qualities to generate customer values, including extended actuation time and driving range, and shorter charging hours.

Automotive Battery Business Overview

Global automobile manufacturers offer alternatives to traditional vehicles with combustion engines, such as electric vehicles, in order to minimize air pollutants and carbon dioxide emissions. With abundant experience in mobile device battery sector, Samsung SDI is developing high-efficiency and high-energy density batteries for low-carbon vehicles.

EV Battery Cell with 600km of Driving Range

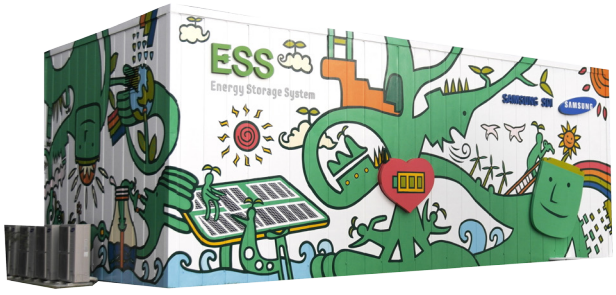
Samsung SDI is currently developing high-energy density battery cells capable of driving 600km in addition to fast charging technology that takes as short as 20 minutes. This battery cell is chargeable at rest areas on the highways up to 80% of its capacity, allowing for a driving range of 500km. It is expected to overcome both the range limit and drivers' concerns regarding electric vehicles. This product is targeted for mass production in 2021.

Low Voltage Battery System

Samsung SDI is developing and producing fuel-efficient 12V and 48V line-ups in line with the eco-friendly trend. These products will effectively improve the internal combustion engine vehicles using combustion systems by 5~20% in preparation for growing stringency of CO2 emissions regulations.

Target: 9.4

ESS Business Overview



Energy Storage System (ESS) is an integral component to realize the next-generation of electrical grid. It controls the power load at times of peak demand to prevent over-investments in generation facilities, provides stable power at the time of unwarned blackouts, and enhances the electric stability of renewable generation facilities, thus attracting attention as the key facility of SmartGrid.

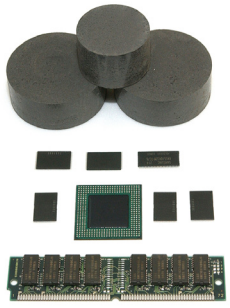
Samsung SDI leads the major markets, including Korea, Japan, America, and Europe, with its key ESS battery products and provides various applications for residential, utility-scale, C&I and UPS. Moreover, with a focus on expansion into emerging markets, our ESS products are provided in diverse application including home use, large-scale use, commercial use and UPS use.

Electronic Materials Business Overview

Samsung SDI's Electronic Materials Business Division develops and sells electronic materials used for semi-conductors, displays and the next-generation energy. With the increasing demands for cutting-edge IT devices, Samsung SDI strives to develop competitive products based on our innovative technology and stable quality.

Semiconductor Materials

Samsung SDI manufactures the following products: SOH, which is used to accurately form micro-patterns within semi-conductors; SOD, a coating material that acts as an insulator among the transistors of semi-conductors; CMP slurry, a key abrasive that planarizes wafers and accommodates the micro-patterned design trend of semi-conductors; and EMC, which thoroughly protects semiconductor circuits from moisture, shock, and heat. Samsung SDI has maximized the functions of semiconductors by perfecting its composition with the excellent technology.



Display Materials

Samsung SDI develops the world's first technology that Polyethylene Terephthalate (PET) to replace Tri Acetyl Cellulose (TAC) film , the key material for polarizing films, consequently lowering the production cost and enhancing its durability. Also, Samsung SDI has retained its market dominance by developing high-luminance Color Resist (CR). With Novaled, a renowned OLED materials company that Samsung SDI acquired in 2013, it seeks maximum synergies to pursue shared growth with the OLED market by developing materials that last long and require less energy.

PASTE

With higher demands for high efficiency in the photovoltaic market, Samsung SDI released customized products for Double Print and High Open Screen printing method to buttress its market dominance. Also, it equips with stronger product competitiveness by developing Mono products which are gradually becoming more significant in cell composition.

High Material Issue 01

Securing market leadership and new market development

BUSINESS CASE

Small-sized Li-ion Battery

Samsung SDI Supplies Batteries to E-Z-GO, the Global Leader in Golf Cart Market

E-Z-GO, the world's second largest golf cart manufacturer, revealed its new ELiTE model that adopted SDI module pack for the first time at PGA Merchandise Show. Samsung SDI co-exhibited at the show with E-Z-GO as the market leader to enhance its brand reputation while continuing to expedite the replacement of lead storage batteries with lithium-ion batteries. In addition, we have improved our advisory service for marketing by sponsoring the European Battery Experts Forum and inviting power tool customers to host tech forums. To expand the use of Li-ion batteries as an eco-friendly and high-efficiency solution, Samsung SDI is actively participating in market education and promotion activities.

Automotive Battery

Samsung SDI Establishes a Production Site in Europe to Strengthen Supply Chain Management System

We established Samsung SDI Hungary Rt.(SDIHU) in an effort to build the new manufacturing base for the electric vehicle battery market in Europe. We invested about KRW 400 billion to equip the new corporation with a capability to manufacture batteries equivalent of 50,000 electric vehicles on a yearly basis, targeted for mass production in the second half 2018. Following Ulsan (Korea) and Xi'an (China), the SDIHU completed the global triangle manufacture system. Since the European automakers' manufacturing facilities are located adjacent to Hungary, the Hungary Corporation will not only reduce the logistics cost but also act as a foothold for Samsung SDI to quickly respond to customer needs. Furthermore, the Hungary Corporation is expected to synergize with Samsung SDI Battery Systems (SDIBS) in Austria to establish the consistent manufacture system from the battery cell to pack, which will enhance its competitiveness in automotive battery industry.

ESS

(Source: AES)

Samsung SDI supplies ESS Battery to California, U.S.

Samsung SDI participated in the electricity grid infrastructure project with other global ESS companies in California, USA, supplying 240MWh of ESS battery. This is the largest ESS project ordered both domestically and internationally, and the amount of electricity generated is equivalent to that used by 40,000 households for four hours. This project was launched in order to replace natural gas power plants with large-scale. Surplus electricity generated from natural gas and photovoltaic plants is stored in Samsung SDI's ESS batteries, and used when demands rapidly increase. The use of ESS reduces carbon emissions by promoting eco-friendly energy use. Especially with the achievement in U.S. market that applies strict regulations on product safety, Samsung SDI will be able to stabilize its dominance over the existing markets.

Electronic Materials

Expansion to China Kicks-off by Operating Chinese Production Lines

The polarizing film plant in Wuxi, China which began construction in July 2015 was completed and its operation kicked off as of Q4 2016. The Wuxi Plant can produce 2,300mm ultra-wide and ultrahigh speed films, which can be applied to 105-inch displays. Its annual production capacity is 40 million square meters, which is wide enough to cover Yeouido in Seoul (2.9km^2) 14 times. Samsung SDI's capacity to produce polarizing film doubled as the Wuxi Plant operation kicked-off. Additionally, Samsung SDI started to operate PV Paste production line in Wuxi in June 2016 and successfully established the system to quickly respond to the demands from the Chinese market. The Wuxi Plant's current capacity level is 40 tons per month, which will extend to 60 tons in 2017 with additional lines in place.

Securing market leadership and new market development

Input

Manufacture Capital

Output		Unit	2014	2015	2016
Energy Solution	Small-sized Li-ion batteries, etc.	Million	1,147	1,079	1,053
Electronic Materials	EMC	Ton	7,825	6,469	6,218
	Polarizing film	1,000㎡	31,015	34,217	45,023

Manufacture Capital

Global Network	Unit	2014	2015	2016
Production Corporations	EA	10	14	16
Sales Sites (Corporation, Branch, Office)	EA	15	14	12
Research Center	EA	1	1	1

Human Capital

Sales/Marketing Manpower Training		Unit	2016
Sales Training	Sales/Marketing staff	Persons	289
	Company-wide percentage of sales/marketing staff	%	3
	Sales/Marketing Training Course	EA	125
	Sales/Marketing Training Cost	KRW Million	118

Output

Financial Capital

Financial Achievements		Unit	2014	2015	2016
Revenue	Energy Solution	KRW 100 Million	33,275	33,127	34,302
	Electronic Materials	KRW 100 Million	7,977	16,421	17,706
Operating Income		KRW 100 Million	708	-2,674	-9,263
Net Income		KRW 100 Million	-803	256	2,111

Financial Capital

Market Share		Unit	2014	2015	2016
Energy Solution (Source: Report published by B3, a market researching firm)	Small-sized Li-ion battery	%	27	25	23
	- Cylindrical	%	32	31	28
	- Prismatic	%	31	27	25
	- Polymer	%	17	18	14
	Automotive Battery	%	4	6	7
	ESS	%	11	16	21
Electronic Materials (Source: Samsung SDI Electronic Material Management Support Team)	EMC	%	7	7	7
	Polarizing film	%	0	6	7
	PV Paste	%	24	29	32

High Material Issue 02

Reinforcing product safety evaluation and management

We continue to enhance quality management by prioritizing safety and quality of our products. We strive to develop products that even take into consideration our end-user environments, to supply batteries and electronic materials suitable to different applications required by the market. Learning from the Galaxy Note 7 incident, we have established more rigorous quality management in an effort to satisfy our customers.

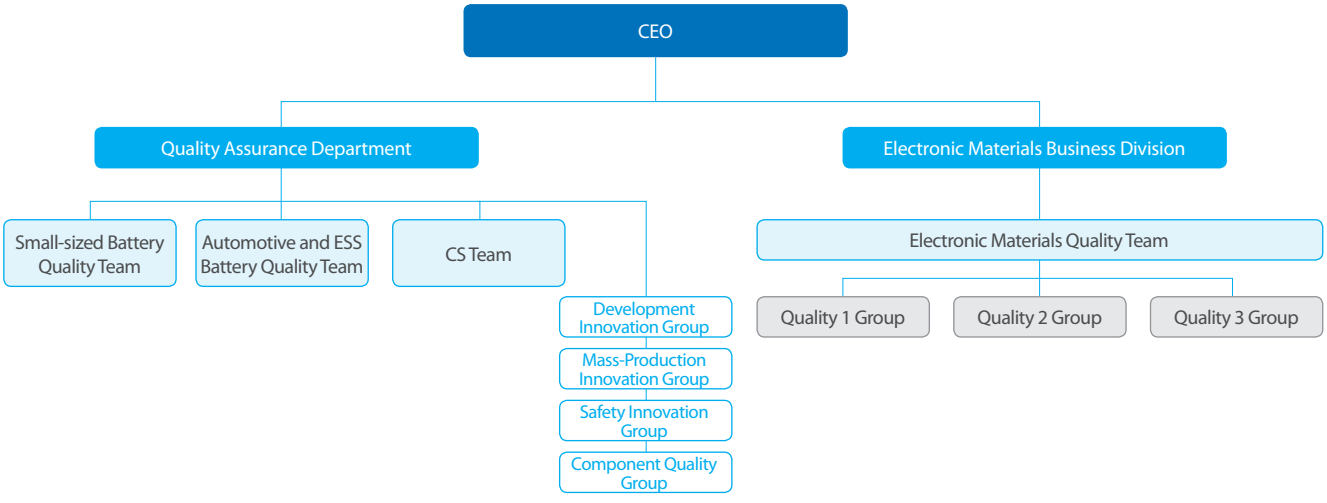
Organization Management

Samsung SDI established the Quality Assurance department under the direct supervision of the CEO, which was upsized to be in charge of the company-wide quality functions.

The Quality Assurance department acts as a quality control tower for improving the synergy of quality management in the Battery divisions and consists of small-sized battery quality, automotive and ESS battery quality, and CS teams. Subgroups are composed of development, mass-production, safety innovation, and component quality groups.

The Quality team of Electronic Materials Division is composed of Development Quality Assurance team responsible for verifying and registering new resources as well as assuring the quality of new product, Mass Production Quality Assurance team responsible for supplier management and quality assurance on mass production, and Customer Service team that deals with customer quality issues and VOC responses.

Quality Management Organization Chart

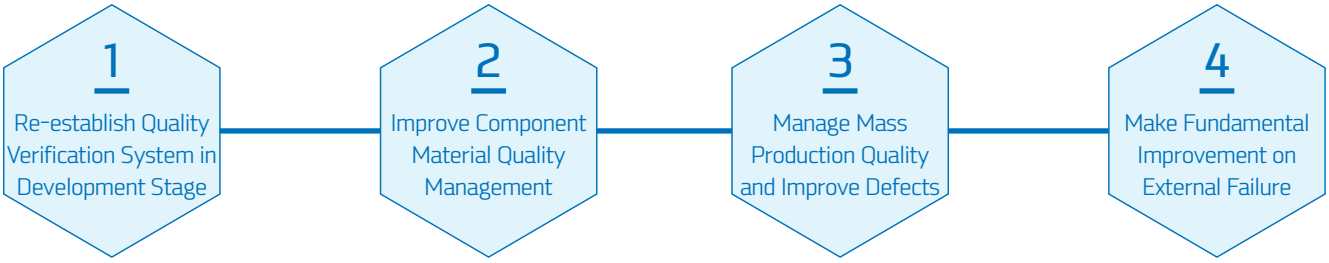


Company-wide Quality Management Activity

Samsung SDI discontinued the existing quality assurance award policy targeted towards work sites, and implemented a new year-end bonus policy on tasks driven by the Quality Assurance department. Each group was assigned a project in regards to improvements in the process and quality competitiveness, and presented before the judges. As a result, best practices were selected and shared with the rest of the employees.

Team members who presented the best practices were given incentives to reward their continuous improvement. Since 2015, Samsung SDI has established the four key assignments of quality development, components, mass production and market based on the issues identified from the management examination. We launched a total of 52 tasks (21 in 2015, 31 in 2016) and completed 38 of them as of 2016 year-end. We have further identified 15 additional tasks from the Galaxy Note 7 incident, which are currently in progress.

Four Quality Improvement Projects



2016 Milestones on Quality Improvement

Project and Activity	Achievement
[Project 1] Establish Quality Verification System in Development Stage	The Quality team at Automotive and ESS Division improved its internal verification process for customer sample by enhancing customer audit responses, carrying out activities to reduce VOC from sample issues, and reinforcing pre-management of the samples. Small-sized Li-ion Battery Division improved sample verification by verifying the qualities of pre-developed products, expanding the scope of product verification, and establishing development verification process and sample shipment standards.
[Project 2] Improvement on Raw Material Quality Management - Improving impurity content in raw materials	The Quality team at Electronic Materials Division continued their effort to improve quality of raw materials. In 2016, the team focused on removing impurities in raw materials in order to improve the quality in line with more refined semiconductor production process, and identified 17 items for micro quality management. In addition, we review and make improvements on quality conformity of raw materials with our suppliers, and enhance raw material quality management by providing technical supports such as optimization of processing conditions at raw and subsidiary material suppliers.
[Project 3] Manage Mass Production Quality and Improve Defects - Reducing nonconformity in measuring instruments	Measuring instruments are the basis of ensuring product quality. We strived to reduce nonconformity in measuring instruments to retain the quality of calibration and control, and succeeded in lowering the nonconformity rate by 45% from 0.6% in 2015 to 0.33% in 2016. We conduct regular management of our measuring instruments to prevent any malfunction.
[Project 4] Make Fundamental Improvement on External Failure - Improving visual inspection failure	In order to fix defective appearances at the production line, we established reasonable and realistic standards derived from consultation with our customers. Internally, we performed improvement activities on welding process and prohibited rework on defects occurring during the production process so that all non-conformant products would be rejected. Moreover, We identified root causes and reinforced management in the production lines, and reduced the defect rate by 96% from 12,225ppm in 2015 to 481ppm in December 2016, leading to higher customer satisfaction.

BUSINESS CASE

Quality Improvement Plans on the Galaxy Note 7 Issues

Quality issue of the Galaxy Note 7 series featuring Samsung SDI's batteries were widely reported in August 2016, and Samsung SDI analyzed weaknesses in the battery structure and production process to establish and execute improvement plans for development, manufacturing technology and quality verification. In late August following the incidents, Samsung SDI immediately established daily emergency situation room under direct supervision of the CEO, in which a team of 100 employees from Development, Production/Technology, and Quality/Verification teams executed Task Force activities on product safety innovation until December to analyze the root causes and establish response plans. Detailed safety management items, including material acceptance standards, were reinforced in the Development sector. In Production/Technology sector, a flawless system was built by supplementing the existing sampling test with a new X-ray inspection process for all products. In Quality/Verification sector, we increased the sample size by 1,000 times and added testing under extreme conditions to build a thorough verification system. Samsung SDI will solve the quality issues at a fundamental level and restore customer trust with our TF activities.

High Material Issue 02

Reinforcing product safety evaluation and management

Customer Satisfaction

We take Voice of Customers (VOC) into account as a major management KPI in an effort to fundamentally improve potential issues. We have a range of communication channels in place including website, social media, customer visits and customer satisfaction surveys, and registers VOC and customer needs through customer visits and Quarterly Business Reviews (QBR). In addition, Samsung SDI is improving the response lead time on quality issues by managing the lead time for each customer VOC level to make timely responses.

Customer Satisfaction Survey

Samsung SDI conducts customer satisfaction surveys for each business division. Customer satisfaction surveys are a process that derives indices from calculated scores on a number of categories including product quality, service, delivery date and technology development. We analyze strengths and weaknesses of the products and infrastructure of each business division based on the survey results. The surveys are intended to provide basic data for customer satisfaction management and to link points of improvement with the quality system.

The Small-sized Li-Ion Battery Division conducted Customer Satisfaction Index (CSI) surveys for 33 major customers in 2016. Based on objective data and our customer's complaints in quality characteristics, quality satisfaction and service level in comparison to the competitors, the division performed improvement activities on customer satisfaction. In addition, Samsung SDI introduced the Customer Quality Sentiment Index to build an internal feedback system on our current performance in product quality. According to the preliminary research, the system improved the external failure rate by 51% due to regular management on product quality trends and early inspection and mitigation on quality issues. Samsung SDI operated a preemptive response system and improvement activities on major customers in response to customer audits. A total of 129 customer audits were conducted in 2016 resulting in 100% conformity, and improvement requests decreased by 11% compared to the previous year.

The Electronic Materials Business conducts annual customer satisfaction surveys and evaluates five items, such as quality and technical support. VOC improvement tasks are under development and the contents of surveys are being improved to improve consistency. We also systematically manage the generation and processing of customer VOCs through our customer quality management system (Focus119).

Quality Improvement Support for the Partner Companies

By 2015, our supplier quality control, which mainly consists of export inspection, has been changed to approach preventive management. In addition, Samsung SDI designated themed audit checklist items, including change point implementation, quality issues and failure management to support a thorough quality management. For automotive and ESS batteries, we inspect the product quality from the customer's point of view, revised the quality assurance manual, and trained 14 VDA (Verband Der Automobilindustrie) 6.3 auditors to perform due diligence. Additionally, we hold discussions about technical issues on a quarterly basis through Quality Technology Reviews (QTR) on important materials.

Overseas Corporation Support

With the establishment of Samsung SDI Wuxi Co., Ltd. (SDIW), Samsung SDI built the quality assurance system and achieved mass production and quality stabilization at an early stage.

The SDIW is equipped with analysis credibility instruments and respective quality assessment systems for raw material/process/product phases. Also, it was certified to ISO9001 and received production approval from major customers on time. The quality management system in the SDIW enables a stable flow of supply for mass production in major polarizing film models and PV paste.

Key Performance Index

KPI	2017 Target	2016 Performance
Ratio of ISO 9001 auditor qualification (%)	23	18
Ratio of quality management qualification (except for ISO 9001)(%)	39	29

Reinforcing product safety evaluation and management

Input

Manufacture Capital

Output		Unit	2014	2015	2016
Energy Solution	Small-sized Li-ion batteries, etc	million	1,147	1,079	1,053
Electronic Materials	EMC	million	7,825	6,469	6,218
	Polarizing films	1,000㎡	31,015	34,217	45,023

Financial Capital

Quality Management Investment	Unit	2015	2016
Inspection cost / Revenue	%	0.65	0.97
Prevention cost / Revenue	%	0.45	0.46

Human Capital

Quality Management Training	Unit	2016
Quality experts	Persons	725
Quality Management Training Hour	Hour	20,480

Output

Financial Capital

Quality Management Cost	Unit	2015	2016
Customer complaint cost to revenue ratio	%	0.28	0.57
Quality failure cost to revenue ratio	%	0.91	1.35

Human Capital

Quality Management Training	Unit	2015	2016
Ratio of ISO 9001 auditor qualification	%	15	18
Ratio of quality management qualification(except for ISO 9001)	%	11	29

Social and Relationship Capital

Customer Satisfaction		Unit	2016
Small-sized Li-ion Battery	Score	Score	76.8
	No. of Company	EA	33
	No. of Customer	Persons	35
Automotive Battery & ESS	Score	Score	82
	No. of Company	EA	2
	No. of Customer	Persons	2
Electronic Materials	No. of Company	EA	28
	No. of Customer	Persons	178

* For Electronic Materials division, we did not present a comprehensive customer satisfaction score due to various product portfolio

High Material Issue 03

Forecasting and responding to fluctuations in the future market

Small-sized Li-Ion Batteries

Since the establishment of the Li-ion battery business in 2000, Samsung SDI's Small-sized Li-ion Battery Division has strived to enhance the product competitiveness in global standards. As the market is faced with increasing demands for Li-ion batteries in power application products such as electric bicycles, robot vacuum cleaners, and electronic power tools, we will secure product competitiveness and technology leadership to become the leader in Battery of Things (BoT) World.

2017 Market Forecast

Market demand for small-sized secondary batteries in 2017 is expected to increase by 8% year-on-year to reach 5.9 billion cells. The electric vehicle industry is experiencing a substantial growth led by Tesla and China. There is an increase in the use of Li-ion secondary cells in power applications, including electronic power tools and vacuum cleaners, and golf-cars are expected to replace lead storage batteries with Li-ion batteries. All of these factors are expected to contribute to the market growth, causing a hike in the demand for power applications by 19% compared to the previous year. In the IT sector, the advance of technologies based on Internet of Things (IoT) has led to the commercialization of artificial intelligence (AI), while smartphones are becoming more important as the hub device for smart homes. LTE services are anticipated to expand in the emerging markets led led by emerging markets, including India. As a result, the growth rate will remain at 7%. Samsung SDI aspires to lead technological innovations in the secondary cell industry across the power application and IT sectors, and to strengthen its leadership in the market.

Li-Ion Battery Demand Forecast

(Unit: Millions)

Category		2015	2016	2017(e)
Power devices	E-Bike	220	250	280
	E-Vehicle	645	1,001	1,337
	Vacuum Cleaner	55	66	82
	Power Tool	515	600	685
	Others	426	555	569
IT	Wearable*	93	111	126
	Feature Phone**	420	364	288
	Smartphone	1,430	1,492	1,603
	Tablet PC	313	260	239
	Laptop PC	656	591	559
	Others	247	185	147
Total		5,020	5,475	5,915

* Wearable Devices : Worn on the body, such as health care wearable and active cameras

** Feature Phone : Low-cost and low-performance cell phones that were extensively used prior to the smartphones

* Source: Samsung SDI Li-Ion Battery Marketing Team

2017 Business Plans and Mid-term Strategy

We plan to create an opportunity for the small-sized Li-ion battery business to rebound and turn profitable in 2017. We will strive to achieve early stabilization of the polymer battery business, re-entrance of cylindrical batteries into the EV market and sustain profitability of the prismatic battery business The Li-ion battery market in a mid- to long-term (2016-2020) is expected to be led by power applications, and the size of the smartphone market will remain stable in the IT sector. Samsung SDI will secure its leadership in high-capacity and high-output product and technology to pre-dominate the market of power tools, EVs, and substitute products for lead storage batteries. For the IT sector, we will strengthen our dominance in the polymer market with high energy density, slim design, flexibility, and securing key technologies for next-generation batteries. Also, our global manufacturing sites will be optimized to enhance production efficiencies and cost competitiveness. With these strategies, Samsung SDI will continue to retain its leading market share in the small-sized secondary cell market.

Automotive Battery

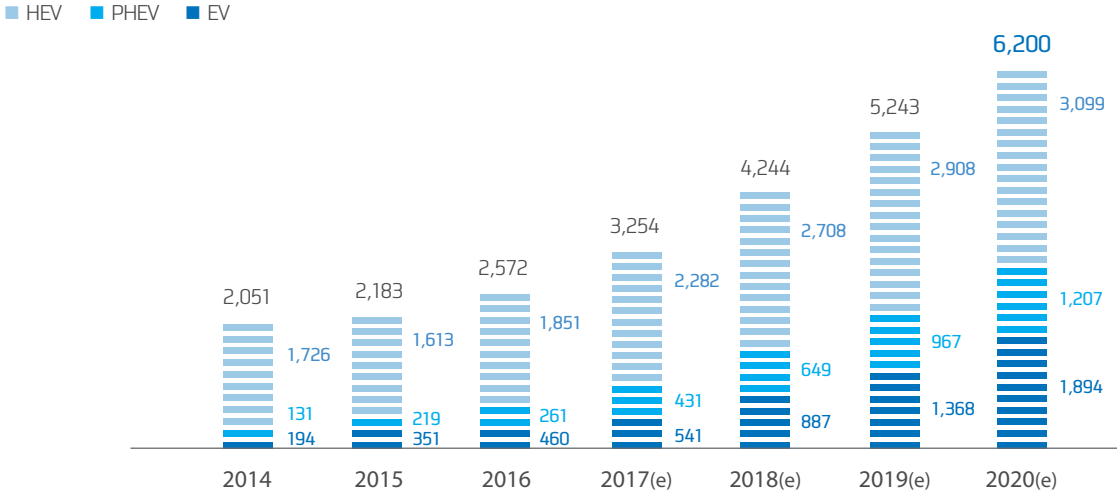
Samsung SDI's Automotive Battery division strives to build the foundation for future growth by accelerating its efforts to achieve higher efficiency (e.g. material cost innovation) and improving its management style that fits into the automobile industry. Although it faces undesirable circumstances in and out of Korea such as EV battery restrictions in China, we are on our way to achieving our management goal by seeking to be registered as a Best Practice company in China. Samsung SDI will become the leading company in lithium-ion battery by constantly investing in automotive batteries, and release automotive battery cells with the world's best energy density.

2017 Market Forecast

In 2017, EV market is expected to expand thanks to the increase in the sales of 300km-range models such as GM Bolt and Tesla Model 3. The PHEV market is projected to grow continuously following development and release of new models by global OEMs, including Audi Q8, Volvo XC40, and BMW 5 series. In the HEV market, we expect that different brands will split the market shares originally dominated by Toyota, as Toyota revealed their patent in addition to increasing sales of Nissan's Note that features e-Power HEV system and the new release of the Juke. In this context, the EV market in 2017 is expected to grow by 27% compared to 2016, selling a total of 3.25 million vehicles.

Electronic Vehicle Demand Forecast

(Unit: Thousands)



*Source: Report published by B3, a market researching firm

2017 Business Plans and Mid-term Strategy

Automotive Battery division will continue its innovative initiatives in development, production and quality competitiveness in order to respond to the market expansion. Samsung SDI is currently building a stable supply system to respond to customer demands, while improving sustainability of the business by strengthening strategic cooperation with the customers and discovering new customers. In addition, we will ensure our internal stability by improving profitability to build a strong foundation for future growth momentum.

High Material Issue 03

Forecasting changes in the future market and its response

ESS

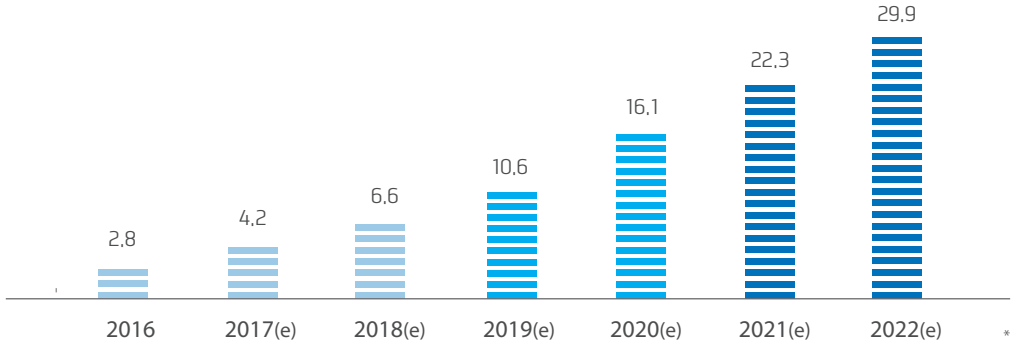
Samsung SDI's ESS business leads the changes of paradigm in the future energy industries with its globally recognized ESS technology. Samsung SDI is on several ESS projects in partnership with KEPCO and provides various solutions such as ESS for frequency regulation, voltage control and integration of renewable energy. In 2016, our cumulative installment capacity of ESS reached 1GWh and we strengthened our leading position in ESS business by winning the largest ESS order from California, USA.

2017 Market Forecast

ESS market in 2017 is expected to grow by 50% at 4.2GWh compared to the previous year. Developed countries like U.S., Europe and Japan are making progress in substantiation projects with supports from the government subsidies and realizing the economies of scale by mass production of lithium-ion batteries. Recently, the ESS sector is gaining competitive edges from high electricity rates and the reducing of feed in tariff (FIT). In addition, there are systemic efforts to encourage ESS by providing the governmental subsidies for linking ESS with renewable energy and to pass the legislation that obligates to install ESS. Therefore, the demands for ESS are expected to grow not only in the U.S. which is the largest ESS market in the world, but also in Europe led by Germany and Asia including Japan and Australia. In Korea, KEPCO is implementing ESS projects for frequency regulation, and T&D lines while the Korean government is promoting the ESS market by introducing systems such as obligation for the public institutes to install ESS and introduction of the tariff system to promote ESS. In this regard, the Korean ESS market is expected to grow.

LIB ESS Mid/Long-term Demand Forecast

(Unit: GWh)



* Source: Samsung SDI ESS Team

2017 Business Plans and Mid-term Strategy

In 2017, as subsidies of FIT(Feed In Tariff) for residential solar power are reduced or removed, self-consumption needs for energy will increase. Our ESS business will gradually increase its market share by expanding provision channels for ESS solutions for household. In addition, we customize our solutions to meet the demand from the growth of renewable energy market including wind and solar power and for the growing use of ESS from the major utility companies due to reduced battery prices and the national policies. In doing so, Samsung SDI plans to make long-term supply contracts with its key utility customers and to reach out to new strategic customers in order to maximize its existing market sales and secure its stable sales bases. We also plan to reinforce our business through strategic approaches to expand new business opportunities by replacing the lead storage battery with lithium-ion battery, which has lower installment areas and maintenance costs than those of lead storage battery. Samsung SDI plans to expand ESS solution business in North America and the European market where the market is growing with electricity rates and improved economic conditions while striving to increase in sales in Korea and China. We will firmly hold our position as the ESS market leader by launching its innovative technology and products. Especially, we aim to turn our business back to profitable operation based on the sales growth exceeding the market growth rate through our credibility and product quality recognized by the most installation cases.

Electronic Materials

Samsung SDI's electronic materials business is building the growth momentum by reinforcing our polarizing film and semiconductor business to respond the changes in technology and promote new material business. In 2016, we developed the world's best first polarizing film and PASTE production line at Samsung SDI Wuxi Co., Ltd. (SDIW) and established the foundation that will promote the future growth of electronic materials business. In the future, we aim to achieve global No.1 in PASTE business, normalize battery material business and strive to improve our capability in the electronic material business by expanding polarizing film business in China and developing new semiconductor products.

2017 Market Forecast

With the increase in demand for low-energy/high-performance/high-capacity semiconductor, the industry is expected to enter into the super cycle in 2017, especially as three-dimensional systems such as 3D NAND and TSV become prevalent.
As the focus of large LCD market moved to China, we are required to save costs and obtain differentiating technologies. However, as the smartphone market began to use OLED display, we expect to see more business opportunities in this sector in the future.

Electronic Material Demand Forecast

(Unit: KRW 100 million)

Category	2016	2017(e)	2018 (e)	2019 (e)	2020 (e)
Semiconductor Materials	31,080	31,530	31,987	32,484	33,280
Display Materials	116,294	117,899	117,254	116,282	114,916
PV Materials	9,860	10,640	11,760	12,410	13,190
Battery Materials	12,125	14,438	18,523	21,703	26,062
Total	169,359	174,507	179,524	182,879	187,448

* Source: Samsung SDI Electronic Material Management Support Team

2017 Business Plans and Mid-term Strategy

Electronic materials business plans to gain the market dominance by pre-emptively developing the materials that outperform competitors', focusing on the growing market such as OLED, 3D, NAND and high-efficiency solar battery. Especially, we plan to secure technology leadership and release differentiating products by making strategic partnerships and cooperation with the partners in our value chains including raw material, facility and the customers. On the other hand, Samsung SDI will step up to become the global leading electronic materials company by reinforcing technological competence, local supply system and operation, and T/S(Technical Service).

High Material Issue 04

Compliance with laws and global anti-corruption principles

Recognizing risk management and prevention on compliance/business ethics are critical tasks, Samsung SDI complies with the regulations in the countries where we operate, and continuously promote relevant activities. Especially in 2016, there are increasing interests and expectations on transparent management from stakeholders with the implementation of 'Improper Solicitation and Graft Act' (also known as anti-graft law). In this regard, Samsung SDI implemented various activities to pre-emptively respond to changing legal risks in domestic and overseas and to spread voluntary compliance culture.

Organization Operation

Samsung SDI runs a Legal Compliance & IP Team that is fully responsible for compliance and ethical management. Each division appoints a compliance practice leader and manager to implement voluntary compliance culture. In 2016, we hosted a session for compliance managers to share recent compliance issues and the relevant work plans and rewarded compliance practice managers who showed the best compliance performance at the end of the year. In addition, the employees who contributed to the settlement of compliance culture domestic and overseas received the CEO award to re-emphasize the importance of compliance and business ethics. For overseas corporations, we established the compliance operating system for new corporations in 2016 and also encourage the existing corporations to continue their compliance management activities by conducting self-compliance assignments.

Training and Inspection

Compliance Training

In 2016, Samsung SDI implemented training across ranks and with different themes to build compliance awareness among the employees. Compliance trainings for the entire employees take into account opinions from the employees and division characteristics to provide customized and selective training for higher efficiency. In addition, we improved the training process, the quality of trainers and materials, reflecting the surveys from our employees to enhance the training satisfaction. In 2016, Samsung SDI carried out consortium trainings for the employees at its 57 partner companies to support trainings related to compliance management, anti-corruption, mutual growth, trade secret, contract, personal information, and patent. In 2017, we will review the existing training system and the materials to reorganize and discover recent issues and relevant case studies to bring more interests and attentions to the employees to maximize the training effectiveness.

Compliance Inspection

Samsung SDI identified major compliance risks based on the laws and regulations relevant to us and conducted regular checks on departments exposed to high risks including sales, purchases and development departments. We conducted additional on-site checks, if necessary, and identified improvement aspects for application and established a strong inspection system that issues warning notes ordered by the head of compliance support team, targeting employees violating internal rules. If we identify that our overseas corporations face problems with global standards or regulations which might affect them such as U.S. federal trade secret act and the European personal information protection, we immediately share the risks with them and carry out local trainings and checks.

Anti-Corruption

Samsung SDI evaluated compliance risks and inspected high-risk departments that directly interact with the customers and checked their expense statements that come from external contacts. As a result, we confirmed that there was a no material risk with no exceptions. In addition, we audited the companies in our supply chain and the departments that interact with the customers for their sales performance, recruiting process and product and material managements. We took strict actions on internal violation cases. In 2016, we penalized a total of 42 people as a result of anti-corruption audits and there were no partner companies involved with violation.

Audit Report

Samsung SDI is receiving reports on unfair demands from using one's position and corruption cases via e-mail, phone, and fax at all times. The report types are the violations of laws and its Code of Ethics. In addition, in case of reporting on social and environmental issues in which various stakeholders have interests such as human rights, labor, local communities, and supply chain, the relevant department is required to deal with these issues according to matters. There were no violation cases received in 2016 on human rights, local community, environmental impacts and labor practices.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Target: 16.3

BUSINESS CASE

Response to the Anti-Graft Act

Samsung SDI conducted various activities to make pre-emptive responses to the anti-graft law implemented in September 2016. We conducted special online trainings not only for the entire employees, but also for department heads, expat workers at overseas corporation and the local experts. In addition, we implemented activities to prevent risks associated with the anti-graft law and help our employees to fully understand the law by offering sessions inviting special instructors, building the guideline for the employees and company-wide promotions and receiving continuous advice. In 2017, we will reorganize the guideline to comply based on updates of the law, provide additional trainings based on feedback received in the past trainings and reinforce checks on the departments that interact with the customers.

Major lawsuit progress

There have been investigations on violating the competition law for colluding on fixing the price for CRT in U.S., EU, Japan and Korea. We paid a penalty in some countries such as Korea, U.S. and Europe to close the case. However, Samsung SDI appealed in Japan, which is currently in progress, and whether Samsung SDI violated the relevant laws will be announced depending on the final verdict. In addition, there have been investigations on violating the competition law for colluding on fixing the price for secondary batteries in U.S. and Europe, which were closed in December 2016. We were not imposed with any penalty or sanction for violating the laws and regulations in those countries.

Compliance with laws and global anti-corruption principles

Input

Human Capital

Compliance, Ethics Training		Unit	2014	2015	2016
Samsung SDI	Corruption Prevention*	Persons	24,060	18,028	17,438
	Ethics*	Persons	19,985	6,971	4,715
Supply Chain	Ethics	Company	70	72	57

* Accumulated person-years

Intellectual Capital

Compliance Inspection	Unit	2015	2016
Theme inspection	Case	2	5
Self-inspection on system	Case	1	1
On-site inspection	Case	13	4
Subcontractor inspection	Case	6	2
Internal transaction inspection	Case	-	1
Overseas corporation inspection	Case	-	2
Legal review on major meetings	Case	97	31
Total	Case	119	46

Output

Human Capital

Penalty	Unit	2014	2015	2016
Punishment from anti-corruption audit	Persons	77	43	42
Partners terminated the contract for corruption involvement	Company	9	3	-

Social and Relationship Capital

Manufacture Capital

Business site corruption risk evaluation	Unit	2015	2016
Total business site No.	EA	30	30
No. of business sites with corruption risk	EA	19	4
Percentage of business site with corruption risk	%	63	13

High Material Issue 05

Building up workplace safety

Samsung SDI strives to manage safety & health and hazardous materials so that our employees can work at safe and healthy work places. In 2016, our executives claimed that 'safety is the first principle in the management' and we worked hard to build safety centered cultures at our work places in domestic and overseas as well as in our supply chian. In addition, we offered continuous trainings and promoted safety cultures to help the employees become aware of the safety in their daily operations and better comply with the laws.

In 2015, Samsung SDI implemented special activities on each component that comprise of safety culture for further improvements after an evaluation of safety culture level for the first time. In 2016, we improved our safety culture level to 'Proactive level' where employees voluntarily participate in safety activities.

Safety Improvement Activity

Samsung SDI holds a monthly safety environment meeting led by business division heads and a bi-monthly meeting hosted by the CEO to check on safety issues that can occur on-site and to take proper actions. In addition, the heads of business divisions and work-sites, and executives of research and staff lead 'My-Area Inspection' following the CEO's on-site inspections, to monitor risk factors at work-sites on a regular basis and to improve communication with employees.

Emergency response training and safety activity

Samsung SDI established emergency scenarios such as explosions, chemical leakage, disasters and accidents in the closed places and implemented emergency response trainings and safety activities every quarter to help our employee better respond to those situations.

Improvement Goal for Safety Culture

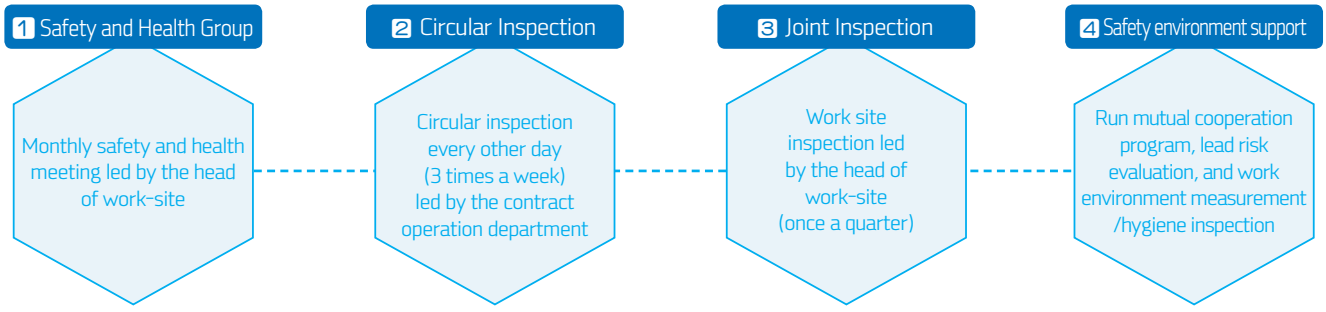
Stage	Goal	Definition
Creative	After 2019	Every member encourages one another and develop oneself to further advance the safety environment.
Proactive	At 2016 level	Every employee voluntarily and actively participates in safety environment activities
Calculative	Achieved in 2015	Safety environment management system is introduced and internalized
Reactive		Reactive compliance of the minimum requirements (e.g. law) and make responses after the incident
Ignorant		The safety environment management is not in place at all.

For in-house partner companies, we check their safety levels and support safety related activities considering them as candidates which should have the same safety level as Samsung SDI has, and periodically evaluate the safety management level to reflect the evaluation in new contracts or contract extension.

Risk assessment activities

Samsung SDI assesses the risks in order to build safe workplace even for daily operations. Employees must check their protection kits before entering the laboratory and fill out safety work permission sheet before working on-sites for risk managements. We also do pre-screenings on new facilities before they are installed in addition to the risk assessments. In this way, Samsung SDI is removing fundamental risk factors through a habit of risk assessment at company-wide levels.

Safety management and inspection process for in-house partner companies



Target: 3.9 Target: 12.4

BUSINESS CASE

Improve safety management monitoring and evaluation

Samsung SDI conducts intensive inspections including inspections across the work-sites, operation inspections and emergency system inspections. Especially, each work site has its own safety inspection systems such as 'daily inspection' and 'tsunami inspection' while Samsung SDI strives to improve its safety measures by applying 'My Area Inspection' to every employee and setting every 4th of the month as the 'safety inspection day'. In addition, we put more emphasis on the safety environment for employee's MBO as a part of performance review. Beginning in 2016, we evaluated safety responsibility at work sites to consider it into performance review. We also intensified reward/penalty regulations on safety environment and impose stricter preventive or disaster penalties to those who violated the core safety conducts and rewarded excellent safety environment cases with the CEO year-end bonus.

Regular inspection
- cross inspection between the work sites
- operating audit
- emergency system inspection

Special inspection
- daily inspection
- tsunami inspection
- my area inspection
- safety inspection day (on every 4th of the month)

Safety Environment Reward Status

Classification		Awarder	Unit
Award Name	Candidate		
CEO Year-end Reward	Entire work sites/departments	CEO	Grand prize, gold, silver, bronze
Safety environment	Potential risk discovery	Team Manager of safety environment infrastructure	Individual
	Safety environment competition	Each work site	Department, Individual
	Immediate reward (at the time of occurrence)	Each work site	Department, Individual

Chemical Substance Management

G-EHS system establishment and operation

Samsung SDI has been pre-examining every chemical material via the G-EHS system since July 2016 in order to prevent potential accidents and improve our verification system on hazardous materials that may harm human body such as high toxic materials. We do not allow to purchase materials unapproved by the system to apply strict managements on chemical materials. This pre-examination process is only applicable to the Korean businesses, but we plan to further apply this procedure to overseas corporation beginning from March 2017.

Response to domestic laws

We are in process of registering "Phase-in substance(s) to registration" to "Act on Registration, Evaluation, etc. of Chemicals" by June 2018 and establishing a cooperation system among the relevant departments to be ready for the revisions in future.

In accordance with "Act on Liability for Environmental Damage and Relief Thereof", we are insured for reimbursing physical or property damages of the third parties due to environmental contamination accidents and built an immediate response system by being additionally insured for potential contamination accidents that may occur during transportations out of business sites.

High Material Issue 05

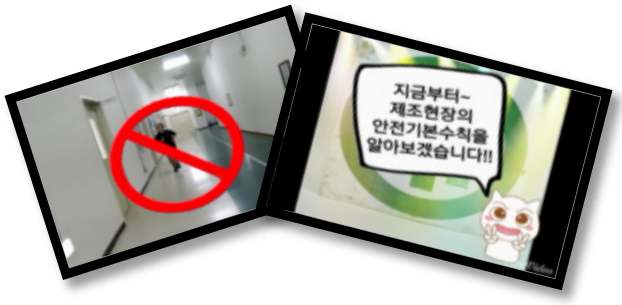
Building up workplace safety

Spread of Safety Culture

Samsung SDI hosts various events not only to build a structured safety system, but also the culture that encourages the employee's voluntary participations.

Safety Culture Campaign

We build a safety culture where employees communicate through active and voluntary participations such as SDI Talk (SDI intra-company community), club activities and safety competitions. In 2016, we held the third UCC and Slogan Contest for Safety and Accident Prevention where excellent works were selected for rewards.



Training experts on safety environment infrastructure

Samsung SDI fosters experts on safety environment infrastructures to enhance safety and health capacities at work places and to prevent and effectively respond to the risks. In 2016, we had a total of 492 experts and each of them completed 58 hours of training.

Regular Safety Training

We conducted safety trainings depending on ranks and types to identify risk factors for improvements. Safety trainings at business sites are composed of regular trainings, new-recruit trainings, and trainings on task changes and special safety and health trainings. We focus our employee trainings on "Occupational Safety and Health Act", general management items, accident preventions, and risks and moving lines of equipment and machines.

Safety Training Implementation Status

Training types	Trainees	Contents
Regular Training	Manufacturer Officer Supervisor	Occupational Safety and Health Act, general management and accident prevention etc.
New-recruit training	Manufacturer Daily worker	Occupational Safety and Health Act, general management and the pre-work checklist etc.
Training on task changes	Manufacturer Daily worker	The risks and work procedure of equipment and machine, and their moving lines etc.
Special safety and health training	Manufacturer Daily worker	Trainings for tasks exposed to three harmful risks including forklift and hoist

Standard, Procedure and Safety Regulations Compliance

We established the optimized standards and procedures to help employees at both Samsung SDI and our partner companies strictly comply with the safety regulations. At the manufacture division, we built a standard where the colleagues record the video of work performance to analyze and enhance the productivity. We secure the safety and quality by implementing work procedures in strict compliance with the standard work guideline.

Key Performance Index

KPI	2017 Target	2016 Target	2016 Performance	Achievement Level
Zero Safety Incidents	0	0	0.40	Not achieved

* Employee injury rate (Number of accidents / Total work hours×1,000,000)

Building up workplace safety

Input

Manufacture Capital

Safety Environment Investment	Unit	2015	2016
Safety Environment Investment Cost	KRW 100 million	56	230.5

Human Capital

Safety Environment HR Training	Unit	2014	2015	2016
Safety Environment Infra Special HR	Persons	515	552	492
Safety Environment Infra Special Training	Hour	24,710	27,924	28,537
Training Hour	Hour	48	51	58

Intellectual Capital

Safety Environment Inspection	Unit	2016
CEO Inspection	Case	8
CEO Meeting	Case	4

Intellectual Capital

Safety Environment Audit	Unit	2016
Korea	Case	1,314
Overseas	Case	793

Output

Human Capital

(Number of accidents / Total work hour x 1,000,000)

Employee's rate of injury	2014	2015	2016
Company-wide	0.34	0.47	0.40
Domestic	0.22	0.32	0.33
Overseas (excl. Austria site)	0.52	0.64	0.47

Human Capital

(Days of loss / Total work hour x 1,000,000)

Employee's rate of loss	2014	2015	2016
Company-wide	17.19	13.09	26.89
Domestic	21.13	15.15	28.45
Overseas (excl. Austria site)	11.55	10.63	25.23

High Material Issue 06

Enhancement of R&D Capability

The slowdown in the global economy coupled with the growing protectionism require more competitive products and services. Samsung SDI strives to better satisfy our customers by developing new technologies and innovations to obtain the future growth momentums in its battery business.

Organization Operation

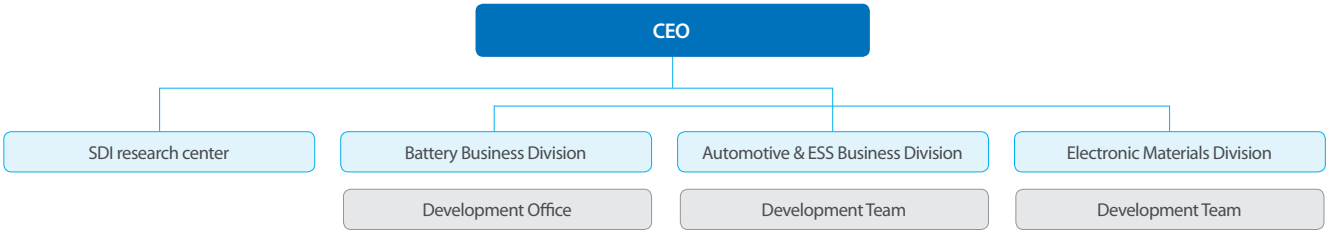
Samsung SDI runs a research center under the direct supervision of the CEO to improve efficiency of the research organization and to build the foundations for improved performances. In addition, development teams at each business division are doing research and development for 'Battery Business', 'Automotive and ESS' and 'Electronic Materials Business' sharing the same vision of procuring the top materials and enhancing the product competitiveness.

The 24% of its employees are assigned to research and development and we support them to exert their best abilities.

Open Innovation

Samsung SDI expands industrial-academic cooperation to obtain the next-generation battery technologies and increase the base for battery research. In 2016, we concluded industrial-academic cooperation programs with four universities in Korea to contribute to active exchanges between universities and the industry. We expect that these programs will converge excellent research capability of the universities and Samsung SDI's experience and technologies to provide opportunities to develop innovative battery technologies in addition to training superior talents.

R&D Organization Map



Patent Competitiveness

Supporting SDI research center and individual business departments in the field of patent business to reinforce the company's intellectual property competency and pioneering next-generation business areas.
As of 2016, the company has 4,273 patents in Korea, and 7,613 patents in major overseas markets such as the United States, China, Japan, etc and patent portfolio optimization is conducted through evaluating the patent which reflects technical trends. Samsung SDI strives to secure R&D competencies through filling,registering and maintaining the patents and to protect and achieve mutual growths with partner companies by co-ownership of patents.
Especially, we have various patent compensation systems for promotion and focus on obtaining excellent patents with these systems.

Major R&D Performance

Major R&D Performance	Research Performance and Estimated Impacts
Developed gap-filling tape for protection of electrode assembly of cylindrical secondary batteries	Improved vibration resistance by fixing and protecting internal components of batteries (jelly roll)
Developed the cylindrical case for xEV lithium-ion batteries	Developed cases specialized for EV batteries to improve K52 safety and reliability
Developed high-luminance CR	Maintained the existing market share by developing products with better luminance
Developed high efficiency electrode paste	Secured sales increase base by developing high efficiency electrode paste
Developed the next-generation polarizing films	Expanded product portfolio by developing polarizing films applicable to new display products
Developed OLED deposition materials	Entered new markets by developing high efficiency and long-lasting deposition materials
Developed slurry for semiconductors	Increased market share by developing new products
Developed EMC for semiconductors	Increased market share by developing EMC which has superior void characteristics

BUSINESS CASE

Automotive Batteries

The battery industry is expected to grow at the high rate as the electric vehicle market started to expand. Samsung SDI developed PHEV cell/module for European OEM in 2016 and will begin mass production in 2017. In addition, we are developing batteries for a number of electric vehicles with other global major OEMs, leading the expansion of eco-friendly electric vehicle market for the future.

Electronic Materials

'OLED' is the hottest topic in the recent display industry. As the global smartphone manufacturers including Samsung Electronics and Apple announced to adopt OLED display for their devices, the market is expected to grow further. Samsung SDI successfully developed phosphorescence Green Host, OLED luminescent material, in 2014 and advanced materials, which have high efficiency and drive voltages, in 2016 to contribute to realizing eco-friendly/low-energy smartphones.

Enhancement of R&D Capability

Input

Financial Capital

R&D Investment	Unit	2014	2015	2016
Investment	KRW 100 million	6,205	5,389	5,525
Investment / Revenue	%	7.4	10.9	10.6

Human Capital

Training R&D Resources	Unit	2016
R&D staff	Persons	2,174
R&D staff / Total employee	%	24
R&D training course	EA	374
R&D training cost	KRW million	224

Output

Intellectual Capital

Patent Registration	Unit	2014	2015	2016
Korea	Case	6,339	4,770	4,273
U.S.	Case	2,630	2,044	2,702
China	Case	1,578	1,380	1,392
Japan	Case	1,533	1,307	1,127
Europe	Case	2,147	735	1,812
Other	Case	441	498	580
Total	Case	14,668	10,734	11,886

High Material Issue 07

Sustainable Supply Chain Support and Management

Samsung SDI's main supply chain is a partner company that supplies raw materials for products and is defined as a supplier of battery raw materials such as electrode plates, assembled materials, and PACK materials, and a supplier of raw materials of electronic materials such as SILICA. Samsung SDI strives to enhance the market competitiveness by pursuing mutual growth and cooperation with the partner companies. In 2016, we concluded mutual growth agreements with 250 1st/2nd tier suppliers and offer support and cooperation programs in finance, education, technology, new market opening and performance sharing to live by our mutual growth value 'we can go farther when we go together'.

Vision and Promotion System

Samsung SDI is promoting three major strategies, including support for 'supporting for competence', 'enhancing cooperation for future technology' and 'establishing fair trade' in all transactions, all aimed at realizing mutual growth through securing competitiveness.
Samsung SDI is operating the Win-Win Cooperation Group as part of the Strategic Sales Team under the Corporate Management Office to systematically promote strategies and tasks for mutual growth. The Win-Win Cooperation Group supports partner companies in terms of finance, technology and training for the supplier's better competence and conducts fair trade inspection activities.

Supporting partner companies to secure competencies

Aspects	Program
Enhancement of overall competency	Operation of cooperative projects and innovation guidance
Expansion of supports for win-win cooperation	Financial support, fair trade, technical support and protection, etc
Expansion of activities for mutual growth	Agreements, education, recruitment support, other direct/indirect supports (measuring instrument calibration support, etc)
Market support	Purchase conference, product exhibition, overseas B/M etc.
Secure manufacture competency	Innovation guidance and cooperation projects (public-private R&D, industry innovations etc)
Further supports to 2nd and 3rd tier suppliers	Industry innovation support, shared fund, Win-win payment system
Technical support and protection reinforcement	Government projects (Public-Private R&D, purchase condition, cost reduction etc), technology escrow, original trade secret certificate system etc.
Expansion of training experts	Adaptive counseling via recruiting supports and consulting agencies etc.
Vitalization of communications	Win-win portal, visiting partner companies and issuing co-prosperity news letters on a quarterly basis

Support for Securing Innovation Competence

Support for Competence Reinforcement Training

Samsung SDI is operating collective education through the Samsung SDI job training center for partner companies' employees to improve their job skills. In 2016, 727 employees were able to complete the collective educational program and 138 employees completed their job training through Credu, an online training system. In addition, we offer the partner companies support for their recruiting process through providing partner companies' new employees with the collective trainings.

Support for Productivity Innovation

Samsung SDI dispatches its advisors to the partner companies to offer advisory services for productivity innovations. Through IBK Management Consulting, SDI provides professional consulting in areas such as management and finance. Aside from these efforts, Samsung SDI participates in projects promoted by the government, such as industry innovation movement, smart plants and invests KRW 600 million per year in 30 secondary/tertiary partner companies' innovation activities.

Support for Creating Domestic/Overseas Sales Channels

In order to help its partner companies to improve their performance, Samsung SDI supports the partner companies in the creation of domestic and international sales channels. We utilize the overseas corporation to provide expertise on the process required for overseas expansions while benchmarking international cases to help build local infrastructures. Furthermore, we inspect follow-up management, actual conditions and how product origins are managed. In addition, Samsung SDI helps the partner companies participate in purchase conferences hosted by the government or by Samsung SDI to give them opportunities for the increase in sales.

Financial Support

Payment and Funding Support

Samsung SDI oversees payment and funding support to build financial soundness and stable management of partner companies. The payment condition of the company, in relation to due payment, is that the company would pay 100% in cash within 10 days of cutoff which occurs 3 times every month. For completed payments before holidays, the company pays earlier than the cutoff. In terms of funding support, SDI provides direct support, with no-interest fund loans, combined support, such as a shared cooperation fund which is initiated together with financial institutions. It also provides indirect support, such as network loans and family loans, and special support such as Industry Innovation Movement, private/public R&D, and the achievement sharing system.

8 DECENT WORK AND ECONOMIC GROWTH

Target: 8.3

Win-Win Payment System

Samsung SDI introduced the Win-Win payment system in November 2015, and has been operating the system ever since. Through this system, the company allows secondary and tertiary partner companies to convert bonds issued from Samsung SDI into cash at commercial banks with the same fee level as that of large companies. In 2016, 26 partner companies participated and we plan to expand the scale.

Enhancement of R&D Cooperation

Technology Support and Protection

Samsung SDI participates in Public-Private Investment Programs for Technology Development projects to support its partner companies with R&D costs for new product and technology up to KRW 1 billion. Likewise, the company is operating 'Tasks with Conditions of Purchase' which supports the partner companies with new development assignment fees, under the premise that Samsung SDI would purchase their products. By operating a technology escrow system the company provides a place for partner companies to store their technologies safely when engaging in cooperation between large companies and SMEs, and protects the partner company's rights if any technology leakages occur. In 2016, Samsung SDI introduced the original trade secret certificate system to protect technical and management information of the partner companies and supports the information registration costs.

Achievement Sharing System

Achievement sharing system is an institution where commissioning companies share results of development of new technologies, improvement of the process and quality, with commissioned companies under a pre-agreement. Since the introduction of this system in 2012, Samsung SDI has been doing 30 projects. In case of company A, the company was able to develop the secondary manufacture technology that is highly efficient and automated, which gave us a differentiated competitive edge against its competitors. This resulted in a better yield and process, and improvement of manufacture capabilities while reducing costs.

S-Partner system

Assessment Process

All Samsung SDI partner companies in contractual relationships are subject to self-initiated diagnoses and due diligence by Samsung SDI at least once every two years. The evaluation criteria includes labor, environment, health and safety, ethics, compliance management, and management system, which are the five major areas of the EICC Check sheet. Evaluations are conducted through self-diagnosis of partner companies and due diligence by consultants assigned by Samsung SDI, whereas the S-Partner certificate is issued for companies which score over 80 points as a result of due diligence. If a partner company receives "A" class two or more times, it will be designated as an S-partner and granted autonomous management. Pollution emissions, legal violations, uncontracted personnel under labor contract, child labor (applicable to national legislation) are set as issues related to mandatory requirements, and partner companies that violate these standards are to be considered for suspension of trade.

BUSINESS CASE

Samsung SDI Shared Growth Day

Samsung SDI held 'the 2016 Shared Growth Day' at the North Chamber of Commerce in the Chungcheong South Province in November 2016. In this day, a total of 150 people, including CEOs of its partner companies and stakeholders of the Shared Growth Committee participated in the event. The Shared Growth Day, as a representative communication channel to communicate with partner companies, is a platform where the performance of Samsung SDI's shared growth in the last year and a plan for the next year are shared. In this event, Samsung SDI's three key strategies of shared growth such as 'supporting for competence' by reinforcing innovation guidance for all areas of management, 'enhancing cooperation for future technology' by vitalizing cooperative projects and training specialists, and 'establishing fair trade' to support shared growth were presented. In addition, the best practice of innovation from partners companies in 2016 including Korea Innotech and Shinheung SEC were shared to seize more opportunities to develop cooperative business models. Moreover, while managers of purchasing divisions and shared growth divisions from the Samsung's 10 affiliates including Samsung Electronics, Samsung Electro-Mechanics participated in the event, partner companies were able to promote their brands and pioneer the market by exhibiting their products. Samsung SDI will be dedicated to promoting shared growth with its partner companies in the future, too.

High Material Issue 07

Sustainable Supply Chain Support and Management

Operation Status and Aspects for Improvement in 2016

In 2016, Samsung SDI conducted assessments for 91 partner companies in Korea, China, Malaysia, and Vietnam (28 of them or 31% are new partner companies in 2016). According to assessment results, there were no violations of mandatory requirements, including child labor. In 2016, the company created education programs on labor contracts, environmental law registration, ethics, and waste storage and disposal, as a result of feedback from evaluations. Furthermore, SDI dispatched specialists on the environment, safety and health, and utility to partner companies.

Target and Evaluation Direction in 2017

In 2017, Samsung SDI plans to evaluate 100 domestic and international partner companies. Especially, we plan to strengthen our partner companies' compliance systems by providing support such as environment management training, CSR training, and standardization of inspection methods. Furthermore, we will reinforce the S-Partner Check Sheet by revising S-Partner Check Sheet items and create manuals for evaluation standards for each item. Finally, Samsung SDI plans to improve the system to issue result reports, plan of improvement, and certificates, and to develop the English version for convenience of the foreign users.

S-Partner certification process

① Prior review	② Training	③ Evaluation
• Global standard • Korean and international laws • Customer request etc.	• Compliance training • CSR training • Foreign partner companies training	• Self-assessment • On-site evaluation (External assessment agency) • Improvement plan establishment

Responsible Sourcing

There are increasing social attentions and concerns on responsible sourcing of raw materials that are used in our products such as minerals.
Samsung SDI strives to be socially responsible for every sourcing process of the raw materials used in our products from mining to processing and procurement.

Policy Improvement

In 2016, Samsung SDI revised the code of conducts and compliance agreement of the partner companies to reinforce our social responsibility on sourcing in order to meet the requests from various stakeholders, including our customers. The revision adds the ban on using minerals involved with the violation of human rights such as child labor, safety and health at work place on top of banning to use conflict minerals (tantalum, tin, gold and tungsten) in Democratic Republic of the Congo and its neighboring countries that was already stated in the previous version. It also expanded and specified the scope of responsible sourcing by explaining about on-site audit.

* The details of code of conducts and compliance agreement of the partner companies can be found at http://www.samsungsdi.com/sustainable-management/sustainability/supply-chain-responsibility.html

Policy for Conflict Minerals and Improvements

In order to ease concerns on procurement practices of conflict materials (tin, tantalum, tungsten, and gold) that are used in our products, Samsung SDI has developed relevant policies and tried to eradicate to use conflict materials since 2011. We conduct regular trainings to the partner companies and implemented the system that analyzes the customer requirements and findings for improvement in the partner company's web portal (SRM) and intranet (SMIS). We collect information on smelter and the place of origin and are updated on 3TG usage status from the partner companies through this system for verification and management.

Conflict Mineral Monitoring System

Goal	Ethical and Responsible Mineral Procurement		
Monitoring/ Improvement Process	Identify the products using 3TG	Research the partner companies that use 3TG (place of origin and smelter etc.)	Certified smelter
Management System	Establish a research system at the partner company's web portal and intranet (Conflict Minerals Reporting Template Online System)		

* 3TG : Tantalum, Tin, Tungsten, Gold

In 2016, we strived to increase the number of smelters that is CFS certified for those that supply four major minerals to the partner companies and plan to further increase them in future.

Response to Cobalt Issue

With the rise of issues related to cobalt purchased from artisanal and small-scale mining (ASM) of Democratic Republic of the Congo in 2016, many reports are to address child labor, safety and health issues at work sites and social/environmental issues that occurred during the mining and procurement process. Although cobalt is extensively used as cathode active material for the battery of mobile devices and electric vehicles, it has not been accounted for social responsibility risk of the supply chain as cobalt is not regulated by the Conflict Minerals Law.

In order to meet the requests from the stakeholders, including our customers, and to clarify social responsibility of cobalt supply chain, Samsung SDI established the strict principle on child labor, safety and health, and environment relevant to cobalt supply chain in 2016 and reflected this into the partner company's code of conducts. Samsung SDI requires the partner companies to identify every smelter and enhance the transparency in access to the documents and record in the revised code of conduct and compliance agreement by complying with OECD guideline. In addition, Samsung SDI visited seven 1st tier suppliers for cathode material and four cobalt precursor suppliers based on 'OECD/CCCMC guideline for responsible mineral supply chain' in order to capture the current status of cobalt supply chain and to secure the transparency.

In addition, we sponsored an external research organization for its fundamental research projects on copper mine regions of Democratic Republic of the Congo.

In November 2016, Responsible Cobalt Initiative (RCI) was established in order to improve the problems on social responsibility of the cobalt supply chain. Samsung SDI will show joint efforts to solve the cobalt issue by cooperating with upstream and downstream companies of the cobalt supply chain in RCI.

In June 2017, Samsung SDI issued 'Progressive Report for Responsible Cobalt Supply Chain' for the first time in the battery industry that describes our detailed actions on cobalt issues. With this, we expect to enhance the transparency of cobalt supply chains and improve cobalt issues based on feedbacks from the stakeholders.

* Samsung SDI's 'Progressive Report for Responsible Cobalt Supply Chain' can be found at http://www.samsungsdi.com/sustainable-manage ment/sustainability/supply-chain-responsibility.html

Key Performance Index

KPI	2017 Target	2016 Target	2016 Performance	Achievement Level
Financial support (KRW 100 million)	Continued Expansion	267	438	Achieved
Group and online training(Persons)	1,030	632	865	Achieved
S-partner certification achievement (Case)	100	100	91	Not achieved

OECD Guideline – 5 Step Framework

* Samsung SDI's policy on responsible cobalt supply chain was established in accordance with "OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas".

High Material Issue 07

Sustainable Supply Chain Support and Management

Sustainable Supply Chain Support and Management

Input

Social and Relationship Capital

Shared growth agreement	Unit	2014	2015	2016
Primary partner company	EA	75	140	112
Secondary partner company	EA	105	174	140
Purchase from companies with agreement	KRW 100 million	678	696	3,551

Financial Capital

Purchase cost	Unit	2014	2015	2016
Total purchase cost	KRW 100 million	30,366	29,634	37,751
Raw material purchase	KRW 100 million	26,094	24,990	28,590
Facility purchase	KRW 100 million	2,368	2,852	3,511
MRO purchase (incl. packaging material)	KRW 100 million	739	775	592
Subcontract cost	KRW 100 million	1,165	1,016	5,058
Local purchase of supplier	%	48	45	46

Financial Capital

Manufacture Capital

Human Capital

Intellectual Capital

Shared growth support activity	Unit	2014	2015	2016
Financial support				
- Direct support (Mold cost credit support)	KRW 100 million	135	126	156
- Hybrid support (co-prosperity fund amount)	KRW 100 million	270	270	270
- Special support (training etc)	KRW 100 million	5	15	12
Direct/indirect management support				
- Group training (partner company)	Persons (Company)	613(122)	320(102)	727(86)
- Online training (partner company)	Persons (Company)	267(20)	162(18)	138(9)
- Recruiting support	Persons	61	60	53
- Recruiting support	Company	13	13	6
- Innovation guidance	Company	-	13	10

Output

Intellectual Capital

Shared growth support achievement	Unit	2014	2015	2016
Technical support and protection achievement				
- Private-public joint investment development project	Case	6	3	1
- Conditional purchase (Localization task)	Case	-	1	1
- Original trade secret certificate system	Case	-	-	5
- Technical escrow system	Case	14	15	15
New market penetration support achievement				
- Purchase conference	Case	-	6	7
- Product exhibition for partner companies	Case	-	1	1
- Overseas benchmarking support	Case	-	2	2
- Overseas corporation investment authority info session	Case	-	1	1
- Support to participate in foreign technology exhibition	Case	-	1	2

Intellectual Capital

Human Capital

S-partner certification achievement	Unit	2014	2015	2016
Korea	Case	67	66	62
Overseas	Case	31	24	29
Total	Case	98	90	91
Unqualified partner company	EA	6	4	-

Manufacture Capital

Major violations by S-Partner	Unit	2016
Violations of child labor/forced labor	Case	-
Non-compliance of requirements under labor contract	Case	18
Inadequate contamination prevention and waste management	Case	35
Unsatisfactory equipment for workplace safety & health	Case	62

High Material Issue 08

Energy Reduction and Utilization of Renewable Energy

In 2016 World Economic Forum, the climate change issue was discussed as an event with the most significant impacts on society. Likewise, climate change has become a global agenda that affects national policies and the system. Korea has been striving to implement sustainable eco-friendly policies and voluntarily reduce GHG emissions such as the introduction of emission trading scheme in 2015. Samsung SDI has been managing the risks of climate change and reducing its impacts with the slogan of 'Lead the market with technology based on changes and innovations as an eco-friendly company'.

Energy Management

Samsung SDI, as an eco-friendly energy company, established its company-wide energy management guideline and implemented low carbon/energy management. In addition, we further require overseas corporations to obtain energy management system (ISO 50001) certificate that is currently implemented in Korea at their work sites to continuously improve energy and environmental management. Moreover, Samsung SDI considered to introduce green energy such as biomass steam and solar power to facilitate the introduction of renewable energy.

Energy Saving Activity

Enhanced energy management at worksites

As three energy management activities, Samsung SDI implemented segmentation of per-unit production cost indicators management of energy balance, and improvement of verification for reduction impacts. Since 2015, we have continuously implemented the improvement of energy management such as energy consulting from external experts.

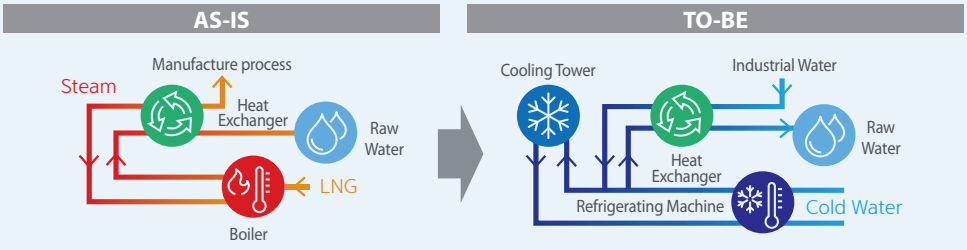
Integration and advancement of energy management system

For efficient energy management, Samsung SDI integrated Energy Management System (S-GEMS) to further reinforce energy saving activities, which had been dually managed by battery and electronic material divisions in July 2016. In doing so, its management system of energy use became more effective; for instance, real time monitoring for energy use performance became possible.

BUSINESS CASE

Installation of heat exchanger for heating industrial water

Samsung SDI historically used LNG boilers to heat industrial water required for its processes during the winter. However, we installed heat exchangers in January 2016 and utilized waste heat from cooling water as thermal energy to heat industrial water. With heated industrial water, reverse osmosis (RO) can be produced, which lead to the reduction of energy costs that were used to heat RO water. As a result, KRW 690 million was saved annually and this activity was considered as an environmentally innovative case for the reduction of wasted energy.



Targets: 7.1, 7.2 Target: 13.2

Response to Emission Trading Scheme

Samsung SDI was selected as an allocation target company for the emission Trading Scheme in 2015. In response, we revised the company-wide GHG management rules to establish MRV (Monitoring, Reporting, and Verification) carbon management system. In 2016, we conducted internal audit trainings for GHG managers at each worksite to improve monitoring and verification. In addition, we conducted internal audit for monitoring plan reports and specification through cross-examinations at each worksite in order to enhance mangers' capability who are responsible for relevant tasks and to improve the management levels of worksites. In 2017, Samsung SDI plans to set up and implement strategies to better manage GHG at overseas corporations such as Europe and China.

Response to Carbon Disclosure Project

CDP (Carbon Disclosure Project) is a non-profit organization, under the consignment of global financial investment institutes, which requests the management data about response to global environmental issues to major registered companies in each nation. In 2016, there was a transition of its evaluation system from a system based on companies' disclosure and achievement scores to a system where companies are assessed between A- and D- grading scale (disclosure (D, D-), recognition (C, C-), management (B, B-), and leadership (A, A-)). Samsung SDI was ranked A-, which is equivalent to top 25% among 1,839 companies that responded.

Energy reduction and utilization of renewable energy

Input

Financial Capital

Energy saving investment and activity	Unit	2014	2015	2016
Total investment	KRW million	1,310	12,360	2,312
Fuel saving	Case	148	167	129
Power saving	Case	1,021	869	513

Natural Capital

Energy use	Unit	2014	2015	2016
Total	TJ	13,683	11,609	12,876
Domestic	TJ	10,247	7,612	8,033
Overseas	TJ	3,436	3,997	4,843
Intensity	TJ/KRW 100 million	0.24	0.23	0.24

Output

Natural Capital

GHG Emissions		Unit	2014	2015	2016
Direct/indirect emissions	Total emissions	tCO_2e	731,089	646,292	747,926
	Direct emissions	tCO_2e	84,830	92,964	99,847
	Indirect emissions	tCO_2e	646,259	553,328	648,080
	Intensity	tCO_2e /KRW 100 million	12.88	13.04	13.74
Other emissions	Business trip	tCO_2e	1,925	2,155	2,184
	Product transportation	tCO_2e	549	1,395	768
Per product	Small-sized Li-ion battery	tCO_2e	457,183	383,760	427,735
	Automotive & ESS battery	tCO_2e		145,618	178,479
	Electronic materials	tCO_2e	71,708	88,630	110,924
	R&D and others*	tCO_2e	202,198	28,284	30,788

* Including PDP business amounting to 163,639 in 2014

Natural Capital

Energy savings activity		Unit	2015	2016
Saved amount	Fuel	tCO_2e	3,694	9,837
	Electricity	tCO_2e	32,648	43,597
Reduced amount (Effect)	Fuel	TJ(KRW 100 million)	73(17)	194(28)
	Electricity	TJ(KRW 100 million)	677(131)	899(109)