SAMSUNG SDI

SAMSUNG SDI

# CREATIVE ENERGY & MATERIALS SOLUTION LEADER

SAMSUNG SDI Sustainability Report 2018

# CREATIVE ENERGY & MATERIALS SOLUTION LEADER

We have published an annual sustainability report since 2003 to share with the stakeholders our efforts and achievements in creating social, environmental and economic values. Our 16th annual publication, “Samsung SDI Sustainability Report 2018,” focuses on our companywide efforts and achievements regarding the topics selected as core issues in the “Material Issue In 2018” based on the results of a materiality test.

# CONTENTS

# SAMSUNG SDI
# Sustainability Report 2018

## Reporting Period

This report covers Samsung SDI's sustainability activities and performances from January 1 through December 31, 2018. The report contains recent data for particular qualitative results. A time-series data for the past 3 fiscal years, 2016 to 2018, is provided to facilitate the understanding of quantitative results.

## Reporting Principles

This report describes our financial performance in accordance with the Core Options of the Global Reporting Initiative (GRI) Standards, the International Integrated Reporting Council (IIRC) framework, and Korean-International Financial Reporting Standards (K-IFRS).

## Reporting Scope

In this report, we have included all the efforts and achievements of our headquarters, production and sales corporations, research centers and offices at home and abroad. We have clarified any changes to the scope of this report with separate footnotes.

## Report Assurance

This report was verified by independent bodies including Samjong KPMG for financial information and DNV GL for other information.

## Inquiry

Planning Team, Samsung SDI
Tel. 031-8006-3100
E-mail. sustainability@samsung.com
www.samsungsdi.co.kr

# CEO MESSAGE

“To achieve sustainable growth, we must build a win-win business ecosystem with our diverse stakeholders based on robust mutual trust.

As a creative technology and market leader, Samsung SDI values communication with its stakeholders to continuously bring about change and innovation, achieve harmonious growth and move forward to greater goals.”

Dear stakeholders,

Thank you for your continued interest and support toward Samsung SDI.

Throughout 2018, all of our staff and executives joined forces as One Team to achieve remarkable growth. In the small-sized Li-ion battery business, we further enhanced market dominance by achieving higher sales in cylindrical batteries, the high capacity, high value-added products. Our automotive battery & ESS business embarked on a full-fledged sale of new EV batteries while winning a sizable order from a global OEM. Our electronic materials business showed steady growth thanks to our excellent performance in the semiconductor materials sector, increased sales in high value-added display materials and a boost in sales in the Greater China region.

Technology pioneers have spearheaded industrial development and changed our lives. In this age of hyper-connectivity, accelerated by the Fourth Industrial Revolution and artificial intelligence, technological competitiveness has become the key to corporate viability. Samsung SDI is therefore making every possible effort to secure our technological competence in order to preoccupy the rapidly changing market and once again play our role as a game changer in the industry. We will equip ourselves with innovative leadership in all key areas including development, manufacturing and sales to maintain our position as the market leader. Our employees will also be provided with full support in becoming experts with an innovative mindset to contribute to greater growth of the company. We will create an organizational culture that shuns unnecessary work practices and promotes values such as concentration and good execution.

Stakeholders today expect businesses to strike a balance between the creation of economic value and the fulfillment of social, environmental responsibilities. Samsung SDI began publishing the Sustainability Report in 2003 as proof of our commitment to sustainable management. Since then, we have put in our utmost efforts to fulfill our corporate social responsibilities. Samsung SDI will now take one more step forward to create business values that will positively influence the world and help people live a healthier life in a better society.

Sustainable growth can be achieved in a mutually beneficial business ecosystem based on the company's capabilities and the stakeholders' trust. In our desire to grow together with our partner companies, we will work tirelessly to create a virtuous cycle in the business ecosystem by supporting our partners in acquiring competitiveness, enhancing our fair trade process and collaborating in future technology areas. In addition to strictly complying with the laws and regulations of each country, we will pursue growth in harmony with the society by participating in global efforts to achieve the Sustainable Development Goals, including efficiently managing various sustainability issues and risk factors.

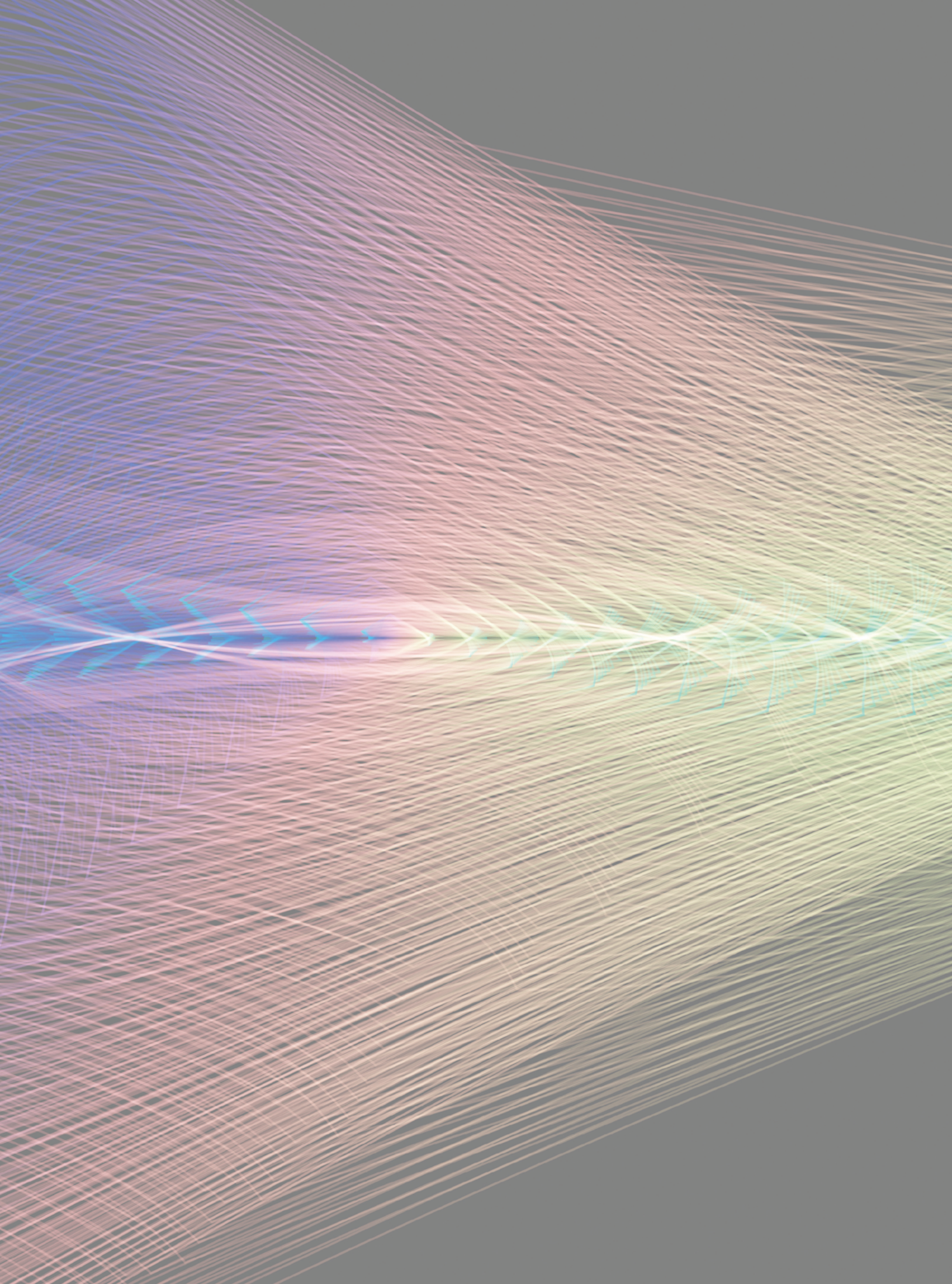
In 2019, Samsung SDI sets a new vision for our corporate social responsibility: "Move Forward Together - Enabling People." We will continue to support the education of youths to help them reach their highest potential.

Sustainable management is a long journey toward innovation and growth. Everyone at Samsung SDI will come together to advance the company into a better business entity. I hope to see your continued interest and support.

Jun Young-Hyun,

President and CEO of Samsung SDI

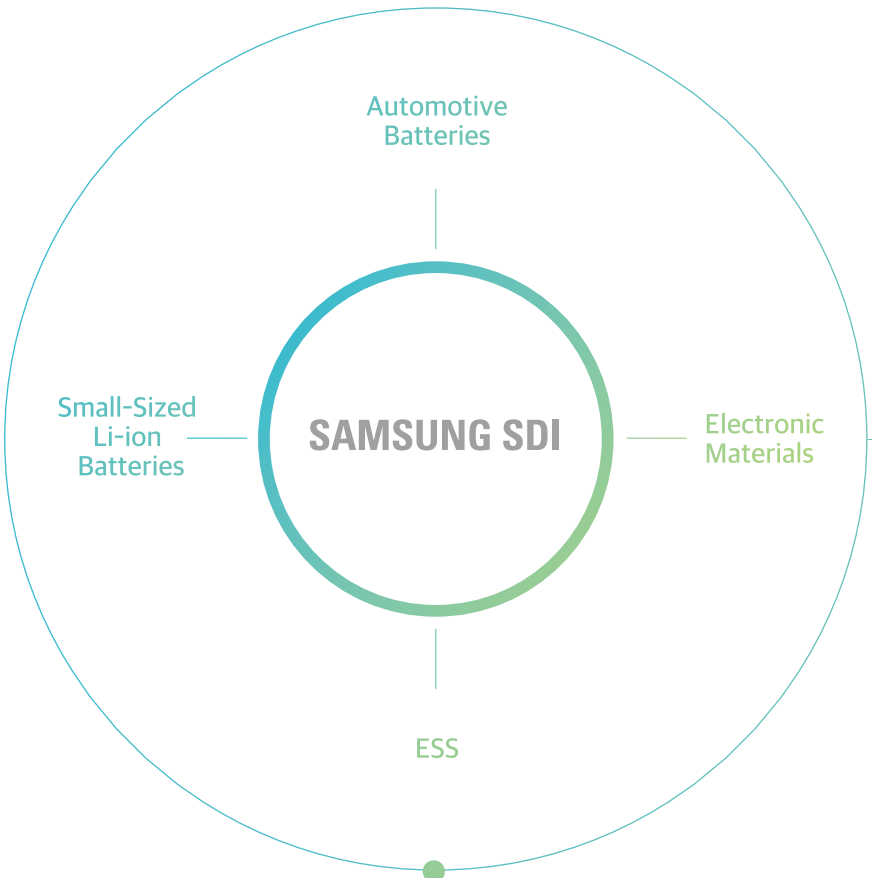
# OVERVIEW



# COMPANY PROFILE

## Current Company Status

Founded in 1970, Samsung SDI currently produces advanced materials for use in the IT and automotive industries, secondary batteries for ESS (energy storage systems), semiconductors, displays, and photovoltaics. Samsung SDI has its head office, research center and production facilities located in Korea. Overseas, Samsung SDI has production facilities and sales bases in North America, Europe, South America, China and Southeast Asia. Samsung SDI intends to lead the market as "a creative leader in energy and advanced materials" by concentrating on securing differentiated technologies with growing importance amid the rapid progress in artificial intelligence and autonomous vehicles among others. Most notably, for sustainable corporate growth, Samsung SDI pursues harmonious growth by seeking measures to realize its vision of social and environmental values while creating economic value as well.




**Creative Energy & Materials Solution Leader**

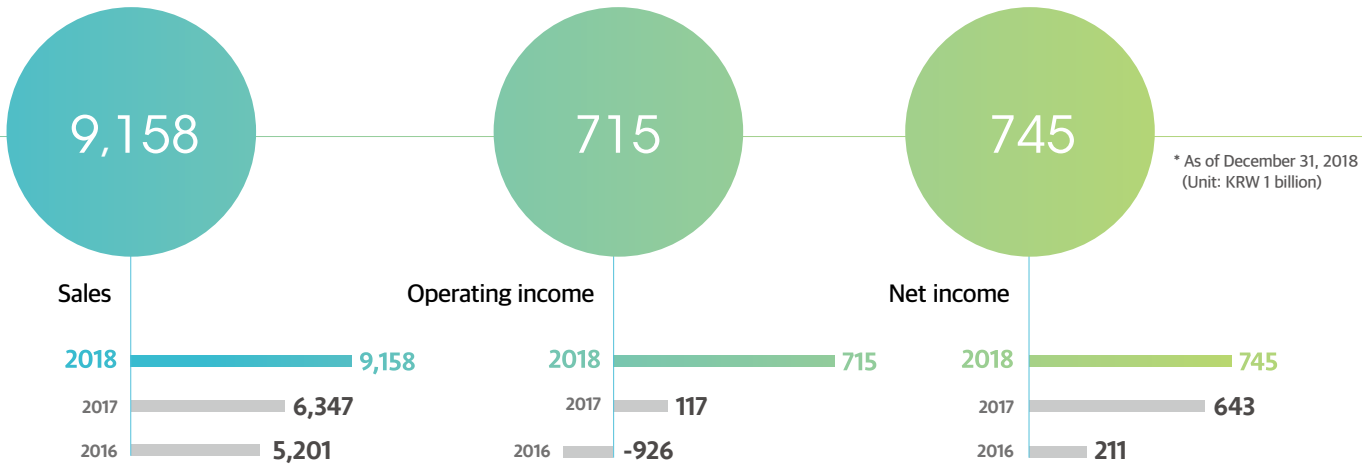
| | |
|---|---|
| Company name | SAMSUNG SDI CO., LTD. |
| CEO | Jun Young-Hyun |
| Foundation | January 1970 |
| Location of the head office | 150-20, Gongse-ro, Giheung-gu, Yongin-si, Gyeonggi-do |
| Major shareholders (with more than 5% of shares) | Samsung Electronics 13,462,673 shares (19.58%)<br>National Pension Service 8,147,452 shares (11.85%) |

* As of December 31, 2018


## GLOBAL NETWORK

Head office 1 ◆ Research center 1 ■ Production Facilities 13 ▲ Sales bases 12 Total 27 Strategic bases

* As of April, 2019

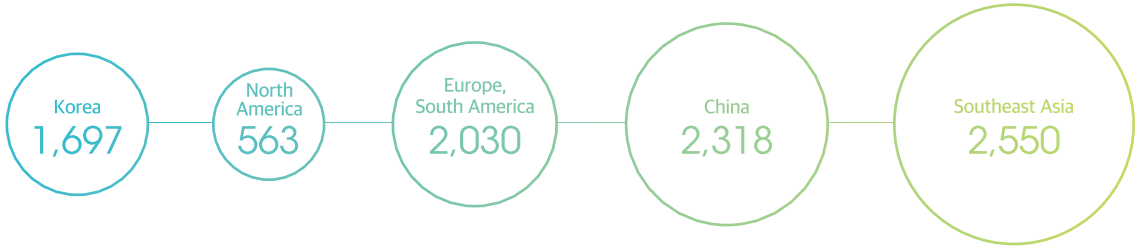



* As of December 31, 2018
(Unit: KRW 1 billion)

## Current Business Status

Samsung SDI consists of an energy solution business that manufactures and sells small-sized Li-ion and medium-to-large-sized batteries and an electronic materials business that produces and sells materials for semiconductors and displays. Despite the difficult business environment in Korea, the company grew in both sales and operating income in 2018.

Revenue by region
(Unit: KRW 1 billion)



# BUSINESS MODEL

## Creative Energy & Materials Solution Leader

Samsung SDI's business model is a process aimed at creating values for all resources and relationships. It strives to realize long-term values through effective management of all resources and relationships on the basis of its core values - Excellence, Customer and Innovation.

## INPUT

### Financial Capital

| | |
|---|---|
| Listed on Korea Stock Exchange in 1979 | |
| No. of issued stocks (Common) | **68,764,530** |
| Cash dividends | **10.1%** |
| Procurement of financial capital from shareholders and investors | |
| Disclosure of business status including general meetings of shareholders | |

### Intellectual Capital

| | |
|---|---|
| Intangible assets | **866.3** billion KRW |
| R&D investment (percentage of revenue) | **604** billion KRW(6.6%) |
| R&D staff (percentage of total employees) | Domestic **2,260** persons(22.2%)<br>Overseas **375** persons(2.6%) |

### Social and Relational Capital

| | |
|---|---|
| Operation of a total of 27 strongholds | |
| Engagement with local community and implementation of social contribution activities through Green Planet Environment School, as well as donation of eyesight recovery surgeries | |
| Investment in social contribution activities | **5** billion KRW |

### Manufacturing Capital

| | |
|---|---|
| Production facilities | **13** |
| Production capacity | Small-sized Li-ion batteries **1,617** million KRW<br>EMC **9,399** Tons<br>Polaroid film **91.16** million ㎡ |
| Tangible assets | **4.61** trillion KRW |

### Human Capital

| | |
|---|---|
| Total number of employees | **24,718** |
| Executive directors / Non-executive directors | **3 / 4** |
| New recruits | **8,188** |
| Education and training expenditures | **9.7** billion KRW |

### Natural Capital

| | |
|---|---|
| ISO 14001 certification | |
| Energy reduction investment costs | **1.84** billion KRW |
| Energy consumption | **18,947** TJ |

## VALUE CHAIN

We run a preliminary product development system to launch competitive, differentiated products ahead of others while implementing systematic management of project development and product information.

- Research and development of safe products (1) (2)
- Development of eco-friendly batteries

**Research and development**

We operate a reasonable procurement process based on an on-time procurement system and strive to strengthen our fair and transparent win-win partnership with suppliers.

- Establishment of mutual growth with partner companies (6)
- Fair and transparent management of contracts and operation
- Conflict mineral management and recycling

**Purchasing**

**VALUE**

We strive to secure cost competitiveness by optimizing global resource operations and operating a plan-based production system, while making improvements toward environmentally harmless production processes that are safe for humans.

- Improvement of environmental efficiency (3) (4)
- Management of workplace safety
- Increased profitability through cost management

**Manufacturing**

We strive to strengthen the visibility of our logistics to make improvements in terms of lead time, costs and operation risks.

- Eco-friendly transport (4)

**Distribution**

### Sustainability Management Issues

1. Securing Future Growth Engines
2. Securing Product Quality and Safety
3. Promotion of a Safe Workplace Culture
4. Climate Change Response

To attain sustainable value creation, we manage major business elements as material sustainability management issues and present the impact of each type of capital in our performance results.

## CHAIN

### Business management

We devise and implement plans to effectively manage our internal resources in various areas such as finance, personnel, environment, organizational culture, social contributions, and compliance.

5 7 8

- Organizational culture management
- Risk management
- Legal compliance/ethical management
- Commitment to social contributions

### Marketing

We analyze market trends, plan new products that meet market needs and carry out business-opportunity-management activities tailored to our potential customers.

2

- Operation of customer feedback response processes
- Implementation of customer satisfaction surveys

### Service

We offer on-site preventive maintenance and repair services at our customers' sites to deal with any of their quality issues immediately.

2

- Establishment and implementation of a customer satisfaction management system

### Sales

We continue to enhance collaboration with our customers for demand planning based on actual customers' demand data and product delivery at their desired time.

1

- Establishment of global sales networks

5 Human Resource Management

6 Sustainable Supply Chain Management

7 Legal Compliance/ Ethical Management

8 Social Contributions

## OUTPUT

### Financial Capital

| | | |
|---|---|---|
| Revenue | Energy Solutions | **6.9542** trillion KRW |
| | Electronic Materials | **2.2041** trillion KRW |
| Net income | | **745** billion KRW |

1

### Intellectual Capital

| | |
|---|---|
| Establishment and approval of strategic directions for each business division | |
| Registered patents | **14,384** |

1

### Social and Relational Capital

| | |
|---|---|
| Corporate taxes | **291.2** billion KRW |
| Partners whose contracts were terminated due to irregularities | **0** partners |
| Beneficiaries of free eyesight restoration surgery | **228,563** (cumulative) |
| Beneficiaries of Green Planet Environment School | **26,210** (cumulative) |

7 8

### Manufacturing Capital

| | | |
|---|---|---|
| Main production output | Small-Sized Li-ion Batteries | **1.514** million |
| | EMC | **6,341** Tons |
| | Polarizer Film | **84,874,000** m² |
| S-partner certification | | **91** companies |
| Total purchase amount | | **7.0896** trillion KRW |

2 6

### Human Capital

| | |
|---|---|
| Ratio of local recruits | **59.2**% |
| Ratio of female managers | **8.2**% |
| Ratio of certified quality-control engineers | **33.1**% |
| Employee injury rate/loss rate | **0.18**% / **17.12**% |

3 5

### Natural Capital

| | | |
|---|---|---|
| Greenhouse gas (GHG) emissions | | **1,129,564** $tCO_2e$ |
| Energy reduction performance | Fuel reduction | **1.0** billion KRW |
| | Power reduction | **7.9** billion KRW |

4

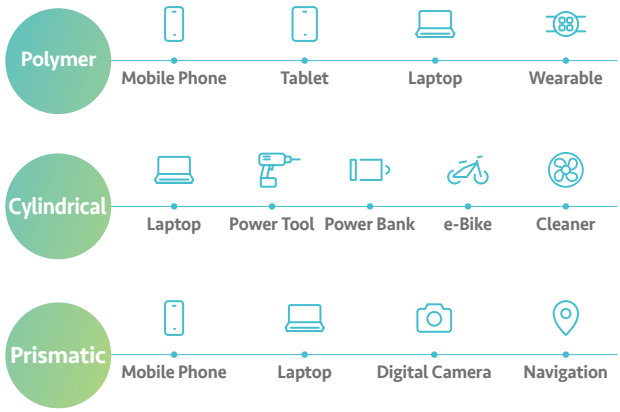
# OUR BUSINESS

## Small-Sized Li-ion Batteries

The Small-Sized Li-ion Battery Division develops and sells cylindrical, prismatic, and polymer battery cells. Based on a quality-oriented management philosophy and ongoing technological innovations, Samsung SDI maintains a large market share in the global Li-ion battery market. We are continuously expanding into business fields that are expected to have high market growth potential due to the expansion of excellent 5G and IoT based technologies such as IT devices including smartphones, wearables, and Bluetooth headsets. We are also expanding into new areas such as power tools, e-bikes, gardening tools, and vacuum cleaners, all of which require eco-friendly high-efficiency technologies.

### APPLICATION

**While mobile phones, laptops and tablets are the three IT devices we are focusing on as targets for battery development, we are also expanding into the market for batteries used in non-IT devices, including power tools and e-bikes.**




## BUSINESS CASE

### Development of a Polymer Solution for 5G Smartphones

Ahead of the release of 5G phones and new mobile services, Samsung SDI has developed high-capacity (4.45V) technology that, compared to existing smartphone batteries, increases capacity by approximately 5%. Most notably, the new technology supports the high-capacity required by the 5G environment, has improved safety and enhances user convenience. Battery solutions are anticipated to continue to develop in line with the launch of full-fledged 5G services and diverse new products, including flexibles.

# Automotive Batteries

Driven by technological advances in batteries, which are not merely power sources, but also fundamental elements for future innovations, the anticipated age of electric vehicles is gradually approaching at a fast pace. Samsung SDI is making ceaseless effort to attain technological advances that enable dynamic yet safe driving of electric vehicles as well as longer range. Our vision in the eco-friendly clean energy solution sector becoming a reality by concentrating on the technological upgrades of batteries used for eco-friendly low-carbon vehicles. With the development of high-efficiency and high-capacity Li-ion secondary batteries and their provision to automakers worldwide, Samsung SDI helps minimize $CO_2$ emissions and various pollutants from traditional internal combustion engine vehicles. We are achieving sustainability through products created not only for economic efficiency but also eco-friendliness.

## APPLICATION

Electric Vehicles (EV) - It is crucial for EV batteries to have high energy density within a given amount of space. By applying high-capacity materials with optimum lifetime performance and by designing optimized battery components, Samsung SDI is driving innovations in extending the EV range.

Plug-in Hybrid Electric Vehicles (PHEV) - Batteries for PHEVs demand a balance between the energy density required for electric-mode driving and the output density needed to support an engine. Samsung SDI strives to attain an optimal balance through its competitiveness in advanced battery development.

Hybrid Electric Vehicles (HEV) - In response to the recent trends and growing popularity of electric vehicles, we are securing a greater investment efficiency to provide solutions for improved fuel economy and enhanced automotive performance.

Micro/Mild HEV - We offer mid-range solutions aimed at improving fuel economy and automotive performance with little investment.

## BUSINESS CASE

### A Next-Generation Battery Cell created through Innovative Materials and Differentiated Design

At Auto China 2018, held in April 2018, Samsung SDI featured a high-capacity battery cell created from the technology of high nickel cathode materials with a lower proportion of cobalt and a higher ratio of nickel. Using this material technology that significantly reduces internal resistance in battery cells, an EV can not only drive for up to 620 km on a full charge, but also charge itself up to 80% of its capacity within 15 minutes. Samsung SDI also featured prismatic battery cells that can achieve a high level of energy density by maximizing the utilization of their internal space along with 21700 (21 mm in diameter, 70 mm in height) cylindrical battery cells whose capacity has been improved by 50% over the 18650 battery cells. Based on such differentiated technological capabilities, Samsung SDI continuously contributes toward expanding the EV market.

# ESS


Samsung SDI is leading the global market based on the strength of eco-friendly energy solutions and Li-ion energy storage devices for the future. We ensure the stability of power grids and provide optimized solutions according to our customer's needs and the environment, through our cutting-edge technology that has the capacity to improve the quality of electrical energy. Samsung SDI's activities in the ESS business have been going strong since 2011. Within three years, we reached the number one rank in the industry, thanks to our world-class stability of small-sized Li-ion batteries. The quality of ESS is ensured by applying the same batteries as those supplied to EVs. Based on solutions optimized for specific countries, we were also able to pioneer markets faster than other competitors in the European utility/residential market, the American utility/commercial market, the Japanese residential market, and the Korean utility/industrial market.

## APPLICATION

**Utility**
We are contributing to the standardization of renewable energy power generation and ensuring the stability of power grids for power supply systems, including power generation, transmission, and distribution.
[Installed locations] Electric power companies, industrial complex microgrids, etc.

**C&I (Commercial & Industrial)**
We are increasing power operation stability and self-consumption by helping reduce daytime maximum loads in office buildings such as commercial offices, public institutions, schools, and hospitals.
[Installed locations] Buildings, plants, etc.

**Residential**
We are linking households to solar power generation systems to make eco-friendly energy available 24-hours a day, resulting in higher energy self-consumption rates and lower power bills.
[Installed locations] Residences

**UPS**
We ensure reliable power quality and continuity that prevents operational gaps in data centers to achieve minimized total power consumption and reduced capital investment.
[Installed locations] Plants, financial institutions, IT companies (servers), etc.

**Telecom**
We offer not only lighter weight, smaller volume, and higher energy density, but also improve lifetime performance. Through the use of lithium batteries, we have brought about innovative savings in maintenance costs.
[Installed locations] Base transceiver stations

## BUSINESS CASE

### Promotion of High-Density High-Voltage Power Products at Exhibitions

Samsung SDI participated in Intersolar Europe 2018, held in Munich, Germany, in June 2018 to introduce a number of new battery models. Under the theme of "Powering Tomorrow - Samsung SDI leads the energy of tomorrow," we introduced upgraded market-leading high-density, high-voltage products for the first time and proposed new future values and directions for ESS through a next generation model concept that integrates ESS to fast charging stations. We also introduced a 1,500V high voltage platform for utility and commercial use, and second generation new residential modules that can increase the voltage to a maximum of 600V, in line with the high voltage trend. Most notably, the "high-voltage residential ESS module," a new model equipped with cylindrical 21700 cells, has almost doubled its energy density in a single year through innovations in areas ranging from cells to modules, in addition to having a lightweight and compact design, attesting to Samsung SDI's unique competitiveness.

# Electronic Materials

We embarked on our electronic materials business in 1994 with the development of EMCs for semiconductors. Since then, we have expanded into new business areas through technological developments based on audacious challenges and self-innovation. The Electronic Materials Division develops and sells materials used in semiconductors, displays, and next-generation energy sectors. While fortifying our market dominance in the existing market for materials used in semiconductors and LCD displays, we are also making continuous efforts to secure a leading position in the market for next generation advanced materials that include OLED materials and separation membranes for secondary batteries. We lead technological trends based on advanced technologies and specialized competencies for various materials used in semiconductors, displays, secondary batteries and photovoltaics.

## APPLICATION

**Semiconductors**
Our electronic materials are used as patterning materials (including SOH, SOD, and slurry) to form semiconductor wafer patterns and as packaging material (EMC) used to protect chips against the external environment.

**Displays**
Our electronic materials are chiefly used in display panels such as LCDs and OLEDs, and are sold in the form of films or base materials. They are used for films, such as polarizer film (POL) and anisotropic conductive film (ACF), and as process materials for organic light emitting diodes (OLEDs) and Color PR (color photo-resist) layers.

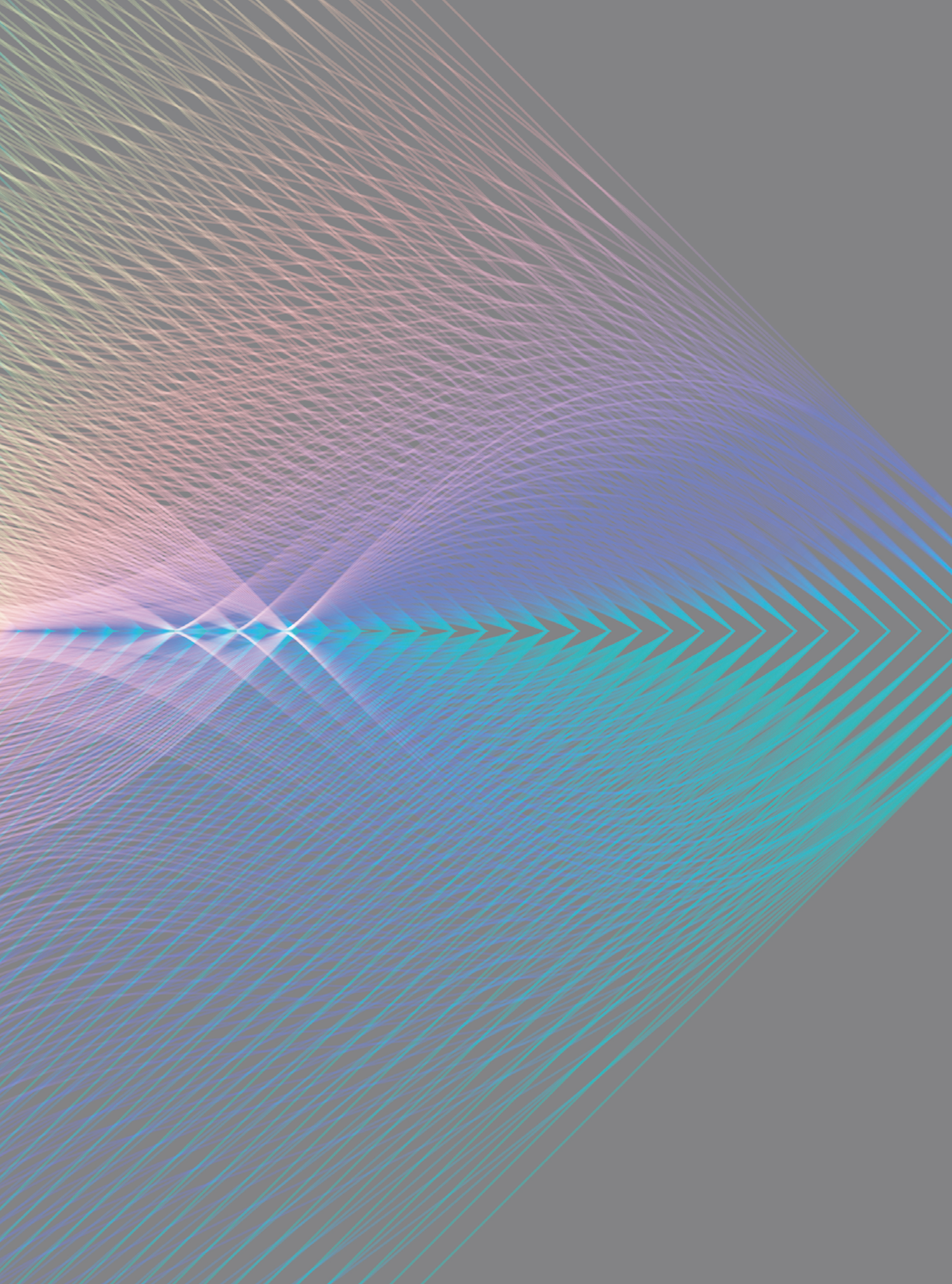
**Next-Generation Energy**
Our electronic materials are used for photovoltaic (PV) paste - a highly-viscous conductive material used to form electrodes of solar cells - and as a separation membrane that serves as an interlayer to prevent short-circuits between the cathodes and anodes of secondary batteries and therefore as a core material that determines stability.

## BUSINESS CASE

### Development of Optical Clear Adhesive (OCA), Core Materials for Foldable Smartphones

Samsung SDI has developed the Optical Clear Adhesive (OCA), a core material for foldable smartphones. OCA is a necessary adhesive for display manufacturing, used to attach polarizer films or the like. The screens of foldable phones should be able to fold, so the adhesive employed must be foldable and durable. We have secured growth momentum in the foldable phone market by preempting next-generation display materials through the development of an OCA for foldable phones.

# SUSTAINABLE MANAGEMENT OVERVIEW



# Sustainability Management System

## Directions for Sustainability Management

In promoting our business activities, we intend to create economic, social and environmental values to enhance our corporate competitiveness and achieve continued growth.
To this end, we actively respond to changing sustainability issues based on communication with various stakeholders. We will continue to work tirelessly to contribute to the local communities, our stakeholders, and ultimately the human society through the implementation of sustainability management with the aim to create not only economic value, but also social and environmental value throughout our business activities.

**SUSTAINABLE DEVELOPMENT INNOVATORS**

"Contributing to society through Sustainable Development based on Strong Leadership in the Economic, Social and Environmental Spheres"


We pursue sustainable growth and the creation of profits through customer satisfaction.

We pursue balanced partnerships based on mutual trust and benefits with our diverse stakeholders.

We pursue contributions to the improvement of the quality of life for mankind through the creation of greater value through eco-friendly ways in both our product and service processes.

## Stakeholder Engagement

Samsung SDI runs different communication channels with its major stakeholders, which directly or indirectly impact its business activities, such as customers, partner companies, employees, shareholders/investors and the local community. Through continuous communication with the stakeholders, we identify important issues in each sector and carry out sustainability management in consideration of the collected opinions. Each year we review and reflect the stakeholders' opinions on our sustainability management activities while reporting our activities and achievements about topics identified as material issues in our annual sustainability reports.

### Communication Channels with Stakeholders

| | |
|---|---|
| Customers | Customer visits, QBR (Quarterly Business Review) meetings, QTR (Quarterly Technical Review) meetings, and our website |
| Partner Companies | Purchase portal system, SSP (Samsung SDI Partner's Association) meetings, supplier meetings, and visits to partner companies by the CEO and senior executives |
| Employees | Labor-Management Council, Open Counseling Center, management briefings, satisfaction surveys, Culture Leader, SDI Talk, Global SDI Pick!, and newsletters |
| Industry Associations, Universities & Research Centers | Active participation in associations and societies including the Korea Battery Industry Association, R&D (Open innovation), and joint cooperation programs |
| Local Community & Civic Organizations | Local Community Council, social contributions, and sisterhood relations |
| Government | Participation in national projects, operation of joint cooperative programs, and organization of conferences and meetings |
| Shareholders/ Investors | General Meetings, IR earnings conference calls, IR road shows, IR conferences, public notices, IR website, IR phone contact and ad hoc meetings |

## Activities to Create Social Value

Samsung SDI intends to contribute to solving environmental and social challenges faced by mankind through sustainability management. We support the United Nations Sustainable Development Goals (UN SDGs) for the sustainable development of the international community. We focus on achieving goals that are highly relevant to our sustainability management directions and our current and future business activities.

### Goals for Sustainability Management Activities

| Sustainable Development Goals (UN SDGs) | | Details | |
|---|---|---|---|
|  | **Quality Education**<br>Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all | 4.4 | By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for corporate activities. |
|  | **Affordable and Clean Energy**<br>Ensure sustainable energy for all | 7.3 | By 2030, double the rate of improvement of energy efficiency. |
|  | **Decent Work and Economic Growth**<br>Promote decent work and economic growth | 8.5 | By 2030, achieve full and productive employment and decent work for all women and men, and equal pay for work of equal value. |
|  | **Responsible Consumption and Production**<br>Ensure sustainable consumption and production patterns | 12.5 | By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse. |
|  | **Climate Action**<br>Take urgent action to combat climate change and its impacts | 13.3 | Improve education on climate change, as well as human and institutional capacity to mitigate it. |

## Solution of the Economic, Environmental and Social Problems of Mankind

| Impact and Value | Samsung SDI's Response Strategies and Activities |
|---|---|
| Quality education leads to sustainable development and a better life. We provide support for the academic and vocational education and training required to promote sustainable development. Most notably, we contribute to substantially increasing the number of youth and adults who have relevant kills for corporate activities through technical and vocational training. | · Employee education and training<br>· Industry-academia collaboration programs<br>· Science Dream of Children (SDI) science class |
| We strive to reduce energy consumption in every process through a life-cycle assessment (LCA). We also aim to contribute to ensuring universal access to sustainable energy through the development of technologies and products that improve energy efficiency. | · Development of low-power eco-friendly products<br>· Implementation of energy conservation tasks<br>· Introduction of green energy<br>· Implementation of a life-cycle assessment |
| Quality jobs eliminate poverty. We strive to create stable and sustainable jobs and a healthy work environment not only in our domestic and overseas business sites but also in our global supply chains. | · Creation of quality jobs<br>· Monitoring and improvement activities related to supply chain CSR risks (human rights/labor, environment, safety & healthcare, ethics, management systems) |
| Waste of natural resources is causing various environmental problems including global warming. Through the sustainable utilization and management of resources, we strive to reduce the environmental impact in all aspects of our production and disposal cycle. | · Promotion of recycling activities<br>· Reduction of waste generation<br>· Improvement of water resource utilization efficiency<br>· Implementation of a life-cycle assessment |
| We strive to reduce our GHG emissions as planned. We offer next generations environmental education as part of our commitment to mitigate, adapt to, and reduce the effects of climate change. | · Reduction of GHG emissions<br>· Green Planet Environment School<br>· Creation of a School Forest (Dream Walking) |

Dow Jones Sustainability Indices
In Collaboration with RobecoSAM

### Incorporated into the DJSI World for the 14th time

Samsung SDI was incorporated into the 2018 DJSI (Dow Jones Sustainability Indexes) World for the 14th time.

GLOBAL100

### Selected as one of the 2019 Global 100

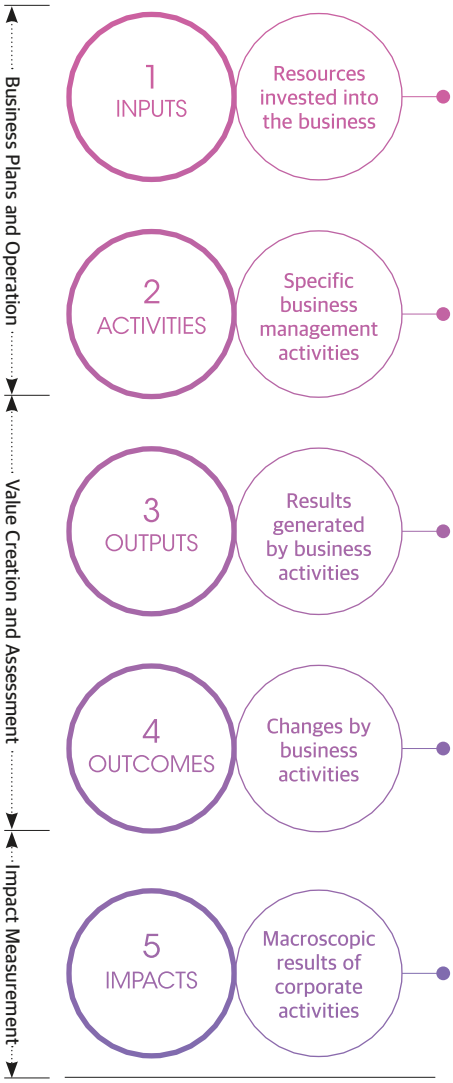
Samsung SDI was selected as one of the most sustainable corporations in the world (Global 100), announced by the Davos Forum for the second consecutive year in 2019.

# SDI Impact Valuation Management

## Measurement of the Impact of SDI's Sustainability Management

To secure continuous prosperity of future generations, we pursue sustainable development in which economic growth harmonizes with social stability and integration, as well as environmental preservation. Therefore, we see sustainability management as a corporate responsibility. In order to comprehensively assess the actual value and impact of our management activities on society, we measure not only the economic value generated by our management activities, but also positive and negative external impacts in social and environmental aspects. We strive to create social value by expanding the positive impacts, minimizing the negative impacts, and fulfilling our corporate responsibility of creating sustainable value.

## Impact Measurement Framework




These resources refer to both financial and nonfinancial assets. This report has defined as key elements the Six Capitals (financial, manufacturing, intellectual, human, social and relationship, and natural) presented by the International Integrated Reporting Council (IIRC).

We continuously put our financial, human, social and relationship, manufacturing, and environmental capital into creating sustainable value from our business activities.

Direct and Indirect Business Management Activities based on the Six Capitals.

We create financial value through the development and sales of products and services ranging from small-sized Li-ion batteries to automotive batteries, ESS, and electronic materials. We also do our best to create value in other areas such as cooperation with our supply chain and building extra infrastructure in the industry.

Identification of positive and negative effects on our company and society as a result of the social and environmental consequences of the development and sales of our products and services.

We work hard to conserve resources like water and energy throughout our product manufacturing processes. We also provide support for partners and make social contributions, the outputs of which are managed by our related department on an enterprise-wide basis.

Social and environmental consequences the development and sales of our products and services represented by the outstanding positive and negative effects inflicted on our company and society.

We applied objective criteria to the results of our business activities, converted them into financial indices, and carried out a direct/indirect impact measurement and analysis in order to calculate the total positive and negative outcomes.

Presentation of actual value reflecting social issues and their materiality based on the quantitative numerical data identified by the assessment of quantification indices.

We converted the outcomes of our business activities to financial indices in order to present the impact of our sustainability management in this annual report.

* As of December 31, 2018

## Evaluation of Integrated Value Creation

We are committed to implementing a sustainable management approach to contribute to solving social issues and creating a sustainable society. To achieve our long-term sustainability management goals, we assess and present our annual achievements in quantitative data. We measured and converted the actual impact value of the positive and negative effects of our business activities in relation with the resources invested into our business, according to the relevant global standards and legally required formulas. The relevant data of such measurements is presented in this report. We disclose the positive and negative impacts of our business activities in terms of value generation and consumption and present them in these graphs. Regarding the areas that are yet to be converted due to a lack of social consensus or technical expertise, we will continue to work in order to disclose the information objectively.

| Value creation by resource factor | | | Index introduction and calculation methods |
|---|---|---|---|
| Financial aspects | Net income | 701,166 | |
| Environmental aspects | GHG emission impact | 28,239 | Social costs incurred by GHG emission<br>(GHG emission quantity × the carbon credit price) |
| | Air contaminant emission impact | 715 | Social costs incurred by emission of air contaminants<br>(air contaminant emissions × health expenditures) |
| | Resource utilization and waste emission impact | 4,286 | Social costs incurred by waste emission<br>(designated waste quantities × waste disposal costs) |
| | Water utilization and wastewater impact | 5,455 | Social costs incurred by the discharge of water contaminants<br>(quantity of water contaminant discharge × industrial wastewater treatment costs) |
| Social aspects | Employee welfare impact | 361,942 | Improvement of employees' quality of life<br>(salary expenses - minimum income (annually) × the number of employees) |
| | Shareholder and investor impact | 65,433 | Increased income for shareholders and investors<br>(cash dividend per share × the number of floating stock) |
| | Supplier impact | 2,709 | Growth of the supply chain through the purchase of partner companies' products and services<br>(total purchase amount from partner companies × domestic SMBs' operating income rate) |
| | Local community impact | 2,345 | There was increased value in the local community thanks to investment in the community.<br>(total amount of investment in social contributions - cash donations × the number of associations and other organizations) |
| | | 2,129 | Direct/indirect economic impacts through job creation<br>(Direct) Number of new jobs (the disabled, veterans' families) × starting salary × 12<br>(Indirect) No. of new jobs at partner companies x basic monthly pay × 12 |
| Comprehensive value creation | The Impact of the Created Social Value | 1,097,029 | |

* Period: Jan. 1 - Dec. 31, 2018, Unit: KRW 1 million

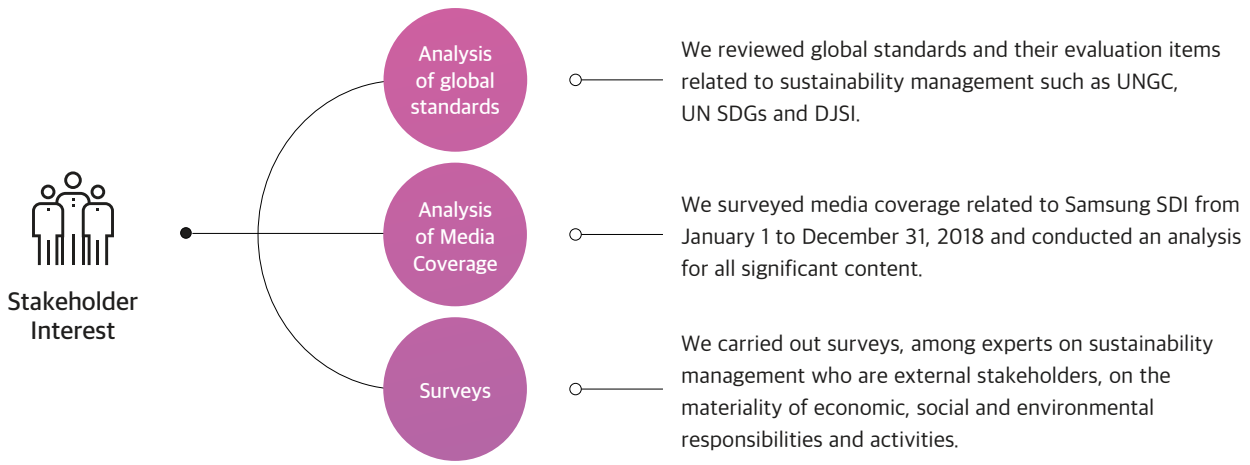
# Materiality Test

## Overview

We carried out a materiality test to report on topics identified as material issues in our careful review of our stakeholder interest and impacts on our business activities. We came up with a 46-issue pool given to our global sustainability management initiatives, standards, industrial initiatives, and media research on top of our existing material issues. After analyzing each issue on the basis of stakeholder interest and business impact, we selected material issues through priority evaluation and final review. We report topics identified as material issues for 2018 in the "Material Issue In 2018" segment and other issues in the "Fundamental" segment.

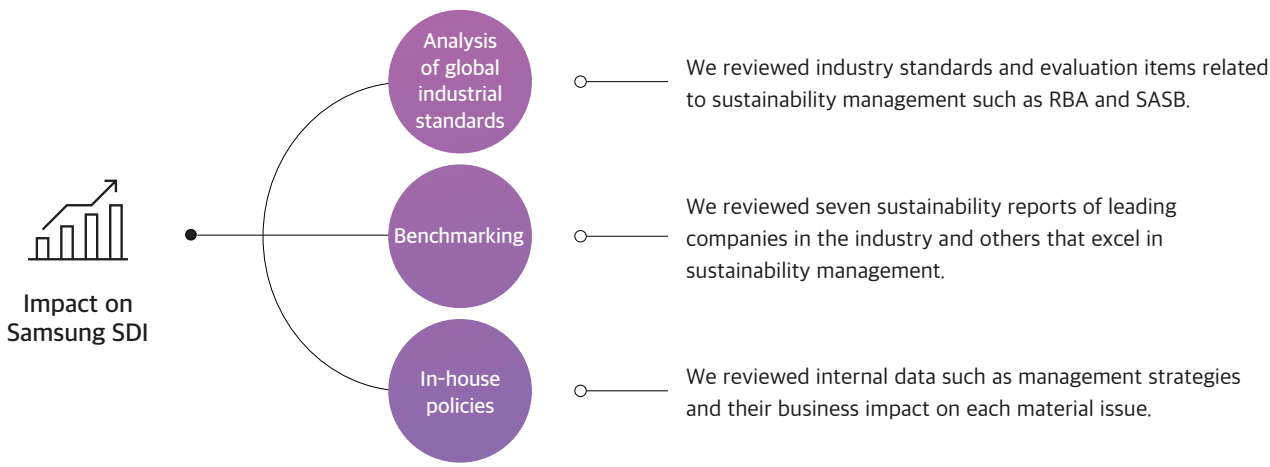
## Stakeholder Interest

We measured the severity of the impact that each issue inflicts on a company's economic, environmental and social accomplishments and reputations.




## Impacts on Samsung SDI

We reviewed what impact each issue had on company appraisal and investment decisions.

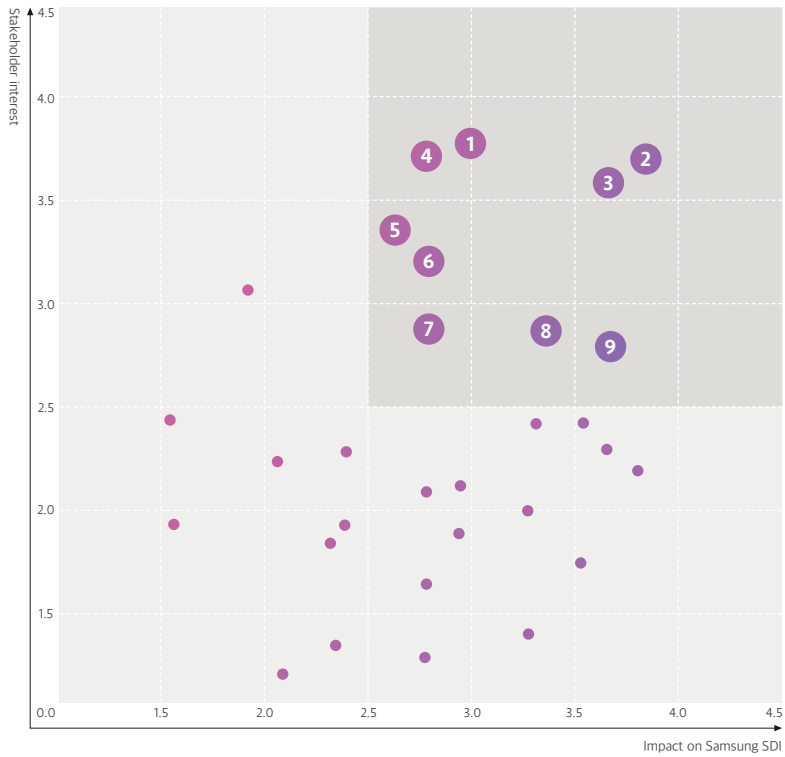


## Evaluation of Priorities

We identified significant topics, which were then reviewed internally to derive material issues. Our company's management approach to each topic is mentioned in the relevant section.

### HIGH MATERIAL ISSUE

1. Security of future growth engines
2. Promotion of a safe workplace culture
3. Enhancement of product safety evaluations and managements
4. Development of human resources with global competence
5. Work-life balance
6. Energy conservation and the use of renewable energy
7. Achievement of stable business results
8. Responsible mineral sourcing
9. CSR support for the supply chain

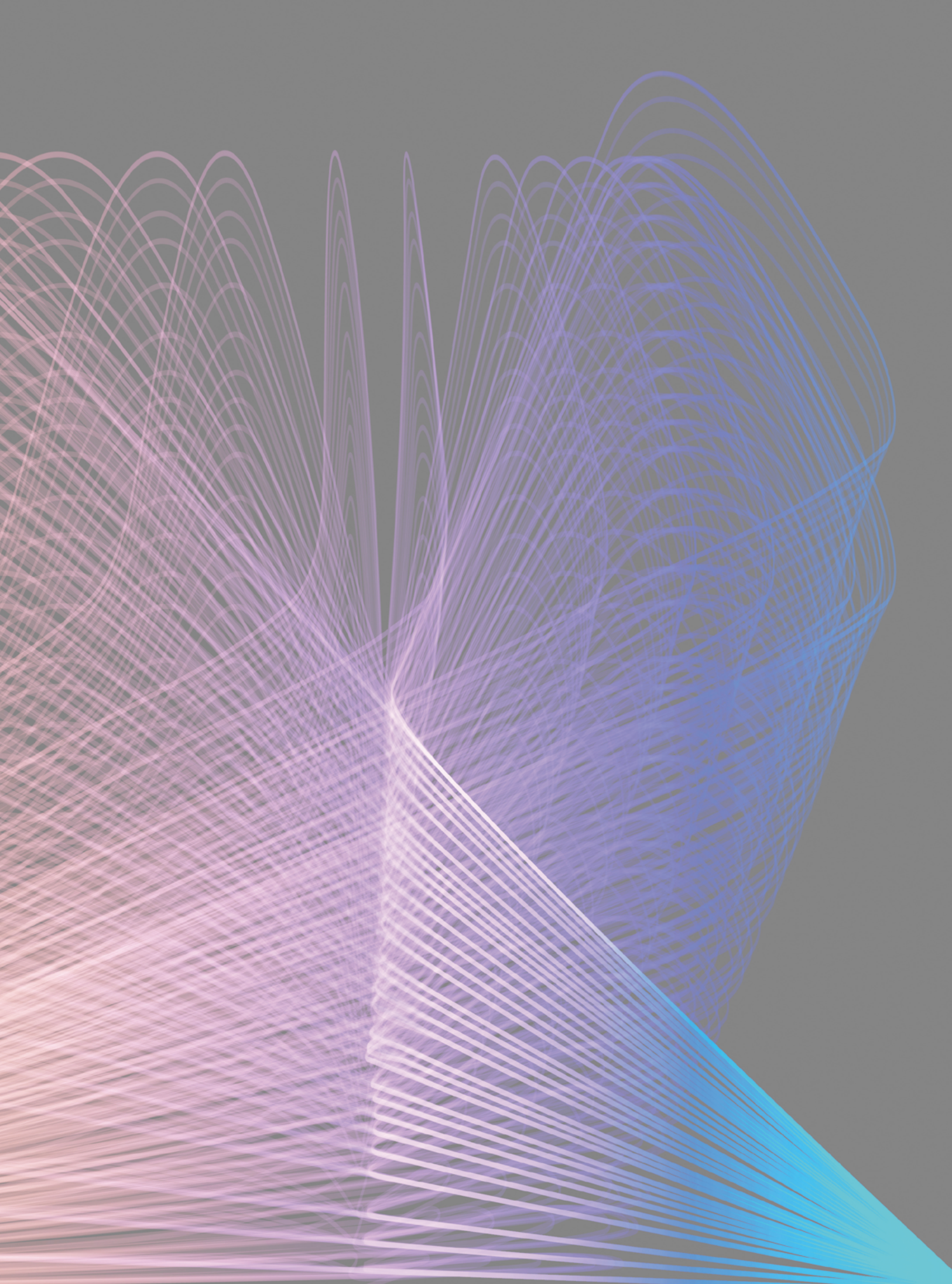



## Material Topics and Activities

| Classification | Strategies | Activities | Scope of Report | Page |
|---|---|---|---|---|
| Securing Future Growth Engines | · Securing differentiated technologies.<br>· Expanding R&D investments. | · No. of patents: 14,384<br>· R&D investment: 604 billion KRW | Shareholders/ Government | 30 |
| Securing Product Quality and Safety | · Establishing credibility in product quality assurance. | · Ratio of certified ISO 9001 auditors: 20.2%<br>· Ratio of certified quality managers: 33.1% | Customers | 38 |
| Promotion of a Safe Workplace Culture | · Preemptive risk management of occupational accidents.<br>· Widening a culture of safety including safety education for our business sites and partner companies. | · Promotion activities for a culture of safety (seminars, education sessions): 3 | Employees/ Customers/ Partner Companies | 42 |
| Climate Change Response | · Enhancing the reduction of GHG emissions and energy management. | · Reduction of GHG emissions 52,887 $tCO_2e$<br>· Energy conservation 1,081 TJ | Local community/ Government | 46 |
| Human Resource Management | · Enhancing employees' capacity.<br>· Promoting work-life balance. | · Training hours per employee in Korea: 123 hours | Employees | 50 |
| Management of a Sustainable Supply Chain | · Expanding partner companies' CSR activities.<br>· Engaging in responsible mineral management. | · Financial support (48.9B KRW)/HR training support (1,102 persons) | Partner Companies/ Government | 54 |

MATERIAL ISSUES IN 2018

# MATERIAL ISSUE IN 2018



01

# Securing Future Growth Engines

## WHAT ARE THE IMPORTANT ISSUES?

**Based on our innovative mindset and strong executive ability, we seek to secure market-leading differentiated technologies and achieve high quality-growth required for sustainable corporate growth.**

Innovative technologies change the way we live and work from the unparalleled impact they have on all aspects of the economy and society. Differentiated technologies are necessary to lead the industrial ecosystem in a market dominated by fast-changing technology trends. We strive to strengthen our market leadership by focusing on securing innovative technologies that will lead us to greater growth.

## OUR APPROACH

As a provider of top-rank materials and total energy solutions, Samsung SDI strengthens its technological competitiveness through consistent investment in R&D. We strive to lead the industrial ecosystem by developing innovative products that will pave the way to the future, through tireless work to make improvements in our products and technologies. We make every effort to secure innovative and differentiated technologies in all areas of development, manufacturing and sales so that we can continue to achieve both quantitative and qualitative growth.

## KEY INDICATORS

| Revenue by Business Area | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Energy Solutions | KRW 100 million | 34,302 | 43,324 | **69,542** |
| Electronic Materials | KRW 100 million | 17,706 | 20,142 | **22,041** |
| Total | KRW 100 million | 52,008 | 63,466 | **91,583** |

R&D Investment

604 billion KRW

Domestic R&D staff

2,260 persons

No. of patents

14,384

# STRATEGY AND MANAGEMENT APPROACH

## Small-Sized Li-ion Batteries

### Prospects for the Global Market

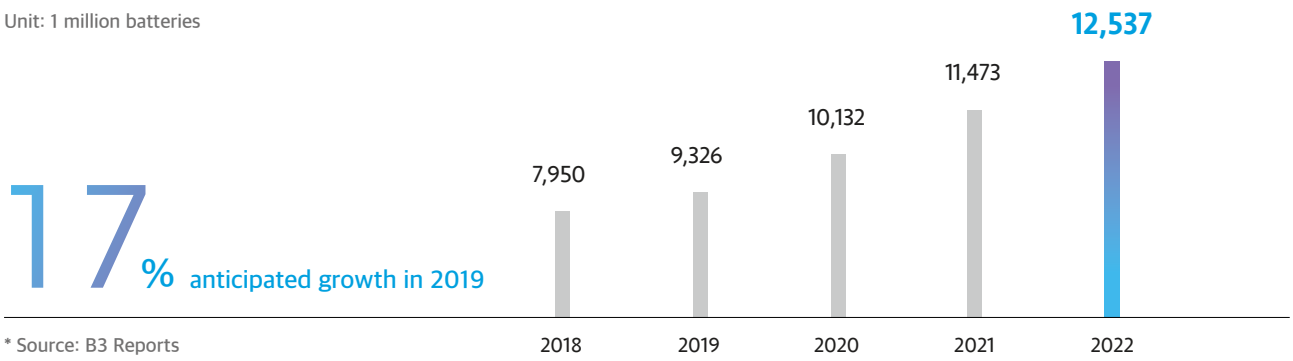
In 2019, demand in the small-sized rechargeable battery market is expected to grow by 17% from the previous year, recording a total of 9.3 billion cells. Most notably, in view of an ever-growing use of Li-ion secondary batteries in non-IT applications such as power tools and vacuum cleaners, demand for these appliances is expected to grow by 20% or more over previous years. In addition, the mobility market for electric vehicles and scooters equipped with cylindrical batteries is dramatically expanding, accelerating the small-sized li-ion battery market. The IT Division forecasts the launch of 5G services along with the full-fledged commercialization of IoT technologies integrated with AI, in addition to the proliferation of new devices such as wearables and Bluetooth headsets. We will strive to further strengthen our market leadership in all IT and non-IT related fields by taking the lead in developing innovative secondary battery technologies.

### Business Strategy and Plans

We provide optimized solutions to diverse IT device markets, including smartphones, laptop PCs, and wearable devices. In the new small-sized Li-ion battery market that grows fast amid the growing trend of eco-friendliness and high-efficiency, we lead the market and expand our business portfolio based on our differentiated technological capabilities. Following increased profits in 2018, we plan to push for consistent growth in sales and higher profits through stability. As for our polymer product groups, we will strive to further expand our sales based on the increased application of these products to diverse IT products. With respect to cylindrical product groups, we will expand the development and release of differentiated products while maintaining our market dominance.

Prospective demand for Small-Sized Li-ion Batteries

Unit: 1 million batteries




* Source: B3 Reports

## BUSINESS CASE

### Achieved the world's highest power and capacity in cylindrical 21700 batteries

Samsung SDI has developed and started mass-producing 4.0Ah batteries in the category of cylindrical 21700 battery cells for the first time in the world. Previously, 18650 batteries were widely used as a common form of cylindrical batteries, but with the advent of new applications, demand for high-capacity batteries has increased and we launched 21700 batteries with higher energy capacity to meet the demand. Through the application of new materials with a high energy density, the capacity of the 21700 4.0 Ah high-power battery increased by more than 33% compared to the existing 18650 product, allowing us to roll out the world's highest-power product through the development of new design technology optimized for high-power batteries. Through this, we expect to strengthen our company's technological leadership and further consolidate our position in the high-power battery application market encompassing power tools, gardening tools and vacuum cleaners.

# Automotive Battery

## Prospects for the Global Market

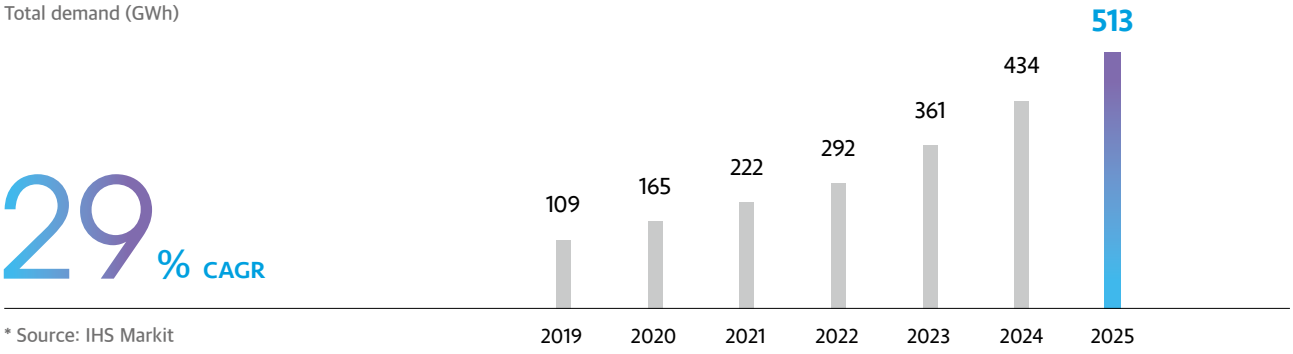
In 2018, our xEV sales increased in major global markets, including China, Europe, and the Americas, by 25% over the previous year. In 2019, automakers are expected to launch diverse EV models with longer ranges and it is predicted that longer-range autonomous EVs will lead the market. By 2022, the number of EVs sold per annum is expected to surpass 10 million, with the sector accounting for 10% of the entire auto market. Due to strict environmental regulations in Europe (aiming to cut automobile emissions by 37.5% by 2030), the ratio of diesel-fueled cars is declining, with countries like Norway, the Netherlands and Sweden planning to ban the sales and driving of internal combustion engine vehicles. China, the world's largest car market, has announced the introduction of a compulsory quota on electric/plug-in hybrid systems starting in 2019, raising the possibility of a dramatic increase in the EV market in the mid-to-long term.

## Business Strategy and Plans

Countries around the world are introducing various environmental regulations to reduce carbon dioxide emissions and other air pollutants that originate from the exhaust of vehicles with internal combustion engines. Automakers are actively proposing alternatives, including electric cars, as an eco-friendly means of transportation. With our accumulated expertise in the mobile device battery sector, we are focusing on the development of high-efficiency, high-energy-density batteries for low-pollution vehicles. Simultaneously, we are promoting diverse investment projects and strategies to expand the launch of our new products equipped with new technologies in energy density and fast charging for Europe, the Americas, and emerging markets expecting consistent growth. Currently, global automakers are racing to develop new electric vehicles to meet the market demand and government policies around the world. For our part, we will strive to not only provide automakers with optimal vehicle battery solutions, but also fulfill our responsibilities as a partner that will lead the upstream and downstream industries in the EV sector.

### Prospective demand for EV batteries

Total demand (GWh)




* Source: IHS Markit

## BUSINESS CASE

### Fully Charged for the 'Auto 2.0' Era

We participate in domestic and international automotive trade shows to introduce our visions and technological capabilities. In 2018, we participated in various exhibitions related to automobile batteries at home and abroad, including the Detroit Motor Show in January, the Beijing Motor Show in April, EV Trend Korea in April, the International Electric Vehicle Expo in Jeju in May, the Volkswagen International Suppliers' Fair in October, and the Daegu International Future Auto Expo in November. At the Detroit Motor Show in January, we presented our own narratives about the three main subjects of EVs, PHEVs, and low-voltage systems, under the banner of "Charged for Auto 2.0." The automobile industry is shifting from the Auto 1.0 era led by mechanical internal combustion engines to the Auto 2.0 era represented by self-driving, EVs and ridesharing. At the trade show, we shared with our customers and consumers information about how our technological innovations in lithium batteries will power the vehicles of the Auto 2.0 era and shared our preparations for the challenges and opportunities of future changes in transportation.

# ESS

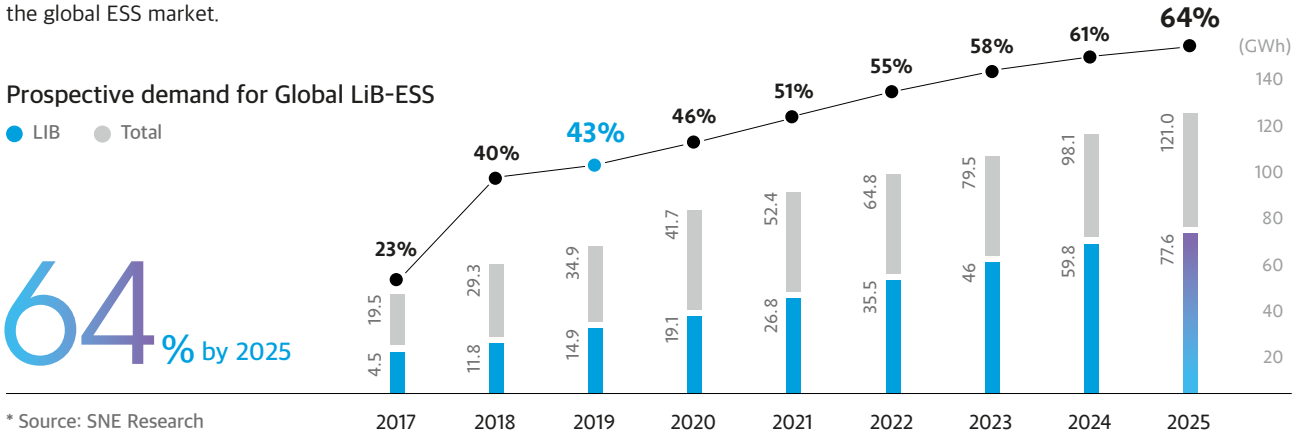
## Prospects for the Global Market

Amid the global trend of phasing out nuclear and coal power, there is an ever-growing interest in renewable energy, which raises the importance of ESS for increasing the efficiency of renewable power generation. The global Li-ion battery ESS market is expected to grow rapidly at a CAGR of 48% yearly from 4.5GWh in 2017 to 77.6GWh by 2025. Advanced countries such as the United States, Europe, Japan, and Australia are carrying out large-scale demonstration projects based on ESS-related government subsidies, with a focus on the stabilization of power systems suffering from the aging of their power grids, as well as on the promotion of renewable power generation, and for securing emergency power supply options. In addition, the installation of ESS is being encouraged systematically through the enactment of mandatory ESS installment bills and the implementation of subsidies for the connection of renewable energy and ESS. Korea is expected to grow steadily in this sector: the government is implementing the REC (Renewable Energy Certificate) policy and is providing support for the development of the ESS industry in accordance with its "Renewable Energy 3020 Implementation Plan." Recently, emerging countries in the Middle East, Southeast Asia and Africa are joining the global ESS expansion trend led by the developed countries. In 2019, further growth is expected in the global ESS market.

## Business Strategy and Plans

With ESS as our flagship product we have continued to expand our market share in advanced economies such as Japan, North America and Europe. We now focus our market expansion on emerging markets while increasing the application of our products from power generation and commercial purposes to residential and UPS batteries. In 2019, we expect ESS to further expand their role as key components in improving the efficiency of the power grid. We have established a strategy to meet the demand for ESS solutions in connection with the stabilization of the power grid following increases in solar and wind power generation. In line with the increased virtual power plants (VPPs) and needs for self-consumed PV energy, we will continue to expand our sales to other applications such as commercial and residential ESS. In addition, we will take the lead in the transition to LIB, with our advantages in improved features and competitive prices in the UPS/telecommunication market dominated by lead-acid batteries with more than a 90% market share. In 2018, our ESS battery sales was more than tripled but as an attempt to better our sales record, we will continue to expand our overseas markets into Australia, the Middle East and Southeast Asia, and find new customers around the world throughout 2019.

Prospective demand for Global LiB-ESS




* Source: SNE Research

## BUSINESS CASE

### Launch of a differentiated household (high-voltage) battery module


Samsung SDI has launched a new ultracompact and lightweight household battery module that utilizes cylindrical 21700 cells (4.1 Ah) of high-energy density. Previously, household ESS generally used an expensive PCS (power conversion system), as they depended on a low-voltage 50V class battery modules whose energy efficiency dropped in the power conversion process to high-voltage (200V, 400V). In 2018, we launched a 100V high-voltage module with cylindrical 21700 cells (3.3 Ah), allowing the system integrator to achieve a high-voltage battery system without the use of an expensive PCS, and providing an opportunity to shift technology trends in the industry to high-voltage systems. In 2019, we have launched another new product, a high-capacity compact product with an increased energy capacity of more than 50%, and an energy density that has almost doubled compared to previous models. In addition to satisfying the needs of household customers who prefer a small-sized ESS, the new 18kg product, with the smallest weight in its class, meets the needs of installers who want to carry and install it themselves (less than 20kg). With the world's top technological competitiveness, we will continue to lead industrial trends and launch battery solutions that can satisfy all stakeholders (consumers, system integrators, installers) in our value chain.

# Electronic Materials

## Prospects for the Global Market

The semiconductor market is said to be leveling off after the memory semiconductor boom that lasted for years. Yet new demand is expected to grow due to the expansion of artificial intelligence and self-driving cars. Competition for the ultra-miniaturization of semiconductors will most likely continue to meet the demand of advanced technologies and various data processing, which requires innovations in technologies and materials in the industry. In the display sector, the LCD market is now dominated by Chinese panel manufacturers on the heels of their aggressive investment, causing previous market leaders to shift their technological focus to OLED.

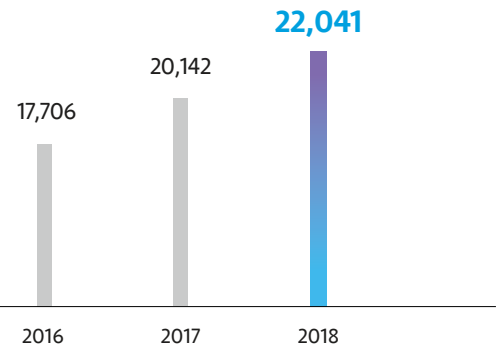
Most notably, the emergence of new form factor products such as foldable phones in the sluggish smartphone market is driving the development of new innovative materials related to displays.

## Business Strategy and Plans

The electronic materials business is technology-intensive and therefore must accurately forecast the trends of product cycles and technological changes in upstream IT industries, such as semiconductors and displays, and timely launch new products based on differentiated technologies. Samsung SDI maintains its distinctive competitiveness by securing key technologies through close technical cooperation with customers and ongoing R&D investment, in addition to a business structure that can minimize risks stemming from fluctuations in the upstream market through rigorous quality assurance and a robust product portfolio. As fierce competition is anticipated for the semiconductor and display industries in 2019, we plan to expand our profitability by strengthening our existing product portfolio while laying the groundwork for business expansion through rapid product development and solution presentation, largely in high growth markets like China. Most notably, in order to secure new growth engines that will lead the rapidly changing technology trends, we will stablish a system in which we can preemptively respond to our customers' needs for pioneering next-generation products such as foldable phones, Quantum dots, and ultra-fine semiconductors, to develop and supply new materials in a timely manner.

Sales of Electronic Materials | Annual sales (Unit: KRW 100 milion)

24.5% Growth rate compared to 2016




BUSINESS CASE

### Turning a crisis into an opportunity: record-breaking performance by the POL business

LCD prices have fallen rapidly, compounding the difficulties faced by materials suppliers. Our flagship product, the polarizer film, also had a negative outlook due to deteriorating upstream market conditions. In spite of such an unfavorable global market environment, we focused our attention on China. While experiencing a steady increase in supply, we also increased the product proportion for the market, and embarked on the improvement of our manufacturing competitiveness. The development of new mobile products in a timely manner and the restructuring of our product portfolio together enabled us to overcome unfavorable market conditions and achieve the highest business performance yet. Most notably, we have stabilized the POL production lines in Wuxi, China, allowing us to supply products to local customers in a timely manner and to respond to Chinese panel manufacturers that keep increasing their production capacity. We are growing steadily despite worsening business conditions in the upstream market.

# Research and Development

## Enhancement of R&D Capabilities

As a supplier of excellent eco-friendly materials and a total energy solution provider, we continue to secure new technologies and enhance our technological competitiveness through continued investments in R&D. We have expanded our business from cutting-edge materials to components, which enabled us to grow into not only a materials supplier for secondary batteries, IT and auto parts, but also a specialized energy company. Since 2014, when our Battery R&D Center and Electronic Materials Business Division moved to Samsung Electronics Materials Research Complex, we have also created a synergistic effect in our joint R&D projects. We will strive to secure global technology leadership by adding our materials technologies and capabilities to our competitiveness in the future energy business sector.

## Open Innovation

Through enhanced industry-academia cooperation with external specialized institutions and universities, Samsung SDI secures next-generation technologies and nurtures human resources with great potential. Since 2016, we have continuously pursued industry-academia cooperation with leading universities in the battery research field, including partners such as Seoul National University, POSTECH, Hanyang University, Sungkyunkwan University, and UNIST, to secure next-generation battery technologies. Through such cooperation, we are carrying out research on all aspects of batteries ranging from materials needed for better performance of batteries to evaluation methods required for better safety in manufacturing. We maintain ties with the universities to ensure that a systematic research environment is maintained between the staff and us, and that researchers build effective teams with professors and students to carry out joint research projects and train the students to become talented individuals with expertise in the process.

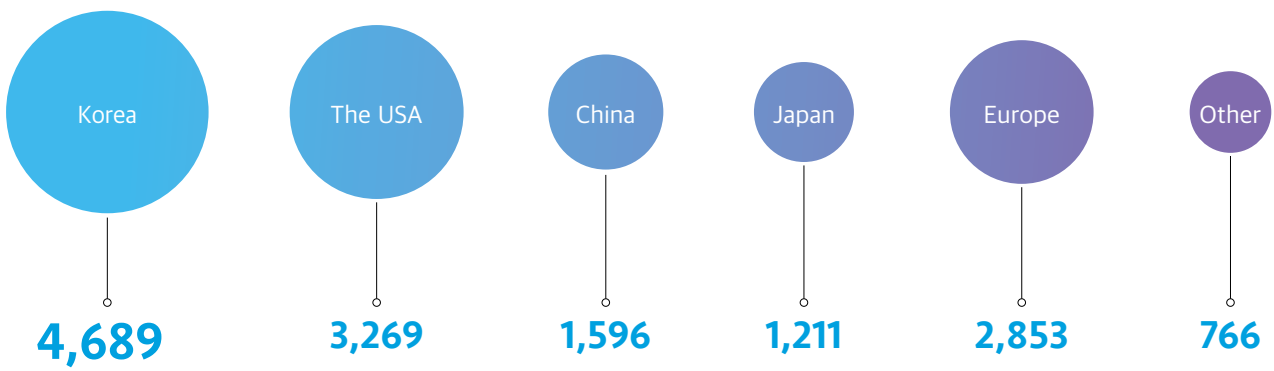
## R&D Organization

We run research and development organizations within the SDI Research Center, the Small-Sized Battery Division, the Mid- and Large-Sized Battery Division, and the Electronic Materials Division, and enhance our global technological leadership through collaborations between the organizations. In addition, we are strengthening our research and development of secondary battery materials and striving for the stabilization of raw material supply. For batteries, materials determine the product characteristics such as energy density, lifetime and output, and their costs account for more than 50% of the battery's price. As a result, the competitiveness of materials is of utmost importance. Samsung SDI runs the SDI Research Center at the Samsung Future Technology Campus which serves as Samsung Electronics Materials Research Complex in Suwon, Korea. The center plays a pivotal role in the development of materials for IT, xEV, ESS batteries. Under the three-pronged strategy of Timing, Differentiation and Collaboration, Samsung SDI Research Center strives to develop new differentiated technologies through collaborations in a timely manner.

## Patent Management

We are developing high-capacity/dense batteries for the next generation, and we are expanding our market share by applying them to battery products used in electrical vehicles and electric storage systems. We are also preventing patent disputes and securing technological competitiveness through efficient management of market leading patent applications and registered patents. Most notably, we enhance our patent competitiveness in material technologies by obtaining patents on the research results of core materials for secondary batteries, semiconductors, and OLED display technologies. As of 2018, we owned 4,689 registered patents in Korea and 9,659 registered patents in major overseas markets including the U.S., Europe, China, and Japan.

Patents Registered | Unit: cases



## Leading Future Markets based on Technological Leadership

In a market that follows fast-changing technology trends, Samsung SDI seeks to lead the industrial ecosystem by focusing on securing differentiated technologies for bigger growth. We strive to secure innovative and differentiated technologies in all areas of development, manufacturing, and sales. We work tirelessly to achieve both quantitative and qualitative growth.

**Development of High Energy Density Automotive Batteries**

We are continuously working to develop safe long-range batteries to develop the eco-friendly EV market. In 2018, we developed high-capacity and long-life materials based on the existing cell structure along with high-density electrodes equipped with secured endurance and safety. We consequently improved energy density by more than 20% compared to existing products. In 2019, we plan to begin mass-production. In addition, we are developing new innovative structures and processes that overcome the structural limits of existing products.

**Certified by NFPA (National Fire Protection Association) for ESS Installation**

Following the US government's requirement for NFTA certification, we established a cooperation system with the UL, the exam administrator, to expedite the procedure for the mandatory certification program. As a result of thorough preparation for preliminary and main certification evaluations, we were accredited in December 2018 for the first time in Korea. The NFPA accreditation maximized our competitiveness for new orders in the Americas in 2019 and we are looking forward to driving up our market share in the American market with a sharp uptick in sales.

**Development of the Industry's Highest-Capacity Highest-Power Cylindrical Battery for Power Tools**

This 35A continuous discharge battery is the world's highest-rated 4.0Ah class and comes in the new standard 21700 size (21mm diameter, 70mm height). We have achieved the highest capacity and ultra-high output through our proprietary technology, the SCN (Si Carbon Nanocomposite) anode material and a low resistance multi-tap design. This enabled us to start mass production ahead of the industry, which contributes greatly to our top market share in the lithium rechargeable battery market for power tools worldwide. As it can also be applied to wireless cleaners, gardening tools and golf carts that require high power and high capacity, the product competitiveness is expected to rise, moving forward.

**Development of the Innovation Module Structure for Automotive Batteries**

In order to increase the range of electric vehicles, we are continuing to develop technologies that can improve the energy efficiency of batteries. In 2018, we developed a multi-functional modular platform that has significantly improved our space efficiency, which in turn has increased the energy capacity per module while reducing its weight. We also strived to develop new technologies that use innovative materials and structures with the goal to lighten electric vehicles and improve space efficiency.

**Development of Optically Clear Adhesives for Foldable Smartphones (FOCA)**

Having reached maturity, there are great expectations in the smartphone market for new innovative products. The foldable smartphone is anticipated to be a game changer in this stagnant market. Nevertheless, the required innovative materials are completely different from conventional ones because these phones will be required to endure being folded hundreds of thousands of times by users. We have succeeded in securing the FOCA technology that can be applied to foldable displays of various shapes and sizes, and began applying them to our customer's next-generation products.
The technology development has enabled us to gain recognition for our technological capabilities in the next-generation smartphone market that is expected to grow rapidly while laying the groundwork to emerge as a leader of related technologies.

**Timely Development and Supply of SOD, a Process Material for Semiconductor Fine Processes**

In order to cope with the rapidly developing semiconductor makers' fine process technology, materials technologies must continue to evolve, too. We have developed and supplied various process materials used in semiconductor processes in a timely manner. For instance, spin-on dielectrics (SOD) which are a coating material used between semiconductor transistors or metal leads, has contributed towards enhancing productivity for customers, and helped reduce capital investment costs in line with their excellent process requirements. In 2018, despite difficult downstream market conditions, we were able to expand our supply not only to the captive market, but also in the external market through product development and supply cycles customized for our customers. In the same year, we won the SK Hynix Best Partner Award as proof of our acclaim in technological excellence at home and abroad.

Main R&D Performance in 2018

| R&D | Expected Effects |
|---|---|
| Development of the industry's highest capacity and high-power cylindrical lithium secondary batteries for power tools | Contributions to market leadership with a 6-month advantage in mass production over competitors |
| Development of gap-filling tapes for the protection of electrode assemblies for cylinder-shaped secondary batteries | Improvement of anti-vibration features through the fixation and protection of inner components (jelly rolls) of batteries |
| Development of cylindrical cases for xEV Li-ion Batteries | Development of a specialized case tailored for EV batteries that have enhanced safety and reliability |
| Development of FOCA for foldable smartphones | Market leadership expected via the development of the industry's first highly durable FOCA |
| Development of OLED deposition materials | Advance into new markets through deposition materials resulting in higher efficiency and longer lifecycles |
| Development of next-generation polarizing films | Portfolio expansion through the timely development of polarizing films applicable to new display products |
| Development of high-luminance CR | Existing MS retention and new market development through products with enhanced functions such as higher luminance |
| Development of semiconductor EMC | Differentiation in product performance through next-generation processing materials and higher product quality |
| Development of SOD for fine semiconductor processes | Securing the captive market and improving external supply through timely development |

## Enhancing Executive Abilities through Innovative Leadership

To lead the market amid growing market uncertainties and changing consumer needs, we need to equip ourselves with innovative perspectives and insights into our market. Samsung SDI will continue moving ahead on its path toward becoming the world's top-notch battery and materials company through a corporate culture strong in innovative thinking and executive abilities.

### System Integration to Enhance Executive Abilities

Previously, automotive battery and ESS business systems were carried out separately, resulting in unnecessary manual work to link the two. In 2018, we integrated supply chain management (SCM), product lifecycle management (PLM) and cost management systems for both. Now everyone in the business departments can access the system anytime, anywhere to communicate and reach decisions rapidly based on the same information. In 2019, we plan to promote  process innovation (PI) and system integration for the entire battery department including the small-sized li-ion battery sector.

### "Tech Forum," On-Site Improvement Activities through Innovation

Samsung SDI carries out various innovation activities such as "Tech Forum," which focuses on the improvement of crucial technologies used in the battery manufacturing process, and on-site dialogues concentrated on loss reduction and workflow improvement. "Tech Forum" 2018 was composed of the presentation of outstanding cases by each business site, and "the exchange meeting of 5 major processes" consisting of electrodes, winding, assembly, formation module and packing. Most notably, the forum brought together key personnel in manufacturing and technology from overseas corporations as well as their counterparts in Cheonan and Ulsan in Korea providing an opportunity to upgrade the technological level of all our manufacturing bases by active benchmarking of outstanding cases.

02

# Securing Product Quality and Safety

Ratio of ISO 9001 Auditor Qualifications

20.2%

Ratio of Quality Management Qualifications*

33.1%

* Excluding ISO 9001

## WHAT ARE THE IMPORTANT ISSUES?

**We strive to become a company that contributes to society and humanity by supplying safe and eco-friendly products to our customers in a timely manner.**

Product quality and safety are the essential factors required for sustaining continuous growth based on customer confidence. Strict compliance with the standards for product quality is required in the entire process, ranging from the management of supply and demand for raw materials, product design and manufacturing, to disposal. Samsung SDI pursues a close relationship with its customers based on trust and confidence by quickly and accurately responding to customer opinions under the quality management policy of "Creating Value for Customers, and Making the World a Better Place."

## OUR APPROACH

To supply optimum batteries and electronic materials, we strive to develop products that reflect quality safety in diverse environments where our products are used through an analysis of market demand and consumer need. Most notably, for rapid and accurate quality verification, we have enhanced our leading and accelerated verification processes together with a certification processes – a measure required for us to produce robust designs. We strive to realize uniform quality anywhere in the world through the careful modification management and verification of mass-production feasibility. To that end, we train quality experts to enable them to secure expertise in their respective fields.

## KEY INDICATORS

| KPIs | Unit | 2018 Targets | 2018 Records | Achievements | 2019 Targets |
|---|---|---|---|---|---|
| Ratio of certified ISO 9001 auditors | % | 16 | 20.2 | ● | 21.3 |
| Ratio of QM certifications (excluding ISO 9001) | % | 29 | 33.1 | ● | 34.8 |
| Certified international quality experts (new) | persons | - | 228 | - | 240 |

# STRATEGY AND MANAGEMENT APPROACH

## Quality Management Strategy

By placing a top priority on product safety and quality, we roll out products that meet our customers' needs through close co-operations with them. In 2018, we upgraded the quality of our small-sized Li-ion batteries while reviewing the safety risks involved in automotive and ESS batteries. We pay particular attention to the achievement of uniform quality products across the globe through manufacturing standardization and automation. The Electronic Materials Division is enhancing its development QA to improve its warranty capabilities for new products. We are in the process of reviewing and evaluating new raw materials. In 2018, we expanded the scope of quality assurance by setting up CoA and accelerated evaluations for new products.

## Project Initiating System

We run Development (PLM), Production (MES) and Quality (IQMS, LIMS) systems based on global quality management systems such as the ISO 9001 and IATF 16949. We also clearly define procedures and decision criteria for each stage and comply with the 8 Main Quality Processes (development management, reliability, parts management, process quality, modification management, abnormal occurrences, shipping assurance, and VOC management). We continue making improvements to enhance product quality.

### QM Slogan

qA-Pro

**Q**
Become a quality expert that can Quickly verify Quality.

**Ace**
Become an Ace in the QA Office through capacity building.

**Pride**
Have Pride in the company, your department, and your work.

**Relationship**
Maintain a good Relationship through close communication.

**Open**
Approach other departments with an Openness for collaboration.

### 8 Major Quality Processes

- Development Management
- Reliability
- Parts Management
- Process Quality
- Modification Management
- Abnormal Occurrences
- Shipping Assurance
- VOC Management

### Quality Management Policies

**Quick and Accurate Quality Verification**

Achieve development completeness through enhanced quality verification competence.

We guarantee robust designs through the enhancement of leading and accelerated quality verification and Qual Process and Test Coverage.

**Global One Quality**

Secure uniform mass-production quality across all lines.

We achieve global one quality through preemptive modification management and innovations across a mass-production Qual Process based on processes and systems.

**Enhanced Quality Expertise**

Raise the capabilities of quality experts.

We heighten the level of quality expertise through continuous education and self-development of our experts.

# Securing Product Quality and Safety

## Enhanced Quality Assurance

For our automotive and ESS batteries, we conduct quality assurance for the entire process covering raw materials all the way to the delivery. In the event of a customer issue, we review the entire process, focusing on foundational areas such as mass production and product development to come up with basic solutions. In addition, our development organization consists of design, PA (Process Architecture) and PE (Product Engineering) to guarantee the balance needed for the final products through a mutual verification at each work stage. For small Li-ion batteries, we have set up a Q-FMEA (Failure Mode and Effect Analysis) database to expand the relevant evaluation coverage, which has enabled us to improve quality assurance through a shift from passive inspection methods to preemptive inspection methods that include a massive drop in verification analysis and safety verifications under harsh conditions.

As for electronic materials, the Quality Assurance (QA) function is strengthened to ensure quality development procedures. New raw materials are undergo inspection and evaluation and in 2018, we expanded the range of QA by using CoA assessments and setting up evaluation methods to verify the changes in physical properties that may occur during the storage period.

Also, we are carrying out activities to strengthen QA for mass production in order to meet the detailed satisfaction demands of the customers. We have also enhanced our monitoring system with the establishment of the Full Pattern Analysis (FPA) to place our QA system at the highest level.

### UL9540A for ESS


NOTICE OF COMPLETION

2018-04-01

SungYeon Yoon
SAMSUNG SDI CO.,LTD
428-5 GOMGE-DONG GIHEUNG-GU
YONGIN-SI, GYEONGGI-DO

Project Number 4788900293
Subject UL 9540A Verification test for UPS battery Unit (Three cost included)

Dear MR. SungYeon Yoon,

Your request for the investigation of your product has been completed under UL 9540A TEST METHOD FOR EVALUATING THERMAL RUNAWAY FIRE PROPAGATION IN BATTERY ENERGY STORAGE SYSTEMS AND EQUIPMENT.
Please note that the scope of the project is verification that submitting this report at the time of installation to Authorities Having Jurisdiction or any other entities that need to make a decision over the installation will be invited.

Should you have any further questions or need any of our services in the future, please feel free to contact us.

Your business is very important to us and if there is any additional information that we may provide to you about the investigation or UL's other services, please do not hesitate to contact us.

Very truly yours,

Sean Yang
+822 2009 6071
Project Engineer
Sean.yang@ul.com

This year, Samsung SDI attracted attention with its further improved safety design technology. The company demonstrated its unrivaled safety design capability by meeting the industry's first ESS fire-resistance test standard from Underwriters Laboratories (UL), a global safety certification company. With this technology, Samsung SDI is set to be a leading company for much safer ESS.

# Quality Management Improvement Efforts

## Support for Partners' Quality Improvement

We support our partners' quality assurance activities by sharing our quality assurance manual with them. We select the inspection criteria from our customers' perspective and have our partners carry out the necessary quality improvements. To prevent any technical issues in advance, we conduct quarterly quality technical reviews on important materials. For automotive and ESS batteries, we placed the focus on the development of their global competitiveness in 2018 through three major shared-growth tasks: support for securing competitiveness, strengthening fair trade processes, and enhancing future technological cooperation. We selected suppliers to produce parts for our plant in Hungary and worked together to improve productivity and quality in response to increasing supply volumes. We also carried out manufacturing innovation activities through the analysis of the partner's defect rate and solutions for chronic problems through QBR (quarterly business review). For electronic materials, demand for the polarizing film is growing for mobile devices. We have organized task forces to provide the technical support required for quality improvement and management of relevant overseas partners.

## Support for Quality Improvement of Overseas Branches

As a way to further enhance our global competitiveness, we provide support to our overseas branches to assist them in their quality improvement efforts so that we can manufacture products with uniform quality, worldwide. For our automotive and ESS batteries, we dispatched quality experts from our mass-production and parts quality departments to our Hungarian production corporation that launched the mass-production of xEV cells/modules in 2018. The experts were sent to train local personnel based on their accumulated experiences and know-how. The efforts resulted in the technological sophistication of a local workforce and an improvement in quality for our global products. The corporation is ready to supply cells/modules to various OEMs in 2019. For electronic materials, we dispatched manufacturing, technology and quality experts from overseas to transfer their polarizing film manufacturing know-how. A forum has been set up to discuss issues and find solutions as soon as possible from among the local workforce, resident employees, and dispatched personnel from the Cheongju production plant.

## Enhancement of a Global Statistical Quality Assurance System

For small-sized Li-ion batteries, we have established a management system for three major control items (capacity, IR and filling volume) to make improvements in warning rates while running a weekly counseling system to improve the analysis and response capabilities of our overseas corporations. In addition, we have made improvements in facility defect rates through the development of an activating the Tray Map analysis system, which has led to a shorter analysis lead time and lower activating defect costs.

# Product Quality Enhancement from the Customers' Perspectives

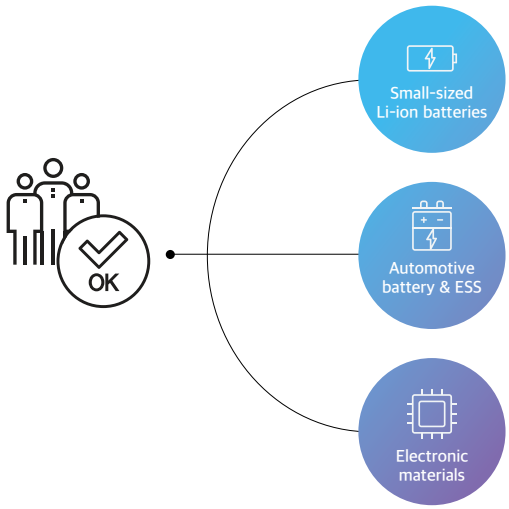
## Product Quality Enhancement through VOC Collection

We have improved our product quality competitiveness by managing customer related items such as voice of the customer (VOC) and defect rates from customers as KPIs in our management activities. In addition to our real-time communication channels with customers, we fielded customer complaints and requests directly through our global response system. As for collected opinions, we analyzed our customers' opinions and made improvements quickly according to the response process so that quality upgrades can be made for customers satisfaction. In 2019, we will prevent quality incidents from happening by managing the trends in process and market defect rates while further consolidating our reputation for product quality by focusing on the prevention of the recurrence of the same defects based on our improvement activities tailored for each customer based on our VOC pattern analysis.

## Raising Customer Satisfaction

Samsung SDI regularly performs detailed customer satisfaction surveys for each business sector. The survey targets product quality and a wide range of other relevant criteria such as R&D competency, services, and deliveries for the purpose of establishing indices and scoring each criterion. The survey results are reflected in the product quality for each business sector and in infrastructure improvements. As for the small-sized Li-ion battery business, a Customer Satisfaction Index (CSI) survey was conducted for 23 major clients in 2018 to analyze customer complaints for categories such as quality characteristics and quality satisfaction progress and to make improvements in those areas.

### Customer Satisfaction for each Business Sector




| | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Customer satisfaction score | Points | 76.8 | 81.9 | **82.0** |
| No. of surveyed companies | Firms | 33 | 21 | **23** |
| No. of surveyed customers | Persons | 35 | 24 | **25** |
| Customer satisfaction score | Points | 82 | 86 | **90** |
| No. of surveyed companies | Firms | 2 | 4 | **4** |
| No. of surveyed customers | Person | 2 | 4 | **4** |
| No. of surveyed companies | Firms | 28 | 33 | **26** |
| No. of surveyed customers | Person | 182 | 190 | **169** |

* As there are various types of products among businesses dealing with electronic materials, there is no overall score for customer satisfaction

## BUSINESS CASE

### Enhancement of the Customer Defect Analysis System

A FIB for Early Analysis of Defects

Samsung SDI secures battery safety quality and market safety quality through our high precision and high-resolution analytical power when it comes to dealing with defects reported by customers. Equipped with a high-resolution non-destructive Computed Tomography (CT) system, a Scanning Electron Microscope (SEM) for micro shape analysis, and a Focused Ion Beam (FIB) which is a micro cross-section shape analysis device, we are initiating improvements in the rate of cause identification of defects through mechanism analysis. We strive to detect and improve design problems of newly developed products and mass-produced goods early on in the establishment of the early defect analysis system and reflect on the implications in the guidelines for the development of new models to secure product stability and on-time product delivery.

03

# Promotion of a Safe Workplace Culture

## WHAT ARE THE IMPORTANT ISSUES?

**We are building a safety management system while enhancing our monitoring efforts to prevent foundational causes of accidents.**

SH&E is a top priority in business management. Furthermore, the recent amendment of the Occupational Safety and Health Act has expanded the management scope of SH&E to partner companies while requiring industrial accident prevention systems to operate companywide rather than at the level of each workplace to ensure strict accountability. Meanwhile, safety management is achieved by employees by identifying risks to the processes they are in charge of, and through subsequent activities taken by safety managers to prevent accidents, the significance of our employees' awareness of SH&E is emphasized.

## OUR APPROACH

With the belief that "All accidents are preventable", Samsung SDI implements preemptive risk management to prevent accidents in advance. Our efforts include technical management efforts such as facility pre-inspections and the horizontal implementation of accident recurrence prevention measures and comprehensive prevention efforts that include safety education and a culture of safety. Samsung SDI strives to create a culture of safety, transcending safety systems and regulations. Rather than merely strengthening systems and regulations, we are striving to create culture of safety so that employees can be aware and implement it on a daily basis. Most notably, we have expanded the target of our safety culture to partner companies in order to achieve a zero-accident rate at all our workplaces and those of our partners.

## KEY INDICATORS

| KPIs | Unit | 2018 Targets | 2018 Records | Achievements | 2019 Targets |
|---|---|---|---|---|---|
| Zero-accidents at workplaces | Case | 0 | 8 | ◑ | 0 |
| Proliferation of safety culture (seminars, training, etc.) | Case | 3 | 3 | ● | 5 |

Proliferation of a safe culture

3 Cases

# STRATEGY AND MANAGEMENT APPROACH

## Safety and Health Management Policy

Following the revision of the Occupational Safety and Health Act in January 2019, Samsung SDI prohibits signing of all in-house contracts of partner companies regarding hazardous and dangerous work that involve plating, mercury, lead and cadmium. To promote the health and safety of not only our employees but also our partner companies' employees, we continue to make investments and take improvement measures.

## Safe Environment Norms

Under the management principle of "SH&E is the top priority of management," we have announced and implemented the ten commandments for a safe environment as action rules to make our workplace safe. The ten commandments for a safe environment that must be followed by all executives and employees are aimed at raising safety awareness ranging from safety philosophy to action principles and safety standards, and promoting voluntary compliance with safety rules.


## Operation of an Integrated Safe Environment System

We implement the management of safety, environment, health, chemical substances, and disaster prevention as an integrated system. Accidents are prevented through real-time monitoring. We continue making improvements in the system to make it easily accessible by managers and users. When necessary, we also benchmark other Samsung affiliates.

## Regular Evaluations and Monitoring

We regularly evaluate and inspect the safety of our environment and infrastructure to efficiently manage and detect ever-changing risks. We work on areas that are found to be problematic and spread the information horizontally, companywide. In 2018, we carried out an in-depth analysis of 347 weak areas in our domestic and overseas workplaces with the assistance of a professional organization. We continue to make improvements in our weaknesses with specific action plans.

## Safety and Health Risk Management

Samsung SDI conducts accident prevention activities such as monitoring to manage safety and health risks at manufacturing and construction sites. In the event of an accident, we devise solutions through an accident sharing meeting and take measures to reduce similar accident risks through the horizontal proliferation of the relevant information.

## Establishment of the Emergency Response System

Samsung SDI runs the CRO (Chief Risk Officer) system companywide. We have established an emergency response system to deal with emergencies such as safety and environmental accidents and to minimize damage through the systematic management of such situations.

| | Normal | Emergency |
|---|---|---|
| CRO | · Hold companywide Crisis Management Committee meetings (semiannual).<br>· Facilitate regional S-CRO organizations.<br>· Check all accident-prone areas and order adjustments (issue a CRO Guide for each case). | · Regular consultation and meetings ▶ convert to an emergency system<br>· Issue an emergency mobilization order for individuals and organizations and resolve situations or grant the authority to do so.<br>· Review recurrence prevention countermeasures and approve action results for each case |
| S-CRO | · Host regional Crisis Management Committee meetings (quarterly).<br>· Check emergency notices and contact systems for each sector<br>· Follow up on activities to raise employee awareness on safety and accident prevention<br>· Check all accident-prone areas and order adjustments | · Report to the CRO about the results of accident investigation and analysis<br>· Issue an emergency mobilization order for the necessary regional manpower and organizations and resolve situations or grant the authority to do so.<br>· Verify recurrence prevention countermeasures and perform inspections |

# Workplace Safety Management

## Identification of Potential Risks

Samsung SDI takes measures to identify potential risks to prevent major disasters from occurring. According to Heinrich's Law, to prevent 1 major accident and 29 minor incidents, we make every effort to reduce the number of 300 unreported occurrences through the identification of potential risks companywide and to manage risk by registering such risks in relevant systems.

## Industrial Safety and Health Education

To support safety management for employees, we carry out safety education sessions every quarter, online and offline depending on the job category. In consideration of the practicality of prior safety education and its relevance to actual job performance, we conduct selective safety education according to the employees' preference. For the frequent accidents, we conduct special training based on actual accidents. In addition to such regular training and prevention exercises, we also run the "Environment & Safety Experience Center" that features safety experiences and fire escapes to raise employees' safety awareness and to respond calmly to unexpected accidents through hands-on activities at the center.

## Promotion of a Safe Culture

Samsung SDI conducts an online safety education every quarter to support employee safety management. In consideration of the practicality of existing safety education and its relevance in the workplace, we offer selective safety education in accordance with the preference of our employees. We conduct special training for frequent accidents based on actual cases of accidents at our company. In addition to such regular training and prevention exercises, we also offer safety drills at our Environment and Safety Experience Center together with fire drills in the event of a fire to raise employee awareness for safety and to help them respond calmly to unexpected accidents through hands-on activities at the center.

### 100 Days of Miracle - "0" Accidents

(2018. 09. 01~2018. 12. 09)

| | | |
|---|---|---|
| 1 | Awards for potential risk identification (Manufacturing: 1 case/month, Others: 1 case/entire period) | All business sites |
| 2 | Established and implemented group ground rules: each group | All business sites |
| 3 | Awards for group rule compliance: once a month per group | All business sites |
| 4 | Took actions to improve locations where accidents occurred throughout 2018: weekly performance check | All production sites |
| 5 | Supervisor safety seminars and meetings : outside lecturers, etc. | All production sites |
| 6 | Safety education for shift manufacturing workers (online→offline) | Shift mfg workers |
| 7 | Secured safety education venues per business site | All business site |
| 8 | Launched a 30-day improvement system for all types of accidents | All business site |
| 9 | Launched the pre-project risk factor evaluation system | Production sites |

## Spreading Safe Culture to Partners

We define the safety management for partners' as one of our responsibilities. We conduct companywide joint inspections to check their compliance to safety rules at each business site and request that corrective measures be taken when shortfalls have been detected. Most notably, we conducted safety seminars for partners' CEOs twice in 2018 to support their safety performance. At the seminars, we presented our suppliers' best safety practices, shared our safety policy directions and emphasized the importance of workers' safety awareness.

## Battery Safety Management

Samsung SDI recognizes the importance of preventing battery fire accidents and continues to make improvements in this regard. To that end, we have verified the ability of fire extinguishing agents according to battery fire characteristics and streamlined battery handling and storage processes while conducting education on battery risks and battery fire extinguisher exercises.

## BUSINESS CASE


### Seminar on Safety Consciousness for Partners' CEOs

To ensure a safe working environment for all workers at our workplaces, we carry out various activities to proliferate our safety culture. The commitment of the management staff at our partner companies is of utmost importance for all our workers to equip themselves with proper safety awareness and for us to achieve an accident-free workplace. In 2018, we held safety awareness and accident prevention seminars with our partner companies' CEOs. There were two seminars held in the first and second half of the year and 200 people from our partner companies took part. Participants shared the latest trends in industrial occupation legislation and built a consensus on the need to establish a robust safety culture.

# Chemical Substance Management

## Chemical Substance Management System

In July 2016, we established G-EHS system (Global EHS System) and since then, we have checked the legal compliance and conducted preliminary toxicity inspections (preliminary evaluations) for all the chemical substances we handle. In 2018, we upgraded this system. When registering information about new chemical substances an alarm goes off for any in-house restricted materials. To enhance the toxicity verification process, we now run a Substance Approval Committee. Most notably, we have expanded the application of our G-EHS system to our overseas corporations in Malaysia, Vietnam, and Tianjin and Xian in China where efforts are being made to stabilize and implement the system.

## Management of Chemical Substance at Workplaces

When purchasing and receiving chemical substances at our workplaces, we manage them according to our classification of chemicals (A, B, C)* based on the regulations for substances prohibited by domestic laws and international norms. Class A (Banned Hazardous Chemicals) is not allowed into the business site. Classes B and C (controlled substances) can be used upon obtaining consent of the Substance Approval Committee following its review of the relevant substance replacement and reduction plan as well as potential risk prevention measures. In addition to eliminating the risks of legal violation caused by false information or input mistakes in the MSDS (Material Safety Data Sheet) of chemicals, and improving its reliability, we had an outside professional chemical substance consulting firm carry out a third party conformity verification in 2018 for a total of 576 chemical substances we manufactured including materials and semi-finished goods across the areas of MSDS reliability evaluation and the hazard information and data verification.

* Class A: prohibited chemicals, Class B & C: controlled chemicals

## Work Environment Monitoring

We conduct work environment measurements every six months for our production and R&D divisions as well as our partner companies that handle chemicals which require legal measurements. We ensure that all our processes are maintained below the legally permitted exposure limits. For a pleasant working environment, we maintain chemical substances at 30% and specially controlled substances at 10% below the exposure limits.

## Management of Local Ventilation Facilities

To create a safe and pleasant working environment free from hazardous factors in manufacturing processes, we installed local ventilation facilities at locations dealing with chemical substances. We have the local ventilation systems inspected and evaluated more than once a year to ensure that the hoods, ducts, fans, etc. operate at the legally required flow velocity or higher. In 2016, we had an external consulting agency conduct a precise diagnosis of the local ventilation systems installed at our domestic workplaces. We made investments in facility upgrades to prevent the generation of hazardous factors and to enhance the air volume efficiency of ventilation facilities. In 2018, we applied the domestic improvement case to our overseas corporations and continued to improve working conditions there.

# Health and Healthcare Management

## Activities to Improve Employee Health

We ensure that employees with suspicious symptoms or health risks (obesity, hyperlipidemia, hypertension, diabetes) as a result of medical checkups will be able to receive sufficient follow-up care for their health. We conduct hazardous factor investigations every three years for those engaged in processes with the legally defined risk of musculoskeletal burdens. For new processes or changes in existing processes, we regularly conduct hazardous factor investigations and join forces with relevant divisions to make improvements where necessary. Our Cheonan and Gumi production sites run the musculoskeletal center to deal with musculoskeletal pain caused by lifestyle habits and work. Most notably, the Cheonan production site runs Total Health Care, a health promotion program that links its in-house clinic and gymnasium with the Medifit program to provide employees with high health risks with various services including physical strength measurement, strength training management and manual therapy to help them regain their health.

Medifit program at the Cheonan production site (manual therapy)

04

# Climate Change Response

GHG Reduction

52,877 $tCO_2e$

Energy Reduction

1,081 TJ

## WHAT ARE THE IMPORTANT ISSUES?

**We run production sites at major countries that signed the Paris Agreement. We comply with relevant laws in all those countries.**

In order to act against climate changes caused by GHG emissions, the government has implemented the K-ETS in 2015 with a goal to reduce emissions by 30% or more from the Business As Usual (BAU) projected for 2020. Voluntary reduction efforts of companies are in demand for heightened effectiveness of such policies. With the development of battery technologies, the era of IoT (Internet of Things), connecting humans to things and humans to space, is shifting to the age of the BoT (Battery of Things). The importance of batteries continues to grow. They are recognized as key components of various products. Stakeholders' interest in the environmental friendliness of batteries is also rising.

## OUR APPROACH

Samsung SDI complies with the environmental regulations of the countries where its headquarters and overseas business sites are located. In Korea, we continue to reduce and manage GHG and energy according to the Korean Emissions Trading System (K-ETS). Overseas, we set up our own GHG and energy reduction goals and continue to cut down on GHG emissions. Also, we have actively participated in policy meetings in relation to the introduction of green energy. We are reviewing various systems being implemented at the locations of our major business bases.

## KEY INDICATORS

| Category | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| GHG Reduction | $tCO_2e$ | 53,434 | 57,510 | **52,877** |
| Energy Reduction | TJ | 1,093 | 1,176 | **1,081** |

# STRATEGY AND MANAGEMENT APPROACH

## Climate Change Response Strategies

The Paris Agreement was signed in December 2015 at the COP21 to set up a new climate regime for 2020 and beyond. Compared to the Kyoto Protocol that required advanced countries to reduce GHG emissions, the agreement compels all signatories to reduce GHG emissions. Accordingly, all of them are required to submit their GHG emission goals and verify its implementation. To reduce GHG emissions, the major cause of climate change, Samsung SDI has made a goal of reducing its GHG emissions by BAU 30% for 2020 and have striven to reduce GHG emissions. We joined the K-ETS in 2015. Through the CDP, we also disclose our strategies to combat climate change and information on our efforts to reduce GHG emissions.

## Enhanced GHG Management of Overseas Corporations

We conduct GHG management education for our overseas corporations to improve their GHG management levels. In 2019, we plan to expand the application of our energy management system (s-GEMS) to overseas to help them enhance GHG management.

## Expanded Application of the Energy Management System

We strive to optimize our energy consumption through the expanded application of our energy management system (s-GEMS) to our overseas workplaces. We are implementing tasks designed to cut down on energy consumption. As for the volume of energy consumption, we seek outside monitoring and verification.
We have also introduced a utility facility management system whereby we have shifted our focus from facility management centered on controls and oversight to system establishment designed to analyze our operation patterns and efficiency in relation to our plan for integrated data management so that we can carry out operation monitoring from the perspective of optimal efficiency. As we have completed the domestic application of the utility facility management system, we are planning to set up the system in all our overseas workplaces by the end of 2019.

## Management of the Environmental Impact of Products

To efficiently cope with the new global climate regime, we are implementing eco-friendly business management by developing eco-friendly products throughout their entire lifecycles and efficiently using resources and energy.

### GHG Reduction Goals | Unit: $tCO_2e$


| Description | 2020 BAU emissions | Target year (2020) |
|---|---|---|
| GHG Emissions | 1,099,587 | 30 % BAU reduction |

* The GHG BAU reduction goal refers only to the energy business sector.

# Climate Change Response Activities

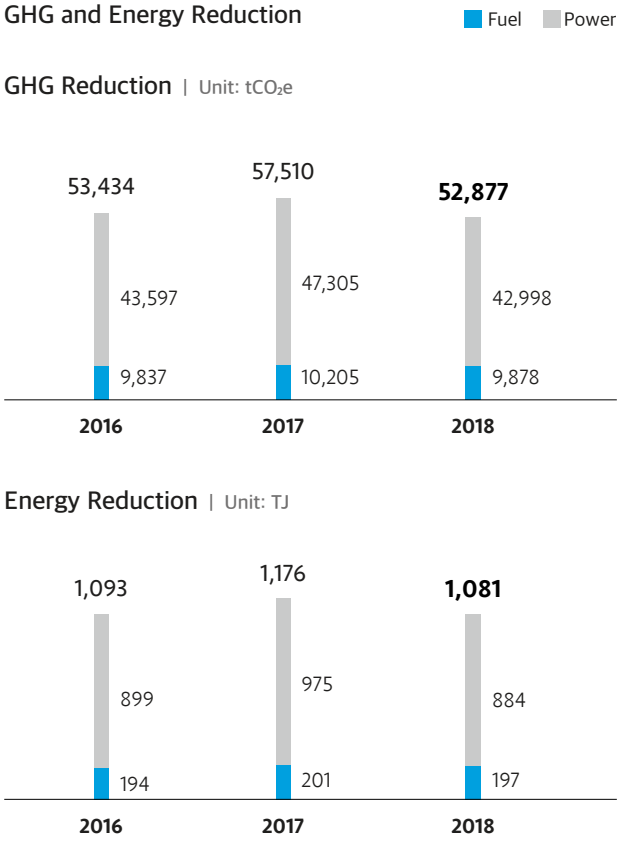
## Participation in the Emissions Trading System (K-ETS)

To actively respond to global climate change related regulations, we have taken part in the country's K-ETS that went into effect in 2015. We are equipped with a carbon management system (MRV/Monitoring, Reporting & Verification). We systematically manage our goals based on an IT system (s-GEMS). We undertook LED light replacement and waste heat recovery projects for all of our domestic workplaces during phase 1 of the ETS. Based on our monitoring system, we were acknowledged for achievements in our internal GHG emission reduction record (10,587 tons). In 2018, our GHG emissions increased due to the installation of new facilities and increases in production and product sales. We have made every effort to reduce GHG emissions through ongoing voluntary reduction efforts.

## Response to Carbon Disclosure Project (CDP)

The CDP is a non-profit organization that requests major listed firms in various countries to provide environmental management information on greenhouse gases and energy on behalf of financial institutions all over the world. Through the CDP, we transparently disclose information on our climate change strategies and our GHG reduction activities. There is a growing importance in the economic impact on climate change. We strive to analyze them objectively.

### GHG and Energy Reduction




# Energy Management

## Energy Conservation Activities

We actively promote energy consumption activities on behalf of energy consumers by setting energy conservation goals for business divisions and running a companywide energy conservation TF. For our major domestic workplaces, we conduct an energy efficiency diagnosis to identify reduction tasks. We make improvements in the operation of facilities that consume a lot of energy. We actively consider applying optimal technologies. We spare no effort in building low energy processes. In 2018, we changed the operation methods of the heating and cooling systems for the Training Center in our Giheung production site and optimized the operation of dehumidifiers installed at our Gumi, Ulsan, and Cheonan production sites as part of efforts to conserve energy.

### Major Energy Conservation Achievements

| | Actions | Results |
|---|---|---|
| Gumi | **Improved React Heat Condensate Traps for Dehumidifiers**<br>Our steam traps are designed to recover dehumidifier steam condensates and steam loss in operation which cause energy loss. We replaced them with orifice type steam condensate traps. | **Energy Conservation**<br>LNG: 153,732 Nm³/year<br>Electricity: 882,570 Kwh/year<br>**GHG Reduction**<br>: 751.61tCO₂<br>**Savings**: 190M KRW |
| Ulsan | **Air Volume Adjustment and Heating Temperature Change for Process Dehumidifier React Fans**<br>The dehumidification rotors were not able to cope with changes in humidity standards according to seasonal humidity condition changes. There was an excessive amount of dehumidification exhaust. To resolve the situation, we adjusted the processed dehumidification air volume and extra measures determined through energy consulting. | **Energy Conservation**<br>Power: 327,631 Kwh/year<br>**GHG Reduction**<br>: 152.758tCO₂<br>**Savings**: 33M KRW |
| Cheonan | **Optimization of Recovery Exhaust Air Volume for Dehumidifier Rotors**<br>We optimized rotor recovery exhaust air volume through the measurement of the rotor recovery exhaust air volume of each dehumidifier. | **Energy Conservation**<br>Electricity: 2,663,625kWh/year<br>**Savings**: 270M KRW/year |
| Giheung | **Changes in Heating and Cooling Methods in Giheung**<br>Changed the cold-water supply method from a hot & cold-water system to a refrigeration system for the training center building | **Savings**: 130M KRW/year |

# Management of the Environmental Impact of Products

## Implementation of LCA (Life Cycle Assessment)

According to our customers' demand, we carried out an LCA whereby we analyzed the GHG emitted from the entire process ranging from raw material extraction to product disposal and used the results to improve energy efficiency and minimize the impacts on the environment. In accordance with the LCA Principles as specified in ISO14040/44, we conduct LCA by collecting environmental information on energy and utilities in the manufacturing process and for the components. We use the energy consumption information available on the s-GEMS to work on each process. Also, with the information available on the Bill of Materials (BOM) regarding product components as well as the EHS system, we also carry out an LCA about the period from production to shipping. We establish strategies to minimize environmental impacts based on the results of careful study including that of energy consumption during the production processes. We also seek to develop highly energy-efficient products and to maximize the utilization of renewable energy to improve our performance in energy efficiency.

### LCA Processes

| | | |
|---|---|---|
| LCA | Analysis of Product and Manufacturing Processes | · Analysis of battery manufacturing processes<br>· Identification of process inputs and outputs |
| | Data Collection | · Inputs (raw materials, packing materials, power, energy, and industrial water)<br>· Outputs (products, wastes, air, and water contaminants)<br>· Transport information, etc. |
| | Data Processing | · Validation of collected data (Calculation errors, correlations, etc.)<br>· Data integration by unit process |
| | Establishment of Environmental Impacts | · Analysis of battery production processes<br>· Identification of process inputs and outputs |
| Echo Design | | · Identification of the major environmental issues of products based on LCA results<br>· Identification of all improvement tasks by stage |

# Green Energy

## Accelerated Introduction of Green Energy

Despite a worldwide trend of businesses using eco-friendly renewables to replace the energy use in their business to reduce environmental impacts, many companies in Korea are having a hard time using renewables simply because of the lack of systems and environments to purchase renewables in the country. In 2018, Samsung SDI actively participated in the government's policy meetings for the introduction of green energy nationwide while reviewing diverse systems being implemented at its major overseas business sites. Samsung SDI in Austria replaced about 81% of its total power consumption with renewables. We plan to urge all our workplaces to join the efforts in using green energy.

### Reduction of GHG Emissions through the EV Charging Infrastructure

To reduce our greenhouse gas emissions, we bought electric cars in 2018 and are waiting for authentication. In 2019, we are planning to use electric buses for employees' commuting purposes and more. We plan to complete the installation of an EV charging infrastructure for our employees at Garage 1 of the Giheung site by March 2019. Ten slow chargers will be installed. We will increase the number after checking the response. We will install five fast chargers in the second half of 2019 at the entrance parking lot used by both customers and employees. Our efforts to promote the use of EVs will enable us to continue to reduce our GHG emissions and make improvements in our environmental protection endeavors.

Samsung SDI Electric Bus

05

# Human Resource Management

Education Hours Per Capita

123 hours

## WHAT ARE THE IMPORTANT ISSUES?

**We focus on cultivating global talents equipped with expertise. We create an autonomous and creative organizational culture that motivates our employees to demonstrate their creativity and actively pursue it.**

To secure the differentiated technological capabilities required to lead industrial development, hiring and retaining global talents is paramount. Hence, it is becoming more and more critical to cultivate people with global competencies, increase their work immersion and create an autonomous and creative organizational culture in which they can exercise strong executive power.

## OUR APPROACH

Samsung SDI constantly strives to lay the groundwork for our employees' continuous growth. Global competition is intensifying in the battery and electronic materials sectors. We focus on fostering highly skilled personnel. We strive to build an HR management system where employees are evaluated according to their duties and expertise. As such, we try to expand our personnel pool of globally competent talents while continuously improving our HR management system and working environment. In 2018, we upgraded our employee education infrastructure for more efficient education and took significant measures so that our employees can achieve work-life balance through immersion and concentration at work. In addition, we are promoting the introduction of a system to motivate our employees to work with autonomy and responsibility. Starting with the overhaul of our hierarchical corporate title system, we are planning to embark on reforming our HR management system. Over time, we will shift to a task-based HR management system that cherishes our employees' expertise.

## KEY INDICATORS

| KPIs | Unit | 2018 Targets | 2018 Records | Achievements | 2019 Targets |
|---|---|---|---|---|---|
| Education Hours Per Capita | hours | 120 | 123 | ● | 120 |

# STRATEGY AND MANAGEMENT APPROACH

## Human Resource Development System

Excellent human resources are an essential element for a company that seeks to enhance its corporate competitiveness and respond flexibly to a rapidly changing business environment.

We conduct consistent capacity building training for our employees to improve their expertise while enhancing the efficiency of employee training through ongoing investments in the area.

Most notably, to cope with the fast pace of technological changes, we seek to secure technological competitiveness through enhanced education in development, process technology and facilities technology. In addition to our own education programs, we also help our employees enhance their job-specific expertise and competencies through industry-academia collaboration training courses and professional exam preparation courses.

## Building an Education Infrastructure

To help our employees enhance their capabilities, we continue to make improvements in our educational facilities and systems. In 2018, we built a total of 12 exam rooms and classrooms in the Human Resource Development Center located in Giheung HQ. Most notably, the center is equipped with a private language education and conversation ability test room so that employees' foreign language conversation abilities can be evaluated anytime as part of efforts to help our employees improve their foreign language fluency. In addition, we have upgraded the facilities and equipment at the Human Resources Development Center at the Cheonan plant. We have also built a Facilities Training Center with a floor area of 1,815m$^2$ to create a foundation for the training of facilities experts. Samsung SDI will continue to make investments in education and training to create a pleasant learning environment.

### Human Resource Development Center

In June 2018, Giheung HQ completed construction of the Human Resource Development Center with language test rooms and language classrooms to enable employees to sit for exams and study foreign languages.
In addition to having in-house official language test rooms, the center offers five foreign language courses to help employees enhance their global competitiveness.
In December 2018, more than 120 employees enrolled in various language courses, with more than 300 attending the Global Biz Writing Practice course designed for those who frequently communicate with our overseas corporations and customers.

### Facilities Training Center

The Facilities Training Center that opened its doors in June 2018 in Cheonan is in charge of overall facilities education from design to operation and maintenance. Equipped with training facilities, the center can offer customized education to anybody when required. With core parts and modules of the equipment used in actual production sites, the center offers theory and practice-based education with one kit per person. The center is responsible for producing experts through improving the quality of education in the field. One difference from outside education is that in addition to regular technical education, the center plays the role of a test bench for engineers who would like to have their ideas verified. The center will continue to identify the technical skills required by the company and develop new education courses accordingly.


# Enhancement of Employees' Expertise

## Strengthening Technological Leadership

Samsung SDI introduced the "Technical Meister" system in 2013 with the purposes of cultivating employees' job expertise and promoting a culture of self-directed learning.

The title Technical Meister is awarded to employees who have obtained three master technician* certificates or two master technician certificates and one technician certificate. A meister is given a certificate allowance, additional points for promotion, and inducted into the hall of fame with the creation of a copper-plate made in their honor. Starting with the installation of a hall of fame at the Cheongju plant in 2018, Samsung SDI has installed halls of fame at all its domestic production sites (Gumi, Cheongju, Cheonan, Ulsan). The technical meister system was expanded to all our production sites in 2016 and starting in 2017, all the sites began to produce technical meisters. The system has not only improved individuals' job performance and competitiveness but also helped raise the company's overall technological competence. We are planning to devise various programs that will tap into their expertise to generate specific outcomes steadily.

* master craftsman: the highest level for national technical qualifications


## Training of Job Experts

To enhance our employees' competencies, we offer online and offline education programs related to all aspects of our business such as development, technology, sales and marketing, and management support. Most notably, we have developed sophisticated courses on development, process technologies and facilities technologies that are offered by in-house expert instructors. We promote in-house seminars and learning cell activities while launching in-house courses according to technical need. To cultivate experts in the fields of development and technology, we offer our employees academic training for master's or doctorate degrees as well as non-degree training programs through an industry-academia collaboration. For those engaged in procurement, quality, management, and finance, we help our employees obtain national and international certificates through a professional certificate support program as part of our efforts to cultivate employees into experts in their respective fields.

## Global Capacity-Building Programs

Samsung SDI has launched various foreign language courses to fully support its employees' efforts to improve their foreign language proficiency and engage in self-development, a requirement in the global era. As self-development programs, we run 4- to 10-week residential intensive foreign language courses, in-house foreign language courses, OPIc courses, and global biz writing courses. The residential programs are designed to teach not only language, but also about business practices and culture. Foreign languages taught at the courses as well as global biz writing courses, in-house foreign language courses and special OPIc lectures include English, Chinese, Japanese and strategic languages. We help our employees obtain foreign language certificates. Currently, we run such foreign language courses at all six of our workplaces in Korea. In addition, we run local expert education programs as key global leader training courses including intensive foreign language classes and overseas study classes. In 2018, we dispatched our regional experts to China, Vietnam, Germany, and Hungary. They also helped with the local personnel of our overseas corporations enhance their capabilities.

### Education at Overseas Sales Offices

More than half of SDI personnel working around the globe are foreigners. They work in Asia, Europe, the Americas and elsewhere. Previously, we provided the personnel working at our overseas marketing firms with local education or headquarters education. In 2018, we offered them more field-oriented education in Korea at places such as Suwon, Cheonan, and Ulsan production sites as well as at the headquarters. We invited outstanding personnel from our marketing firms in China, Taiwan, the US, and Germany among others to Korea. During the first week, we shared our company's basic principles through classes such as core DNA, companywide compliance and information security policies. During the second and third weeks, we provided them with technology and manufacturing site education including intensive battery courses at our Cheonan and Ulsan production sites. In 2019, we are planning to expand education to our production plants and offer technology and leadership education for them.

## Hiring and Cultivation of Top Talents

Samsung SDI strives to create quality jobs at home and abroad and continues to secure global top talents. In 2018, we hired a large number of personnel in the fields of technology and manufacturing for our global production bases in Cheonan, Ulsan, Hungary, and Vietnam and worked hard to train them to be technology experts. We also had college career fairs and campus recruiting events in Korea and the United States to recruit global talents in the areas of R&D and technologies.

### Employee Education

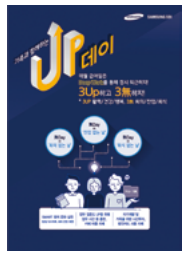
| Description | 2016 | 2017 | 2018 |
|---|---|---|---|
| Participants<br>* running total<br>Unit: person | 44,045 | 43,760 | **49,036** |
| Education hours per person (Korea)<br>Unit: hours | 100 | 103 | **123** |
| Education hours per person (overseas)<br>Unit: hours | 90 | 86.1 | **97** |

# Work-Life Balance

## Diverse Support Measures

To create a culture where our employees can work with autonomy and responsibility, we run various programs including flextime. By introducing a particular working-hour system, we have enabled our employees to control their own working hours so that they can increase their work immersion, and find time to achieve work-life balance. To facilitate their quality leisure activities, we pay keen attention to our overall employee vacation planning while encouraging them to use up their allotted holidays. Most notably, in the new system introduction and implementation processes, we consult closely with employee representatives and raise the satisfaction level by making changes through constant communication with all our employees. We also fully support our female employees so that they will not suffer difficulties at work due to pregnancy and childbirth. We offer them a choice of additional 12-month maternity leave on top of a 12-month mandatory maternity leave. We have installed mommy rooms in each of our workplaces. We also run day care centers so that our female workers can work without worrying about their children.

## Innovations in Work Culture



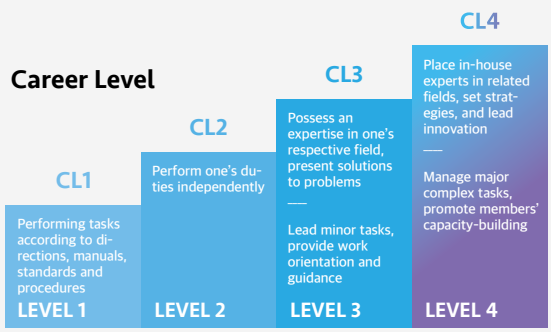

Work Immersion Campaign

Samsung SDI complies with the laws governing wage policies and working hours in the countries where it operates.

In Korea, the Labor Standards Act was amended in July 2018 so that the maximum weekly working hours should not exceed 52 hours. We embarked on the improvement of our work culture so that our employees could break from common practices and increase their work immersion and concentration systematically to achieve a work-life balance. In 2018, we launched the "Work Efficient Up" campaign to minimize the number of meetings and simplify the hierarchical reporting system. We have produced an educational video series that has dramatized our key workplace issues such as meetings, reports, immersion and task management and posted it on the in-house online bulletin board. We conduct a good manners campaign as well.

## BUSINESS CASE

### Change the Job Hierarchy Structure to a Career Level System




Stages of Job Expertise Development

As global competition heats up in the battery and electronic materials industries, securing human resources has become crucial. This determines industry leadership moving forward. To help our employees reach their fullest potential, we strive to create an organizational culture where they do not fear making mistakes and instead become enterprising and creative. We changed our traditional job hierarchy structure into a grade level system with the goals of building a horizontal organizational culture and improving our employees' expertise. According to the new systems, our employees are recognized for their performance and expertise. The career levels consist of four levels: CL1, CL2, CL3, and CL4. As our employees' expertise improves, for instance, they can expect their career levels to rise. The new system requires all our employees, except those in managerial positions, to functions as experts in their respective fields.

06

# Management of a Sustainable Supply Chain

Financial assistance

48.9 billion KRW

Training and Hiring Assistance

1,102 persons

## WHAT ARE THE IMPORTANT ISSUES?

**Under the slogan of "Grow as global leaders through win-win collaborations,' we promote CSR in our supply chain to grow with our partners.**

Following industrial convergence and diversification, it is critical to secure a competitive supply chain through collaboration in order to obtain global competitiveness. Stakeholders demand that businesses fulfill their social responsibilities toward their supply chains. Businesses can secure the sustainability of their business models by joining forces with their respective supply chains to faithfully implement their social and environmental responsibilities.

## OUR APPROACH

With the conviction that competent partner companies are a driving force behind corporate growth, we assisted our partners with an aim of creating virtuous cycles of corporate ecosystems instead of the one-way dispensation of favors. In 2018, with a focus on our partner companies' innovations in manufacturing and quality, we strove to enhance their innovation capabilities through assistance in training and hiring as well as the implementation of collaborative tasks. Also, as a global corporation, we carry out technology protection and payment risk prevention activities. In this regard, we continuously monitor our partners' risks in labor, safety and health, the environment, ethical management, and management systems and ensure that they comply with sustainability standards through cooperations with us. We pay particular attention to continuous monitoring for responsible mineral sourcing and to ensure that we fulfill our corporate social responsibilities (CSR) starting at the raw materials acquisition stage for the production of batteries and electronic materials. We are planning to expand a win-win cooperation system to our second- and third-tier partner companies so that our first-tier partners can establish a fair transaction culture with our second- and third-tier companies and so that we can expand the scope of our CSR activities.

## KEY INDICATORS

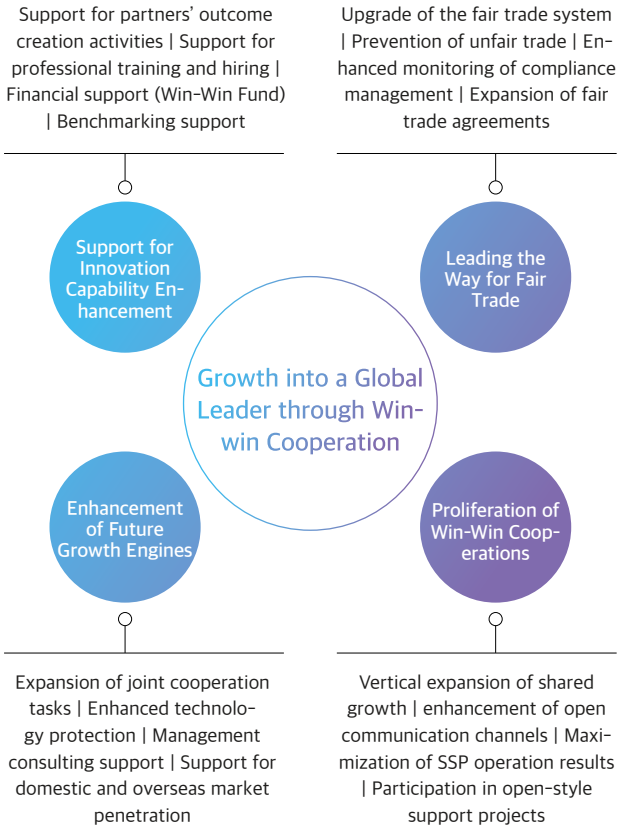
| KPIs | Unit | 2018 Targets | 2018 Records | Achievements | 2019 Targets |
|---|---|---|---|---|---|
| Financial assistance | KRW 100 million | Ongoing Expansion | 489 | ● | Ongoing Expansion |
| Manpower training support | Persons | 1,100 | 1,102 | ● | 1,120 |
| S-Partner Certification | Case | 100 | 91 | ◑ | 90 |

# STRATEGY AND MANAGEMENT APPROACH

## Win-Win Cooperation Promotion System

Samsung SDI manages the suppliers of raw materials used for the production of batteries and electronic materials as its major supply chain. Our supply chain is composed of the first-tier partners that supply raw materials and parts for the components and products that we produce and the second- and third-tier partners who supply raw and subsidiary materials to our first-tier partners. To ensure that systematic support is provided to the supply chain, the Win-Win Cooperation Bureau at the Purchase Team promotes compliance with fair trade legislation and partner companies' capacity-building. In 2018, we helped our partners in the areas of innovations in manufacturing and quality, training and hiring, and collaborative tasks. We continued to work with them on technology protection and payment risk reduction as a global corporation. On the basis of our corporate principles such as fair trade, safety, and ethics, we are planning to promote the establishment of a fair-trade culture between our first-tier partners and second- and third-tier partners.

### Win-Win Cooperation Promotion Plan (2019)



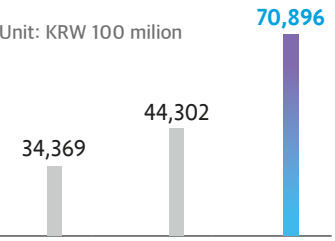

## Supply Chain Risk Management

For suppliers' social and environmental risk management, we have established a code of conduct for our suppliers, which must be obeyed by all our suppliers. All new partners are required to sign and submit the "CSR Compliance Agreement" as part of our efforts to minimize supply chain risks. For any violations, we recommend corrective measures. Should the violation continue, we place restrictions on future transactions. To secure transparency and fairness in our partner selection and management process, we carry out application reviews and conduct due diligence by checking not only financial status, production capabilities, and quality levels, but also production site safety, environment, and human rights protection as nonfinancial risks. Most notably, through the S-Partner certification system, we monitor our partners' risks in labor, ethics, environment and safety and health for their continuous improvement in the fields as part of our efforts to fulfill our duties to promote their social responsibilities and secure their sustainability.

## Fair Trade Policies

To establish a reasonable and fair trade order, we use a standard agreement in transactions with our partners. We proceed with purchase agreements with our partners under the following four principles: "Execution of desirable agreements," "Selection and registration of partners," "Establishment and operation of an In-House Deliberation Committee," and "Issuance and retention of written agreements." The Subcontract Deliberation Committee convenes every month to review fairness in contract execution processes including pricing as well as compliance with relevant laws for a subcontract worth a certain amount of money. The committee asks for corrective actions or imposes sanctions as required.

**Total Purchase Amount** | Unit: KRW 100 milion




| Description | 2016 | 2017 | 2018 |
|---|---|---|---|
| Raw materials | 28,590 | 37,512 | **55,921** |
| Facilities | 4,402 | 5,191 | **12,729** |
| MRO* | 1,091 | 1,384 | **2,035** |
| Outsourcing | 286 | 215 | **211** |

* MRO(Maintenance, Repair & Operation): Including packing costs

# Support for Win-Win Cooperation

## Support for Shared Growth

Samsung SDI has concluded fair trade and shared growth agreements with its suppliers to support various win-win cooperation programs. Some programs include not just first-tier partners with whom it is in a direct contractual relationship, but also third-tier partners as its support beneficiaries. To achieve joint growth, we plan to expand our support for second- and third-tier partners.

### Shared Growth Agreement | Unit: No. of companies

| Description | 2016 | 2017 | 2018 |
|---|---|---|---|
| 1st-tier partners | 112 | 110 | **111** |
| 2nd tier partners | 140 | 120 | **129** |

## Support for Securing Competitiveness

To enhance our partners' innovative capabilities, we help them in various areas such as financial support, professional personnel training, and hiring, overseas benchmarking and customized specialized consulting. For partners having a hard time with finance operations, we have upgraded our payment criteria and created a Win-Win Fund to support our first-, second- and third-tier partners. We take part in the Industrial Innovation Movement being promoted by the Ministry of Trade, Industry, and Energy and the Korea Chamber of Commerce and Industry to contribute to efforts to improve the country's industrial productivity and support innovation activities in manufacturing sites. In 2018, we provided offline education to 910 people from 137 partner companies and online education to 111 people from 11 partner companies.

### Financial Support | Unit: KRW 100 milion

| Description | 2016 | 2017 | 2018 |
|---|---|---|---|
| Direct support (Molding fee support, etc.) | 156 | 97.1 | **160** |
| Hybrid support (Win-Win Fund contributions*) | 270 | 270 | **325** |
| Special support (Education, etc.) | 12 | 11.8 | **4** |

* Eligible for first-, second- and third-tier partners

### Education Support | Unit: person/No. of companies

| Description | 2016 | 2017 | 2018 |
|---|---|---|---|
| Offline education | 727/86 | 759/75 | **910/137** |
| Online education | 138/9 | 146/14 | **111/11** |

## Support for Win-Win Cooperation between 1st and 2nd Partners

We have our first- and second-tier partners execute agreements to spread the win-win cooperation culture through financial and technological support. Through a win-win payment system, we monitor the payment status between our second-tier and third-tier partners and encourage them to improve their payment schemes.

## Enhancement of Technological Protection for Future Growth

Besides various win-win cooperation programs, we help our partner companies enhance their overall competitiveness through collaborations including joint research and development. As we increase our global business network, we promote shared growth with our partners by enhancing their global competitiveness. To technologically support our partners, we implement a conditional procurement system and results sharing system. To protect their technologies, we run "the Trade Secret Original Certification System" and support full expenses incurred with information registration.

In addition, we implement "the Technology Depot System" to deposit relevant technologies into a Large and Small Enterprise Cooperation Fund (KESCROW) so that our partners' interests can be protected in the event of technology leakage.

## BUSINESS CASE Securing Transparency and Reliability in Contract Procedures

For domestic workplaces, we undertake purchase agreement execution and management using a public certification method. For overseas corporations there have been various issues such as document loss or work inefficiency in manual labor due to the lack of the public certification method. Hence, we have established an e-contract system for our overseas corporation through blockchain technology for the first time in the Korean manufacturing industry. We have secured the transparency and reliability of contract-related work by managing signature and seal images and user passwords through blockchain. In 2018, we applied the system to all our corporations in China, Malaysia, and Hungary. When the relevant law goes into effect, we will apply the blockchain method in domestic e-contract management and expand blockchain applications to other areas as well. Also, overseas corporations depend on employees' manual work for their construction management ranging from contract management to final payment while construction management in Korea is being implemented through the G-SRM system. Thus, in order to prevent accidents caused by inadequate construction and carry out purchasing fairly, we standardized construction processes at our overseas corporation in 2018 including proposal, estimations, bidding, contractor selection, contract execution, and supervision.

# Enhancement of Cooperation through Communication

## Shared Growth through Information Sharing

We run a partner portal website (SRM) on which we not only manage new partners' registration and management, but also share information on diverse issues such as producing environmental restrictions and conflict minerals. We also run the Samsung SDI Partners' Association (SSP) and make a firm commitment toward win-win prosperity with partners. As of 2018, the association had 38 partners and held top management seminars and carried out overseas benchmarking tours for their representatives to grasp the global economic and industrial trends and cope with ongoing industrial changes worldwide.


Partner Consulting Channels

## Partner Communication Channels

To manage partners' grievances, we run "Partner Sinmungo" on our website to collect complaints and diverse opinions about unreasonable systems among others. We keep all the submitted information confidential and take corrective actions according to the relevant procedures. In 2018, we reflected "Partner VOS Operation Process" on our in-house rules "Partner Company Management Regulations" to set up our opinion gathering (dispute adjustment etc.) procedure and reporting system (CEO) among others.

## ASUNG PLATECH Won Outstanding Innovation Award on "2018 Shared Growth Day"

We celebrate Shared Growth Day annually to share our partners' innovation cases and recognize our outstanding partners.

ASUNG PLATECH is a supplier of plastic parts for automotive battery modules. They initially faced difficulty meeting requirements in terms of productivity and quality as it had specialized in automotive interior and exterior materials. In addition to quality improvements, process innovations were required as product order quantities increased. We joined forces with the company to find solutions.

### Securing Quality

To solve the burr defect problem of ASUNG PLATECH, we manufactured new molds. The existing molds were still usable, but to reduce burr occurrence due to mold erosion and to secure mold repair periods within the delivery periods, we fabricated additional molds. In the new mold fabrication and approval process, all relevant divisions of Samsung SDI and ASUNG PLATECH closely cooperated and obtained approval for the mass production of new molds.

### Productivity Improvement

Samsung SDI dispatched a professional consultant to ASUNG PLATECH for manufacturing innovation consulting. Following the analysis of operators' movements and processes, we improved the operating rate of the injection molding machine through a real-time accumulated management of injection production time. In the case of holder busbars, ASUNG PLATECH was able to improve productivity per person by 94% from 71 to 138 per hour following the minimization of non-operating losses. Previously, product inspection and packaging was done on the same floor. Following innovation consulting, the two jobs were assigned to different floors, logistical problems were resolved, and shipping efficiency was improved.

# Management of a Sustainable Supply Chain

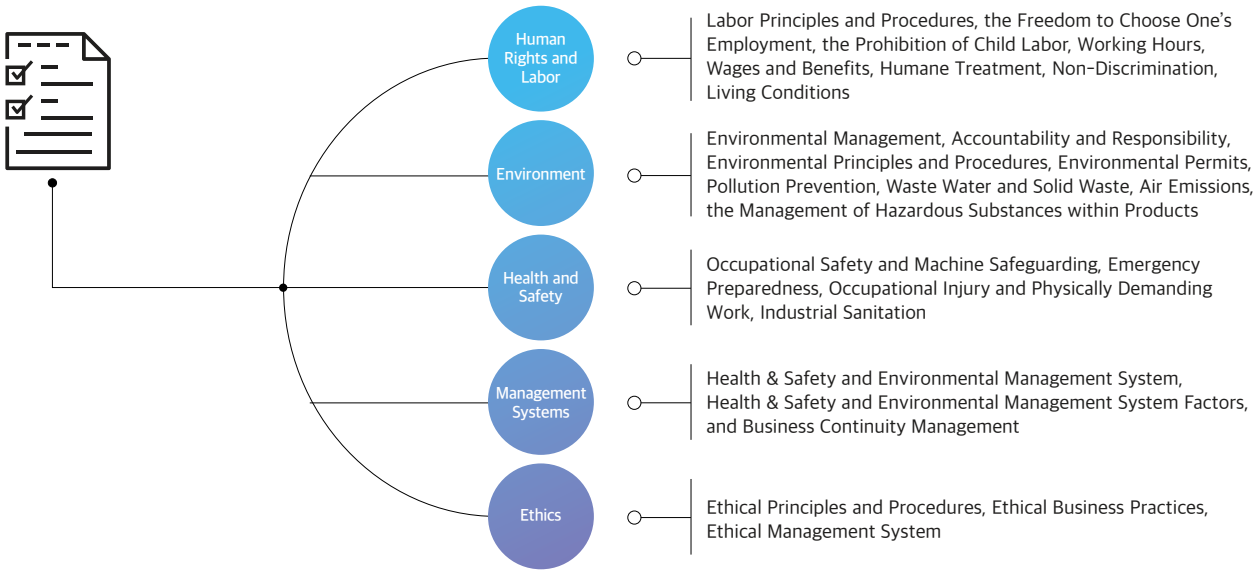
## S-Partner Certification System

We operate the S-Partner System as part of pre-emptive steps to improve our partners' working environment and eliminate potential risks related to human rights, labor, environment, safety, health and ethics. In 2017, we established the Samsung SDI Partner Code of Conduct based on the RBA Code of Conduct. We have since conducted education on the code among our partners every year to raise their awareness. We run the S-Partner certification system to ensure their compliance with the code, whereby their self-analysis and our on-site audits are carried about over their systems governing human rights, labor, environment, safety, health, ethics and business practices. We request them thorough compliance under the principles of intolerance regarding key provisions related to child labor, forced labor, pollutant discharge and environmental permits and licenses.

## S-Partner Evaluation Process

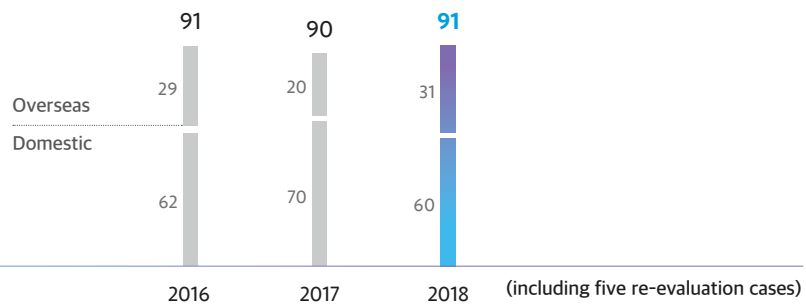
Every two years, we carry out the S-Partner certification evaluation for all our raw material suppliers including new partners. The evaluation consists of a self-diagnosis by our partners and on-site inspections by professional consultants commissioned by Samsung SDI. Re-evaluations are conducted for partners found to have violated key compliance items or to have fallen short of the stipulated overall scores (80 for existing partners and 70 for new partners). Also, regarding items found inappropriate by independent consultants, we ask relevant partners to submit improvement plans within one month. In 2018, we conducted evaluations for a total of 91 partners including 60 in Korea and 31 overseas, including re-evaluations for five companies at the bottom of our 2017 evaluation. The 2018 evaluation results indicated that none of them violated rules related to child labor or forced labor. Regarding some major violations detected in the areas of labor, environment, health and safety, we have asked relevant partners to submit improvement plans and to implement them.

### Evaluation Criteria




### S-Partner Certification Performance | Unit: cases

**91** cases in 2018




(including five re-evaluation cases)

# Responsible Mineral Sourcing

## Cobalt

Cobalt is a critical metal in the production of batteries for the automotive and electronics industries. The world's largest known reserves of this raw material are located in the Democratic Republic of the Congo. Large scale, industrial mining accounts for roughly 80-85% of Congolese cobalt production, with artisanal mining operations producing the remaining 15-20%. At present, companies are facing challenges in the areas of environment, health and safety, and human rights when cobalt is extracted through artisanal mining.

### Policy and Management System

For the past 3 years Samsung SDI has been striving at improving its due diligence policies and practices towards human rights, with an explicit mention for cobalt, in accordance to OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas. Starting from 2017 we have been very transparent about our policy and we publicly disclosed our policy through our website and a fully detailed progress report.

We communicate regularly our policy through training sessions to all our stakeholders, including our investors, suppliers, our purchasing department and our executive management

### Risk Assessment

We map regularly, on a yearly basis, the circumstances of our cobalt supply chain. Starting from 2018 we have been requiring our suppliers utilizing Cobalt to submit an industry-wide standard Cobalt Reporting Template ("CRT"). In 2018 we requested 19 suppliers to fill the CRT, and collected and processed data provided by 15 suppliers through their completion of the CRTs and other sources of information to map our supply chain to the smelter and refiner level and to the mine-site level, to the extent available. The response rate to the CRT request in 2018 was 79%. It is our responsibility to strive to increase the response rate for the years to come.

Based on our risk assessment, we have identified at least 4 major risks related to the cobalt value chain: (1) Child Labour and Human Rights Abuses, (2) Health & Safety Protection, (3) Environmental Pollution, (4) Bribery, although there is still a gap to fill in linking particular value chains to the related specific risks, given the lack of cooperation of few suppliers.

### Risk Response

In the year 2018 we have decided to partner with likeminded companies and try to address the risks associated with extraction, trade, handling and export of cobalt straight to the root, right in DRC. For more information please have a look at the call-out below "GIZ Project. Cobalt for Development"

## Cobalt for Development

Cobalt for Development

Samsung SDI, together with Samsung Electronics, BMW Group, and BASF SE has commissioned a fully privately financed pilot project, named Cobalt for Development, to the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The project aims to scrutinize, over a period of three years, how the living and working conditions in artisanal and small-scale mining and surrounding communities in the Democratic Republic of the Congo can be developed.

GIZ started to implement the project in D.R. Congo in February 2019 with an initial focus on one artisanal pilot mine site.

The aim is to contribute in developing better working standards for artisanal cobalt mines. Provided this pilot project is successful, these might be scaled up to other artisanal mines in D.R. Congo. Measures include workshops and training on health and safety standards (e.g. usage of adequate protective equipment), environmental management (e.g. reduction in air and water pollution) and management systems (e.g. legal compliance and effective access controls). Local stakeholders, such as mining cooperatives, are participating from the very beginning in implementing learned measures, strengthening their capacities and skills.

At the same time, the project seeks to improve living conditions in neighbouring communities by facilitating access to education, improving household budget management skills and strengthening alternative livelihoods.

Cobalt for Development builds on a feasibility study conducted by GIZ, and funded by BMW Group. Insights gained from visits to several artisanal mines, stakeholder interviews and surveys of miners and community members were instrumental in shaping the approach for the project.

The findings from the project will flow into the work of other initiatives that promote sustainable battery supply chains, such as the Global Battery Alliance.

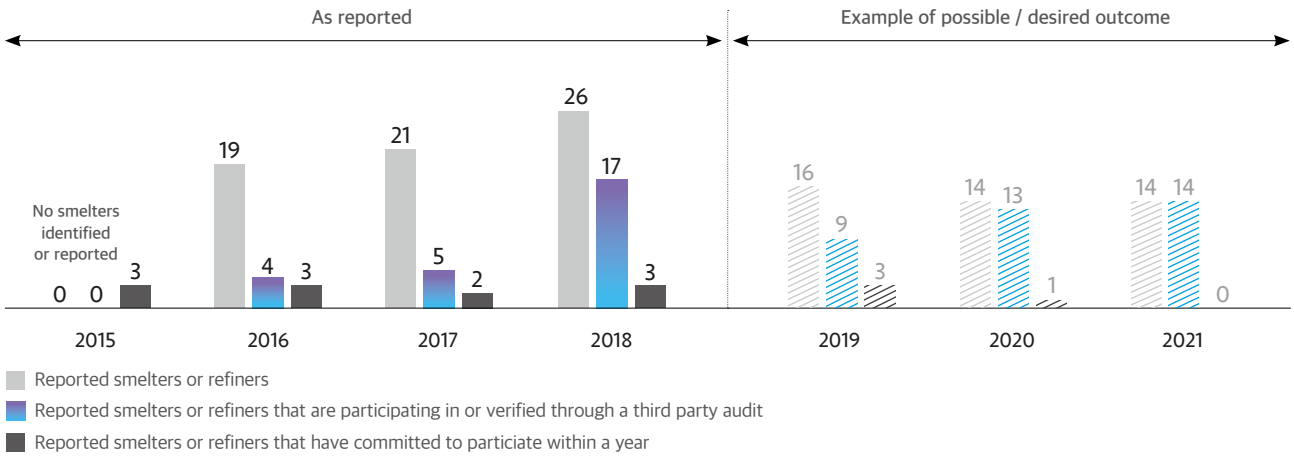
## Third Party Audits

Our goal is to see the pace of third party audits to accelerate. Since 2015, we have seen tangible improvements in the amount of cobalt refiners/smelters in our supply chain that decided to voluntarily undertake a third party audit, and we are hoping to see more by the end of 2019.

## Public Reporting

We keep on reporting publicly about our progresses in our cobalt supply chain through our sustainability report and a dedicated webpage on our website. We also publicly report, since 2017 our smelters list and the countries of origin.

Year over Year progress towards participating cobalt smelters and refiners in the Samsung SDI cobalt supply chain.




## Reported Smelters and Refiners

| | Smelters and Refiners | Plant |
|---|---|---|
| 1 | Chambishi Metals Plc | Zambia |
| 2 | CTT Guemassa | Morocco |
| 3 | Etoile | DRC |
| 4 | Freeport Kokkola | Finland |
| 5 | Gangzhou Yi Hao Umicore Industry Co., Ltd. | China |
| 6 | Ganzhou Tengyuan Cobalt New Material Co., Ltd. | China |
| 7 | Gem (Jiangsu) Cobalt Industrial Co., Ltd. | China |
| 8 | Guangdong Jiana Energy Technology Co., Ltd. | China |
| 9 | Guangxi Yinyi Advanced Material Co., Ltd. | China |
| 10 | Jiangsu Xiongfeng Technology Co., Ltd. | China |
| 11 | Jiangxi Jiangwu Cobalt Industry Co., Ltd | China |
| 12 | Jingmen GEM Co., Ltd. | China |
| 13 | JSC Kolskaya Mining and Metallurgical Company (Kola MMC) | Russia |
| 14 | Kamoto Copper Company | DRC |
| 15 | Lanzhou Jinchuan Advanced Materials Technology Co., Ltd. | China |
| 16 | Nantong Xinwei Nickel Cobalt Technology Development Co., Ltd. | China |
| 17 | New Era Group Zhejiang Zhongneng Cycle Technology Co., Ltd. | China |
| 18 | Norilsk Nickel Harjavalta Oy | Finland |
| 19 | Quzhou Huayou Cobalt New Material Co., Ltd. | China |
| 20 | SungEel HiTech Co.,Ltd. | Korea |
| 21 | Tianjin Maolian Science & Technology Co., Ltd. | China |
| 22 | Umicore Olen | Belgium |
| 23 | Usoke | DRC |
| 24 | Vale | New Caledonia |
| 25 | XTC New Energy Materials (Xiamen) Ltd. | China |
| 26 | Zhejiang Huayou Cobalt Co.,Ltd. | China |

## Reported Countries of Origin

| | The origin of cobalt |
|---|---|
| 1 | Australia |
| 2 | Democratic Republic of Congo (DRC) |
| 3 | New Caledonia |
| 4 | Madagascar |
| 5 | Russia |
| 6 | Finland |

## Graphite

Natural graphite is widely used as a key material in battery cathodes. Recent environmental pollution issues in the area includes fugitive dust generated during the extraction and processing stages in graphite mines in China.

In 2018, we established our own evaluation criteria for graphite suppliers in China and conducted on-site inspections for major graphite mines and suppliers in the country related to our products. For graphite mines and suppliers that are not involved in direct transaction relations with us, we asked our first-tier partners to carry out a self-diagnosis and to make the necessary improvements.

The findings at our on-site inspections indicate that Chinese graphite mines and processing plants related to our products are not involved with any environmental issues and that they have little negative impact on their neighboring communities.

We plan to carry out regular on-site inspections for the graphite mines and processing companies and make sure that the necessary improvements are made promptly.

## Conflict Minerals

Conflict minerals refer to the raw materials: tantalum, tin, tungsten and gold that are extracted in African conflict zones, benefited by armed groups, and often involve human rights violations and child labor among other social issues. We actively participate in efforts to eliminate the concerns of the international community regarding conflict minerals extracted from the Democratic Republic of the Congo and neighboring regions.

We have established conflict minerals management policies and management processes. We conduct relevant education for our partners at least once a year to distribute our policies. Also, through a conflict minerals management system, we check the performance of our supply chain and if we find a smelter that does not possess a conflict-free smelter certification, we strongly ask the relevant partner to deal only with certified smelters.

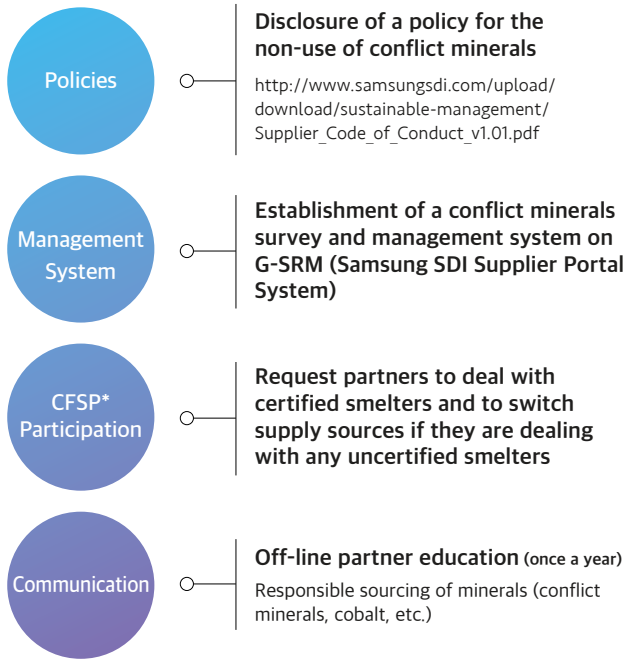
In the results of our 2018 survey regarding the use of conflict minerals, the smelters of the four minerals (tantalum, tin, tungsten and gold) used in Samsung SDI products have all acquired the certification that show that “they do not provide benefits to armed groups.”

### Major Evaluation Results from an Environmental Aspect

| Description | Major Content | Grade |
|---|---|---|
| Mines | · Cleanness of the mines (generation of fugitive dust in mining operations)<br>· Recycling of leachate from extraction instead of disposal as wastewater<br>· Compliance with environmental laws and annual implementation of environmental impact assessment | ● |
| Processing | · Air pollutants are released after having been first treated at air treatment facilities<br>· Wastewater treatment at the neighboring complex<br>· Compliance with legal requirements regarding the environment | ● |
| Community Impacts | · Impacts on the local environment including the neighboring arable land and streams | ● |
| Others | · Safety and health: Noise needs to be reduced<br>· Labor: Worker penalty rules need to be improved | ▲ |

Good ● Average ▲ Bad ×

### Conflict Minerals Improvement System




* CFSP: Conflict-Free Smelter Program

# SUSTAINABILITY DATA

## 01. Securing Future Growth Engines

### Financial Performance

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Revenue | Energy solutions | KRW 100 million | 34,302 | 43,324 | **69,542** |
| | Electronic materials | KRW 100 million | 17,706 | 20,142 | **22,041** |
| | Total | KRW 100 million | 52,008 | 63,466 | **91,583** |
| Operating income | | KRW 100 million | -9,263 | 1,169 | **7,150** |
| Net income | | KRW 100 million | 2,111 | 6,432 | **7,450** |
| Total assets | Stockholders' equity | KRW 100 million | 109,641 | 114,520 | **122,252** |
| | Liabilities | KRW 100 million | 39,362 | 42,897 | **71,245** |
| | Total assets | KRW 100 million | 149,003 | 157,417 | **193,497** |

### Output

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Energy solutions | Small-sized Li-ion batteries, etc. | Millions | 1,053 | 1,158 | **1,514** |
| Electronic materials | EMC | Tons | 6,218 | 6,236 | **6,341** |
| | Polarizing film | 1,000m$^2$ | 45,023 | 66,046 | **84,874** |

### Market Share

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Energy solutions | Small-sized Li-ion battery | % | 24 | 21 | **19** |
| | - Cylindrical | % | 26 | 24 | **23** |
| | - Prismatic | % | 25 | 25 | **20** |
| * Source: Reports by market research firm B3 | - Polymer | % | 14 | 14 | **13** |
| | Automotive battery | % | 7 | 7 | **5** |
| * Source: criteria of SNE Research | ESS | % | 21 | 35 | **46** |
| Electronic materials | EMC | % | 7 | 7 | **6** |

### Enhancement of R&D Capabilities

| R&D Investment | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| R&D costs | KRW 100 million | 5,525 | 5,259 | **6,040** |
| Investment/revenue | % | 10.6 | 8.3 | **6.6** |

| Training R&D Staff | Unit | 2018 | |
|---|---|---|---|
| | | Korea | Overseas |
| R&D staff | Persons | 2,260 | **375** |
| Companywide ratio of R&D staff | % | 22.2 | **2.6** |

| Patent Registration | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Korea | Cases | 4,273 | 4,314 | **4,689** |
| U.S. | Cases | 2,702 | 2,869 | **3,269** |
| China | Cases | 1,392 | 1,437 | **1,596** |
| Japan | Cases | 1,127 | 1,084 | **1,211** |
| Europe | Cases | 1,812 | 2,981 | **2,853** |
| Others | Cases | 580 | 619 | **766** |
| Total | Cases | 11,886 | 13,304 | **14,384** |

### Tax Risk Management (2018 Tax Payments by Country)

We comply with the tax laws of the countries where we run our business by faithfully filing and paying taxes. We assess our tax risks from various aspects. We prevent tax risks in advance through carefully checking global business sites and transaction partners. To comply with the regulations designed to prevent tax avoidance and evasion across the globe, we keep monitoring not only tax laws at home and abroad, but also the policies of tax authorities in different countries and regions for them to be reflected in our corporate tax policies.

(Unit: KRW)

| | | | |
|---|---|---|---|
| Korea | 141,334,370,420 | South-East Asia | 4,334,737,927 |
| Japan | 296,685,442 | China | 34,033,969,857 |
| America | 6,414,004,815 | South America | 4,338,053,536 |
| Europe | 22,453,601,167 | Hong Kong | 2,059,600,327 |

## 02. Securing Product Quality and Safety

### QM Staff Training

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Quality experts | Persons | 140 | 74 | 43 |
| QM training hours | Hours | 1,398 | 1,346 | 704 |

### QA Staff Training

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Ratio of qualified ISO 9001 auditors | % | 18 | 15 | 20.2 |
| Ratio of qualified QM staff (excluding ISO 9001) | % | 29 | 26 | 33.1 |

### Customer Satisfaction

| Description | | Unit | 2018 |
|---|---|---|---|
| Small-sized Li-ion battery | Score | Points | 82 |
| | No. of companies | Company | 23 |
| | No. of customers | Persons | 25 |
| Automotive battery & ESS | Score | Points | 90 |
| | No. of companies | Company | 4 |
| | No. of customers | Persons | 4 |
| Electronic materials* | No. of companies | Company | 26 |
| | No. of customers | Persons | 169 |

* We do not present scores for electronic materials due to too diverse kinds of products.

## 03. Workplace Safety and Health

### Safe Environment Inspections and Audits

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| CEO-led meetings | | Cases | 4 | 4 | 4 |
| Safe environment audits | Korea | Cases | 1,314 | 188 | 81 |
| | Overseas | Cases | 793 | 168 | 266 |

### Ratio of National Technical Certificates

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Industrial engineers or higher | % | 73 | 83 | 68 |
| Master craftsmen or higher | % | 17 | 37 | 21 |

## Industrial Accidents

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Employees | No. of accidents | Cases | 55 | 7 | **8** |
| | Accident rate | | 0.3000 | 0.0334 | **0.0377** |
| | - Korea | | 0.2943 | 0.0327 | **0.0763** |
| | - Overseas | | 0.3109 | 0.0339 | **0.0000** |
| | Illness rate | | 0 | 0 | **0.0054** |
| | Fatalities | Persons | 0 | 0 | **0** |
| In-house partners | No. of accidents | Cases | 1 | 0 | **1** |
| | Accident rate | | 0.0910 | 0.0000 | **0.0459** |

| Description | | Employees | | | In-house partners | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Korea | Overseas | Total | Korea | Overseas | Total | Korea | Overseas | Total |
| Injury rate | On a 300-day basis | 0.3472 | 0 | **0.1794** | 0.3157 | 0 | **0.1911** | 0.3434 | 0 | **0.1807** |
| Loss rate | | 33.1163 | 0 | **17.1181** | 21.4647 | 0 | **12.9969** | 29.1133 | 0 | **16.6851** |
| Incidence rate* | | 0.0833 | 0 | **0.0431** | 0.0758 | 0 | **0.0459** | 0.0858 | 0 | **0.0434** |

* Accident and Illness

# 04. Climate Change Response

## GHG Emissions

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Direct/indirect emissions | Total | $tCO_2e$ | 747,926 | 919,382 | **1,129,564** |
| | Domestic | $tCO_2e$ | 379,701 | 438,399 | **511,379** |
| | Overseas | $tCO_2e$ | 368,225 | 480,983 | **618,185** |
| | Direct emissions | $tCO_2e$ | 99,847 | 143,581 | **154,704** |
| | Indirect emissions | $tCO_2e$ | 648,080 | 775,801 | **974,860** |
| | Direct emissions intensity | $tCO_2e$/KRW 100 million | 14.38 | 14.49 | **12.33** |
| Other emissions | Employee trips | $tCO_2e$ | 2,184 | 4,331 | **4,385** |
| | Product transport | $tCO_2e$ | 768 | 516 | **562** |
| Emissions by product | Small-sized Li-ion batteries | $tCO_2e$ | 427,735 | 467,140 | **566,356** |
| | Automotive & ESS batteries | $tCO_2e$ | 178,479 | 221,133 | **331,027** |
| | Electronic materials | $tCO_2e$ | 110,924 | 197,008 | **189,661** |
| | R&D and others | $tCO_2e$ | 30,788 | 34,101 | **42,520** |

## Energy Consumption

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Total | TJ | 12,876 | 14,988 | **18,947** |
| Domestic | TJ | 8,033 | 8,609 | **10,509** |
| Overseas | TJ | 4,843 | 6,379 | **8,438** |
| Intensity | TJ/KRW 100 million | 0.25 | 0.24 | **0.21** |

### Energy Conservation Investments/Activities & Effects

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Total investments | | KRW 1 million | 2,312 | 3,522 | **1,840** |
| Fuel conservation activities | | Cases | 129 | 71 | **78** |
| Power conservation activities | | Cases | 513 | 390 | **634** |
| Conservation Effects | Total conservation | TJ | 1,093 | 1,176 | **1,081** |
| | Fuel conservation | TJ | 194 | 201 | **197** |
| | Power conservation | TJ | 899 | 975 | **884** |
| | Total conservation effects | KRW 100 million | 137 | 102 | **89** |
| | Fuel conservation effects | KRW 100 million | 28 | 11 | **10** |
| | Power conservation effects | KRW 100 million | 109 | 91 | **79** |

- Scope of data collection: all domestic and overseas production corporations, headquarters, and research centers except sales corporations and offices (only production corporations with production records in 2018 are included).
- Sales used in calculating the amounts in KRW are based on consolidated financial statements.

## 05. Human Resource Management

### Employees

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Total | | Persons | 19,353 | 22,142 | **24,718** |
| By gender | Males | Persons | 14,489 | 16,211 | **18,307** |
| | Females | Persons | 4,864 | 5,931 | **6,411** |
| By region | Korea | Persons | 9,200 | 9,258 | **10,268** |
| | Asia | Persons | 9,378 | 11,858 | **12,242** |
| | Europe | Persons | 694 | 895 | **2,037** |
| | America | Persons | 81 | 131 | **171** |
| By age | Under 30 | Persons | 9,253 | 4,595 | **12,185** |
| | 30-50 | Persons | 9,258 | 16,553 | **11,384** |
| | Over 50 | Persons | 842 | 994 | **1,149** |
| By employment type | Full-time | Persons | 17,631 | 20,078 | **22,410** |
| | Contract | Persons | 1,326 | 1,364 | **1,387** |
| | Dispatched* | Persons | 396 | 700 | **921** |

* Domestic dispatched employees include executive secretaries, administrative assistants, interpreters, and drivers whereas overseas dispatched employees include those engaged in manufacturing and packaging inspection tasks.

### Employment

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| By gender | Males | Persons | 3,201 | 4,999 | **6,046** |
| | Females | Persons | 1,496 | 3,007 | **2,142** |
| By region | Domestic | Persons | 755 | 684 | **1,128** |
| | Overseas | Persons | 3,942 | 7,322 | **7,060** |
| Total | | Persons | 4,697 | 8,006 | **8,188** |

### Training

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Hours per person - Korea | Hour | 100 | 103 | **123** |
| Costs per person - Korea | KRW | 1,097,022 | 990,632 | **984,151** |
| Hours per person - Overseas corporations* | Hour | 90 | 86.1 | **97** |
| Total costs | KRW 100 million | 82 | 83 | **97** |
| Total persons | Persons | 44,045 | 43,760 | **49,036** |

* excluding newly incorporated or acquired overseas corporations in 2019

### Training of Sales/Marketing Personnel

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Total sales/marketing personnel (domestic/overseas) | Persons | 289/160 | 314/160 | **328/185** |
| Ratio of sales/marketing personnel (domestic/overseas) | % | 3.2/1.6 | 3.4/1.2 | **3.2/1.3** |
| Sales/marketing training costs | KRW 1 million | - | 12 | **9** |

### Turnover

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Turnover Rate | Total | % | 22.3 | 27.4 | **22.2** |
| | Domestic | % | 13.6 | 2.4 | **2.5** |
| | Overseas | % | 30.2 | 45.6 | **35.9** |
| By gender | Males | % | 19.3 | 23.9 | **21.1** |
| | Females | % | 30.8 | 36.6 | **25.4** |
| By region | Asia | % | 31.5 | 48.1 | **37.2** |
| | Europe | % | 10.0 | 13.9 | **26.4** |
| | America | % | 24.1 | 11.5 | **28.7** |
| By age | Under 30 | % | 31.0 | 45.2 | **35.2** |
| | 30-50 | % | 10.5 | 12.0 | **11.3** |
| | Over 50 | % | 67.7 | 5.4 | **6.6** |

* From 2017, the calculation of the turnover rate is the number of staff leaving during the year divided by the average number of staff.

## 06. Management of a Sustainable Supply Chain

### Purchasing Amounts

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Total purchasing amounts | KRW 100 million | 34,369 | 44,302 | **70,896** |
| Raw/subsidiary materials | KRW 100 million | 28,590 | 37,512 | **55,921** |
| Facilities | KRW 100 million | 4,402 | 5,191 | **12,729** |
| MRO purchasing (incl. packaging materials) | KRW 100 million | 1,091 | 1,384 | **2,035** |
| Outsourcing costs | KRW 100 million | 286 | 215 | **211** |
| Ratio of partners' local purchasing (Battery Division) | % | 40.0 | 40.6 | **39.0** |

* MRO(Maintenance, Repair & Operation)

## Shared Growth Agreement

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| First-tier partners | Companies | 112 | 110 | 111 |
| Second-tier partners | Companies | 140 | 120 | 129 |

## Shared Growth Support Activities

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| **Financial support activities** | | | | |
| - Direct support (mold cost support, etc.) | KRW 100 million | 156 | 97.1 | 160 |
| - Mixed support (contributions to win-win fund)* | KRW 100 million | 270 | 270 | 325 |
| - Special support (education, etc.)* | KRW 100 million | 12 | 11.8 | 4 |

* available to first, second, and third-tier partners

| | | | | |
|---|---|---|---|---|
| **Direct/Indirect Management Support** | | | | |
| - Group training (partners) | Persons (companies) | 727(86) | 759(75) | 910(137) |
| - Online training (partners) | Persons (companies) | 138(9) | 146(14) | 111(11) |
| - Recruitment support* | Persons | 53 | 65 | 81 |
| | Companies | 6 | 7 | 4 |
| - Innovation guidance | Companies | 10 | 12 | 12 |

* support for youth job creation (between the ages of 15-30)

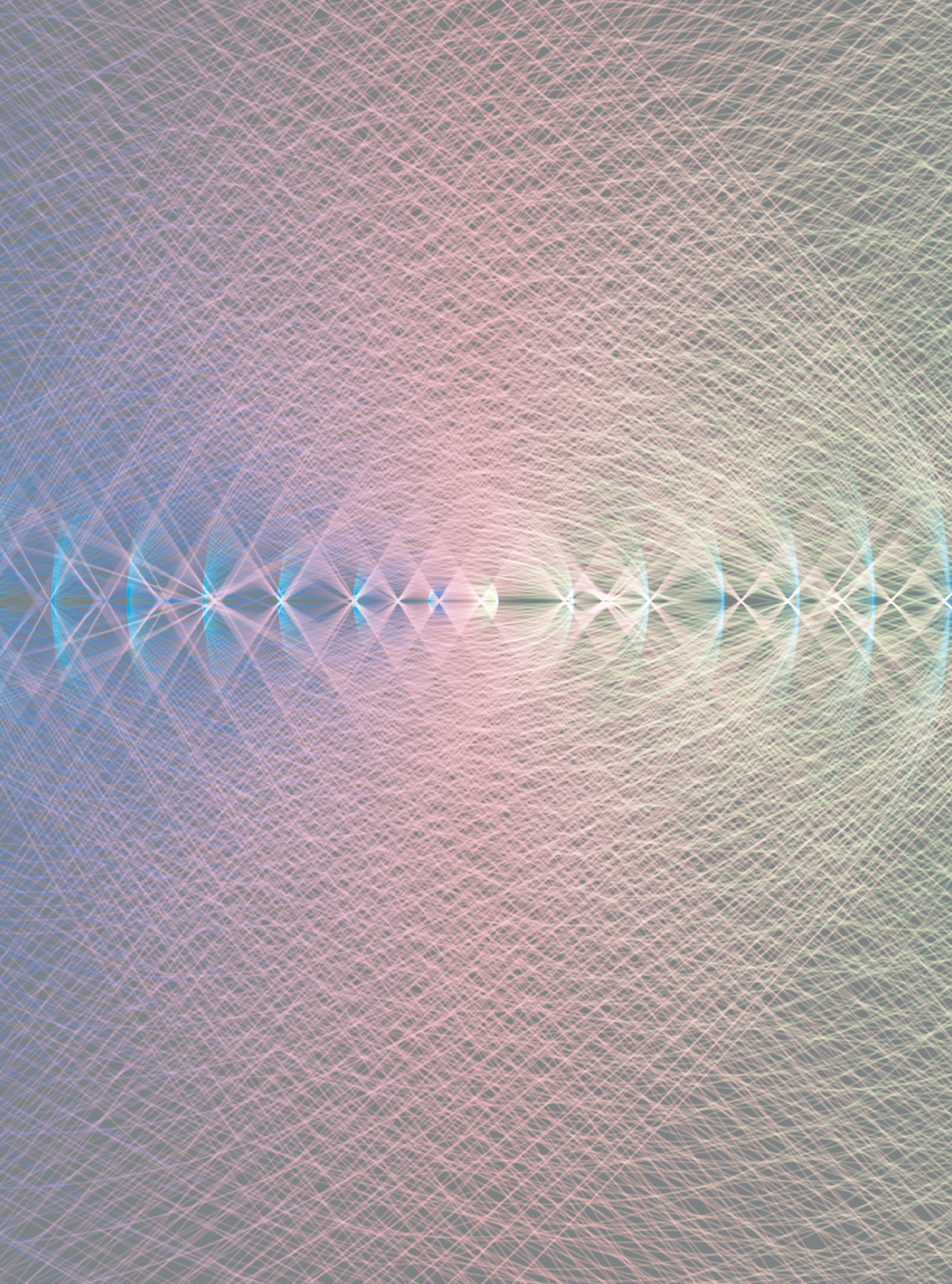
## Achievements in Shared Growth Support

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| **Achievements in Skill Support and Protection** | | | | |
| - Public-private joint investment development projects | Cases | 1 | 2 | 0 |
| - Conditional purchases (localization tasks) | Cases | 1 | 5 | 0 |
| - Original trade secret certification system | Cases | 5 | 19 | 47 |
| - Technical escrow system | Cases | 15 | 8 | 8 |
| **Achievements in New Market Penetration Support** | | | | |
| - Support for partners' buyer meetings | Cases | 7 | 6 | 6 |
| - Support for partners' trade fair exhibitions | Cases | 1 | 1 | 1 |
| - Support for partners' overseas benchmarking | Cases | 2 | 2 | 2 |
| - Participation in overseas corporations' info sessions with the Investment Authority | Cases | 1 | - | 1 |
| - Support for participation in overseas tech expositions | Cases | 2 | 1 | 1 |

## Achievements in S-Partner Certification

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Domestic | Cases | 62 | 70 | 60 |
| Overseas | Cases | 29 | 20 | 31 |
| Total | Cases | 91 | 90 | 91 |
| Partners that failed to meet certification criteria | Companies | - | - | - |

# FUNDAMENTAL



# GOVERNANCE

## BOD Composition

Our board of directors deliberates and makes decisions on matters specified in the laws and Articles of Incorporation or delegated by general meetings as well as other important matters related to our basic management policies and major business operations. As of March 2019, the board consisted of a total of seven directors, including three executive directors and four outside directors who account for 57% of board members.

The board chairman is selected from among the directors by a resolution of the Board. Any outside director may also be appointed as the chairman. All outside directors maintain independence from our management based on Article 382 of the Commercial Act regarding the ineligibility of outside directors and the provisions of Article 22 of our Articles of Incorporation. To prevent conflict of interest, outside directors cannot be engaged in business activities in the same category as our company's business activities without the BOD's consent according to Article 25 of the Articles of Incorporation.

## Selection of Directors

Directors are selected by a general meeting following strict evaluations and recommendations by the BOD and the Outside Director Nominations Committee. Our outside directors meet the qualifying criteria set forth in the related laws as well as in the Articles of Incorporation in addition to the fact that they are experts with a wealth of knowledge and experience in business management, economics, electronics and battery technologies not to mention overall industrial trends. Directors serve a term of three years. We make sure that the BOD pays keen attention to diverse social values involved in their decisions.

### BOD Composition

| Category | Name | Field | Major Experiences | BOD Roles |
|---|---|---|---|---|
| Executive Director | Young Hyun Jun | - | CEO and President | BOD Chairperson<br>Member of the Management Committee<br>Member of the Outside Director Nominations Committee |
| | Young No Kwon | - | Leader of Management Support Office | Member of the Management Committee<br>Member of the Outside Director Nominations Committee<br>Member of the Compensation Committee |
| | Tae Hyuk Ahn | - | Leader of Small-sized Li-ion Battery Business Divison | Member of the Management Committee<br>Member of the Outside Director Nominations Committee |
| Outside Director | Sung Jae Kim | Business administration | Prof. at Hankuk Univ. of Foreign Studies (Business Administration) | Chairman of Audit Committee<br>Chairman of the Internal Transaction Committee<br>Member of the Outside Director Nominations Committee<br>Member of the Compensation Committee |
| | Serck Joo Hong | Finance | CEO of Locus Capital Partners | Member of the Audit Committee<br>Member of the Internal Transaction Committee<br>Member of the Outside Director Nominations Committee<br>Chairman of the Compensation Committee |
| | Ran Do Kim | Customers | Prof. at the College of Human Ecology, Seoul National Univ. (Consumer Science) | Member of the Audit Committee<br>Member of the Internal Transaction Committee<br>Member of the Outside Director Nominations Committee |
| | Jai Hie Kim | Technology | Prof. at the College of Engineering, Yonsei Univ. (Electrical & Electronic Engineering) | Member of the Audit Committee<br>Member of the Internal Transaction Committee<br>Member of the Outside Director Nominations Committee |

* as of March, 2019

## Operation of the BOD

To help our outside directors improve their understanding of our business and deepen their expertise, we make sure that they visit domestic and overseas management sites and support them by providing current briefings. In addition, to ensure that they can leverage their expertise at the BOD or its committee meetings, we provide them with enough data to become familiarized with the relevant agenda upon arrangement of the meetings.

The Board of Directors holds regular meetings quarterly and ad-hoc meetings as required. BOD meetings are convened by the BOD chair or the CEO. In 2018, nine BOD meetings were held, and resolutions were made for a total of 35 agenda items. BOD resolutions are made by a majority of the members present. Those with conflicts of interest are not allowed to exercise their voting rights.

## BOD Subcommittees

To realize transparent, responsible business management and make better professional decisions, our BOD runs five subcommittees: the Management Committee, Audit Committee, Internal Transactions Committee, Outside Director Nominations Committee, and Compensation Committee. Our Board delegates some of its authority to subcommittees to enable more professional and effective decisions to be made on major issues.

## BOD Performance Evaluation and Remuneration

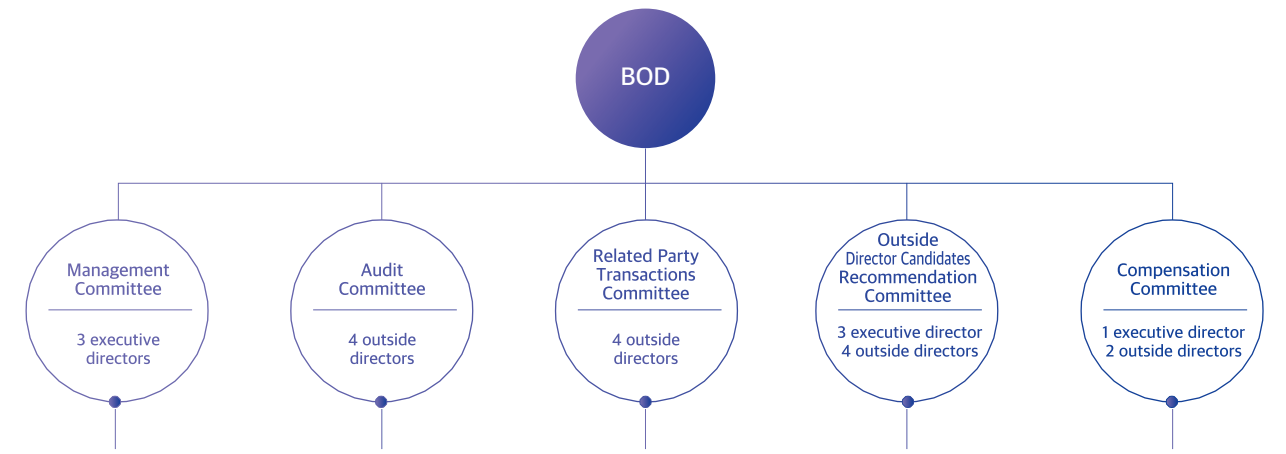
Directors' remuneration is discussed at BOD meetings with the evaluation of their expertise in business and technologies and their participation in BOD activities. The remuneration of executive directors is determined within the limits approved at the General Meeting and composed of a position-based base salary and performance-based bonus. Performance includes quantitative indicators related to economic performance such as revenue, net income and stock prices and non-quantitative indicators related to environmental and social performance such as safety, labor relations, insolvency, corruption, security and compliance.

### BOD Remuneration

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Net payment | KRW 100 million | 47 | 49 | **56** |
| Total BOD remuneration (executive directors) | KRW 1 million | 4,257 | 4,493 | **5,268** |
| Total BOD remuneration (outside directors & auditors) | KRW 1 million | 419 | 402 | **355** |
| Average remuneration per director (executive directors) | KRW 1 million | 710 | 899 | **1,317** |
| Average remuneration per director (outside directors & auditors) | KRW 1 million | 84 | 80 | **71** |

* as of 12/31/2018

### Composition for BOD Subcommittees




- Undertaking tasks according to the provisions of the Articles of Incorporation and resolutions by the BOD
- Deliberation and decision on matters delegated by the BOD

- Audits on accounting and business operations

- Ensuring the transparency of internal transactions and compliance with fair trade rules

- Recommending candidates for outside directors

- Deliberation of compensation ceilings for registered directors and matters delegated by the BOD

# COMPLIANCE

## Compliance Management System

We run compliance programs with the aim of ensuring that all our employees around the world comply with the rules and regulations when undertaking tasks. The programs include compliance in a variety of areas such as cartels, internal transactions, trade secrets, corruption prevention, personal information and subcontracts.Through the operation of our compliance programs composed of "Prevention – Inspection & Monitoring – Follow-up Management", we intend to preemptively respond to rapidly changing corporate environments while preventing and minimizing the risk of regulatory violations. For 2018, there were zero cases of imposed penalties or restrictions due to legal and regulatory violations.

Cases of imposed penalties, restrictions, etc., due to legal and regulatory violations in 2018

0

Compliance Activity Processes

**Preventive activities**

Compliance education, support for self-checks, pre-agreements, pre-reporting, operations of the Help Desk, etc.

**Inspections & monitoring**

Sensing, compliance risk checks, operation of a Hot Line (whistleblowing), etc.

**Follow-up Measures**

Evaluations and reporting, rewards or sanctions, compilation and publishing of violations, promotion of corrective actions, etc.

## Compliance System

To raise awareness of regulatory compliance among our employees as well as on the part of the corporate entity and to secure better performance in the area, we continue to conduct compliance education, inspection and monitoring activities. We run a compliance system that supports various compliance activities through which our employees can conveniently obtain access to appropriate support measures for compliance issues that might occur during their work anytime. They can also check the compliance guidelines and manuals and make use of diverse functions such as self-checking, pre-reporting, inquiries and whistleblowing easily in the system.

Most notably, to help enhance our employees' legal knowledge, we regularly update domestic and overseas legislation trends and related data in the system. In 2018, we registered major new compliance guidelines and job performance procedures with the Companywide SDI Policies Procedures Management System and developed them into in-house regulations. Through the improved accessibility to the data, we have increased our employees' compliance with the guidelines and procedures.

## Compliance Organization

To ensure that exclusive compliance units under the Compliance Support Team proceed with efficient compliance management, we run compliance implementation units according to our Compliance Control Regulation. Compliance implementation units are organized in each division with executives serving as their compliance implementation leaders and managers as their compliance implementation officers. The units play a part in encouraging their members to participate in compliance activities including compliance education and self-checking and to back up compliance inspection duties including the distribution of compliance related guidelines.

The Compliance Support Team provides regular compliance education to compliance implementation officers in addition to the supply of compliance newsletters and updates on major related legislation enactment and amendments so as to enhance the officers' job performance and capabilities. Furthermore, we reflect the performance of compliance implementation units in our annual organization and executive evaluations to motivate them to engage in compliance activities continuously and proactively.

## Compliance Education

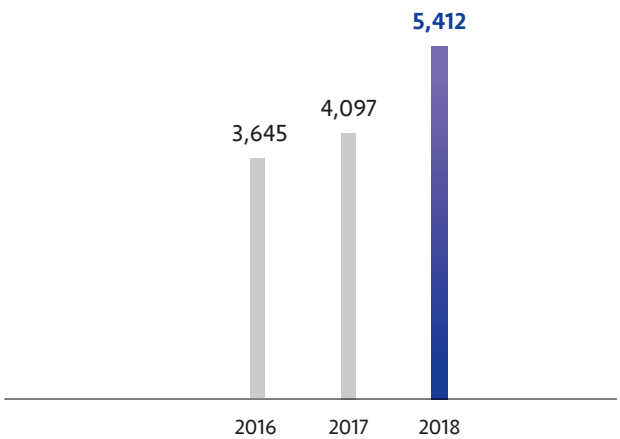
In 2018, we conducted compliance education through training by position and role levels. Most notably, for more efficient compliance education, we offered customized curricula to those that had to complete training in relevant courses. In sessions, we promoted discussion-oriented classes so that instructors and trainees could have interpersonal communication in small groups. To maximize trainees' interest and educational effects, we made sure that videos and audio narrations among others would be used actively. We also ensured that all our employees can enjoy educational equity in compliance education.

## Inspections and Monitoring

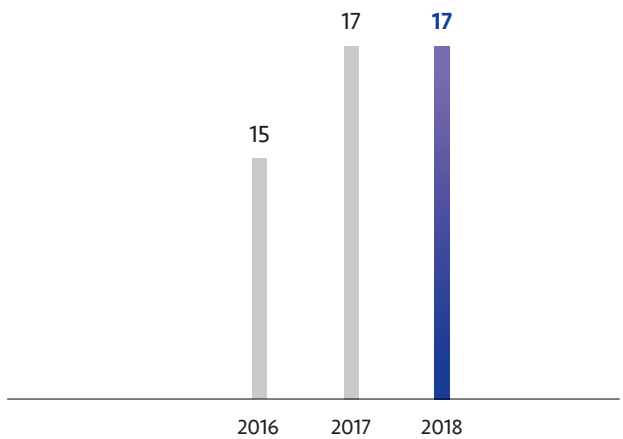
In 2018, we conducted compliance inspections regarding risks identified through the sensing and monitoring processes of compliance issues and related legislation. With the aim of actively reducing risk in advance, we offer consulting-type inspections and solutions based on the observation results of respective divisions with greater risk potential. The 2018 inspection results were also reflected in our education curricula, regulations and guidelines. To enhance the efficiency of corrective measures, we have established a post-inspection management process and improved upon the relevant features in our compliance system.

Compliance & Ethics Education | Unit: person

* Domestic running total




Compliance Inspection Activities | Unit: case




## Partner Consortium Education

We offer yearly consortium education designed for our partners, one of our essential stakeholders. Through the education, we share our compliance status with them and help them to enhance their legal capabilities as a means of enhancing a win-win cooperation.

In May 2018, we provided 53 partner companies with a two-day training course that consists of various topics such as compliance management, contract, fair trade, intellectual properties and the Improper Solicitation and Graft Act.

## Counseling and Whistleblower Channels

We receive whistleblower reports on superiors' unfair demands based on their authority as well as any noticeably dishonest or fraudulent conduct. We keep all those reports confidential and anonymous.

# HUMAN RIGHTS

## Human Rights Management

Companies pay keen attention to human rights management worldwide due to the potential for big problems they can create. International organizations and civic associations present diverse criteria that corporations must meet to fulfill their responsibilities of maintaining human rights. They also request that businesses meet their responsibilities for the protection of human rights and the promotion of diversity according to global standards and expand their scope of responsibility to their suppliers so that human rights violations do not occur in their supply chains, either.

Samsung SDI complies with the ILO conventions, the RBA (Responsible Business Alliance) Code of Conduct, and labor laws of the countries where it conducts business. We abide by standards on child labor, forced labor, working hours, wages and benefits, humanitarian treatment, the prohibition of discrimination, and freedom of assembly. Through monitoring not only our employees, but also our global business sites and partner companies, we guarantee the respect for workers and their dignity.

Each year, our headquarters or our corporations take the lead in undertaking monitoring for our global business sites and partner companies. The 2018 monitoring found no violations regarding child labor, forced labor or discriminatory measures.

## Management of Workplace Human Rights/Labor Impacts

We review our human rights and labor standards three to four times a year, identify factors that adversely affect human rights, and pay particular attention to the management of vulnerable areas and business sites. We manage human rights and labor impact based on a series of check lists made according to the Code of Conduct of the RBA (formerly the Electronic Industry Citizenship Coalition). In 2018, we carried out the self-diagnosis of human rights and compliance for all 14 overseas corporations (8 manufacturing sites and 6 sales offices) to check the risks involved. We identified areas that required improvement in the mid- to long-term and we have begun to take action on them.

## Respect for Diversity

We respect our employees' diversity, prohibit discrimination based on gender, religion or nationality, and provide every one of our employees with the same opportunities. We recognize our "difference" in our efforts to create a one-team organizational culture where employees with diverse cultural backgrounds, from around the world can fulfill their potential in their respective areas. We also fully support female staff and employees so that they can demonstrate their competitiveness and expertise while continuing to develop their capabilities.

### Employee Diversity | Unit: %

| Description | 2016 | 2017 | 2018 |
|---|---|---|---|
| Female employees | 25.1 | 26.8 | **25.9** |
| Ratio of female managers | 7.7 | 8.2 | **8.2** |
| Ratio of local recruits | 56.9 | 58.3 | **59.2** |

## Human Rights Education

We conduct education on sexual harassment for all our employees every year. To create a healthy organizational culture where all our employees comply with basic decency, we run a bulletin board called, "It Basic" on our corporate website and provide a practical guide on human rights issues.

The amendment of "The Equal Employment Opportunity and Work-Family Balance Assistance Act" related to sexual harassment at work among others went into effect in May 2018. We reflected the changes in our policy. We posted educational content on the prevention of sexual harassment on the "It Basic" bulletin board. In the practical guide, we specify what to do to prevent sexual harassment and verbal abuse and implement a better drinking culture while sharing information on disciplinary guidelines about the types of violations such as sexual harassment and information leakage.

## Evaluation and Compensation

The focus of employee evaluation has shifted to an evaluation of employee expertise following a change in the company's personnel management system from a rank-based system to a career level system. To enhance fairness in evaluation, we have replaced the traditional system of performance-based evaluation and compensation with a comprehensive review of employees' performance and leadership capabilities required at a higher level. We are planning to enhance the correlation between performance and compensation by applying a higher wage increase rate to those rising to CL3 or higher.

## Operation of Works Council

We run the Works Council composed of equal representation from labor and management. The council holds regular meetings every quarter in addition to ad-hoc meetings when necessary, to deal with major labor-management issues such as increasing wages and improving the working environment and worker health and safety among others.

We notify employees in advance of any significant changes in business management circumstances according to the procedures set forth in the relevant country's legislation for further discussion at council meetings. We immediately publish the results of council meetings to keep all our employees up-to-date with the latest developments.

## Promotion of Employee Communication

Samsung SDI runs various employee communication channels such as SDI talk, Global SDI Pick, and an in-house broadcasting station. We operate "SDI talk," a bulletin board for employees to post opinions freely. In April 2018, we launched Global SDI talk, a global newsletter that consists of diverse corporate news, with the goal of motivating SDI members all around the world to be part of One Team through communication. The newsletter consists of three sections such as "News in SDI," which contains major in-house news, "Leader in SDI" that conveys messages from the CEO and executives, and "Zoom in SDI" that talks about corporate business or introduces stories about employees' everyday stories. It serves as a medium of global communication among SDI members around the world.

In addition, we conduct an organizational culture diagnosis called the Samsung Culture Index (SCI) among our employees each year to uncover issues and work on them promptly. We reflect on the feedback collected through the diagnosis of improvement efforts to innovate our corporate culture.

## Grievance Mechanisms

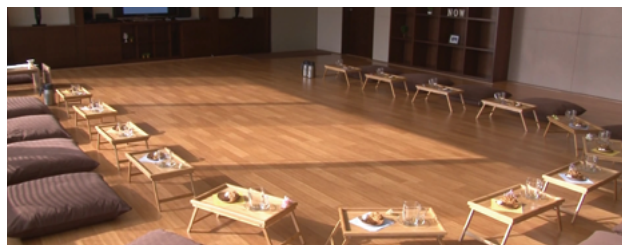
As part of our endeavors to create a healthy corporate culture, we run an online grievance board ("Sisicolcol") where employees post anonymous messages. We work on information posted on the board in accordance to the relevant procedures following the due investigative steps. In 2018, we received 887 bits of information and took proper action on them all. We will more actively collect employees' opinions and make improvements to create a better working environment.

### Actions on Employee Grievances (Korea) | * Only for Korea

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| No. of grievances | Cases | 414 | 441 | **887** |
| Resolution ratio | % | 100 | 95.2 | **99.9** |

## Life Coaching & Counseling Centers

For the promotion of employees' mental health and stress management, we run "Life Coaching & Counseling Centers" at all our domestic business sites. Staffed by certified professional counselors, the centers offer solutions to various psychological difficulties employees might suffer at work or elsewhere in their daily lives in order to reduce their stress and help them achieve self-development.



Meditation Room at the Cheonan Production Site

### Programs

- **Personal Counseling**
  - Psychological testing and personal counseling for employees and their families
  - One-on-one counseling to cope with job stress, depression and anxiety, and family relationships
- **Collective Programs/ Sessions**
  - Education sessions and collective programs related to mental health such as effective communication methods, stress management, team relationship improvement, and emotional control
- **Meditation**
  - Breathing meditation, walking meditation, tea meditation sessions are offered via the meditation rooms

# SOCIAL CONTRIBUTIONS

## Purpose of Social Contributions

Samsung SDI undertakes various activities to add value to global communities' by helping children and youths foster their dreams as an energy source for the future of the world by tapping into employees' talent while sharing their technologies and capabilities as an eco-friendly corporation with the local community. In 2018, we invested about 5 billion KRW in social contributions in Korea with more than half of it on academic research and education.

In 2019, under the new vision for social contributions titled: "Enabling People", we will embark on mid- to long-term social contribution strategies across four sectors. We will place a particular emphasis on "Education for Future Generations," which is also the main theme of our social contribution activities.

| Vision |

[ Enabling People ]

| Theme |

**Education for Future Generations**

| Four Major Sectors |


## Samsung SDI Major Social Contribution Activities

### Green Planet Environment School

As a creative leader of energy and state-of-the-art materials, we run a green energy & environment education program. Green Planet Environment School is an experiential education program teaching the importance of conservation and energy use to elementary school students. Our employees have taught at the school since 2011 providing various hands-on environmental education on renewables, global warming and eco-friendly vehicles. Most notably, we acquired a certification for our own education program from the Ministry of Education in 2015, which is a testament to the excellence of our educational program.
We offer summer camps to underprivileged children in five major regions of the country every year. With our exclusive education buses, we offer the mobile Green Planet Environment School to elementary school students all over Gyeonggi Province. In 2018, 9,149 students participated in the program thanks to the keen interest of parents as well as students. Thus far, a total of 26,210 students have joined the program school activities. In 2019, in association with the country's implementation of a free semester program for middle school students, we are planning to launch Green Planet Environment School for them to teach them the importance of conservation and green energy while allowing them to experience various career options available to them.


**26,210** Persons

Green Planet Environment School
Number of participating students

WE Dream School

WE Dream Home

## WE Dream School :: Children & Youths

### "Science Dream of I (SDI)" Science Class

Since 2016, Samsung SDI Suwon has offered two-hour science classes each month to underprivileged children who spend their after-school hours at local children's centers.

This provides opportunities for experience-based science, testing and experiments that are not available in their school curricula with the purposes of deepening their understanding of science and cultivating convergent and creative thinking among them. We will increase the chances for them to access science education as part of our efforts to reduce educational inequality.

"Science Dream of I (SDI)" Science Class

### Challenge! Golden Bell for Reading

Our Ulsan business site holds an annual event called "Challenge! Golden Bell for Reading," to encourage children in its neighboring local children's centers to read more and to give them an opportunity to show off their hidden talents. Amid the keen interest of local children's centers, 270 children participated in the 2018 event. A "Cheerful Athletic Meet" followed the Golden Bell competition to promote the children's balanced growth between mental and physical capabilities while having fun together with others.


Challenge! Golden Bell for Reading

### Sports School and Athletic Competitions for Students with Disabilities at Chungnam Province

In accordance with an MOU with Chungnam Provincial Government, our Cheonan site offered sports promotion programs for more than 4,100 adolescents with disabilities in the province between 2014 and 2018. After selecting those with stronger growth potential, we have helped them train to become elite athletes through subsequent SDI Sports School programs, which produced a total of 425 medalists in Korean Youth Para Games from 2014 to 2018.

### Field Day for Disabled Children

Every fall, Samsung SDI Gumi plays host to a field day for disabled children attending the Eungwang Child Care Center. An average of 170 people take part in the event including disabled children, their families, teachers and our volunteers who form pairs with the children one-on-one to create fond memories. The event launched in 2007 has established itself as a representative social contribution commitment by Samsung SDI Gumi.

Field Day for Disabled Children

### Donated Eyesight Recovery Project

In 1995, we signed an MOU with Siloam Eye Hospital to help the underprivileged that are at risk of going blind due to a lack of proper eye care. We have sponsored free eye surgery for some of them. We donated a mobile eye clinic bus equipped with state-of-the-art medical equipment such as operating microscopes and cataract surgery instruments to provide eye care services in rural areas, including islands, to those in need, but went untreated due to lack of cutting-edge medical services. So far more than 228,563 people have benefited from the eye care services. In 2018, 4,125 people received free eye care services including emergency eye surgery for 39 persons in the mobile eye clinic bus.

Free Eye Care and Surgery

WE Dream Green

## We Dream Green :: Environmental Production

### Moving Together

"Moving Together" is a social contribution activity in which those from our Cheonan site help single seniors and underprivileged households in Cheonan to move through an MOU with the municipal government of Cheonan. Launched in October 2005, the service helped a total of 300 households to move in January 2018. In addition to moving household items, the service improves living conditions by installing new wallpapers and flooring and upgrading existing electric power and water supply systems as well as providing free home appliances as "Hope Goods."


Moving Together

### Sharing the Kimchi of Love

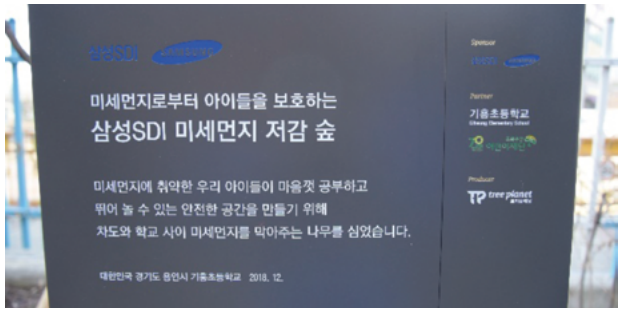
Through volunteer activities called "Sharing the Kimchi of Love," we share our heart with the disadvantaged in our local communities in the winter. In 2018, our six business sites in Korea participated in the event with their employees who had yet to learn how to make kimchi for the winter, to actively partake in the effort. A total of 7,200 heads of Napa cabbage kimchi were donated to local welfare institutions and delivered to single seniors, too.


Sharing the Kimchi of Love

### Creation of a School Forest (Dream Walking)

On our foundation day, we conduct an online walking campaign with the aim to pass on clean air to future generations. We contribute to a matching fund in proportion to the distance our employees walked that day. The funds are used to create school forests so that children can study and play at school worry free from fine dust.

In 2018, we planted 24 zelkova trees and 1,000 shrubs at Giheung Elementary School near our headquarters. We will continue with our school forest creation project to raise environmental awareness and act on practical solutions to environmental degradation.




Creation of School Forest (Dream Walking)

### Refining One Stream, per One Company

To celebrate World Water Day on March 22, all our business sites conduct activities to improve water quality and the environment of their nearby streams in coordination with local communities. In 2018, our 950 volunteer employees took part in the efforts while producing 1,000 pop-up books on the topic of the importance of water and delivering them to children's centers in their neighborhoods.

Refining One Stream, per One Company

WE Dream Global

## We Dream Global :: Go Global

### Sisterhood Support for Overseas Underprivileged Children

To improve the living environments of overseas children in impoverished areas, we support more than 400 children through sisterhood relationships based on matching contributions between the company and our employees. We promote their healthy growth through regular medical check-ups and free food and nutritional supplements while helping them receive quality education by supplying them with school supplies among others.

### Donation of "Hands-on" Handicraft Items to Vietnamese Children

Every October, we hold a Global Volunteer Festival worldwide along with our major overseas corporations which get involved in diverse social contribution activities customized for the development of their local communities. In 2018, our domestic employees presented children in Vietnam with school supplies including their own handicraft goods such as eco-bags, school bags and pencil cases. All our overseas corporations carried out social contribution activities reflecting their local characteristics including delivering Hope Goods to low-income households and providing the clean-up of environmental pollution.

Activities Involving the Donation of Handicrafts

### Language Education Support for Multicultural Families

We support bilingual education projects designed for a growing number of multicultural families across the country. With the purpose of helping marriage migrants learn Korean for their stable settlement in Korean society and giving their children opportunities to become bilingual, to be able to develop into global talents, we have signed an MOU with the Multicultural Family Support Center of Yongin City and supplied them with various goods.


MOU execution for the support of multicultural families' language education

## Employee Volunteer Services

### Blood-Donation Campaign

Our business sites carry out blood donation campaigns regularly. In 2018, 2,234 employees, up 318 from the previous year, donated blood. In addition, we collected 1,000 Blood Donor Cards from our employees and donated them to local trauma centers in need of blood. We consistently took actions on the country's blood shortage.

### Grand Volunteer Festival on Foundation Day

In June 2018, we held Grand Volunteer Festival throughout the entire month in celebration of our company's 48th anniversary. We wanted to express our gratitude to our local communities through our employees' active participation in diverse sharing activities with local communities. Young Hyun Jun, president and CEO, donated the entire amount of his Haedong Award. Combining donations from other employees, we installed an IT education room in the daycare center of a local community. We shared the pleasure of our company's 48th anniversary with our local communities through a whole host of other events such as Dream Walking aimed at creating school forests, making hands-on handicraft items and donation activities, and a series of Dream Talk Concerts led by celebrities.

### Talent Donation Campaign

Samsung SDI provides proactive support to help employees make the most of their personal competence and working knowledge in donating their talent. The Badminton Club provides regular training for the disabled in wheelchairs to learn badminton, and the Mountaineering Club breathes new life into mountain climbing activities with participation of visually impaired locals. We also offer consistent volunteer services to our underprivileged neighbors to improve the residential environment of severely handicapped people and to help children in local childcare centers focus on their studies through our volunteers' working knowledge and commitment. Members of the Photo Club of Samsung SDI Giheung have taken 624 yearbook pictures for students in Suwon Seokwang School, a special education school for students with disabilities, for 14 years since 2004. The members have also accompanied the students on graduation trips to create fond memories recorded in the students' yearbooks. They installed photo-taking booths at graduation ceremonies and took photos of the students and their family members to present them to the families as gifts.

Talent donation campaign (graduation ceremony of Seokwang School)

# ENVIRONMENTAL MANAGEMENT

We strive to reduce the environmental impact of all our business activities and throughout all production and consumption processes. We make every effort to increase the efficiency of our resource utilization at all our business sites. We reduce our environmental impact through the application of in-house standards for pollution management that are stricter than the government's minimum legal requirements.

## Management of Water Resources

### Management of Water and Wastewater

The importance of water and wastewater management is growing given the water scarcity and pollution of water resources. We strive to increase the efficiency of water usage in the manufacturing processes while promoting the efficient use of water resources through wastewater recycling and reuse.

We discharge our wastewater to sewage treatment facilities run by the government after first treating it at our wastewater treatment plants. In 2018, we upgraded the sewage transfer system at the Cheonan site for more stable wastewater treatment as the generation of organic wastewater (manufacturing and human waste) was anticipated to increase following the expansion of the M Line at the site among others.

### Wastewater Generation in 2018 | Unit: ton

| Description | Location | Quantity |
|---|---|---|
| Domestic | | 2,324,893 |
| | Giheung | 471 |
| | Suwon | 24,314 |
| | Cheonan | 829,579 |
| | Cheongju | 405,299 |
| | Gumi | 379,523 |
| | Ulsan | 685,707 |
| Overseas | | 1,140,695 |
| | Malaysia | 398,309 |
| | Tianjin | 45,665 |
| | Xian | 49,447 |
| | Wuxi | 562,843 |
| | Hungary | 84,431 |
| Total | | 3,465,588 |

* Scope of data collection: all domestic and overseas production sites, headquarters and research centers (excluding sales offices, overseas offices, and production facilities with no production records in 2017)

## Management of Pollutants

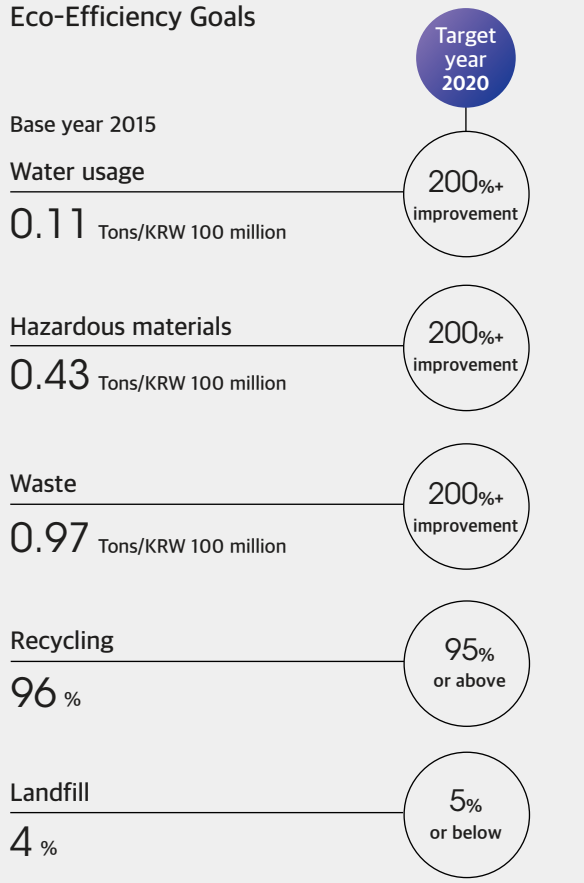
### Air Pollution Control

We control all possible sources of air pollution through the application of stricter in-house standards that exceed the legal requirements. To reaffirm the companywide measurement of air pollutants and its management, we conduct a "Companywide Monitoring of Air Pollution Measurement Results" every month. We take preemptive measures against all air pollution potential.

### Water Pollution Control

To verify the credibility of water pollutant measurements and analysis and to prevent environmental accidents from arising due to data errors, we carry out an "evaluation of water quality assessment capabilities" of those charged with our water quality assessment every year.

### Eco-Efficiency Goals



## Waste Management

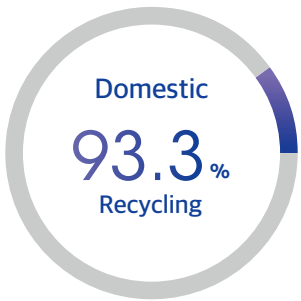
### Securing Waste Treatment Stability

We assign waste treatment to outside contractors. To secure their stability in waste treatment and to ensure that all the waste generated by our business sites are treated legally and according to the relevant environmental laws, we check with the businesses for any potential violations through the implementation of a "Legal Violation Statement" system. We keep them informed of our strong commitment to comply with all the legislation as a way of ensuring that our waste is treated properly.

### Waste Reduction Efforts

To minimize the generation of waste from our manufacturing processes, we promote further recycling based on the transition of waste into resources. Most notably, our plant in Gumi spiked its average recycling rate from 81.3% to 85.8% between 2017 and 2018 following its discovery of ways to recycle its SOD salt waste.

### Waste Management 2018




| Domestic | |
|---|---|
| Total waste | 68,746 Tons |
| General waste | 33,895 Tons |
| Designated waste | 34,852 Tons |
| Recycling quantity | 64,154 Tons |
| Recycling rate | 93.3% |
| Landfill rate | 6.7% |


| Overseas | |
|---|---|
| Total waste | 37,966 Tons |
| General waste | 33,136 Tons |
| Designated waste | 4,830 Tons |
| Recycling quantity | 35,282 Tons |
| Recycling rate | 93% |
| Landfill rate | 7.1% |

## Recycling

### Promotion of Recycling

As environmental pollution worsens due to global resource waste, a growing number of governments and NGOs requested a "resource circulation production method." Global clients also demonstrated strong interest in the Closed-Loop System that applies metals extracted from battery waste to new products.

Demand for metals used to produce batteries (cobalt, lithium, and nickel) continuously grows, raising price fluctuations and demand risks.

From this context, we are seeking to establish a recycling eco-system to preemptively respond to the demands of our customers and civic societies regarding resource recycling and to diversify our supply source of core raw materials.

* Closed-Loop: A system aimed at using metals extracted from battery waste in new products

### Resource Recovery Processes

There are two ways to recover battery waste for recycling.

First, the scraps generated in the process of manufacturing products are recovered in a factory. Second, waste batteries are recovered from consumers and sent to recycling companies to undergo a shredding and chemical treatment processes before being used to make key metal materials including cobalt and nickel.

We plan to establish a strategic collaboration system with battery customers and recycling companies for the recovery of waste batteries through a closed-loop system. In 2018, we had discussions with our partner companies about the establishment of a recycling process. We will start recycling in 2019 with scraps from plant operations. We will continue to establish and expand upon a collaborative network with diverse stakeholders to recover waste batteries from our customers.

# SUSTAINABILITY DATA

## Compliance

### Compliance & Ethics Education

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Samsung SDI | Corruption prevention (Domestic running total) | Persons | 22,969 | 9,377 | 4,591* |
| | Compliance & ethics (Domestic running total) | Persons | 3,645 | 4,097 | 5,412 |
| Supply chain | Compliance & ethics | Company | 57 | 80 | 53 |

* The 2018 number diminished due to the non-implementation of online education (2016) and special education (2017).

### Compliance Audits

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Compliance audits | Cases | 15 | 17 | 17 |

### Business Site Corruption Risk Evaluation

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| No. of business sites | EA | 30 | 30 | 30 |
| Sites evaluated as having corruption risks | EA | 4 | 2 | 2 |
| Ratio of sites evaluated as having corruption risks | % | 13 | 7 | 7 |

### Disciplinary Measures

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Disciplinary measures from corruption audits (Korea) | Persons | 42 | 20 | 2 |
| No. of terminated partners due to corruption | Company | - | - | - |

## Human Rights Management

### Diversity and Social Equality

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Disability employment | | Persons | 137 | 133 | 152 |
| Local employment | No. of local leaders * | Persons | 111 | 105 | 109 |
| | No. of local leaders in overseas branches | Persons | 195 | 180 | 184 |
| | Actual hiring rate | % | 56.9 | 58.3 | 59.2 |
| Female employment | No. of female managers or above | Persons | 274 | 303 | 316 |
| | No. of all managers or above | Persons | 3,570 | 3,715 | 3,858 |
| | Ratio of female managers or above | % | 7.7 | 8.2 | 8.2 |

* Managers or above include group and team leaders.

### Welfare and Benefits

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Welfare and benefit expenditures | | KRW 1 million | 282,779 | 255,013 | 297,369 |
| Parental leave | Return to work ratio* (2018 return ratio of those on 2017 leave) | % | 81.9 | 82.1 | 95.8 |
| | Re-entry ratio after parental leave* (re-entry ratio for employment for over 12 months) | % | 70.9 | 80.7 | 96.5 |
| SCI Assessment Score | | Points | 70.1 | 70.3 | 70.0 |

* Only for Korea

### Remuneration and Others

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Remuneration | KRW 1 million | 970,241 | 759,356 | 977,764 |
| Severance pay | KRW 1 million | 428,381 | 65,489 | 64,183 |
| Gender-based base remuneration ratio | Males/Females | 1:1 | 1:1 | 1:1 |
| Members of Works Council* | Persons | 52 | 52 | 52 |

* Only for Korea

### Grievances

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Resolution ratio (Korea) | % | 100 | 95.2 | 99.9 |
| No. of grievances (Korea) | Cases | 414 | 441 | 887 |

## Local Community Contributions

### Social Contribution Investments

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Social contribution amounts | KRW 100 million | 49 | 40 | 50 |
| Social welfare | % | 37.0 | 40.4 | 40.3 |
| Research and education | % | 54.9 | 45.6 | 52.9 |
| Healthcare | % | 1.0 | 3.1 | 2.4 |
| Sports promotion | % | 1.9 | 2.1 | 1.4 |
| Conservation | % | 2.8 | 6.7 | 0.7 |
| Culture and arts | % | 2.3 | 2.2 | 2.3 |
| Matching funds | KRW 100 million | 19.8 | 18.5 | 23.4 |

### Employee Engagement

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Engagement ratio | % | 98.6 | 97.0 | 98.0 |
| Volunteer hours per person (Korea) | Hours | 11.7 | 13.7 | 13.7 |

### Major Social Contribution Achievements

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Donated Eyesight Recovery Project (Accumulated) | Persons | 218,728 | 224,399 | 228,563 |
| Donated Eyesight Recovery Project (Treatment) | Persons | 6,243 | 5,615 | 4,125 |
| Donated Eyesight Recovery Project (Operation) | Persons | 73 | 56 | 39 |
| Green Planet Environment School (Accumulated) | Persons | 8,584 | 17,061 | 26,210 |
| Green Planet Environment School Beneficiaries | Persons | 5,356 | 8,477 | 9,149 |
| Green Planet Environment School satisfaction ratio | Points | 87 | 91.9 | 89.2 |
| Talent Nurturing Company Scholarship Recipients (Accumulated) | Persons | 94 | 104 | 114 |

# Environmental Management

## Water Resources

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Total consumption | 1K Tons | 5,646 | 6,408 | 7,927 |
| Domestic | 1K Tons | 3,399 | 3,484 | 3,485 |
| Overseas | 1K Tons | 2,247 | 2,924 | 4,442 |
| Intensity | 1K Tons/KRW 100 million | 0.11 | 0.10 | 0.09 |

## Wastewater

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Domestic quantity | 1K Tons | 2,535 | 1,960 | 2,325 |
| Overseas quantity | 1K Tons | 373 | 1,060 | 1,141 |
| Intensity | 1K Tons/KRW 100 million | 0.70 | 0.05 | 0.04 |

## Pollutants

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| **Discharge of Water Contaminants (Domestic)** | | | | |
| BOD intensity | Kg/KRW 100 million | 0.13 | 0.12 | 0.06 |
| COD intensity | Kg/KRW 100 million | 0.57 | 0.41 | 0.20 |
| SS intensity | Kg/KRW 100 million | 0.70 | 0.36 | 0.24 |
| **Emission of Air Pollutants (Domestic)** | | | | |
| NOx | Kg/KRW 100 million | 0.05 | 0.14 | 0.21 |
| SOx | Kg/KRW 100 million | 0.02 | 0.02 | 0.11 |
| Dust | Kg/KRW 100 million | 0.20 | 0.09 | 0.19 |
| **Ozone Depleting Substances** | | | | |
| Domestic quantity | kgCFC11eq | 52 | 52 | 239.50 |
| Overseas quantity | kgCFC11eq | 92 | 0.3 | 113.12 |
| Intensity | kCFC11eq/KRW 100 million | 0.003 | 0.001 | 0.004 |

* An annual basis calculation is difficult because certain overseas corporations have different measurement cycles for different types of pollutants.

## Hazardous Chemical Substance

| Description | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Total consumption | Tons | 20,694 | 26,097 | 47,103 |
| Domestic | Tons | 20,274 | 24,228 | 41,338 |
| Overseas | Tons | 420 | 1,869 | 5,764 |
| Intensity | Tons/KRW 100 million | 0.40 | 0.41 | 0.51 |

## Waste

| Description | | Unit | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Domestic | | Tons | 40,346 | 46,705 | 68,746 |
| Overseas | | Tons | 12,957 | 26,025 | 37,966 |
| Intensity | | Tons/KRW 100 million | 1.02 | 1.15 | 1.17 |
| Designated waste | | Tons | 21,922 | 25,225 | 39,682 |
| Domestic | Recycling | % | 97.7 | 99 | 93.3 |
| | Landfill | % | 1.9 | 1 | 6.7 |
| Overseas | Recycling | % | 84.8 | 92 | 92.9 |
| | Landfill | % | 15.2 | 8 | 7.1 |

| Description | | Unit | Total |
|---|---|---|---|
| Waste treatment | Incineration | Tons | 12,093 |
| | Landfill | Tons | 919 |
| | Recycling | Tons | 90,851 |
| | Total | Tons | 103,863 |

* The scope of data collection: All domestic and overseas production corporations, the HQ and research centers (except sales offices and production sites without production records in 2018)
* Amounts in KRW are based on consolidated financial statements.
* An annual basis calculation is difficult because certain overseas corporations have different measurement cycles for different types of pollutants.

# APPENDIX

# FINANCIAL DATA

## Consolidated Financial Statements (Unit: KRW)

The 49th as of 12/31/2018
The 48th as of 12/31/2017
The 47th as of 12/31/2016

| | End of 47th | End of 48th | End of 49th |
|---|---|---|---|
| Assets | | | |
| Current Assets | 3,958,265,726,800 | 3,584,576,077,532 | 5,519,342,209,666 |
| Cash and Cash Equivalents | 1,011,701,875,328 | 1,209,015,663,790 | 1,516,585,546,977 |
| Account Receivables and Other Receivables | 1,046,794,723,821 | 1,230,256,403,435 | 1,851,185,858,690 |
| Inventories | 729,058,574,260 | 966,571,644,365 | 1,745,650,833,399 |
| Other Investment Assets | 932,699,739,874 | 113,795,179,915 | 150,531,067,707 |
| Other Current Assets | 158,666,025,997 | 64,937,186,027 | 198,560,107,177 |
| Non-current Assets Held for Sale | 79,344,787,520 | - | 56,828,795,716 |
| Non-current Assets | 10,942,045,507,407 | 12,157,129,300,725 | 13,830,378,974,263 |
| Account Receivable and Other Receivable | 5,145,658,180 | 3,379,614,318 | 23,168,938,800 |
| Investments in Associates | 5,525,570,909,727 | 6,219,349,912,456 | 6,554,633,768,115 |
| Tangible Assets | 2,503,794,949,241 | 2,930,339,325,646 | 4,608,333,985,853 |
| Intangible Assets | 941,686,030,402 | 897,447,247,322 | 866,271,119,300 |
| Real Estate Investments | 145,683,976,159 | 149,914,778,172 | 149,725,014,028 |
| Pre-paid Salary Assets | 15,732,302,823 | - | - |
| Deferred Tax Assets | 38,421,655,680 | 41,407,873,779 | 51,799,609,019 |
| Other Investment Assets | 1,626,791,063,141 | 1,785,846,776,491 | 1,495,631,279,112 |
| Other Non-current Assets | 139,218,962,054 | 129,443,772,541 | 80,815,260,036 |
| Total Assets | 14,900,311,234,207 | 15,741,705,378,257 | 19,349,721,183,929 |
| Liabilities | | | |
| Current Liabilities | 2,212,795,893,287 | 2,664,061,476,102 | 4,012,822,498,262 |
| Account Payables and Other Payables | 1,658,167,209,814 | 1,485,918,600,167 | 2,145,075,054,015 |
| Current Tax Liabilities | 43,097,065,919 | 20,807,947,629 | 35,623,226,493 |
| Advance Payment | 77,372,218,374 | 44,172,530,214 | 69,598,588,790 |
| Unearned Revenue | 50,198,579,787 | 33,857,200,178 | 6,304,689,548 |
| Short-term Loan | 383,960,819,393 | 1,079,305,197,914 | 1,739,389,710,470 |
| Derivative Liabilities | - | - | 15,202,782,348 |
| Non-current assets as held for sale | - | - | 1,628,446,598 |
| Non-Current Liabilities | 1,723,405,113,962 | 1,625,644,404,713 | 3,111,679,469,477 |
| Account Payables and Other Payables | 218,037,566,906 | 181,119,003,713 | 291,312,664,392 |
| Long-term Unearned Revenue | 69,135,389,783 | 44,139,747,984 | 27,083,906,195 |
| Long-term Loan | 566,585,621,889 | 345,303,351,571 | 1,514,282,000,856 |
| Salary Payables | - | 25,621,629,290 | 70,146,754,408 |
| Derivative Liabilities | 19,211,000,000 | 20,220,577,592 | 29,866,610,049 |
| Deferred Tax Liabilities | 850,435,535,384 | 1,009,240,094,563 | 1,178,987,533,577 |
| Total Liabilities | 3,936,201,007,249 | 4,289,705,880,815 | 7,124,501,967,739 |
| Stockholder's Equity | | | |
| Controlling Interest | 10,722,130,891,929 | 11,257,301,680,704 | 11,934,022,744,253 |
| Capital Stock | 356,712,130,000 | 356,712,130,000 | 356,712,130,000 |
| Capital Surplus | 5,031,244,206,194 | 5,042,698,139,239 | 5,037,936,783,944 |
| Other Capital Items | -251,530,117,715 | -345,131,583,767 | -345,131,583,767 |
| Other Comprehensive Income | 590,987,395,653 | 602,435,774,875 | 271,989,660,350 |
| Retained Earnings | 4,994,717,277,797 | 5,600,587,220,357 | 6,612,515,753,726 |
| Non-Controlling Interests | 241,979,335,029 | 194,697,816,738 | 291,196,471,937 |
| Total Stockholder's Equity | 10,964,110,226,958 | 11,451,999,497,442 | 12,225,219,216,190 |
| Total Liabilities and Equity | 14,900,311,234,207 | 15,741,705,378,257 | 19,349,721,183,929 |

## Consolidated Statement of Comprehensive Income (Unit: KRW)

The 49th as of 12/31/2018
The 48th as of 12/31/2017
The 47th as of 12/31/2016

| | End of 47th | End of 48th | End of 49th |
|---|---|---|---|
| Revenue | 5,200,822,510,213 | 6,346,606,593,493 | 9,158,272,454,945 |
| Cost of Goods Sold | 4,450,250,017,519 | 5,180,761,473,455 | 7,118,188,528,425 |
| Gross Profit | 750,572,492,694 | 1,165,845,120,038 | 2,040,083,926,520 |
| Selling and Administrative Expenses | 1,676,905,126,686 | 1,048,950,333,520 | 1,325,113,320,369 |
| Operating Income (Loss) | -926,332,633,992 | 116,894,786,518 | 714,970,606,151 |
| Other Income | 522,463,321,541 | 196,226,647,012 | 129,512,316,584 |
| Other Expenses | 649,922,869,981 | 183,023,147,146 | 193,470,665,337 |
| Financial Income | 285,569,134,952 | 250,012,082,221 | 381,754,696,963 |
| Financial Expenses | 297,649,578,505 | 251,450,264,219 | 338,715,140,922 |
| Gains and Losses from Equity Method | 245,178,733,518 | 695,404,774,170 | 342,181,823,994 |
| Earnings (Loss) Before Taxes | -820,693,892,467 | 824,064,878,556 | 1,036,233,637,433 |
| Income Tax Expense | 57,809,852,547 | 180,871,015,592 | 291,184,451,986 |
| Income (Loss) from Continuing Operations | -878,503,745,014 | 643,193,862,964 | 745,049,185,447 |
| Income (Loss) from Discontinued Operations | 1,089,614,935,226 | - | - |
| Net Income (Loss) | 211,111,190,212 | 643,193,862,964 | 745,049,185,447 |
| Other Comprehensive Income | -222,175,443,064 | -6,154,449,821 | 51,278,320,541 |
| Items that will not be reclassified as profit or loss | -7,514,539,894 | 16,421,113,526 | 36,023,582,593 |
| Re-measurement of Net Defined Benefit Liabilities | -9,891,811,881 | 21,529,601,753 | -29,815,080,893 |
| Gain on valuation of financial assets from other comprehensive income measurements | - | - | 77,282,456,975 |
| Tax effects | 2,377,271,987 | -5,108,488,227 | -11,443,793,489 |
| Items that may be reclassified as profit or loss | -214,660,903,170 | -22,575,563,347 | 15,254,737,948 |
| Revaluation of financial assets available for sale | -319,318,208,339 | 171,461,576,116 | - |
| Changes in the capital under Equity Method | 107,468,284,369 | -1,625,771,441 | -6,897,968,336 |
| Revaluation of derivatives | - | - | -25,658,003,955 |
| Foreign currency translation | -54,772,638,958 | -156,923,295,181 | 39,557,923,656 |
| Tax effects | 51,961,659,758 | -35,488,072,841 | 8,252,786,583 |
| Total Comprehensive Income | -11,064,252,852 | 637,039,413,143 | 796,327,505,988 |
| Net Income (Loss) Attributable to: | | | |
| Controlling Interest | 219,405,853,323 | 657,236,340,934 | 701,166,336,925 |
| Non-Controlling Interest | -8,294,663,111 | -14,042,477,970 | 43,882,848,522 |
| Comprehensive Income (Loss) Attributable to: | | | |
| Controlling Interest | 21,129,717,383 | 685,105,833,682 | 748,427,028,644 |
| Non-Controlling Interest | -32,193,970,235 | -48,066,420,539 | 47,900,477,344 |
| Earnings Per Share (EPS) | | | |
| Basic and diluted earnings per ordinary share | 3,133 | 9,824 | 10,484 |
| Basic earnings (loss) per share from continuing operations | -12,434 | 9,824 | 10,484 |
| Basic earnings (loss) per share from discontinued operations | 15,567 | | |

# GRI STANDARDS INDEX

## Universal Standards (GRI 100)

| Classification | Disclosure | Indicators | Pages / References |
|---|---|---|---|
| Organizational Profile | 102-1 | Name of the organization | 10 |
| | 102-2 | Activities, brands, products, and services | 11, 14~17 |
| | 102-3 | Location of headquarters | 11 |
| | 102-4 | Location of operations | 11 |
| | 102-5 | Ownership and legal form | 11 |
| | 102-6 | Markets served | 12 |
| | 102-7 | Scale of the organization | 11~12 |
| | 102-8 | Information on employees and other workers | 65, Annual Report 171~172p |
| | 102-9 | Supply chain | 54~61, 66~67 |
| | 102-10 | Significant changes to the organization and its supply chain | N/A |
| | 102-11 | Precautionary Principle or approach | 43, 45, 55, 63, 72, 74 |
| | 102-12 | External initiatives | 22~23, 59~60 |
| | 102-13 | Membership of associations | 21 |
| Strategy | 102-14 | Statement from senior decision-maker | 6~7 |
| | 102-15 | Key impacts, risks, and opportunities | 6~7, 30~34 |
| Ethics and Integrity | 102-16 | Values, principles, standards, and norms of behavior | 72~73 |
| | 102-17 | Mechanisms for advice and concerns about ethics | 72~73 |
| Governance | 102-18 | Governance structure | 70~71 |
| | 102-22 | Composition of the highest governance body and its committees | 70~71 |
| | 102-23 | Chair of the highest governance body | 70 |
| | 102-24 | Nominating and selecting the highest governance body | 70 |
| | 102-25 | Conflicts of interest | 70 |
| | 102-26 | Role of highest governance body in setting purpose, values, and strategy | 70 |
| | 102-27 | Collective knowledge of highest governance body | 70 |
| | 102-28 | Evaluating the highest governance body's performance | 71 |
| | 102-35 | Remuneration policies | 71 |
| | 102-36 | Process for determining remuneration | 71 |
| | 102-38 | Annual total compensation ratio | 71 |
| Stakeholder Engagement | 102-40 | List of stakeholder groups | 21 |
| | 102-41 | Collective bargaining agreements | 75, 83 |
| | 102-42 | Identifying and selecting stakeholders | 21 |
| | 102-43 | Approach to stakeholder engagement | 21, 26 |
| | 102-44 | Key topics and concerns raised | 26~27 |
| Reporting Practice | 102-45 | Entities included in the consolidated financial statements | Annual Report 3~4p |
| | 102-46 | Defining report content and topic Boundaries | 26~27 |
| | 102-47 | List of material topics | 27 |
| | 102-48 | Restatements of information | 82 |
| | 102-49 | Changes in reporting | 4 |
| | 102-50 | Reporting period | 4 |
| | 102-51 | Date of most recent report | 4 |
| | 102-52 | Reporting cycle | 4 |
| | 102-53 | Contact point for questions regarding the report | 4 |
| | 102-54 | Claims of reporting in accordance with the GRI Standards | 4 |
| | 102-55 | GRI content index | 90~91 |
| | 102-56 | External assurance | 92~93 |
| Management Approach | 103-1 | Explanation of the material topic and its Boundary | 26~27 |
| | 103-2 | The management approach and its components | 30, 38, 42, 46, 50, 54 |

## Economic Performance (GRI 200)

| Classification | Disclosure | Indicators | Pages / References |
|---|---|---|---|
| Economic Performance | 201-1 | Direct economic value generated and distributed | 12~13 |
| | 201-2 | Financial implications and other risks and opportunities due to climate change | 46~47 |
| Market Presence | 202-2 | Proportion of senior management hired from the local community | 82 |
| Indirect Economic Impacts | 203-1 | Infrastructure investments and services supported | 76~79 |
| | 203-2 | Significant indirect economic impacts | 76~79 |
| Procurement Practices | 204-1 | Proportion of spending on local suppliers | 55, 66 |

| Classification | Disclosure | Indicators | Pages / References |
|---|---|---|---|
| Anti-corruption | 205-1 | Operations assessed for risks related to corruption | 72~73, 82 |
| | 205-2 | Communication and training about anti-corruption policies and procedures | 72~73, 82 |
| | 205-3 | Confirmed incidents of corruption and actions taken | 82 |
| Anti-competitive Behavior | 206-1 | Legal actions for anti-competitive behavior, anti-trust, and monopoly practices | 72~73 |

## Environmental Performance (GRI 300)

| Classification | Disclosure | Indicators | Pages / References |
|---|---|---|---|
| Energy | 302-1 | Energy consumption within the organization | 48, 64~65 |
| | 302-2 | Energy consumption outside of the organization | 48, 64~65 |
| | 302-3 | Energy intensity | 48, 64~65 |
| | 302-4 | Reduction of energy consumption | 46~49, 64~65 |
| | 302-5 | Reductions in energy requirements of products and services | 48~49, 65 |
| Water | 303-4 | Water discharge | 80 |
| | 303-5 | Water consumption | 84 |
| Emissions | 305-1 | Direct (Scope 1) GHG emissions | 64 |
| | 305-2 | Energy indirect (Scope 2) GHG emissions | 64 |
| | 305-3 | Other indirect (Scope 3) GHG emissions | 64 |
| | 305-4 | GHG emissions intensity | 48, 64 |
| | 305-5 | Reduction of GHG emissions | 48, 64 |
| | 305-6 | Emissions of ozone-depleting substances (ODS) | 80, 84 |
| | 305-7 | Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions | 80, 84 |
| Effluents and Waste | 306-1 | Water discharge by quality and destination | 80, 84 |
| | 306-2 | Waste by type and disposal method | 81, 85 |
| | 306-3 | Significant spills | N/A |
| Supplier Environmental Assessment | 308-1 | New suppliers that were screened using environmental criteria | 54~55, 58~61, 67 |
| | 308-2 | Negative environmental impacts in the supply chain and actions taken | 58~61, 67 |

## Social Performance (GRI 400)

| Classification | Disclosure | Indicators | Pages / References |
|---|---|---|---|
| Employment | 401-1 | New employee hires and employee turnover | 65~66 |
| | 401-2 | Benefits provided to full-time employees that are not provided to temporary or part-time employees | 74~75 |
| | 401-3 | Parental leave | 82 |
| Labor/Management Relations | 402-1 | Minimum notice periods regarding operational changes | 75 |
| Occupational Health and Safety | 403-1 | Occupational health and safety management system | 42~43 |
| | 403-2 | Hazard identification, risk assessment, and incident investigation | 42~45 |
| | 403-3 | Occupational health services | 42~45 |
| | 403-5 | Worker training on occupational health and safety | 42~45 |
| | 403-6 | Promotion of worker health | 45, 75 |
| | 403-7 | Prevention and mitigation of occupational health and safety impacts directly linked by business relationships | 42~45, 63 |
| | 403-8 | Workers covered by an occupational health and safety management system | 63~64 |
| | 403-9 | Work-related injuries | 64 |
| | 403-10 | Work-related ill health | 64 |
| Training and Education | 404-1 | Average hours of training per year per employee | 50~53, 66 |
| | 404-2 | Programs for upgrading employee skills and transition assistance programs | 50~53 |
| Diversity and Equal Opportunity | 405-1 | Diversity of governance bodies and employees | 70~71 |
| | 405-2 | Ratio of basic salary and remuneration of women to men | 83 |
| Non-discrimination | 406-1 | Incidents of discrimination and corrective actions taken | 74~75 |
| Human Rights Assessment | 412-1 | Operations that have been subject to human rights reviews or impact assessments | 58~61, 67, 74 |
| | 412-2 | Employee training on human rights policies or procedures | 74 |
| | 412-3 | Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening | 58~61 |
| Local Communities | 413-1 | Operations with local community engagement, impact assessments, and development programs | 83 |
| Supplier Social Assessment | 414-1 | New suppliers that were screened using social criteria | 58~61 |
| | 414-2 | Negative social impacts in the supply chain and actions taken | 54~61 |
| Customer Health and Safety | 416-1 | Assessment of the health and safety impacts of product and service categories | 38~41 |
| | 416-2 | Incidents of non-compliance concerning the health and safety impacts of products and services | N/A |
| Socioeconomic Compliance | 419-1 | Non-compliance with laws and regulations in the social and economic area | N/A |

# Independent Assurance Statement

DNV·GL

## INDEPENDENT ASSURANCE STATEMENT

### Introduction

SAMSUNG SDI CO., LTD. ("Samsung SDI") commissioned DNV GL Business Assurance Korea Ltd. ("DNV GL"), part of DNV GL Group, to undertake independent assurance of the Sustainability Report 2018 (the "Report"). The directors of Samsung SDI have sole responsibility for the preparation of the Report. The responsibility of DNV GL in performing the assurance work is to the management of Samsung SDI in accordance with the terms of reference. DNV GL's assurance engagements are based on the assumption that the data and information provided by the client to us as part of our review have been provided in good faith.

### Scope and Basis of assurance

Based on non-financial data and sustainability activities and performance data of 2018 generated from Samsung SDI, we have evaluated the adherence to AA1000 Accountability Principles (AP) 2018 and assessed the quality of sustainability performance information. We have reviewed that the Topic-specific disclosures of GRI Standards which are identified in the process for defining report content;

| | Material Topic | GRI Disclosure | | | Material Topic | GRI Disclosure |
|---|---|---|---|---|---|---|
| 1 | Securing Future Growth Engines | 201-1 | | 4 | Response to Climate change | 302-4 |
| 2 | Securing Product Quality and Safety | 416-2 | | 5 | Human Resource Management | 404-1 |
| 3 | Promotion of a Safe Workplace Culture | 403-5 | | 6 | Sustainable Supply Chain Management | 414-2 |

We performed our work using AA1000AS (2008) and DNV GL's assurance methodology VeriSustainTM[1] which is based on our professional experience, international assurance best practices. DNV GL provides Type 1 and the moderate level of assurance, and we applied the Type 2 for the selected data. The assurance was carried out April 2019. The site visits were made to Giheung HQ and Cheonan Plant in Gyeonggi-do of Korea. We undertook the following activities as part of the assurance process:

- challenged the sustainability-related statements and claims made in the Report and assessed the robustness of the underlying data management system, information flow and controls;
- interviewed representatives from the various departments;
- conducted document reviews, data sampling and interrogation of supporting databases and associated reporting system as they relate to selected content and performance data;
- reviewed the materiality assessment report.

### Limitations

The engagement excludes the sustainability management, performance and reporting practices of Samsung SDI' subsidiaries, associated companies, suppliers, contractors and any third-parties mentioned in the Report. We did not interview external stakeholders as part of this Assurance Engagement. Economic performance based on the financial data is cross-checked with internal documents, the audited consolidated financial statements and the announcement disclosed at the website of Korea Financial Supervisory Service (http://dart.fss.or.kr) as well as Samsung SDI's website (www.samsungsdi.co.kr). These documents, financial statements and the announcements are not included in this Assurance Engagement. Limited depth of evidence gathering including inquiry and analytical procedures and limited sampling at lower levels in the organization were applied. The baseline data for environmental and social performance are not verified, while the aggregated data at the corporate level are used for the verification. DNV GL expressly disclaims any liability or co-responsibility for any decision a person or an entity may make based on this Assurance Statement.

### Conclusion

On the basis of the work undertaken, nothing comes to our attention to suggest that the reported data and information disclosed in the Report do not give a fair representation of Samsung SDI's related sustainability performance nor is prepared 'in accordance' with GRI Standards Core option. Further opinions with regards to the adherence to the Principles are made below;

[1] The VeriSustain protocol is available upon request at DNV GL Website (www.dnvgl.com)

**The Principle of Inclusivity**

Samsung SDI has identified internal and external stakeholder groups such as Customers, Suppliers, Employees, Industry Association/Colleage/Research Institute and Local Communities/Civic Group, Government and Shareholders/Investors. Samsung SDI engages with the stakeholders at the company and business unit levels through various channels. The examples of approaches to engage with selected stakeholders and relevant organizations are described in the Report.

**The Principle of Materiality**

Samsung SDI has conducted the materiality assessment to prepare the Report. Various issues have been derived by analysing the topics covered in various global initiatives and standards, reviewing industry peers' reports and media reports. The issue pools were used on internal and external stakeholder survey to rate the material topics and subsequently material topics are prioritized. Samsung SDI has presented the management approach and major performances for each stakeholder issue in the Report. We have reviewed the materiality assessment process and noted relevant material topics prioritized from the process are addressed in the Report.

**The Principle of Responsiveness**

Samsung SDI has developed strategies and goals for material sustainability topics. The Report presents Samsung SDI 's sustainability and sustainability strategies and discloses the business results, decisions, key performance and future plan on material topics in terms of sustainability during the reporting period. In addition, Samsung SDI reports the impact of value creation through business model and value chain analysis based on six resources suggested by the IIRC[2], reports on their response strategies and activities to the impact and value of the UN SDGs. Through this, Samsung SDI quantitatively presents the integrated value considering of both positive and negative impact in the Report.

**The Principle of Impact**

The Report presents the direct and indirect impacts of material topics identified materiality assessment. We have reviewed that Samsung SDI identifies, monitors and assess the impacts of material topics to stakeholders. Samsung SDI could report measurable targets for medium- and long-term sustainability aspects in the future reporting and the progress.

**Quality on sustainability performance information**

We have tested data and information on a sampling basis. Further, selected data including water consumption, waste volume, and injury/diseases rate are tested with Type 2 methodology. DNV GL has interviewed the data owners in order to figure out the data control process and verified the selected data against the relevant documents and records. The intentional error or misstatement is not noted from the data and information disclosed in the Report. Data owners were able to demonstrate the origin and interpretation of the data in a reliable manner. Samsung SDI could report the information through consistent source that support comparability of data in the future reporting.

## Competence and Independence

DNV GL applies its own management standards and compliance policies for quality control, in accordance with DNV GL applies its own management standards and compliance policies for quality control, in accordance with ISO/IEC 17021:2011 - Conformity Assessment Requirements for bodies providing audit and certification of management systems, and accordingly maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements. We have complied with the DNV GL Code of Conduct[3] during the assurance engagement and maintain independence where required by relevant ethical requirements. DNV GL was not involved in the preparation of statements or data included in the Report except for this Assurance Statement. DNV GL maintains complete impartiality toward stakeholders interviewed during the assurance process. DNV GL have no other contract with Samsung SDI and did not provide any services to Samsung SDI in 2019 that could compromise the independence or impartiality of our work.

May 2019
Seoul, Korea

Jang Sup Lee
Country Representative
DNV GL Business Assurance Korea Ltd.

AA1000 Licensed Assurance Provider 000-10

[2] The International Integrated Reporting Council
[3] DNV GL Code of Conduct is available from DNV GL website (www.dnvgl.com)

# GHG Verification Statement

kfq Korean Foundation for Quality

IQNet

## Third Party's Verification Statement

### ■ Introduction

Korean Foundation for Quality (hereinafter 'KFQ') has been engaged by Samsung SDI Co., Ltd.(hereinafter the 'Company') to independently verify its 2018 Greenhouse Gas Emission Report of domestic corporations and 9 overseas subsidiaries.
It is the responsibility of the Company to compile the Greenhouse Gas Emission Report according to the 'Guidelines for GHG emission reporting and certification of GHG emission trading scheme (Notification No. 2018-78 of Ministry of Trade, Industry and Energy), 'Verification Guidelines for the operation of GHG Emission Trading Scheme (Notification No. 2018-70 of Ministry of Environment)', and 'ISO 14064-1:2006', and KFQ has responsibility to conduct verification based on the ISO 14064-3 to provide verification opinion on compliance of the Report against verification criteria.

### ■ Verification Scope

In this verification, domestic corporations and 9 overseas subsidiaries under operational control of Samsung SDI Co., Ltd., and reported emission in including Scope 1 and Scope 2 emission. Scope 3(Indirect-business trip and logistics) is also considered in total Greenhouse Gas Emission.

### ■ Verification Opinion

Through the verification process according to the ISO 14064-3, KFQ could obtain reasonable basis to express following conclusion on the Greenhouse Gas Emission Report.

1) 2018 Samsung SDI Co., Ltd., Greenhouse Gas Emission Report was prepared against 'Guidelines for emission reporting and certification of greenhouse gas emission trading scheme', and 'ISO 14064-1:2006':
2) As a result of materiality assessment on 2018 domestic Greenhouse Gas Emission(Scope 1 and Scope 2), material discrepancy is less than the criteria of 2.5% for the organization who emits greater than 500,000 $tCO_2eq/yr$ and less than 5,000,000 $tCO_2eq/yr$ in accordance with the requirements of the 'Verification Guidelines for the operation of GHG Emission Trading Scheme' :
3) For the 9 overseas subsidiaries, material assessment was conducted according to the document review result and it shows that material discrepancy is less than 2.5%.
4) Among reported Greenhouse Gas Emission purchased electricity and LNG consumption take most of total emission. Activity data of these emission sources were checked through the objective evidence provided by supplier therefore KFQ could confirm that these activity data is valid itself.
   For the overseas subsidiaries, national net caloric value and electricity emission factor were preferentially used but net caloric value in 'Guidelines for GHG emission reporting and certification of GHG emission trading scheme' was used in case of nonexistence of it.
   For the Scope 3 of the domestic corporation, its emission was calculated according to the Company methodology considering travel distance for business trip only by objective evidence. And for the factors considered in emission calculation, the latest factor was used thus consistency and correctiveness is substained in 2018 Greenhouse Gas Emission Report against Samsung SDI Co., Ltd., internal guideline.
5) Except unconsidered emission source in the 'Samsung SDI Co., Ltd., Greenhouse Gas Inventory Guideline', material error, omission or insignificant issues was not founded in 2018 Samsung SDI Co., Ltd., Greenhouse Gas Emission Report.

(Unit: ton $CO_2$ eq)

| Report year | | 2018.1.1 ~ 2018.12.31 | |
|---|---|---|---|
| Verification Scope | | Domestic | Overseas |
| GHG emission | Scope 1 | 511,379 | 618,185 |
| | Scope 3: Business trip and logistics for the domestic corporation | 4,947 | |

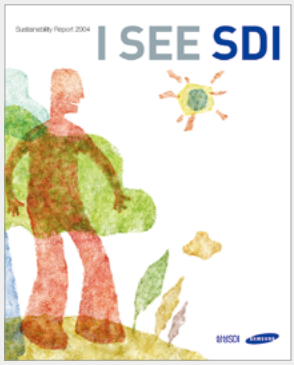
[ 2018 Samsung SDI Co., Ltd., Greenhouse Gas Emission ]

April 1st, 2019

**Seok Un Yoon**
President & CEO Korean Foundation for Quality

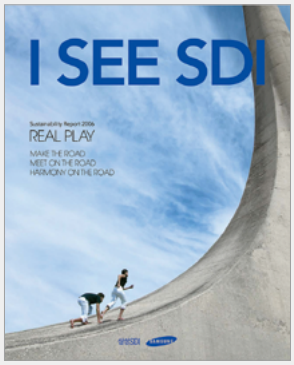
# Sustainability Reports in Previous Years

2003



2004

2005

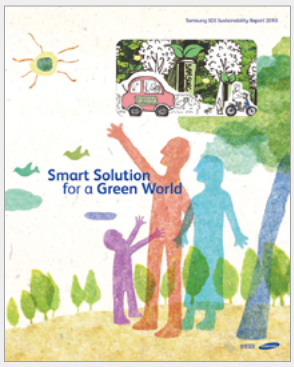


2006

2007

2008

2009



2010

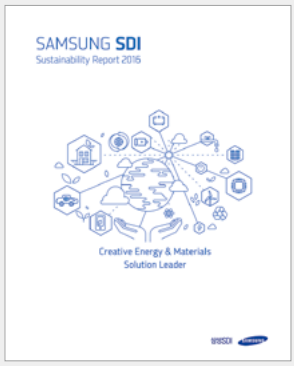
2011

2012

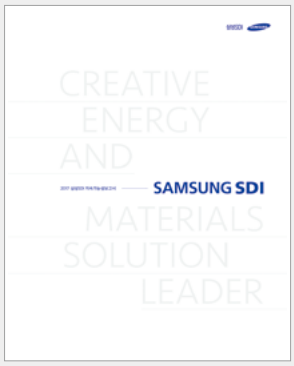

2013

2014

2015



2016



2017

SAMSUNG SDI




This product is made of FSC™-certified and other controlled material.