WE CARE FOR THE FUTURE

Healthcare, Earthcare

SK chemicals

Contents

Cover

SK chemicals consists of Green Chemicals Biz. which protect the Earth's environment with eco-friendly materials and Life Science Biz. that provide total healthcare solutions. "SK chemicals Sustainability Report 2018" imply the eagerness of SK chemicals for the better life and future of humanity with nine icons of Social Value (SV) Index (please refer to page 18) on a green and orange background color that each represent 'Earthcare' of Green Chemicals Biz. and 'Healthcare' of Life Science Biz.. SK chemicals creates social value through solutions based on chemical and pharmaceutical technology.

Overview

SK chemicals has been publishing a Sustainability Report every year since 2011 to make management performance transparent to the stakeholders, including social value creation, and to strengthen the commitment to sustainability. SK chemicals' 8th Sustainability Report, 'SK chemicals Sustainability Report 2018', specifically contains performance and contribution in business, CSR, and indirect economic area, in terms of Social Value (SV).

CEO Message

Through the ‘Sustainability Report,’ SK chemicals seeks to share the values it pursues with various stakeholders. SK chemicals is also trying to raise the happiness of its executives and employees, stakeholders, and society as well as contributing to solving social problems through continuous growth and the expansion of social values.

Dear honorable shareholders, customers, partners, and stakeholders,

We would like to express our deep appreciation for your unwavering support and interest and thank all of you with the 8th ‘Sustainability Report.’ SK chemicals is continuing its effort and sincerity towards ‘Sustainable Society and Future’ this year.

SK chemicals has had many changes over the last few years. It was separated into holding company–SK Discovery and business managing company–SK chemicals. This was to develop the professional capabilities and enhance the company’s value by separating its investment and business management. Also, in order to strengthen the expertise of SK chemicals Life Science Biz., SK chemicals separated its vaccine business (SK Bioscience) and blood product business (SK Plasma). Green Chemicals Biz. merged with SK Petrochemical to create a vertical hierarchy of co-polyester business, its major business. Ulsan Factory is carrying out investments in improving various facilities for stable operation as well as safety, environment, and healthcare programs. The entire company is making efforts to overcome the difficulty of management environment through the innovation of process and corporate culture. It pursues continuous optimization of business management and operation efficiency (Operation Excellence) as well as creating an organizational culture that can respond quickly to crises and increase business executions by strengthening data-based system management.

With the effort for continuous growth, SK chemicals is also striving to improve the members’ happiness and expand social values to enhance the happiness level of its executives and employees, stakeholders, and society. SK chemicals will make institutional efforts to encourage the members’ growth and development and enhance their level of happiness. While changing into an organizational culture to generate high performances by increasing the executives and employees’ capabilities, SK chemicals will strive its best to raise their quality of life and happiness.

With a mission and vision of ‘Protecting the Earth’s Environment and Improving Human Health’ since 2011, the business of SK chemicals has been changing itself towards solving social problems. In addition, it has been able to recognize its potentiality to generate values through the measurement of social value performance which started in 2018. Since last year, SK chemicals has expanded the concept of members to the executives and employees’ families, partners (suppliers), and social enterprises to develop a new business model with social values. Through cooperation between SK chemicals’ business and social enterprises ranging from ecofriendly chemical products to medicines and vaccines, we seek to contribute to solving social problems.

Through the 2018 Sustainability Report, we hope that the values and sincerity SK chemicals pursues are delivered not only to its executives and employees but also to its shareholders and partners. Also, we would like to ask for your participation in SK chemicals’ journey towards happiness. Thank you very much.

Company Overview

SK chemicals, first launched in 1969 as Sun Kyung F Co., has been providing chemical and bio-science products for the better life of mankind by setting the vision 'Leap as a Global-leading Company that provides total solutions for eco-friendly materials and healthcare' in 2011.

Management Vision

Global leading solution provider in eco-friendly material and total healthcare

Global leading solution provider in eco-friendly material and total healthcare

Eco-friendly materials
Resin · High-functional Materials, Biomaterials

Total Healthcare
Pharma · Vaccines · Blood Derivatives

Provide total solution from the customer's point of view
Secure global competitiveness

Company Overview

Company Name	SK chemicals Co., Ltd.
Business Type	Chemicals, Pharmaceuticals
Address (Headquarters)	310, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do
No. of Employees	1,412
Revenue	KRW 1.3677 trillion
Business Profits	KRW 45.7 billion
Net loss during the term	KRW 16.4 billion

* As of December 31st, 2018

Major Business Area

SK chemicals divided the business entities into the Green Chemicals Biz. for protecting the Earth's environment, and the Life Science Biz. for improving the health of human, and takes the lead in transforming and innovating the domestic chemical and life science sectors. As Green Chemicals Biz. oversees the chemical and energy business, SK chemicals is able to take a bold leap forward into becoming a global leading company in the eco-friendly material sector with world-class technology, know-how, and production facilities. For this, Green Chemicals Biz. has actively invested in the advancement of an existing business such as copolyester, biodiesel, etc. and for entering new business, e.g., super-engineering plastic and biomaterials. Life Science Biz., in charge of healthcare business, provides integrated solutions for the entire process of healthcare from the prevention of diseases to treatment. Life science Biz. makes it possible for cure with innovative medicines, early detection through diagnosis solution, and prevention of disease with vaccine. SK chemicals is actively expanding its business into the global market with the development of innovative medicines and differentiated technology.

Healthcare, Earthcare

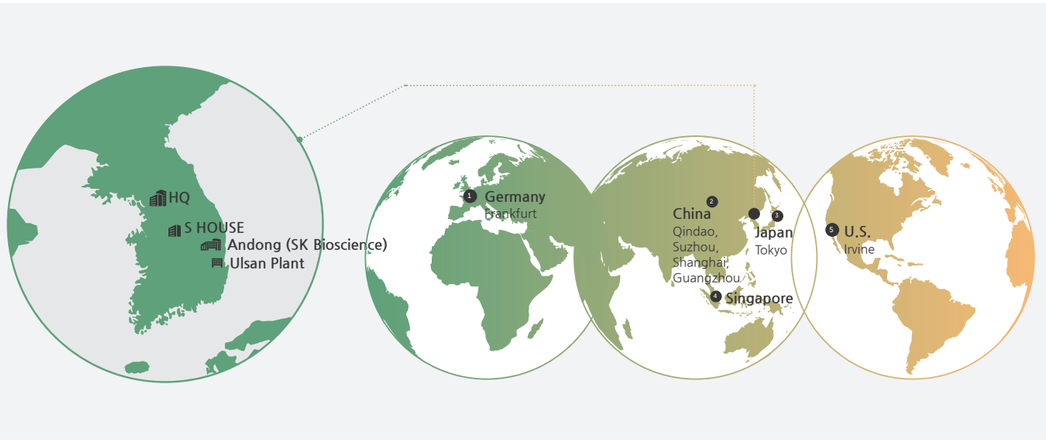
Health: Prevention and Treatment
We make a healthy world. Our vaccines and medicines provide total healthcare solutions from disease prevention to treatment, to create a healthy world.

Environment: Environment Protection
We protect the environment of the Earth. Our eco-friendly materials protect the Earth's environment by replacing traditional petrochemical materials.

Resource: Energy Efficiency
Our high-functional materials and composite materials have excellent functionality to prevent depletion of fossil energy resources by extending the material life cycle and making lighter vehicles.

Domestic Business and Global Network

Along with Pangyo Headquarters (ECO Lab), SK chemicals operates 3 production sites (Ulsan, Andong (SK Bioscience), Cheongju (S HOUSE)) in Korea. Chemical products are produced at the Ulsan operations, and preventive and therapeutic medicines are produced at Andong (SK Bioscience) and Cheongju (S House). Also, regional offices are operated in Qingdao (China), Germany, Singapore, Japan, and the U.S.



Ownership ratio

Current Status of Subsidiaries for Connection (2019.05.15)

SK Bioscience — 98.04%
Pharmaceutical manufacturing business

Initz Co., Ltd. — 66.00%
Manufactures PPS base resin/ compound products

JSI Co., Ltd. — 56.03%
Epoxy resin manufacturer

SK chemicals America — 100%
Wholesale business

SK chemicals GmbH — 100%
Wholesale business

SK chemicals Qingdao Co., Ltd. — 100%
Prepreg manufacturing business

SK chemicals Suzhou Co., Ltd. — 100%
Resin manufacturing business

SK chemicals Shanghai Co., Ltd. — 100%
Chemical product, plastic & compounding Resin sales business

* 'SK Hwagong (Shanghai) Limited' has been incorporated as a consolidated subsidiary company as of 2019.02.28.

Ownership ratio

Major Affiliates

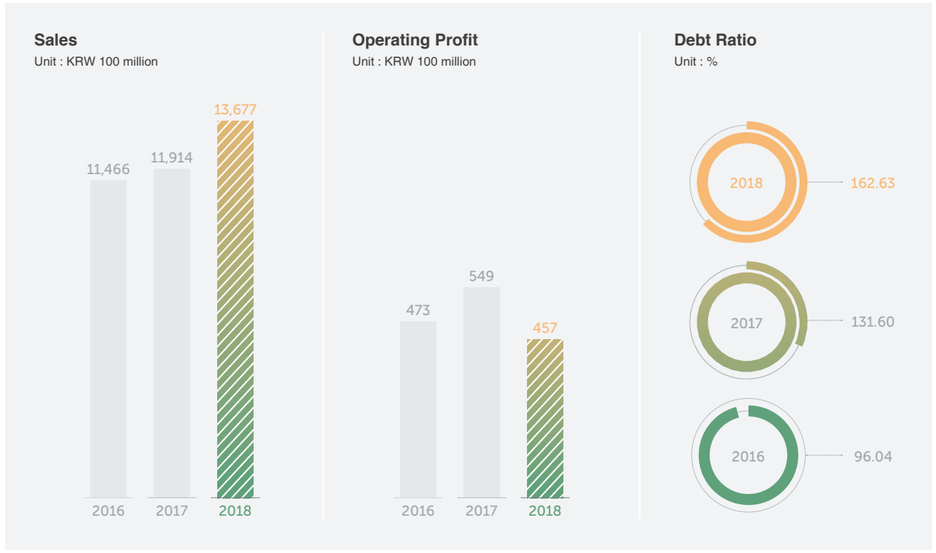
ENTIS Co., Ltd. — 50.00%
Manufacturing business

ST Green Energy Pte, Ltd. — 50.00%
Trading of biodiesel and biomaterials

Financial
Key Performance

Performance in 2018

Despite the rise in raw material prices and decrease in global demand due to trade disputes between the U.S., and China, SK chemicals has achieved sales growth for four consecutive years, focusing on increasing sales of copolyester, biodiesel, and vaccines. SK Petrochemical Co., Ltd., which operates the DMT business, was merged on May 1st, 2018 to establish a vertical sequencing system for production of PETGs, an eco-friendly/high-performance resin. The biodiesel mandatory mixing rate has increased from 2.5% to 3.0% since 2018, to improve profitability in the Bio Energy sector. Furthermore, the company achieved growth in sales for the second consecutive year due to the positive performance of Pharma (pharmaceutical department) business and the optimization of its operation. Despite the difficult external environment, the company recorded operating profits such as increased sales and improved profitability, but its net loss was recorded in the current period based on one-shot costs due to conservative accounting policies. However SK chemicals figures out a possibility of quantum jump; succeeded in commercializing 'SKYZoster', the world's second shingles vaccine, in the vaccine business by SK Bioscience separated as of July 1st of 2018; and started a full-scale growth system through the sale of the vaccine 'SKYVaricella'; a milestone that transferring the cell-culture derived influenza vaccine production technology to Sanofi Pasteur brought an increase in royalty income; and we entered the clinical study stage of next-generation pneumococcal conjugate vaccine. Although the company is burdened by deficit caused by the delayed normalization of its subsidiary INITZ, we are achieving performances by making an effort to improve the performance of employees through the installation of raw material recovery systems and stir-fabrication.



* SK chemicals became a new corporation through equity spinoff as of December 1st, 2017, but for continuity of data, the data of SK Discovery was used until data of November 2017(May differ from external disclosure data)

Plan and Prospects for 2019

In 2019, the chemical sector will focus more on the enhancement of competitiveness and acceleration of performance growth as a market leader based on the stable growth of copolyester and steady profit of Bio Energy. Furthermore, the life science sector will strive to fulfill full-scale profit growth and carry out various projects by continuously growing Pharma business through the expansion of existing products and the diversification of product portfolio as well as realizing Bioscience's investments for more than a decade, including shingles vaccine and varicella vaccines. Through this, we are committed to the change and challenge of our path as a global company that offers eco-friendly materials and total healthcare solutions.

GC Green Chemicals Biz.

Future Market Prospect The chemical industry is exposed to various external environment such as the global economic recession and currency fluctuations following the U.S-China trade dispute, and the expansion of oil price volatility due to geopolitical risks in the Middle East. However, we expect sustainable growth of the existing projects and stabilization of new projects due to the steady increase in demand for eco-friendly products and light-weighted materials. Copolyester is steadily replacing existing plastics and developing new applications in areas such as cosmetics containers, home appliances, and household goods. Market demand for biofuels is also expected to expand due to the legislation of heavy fuel Bio Energy and strict regulations on marine oil environment. The engineering plastic sector is steadily growing as demand for lightweight materials for eco-friendly vehicles (EVs, HEVs).

Strategic Orientation Based on stable growth of existing businesses, we are planning to expand our portfolio to eco-friendly/biomaterials and high-functional materials to secure future growth motives. As the copolyester business is in the process of expanding production facilities, we plan to focus on upgrading our product portfolio prior to the boost production of 2021. Through new applications and customer development, we will expand our sales base and improve our profitability by increasing sales of high-value products, which will not only lead to quantitative growth but qualitative growth as well. The Bio Energy business will increase its cost competitiveness by supplying various raw materials and maximize profits by streamlining operations. The engineering plastic business plants to push forward capacity and accelerate customer development through full-scale operation of stabilized PPS production facilities and new compounding facilities to ensure early settling into a stable growth.

LS Life Science Biz.

Future Market Prospect The domestic pharmaceutical business is expected to face fierce competition in the domestic market due to the government management of drug prices, regulations, and strengthened ethical and compliance activities. Korean pharmaceutical companies are expected to carry out activities to expand their product portfolios and advance into overseas markets through partnerships. Although there have been large-scale technology transfer contracts in Korea over the recent years, the controversy over the termination of the contract has also ignited. Investments that have continued in R&D and business diversification will also be pushed forward. At the same time, we expect to improve profitability by increasing the movement of internal operation efficiency.

Strategic Orientation We have established organizations that have enhanced professional performance efficiency in the Pharmaceutical sector (Pharma) and Vaccine sector (Vaccine) to proactively respond to the rapid changes in the pharmaceutical market. Especially, we will focus on strengthening the foundation of the pharmaceutical business and commercializing through R&D. In all areas of marketing, production, research, and development, we will internalize ethical management that conforms to the international standards to enhance the status of global pharmaceutical companies.

Business
Key Performance

GC Green Chemicals Biz.

SK chemicals' Green Chemicals Biz offers differentiated products based on the customer's needs based on three solution areas and five product groups. In particular, high-performance and eco-friendly products such as energy and resource-reduction lightweight materials, water-soluble products without environmental hormones, eco-friendly alternative energy including biodiesel and bio-heavy oil, and biomaterials that replace petrochemical-based materials contribute to economic value creation and environmental impact.

SK chemicals developed the world's first eco-friendly, transparent, heat-resistant copolyester, biodiesel, and bio heavy oil based on our exclusive technology in the Bio Energy industry. Besides, 'SKYGREEN' released in 2001 and 'ECOZEN' launched in 2009, the most representative eco-friendly copolyester products of SK chemicals, acquired the 'Gold' level certificate in the 'Material Health' sector from an eco-friendly certification institution (C2CPII) in the U.S in 2013.

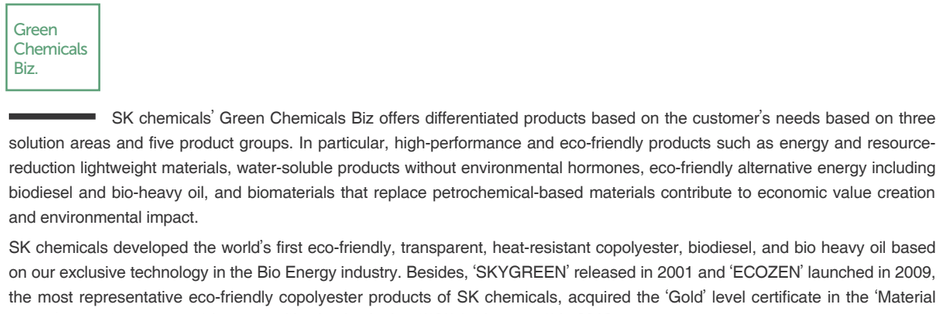
Main Product Lines

Copolyester

SK chemicals creates differentiated performance based on high-performance, eco-friendly materials and products. In 2001, SK chemicals developed 'SKYGREEN,' an eco-friendly and high value-added plastic material, for the second time in the world. In 2009, 'ECOZEN' was commercialized as the world's first high-temperature resistant transparent polyester resin. ECOZEN, a bio copolyester plastic, is an environment-friendly product that supplements the limitations on petroleum-based plastics and reduces reliance on petroleum-based material.

Bio Energy

Biomaterials that are eco-friendly, and biocompatible can replace petroleum-based materials. With increasing customer demand and the implementation of government policies to encourage new materials, it is expanding at a high annual growth rate of 10%. Besides, the biomaterials business is expected to grow a market value KRW 80 trillion by 2020. SK chemicals developed high-quality biodiesel 'ECOPRIME' through its own production process. Biodiesel is the eco-friendly alternative energy which is manufactured by the chemical reaction of animal and vegetable oils (fats) with methanol. Over 80% or more of biodiesel decomposes within a month, and it reduces carbon dioxide by 2.9 tons per ton during combustion. ECOPRIME is currently supplied to major oil refineries in Korea. We are expanding our business into bio heavy oil for power generations. We are also preparing for certification and registration to enter the biodiesel markets in the U.S., and Europe.



Engineering Plastic

As Korea's first developed super engineering plastic, SKYPURA (PCT) is an excellent material with exceptional heat resistance for high temperatures over 260℃, thermal stability, reflectivity, and light resistance. In 2013, it received a prize by the Ministry of Trade, Industry and Energy at the 'Korea Technology Awards' and had acquired the best ten new technology certifications. The TPEE material polyester-based Elastomer 'SKYPEL' has both rubber and plastic properties. Low friction coefficient, flexibility at room and low temperatures, superior chemical resistance, and high mechanical strength make it more widely used in many fields. The compounding brand 'SKYTRA' offers solutions that meet the needs of different business areas such as automobiles, civil engineering, electricity and electronics, and home appliance through various functions based on resin eco-friendly, high-performance and resin-based products by SK chemicals. Moreover, in 2013, we established a joint venture, INITZ, with a global chemical company Teijin Limited, and develop 'ECOTRAN'. ECOTRAN is the world's first eco-friendly PPS that eliminates the use of chlorine, a hazardous substance, in all processes of raw materials, production, and products unlike conventional PPS. It is a lightweight, high-performance, eco-friendly material that is resistant to shock and heat.

Adhesives & Coatings · Composite Materials

SK chemicals has been actively pursuing projects for adhesion and coating through joint ventures with global chemical companies since 1988, when manufacturing and selling eco-friendly powder coating resin and ultraviolet (UV) curable resin for the first time in Korea. 'SKYBORN' has recently become a popular resin for adhesives and coatings in various fields because of its flexibility, outstanding adhesion, and eco-friendly properties without any environmental hormone emissions. Since 2005, it established the subsidiary SK chemicals Ltd. in China (Suzhou) to produce and sell products related to adhesives. 'CRYLCOAT', which is a powder coating resin, and 'EBECRYL', which is an ultraviolet curable resin, are used for coating and adhesion of metal surface paint, plastics, and wood, respectively.

SK chemicals is currently producing 'Prepeg', a composite material that combines reinforced fiber and carbon fiber. Carbon fiber, which is lighter than aluminum and harder than steel, has been widely used in from the construction of spacecraft and aircraft to sports and leisure, such as bicycles. Especially it is also attracting attention as an alternative material that can be used to make lightweight the body of automobiles and blades for wind power generators. In 2012, SK chemicals and Mitsubishi Rayon Co., Ltd. established a strategic business cooperation for the supply of raw materials.

The high-purity solvents used in semiconductor precursors in the equipment analysis, synthesis of ultra-precision chemical products, and electronics and biotechnology industries were developed based on SK chemicals' proprietary technology and partnership with Honeywell International, Inc. of the U.S. Based on organic synthesis technology, SK chemicals currently produces and develops materials for displays such as quantum dot, OLED pixel materials, and LCDs along with semiconductor precursors and etchants.

R&D

Under the core value of 'Protecting the Earth's Environment', we has established a product portfolio based on three main themes : energy saving, replacing harmful substances, and no-oil. For this goal, the Chemical Research Institute is turning into a top global company in the ecofriendly co-polyester field through strengthening its technology competitiveness, and it is also striving to competitiveness in super engineering plastics. Furthermore, the institute also performs research and development activities to discover new growth engines, including but not limited to new biomaterials, all of which are suitable for the mission of SK chemicals.

Development of Flame Retardant PET for Motor Insulators

SK chemicals developed flame-retardant polyethylene terephthalate (PET) compound material with high strength and formability. SK chemicals applied the material to direct-driven large electric motor insulators, which have been exclusively applied to DuPont products, and has successfully expanded its application to electric-insulated components such as bobbin and relay.

Commercialization of PPS Fiber

The property of polyphenylene sulfide (PPS) resin has been successfully improved to process the material into fiber, and the sale of PPS Fiber has officially started. SK chemicals' PPS production employs eco-friendly processes that do not use chlorine or harmful solvents in contrast to the existing processes. Moreover, the process is also known for not producing by-products. The PPS Fiber of SK chemicals is characterized by low interruption rate, the stopping of weaving process due to the snapped string during weaving, which is known to be around 10% of existing products.

Development and Commercialization of PPS Compound of Automotive Lamp Parts

By developing the Polyphenylene Sulfide (PPS) Compound material with low out-gas content, the problem of haze due to the flammable out-gas component when applied to the automotive lamp part has been solved. This compound material has been applied to the automobile headlamp parts for commercial sales.

Development of PCT Resin for Film Used in Flexible Flat Cable (FFC)

By developing the Polycyclohexylene dimethylene Terephthalate (PCT) film-based FFC, replacing the existing cables and harnesses for vehicles, SK chemicals succeeded in commercializing PCT for the use of electric vehicles parts. The material was introduced at this year's Consumer Electronics Show (CES), the world's largest consumer electronics show, as it has a better heat resistance than conventional PET films and a better price competitiveness than expensive polyimide (PI) films.

Global Expansion

Copolyester

SK chemicals' copolyester products can replace plastic materials such as PC (Polycarbonate), PVC (Polyvinyl Chloride), PMMA (Polymethyl Metacrylate), and PS (Polysturene) due to safety that does not cause harmful substances such as BPA. Based on these characteristics, they are actively used in food containers and storage containers related to the human body. Especially copolyester eco-friendly PETG 'SKYGREEN' and bio-copolyester 'ECOZEN' are a safety with Bisphenol-free, transparent and chemical-resistant material, so they are highly popular in the global premium cosmetics companies in the world. 18 of the top 20 cosmetics companies in the world use SK chemicals' copolyester materials to the luxury cosmetics product. In particular, the company has been recording high sales amount and market shares after entering the cosmetics market of China since 2016. Also, as the company continues to grow by showing superior quality in shrink film in Europe, the copolyester business will continue to expand into larger global market by expanding its supplies and developing uses in the existing market.

DMT

The global DMT market currently consists of five major production companies (U.S., German, Turkey, Iran, and Korea). SK chemicals in Korea is the only company in the East Asia with the production facilities. SK chemicals is currently focusing on supplying DMT to the existing partners in East Asia under the name of 'SKYDMT' and is making efforts to create a downstream market.

PPS

SK chemicals' subsidiary INITZ Co., Ltd., a joint venture between SK chemicals and Teijin Limited, produces polyphenylene sulfide (PPS) 'ECOTRAN'. ECOTRAN is lightweight, heat-resistant material that can replace metal. INITZ is setting up a global strategy to advance with the aim to stabilize the business in 2020. Around 65% of exports and 35% of domestic consumption are expected, and INITZ plants to expand its business by setting Europe, India, and Southeast Asia as destinations for exports, with China as the biggest demand.

LS Life Science Biz.

Life Science Biz. has two business areas across the healthcare industry: Pharmaceuticals (Pharma) and Vaccine (Vaccine). It contributes to the treatment of diseases through medicine, and prevents diseases through vaccines. In July of 2018, SK chemicals established SK Bioscience by carving out its vaccine business. This division strengthens the expertise of SK chemicals on chemical drugs and SK bioscience on vaccine business areas, and this made it possible to provide better integrated solutions on the entire process encompassing prevention of disease to cure.

Life Science Biz. has a strong market share in the pharmaceutical sector, with its own film-type anti-impotence dugs and arthritis treatment, a botanical new drug. We also export the cure for dementia based on outstanding research and development capabilities. Furthermore, the company selected the vaccine sector as the next growth engine and invested in R&D to establish advanced vaccine production sites for the development of premium vaccines and essential vaccines.

Major Business Area

Pharmaceutical (Pharma)

The pharmaceutical (Pharma) sector has continued to develop chemical new drugs since 1999 when it became the 11th country in the world to successfully develop new drugs in Korea for the first time. SK chemicals developed and launched the Korea's first botanical New drug 'JOINS' in 2001, No. 1 anti-impotence drug 'MVIX' in 2007, and world's first film-type anti-impotence drug 'MVIX-S' in 2011. Since then, the company has developed superior Drug Delivery System (DDS) technology to launch 'TRAST', a deodorized arthritis treatment drug. SK chemicals' technical skills are also recognized overseas. Starting with the 2013 approval of the first generic drug in Europe, the company gained approval to sell the drug 'SID710' in Australia and Colombia in 2016, Mexico and Jordan in 2017, and Canada in 2018. Currently, in countries such as the U.S. and Brazil, SK chemicals is continuing to extend business abroad, including the licensing process. Moreover, 'AFSTYLA', which is recombinant bio new drug for hemophilia, is the first new drug in Korea to export its technology to Australian CSL. SK chemicals is leading successful global business by gaining market authorization in the U.S., Canada, Europe, and Australia. Based on SK chemicals' own R&D capabilities, the pharmaceutical business will expand its product portfolio through the development of new drugs using patent and formulation technologies as well as various partnership activities.



Vaccine (Vaccine)

The domestic vaccine market is worth KRW 573.9 billion (as of 2017) and is expected to grow at an annual rate of more than 8% depending on the scope of the country's NIP (National Immunization Program) and changes in the medical service paradigm. However, about 50% of vaccines distributed in Korea (as of 2016) are produced by global pharmaceutical companies, and the Food and Drug Administration announced plans to improve the self-sufficiency rate up to 75% by supporting companies developing vaccine and expanding R&D funding. Accordingly, SK Bioscience, a subsidiary of SK chemicals specializing in vaccine, is actively responding to the request to develop the national medical industry and secure vaccine independence.

SK chemicals officially started research on vaccines in 2008 and signed a joint R&D contract for next-generation pneumococcal conjugate vaccines with global vaccine company Sanofi Pasteur (SA) in 2014. In the case of autonomously developed vaccine, the country's first cell-cultured adult influenza vaccine, and the world's first cell-cultured pediatric influenza vaccine 'SKYCellflu' was commercialized in 2015. Produced based on animal cells, the production period was reduced to 2~3 months, and it has the advantage of stable supply regardless of lack of fertile eggs. In 2016, we successfully launched 'SKYCellflu Quadrivalent'. This is






the world's first cell-cultured quadrivalent influenza vaccine, and it can prevent four types of influenza viruses that are popular among humans such as two types of Type A, two types of Type B. In 2017, we obtained permission for the vaccine 'SKYZoster'. 'SKYZoster' is a vaccine for the prevention of shingles in adults over the age of 50, and it is a live-attenuated vaccine of varicella-zoster virus. 'SKYZoster' successfully settled into the market after its launching, recording around 40% of market shares as of 2018.

In 2017, the company obtained permission for another in-house vaccine called 'SKYVaricella'. 'SKYVaricella acquired high immunogenicity and stability through clinical study of phase III in 19 domestic and overseas research organizations to contribute to the enhancement of public health.

Furthermore, in 2019, the trivalent influenza vaccine 'SKYCellflu' became the world's first cell-cultured influenza vaccine to obtain WHO PQ (Pre-qualification). With the obtainment of WHO PQ, 'SKYCellflu' has been able to participate in the international bidding market. Considering that there was no precedent for PQ certification among cell-cultured influenza vaccines other than the ones produced from fertile eggs, the approval was obtained in a relatively short period of about a year and a half.

Major Performances in 2018

Approval of Varicella Vaccine SKYVaricella and its Launch

The hospital supply of the varicella vaccine 'SKYVaricella' started in September. SKYVaricella is the second varicella vaccine developed by domestic companies, and it has secured the immunogenicity and safety, contributing to the enhancement of public health.

Acquisition of WHO PQ* for SKYCellflu

SKYCellflu is the world's first cell-cultured influenza vaccine to receive WHO PQ. Based on WHO PQ, SK bioscience is planning to actively participate in the international bidding of the influenza vaccine in the future.

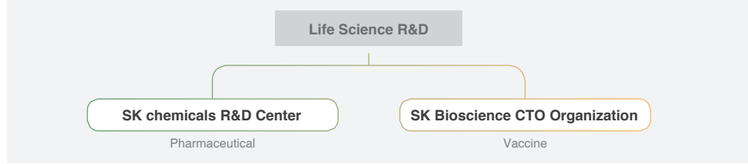
*WHO PQ : WHO Prequalification

Acquisition of Marketing Authorization in Canada for Dementia Patch (SID710)

After the 1st generic release in the European market in 2013, marketing license was acquired in Australia in 2016, Mexico and Jordan in 2017, and Canada in 2018.

R&D Strategy

Life Science Biz. continues to invest in R&D of the pharmaceutical and vaccine sectors that will fuel the future life science projects. Based on experience of the new drug development, SK chemicals have established a advanced portfolio of drugs, such as GINEXIN and JOINS, which is maintaining its top position in the market shares. SK chemicals continue to expand our product portfolio through the development activities of compounds and botanical drugs. SK chemicals R&D Center and SK Bioscience CTO organizations have been reorganized to focus on research and development in pharmaceuticals and vaccines, respectively, for the enhancement of competitive advantage. Through this, Life Science Biz. aims to fulfill the mission of SK chemicals to contribute to the enhancement of human health.



R&D Performance

Main Performance

Life Science R&D is committed to launching new products, obtaining overseas certifications and market authorizations, and making new ways to enter the overseas markets. We are working with leading organizations such as Sanofi Pasteur and the International Vaccine Institute to continue with the best annual performance by researching on premium and essential vaccines. Development, authorization, and launch details are as follows:

Before 1999
- Development of the first domestically developed new drug and a third-generation platinum-based chemotherapy (SUNPLA Injection®)
- Development of a blood circulation improving drug derived from gingko leaves (GINEXIN®)
- Development of anti-inflammatory and analgesic drug (TRAST®)
- Korea's first exporter of the newly improved ulcer drug to Europe (OMED®)

2000~2010
- Release of the first domestically developed botanical drug for osteoarthritis (JOINS®)
- Release of an erectile dysfunction drug (MVIX®)
- Contract to sell NBP601(AFSTYLA®) to CSL of Australia
- Release of an antithrombotic drug (RENEXIN Tab®)

After 2011
- Release of orally disolving film for erectile dysfunction drug (MVIX-S®)
- Contract signed with Sanofi Pasteur for development and supply of a next-generation pneumonia vaccine
- Approval and launch of Korea's first cell culture-derived trivalent influenza vaccine (SKYCellflu®)
- Approval and launch of the world's first cell culture-derived quadrivalent influenza vaccine (SKYCellflu Quadrivalent®)
- Approval and launch of NBP601 (AFSTYLA®) in U.S., Europe, Canada, Australia
- Approval and launch of shingles vaccine (SKYZoster®) and acquired approval
- Approval and Launch of varicella vaccine (SKYVaricella®) and acquired approval
- Received WHO PQ of trivalent influenza vaccine (SKYCellflu®)
- Acquired approval for generic patch-type dementia treatment (WONDRON Patch®) for the first time in Europe

Status of R&D

Life Sciences Biz. is actively conducting research and development with an investment of KRW 32.6 billion in 2018. There is a total of 12 ongoing R&D projects including 5 vaccine development projects, 6 chemical drugs, and 1 botanical drugs. The next-generation pneumococcal conjugate vaccines and Parkinson's treatments are being developed in the midst of social interest. The chronic arterial pulmonary embolism treatment is also at phase III of the clinical study, which will be introduced to the emerging botanical drug market.

New Product Launch in 2018

SKYVaricella
Drug to prevent varicella with validity and stability certified from 19 domestic and overseas institutes

COSCA EX
Amlodipine + Losartan compound high blood pressure treatment

QUDEXY XR
Korea's the first extended-release topiramate epilepsy treatment

Global Expansion

Expansion of Global Exports of Patch Treatment

The pharmaceutical (Pharma) sector continues to expand into the global market by offering high performance with its superior products. Among them, exports of patch types are steadily expanding. For the past 6 years since its release in 2013, SID710 has accumulated more than KRW 130 billion in exports and maintains the largest market share in Europe among the same ingredients. The product also successfully entered the markets of Australia and Colombia in 2016, and was approved for marketing in Mexico and Jordan in 2017 and Canada in 2018. Currently, the U.S., Brazil, and Saudi Arabia are screening the marketing licenses. U.S, approval is expected for approval and release in 2019 with royalty of more than KRW 1 billion. Another key product 'TRAST' has surpassed more KRW 54 billion in accumulated sales over the last 13 years since its release in China in 2006, and has expanded its sales to Saudi Arabia and the Philippines.

Trivalent Influenza Vaccine 'SKYCellflu' to Receive WHO PQ Certification

SK Bioscience participated in the procedure to obtain WHO PQ certification. After its rigorous screening process that lasted for about one and a half year since September of 2017, SK Bioscience became the first company to acquire WHO PQ of cell-cultured influenza vaccine. WHO PQ Certification is a prerequisite that has to be met in order to participate in international biddings organized by UN agencies such as UNICEF and PAHO, meaning that it is considered as an important licensing reference in many countries. SK Bioscience is planning to actively participate in international bidding of influenza vaccine based on WHO PQ.

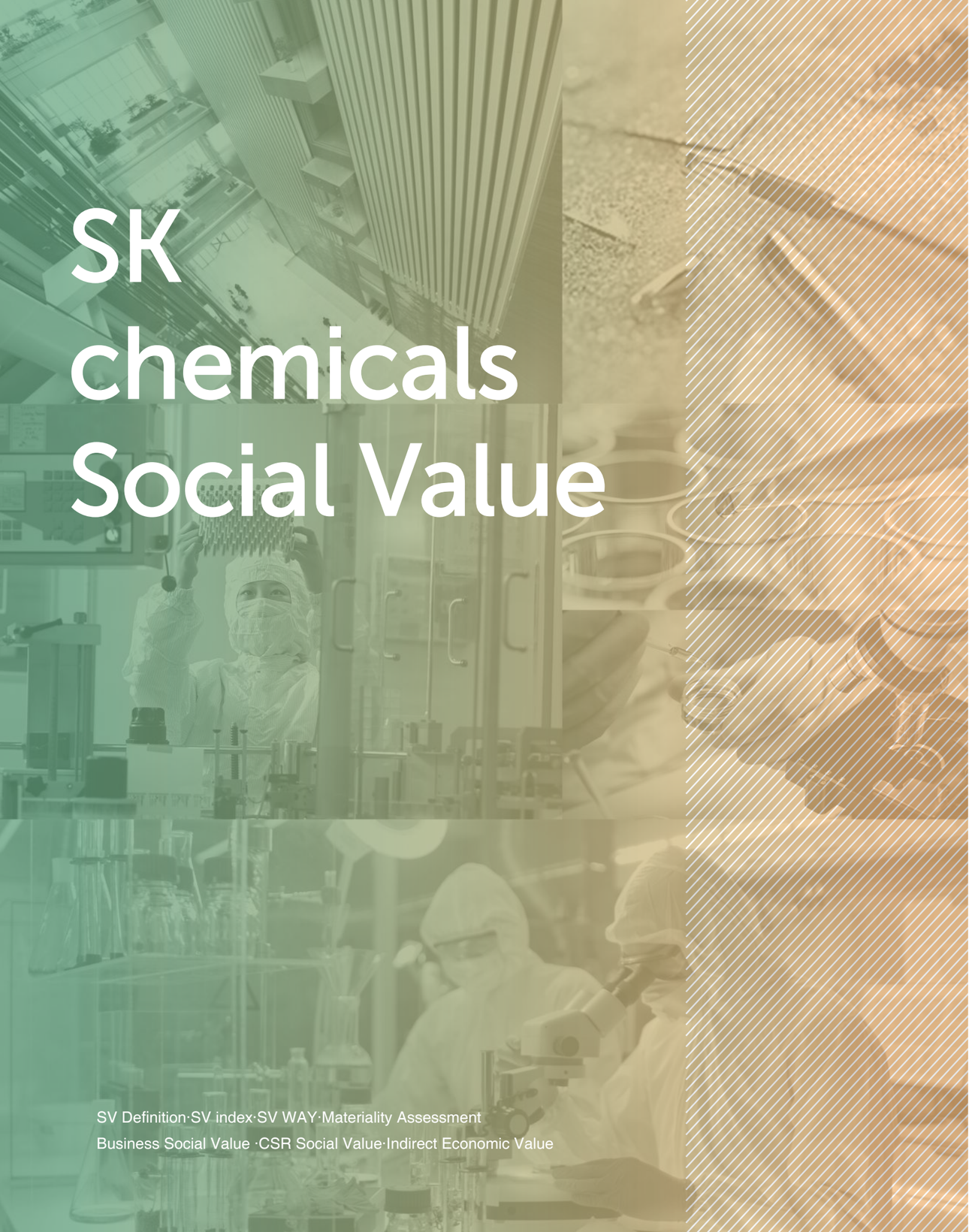
Contract to Transfer Production Technology of Cell-Culture Based Influenza Vaccine Manufacturing Technology

SK Bioscience exported its own technology of manufacturing cell-culture based influenza vaccine production to Sanofi Pasteur, the top company in the global influenza vaccine market. The contract is eligible for up to $155 million, including an upfront payment of $15 million and an additional pay of $20 million after the completion of technology transfer. Sanofi Pasteur plans to use this technology to develop advanced influenza vaccine.

Using the technology, SK Bioscience has launched the first trivalent cell-cultured influenza vaccine in Korea and the first quadrivalent cell-cultured influenza vaccine in the world. Especially, 'SKYCellflu' sold more than 18 million doses (one dose for one injection) in just four years since its launching.

SK – Sanofi, Focus on the Next-generation Pneumococcal Conjugate Vaccine in the U.S.

The phase I of clinical test for the next-generation pneumococcal conjugate vaccine, co-developed by SK Bioscience and Sanofi Pasteur, started in December, 2018. Co-development agreement of next-generation pneumococcal conjugate vaccine is worth about KRW 50 billion and will be produced at SK Bioscience's Andong Vaccine Factory if the commercialization succeeds. The market for pneumonia vaccines in the U.S., Japan, and five major European Union countries stood at about KRW 5.2 trillion in 2016, and it is expected to grow to about KRW 7.1 trillion by 2025.



SK chemicals Social Value

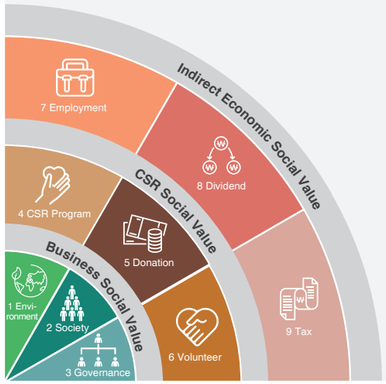
SV Definition·SV index·SV WAY·Materiality Assessment
Business Social Value ·CSR Social Value·Indirect Economic Value

With the development of the digital technologies and the increasing expectations of stakeholders on the social role of corporations, corporations are required to create not only economic values but other diverse values. SK chemicals is currently implementing Double Bottom Line (DBL) management that seeks economic value (EV) and social value (SV) together from 2018 in order to accept the changing needs of consumers and the society.

SV Definition

A corporate can grow by continuously providing the value demanded by the society. Based on Double Bottom Line (DBL), SK chemicals strives to put social value in the direction of all its business by pursuing both economic value (EV) and social value (SV) at the same time. Ultimately, all management activities of SK chemicals will create social value and lead to sustainable development of the company.

SK chemicals Social Value

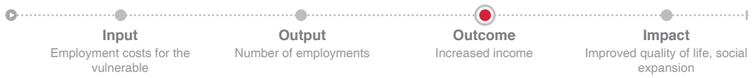


SV Definition of SK chemicals

Social Value (SV), as defined by SK Chemical, means 'the sum of performance that does not belong to a particular stakeholder but has contributed to the resolution of social problems.' SV can be broken down into three categories: 'Business Social Value' which refers to the social value generated by product development, production, and sales; 'CSR Social Value' is generated by social distribution activities to communities; and 'Indirect Economic Social Value' that indirectly contributes to the economy through business activities. Detailed areas related to performance are managed based on specific figures.

Measured Target and Methodology

Since 2017, we have developed a measurement methodology through consultation between outside experts and SK affiliate, and we have modified and supplemented the principles and standards for measurement through 2018 pilot measurement. Through the detailed index of the performances that correspond to the SV definition, we measure the social values on all business activities that can be measured, and our target is on the overall business activities such as product development, production, sales, HR, and business partner cooperation. The results of the measurement are calculated by unifying the social value as the actual result of management activities into the monetary value. The basic formula for monetizing is 'Quantity' x 'Monetizing Proxy'. If needed, the exchange rate can be reflected. Thus, SK chemicals is upgrading its SV measurement system by securing objectivity in the quantity, i.e. sales volume or usage with SV elements.



Measurement Case: Bio Energy

SK chemicals' Bio Energy products are those that want to reduce greenhouse gas emissions by avoiding the use of petroleum products. The SV quantity of this product is 'greenhouse gas reduction'.

(❶×❷)×(❸−❹)

1. Bio Energy sales (tons),
2. Bio Energy reduction per ton of Bio Energy,
3. Trading price for European carbon Discharge,
4. Trading price for Korea Carbon Discharge

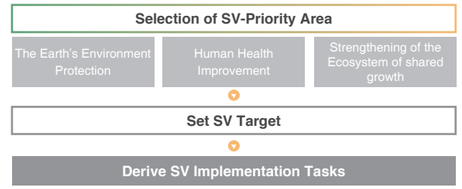
Application of Measurement Results

The ultimate goal of developing SV measurement system is to spread social value back to the society. For this, SK Group is upgrading its management systems, such as the measuring system and ERP system, by linking them to social values and joining forces with about 10~15 multinational companies in countries such as Europe and the U.S. for the global standardization of social value measuring system.

SK chemicals SV Strategy

SV Strategy

SK chemicals selected three priority areas: 'Protection of the Earth's Environment' and 'Human Health Improvement', specified in the mission and vision since 2011, and 'Strengthening the Ecosystem of shared growth'. Along with the awareness of the stakeholders, we continue to derive social problems that businesses need to resolve and select implementation tasks to resolve them. As a support for executing the initiatives, we establish and operate internal and external communication strategies and the system for review, evaluation, compensation, personnel, and data.



SV Management System

SK chemicals conducts materiality assessment based on stakeholder awareness survey when publishing the Sustainability Report every year and thereby selects the areas for priority. Moreover, the company plans to operate the SV Assessment Items and Assessment Tool in the KPIs that are set and evaluated every year. SK chemicals is committed to making fundamental changes by devoting 50% of its CEO's evaluation to SV tasks from 2019.

Project Management System (PMS) and R&D PMS review SV elements of the tasks in the business and research areas according to the selected priority areas. We have a CEO-direct SV executive organization, and a regular meeting ordered by the CEO is held once a month. Data regarding SV has been systematically managed through the online system, and SV training has been provided for members when needed.

	Product	Process	Value Chain	Community
Environment Reduction of Resource Consumption Reduction of Environmental Pollution	▪ Reduction of greenhouse gas emissions from Bio Energy ▪ Use of bio raw materials of PO3G, PLA	▪ Water ▪ Waste ▪ Water contaminants ▪ Air pollution ▪ Greenhouse Gas	▪ Reduction of Waste Disposal Charge (PETG)	
Society	▪ Influenza Vaccine ▪ Shingles Vaccine ▪ Varicella Vaccine	▪ Employment of labor vulnerable ▪ Reduced working hours/paid leave ▪ Health examination of workers	▪ Financial support for the business partner	▪ Various social contribution activities
Governance Protection of shareholder rights and interests Accounting transparency Act of Anti-Corruption Compliance	▪ Compliance on the corresponding law	▪ Compliance on the corresponding law	▪ Compliance on the corresponding law	▪ Compliance on the corresponding law

SV Index

SK chemicals manages SV indicators as an index. The priority is selected through an annual materiality assessment.

Business Social Value

The measurement item of Business Social Value referred to the ESG (Environment/Society/Governance) system, which is a classification commonly used in society to assess sustainability. Excluding the product measurement, Environment was centered on process and Society was focused on labor/win-win growth. The process measurement of the Environment measured the negative effect(-) on society in total performance, and the total amount measured for the use of water resources and the emission of environmental pollutants (atmospheric/water pollution/greenhouse gas) was applied as the negative(-) value. The measurement of labor/win-win growth in Society was on the improvement of the labor environment of the employees and the performance of win-win growth for suppliers. Governance measurements were intended to measure social costs such as improvements, performance, and law violations. However, due to the absence of a measurement method, the measurements have been postponed until next year while we continue to study on the measurement method.

Product measurements are developed as a particular indicator for each company in the group rather than a common measurement indicator. SK chemicals has developed individual unique indicators for a total of nine products including six environmental products such as bio-heavy oil, biomaterial, and non-BPA, and three social products such as influenza vaccine.

CSR Social Value

This is the performance contributed to the society through SK chemicals' CSR activity. SK chemicals generates social contribution performance through various CSR Programs along with donations. Social contribution promotion ways are defined according to UN sustainability goal and promoted in line with the UN SDGs goal for 'Eco-friendliness', 'Social Welfare', 'Spreading Happiness', the three top CSR areas. Main CSR programs include environmental education for elementary school students, support for Silver theaters, SK Happiness Well, and also SK chemicals Volunteer Group and direct donations, etc.. SK chemicals has created various performance as above, and converts its value to measure CSR Social Value.

Indirect Economic Value

This refers to the performance that indirectly contributed to the national economy based on economic resources transferred to stakeholders through SK chemicals' management activities. Stakeholders of SK chemicals are defined as members, customers, shareholders, and society. Members are provided with labor costs (employment), shareholders with dividends, and tax (local tax and etc.) for society. Because we deliver value to customers, it is recognized as direct performance.

Index			SV Creation Goal	Main Activity	2018 SV Creation	page
Business Social Value	1 Environment	Product	Reduction of environmental pollution and SV creation through Green Chemicals Biz.	Reduction of environmental pollution	KRW 62.7 billion	30
		Fairness	Create SV and reduce greenhouse gas through environmental management	Systematic environmental management	KRW -48.5 billion	27
				Reduction of greenhouse gas		28-29
	2 Society	Quality of life (product)	Create SV and enhance health of human through Life Science Biz.	Disease prevention	KRW 39.2 billion	31-32
		Labor, quality of life	Healthy and stable life through enhancement of labor environment	Employment of labor vulnerable	KRW 700 million	33-34
				Quality life of Employees		34-35
				Safety and welfare of employees		35-38
		Win-win growth	Expand sustainability of supply network through win-win growth	Establish the foundation of win-win growth	KRW 720 million	38
				Support strengthening of competitiveness		38-39
				Benefit Sharing		39
	3 Governance		Create SV and strengthen transparency of business management through improvement of governance structure	Business governance structure	Not measured	42-43
				Ethics management		44
				Compliance		45
CSR Social Value	4 CSR Program		Create SV through CSR activity	CSR strategy	KRW 500 million	47
				Representative CSR programs		48
	5 Donation			Donation performance		47
	6 Employee volunteer			Volunteer system		49
				Main volunteer activity		49
Indirect Economic Value	7 Employment		Create SV through returning business profits	-	KRW 117.5 billion	53
	8 Dividend				KRW 5.3 billion	
	9 Tax				KRW 24.7 billion	

SV WAY

SK chemical has been accelerating efforts to create social values since 2010, based on the establishment of system for promoting environmental management. The world is changing more rapidly that it was a decade ago, and customers and the society are requiring businesses for as much social value. SK chemicals will continue to provide the social value that customers and the society need in line with the rapid changes of the world.

Environmental Management (Green Triple 40!)

SK chemicals recognized the importance of environmental risk management in 2010 and sought to establish a system of environmental management. SK chemical sought Eco-friendliness in the aspect of culture, process, and product so that the company can become a leading company for environmental management in the future. This was before the establishment of sustainable management system. Through the environmental management, we focused on the environmental part of ESG (Environment/Society/Governance) structure, one of the sustainable management systems. Environmental management was the first step toward sustainable management.

Establishment of Mission/Vision for Sustainable Society

In 2011, SK chemicals attempted to fulfill its corporate social responsibility by putting effort in resolving the social polarization problem (social problem) of the society through two small businesses (chemical business and life science business). Proposing solutions for the polarization of society, SK chemicals creates value for the society also gains customers' trust and support. With respect to this social value by project: the chemical business aims to protect the Earth's environment by replacing the existing petrochemical materials and reducing the use of fossil energy; the life science business aims to improve human health by disease prevention and treatment.

Move into the ECO Lab

The Eco Lab is located in Pangyo Techno-valley in Seongnam-si, Gyeonggido. It is an eco-friendly laboratory of SK chemicals. The Eco Lab was built with the goal of the best eco-friendly architecture, therefore both eco-friendliness–positive effect on the global environment and human-friendliness–helpfulness to human life were considered. The Eco Lab applied 101 eco-friendly technologies with the purpose of reducing energy by 44%, reducing greenhouse gas by 33%, and reducing water resource by 63%. In 2011, a joint verification was conducted with the Korea Institute of Architecture and Technology where results showed 44% reduction in energy, 31% reduction in greenhouse gas emissions, and 63% reduction in water resources. Such efforts were shown by external certification including LEED platinum rank, top rank of GBCC, and energy efficiency top rank of Korea Energy Corporations.

Operation of Eco Green Boiler

Before the government's regulation on greenhouse gas emissions became actualized (in 2010), SK chemicals has implemented various efforts to reduce greenhouse gas emissions. As part of this, we used a waste wood boiler under the name Eco Green Boiler. Since the IPCC stipulated zero CO_2 emissions from greenhouse gases, waste wood was recycled for fuel and no equivalent fossil fuel was used to reduce greenhouse gases. The company still uses Eco Green Boiler at the Ulsan Factory. The company currently reduces about 55,000 tons of greenhouse gas.

Operation of L HOUSE

SK chemicals has been developing vaccines to promote human health and has built a vaccine manufacturing factory called L HOUSE in Andong. Due to the characteristics of drug development, L HOUSE has been constructed to enable clinical tests of products and production after being verified first. We produce various vaccines at the factory for domestic supply and plan to export. L HOUSE is SK chemicals' commitment to create a vaccine independence thereby ends the generation of being forced to rely on imported vaccines.

Development of Korea's First Cell-Cultured Vaccine

A vaccine makes pathogens weak, creating antibodies to pathogens in the body. The vaccine is raised in organisms, most of which are grown in fertile eggs. Cell-culture is completed within 2-3 months, and it takes around half time compared to the existing breeding system that take up to around 6 months. With this advantage, the reason the cell-culture method was not adopted was because of the difficulty of operation. By resolving this, SK chemicals implemented a fast cell-culture method. SK chemicals hopes to achieve the dream of Korea's vaccine independence by using cell-culture method.

Start of the Biofuel Business

The world is doing the best to reduce greenhouse gas from fossil fuels (oil, coal, and etc.) Greenhouse gas can be reduced by replacing materials that have been extracted from crude oil with biofuels or by replacing fossil fuels with biofuels. SK chemicals is also working hard to reduce greenhouse gas by developing biofuels and biofuels materials. The first biofuel developed since 2007 has saved greenhouse gas by replacing light oil with biodiesel, and the second is the bio-oil (replaced B-C oil for power generation), which was officially approved as fuel in 2019.

SV Materiality Assessment

SK chemicals carried out a materiality assessment to adequately reflect issues of interests and expectations from stakeholders for the business environment and SV. It is evaluated by following the guideline on report contents and composition based on Global Reporting Initiatives (GRI) Standards. In the 2018 Materiality Assessment, the strategic and financial impacts were analyzed in terms of stakeholder influence and SK chemicals' business to decide material topics. In particular, we added a priority selection process for SV so that it can be linked even to the creation of SV implementation tasks in the long run. Specific Materiality Evaluation procedures are as follows:

Stakeholder social issue survey → **Selection of SV priority area** → **SV target settings** → **Deriving SV implementation tasks**

Materiality Assessment Process

Step 1 Identification

Definition on Stakeholders' Social Issue

Issue proposed by Stakeholders
Main keywords related to SK chemicals and chemical industry by reviewing issues raised by stakeholders such as investors, government, and media surveys.

International Guideline
Review the international standards and guidelines in terms of sustainability management and chemical industry

Peer Analysis
Major issues within the chemical industry were reviewed by benchmarking domestic and overseas similar companies

Step 2 Derivation

Deriving Stakeholder's Social Issue

Categorizing the major social issues from objective evaluation data and media to E/S/G, and integrating social issues to the SK chemicals management system before stakeholders' survey

Environmental
❺ climate change management, Pollution problems (daily wastes), Harmful chemical products on the body ▶ ❶ Innovation and R&D, ❹ Enhancing the scope of global market

Society
❷ Improve quality management and product safety, ❼ Local community, ❾ Training and education, ⓬ Sustainability of supply chain, ⓭ Customer satisfaction, ⓮ Occupational Safety and Health (SHE), ⓯ Employment and labor relations, Disease eradication (treatment and prevention) ▶ ❶ Innovation and R&D, ❹ Enhancing the scope of global market

Governance
❽ Stakeholder's participation in management, ❿ Compliance, ⓫ Risk management, ⓴ Corporate governance

Step3 Assessment

Stakeholders and Business Influence

We conducted a survey of internal and external stakeholders on the importance of SK chemicals' material topics, and collected opinions from major stakeholders

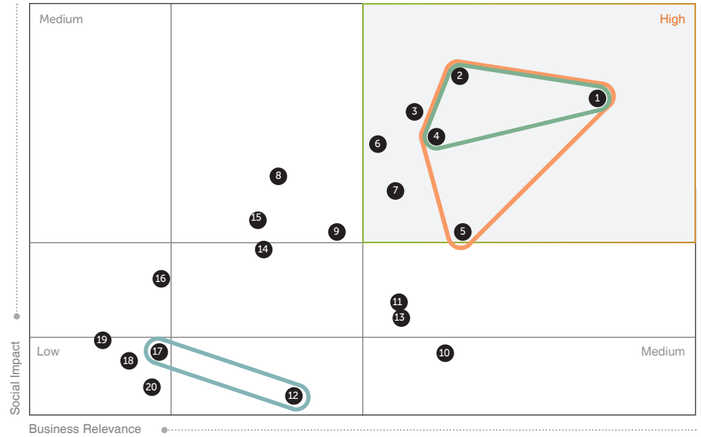
From a business perspective, strategic alignment and financial impact were analyzed and evaluated.
Strategic connection: Analysis of mid/long-term objectives achievement perspective and business relationship
Financial impact: revenue generation, opportunity factor, cost reduction opportunity, the seriousness of increase of cost, response to current risk, seriousness when occurring in the future

Step4 Prioritization

Selection of SV Priority and Focused Promotion Area

The priority of material topics has been selected by considering the influence of business and stakeholders. Social impact of SK chemicals, business relativity, business model possibilities and etc., were considered to derive the SV focused promotion area.

Materiality Assessment Result



	Topics	Boundary: Internal	Boundary: External	Assessment Result: Social Impact	Assessment Result: Business Relevance	SK SV
1	Innovation and R&D	●		92.20	94.43	2
2	Improve quality management and product safety	●	●	94.45	88.87	2
3	Management strategy	●		89.24	83.30	1 2 3 4 5 6 7 8 9
4	Enhancing the scope of global market	●		89.04	83.32	2
5	Climate change management	●	●	76.75	88.87	1
6	Economic performance	●		86.82	77.75	7 8 9
7	Local community		●	80.82	77.75	4 5 6
8	Stakeholder's participation in management	●	●	88.80	66.60	3
9	Training and education	●		82.38	72.17	2
10	Compliance	●		70.31	83.3	2
11	Risk management	●		76.22	77.75	2 3
12	Sustainability of supply chain		●	85.42	66.60	2
13	Customer satisfaction		●	75.39	77.75	2
14	Occupational Safety and Health	●		84.50	66.62	2
15	Employment and labor relations	●		85.47	55.50	7
16	Waste water Wastewater and waste management	●	●	73.31	66.62	1
17	Win-Win growth	●	●	82.02	55.45	2
18	Diversity and equal opportunity	●		79.14	49.95	2
19	Human Rights Management	●		84.50	38.85	2
20	Corporate governance	●		77.25	49.95	3

※ No-Regret activities, such as business management activities and risk mitigation actions were excepted from selection of SV priority area.

Business Social Value

Materiality

- Focusing on social values such as product development, production, and sales is an important management activity that increases the sustainability of the business in terms of reducing latent risks and creating new market opportunities.
- Especially, according to the characteristic of the industry, the impact that influences the safety of stakeholders and the environment along with the business growth are important, where approach and strategy of DBL perspective are important.

Approach & Strategy

- SK chemicals identifies social problems with regards to the business through social value improvement activity and utilizes this as Biz. Model innovation opportunity to enhance the sustainability of the business.

Long Term Target

- Eco-friendly sales goal: 40%

Environmental Performance

KRW **14.3** billion

Total value of environmental pollution reduction by using products and through environmental pollution of production process

Social Performance

KRW **40.6** billion

Promotion of human health, win-win growth, and improvement of labor environment through vaccine

1-1 Environment

SK chemicals SV

SK chemicals carries out various activities by setting environmental impact minimization through business and response to climate change as major issues and proactively responding to the domestic and foreign regulations on energy and greenhouse gas reduction.

Create SV through Processes (Environmental Management): Greenhouse Gas Reduction

Implementation of Systematic Environmental Management

Certification of Environmental Management System

SK chemicals was the first to receive the environmental management system certification system, ISO14001, of the International Organization for Standardization (ISO) in 2005 for systematic management of the company's environmental management. ISO14001 is an international certification on the overall matters of environmental management such as environmental policies, implementation plans, corrective actions, management reviews, and continuous improvement activities. The company has acquired re-certification in 2018 within the deadline with revised and enhanced specifications.

Integrated Management of Environmental Information

SK chemicals systematically established the integrated management system 'Environmental Information Integration Management System' to collect and manage all data in terms of the environment such as raw/subsidiary materials, air pollutants, water pollutants, energy, greenhouse gases, safety, health, and eco-friendly purchases. Based on the data, the company set the environmental management goal of 'Green Triple 40!' to implement activities in accordance with the strategic direction. This is an effort to achieve the quantified goals that have been set.

Operation of Eco-Friendly Business Place

SK chemicals considers eco-friendly elements from construction stage of the business place based on the overall eco-friendly policies to be setting eco-friendly goals for each business place and also putting effort to achieve the goals.

ECO Lab

ECO Lab (headquarters) applied 101 eco-friendly materials and technologies by considering the influence on construction design to the environment. In the case of SK Bioscience's L HOUSE (Andong), 16 eco-friendly technologies were adopted. As a result, in the case of ECO Lab, energy was reduced by 44%, water resource by 63%, and CO_2 generation by 31%* in contrast to existing facilities, and this is the same effect as planting 94,000 pine trees. For L HOUSE, when comparing to the existing factories, around 30% of the energy is being reduced. In recognition of its environmental degradation performance, ECO Lab achieved the highest energy efficiency rating in the office building sector, acquired LEED** Platinum (highest ranking) of the U.S., and also received the highest rating at the GBCC*** in Korea. On the other hand, L HOUSE has earned its first gold rating for a pharmaceutical factory in the world and earned OHSAS-KOSHA 18001 Certification while complying with the Drug Manufacturing and Quality Management Standards (GMP), a strict certification standard applied to food, medicine, and cosmetics manufacturing.

Ulsan operation installed the Reverse Osmosis System to re-use general drainage. In the future, 75% of general drainage will be recovered to replace approximately 62% of the total net usage.

* Results of joint monitoring with SK Engineering and Construction Research Institute, 2011
** LEED (Leadership in Energy & Environmental Design): U.S. Green Building Certification
*** GBCC (Green Building Certification Criteria): Domestic Green Building Certification

Reducing Greenhouse Gas Emissions in Value Chain

Establishing Greenhouse Gas Reduction Goals

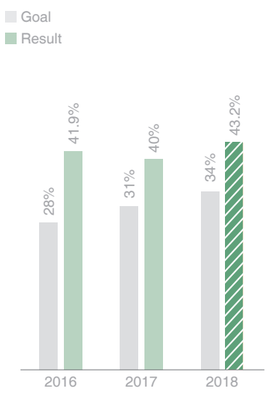
SK chemicals continues its effort to reduce greenhouse gas emissions in business places to cope with climate change and also actively participates in the government's climate change policy to minimize the impact of changes in the domestic and overseas energy policies.

The company established a reduction goal as 40% compared with greenhouse gas emission forecast (BAU) and a mid to long-term reduction in energy basic units by 2020. To achieve this goal, we have proposed various climate change response policies and confirmed the possibility of expanding the scope of bio-gas use to be developing gas emission coefficients. Furthermore, to reduce greenhouse gas emission continuously, the company has established detailed goals such as setting greenhouse gas goals, monitoring emissions, and making decisions to purchase emission credits by site to establish long-term plans for reduction of greenhouse gases and energy use after 2020. In the future, SK chemicals will continue its effective greenhouse gas reduction and energy reduction activities in joint with the government's 2030 greenhouse gas reduction roadmap.

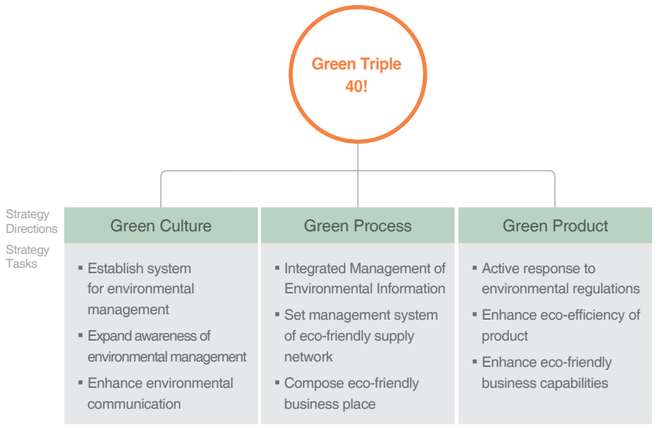
Managing Environmental Management Goals : Green Triple 40!

By 2020, SK chemicals will be reducing greenhouse gas emissions by 40% of forecast and increase the sales of eco-friendly products by 40%. From the 'Green Culture' perspective, we focus on expanding the awareness of environmental management and promoting eco-friendly corporate culture. From the 'Green Process' perspective, we focus on creating a Green Plant by improving the company-wide environmental management process. From the 'Green Product' point of view, we focus on enhancing eco-friendly business capabilities by establishing eco-friendly business strategies and developing new businesses. SK chemicals aims to enhance the eco-friendliness of the products, minimize environmental load due to production processes and business activities, and promote green growth to create new values by promoting diverse environmental protection activities.

Eco-friendly Products Sales



Environmental Management Goal and Strategy



Biogas

10,686 ton

Waste Wood

64,558 ton

Process Waste Heat

15,852 ton

Recycling of Resource

SK chemicals is putting effort to recycle wasted resources into energy, to save both energy and money.

SK chemicals Sewage Treatment Plant, located in Yongyeon of Ulsan City, recycles methane gas that is generated during sewage treatment into boiler fuel in the plants. By recycling, the company gains two effects, reducing greenhouse gases and removing methane gas which is generated during wastewater treatment. The total biogas fuel consumption in 2018 was 10,686 tons, resulting in a reduction of 33,829tCO_2eq greenhouse gas.

Biomass byproduct NE-30, which is generated during the production of the main product biodiesel, is processed with decompression refined oil and used as fuel in the business place to reduce greenhouse gases. Around 3,060 tons of bioliquid oil was used, which resulted in reduction of 6,694tCO_2eq greenhouse gases compared to the use of diesel in 2017.

In 2009, the 'Carbon Neutral Roadmap' was established to replace the fuel of boiler based on fossil fuels with non-fossil fuels. When using Eco Green Boilier (EGB) exclusively for waste wood, due to the nature of combustion, there was a disadvantage in the production site where stable pressure is required, because of changes in the production pressure. In October of 2017, the pressure of EGB production steam was stabilized by installing a quantitative injection facility that can provide stable steam pressure to the production team. As a result, KRW 900 million was saved in power bills due to the increased self-power generation.

The waste heat is also recovered to reduce greenhouse gases. By recovering 15,852 tons of waste heat (steam) generated in the PDH process of SK Advanced and utilizing it as an alternative fuel, we reduced 3,836tCO_2eq greenhouse gases compared to the bituminous coal boilers.

Operation of Energy Optimization (EOPT) TF

Starting in January of 2019, the Ulsan Factory established a TF organization, where operators of energy consumption department have participated. The UT (Steam, electric, and etc.) basic unit status and goals of each process are set and reduced, and the energy saving culture is spreading in-house by preparing a collection of energy saving cases.

Conduct thermal insulation test for thermal burns	Improvement of large pump and process boiler operation	Replace LED lights	Reduce power of cooling tower	Manage heat exchanger	Adopt process optimal control system
We have conducted thermal insulation diagnosis through an external specialist agency, and based on the results, we plan to conduct thermal insulation prevention in the future.	We are searching for ways to improve and optimize the operation of large pumps and process boilers.	We plan to reduce energy use by replacing LED lights for 24-hour lighting.	We plan to shut down the large pump or reduce power usage by optimizing and reducing the amount of coolant needed in the process. Around 385 kW is reduced for one oil process pump that is stopped.	The heat exchangers will reduce the amount of steam and industrial water used by increasing the efficiency of energy use through regular cleaning with energy-consuming facilities.	We plan to systematically reduce process stability and energy use by adopting process optimal control APC and Batch Management System (BMS).

Creating SV through Products (Green Chemicals Business): Reduction of Environmental Pollution

Reduction of Environmental Pollutants

The issue of environmental pollution in the ecosystem caused by plastics dumped all over the world is emerging. Furthermore, direct damage is occurring, and anxiety is spreading among the consumers. It is important to create an environment-friendly ecosystem in the chemical industry as a whole, and reducing environmental pollutants is being perceived as an essential management strategy for the sustainable chemical industry.

PETG Business: Effect of Replacing PVC

PETG helps to solve environmental problems by replacing Polyvinyl Chloride (PVC) among conventional plastic products. PVC emits toxic gas (chlorine gas) during production, use, and processing, and also substances including dioxin and furan during incineration process. It also causes environmental issues such as using materials like lead and cadmium, which are heavy metals, to improve processing power. Like this, plastic products containing harmful substances are being reduced worldwide, and there are regulations of the use of PVC and practice to reduce the usage of PVC products in Europe. SK chemicals' PETG project replaces the market that applies PVC with the advantage of eliminating the harmfulness of PVC. The social value of PETG business of SK chemicals is to replace PVC and also contribute in resolving environmental issues. The economic cost of using PVC can be measured in order to convert the numerical values. Plastic products are subject to a Recycling Charge amount under the Act on the Promotion of Saving and Recycling of Resources. Therefore, the SV of PETG can be calculated by multiplying the quantity of the PETGs sold by the Recycling Charge, replacing PVC.

PETG quantity sold in replacement of PVC × Recycling Charge amount per 1kg of PVC

Here, we measured only the social value of the recycling process and did not produce any substitution for the global ecosystem that occurs during PVC reclamation and incineration and the adverse effects on human health. In the future, we will be measuring the social value of PETG while observing the research results of various aspects in Korea and abroad.

Bio Energy: Effect of replacing Chemical Energy

The SK chemicals' bio energy sector, which started in 2007, is pushing for a bio-heavy oil project to replace light oil for vehicles and heavy oil for power generation. By replacing fossil fuels (vehicles, heavy oil for power generation) with eco-friendly fuels (such as animal and vegetable oil), which produce significantly less greenhouse gases, the quality of the atmosphere will be positively affected.

SK chemicals measured the amount of greenhouse gases reduced by using of non-fossil fuels to measure the social value of the bio energy business. When combusting 1 ton of bio energy, in contrast to the same amount of fossil fuel, 2.9tCO_2eq greenhouse gas discharge can be reduced. Using the average carbon credit price in 2018, the social value of the bio energy business is calculated by the formula below.

Reduction amount of greenhouse gases unit × 2018 average carbon credit price* × 2018 sales

* Average price of carbon credit: Average price of EV carbon credit in 2018 – Average price of domestic carbon credit in 2018

Also, SK chemicals recycles byproducts from process of palm oil, wastes, and waste oil, instead of using edible crops which are common raw materials for bio energy production. Thus, the social value on this can be calculated in the future.

Vaccine Research and Development Timeline

- 2015 Korea's first cell-cultured influenza, SKYCellflu Trivalent, commercialized
- 2016 Released the world's first cell-cultured influenza quadrivalent vaccine, SKYCellflu Quadrivalent
- 2017 Acquired marketing authorization for target-to-population vaccine SKYZoster
- 2018 Acquired authorization for self-developed varicella vaccine, SKYVaricella
- 2019 Acquired SKYCellflu WHO PQ (Pre-qualification) certification

1-2 Society

SK chemicals SV

SK chemicals puts effort to develop vaccines for the healthy life of mankind to create social value through business. Also, conducts various activities by selecting improvement of labor environment and win-win growth as the main issues.

Create SV through product (Life Science Biz.): Improvement of Human Health

Disease Prevention

SK chemicals strives to improve human health by developing various treatments and vaccines. Before infection occurs, vaccine is injected into the body with weakened pathogens in advance to activate the immune system to prevent possible infection damage in the future. Investment in these vaccines contributes to society in terms of creating public health value through disease prevention and reducing medical costs for individuals and countries involved in treating diseases.

Social Value of Disease Prevention and Vaccines

Disease infection creates social cost such as treatment cost and lost labor cost. Therefore, the SV of vaccine is to prevent the outbreak of disease and can be calculated by the sum of disease treatment cost and the amount of lost labor cost.

(❶ × ❷ × ❸) + {❶ × (❷ × Labor-producing Population) × ❹ × ❺}

❶ Number of influenza vaccinations of SK chemicals
❷ Prevention effect of influenza vaccinations*
❸ Total cost of direct/indirect treatment for each person when having a influenza
❹ Isolation period
❺ Korea's minimum wage as of 2018

* It means the decreased rate of influenza occurrence by vaccination. The formula to calculate the prevention effects is omitted due to space limit.

Here, only the amount of losses incurred by the individual was added. The cost regarding national health infrastructure such as the enactment of medical treatment insurance was excluded where the social value of the vaccine can be calculated by raising. Also, we possess the value of vaccine independence in the aspect of being able to provide our medicine to the citizens in a stable manner with no relations to the external environment in an important area regarding life.

Vaccine Research and Development

SK chemicals established a Life Science Resesarch Center in 1987 with the goal of developing a new drug and launched the top stomach cancer medicine SUNPLA in 1999. SUNPLA was the first new drug in the history of the pharmaceutical industry in over a century.

Selecting the vaccine sector as the next growth engine, SK chemicals has been absorbed in vaccine R&D and expanding its vaccine pipeline. Especially, in the L House which is a state-of-the-art vaccine manufacturing facility located in Andong of Gyeongsangbuk-do, can produce most of the vaccines that can be developed in Korea by having basic technologies and production facilities such as cell cultivation, bacterial cultivation, gene recombination, and protein binding vaccine. SK chemicals has completed its independent vaccine business portfolio with 11 years of research and has succeeded in developing and commercializing various vaccines to be making its mark in the global vaccine field.

Development of Influenza Vaccine

Flu (influenza) infections can cause massive human and national economic losses, thus, the study of the disease and the development for treatment are important. The World Health Organization (WHO) and experts on global infectious disease are warning of an increase of pandemic of high-risk influenza, and recommend prevention, early prediction, and diagnosis measures. In April of 2019, SK chemicals' homegrown SKYCellflu became the first cell-cultured influenza vaccine in the world to acquire WHO's PQ* certification. SKYCellflu is the world's first cell-cultured influenza vaccine for adults and children, but mostly commercialized for children. It also has the advantage of being able to produce quickly, as the production period is half as short of the conventional methods.

* WHO PQ: WHO Pre-qualification

Development of Shingles Vaccine

According to the Korea Health Insurance Review & Assessment Service, the number of shingles patients in Korea as of 2017 exceeded 700,000 and has been increasing by 3~4% every year. Shingles is a disease that causes severe pain by rashes and blisters on the skin, and it occurs when latent varicella virus in the human nerves is dominant as one's immune system becomes weak. It may cause complications such as meningitis if it is not treated properly in the early stage; therefore prevention is significantly important.

SK chemicals started to sell SKYZoster, a shingles vaccine made with its own technology, to expand the chances of vaccination in Korea in December, 2017. This is the first time a Korean company obtaining health authorities' approval for the vaccine, and the second in the world after MSD's Zostabox. SKYZoster lasts about 10 years when inoculated and has been proven to be safe in nonclinical testing institutions specialized in foreign countries. It has been developed through about five years of domestic clinical practice in eight clinical institutions including Korea University Guro Hospital.

As of 2017, the total medical expenses on shingles in Korea is KRW 85.1 billion and has been increasing by 6~10% every year. In this context, SK chemicals' development of the shingles vaccine is meaningful as it expands beneficiary, lowers the price and strengthens vaccine independence.

Development of Varicella Vaccine

Varicella is the main cause of the varicella-shigles virus, and the virus is the same as the pathogen that causes rashes. Children or senior citizens with weakened immune system are usually caused with this disease, leading to increased social risk due to the varicella in increased elderly population.

In June of 2018, SK chemicals acquired the license to market by the Ministry of Food and Drug Safety for SKYVaricella a self-developed varicella vaccine. SKYVaricella has conducted three multinational clinical tests to check the validity and safety on 499 children aged 12 months to 12 years old by 19 clinical institutions in Korea and abroad including St. Vincent Hospital of Catholic University of Korea. A growing number of developing countries are simplifying the licensing process, including shortening the screening period approved by Korea's Ministry of Food and Drug Safety. This can contribute to increased outbound shipments and reduced infant mortality in developing countries.

New Employee Training Track

New Leader Training

Training hours and costs per person (in 2018)

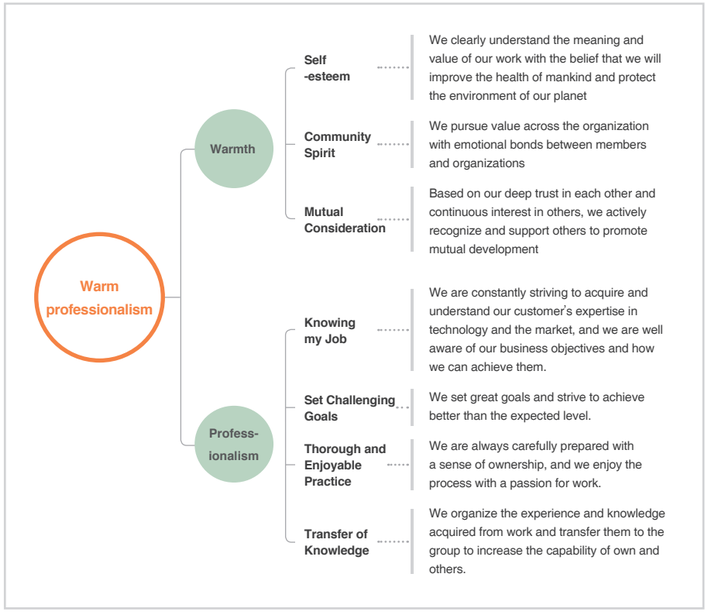
244 hours

KRW 1,254,969

Create SV by Improving Labor Environment: Safe and Healthy Life

Securing and Training the Talented

SK chemicals strives to train people with warmth and expertise. The company aims to build a team with a clear sense of goal and autonomy for its 'warm professionalism'.



Securing the Talented

In 2018, we wanted to secure suitable talented people through new competency verification method based on more sophisticated job analysis, and through a training program, we created an environment that fully recognized performance and capabilities through rational and fair evaluation and compensation system, and supported members to grow into a 'Warm Professional'.

To secure the talented, we selected a recruiter for each school and research lab in Korea, visited schools and academic conferences frequently, promoted the industrial and academic scholarship student system to strengthen networking with talented people, and continued networking with key talent overseas through SK Global Forum.

Training the Talented

Training New Employees SK chemicals has adopted new program called the 'New Employee Training Track' since 2018. Based on the training of theory by each job and the performance of practical tasks by team, the company has been able to gain great response from new employees as it is able to expand networking with seniors and experience the actual work before deployment through the process of strengthening the volume of work by helping them understand basic business mechanisms.

Degree and Certificate Support System In order to improve the professionalism of all members, the company prepared an all-members-to-win degree and certificate support system in the second half of 2018. This was implemented in January of 2019. This has also enabled us to strengthen the job expertise of the staff within SK chemicals.

Training the R&D Talent The institute has implemented an Open Innovation program to provide short-term overseas training to support the ability of members and strengthen their research and development capabilities. We plan to continue our efforts to strengthen our R&D capabilities.

Improving Leadership Capabilities SK chemicals focuses on improving the leadership of the new team leader. In 2018, we implemented new team leader course to enhance performance management leadership and train leaders on the knowledge and systems they need to know. We improved the capabilities that need to be possessed by a performance manager by executing training for capability improvement for members and team leaders. In 2019, we plan to create new leadership course and train new team leaders and project leaders. Also, we plan to conduct G2 promotion courses in 2019 to focus on enhancing influence and leadership, in order to foster the next generation of leaders.

Training Outstanding Personnel The education program of SK chemicals is largely divided into selection and general courses. The members that are selected as outstanding employees are given the opportunity to develop their competencies through schools and specialized educational institutions in Korea and abroad. Also, all expenses are supported by the company to help concentrate on the studies.

Fair Evaluation and Reward

SK chemicals has been operating IT-based performance evaluation system PECS (Performance Evaluation & Coaching System) since 2001. Goal achievement and capability enhancement are supported through evaluation for each quarter, and evaluation is conducted according to the three main directions of absolute evaluation, achievement and capability-oriented evaluation, and process and development-oriented evaluation.

We strive to provide financial rewards such as basic pay, bonus, and incentives under the system as well as non-monetary rewards such as self-esteem, fulfillment, and recognition, to ensure that members receive appropriate compensation according to their performance. New employees are paid the same wages without discrimination by gender, age, and etc. After entering the company, reasonable rewards are compensated differently according to system.

Innovation of Organizational Culture

Innovation of the Ways of Working

SK chemicals is committed to innovation of the way of working in systems, scheme, and programs to achieve high performance and organization.

Improve Business Efficiency At the system level, we have built a management and IT system infrastructure to increase operational efficiency. In 2018, we reduced and closed our regional sales offices and operated them in the form of a business center, which improved the business efficiency by around 30% by reducing the usual and unnecessary commute. Furthermore, we will be establishing a master plan for continuous improvement of the operation method and implement it systematically, step by step.

SHE Policy

Group Perspective:
17 types of SHE operating elements
- Around 30 kinds of real-life guides

Relative Company Perspective:
SHE Regulations
- Business Place SHE Regulation
  Research Center, Osan (SK Plasma), Ulsan, Andong, Cheongju Business Place and Overseas Office

Simplified Positioning System for Lateral Organizational Culture In an institutional-level effort to create a more lateral organizational culture, the position has been simplified and the title been unified into a “manager” since 2018. Also, we plan to move away from a uniform promotion and compensation system to a capacity-oriented evaluation and compensation system for individuals.

Balance of Work and Life

SK chemicals creates happy corporate culture by combining work and family. We have improved the overall work system to improve the culture of working long hours and to enhance work productivity and quality of life for executives and employees.

Expansion of Flexibility of Work Through the flexible work system, we provide flexible work hours that can be adjusted freely from 6 AM to 10 AM depending on the characteristics of each organization and work. We also have a certain number of joint annuals so that members can plan and recharge their own development and family time. For a flexible and efficient work-hour culture, we also introduced and have operated a variety of systems such as optional work system and PC Alarm.

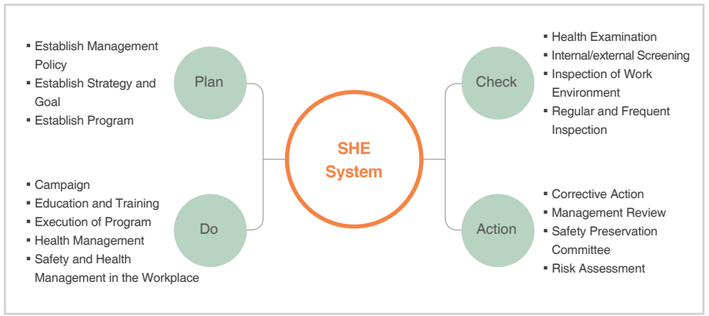
Family-Friendly Support Diverse institutional efforts are made to create a culture that is compatible with the members’ work and family. We implement shorter workweek for pregnant employees and employees with childcare. We also guarantee one year’s paternity leave after childbirth. Furthermore, the company operates a workplace daycare center to prevent members from cutting their careers. The company provides financial stability for families by reducing the burden on childcare, and provides housing and child educational funds with employee welfare funds. We also support the use of condominiums for 4 nights a year so that members can enjoy leisure time with the family.

Safety and Health of Executives and Employees

SHE (Safety/Health/Environment) Management

SHE Management System SK chemicals builds and operates a systematic SHE (Safety, Health, Environment) management system with strategic tasks and goals based on ISO14001 and OHSAS18001. Furthermore, we established SHE company regulations for consistent management by announcing a commitment to safety and health environment management, internally and externally. We also defined elements that should be observed throughout the company through SHE procedures (business establishment regulations), and prepared a special management system for each business place.

Safety and Health Management System



Based on SHE management system, SK Group, SK chemicals headquarters and business place, and SHE organization operate and improve management system at each level. SK Group's SHE organization supports raising the SHE level of all related companies. In the case of the SHE department of the headquarters, it acts as a coordinator with the business establishment for SHE target tasks at the group level as well as SHE issues that affect the entire company. Finally, the SHE department is at the core of the SHE management system, and it is the most directly involved in preventing SHE accidents in the business place.

Health and Safety Environment Governance Ulsan Factory organizes labor-management cooperative industrial safety and health committee, which consists of representatives of employees and management of the same number of employees to deliberate and vote on major issues related to safety and health. Throughout this process, we execute health management of all employees to prevent risk that can occur in the business place.

Establishing a Safety Culture We execute activities such as sharing outstanding cases between business places by discussing ways to improve the safety environment through Process Safety Management (PSM) workshop, safety environment conference, and meetings. Also, the company trains new employees to improve understanding of the SHE management system. Furthermore, unlike manufacturing and research personnel that perform SHE activities directly, the office staff may lack awareness of SHE; therefore, the company guides them to prepare for epidemics and natural disasters.

Introduction of Safety and Health Programs

Safety Inspection and Audit	Preventing any safety accidents under the permit to work system to inspect all constrction projects and works and risk assessment for each process and conducting self-audit twice a year
SHE Performance Evaluation	Clarifying company-wide KPI guidelines to evaluate SHE performance at plants and carrying out fair evaluation based on objectfied data
Industrial Safety and Health Committee	Holding a meeting of the industrial safety and health committee on a quarterly basis to share the current status of safety with management and employees, improve safety and health-related issues, and collect opoinions
Safety Green Card System	Dividing the level of safety management into a green, re and yellow card at the Ulsan Plant and applying the results to regular maintenance and constrction site-related companies
Safety 7 Rules	Applying seven key safety rules to root out safety accidents for employees before entering the Ulsan Plant
Safety and Health Programs for Coexistence and Cooperation	Providing seven in-company suppliers and 30 external suppliers with various safety and health programs, including risk assessment training and joint safety inspection, at the Ulsan Plant

Industrial Safety

Material and Quality Control System Ulsan Factory manages harmful chemicals thoroughly through the chemical management process. The chemical management process is divided into 6 stages: pre-report by the government office, warehousing chemicals including hazardous chemicals, storage, use, disposal, and post-report by the government office. Also, history management is carried out at each stage. In the case of a government office report, prescribed forms are followed, entering into the SHEQ system from warehousing to disposal, and management log for each step is prepared. We have also operated a Material Safety Data Sheet (MSDS) preparation and management system since 2017 to provide product safety information to the customers.

On the other hand, Andong Factory manages the quality of its medicines at the production stage through the Quality Assurance (QA) process and the operation of Quality Management System (QMS). Also, the company systematically manages the entire product process through internal and external audits, Good Manufacturing Practice (GMP) quality management, nonconformity management, periodic product reviews, out-of-specification management, and customer complaints response and non-compliance management.

Safety Environment Diagnosis of Plant The safety environment audit system of Ulsan Factory is divided into regular audit, intensive audit, and subject inspection. A total of 10 regular audits, intensive audits, and topical inspections were conducted in 2018. Also, the company plans to diagnose in-depth, diagnose new acquisition site systems, and diagnose facility management systems for small businesses for multiple business places as well as regular diagnosis. Meanwhile, SK chemicals conducted the Off-site Risk Assessment on the 11 processes including 2 investment corporate bodies (INITZ and ENTIS) in order to respond to regulations on harmful chemicals and ensure the safety of business sites, and have been implementing the Hazard Management Plan in accordance with the evaluation results.

Regular Inspection	Total management system, process safety, facility and work safety inspection of Ulsan Factory
Intensive Inspection	Items derived according to safety environment issues
Topic Inspection	Worksites with high probability of a major disaster
Off-site Risk Assessment	Analysis of the influence of chemical accidents on the outdoor people and environment of the business place

SHE Key Performance Index (KPI)

Indexes and Guidelines

Points are deducted when a safety/environmental accident occurs (based on the Ulsan Plant)

- 90 points if no safety/environmental accidents occur
- Deducted points x 100/number of team members + Material loss (10 points/KRW 10 million)

Extra points will be awarded for extraordinary efforts that have contributed to preventing safety & environmental accidents.

Mock Training in Response to Emergencies

2 times a year

Prevention of Safety and Environmental Accidents Andong Factory actively implements the domestic PSM system to prevent serious industrial accidents, and through the safe work permit system, it preemptively blocks risk factors while working. Through the work risk assessment system and the excavation of Near Miss, we improve the working environment and conduct regular safety checks to prevent safety accidents.

Ulsan Factory prepares and implements accident prevention, over-the-counter impact assessment, and emergency response programs by establishing a 'risk management plan' with regards to chemicals, and notifies residents about the information related to them. Like this, SK chemicals strives to minimize damage in the event of chemical accidents by establishing its own prevention plan and informing people around the business place.

Response to Emergencies

Each business place of SK chemicals has established institutional devices to minimize damages and losses in the event of an emergency such as establishing emergency contact networks and establishing response procedures such as a system of conduct, and are conducting regular mock drills. Especially, all employees check the response system through safety inspection and emergency contact network to prepare for emergency situations during long vacation period like holidays and annual leave.

Health of Employees and Health Care

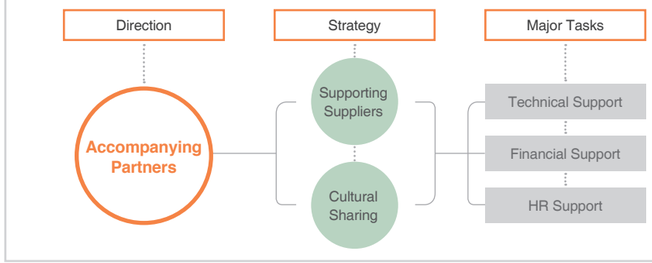
SK chemicals conducts regular health checkups for all employees. Especially, Ulsan Factory supports personal health management through individual counseling and regular follow-up management for those who have been exposed to diseases as a result of medical examination. Furthermore, the company operates an anti-smoking support program and an obesity eradication program to prevent adult diseases. Since 2019, the company adopts an average daily work-out program. Through the implementation of these health promotion programs, we contribute not only managing the health of employees but also improving their active work life and concentration.

Create SV through Win-Win Growth: Sustainable Expansion of Supply Network

Build a Foundation for Win-Win Growth

Establish a System for Win-Win Growth

SK chemicals strives to spread a fair-trading culture to its business partner—suppliers. Actual benefits such as technology support, financial support, and manpower support are provided to strengthen the competitiveness of suppliers, and we establish promotion systems for win-win growth for a more efficient support. In 2018, we updated the list of best suppliers in 2018 reflecting transaction performance in 2017 and evaluation results to provide support programs by partner.



Support Enhancement of Competitiveness

SK chemicals recognizes its suppliers as partners that raise value and competitiveness to grow together. In addition to providing economic support to them, SK chemicals provides various competitiveness strengthening programs and will make efforts to broaden the scope of beneficiary partners.

Financial Support

SK Shared Growth Fund SK chemicals is well-aware of the importance of delivering funds needed by companies on time through the decades of years of management experiences. For its partners to carry out smooth and stable business management, SK chemicals has launched and continuously run SK Shared Growth Fund since 2013. Through SK Shared Growth Fund, SK chemicals' partners have been able to secure finances needed for operation and facilities at a lower interest rate than the market. In 2018, SK chemicals managed a Shared Growth Fund of KRW 7.5 billion and provided KRW 2.54 billion to 7 companies in total.

Participants in Supplier Training Programs

CEO Seminar 69 people

SK Win-Win Growth MBA 5 people

Subcontract Payment SK chemicals implements cash payment for subcontracting, short-term payment for subcontracting, and free financial support for suppliers. For 2018, the company implemented cashable settlement 42 days earlier than the legal to increase the business stability and satisfaction of the suppliers as creating social value for the suppliers.

Management Support

Training to Enhance Competitiveness SK chemicals strives to create practical social values for the suppliers and contributes to the enhancement of competitiveness by providing various education support programs such as 'Win-Win Growth e-learning', 'online training', 'SK Win-Win Growth MBA', and 'Win-Win Growth CEO Seminar'. Especially, the targets of the 'Win-Win Growth Academy', 'Win-Win Growth MBA', and 'Win-Win Growth e-learning', which have been under way at the level of SK Group since 2006, have been expanded from 2017 and a new 'Win-Win Growth CEO Seminar' has been established for business partners. Around 69 business partners and five managers at the SK Win-Win Growth MBA participated in the CEO seminar of 2018.

Support to Secure Suppliers SK chemicals has held 'SK Win-Win Growth Recruitment Fair' since 2013 with SK Corporation in Ulsan area to help small and medium sized suppliers to improve their competitiveness by hiring the excellent talent. Through the recruitment fair, SK chemicals has created social values: providing suppliers with opportunities to improve their competitiveness by securing the excellent talent; and job seekers with job opportunities.

Especially, SK held '2017 SK Win-Win Growth Partner Recruitment Fair' in November 2017 expanded the number of participants from the first business partner to the second and third suppliers. Moreover, in 2018 for the first time, the company expanded the opportunity to recruit talented people from Seoul to regional business partners in the metropolitan area. By 2016, an accumulated 6,000 people had participated in the Win-Win Growth Recruit Fair, of which 354 had succeeded in finding jobs.

Benefit Sharing

Joint Development of New Products and Sharing Benefit

SK chemicals is leading the win-win process through research and business development by cooperating with small and medium-sized enterprises with advantages in various fields.

Especially, Wood Plastic Composite(WPC), an eco-friendly wood plastic composite developed with Donghwa Co., Ltd., is regarded as a successful example of a mechanical ground between large and small businesses. SK chemicals has succeeded in developing eco-friendly materials similar to natural wood in texture and appearance by closely cooperating with SK chemicals' new eco-friendly technology and dispatching experts to Donghwa, a company specializing in wood development. This product is highly water-resistant and durable. It can withstand 1.5 times more loads than existing products with less strain due to external temperature changes, thus reducing construction and maintenance cost. It can be used mainly for hiking trails and bike paths.

In 2018, the company participated in 'ANTEC 2018', the largest conference in the plastic industry held in Orlando, Florida, with Donghwa Co., Ltd., to aim for the global market.

Special Page

SK chemicals' Project Lab, Innovation with Shared Infrastructure

Project Lab for Coexistence with Partners

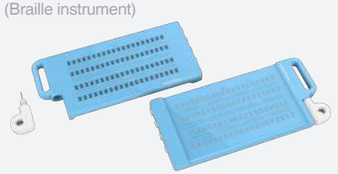
Project Lab, which started in 2018, is a program that supports the commercialization of plastic products by small and medium-sized businesses through various infrastructures and business partner networks held by SK chemicals. In 2018, we signed MOUs with a total of 16 partner companies in various fields, including product design, CAE* interpretation, molding, product molding, analysis and evaluation, injection equipment, and peripheral facilities. Through this, the company can identify the customer's product development needs, such as product development plans and product requirements, and provide the customer with a comprehensive solution that gathers technologies and know-how from the product design stage to mass production.

* CAE (Computer Aided Engineering): Uses computers to integrate information needed to manufacture a product to proactively assess manufacturing processes, product performance, and etc..

Product design	Introduce partners that can implement differentiated designs
Prototype	Propose a method suitable for prototyping in new product development
Material Proposal, Analysis	Propose material according to the need of customers
CAE Interpre-tation	Optimize product and mold design and verify structural safety using CAE
Mold Design, Manu-facture	Support mold design and manufacturing by reflecting product characteristic and customer request
Product Mass Production	Introduce partners to mass-production and help solve technical issues during mass production

Air Purifier

Assist Device for Handicapped People (Braille instrument)



Project Lab that leads SV Creation Business Model

Project Lab considers not only the primary social value that supporting SMEs, but also the social value created by these SMEs which SK chemicals is supporting. So far in 2019, five projects, related to a variety of social issues, are ongoing. From responding to safety and environmental issues such as fine dust to business for the socially, SMEs in various business sectors have made social values as collaborating with Project Lab. In 2019, we will launch a Project Lab website to create a system that can accurately understand the needs of our customers and provide them with the solutions they need. We will increase our knowledge with employees' abilities, networking power to source external capabilities, and our ability to build platforms such as website of Project Lab, so that more customers and service providers can find partners and realize the social values they have not imagined.

Product and Business Areas	SV Creation
Medical Apparatus	Prevention of secondary infection to medical apparatus
Patient Support Apparatus	Delay in disease progress (reduce the cost of treatment)
Air Purifier	Prevention of disease due to reduction of fine dust
	Number of benefits from air purifier
Prosthetic Arm	Low-cost supply compared to other products
	General disclosure of production know-how
Assist Device for Handicapped People	Low-cost supply compared to other products

Interview

CEO Lee,Sangho of Mand.ro Co., Ltd.

Mand.ro Co., Ltd., is a low-cost, light-weight electronic prosthetic arm manufacturing company for people with upper extremities amputated person. The company sells products at a price about 1/30 of the existing electronic prosthetic arms. Currently, main operates are located in Korea and the Middle East.

For the existing electronic prosthetic arms, the current penetration rate is only 0.1% due to the high price reaching KRW tens of millions. It is the social value that Mand-ro. creates to increase the penetration rate through the low-cost prosthetic arms giving the disabled with upper extremities amputation better life.

Mand.ro decided to mass-produce the key parts in mold during the development of the next version of prosthetic arms, in contrast to when all parts had been produced with 3D printers. Therefore we participated in SK chemicals' Project Lab to acquire advice regarding mold production. We received counsel for cost-effective placement of mold and revision of drawings to make them easier to dispense with, which helped to reduce production time and cost.

By successfully mass-producing the new prosthetic arms, Mand.ro plans to make inroads into many countries with better products.

1-3 Governance

SK chemicals SV -

SK chemicals established a transparent governance structure to continue its management activities for all stakeholders of SK chemicals, including shareholders and suppliers.

Create SV through improved Governance Structure: Enhance Transparency in Corporate Management

Corporate Governance

The Board of Directors of SK chemicals is committed to the basic policies and business execution of the company according to the Regulations of the Board of Directors, matters delegated by shareholders' meetings, stipulated by statutes and articles of association, and concerning the basic policies and business execution of the company's management. Also, the Board of Directors supervises the execution of the duties of directors.

Composition and Independence of the Board of Directors

SK chemicals' Board of Directors consists of two executive directors and three independent directors (As of March of 2019). For the function of the Board of Directors' checks and balances to management, more than half are independent directors. According to the Commercial Act, directors are not allow to be executive at more than one another company and to get employment at companies that are mutually beneficial.

Position	Name	Committee	Field of Expertise
CEO (Chairman of the Board of Directors)	Kim,Cheol	▪ Management Committee ▪ Indepedendent Director Nomination Committee	Mangement
CEO	Jeon,Gwanghyeon	▪ Management Committee	Mangement
Independent Director	Choi,Jeong-hwan	▪ Audit Committee ▪ Indepedendent Director Nomination Committee	Law
	Ahn,Yangho		Administration, Finance
	Park,Jungsoo		Economics

In 2018, SK chemicals held a total of 10 BOD meetings, and each agenda was reviewed and approved in consideration of domestic and international market conditions. BOD meeting is held to actively collect opinions from shareholders and stakeholders and reflect them in management. The Board of Directors shall review and approve key issues that cover various areas such as society, environment, and economy. SK chemicals informs the Secretariat of the Board of Directors at least five days in prior to the BOD meeting and communicates about the date and place of the meeting, agenda items for discussion and reporting.

Expertise and Diversity

When choosing a director, experience and expertise are considered to recommend candidates. The company discloses all requirements for directors, backgrounds to appoint, and independence, thus promotes transparency in the operation of its board of directors. Outside directors are comprised of experts from industry, economy, and legal fields to help make reasonable decisions by providing reflecting opinions on each area of expertise.

SK chemicals has set up to operate three subcommittees under its Board of Directors to enhance the expertise of its Board of Directors.

Number of Board of Directors Meetings

10 times

Agenda of BOD

Agendas Voted Down 27 cases

Agendas Passed 13 cases

Independent Director Nomination Committee Matters regarding composition and operation of the committee for recommending candidate are discussed.

Audit Committee Audit plans for the company are established and executed, results are evaluated, follow-up actions are made, and improvement ways are suggested. Furthermore, the matters delegated by the Board of Directors, law, and articles of association are audited. The committee is composed of independent directors to emphasize transparency of operation and independence of the Board of Directors.

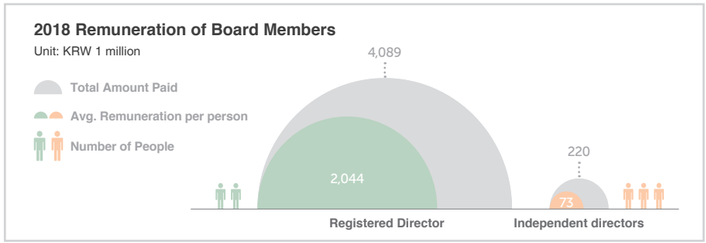
Management Committee The committee is composed of two executive directors, deliberating and voting on the matters concerning management, and establishing measures to enhance management performance for the development of the company.

Evaluation and Remuneration

Whether SK chemicals director will be reelected or not is decided at the end of each term by assessing the activities of the director's term. The participation rate of the director is disclosed to raise transparency.

The remuneration of directors will be carried out through approval of the shareholders' meeting and will be paid within the total director's remuneration limit. Executive director's remuneration is based on the value of job performance, and independent director's remuneration is set in accordance with the director's remuneration payment process and paid equally to all independent directors.

Performance remuneration is calculated by comprehensively evaluating metric indices composed of sales, operating profit, and pre-tax profits, and non-metric indices composed of leadership, expertise, and other company contributions. The remuneration of Board of Directors approved in 2018 was a total of KRW 5 billion, and KRW 4.3 billion was paid to board members. If individual compensation of directors and auditors exceeds KRW 500 million, they are reported in the business report in accordance with the related statutes.



Transparent Public Announcement

SK chemicals holds a shareholders' meeting every year to share the management status, collect opinions from shareholders on the direction and management of the company and ultimately protect shareholders' rights and interests. Major management items approved by Board of Directors are immediately disclosed to shareholders and other stakeholders. Especially, key matters closely related to investor interest are disclosed on the official website of SK chemicals, the Financial Supervisory Service Dart System and Korea Exchange.

Current Status of Share Ownership 2018.12.31	Shareholder	Unit	No. of shares owned	Share ownership
Shareholders with 5% stake or over	SK discovery CO., LTD.	Share	3,930,310	30.14%
	National Pension Service		1,294,311	9.93%
Minority shareholders	-		6,329,453	54.65%

Ethics Management

Code of Ethics

SK chemicals has the code of conduct that reflect SK Management System's (SKMS) basic management philosophy and principles of action. Furthermore, we have SKMS code of practice, code of ethics, and code of conduct to be presented for the behavior of members while establishing a transparent ethical system and culture.

- The company must obtain trust from the customer by continuously satisfying the customer, and ultimately develop with the customer.
- The company shall create an environment for its members to work voluntarily and enthusiastically, and the members shall contribute to the development of the company and value creation of interested parties.
- The company shall enhance the value of its business so that shareholders' value can be generated, and to this end, it shall enhance transparency and manage efficiently.
- The company shall pursue joint development with a partner company and competes with its competitors in a fair manner.
- The company shall contribute to society through social and cultural activities along with its contribution to economic development, and manage according to social norms and ethical standards.

Compliance Management System

The Board of Directors operates a legal compliance support system that is linked to the Fair Trade Compliance Program and appoints the Director of Legal Affairs Department as a compliance officer and a compliance manager for the Fair Trade Compliance Program to encourage the members to comply voluntarily with laws and regulations. Also, the Board of Directors establishes and implements the compliance control criteria for the highest standard of compliance activities and reports the compliance with the compliance education and compliance regulations to the Board of Directors once a year.

Process for Compliance Support Activities

Prevention	▪ Providing regular consultation ▪ Supporting major projects ▪ Education for legal compliance	
Monitoring	▪ Checking whether employees comply with the standards for legal compliance/observing overall legislation ▪ Examining major points regarding compliance with legal risks	
Post management	▪ Analyzing results of activities for compliance control ▪ Implementing educational programs for compliance	

Anti-Corruption We handle the tasks related to Improper Solicitation and Graft Act and ethics consultation and reporting. There was a total of six online reports on ethics and compliance and there were four violations in 2018. SK chemicals gave appropriate answers and guidelines on online reporting.

Among the reported cases, sexual harassment in the workplace, abuse of authority inside and outside the organization, and violation of compliance were identified as serious disciplinary reasons, and the disciplinary committee may decide on a heavier punishment than suspension.

Expansion of Ethical Culture

In January 2016, SK chemicals newly established a compliance team specialized in each business for Green Chemicals Biz. and Life Science Biz. to manage systematic ethics management. The company also conducts self-inspection every year to strengthen ethics management. To raise the level of ethics management practice among all members and strengthen ethics management skills, we conduct a diagnostic survey and go on a workshop for online education and leadership-oriented ethics practice. In 2018, we have strengthened our commitment to more advanced ethics management through a ceremony to declare ethical management. For some business (Life Science Biz.), furthermore, we will reflect the results in the KPI evaluation of the members with the goal of 0 violations.

SK chemicals SV KPIs

Environment	− Consumption of resources and environmental pollution generated during the process by measuring the amount of water used, waste, greenhouse gas, air pollution, and water pollution + Non BPA and Bio Product Sales Amount + Commercialization of Bio-based new materials/fuel
Society	+ Contribute to improvement of health and quality of life through sales of influenza, shingles, and varicella vaccines + Develop Win-Win Growth BM

Amount of hazardous chemicals used

164,150 ton

Accidents involving hazardous chemicals

0 case

Fair Trade Code of Conduct

01. Compliance with the law
02. Fair competition
03. Fair deal
04. Participation in self-contained management
05. Seeking management innovation

Compliance

Management of Chemicals

SK chemicals complies with the Act on Registration, Evaluation, etc. of Chemicals, the Chemical Control Act, and the Waste Control Act. While complying with the domestic and foreign environmental laws and regulations, the company implements social needs for companies that can be detected in changes in regulations by reflecting them in its management.

Chemical and Contaminant Management SK chemicals complies with the Act on the Registration and Evaluation of Chemicals, the Chemical Management Act, and the Waste Management Act. In particular, under the Act on the Integrated Control of Pollutant-Discharging Facilities in 2017, the company has been applied with the integrated environment management system and has been granted an integrated license to various environmental media, including water quality and air quality. We are analyzing contaminants and their impact at each business place and preparing an integrated environment plan.

Resource Circulation Complying to the Framework Act on Resources Circulation in 2018, SK chemicals' Ulsan operation has evaluated by the Ministry of Environment for setting resource circulation goals, cyclical usage, and reduction result. In addition, the Waste Disposal Charge imposed on SK chemicals in 2018 was KRW 690 million. SK chemicals will continue its efforts to reduce waste generation and increase recycling rates throughout the process from production to distribution, consumption and disposal.

Fair Trade

SK chemicals aims to compete fairly and freely in a mutually trusted relationship. Through continuous efforts for fair trade, we intend to enhance the image of companies, prevent violations of laws and regulations, and carry out compliance management and corporate responsibilities.

Fair Trade Compliance Program SK chemicals has been operating Compliance Program since 2006, understanding that compliance with competitive order and autonomous implementation of Fair Trade Act are crucial elements of sustainable management in its corporate activities. Under the supervision of the appointed Fair Trade Self-Compliance Manager, the working-level officials of each department conduct regular inspections through checklists, and in case of cases of high possibility of violation of the law, the company operates an internal monitoring system by reviewing them in advance with the internal expert department.

The Settlement of Fair Trade Culture SK chemicals published a manual of fair trade compliance that covers domestic related statutes including the Fair Trade Act and overseas anti-corruption laws such as the U.S. Foreign Corrupt Practices Act (FCPA) and the U.K. Bribery Act (BA). We also share legal and ethical criteria that SK chemicals executives and employees must comply with by providing fair trade practices. Also, we provide fair trade education every year to check and understand the members' implementation of self-compliance and to help them understand the revision of relevant statutes. In 2018, the company provided training on subcontracting methods, agency laws and related statutes for chemical management. No transactions with any outside stakeholders have violated the fair trade behavioral regulations.

Monitoring and Inspection

SK chemicals conducts its own management diagnostics to quickly integrate changes domestic and foreign laws and social needs into its management style. The company implements management diagnosis for all of its functions, including management status, performance, planning, and operation of internal management regulations. In 2018, we conducted self-cleaning system checks in six areas: HR, purchase/BP, cost, sales/ receivables, investment, and special risk management. We found out seven items to be improved, and we have modified and developed the internal control system and internal regulations to enhance compliance through the internal management diagnosis.

CSR Social Value

Materiality

- Companies should actively contribute to the development and innovation of the local community as a member of the society. This is an important management activity that enhances the sustainability of the business in terms of reducing the environmental and social risks that may arise in the local community through the resolution of social problems, and helping the economic activities of consumers as products and services.
- Social contributions, donations and volunteering are no longer one-sided commitments for society alone. Access and strategy from the DBL perspective are important in terms of Creating Shared Value (CSVs) where society and businesses share values.

Approach & Strategy

- SK chemicals strives to foster social contribution activities, volunteer work and social enterprises through various cooperation with stakeholders in local community, and in the process, it enhances the sustainability of businesses and society.

Long Term Target

- Hours of social contribution per person
  : 40 hours

Social contribution performance

KRW 500million

Generate value through community investments such as CSR programs

Employee Volunteer

926people

Number of volunteers

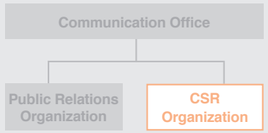
Social Contribution Strategy System

Social Welfare Leading a respected corporate culture by implementing social contribution activities with the engagement of employees and the socially disadvantaged.

Eco-friendliness Contributing to realizing healthy and safe eco-friendly lifestyles by carrying out eco-friendly management such as activities and education programs for cleaning the environment.

Spreading Happiness Spreading a healthy social culture by sharing sound values, cultural sectors, and expertise.

Organization Chart of CSR



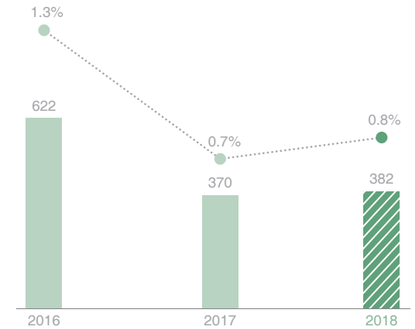
2-1 Donation

SK chemicals SV -

SK chemicals has been sharing its economic performances with much more members of society through donations every year. In 2018, SK chemicals donated KRW 382 million (0.8% of Operating incomes), which is a net donation amount after excluding Employee Welfare Fund, monetized values of community service, and additional costs for running CSR programs.

Gross Donation Performance

Unit: KRW 1 million



2-2 CSR Program

SK chemicals SV -

SK chemicals puts its infrastructure and capabilities into making sincere CSR that are actually helpful to society. We establish a strategy direction for CSR program aligned with UN SDGs by reflecting the needs of the local and the international community.

Direction of CSR

SK chemicals undergoes CSR program by theme in accordance with its mission to 'improve human health and protect the Earth's environment.' The UN Sustainable Development Goals (SDGs), established by the United Nations in 2015, are 17 goals that countries, businesses, and organizations must achieve together to ensure sustainable development around the world. To participate in SDGs achievement, SK chemicals promotes 'Eco-friendliness', 'Social Welfare' and 'Spreading Happiness', which are the three key areas of CSR, in joint with SDGs goal.

CSR Organization

SK chemicals has exculsive organization for CSR (CSR Organization) to support efficient and strategic company-wide implementation of CSR. The direction of the company's social contribution is linked to the person in charge of each business place, and the project and service are being carried out.

Representative Social Contribution Activities

Environmental Education: Happy Green School

SK chemicals has been executing an environmental education business since 2012 to promote the importance of the environment and to promote awareness of environmental protection. Especially, from 2018, it has been reborn as a "Happy Green School" by reorganizing the contents of the previously operated "Happy Green Classroom". Since 2012, a total of 130 executives and employees of SK chemicals who have turned into "eco-friendly teachers" have met 7,720 (360 in 2018) elementary school children at the Happy Green School in Seongnam and Ulsan. SK chemicals executives and employees use PPT textbooks and board games to the viewpoint of 3rd grade elementary school students to help them understand the importance of the environment easily and interestingly. Like this, students will learn about air and ocean pollution and how to practice environmental protection. In 2019, we will take the lead in promoting the importance of eco-friendly environment by conducting environmental education in earnest based on newly upgraded textbooks.

'Hope Maker' to Support Low-income Children and Youth

'Hope Maker' is a social welfare CSR project supporting low-income children and young people and provides mentoring programs. Hope Maker is SK chemicals' representative social contribution program that has been going on since 2012 and has sponsored 220 children and youth in 15 social welfare institutions nationwide along with SK Gas.

With 14 local welfare centers, the company provided economic and cultural activities to 160 children and teenagers by team, while also providing volunteer work for the welfare centers. In 2018, we launched 'Hope Maker School', which focuses on career education and mentoring by identifying students' needs, to conduct phased and systematic career education and consulting for elementary, middle and high school grades.

Support of Silver Theater

SK chemicals has been supporting the Silver Theater, the first theater dedicated to senior citizens for the silver generation, since 2009. The Silver Theater is the number one social enterprise in the field of culture and arts where people over 55 can enjoy classical films of memories at a low price (KRW 2,000). Since 2009, the company has provided a total of KRW 9.5 billion in accumulated funds to enhance elderly leisure and expand cultural space. Furthermore, we have hosted the 'Outreach Silver Film Center' to screen performances and movies at senior welfare service centers in various regions to help the silver generation benefit from low cultural and welfare benefits.

SK Happiness Well

We currently operate well development business to supply clean water in Kenya, Africa, where people suffer from the lack of water. In 2016, we completed three SK Happiness Wells in Tarasa/Wachuoda/Sheli area and supply 7,300 tons of drinking water annually.

2-3 Employee Volunteer

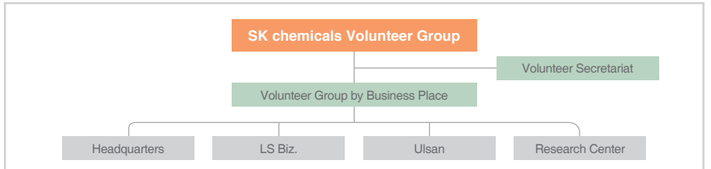
SK chemicals SV -

SK chemicals formed 'SK chemicals Volunteer Group' in 2004 to fulfill its mission as a corporate citizen, and all executives and employees participate in community service. In 2018, there were 926 volunteers that participated in volunteer work for a total of 3,452 hours.

Social contribution investment and support		Unit	2016	2017	2018
Participation in Volunteer Activities	Number of volunteers	People	1,693	1,629	926
	Hours of volunteer per person	Hours	7.0	6.7	3.7

The volunteer group of SK chemicals is composed of volunteer groups by business establishment such as headquarters, LS Biz., Ulsan and research center. The leader of the volunteer group is carried out by the CEO, and the office provides direction for service activities, the launch of company service programs, and cooperation with external agencies.

Volunteer Promotion System



Happiness Sharing Season

SK Group's Volunteer Activities during the Winter Season, 'Happiness Sharing Season'

SK chemicals actively participates in volunteer activities of Happiness Sharing Season that SK Group has been operating since 2005. In 2018, the company held a Happiness Sharing Bazaar in joint with SK Gas to support meal expenses for children who starve in the winter with proceeds from the sale of donated goods. Also, the SK Corporation located in Seongnam city shared Making Kimchi with Happiness with the local community neighbors. For 365 days a year, the 3,650 heads of kimchi cabbages, which symbolizes the practice of a warm neighborhood love of 36.5°C, was delivered to the homes of the children and elders of Seongnam that have participated in Homemaker.

A.Cure

SK Pro Bono Talent Donation Activity

SK Pro Bono* is an activity of donating talents participated by all SK Group members, and members of SK Group share expertise and technology to social enterprises. We give back our professional knowledge and talents to the society and discover and support the talented who has artistic gift.

* Pro Bono: This refers to activities where experts use their expertise to help the socially disadvantaged and underprivileged. This is a term derived from the Latin word 'pro bono publicico' which means 'for the public good'.

A.Cure

Each business place carries out A.cure activity, a river purification activity to protect the ecosystem. A.cure is a combination of aqua, which means water, and cure, which means healing, which is a volunteer activity to protect water resources and create a pleasant ecological space.

Special Page

Story: SK chemicals' Pro Bono

SK chemicals Pro Bono, Contributing to Solving Social Issues

SK chemicals activate employees' pro bono activities by dividing it into four areas: family type, in-house type, education type, and advisory type and put effort to solve social issues. In line with the characteristics of each employees, we perform various activities for the environment, social welfare, and welfare for the elderly, in connection with social enterprises and social ventures. Around 380 members of SK chemicals headquarters participate in the program of various social enterprises through SK's Happiness Foundation.

Interview

The lively "Pro Bono" activities of SK chemicals executives and employees are an extension of SK chemicals' extensive interest in "sustainable management." Through Pro Bono Seungwon Lee, more detailed story about the SK chemicals' creation of social values is to be shared.

Q. Hello, please introduce yourself.

Nice to meet you. I'm Seungwon Lee from SK chemicals Petrochemical Business Team. I'm in charge of profit and loss and planning for Energy

Q. Is there a special reason you started the Pro Bono Activity?

In fact, I started the Pro Bono career from small daily routine. Any office workers will probably feel the same. But due to the repetitive daily routine, I've felt the need for a change. In the meantime, I saw the announcement on the company's (SK chemicals) recruiting program as it was fate.

Q. You've made a great choice to create social value while breaking away from the daily routine. Then, what kind of activities have you participated in?

I was first matched to the 'Kimpo Senior Club'. It is a social enterprise dedicated to creating jobs for the elderly. It also produces and sells eco-friendly products. We sold good products and were in constant demand, but we were having trouble operating due to the revenue structure issues. As a person working in the financial part, they needed me for help.

Q. I'm sure you felt proud to help out. Please introduce another activity.

This year, I am participating in training to give management advise to 'Noneumagy Coop.' It is an organization founded to help the vulnerable. They make profits by selling EM soap and donated goods, but they needed additional revenue to improve their financial structure and create jobs. That's why I applied because they needed a variety of management advice.

Q. I see. Did you have any positive results through your activity?

Yeah, I got a call from Kimpo Senior Club few months later, and I was very proud to hear that an additional employee was hired because of the improved profit structure. After the first meeting, Noneumagy Coop. provided practical support and related education such as sharing considerations in the business value chain of the product sales process, and building files to examine product margins.

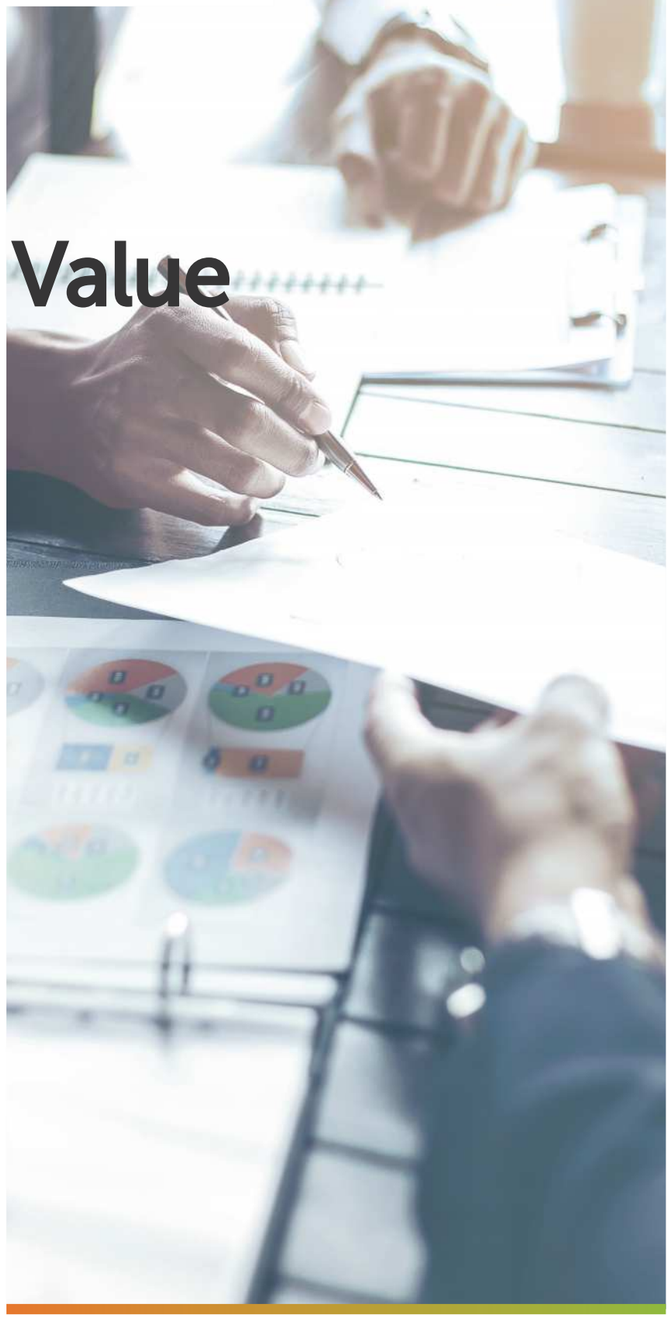
Q. I bet the positive changes you see will have huge impact on your as well.

Right. Unlike volunteer work, I felt a tremendous impact on one institution. If continuous performance is generated through Pro Bono activities, I would like to acquire a certificate such as a business manager after retirement to consult a small business.

Q. What do you think is the future of SK chemicals Pro Bono activities?

I will have to only be in charge of 1~2 companies where it is not a disturbance to my main job. Pro Bono is expected to continue to expand because of the good reaction that is executed in groups.

Indirect Economic Value



Materiality

- The company indirectly contributes to the revitalization of the domestic economy by transferring economic resources to various stakeholders through employment, dividends of profits, and taxes that inevitably accompany its management activities.

Approach & Strategy

- SK chemicals promotes sustainable growth of its business based on DBL management, to pursue both economic and social values. As the company grows, its indirect economic value also increase naturally, creating social value.

Employment Performance
KRW 117.5 billion
Create indirect economic value through employment

Dividend Performance
KRW 5.3 billion
Create indirect economic value through dividend on the shareholders

Taxation Performance
KRW 24.7 billion
Create indirect economic value through taxes such as corporate tax

New Recruitment

2017 183 people

2018 206 people

Dividend tendency*

87.64%

* Dividend tendency: Percentage of dividend amount compared to net profit during a term

3-1 Employment

SK chemicals SV -

SK chemicals generated KRW 105.5 billion in economic indirect contributions by paying salary of 1,937 executives and employees in 2018. Including performance-based extra payment, the amount increases to KRW 117.5 billion. Salaries are applied to the withholding amount of earned income reported to the National Tax Service. Extra payment is amount aside from the typical wage, including IB (Incentive Bonus) and grant, etc.

Name of Company		Unit	2017	2018
SK chemicals	Salaries	KRW 100 million	1,095	914
	Extra payment		109	90
SK Petrochemical	Salaries		40	14
	Extra payment		10	3
Initz	Salaries		46	49
	Extra payment		15	10
SK Bioscience	Salaries		-	79
	Extra payment		-	16

3-2 Dividend

SK chemicals SV -

SK chemicals contributes indirectly to the national economy by allocating profit from sales activities to its shareholders. The dividend performance is appropriated by the dividend amount on the statement of changes in equity on the financial statements as well as the dividend paid from a subsidiary to the parent company. In 2018, SK chemicals' indirect economic value to the national economy through dividend was KRW 5.3 billion.

Name of Company		Unit	2017	2018
SK chemicals	Total dividends	KRW 100 million	-	53
	(HC+TM+Parent company)		-	17
	(Foreign company and foreigner)		-	4

3-3 Tax Payment

SK chemicals SV -

SK chemicals calculates its tax payment by adding up the corporate tax on its profit and loss statement as well as national tax and local tax among the Taxes and Dues Account. In 2018, SK chemicals' indirect economic value to the national economy through tax payment was KRW 24.7 billion.

Name of Company		Unit	2017	2018
SK chemicals	Korea	KRW 100 million	–14	47
	Overseas		0	11
SK Petrochemical	Korea		–45	–22
	Overseas		0	0
Initz	Korea		–131	206
	Overseas		0	0
SK Bioscience	Korea		0	3
	Overseas		0	2
Total			–190	247

Appendix

Customer Satisfaction

Green Chemicals Biz.

SK chemicals' Green Chemicals Biz. developed a Customer Relationship Management (CRM) system to enhance efficiency of customer and complaint management. After pilot operation and supplementation in the copolyester resin business in December 2017, SK chemicals has expanded and operated it to the entire business and is continuously making improvements for the optimized system since July 2018.

The CRM system records and manages all customer information, customer support, complains, and reflections. The details of customer information, consultation, and complaint resolution are stored in the database through the institutionalized reporting process. All information stored in the database is easily convertible, so the person in charge of customers make the customer management activities into a dashboard for systematic management and response. Notably, the interoperation of the CRM and ERP systems, SK chemicals aims to comprehensively manage all the technology supports and sample production history provided to its partners from the past. It seeks to offer new products and services to partners based on the information in the system.

Through this customer management system, Green Chemicals Biz. efficiently listens to and quickly solves difficulties in product usage and complaints about abnormalities of product process. Also, the data collected in the database is regularly reported in statistic form to the respective managers of Marketing, Production, Reasearch Institutes, and Quality Control and CEOs, and will be actively reflected in the quality improvement of the products.

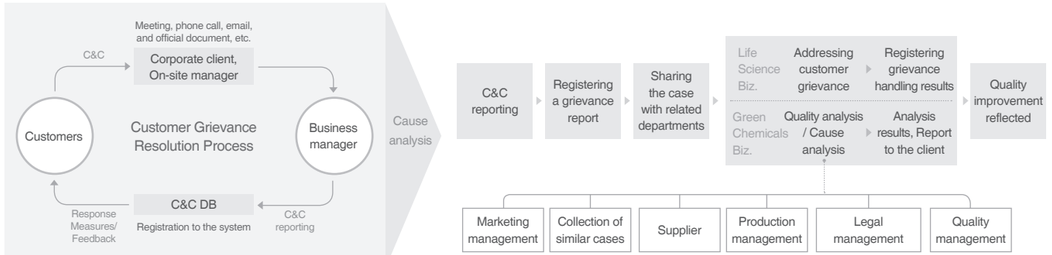
Life Science Biz.

SK chemicals Life Science Biz. operates 'Voice of The Customer' (VOC) with a focus on the customer counseling. The VOC covers range from receiving complaints about difficulties in use and abnormalities in medicines to resolving complaints from SK chemicals. We strive to gain continuous trust from customers with rational processing and resolution.

All reception and reflection details are recorded and managed in the Complaint Database. The details of customer consultation and customer complaints are reported every month to Marketing, Production, Reasearch Institutes, and Quality Control and CEO according to the monthly consultation statistics reporting system, and are actively reflected in the improvement of medicine and changes in packaging.

Meanwhile, Life Science Biz. is also strengthening the privacy of its customers. According to the privacy policy, the customer counseling office preserves the information for a specified period of time according to the relevant statutes and then disposes them. Also, all the unique identification information is deleted from the computer and the system.

Customer Grievance Resolution Process



Human Rights Management

Human Rights Policy and Report on UNGC Compliance Report

Based on its mission of 'Improving human health, protecting the Earth's environment' SK chemicals seeks to realize the value of human rights respect throughout its management activities. In order to fulfill human rights respect in all of its management activities while respecting its employees' human rights, SK chemicals supports and respects the human rights protection and labor standards of international organizations.

Since 2011, SK chemicals has upheld the ten principles on human rights, labor, environment, and anti-corruption of UNGC. SK chemicals' voluntary efforts and activities that follow the ten principles in four major sectors are reported as follows:

Major themes	Principle	page
Human Rights	1. Businesses should support and respect the protection of internationally proclaimed human rights.	56
	2. Make sure that they are not complicit in human rights abuses.	
Labor	3. Uphold the freedom of association and the effective recognition of the right to collective bargaining.	33-38
	4. Eliminate all forms of forced and compulsory labor.	
	5. Abolish child labor effectively.	
	6. Eliminate discrimination in respect of employment and occupation.	
Environment	7. Support a precautionary approach to environmental challenges.	27-30
	8. Undertake initiatives to promote greater environmental responsibility.	
	9. Encourage the development and diffusion of environmentally friendly technologies.	
Anti-Corruption	10. Work against corruption in all its forms, including extortion and bribery.	44-45

SK chemicals follows the above principles and the Human Rights Management Policy of SK Co., Ltd., and will develop and establish an organization, operational structure, monitoring, measures, and internal/external report process to fulfill the UN's Corporate and Human Rights Principles.

Human Rights Management Policy of SK chemicals

01 SK chemicals respects the human rights of its all members and guarantee their human dignity.

02 SK chemicals makes its best effort to prevent the elements of human rights infringement from all value chains.

03 SK chemicals pursues the happiness of all stakeholders and considers the human rights elements of all products and services it produces.

04 SK chemicals fulfills social corporate responsibilities and strives to develop communities and respect human rights.

Prohibition of Discrimination and Respect for Diversity

SK chemicals provides equal opportunities for employment, promotion, reward, and training to all employees, prohibits all kinds of discrimination based on gender, age, race, religion, labor union activity, physical handicap, pregnancy, marital status, and social status, and respects the diversity of its employees. SK chemicals also mentions talent recruitment without discrimination according to race, nationality, gender, religion, physical handicap, region, and affiliated organization on its personnel rule and employment regulations.

Financial Performance

Consolidated Balance Sheet

Assets	Unit	2017	2018
Current assets	KRW	662,574,651,356	717,166,309,658
Cash and cash equivalents		155,162,078,234	45,286,768,519
Short-term trading financial assets		-	135,393,316,647
Trade receivables and other receivables		204,493,252,994	195,942,079,590
Inventories		290,263,035,755	328,951,762,092
Other current assets		12,656,284,373	11,592,382,810
Non-current assets		1,249,840,296,687	1,233,638,701,180
Long-term trading financial assets		57,487,609	46,786,467
Long-term investment		419,199,443	419,199,443
Long-term loans		-	10,984,840,000
Deposits provided		4,415,164,163	1,870,636,220
Investment in the joint venture		7,381,881,533	6,711,986,415
Property, plant and equipment		1,098,042,431,284	1,103,321,131,405
Intangible assets		47,391,971,824	38,341,453,801
Investment in properties		61,586,325,401	53,927,098,881
Other non-current financial assets		673,726,473	1,638,151,342
Deferred tax assets		29,872,108,957	16,377,417,206
Total assets		1,912,414,948,043	1,950,805,010,838
Liabilities			
Current liabilities	KRW	660,898,997,378	594,303,651,410
Account payable and other payable		240,236,630,563	230,195,332,597
Short-term borrowings		129,665,502,962	181,240,018,975
Current portion of long-term debt		274,454,763,454	144,539,900,802
Current income tax liabilities		315,627,925	4,122,950,750
Other current liabilities		15,595,688,261	16,432,219,270
Provisions		630,784,213	-
Contract		-	17,773,229,016

Consolidated Balance Sheet

Liabilities	Unit	2017	2018
Non-current liabilities	KRW	520,154,093,095	630,940,893,842
Bonds		255,145,890,869	409,125,862,838
Long-term borrowings		228,966,252,628	180,544,183,104
Defined benefit liability		13,371,005,913	14,405,928,261
Other non-current liabilities		18,809,163,529	25,957,604,673
Deferred tax liabilities		251,404,338	365,470,076
Provisions		3,610,375,818	-
Contract		-	541,844,890
Total liabilities		1,181,053,090,473	1,225,244,545,252
Equity			
Parent company ownership interest		696,582,079,332	691,831,365,771
Capital		65,192,610,000	65,192,610,000
Capital surplus		667,419,016,385	668,175,712,895
Other reserves		-25,503,653,539	-35,433,410,770
Accumulated other comprehensive income		-1,833,592,207	-3,115,429,018
Unappropriated retained deficit		-8,692,301,307	-2,988,117,336
Non-controlling interests		34,779,778,238	33,729,099,815
Total equity		731,361,857,570	725,560,465,586
Total liabilities and equity		1,912,414,948,043	1,950,805,010,838

* SK chemicals is a newly established corporation, which was launched by splitting Green Chemicals Biz. and Life Science Biz. being operated by SK discovery, on December 1, 2017 in accordance with Article 530-2 or Article 530-11 of the Commercial Act. Accordingly, the performance mentioned above is equivalent to one month of December 2017.

* Several line items are reclassified due to the alteration of accounting standards.

Consolidated Statements of Comprehensive Income

	Unit	2017*	2018
Sales	KRW	87,836,375,138	1,367,719,213,257
Cost of goods sold		75,145,447,419	1,095,287,319,601
Gross profits		12,690,927,719	272,431,893,656
SG&A		21,872,183,928	226,698,244,297
Operating incomes (losses)		-9,181,256,209	45,733,649,359
Other incomees		198,007,160	6,205,785,599
Other expenses		1,244,926,239	21,166,143,660
Finance incomes		2,214,365,229	22,288,997,620
Finance costs		4,455,052,646	49,583,627,402
Gains on equity method for investment in the joint venture		-122,782,300	1,682,629,712
Earnings (losses) before taxes		-12,591,645,005	5,161,291,228
Tax expenses (incomes)		-2,707,081,047	21,581,039,208
Net loss		-9,884,563,958	-16,419,747,980
Other comprehensive incomes		-154,940,093	-1,842,269,714
Items that will be reclassified to profit or loss			
Unrealized gains and losses on equtiy method investment		-7,398,632	33,894,100
Gains (losses) on overseas operations translation		-77,754,423	-73,655,977
Gains (losses) on valuations of derivatives		-	-1,242,074,934
Items that will not be reclassified to profit or loss			
Remeasurement of the defined benefit liability		-69,787,038	-560,432,903
Net total comprehensive loss		-10,039,504,051	-18,262,017,694
Attribution of net income (loss)			
Parent company ownership interest		-8,535,887,391	6,028,110,051
Non-controlling interest		-1,348,676,567	-22,447,858,031
Attribution of consolidated total comprehensive income (loss)			
Parent company ownership interest		-8,777,454,362	4,358,636,961
Non-controlling interest		-1,262,049,689	-22,620,654,655
Earning (loss) per share of parent company ownership interest			
Earning (loss) per ordinary share		-655	457
Loss per preferred share		-655	507

* SK chemicals is a newly established corporation, which was launched by splitting Green Chemicals Biz. and Life Science Biz. being operated by SK discovery, on December 1, 2017 in accordance with Article 530-2 or Article 530-11 of the Commercial Act. Accordingly, the performance mentioned above is equivalent to one month of December 2017.

ESG Performance

100 Universal Standards

102-2, 102-7 Scale of the Organization_ Manufactured Products		Unit	2016	2017	2018
Green Chemicals Biz.	Biodiesel	ton	155,996	149,918	182,078
Life Science Biz.	Vaccines	Dose	5,321,420	5,944,810	6,000,806
	Tablets	Tablet	517,746,471	582,524,653	578,340,985
	Patches	Patch	32,951,523	45,121,288	37,125,447

102-2, 102-7, 201-1 Scale of the Organization_Sales by Business Line					
Green Chemicals Biz.	Bio Energy	KRW 100 million	2,881	2,817	2,770
	E&A Business/EP Business		556	703	690
	Composite materials		628	622	545
	Power UT		662	700	615
	Others		23	20	0
Life Science Biz.	Pharmaceuticals		1,804	2,003	2,085
	Vaccines		1,477	1,195	1,402
	Others (except plasma)		38	11	0
Others			3	3	0
Total			11,466	11,914	12,575

102-8, 405-1 Total Number of Employees by Plants					
Male	Headquarters (Eco Lab)	Person	756	729	797
	Ulsan Plant		358	366	487
	Andong Plant (L HOUSE)		125	132	140
	Cheongju Plant (S HOUSE)		100	102	105
Female	Headquarters (Eco Lab)		243	250	286
	Ulsan Plant		23	26	24
	Andong Plant (L HOUSE)		31	33	41
	Cheongju Plant (S HOUSE)		58	57	59
Full-time employees	Headquarters (Eco Lab)		971	954	1,055
	Ulsan Plant		378	387	508
	Andong Plant (L HOUSE)		125	143	177
	Cheongju Plant (S HOUSE)		146	149	158
Contract-basted employees	Headquarters (Eco Lab)		28	25	28
	Ulsan Plant		3	5	3
	Andong Plant (L HOUSE)		31	22	4
	Cheongju Plant (S HOUSE)		12	10	6

100 Universal Standards

102-8, 405-1 Total Number of Employees by Genders, Employment Type		Unit	2016	2017	2018
No. of employees	Male	Person	1,423	1,329	1,529
	Female		383	366	410
No. of employees by employment type	Full-time		1,709	1,633	1,898
	Contract-based		97	62	41
Composition of Executives	Male		37	30	34
	Female		2	1	1
	Ratio of female executives	%	5	5	5
Composition of Managers	Male	Person	166	184	188
	Female		8	13	12
	Ratio of female managers	%	4.6	6.6	6.4

* Ratio of female managers = No. of female executives / No. of total executives × 100

102-9 Total Number of Business Partners Managed					
No. of business partners that are registered and managed	Company -wide	Business partner	968	1,013	954
Total procurements from business partners		KRW 100 million	6,934	7,814	7,825

102-12, 102-13 Memberships of Associations

Korea Economic Research Institute	Korea Employers Federation
Seongnam Chamber of Commerce	Korean Fair Competition Federation
Korea Industrial Technology Association	Korean Association of Occupational Health Nurses
Seongnam Branch of Korea Industrial Safety Association	

102-17, 103-2 No. of Cases Reported, Found and Addressed by Official Ethics Management Reporting Channel				
No. of cases reported for the reporting period	Case	3	6	6
No. of cases addressed for the reporting period		3	6	6
Ratio of grievances addressed	%	100	100	100

102-18, 33 Operation of the Board of Directors				
No. of regular meetings	Times	10	12	10
Issues voted down	Case	13	42	27
Issues passed		13	42	27

102-18, 33 Engagement of the Board of Directors				
Attendance rate for executive directors	%	90	91	100
Attendance rate for independent directors		83	96	100

200 Economic Performance

201-3 Coverage of the Organization's Defined Benefit Plan Obligations		Unit	2016	2017	2018
Size of retirement pension plan (Defined benefit, DB)	Company-wide	KRW 100 million	873	835	814
No. of employees covered by the retirement pension plan (Defined benefit, DB)	Company-wide	Person	1,513	1,548	1,256
201-4 Financial Assistance Received from the Government					
Government subsidiary	Company-wide	Case	11	7	14
Tax exemption	Company-wide	KRW 100 million	38	78	42
203-2 Win-Win Growth and Shared Growth Cooperation with Suppliers					
Amount of Shared Growth Fund for suppliers		KRW 100 million	75	75	75
Total amount of loans for suppliers			42	46	25.4
No. of suppliers with loans		Number	9	10	7
Number of partners with temporary or permanent shutdown transactions			0	0	3
206-1 Anti-Competitive Behavior, Antitrust, and Monopoly Practices, and Non-Compliance with Laws and Regulations					
No. of cases of anti-competitive behavior, antitrust, and monopoly practices, and non-compliance with laws and regulations		Case	0	0	0
No. of non-monetary sanctions of anti-competitive behavior, antitrust, and monopoly practices, and non-compliance with laws and regulations			0	0	0
No. of lawsuits of anti-competitive behavior, antitrust, and monopoly practices, and non-compliance with laws and regulations (lost lawsuits determined)			0	0	0

300 Environmental Performance

301-1, 2, 3 Materials Used by Weight or Volume		Unit	2016	2017	2018
Volume of raw and subsidiary materials used	Ulsan Plant	ton	441,471	494,415	659,645
	Andong Plant (L HOUSE)		248	265	305
	Cheongju Plant (S HOUSE)		421	1,986	2,439
302-1 Power Generation Using Renewable Energy					
Solar heat	Headquarters (Eco Lab)	MWh	7.7	8.3	8.4
Geothermal heat		Gcal	9.5	35.6	36.2
302-1 Energy Consumption within Company					
Coals	Company-wide	ton	159,748	146,396	151,362
Waste wood		ton	52,766	60,386	64,558
Gasoline		kl	22	10	10
Diesel		kl	28	60	44
Biodiesel and synthesis gas		ton	2,507	3,060	2,815
LNG		1,000㎥	12,789	10,253	11,819
LPG		ton	26	88	32
Biogas		ton	11,173	12,282	10,686
Electricity		MW	149,001	8,471	160,920
Steam		TJ	17	19	71
Propane		ton	4,819	7,617	13,111
Process waste heat		TJ	143	41	50
Limestone		ton	2,591	2,660	3,431
SF_6		kg	900	900	900
302-2 Energy Consumption Outside Company					
Electricity	Ulsan Plant	TJ	1,309	1,442	1,123
Heat			3,403	4,002	3,132
303-1, 2 Total Water Withdrawal and Consumption					
Water consumption	Headquarters (Eco Lab)	ton	60,230	66,990	55,316
	Ulsan Plant		7,782,366	8,017,246	8,645,644
	Andong Plant (L HOUSE)		103,429	102,923	97,863
	Cheongju Plant (S HOUSE)		52,181	26,388	49,957

300 Environmental Performance

303-3 Total Water Withdrawal and Consumption from Underground, Recycled, and Reused		Unit	2016	2017	2018
Total volume of water drawn from underground, recycled, and used sources	Headquarters (Eco Lab)	ton	2,940	2,576	3,236
	Ulsan Plant		3,452,159	3,368,667	3,647,881
305-1, 2 GHG Emissions					
Scope1 emissions	Company-wide	tCO_2eq	415,746	397,749	428,488
Scope2 emissions			70,105	81,389	165,944
305-4 GHG Emission Intensity					
Scope1 intensity ratio	Company-wide	tCO_2eq/ KRW 100 million	36.3	33.3	31.4
Scope2 intensity ratio			6.1	6.8	12.2
302-4, 5, 305-5 GHG Emissions Target (Environmental Management (Green Triple 40!))					
BAU emissions		tCO_2eq	692,000	695,000	815,000
Target reduction		%	39.9	39.9	40.0
Actual emissions		tCO_2eq	485,851	479,138	594,428
Actual reduction		%	29.8	31.2	27.1
201-2 Eco-Friendly Sales (Environmental Management (Green Triple 40!))					
Target of eco-friendly sales		%	28.0	31.0	34.0
Actual eco-friendly sales			41.9	40.0	43.2
305-6, 7 Intensity of Air Pollutants Discharged					
Dust	Ulsan Plant	mg/Sm^3	5	3	4
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		4	4	3
ulfur oxide (SOx)	Ulsan Plant	ppm	30	28	39
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		0	0	0
Nitrogen oxide (NOx)	Ulsan Plant	ppm	67	37	56
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		81	80	64
Volatile organic compound (VOC)	Ulsan Plant	ppm	0	1	1
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		15	18	18

300 Environmental Performance

306-1, 2 Total Water Discharge		Unit	2016	2017	2018
Water discharge	Headquarters (Eco Lab)	ton	22,144	27,029	27,363
	Ulsan Plant		697,615	809,642	961,637
	Andong Plant (L HOUSE)		70,446	65,193	64,270
	Cheongju Plant (S HOUSE)		25,969	19,577	24,281
306-1, 2 Intensity of Water Pollutants Discharge					
BOD	Ulsan Plant	ppm	5	3	1
	Andong Plant (L HOUSE)		147	83	107
	Cheongju Plant (S HOUSE)		2	4	1
COD	Ulsan Plant		20	14	18
	Andong Plant (L HOUSE)		51	45	64
	Cheongju Plant (S HOUSE)		16	19	13
SS	Ulsan Plant		2	2	2
	Andong Plant (L HOUSE)		38	35	36
	Cheongju Plant (S HOUSE)		10	11	11
306-2, 4 Total Waste by Type					
Amount of generated regular waste	Ulsan Plant	ton	26,732	27,309	27,986
	Andong Plant (L HOUSE)		72	100	134
	Cheongju Plant (S HOUSE)		146	187	153
Amount of generated designated waste	Ulsan Plant		6,408	6,805	7,408
	Andong Plant (L HOUSE)		66	59	79
	Cheongju Plant (S HOUSE)		1,767	1,849	1,852

300 Environmental Performance

306-2, 4 Total Waste by Disposal Method		Unit	2016	2017	2018
Incineration	Ulsan Plant	ton	967	321	407
	Andong Plant (L HOUSE)		113	126	169
	Cheongju Plant (S HOUSE)		1,862	1,969	1,952
Reclamation	Ulsan Plant		7,168	7,449	7,139
	Andong Plant (L HOUSE)		0	0	0
	Cheongju Plant (S HOUSE)		14	27	0
Recycling	Ulsan Plant		23,912	26,327	27,396
	Andong Plant (L HOUSE)		25	33	44
	Cheongju Plant (S HOUSE)		81	62	65
Marine emissions	Ulsan Plant		0	0	453
	Andong Plant (L HOUSE)		0	0	0
	Cheongju Plant (S HOUSE)		0	0	0
Recycling ratio	Ulsan Plant	%	72	77	77
	Andong Plant (L HOUSE)		22	20	26
	Cheongju Plant (S HOUSE)		4	4	3

306-4 Transfer of Hazardous Waste					
Amount of Hazardous Chemicals Usage	Ulsan Plant	ton	37,411	26,237	164,150

306-1, 2 Environmental Investment					
Environmental investment and target	Headquarters (Eco Lab)	KRW 100 million	0	0	0
	Ulsan Plant		14.1	27.4	147.2
	Andong Plant (L HOUSE)		1.5	0	0
	Cheongju Plant (S HOUSE)		5.5	0.9	0.6

400 Social Performance

401-1 Total Number and Rates of New Employees and Employee Turnover_Number of Retirees and Turnover Rate		Unit	2016	2017	2018
No. of new employees hired	Male	Person	122	124	124
	Female		58	59	82
No. of retirees	Male		117	128	68
	Female		54	55	59
	Total		171	183	127
Turnover rate	-	%	10.2	8.6	6.5

401-3 Maternity Leave					
Male	No. of employees who took maternity leave	Person	0	0	3
	No. of employees who returned after maternity leave		0	0	2
Female	No. of employees who took maternity leave		33	28	30
	No. of employees who returned after maternity leave		25	23	19
Male	Number of employees who have worked for more than 12 months since returning to work		1	0	0
Female	Number of employees who have worked for more than 12 months since returning to work		14	18	11

402-1, 403-1, 4 Current Status of Labor Union and Labor-Management Consultative Body					
No. of people with membership of labor union and labor-management consultative body	Company-wide	Person	474	447	520
Ratio of membership of labor union and labor-management consultative body		%	26	26	28
No. of meetings of labor union and labor-management consultative body		Person	4	4	4

403-2 Type of Injury, Occupational Diseases, Lost Days, and Absenteeism, Total Number of Work-related Fatalities					
No. of accidents	Company-wide	Case	3	4	4
Death toll			0	0	0
No. of lost days		Day	114	155	325

400 Social Performance

403-3 Current Status of Medical Checkup Support and Implementation		Unit	2016 Eligible employees	2016 Employee health screening	2017 Eligible employees	2017 Employee health screening	2018 Eligible employees	2018 Employee health screening
Comprehensive medical checkup	Headquarters (Eco Lab)	Person	830	827	503	492	862	861
	Ulsan Plant		203	203	382	379	241	241
	Andong Plant (L HOUSE)		12	12	94	94	12	12
	Cheongju Plant (S HOUSE)		140	140	49	49	155	155
General medical checkup	Headquarters (Eco Lab)		993	992	607	603	1,009	1,008
	Ulsan Plant		381	381	384	384	431	431
	Andong Plant (L HOUSE)		42	42	57	57	47	47
	Cheongju Plant (S HOUSE)		140	140	152	152	164	164
Special medical checkup	Headquarters (Eco Lab)		154	154	159	159	168	168
	Ulsan Plant		271	271	268	268	346	346
	Andong Plant (L HOUSE)		94	94	98	98	96	96
	Cheongju Plant (S HOUSE)		106	106	133	133	117	117

404-1, 2 Training Hours and Investments for Employees		Unit	2016	2017	2018
Annual average training hours per employee	Company-wide	Hour	207	271	244
Annual average training costs per employee		KRW	1,419,481	1,238,095	1,254,969
Total Training Hours		Hour	422,901	569,100	533,930
Total amount of investments in employee training		KRW 100 million	29	26	28

404-3 Ratio of Employees Receiving Regular Performance Review		Unit	2016	2017	2018
No. of employees eligible for regular performance review	Company-wide	Person	1,031	1,222	1,270
No. of employees who received regular performance review			995	1,105	1,175
Ratio of employees who received performance review		%	96.5	90.4	92.5

405-1 Composition of Employees_Diversity of Employees		Unit	2016	2017	2018
No. of disabled employee hired	Company-wide	Person	25	23	20
No. of patriots and veterans hired			36	36	36
No. of foreigners hired			5	4	2

405-2 Percentage of salary by gender and position		Unit	2016	2017	2018
Male	Company-wide	%	85%	85%	85%
Female			15%	15%	15%
Administrative Position			21%	23%	20%
Non-supervisory Position			79%	77%	80%

* Percentage for each classification in contrast to the total salary expenses

400 Social Performance

413-1 Social Contribution Investment and Support		Unit	2016	2017	2018
Amount of investment in social contribution	-	KRW 100 million	16	15	15
Volunteer activity participation	No. of employee volunteers	Person	1,693	1,629	926
	No. of volunteering hours per employee	Hour	7.0	6.7	3.7

413-1 Theme-Based Social Contribution Performance	Unit	2016	2017	2018
No. of employees for environmental training	Person	930	1,800	360
Hope Maker Membership	%	93	93	93
No. of audiences for Silver Theater	Person	250,000	230,000	320,000

418-1 Protection and Loss of Customer Personal Information	Unit	2016	2017	2018
No. of customer data (including personal information) stolen	Case	0	0	0
No. of customer data (including personal information) lost		0	0	0

R&D Performance

R&D Investment (Green Chemicals Biz.)	Unit	2016	2017	2018
Number of R&D employees	명	152	149	148
R&D investment	억원	271	294	291
Sales to R&D investment ratio	%	2.8%	2.7%	2.6%
Sales	억 원	9,763	10,837	11,261

R&D Investment (Life Science Biz.)	Unit	2016	2017	2018
Number of R&D employees	명	106	94	93
R&D investment	억원	446	335	326
Sales to R&D investment ratio	%	13.4%	10.4%	9.4%
Sales of new products	억원	292	10	15
Sales of new products to total sales ratio	%	8.79%	0.31%	0.42%
Sales	억 원	3,319	3,231	3,487

Intellectual Properties (accumulated)		Unit	2016	2017	2018
Domestic	Patents	개	457	474	501
	Trademarks		1,015	1,024	1,030
Overseas	Patents		355	512	636
	Trademarks		356	383	386

Independent Assurance Statement

KMR Third Party's Assurance Statement

To the Readers of SK chemicals 2018 Sustainability Report:

Foreword

Korea Management Registrar Inc. (hereinafter "KMR") has been requested by of SK chemicals to verify the contents of its 2018 Sustainability Report (hereinafter "the Report"). SK chemicals is responsible for the collection and presentation of information included in the Report. KMR's responsibility is to carry out assurance engagement on specific data and information in the assurance scope stipulated below.

Scope and standard

SK chemicals describes its efforts and achievements of the corporate social responsibility activities in the Report. KMR performed a type2, moderate level of assurance using AA1000AS (2008) and SRV1000 from KMR Global Sustainability Committee as assurance standards. KMR's assurance team(hereinafter "the team") evaluated the adherence to Principles of Inclusivity, Materiality and Responsiveness, and the reliability of the selected GRI Standards indices as below, where professional judgment of the team was exercised as materiality criteria.

The team checked whether the Report has been prepared in accordance with the 'Core Option' of GRI Standards which covers the followings.

- **GRI Standards Reporting Principles**
- **Universal Standards**
- **Topic Specific Standards**
  - · Management approach of Topic Specific Standards
  - · Economic Performance: 201-1, 201-3
  - · Anti-Corruption: 205-2
  - · Anti-Competitive Behavior: 206-1
  - · Materials: 301-1, 301-2, 301-3
  - · Energy: 302-1, 302-2
  - · Water: 303-1, 303-3
  - · Emissions: 305-1, 305-2, 305-4, 305-5, 305-6, 305-7
  - · Effluents and Waste: 306-1, 306-2
  - · Employment: 401-1, 401-2, 401-3
  - · Occupational Health and Safety: 403-2, 403-3, 403-4
  - · Training and Education: 404-1, 404-2, 404-3
  - · Diversity and Equal Opportunity: 405-1, 405-2
  - · Local Communities: 413-1
  - · Customer Privacy: 418-1

This Report excludes data sand information of joint corporate, contractor etc. which is outside of the organization, i.e. SK chemicals, among report boundaries.

Our approach

In order to verify the contents of the Report within an agreed scope of assurance in accordance with the assurance standard, the team has carried out an assurance engagement as follows:

- **Reviewed overall report**
- **Reviewed materiality test process and methodology**
- **Reviewed sustainability management strategies and targets**
- **Reviewed stakeholder engagement activities**
- **Interviewed people in charge of preparing the Report**

Our conclusion

Based on the results we have obtained from material reviews and interviews, we had several discussions with SK chemicals on the revision of the Report. We reviewed the Report's final version in order to confirm that our recommendations for improvement and our revisions have been reflected. When reviewing the results of the assurance, the assurance team could not find any inappropriate contents in the Report to the compliance with the principles stipulated below. Nothing has come to our attention that causes us to believe that the data included in the verification scope are not presented appropriately.

- **Inclusivity** Inclusivity is the participation of stakeholders in developing and achieving an accountable and strategic response to sustainability
  - SK chemicals is developing and maintaining stakeholder communication channels in various forms and levels in order to make a commitment to be responsible for the stakeholders. The assurance team could not find any critical stakeholder SK chemicals left out during this procedure.
- **Materiality** Materiality is determining the relevance and significance of an issue to an organization and its stakeholders. A material issue is an issue that will influence the decisions, actions, and performance of an organization or its stakeholders.
  - SK chemicals is determining the materiality of issues found out through stakeholder communication channels through its own materiality evaluation process, and the assurance team could not find any critical issues left out in this process.
- **Responsiveness** Responsiveness is an organization's response to stakeholder issues that affect its sustainability performance and is realized through decisions, actions, and performance, as well as communication with stakeholders.
  - The assurance team could not find any evidence that SK chemicals's counter measures to critical stakeholder issues were inappropriately recorded in the Report.

We could not find any evidence the Report was not prepared in accordance with the 'Core Option' of GRI standards.

Recommendation for improvement

We hope the Report is actively used as a communication tool with stakeholders and we recommend the following for continuous improvements.

- SK chemicals successfully identified key topics from 2018 based on the properly developed materiality assessment process and short- to long-term sustainability strategies and compared the performance against the plan in detail. Its methods for measuring and reporting social and environmental performance were outstanding. The organization is advised to expand the current group of key performance indicators to promote social values, and measure and report performance with consistency, further strengthening communication with stakeholders.

Our independence

With the exception of providing third party assurance services, KMR is not involved in any other SK chemicals's business operations that are aimed at making profit in order to avoid any conflicts of interest and to maintain independence.

July,8th, 2019 CEO E.J Hwang

KMR SRV1000 Sustainability Committee Assurance AA1000 Licensed Assurance Provider 000-129

E. J Hwang

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About This Report

Characteristic of the Report

'SK chemicals Sustainability Report 2018' reports the 7 core aspects of sustainable management based on the issues generated through internal management system, external environment analysis, and stakeholder engagement. It also describes the reasons behind the selection of key reporting aspects, crisis and opportunity factors for issues, and SK chemicals' major policies, activities, and performance. Further details can be found in this report.

Principle of Report

This report complies with the core compliance with the Global Reporting Initiatives (GRI) Standards, which are the international reporting guidelines for sustainable management, and reflects some of the principles and contents set forth by the International Integrated Reporting Council (IIRC) Framework. It also reflects the 10 principles of UNGC, and data on financial information contained in this report complies with K-IRFS (Korea International Financial Reporting Standards.)

Report Period

This report covers activities from January to December of 2018 and includes three years of data from 2016 to 2018 to enhance comparability for substantial sustainability performance cases*. It also includes some information prior to 2018 and 2019 that could have significant impact on the stakeholders.

Scope of Report

The scope of this report includes SK chemicals' domestic operations, its headquarters and research institutes, operations in Ulsan and Cheongju (S HOUSE), and Andong plant of SK Bioscience (L HOUSE). Scope that is out of range is separately marked.

Report Reliability

In order to secure reliability of the report, verification procedures have been performed according to 3 principles (comprehensive, materiality, responsiveness) of AA1000AS, and the results included on page70-71.

Additional Information

SK chemicals publishes sustainability report in Korean and English to enhance access to information among its stakeholders. The report can also be views on SK chemicals' website (http://skchemicals.com).

* SK chemicals became a new corporation through equity spinoff as of December 1st, 2017, but for continuity of data, the data of SK Discovery was used until data of November 2017.