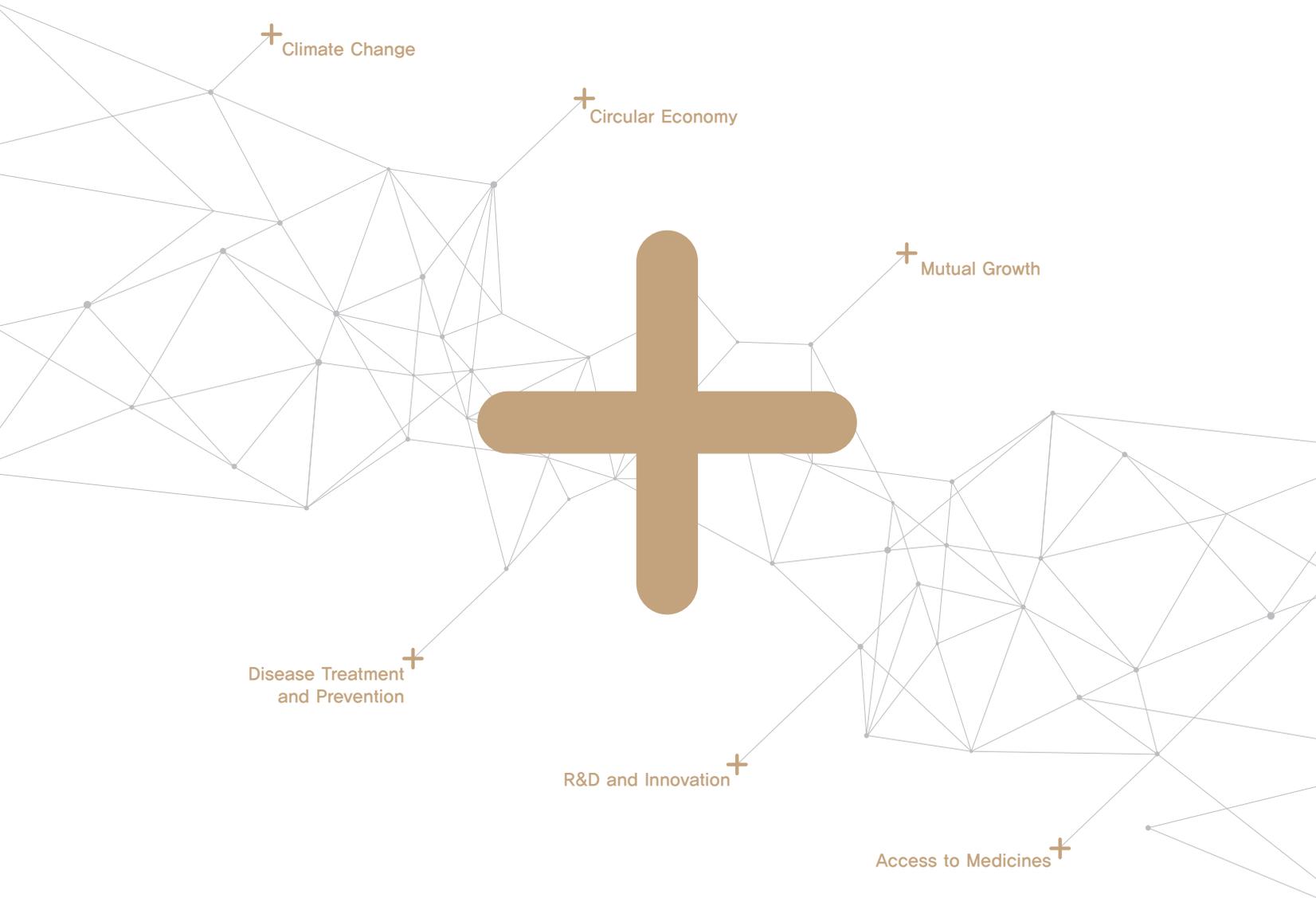


# WE CARE FOR THE FUTURE

Healthcare, Earthcare





## COVER STORY

Based on our Double Bottom Line (DBL) pursuing both economic and social value, SK chemicals strives to have all facets of our business directions go hand in hand with social value. This report demonstrates our will to move forward into a sustainable future through new value creation under a motif of 'plus(+).'



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## Shortcuts Added to Webpage



SK chemicals created shortcuts leading to webpages to present more details on our Sustainability Report 2019. If you click on the icon above, it will lead you to relevant websites for accessing to additional information.

# CEO MESSAGE



Dear honorable shareholders, customers, partner companies and stakeholders,

We would like to extend our sincere gratitude for your unwavering support and interests. This year marks nine years of annual reporting on our sustainability progress. SK chemicals also continues to make efforts towards 'sustainable society and future' this year.

Last year, the global economic slowdown combined with the trade conflict between the U.S. and China brought about a change in the management environment. In the face of the highly variable climate in 2019, SK chemicals still contributed to the creation of not only economic but also social value through our bioenergy business, which belongs to Green Chemicals Biz., expanding the supplies of eco-friendly fuels. In addition, we achieved KRW 500 billion of sales in our pharmaceuticals business under Life Science Biz., on the strength of the improved efficiency of business management and the growth in our vaccine business. We, however, saw sluggish progress in our new businesses including PPS, which functioned as a constraint on the growth of sales company-wide, so we unfortunately could not reach our expected management goal.

We had tirelessly made our way in 2019, and rang in the year of the white rat, 2020, anticipating abundance, hopes and new opportunities. However, unfortunately, we are faced with unfavorable environments due to the outbreak of COVID-19, and global business outlook is also expected to be not optimistic. 2020, however, will become a critical year for us to take up the challenge to grow into a sustainable company.

We will focus on laying the foundation for growth in existing businesses. In an effort to do this, the efficiency and optimization of operation will be pursued to make 'Full Production Full Sales' possible. We continue to work on projects in coalition with partners at home and abroad to solidify our growth base over a medium to long term period.

Cheol Kim SK chemicals CEO *Cheol KIM*

Meanwhile, we will spur our new businesses, which are the future growth engine for us, to produce tangible results earlier. For the vaccine business, we will reinforce our presence in the domestic market while tapping into the global market. In the PPS business, we will put our focus on securing profitability to raise its sustainability. In addition, we will identify new businesses enabling both social problem resolution and profit generation, thereby discovering new opportunities for further growth.

We will also continue to work on the establishment of systems and infrastructure within our organization to constantly implement 'Innovating the Way of Work' and 'Operation Excellence.' With new challenges ahead, we will foster a professionalism-oriented corporate climate based on new processes and procedures to ensure the growth of both individuals and the company.

Social value creation will also be our focus. SK Group measures social values in many aspects ranging from employment/allocation/tax payment (positive effects), greenhouse gases/waste/pollutants (negative effects), labor/mutual growth (positive effects) to social contribution (positive effects). In 2019, SK chemicals is creating social values across our businesses encompassing the development of vaccines preventing diseases, eco-friendly biomaterials, substitutes for hazardous materials and lighter materials. The social value generated through our products has accounted for about 40 percent of the total. In 2020, we plan to create social value through our recycled products.

I hope this sustainability report delivers our sincerity and the values we seek to not only our employees but also our shareholders, customers and partner companies. I wish all of our stakeholders to join our journey toward happiness.

Thank you.



Gwang-hyeon Jeon SK chemicals CEO

50  
YEAR  
ANNIVERSARY

# Together for the past 50 years, Together for the next 50 years

## SPECIAL PAGE

The year 2019 marked the 50<sup>th</sup> anniversary of the foundation of Sunkyung Synthetic Fiber, the matrix of SK group and the root of SK chemicals. To emerge from Sunkyung Synthetic Fiber that ushered in the new chapter of Korea's fiber industry in the ashes of Korean War 50 years ago to SK chemicals that has provided eco-friendly materials and health care total solutions, we have been rising to countless challenges and changes, constantly innovating ourselves. Sunkyung Synthetic Fiber was a representative yarn maker in Korea, driving the fiber industry that was a major locomotive of the economic growth of Korea. Since then, our unremitting innovation and business diversification allowed us to launch a third-generation platinum-based chemotherapy SUNPLA Injection<sup>®</sup> for the first time in the world and acquire US FDA certification with ECOZEN<sup>®</sup>, the world's first environmentally friendly heat-resistant and transparent bioplastic that are remarkable progress in Korean history. These achievements resulted from the concerted efforts and will of a vast number of stakeholders including our employees, the government, shareholders, customers, and partners as well as the founder of SK group, Jong-kun Choi. SK chemicals will keep challenging ourselves on this journey toward the next 50 years without a fear of facing changes based on the lively communication with our various stakeholders.





## Awards & Accreditations

- 
- 2002** • 'SKYGREEN<sup>®</sup>' (PETG) resins awarded IR52 Jang Young-Shil Prize
- PETG was accredited as the World-Class Product Certification by Minister of Industry
- 
- 2008** • Won Dongtan Order of Industrial Service Merit
- 
- 2010** • 'ECOZEN<sup>®</sup>' won Korea's Top 10 New Technology Award / Silver prize in Korea Technology Award
- Biodiesel won Green Technology Grand Ministerial Prize
  - Obtained ECO Lab LEED-certified PLATINUM rating
- 
- 2011** • 'ECOZEN<sup>®</sup>,' world's first eco-friendly high heat-resistant transparent bioplastic, obtained US FDA certification
- 
- 2012** • Hemophilia drug, NBP601 awarded Korea New Technology / Ministerial Prize by the Ministry of Knowledge Economy
- 
- 2013** • PCT material selected as Korea's Top 10 New Technology and won Ministerial Prize
- L HOUSE earned GOLD grade from LEED (for the first time as pharmaceutical factory in the world)
  - Eco-friendly materials, 'ECOZEN<sup>®</sup>' and 'SKYGREEN<sup>®</sup>' acquired the first Gold Level certification in Korea
- 
- 2014** • Awarded Presidential Citation in the Government Award for Merit for Job Creation
- Awarded Innovative Pharmaceutical Company Prize in K Pharma Night 2014
- 
- 2015** • Won the top place in the chemical sector in DJSI 2015
- 
- 2017** • Biopolyester/ABS composite materials, the automobile interior materials, won IR52 Jang Young-Shil Award
- 
- 2018** • 'SKYCellflu<sup>®</sup>' selected as the Highest Brand of the year 2018
- Won Innovation Award at JEC Asia 2018
- 
- 2019** • 'SKYCellflu<sup>®</sup>' Trivalent/Quadrivalent vaccines acquired WHO PQ certification for the first time in the world as cell-cultured vaccines
- 'SKYVaricella<sup>®</sup>' (varicella vaccine) obtained WHO PQ certification for the second time in the world
  - Won the grand prize in the category of vaccine at Medical Korea Awards

SK chemicals 50-Year

# History

Together for the past 50 years · 1969~2019

This shows you fifty years of our history where we have evolved from a yarn maker representing Korea into a global healthcare total solution provider.

## 1969~1985

### Beginning and Challenge

We established Sunkyung Synthetic Fiber in the 1960s and ran factories, opening an era of polyester fiber in Korea. Then, Sunkyung Synthetic Fiber continued to challenge and innovate itself by producing Korea's first polyethylene terephthalate (PET) resin for bottles and establishing the Sunkyung Synthetic Fiber Research Institute, thereby making the foundation for chemical material business.

- 1969** Establishment of Sunkyung Synthetic Fiber
- 1974** Completed building polyester cotton factory in Ulsan
- 1976** Initial public offering of Sunkyung Synthetic Fiber
- 1978** Developing PET resin for bottles for the first time in Korea
- 1979** Establishment of Sunkyung Synthetic Fiber
- 1985** Acquiring Suwon Textile Factory

## 1986~1997

### Uprising to Changes and Challenges

The fierce competition in the polyester business required us to come up with an alternative plan to prepare for the next 50 and 100 years. Against this backdrop, Sunkyung Synthetic Fiber changed our name to Sunkyung Industries, and expedited fine chemical and life science businesses, enhancing our stature as a comprehensive synthetic chemistry company while securing future growth engines through continuously transforming business structures.

- 1987** Established Sunbo Pharmaceutical  
Acquired Samshin Pharmaceutical  
Established SK cytec
- 1988** Changed company name to Sunkyung Industries
- 1989** Completed an emulsified PTA/DMT plant  
Established Life Science Research Center  
Developed PPS resin
- 1990** Established Petrochemical Research Center  
Changed company name to Sunkyung Pharmaceutical
- 1991** Developed 'Ginexin-F<sup>®</sup>'
- 1994** Developed 'Trast<sup>®</sup>'  
Developed polyester adhesive



July 1, 1969 Established Sunkyung Synthetic Fiber Co., Ltd



Mar 25, 1980 Signboard hanging ceremony of Sunkyung Synthetic Fiber Research Institute



Nov 30, 1989 Launched DMT and PTA products from Ulsan Plant



View of Sunkyung Pharmaceutical in the 1990s

## 1998~2009

### Making a Foundation for a Leap

When the group's CI was changed from Sunkyung to SK in 1998, we also changed our company name from Sunkyung Industries to SK chemicals to take a leap forward a global company. With the new company name, SK chemicals, we accelerated our Green Chemicals Biz. and Life Science Biz. while advancing the business structure to future-oriented businesses.

- 1998** | Changed company name to SK chemicals  
Established SK NJC for commercial CHDM production
- 1999** | Export 'Omed<sup>®</sup>,' a gastric ulcer drug, to EU for the first time for a Korean finished drug product  
Launched Korea's no.1 new drug and world's first 3<sup>rd</sup> generation platinum complex anticancer drug, 'Sunpla<sup>®</sup>'
- 2000** | Spun off polyester fiber business and established a joint venture, HUVIS
- 2001** | Established SK chemicals (Qingdao) Co., Ltd., our first production company in China  
Developed 'SKYGREEN<sup>®</sup>' an eco-friendly high functional resin
- 2002** | Launched 'Joins<sup>®</sup>' Korea's first herbal medicinal product for arthritis
- 2005** | Established SK chemicals (Suzhou) Co., Ltd.  
SK pharmaceutical was merged into SK chemicals
- 2006** | Dongshin Pharmaceutical was merged into SK chemicals  
Developed biodiesel production technology
- 2007** | Launched 'Mvix<sup>®</sup>' a new drug for treating erectile dysfunction
- 2009** | Developed 'ECOZEN<sup>®</sup>' an eco-friendly transparent heat-resistant copolyester  
Founded SK syntec  
L/O of hemophilia treatment NBP601 for the first time for a Korean bio new drug  
Established ST Green Energy

## 2010~2019

### New Challenges

Declaration of 'Healthcare & Earthcare company,' we have completed our corporate business structure centering on Green Chemicals Biz. and Life Science Biz. We began our new leap forward a company with centennial history with setting the goal to establish our GC business as 'solution provider of eco-friendly materials' and our LS business as 'solution provider of total healthcare' in line with our mission, 'We promote human health and protect the environment.'

- 2010** | Declared 'Health & Earthcare Company'
- 2011** | Launched the world's first ODF(Oral Dissolving Film) for erectile dysfunction treatment 'Mvix S<sup>®</sup>'  
World's first eco-friendly high heat-resistant transparent bioplastic, 'ECOZEN<sup>®</sup>'  
Acquired US FDA certification
- 2012** | Acquired the first generic license in EU with 'Rivastigmine patch,' a patch-type dementia treatment
- 2013** | Established Teijin and Initz, a joint venture, and began construction of special facility for PPS
- 2014** | Signed a contract with Sanofi Pasteur for developing and supplying next-generation pneumonia vaccine
- 2015** | World's first approval of cell-cultured quadrivalent influenza vaccine  
Launched 'SKYCellflu<sup>®</sup>,' Korea's first cell-cultured influenza vaccine
- 2016** | Launched 'SKYCellflu<sup>®</sup> Quadrivalent,' the world's first quadrivalent cell-cultured influenza vaccine  
Received the first marketing approval of 'AFSTYLA<sup>®</sup>,' a hemophilia treatment drug, in the US and Canada as the Korean bio new drug  
Developed high-performance secondary battery electrolyte additive for the first time in Korea
- 2017** | Founded SK discovery, a holding company  
Received approval for 'SKYZoster<sup>®</sup>,' a shingles vaccine for the second time in the world and the first in Korea  
'SKYFLEX<sup>®</sup>,' acquired product certification for wind power  
First application of automobile PCT connector in domestic large and medium-sized automobiles
- 2018** | Established 'SK bioscience,' a spin-off of vaccine business  
Acquired marketing approval for 'SKYVaricella Inj.<sup>®</sup>,' a chickenpox vaccine  
Merged SK petrochemical
- 2019** | Acquired US FDA approval for 'Rivastigmine patch,' a dementia treatment patch



July 1999 Launched 'Sunpla<sup>®</sup>'



SK chemicals' researcher studying PETG materials



July 1, 2009 Opening ceremony of Cheongju plant



Completed building SK chemicals ECO Lab in September 2010

SK chemicals 50-Year

# For the Future

Together for 50 years to come



**“SK chemicals should focus on eco-friendly chemical materials business and vaccine business with high growth potential based on the efficiency of the existing businesses.”**

**Shinyoung Asset Management / Manager Woo-yeol Kim**

What areas should SK chemicals focus on while corporate social responsibility assumes greater significance? A company’s social responsibility lies in various fields including environment area, but above all, I believe job creation is the most salient one. SK chemicals has been seeing our eco-friendly chemical materials represented by Green Chemicals Biz. on the steady rise and the vaccine business with high potential constantly growing. On this wise, if SK chemicals concentrate its capabilities on our strength while achieving consistent efficiency, I am convinced that it will create much greater social value based on the expanded job creations.

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In advance of a journey toward a company with centennial history, we interviewed outside expert groups and our suppliers in an effort to find ways we go hand in hand with the society and our stakeholders toward sustainable growth.

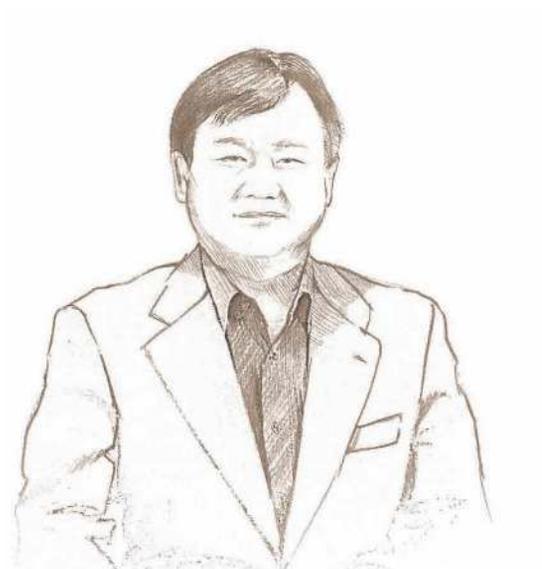


**“Higher competitive edge of SK chemicals’ products brings about sharper competitiveness of Huvis’ products.”**

**Huvis / Team leader, Jin-wook Kim**

What do SK chemicals and Huvis need for the creation of greater synergy? Huvis purchases PPS resin from SK chemicals and manufactures it in the form of fabric. The PPS produced in fabric type is utilized in producing bag filters that filter out fine dust from power plants. As the regulations and social awareness on fine dust emissions from power plants have increased worldwide, there are growing needs for functional improvement in bag filters. The higher performance of PPS resin, a raw material, leads to the better quality of bag filters that can filter out more fine dust. Like this, the performance improvement in SK chemicals’ products is directly linked to the rise in Huvis’ competitiveness. Thus, I hope SK chemicals to create far greater synergy effect through continuously advancing its product functions.

In order to become a beloved company with a centennial heritage, it is vital to be able to continuously create palpable social value so that all stakeholders in relationship with the company can feel the effects of the creation. Accordingly, SK chemicals interacts with stakeholder groups through various communication channels to better understand their pain points as well as needs, thereby actively applying them in our management. In the course of preparing for the next 50 years, we individually interviewed external expert groups and stakeholders and the details of the interview are as follows;



**“Efficient R&D activities are required to take the lead in spreading a circular economy, which is a global trend.”**

**Seoul National Univ. of Science and Technology / Professor Min-young Lyu**

**What areas should SK chemicals focus on to create more social value?**  
As a chemical company that produces plastic resins, leading the spread of a circular economy is highly essential. Now, rather than simply making sturdy and high-performance plastics, SK chemicals should put its focus on how to make it easy to separate, dismantle and recycle, taking into consideration recyclability from the stage of product design. Furthermore, I think approaching at all angles through open innovation from the early stage of product R&D will enable SK chemicals to produce products that can create social value more swiftly and effectively.



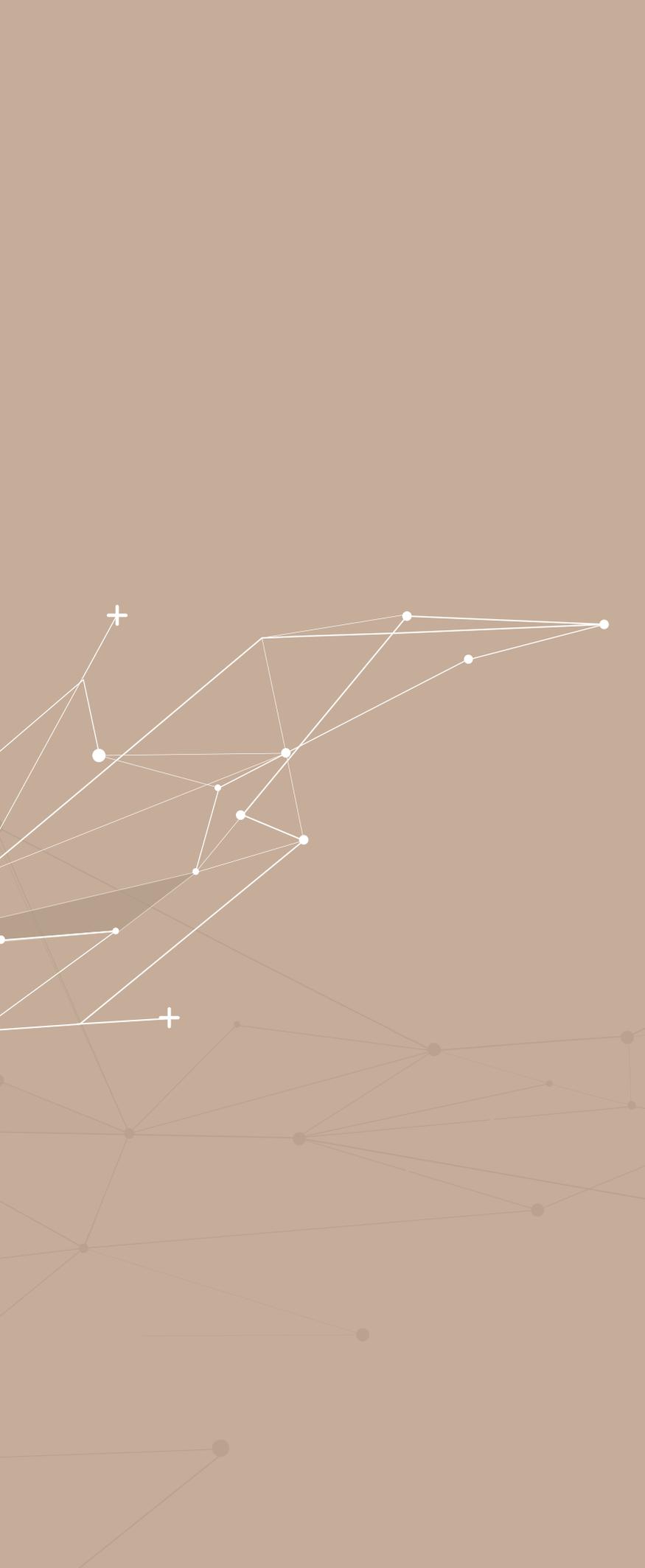
**“Partnership underpinned by mutual trust should be profoundly established based on the expertise of each other.”**

**Seed CO-OP / CEO Seung-hwan Lee**

**What is significant for Seed CO-OP and SK chemicals to create greater social value in the future?** The joint development of environmental education contents with SK chemicals was a very meaningful experience to Seed CO-OP, which was established to support public education and close regional gaps in education gaps. Seed CO-OP attempts to alleviate regional disparities in career education through joint development and dissemination of parishes in the field of career education that cannot be fully covered online. If we maintain our profound partnership based on each expertise, I am convinced that our collaboration with SK chemicals will play a contributing role in supporting the public education and narrowing educational gaps by region, creating continued social value.

# OVERVIEW



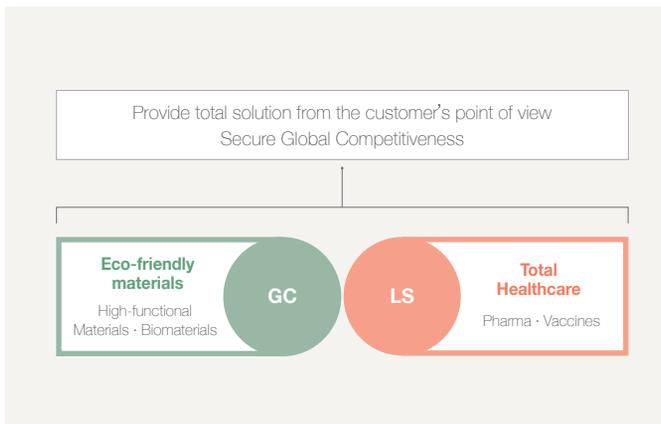


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# COMPANY OVERVIEW

Since our inception as Sunkyung Synthetic Fiber in 1969, SK chemicals has led innovation in the domestic chemical and life science fields. Under the vision of ‘Leap toward a global-leading company that provides total solutions for eco-friendly materials and healthcare,’ we provide chemicals and life science products and solutions imperatively essential to humanity on the basis of two pillars of Green Chemicals Biz. and Life Science Biz.

## Management Vision



<b>Company Name</b>	SK chemicals Co., Ltd.
<b>Business Type</b>	Chemicals, Pharmaceuticals
<b>Address (Headquarters)</b>	310, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
<b>No. of Employees</b>	2,026
<b>Revenue</b>	KRW 1.4271 trillion
<b>Business Profits</b>	KRW 80.3 billion
<b>Net Profit During the Term</b>	KRW 5 billion

As of December 31, 2019

## Major Business Areas

Under the mission of enhance the human health and protect environment, SK chemicals revamped our business structure to focus on Life Science Biz. and Green Chemicals Biz. Life Science Biz. focuses on the promotion of humanity's health and Green Chemicals Biz. puts environmental protection of the earth first. Encompassing healthcare businesses such as pharmaceuticals and bio areas, Life Science Biz. offers a variety of solutions from treatment to prevention of diseases from a comprehensive perspective, treats them with innovative medicines, and prevents illness with vaccines. Based on the development of innovative drugs and differentiated technology, Life Science Biz. has actively pursued entry into global markets. Green Chemicals Biz. manages the chemicals and energy businesses based on the world's top-notch technology and know-how as well as production facilities. We have advanced the existing businesses including high-functional copolyester and biodiesel while actively investing in new businesses such as super-engineering plastics and biomaterials so as to become a global leading company in the eco-friendly materials sector.

## Healthcare, Earthcare

 <p><b>Health</b> Prevention &amp; Treatment</p> <p>We create a healthy world. Our vaccines and medicines provide a total solution ranging from disease prevention to treatment, thereby bringing about a healthier world.</p>	 <p><b>Environment</b> Environmental Protection</p> <p>We safeguard the Earth's environment. Our eco-friendly materials replace conventional petrochemical materials, protecting the Earth's environment.</p>	 <p><b>Resources</b> Energy efficiency</p> <p>Our high-performance materials and composite materials prevent the depletion of fossil energy resources by extending material life cycle and making automobiles lighter through their excellent functionality.</p>
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### Domestic Business Sites and Global Network

SK chemicals has Pangyo Headquarters (ECO Lab) as well as three production sites in Ulsan, Andong (SK bioscience L HOUSE), and Cheongju (S HOUSE). Chemical products are manufactured in Ulsan Plant and preventive and therapeutic medicines are produced in SK bioscience and S HOUSE in Andong and Cheongju respectively. Besides, we operate overseas production business sites in Qingdao and Suzhou, China while running regional offices in Germany, Singapore, Japan, and the United States.



#### Major Affiliates

##### ENTIS Co., Ltd.



Manufacturing business

##### ST Green Energy Pte, Ltd.



Trading of biodiesel and biomaterials

Ownership ratio ●

#### Current Status of Subsidiaries for Connection

As of December 31, 2019

##### SK bioscience



Pharmaceutical manufacturing business

##### JSI Co., Ltd.



Epoxy resin manufacturer

##### SK chemicals GmbH



Wholesale business

##### SK chemicals America



Wholesale business

##### SK chemicals Shanghai Co., Ltd.



Chemical product, plastic & compounding Resin sales business

##### SK chemicals Qingdao Co., Ltd.



Prepreg manufacturing business

##### SK chemicals Suzhou Co., Ltd.



Resin manufacturing business

Ownership ratio ●

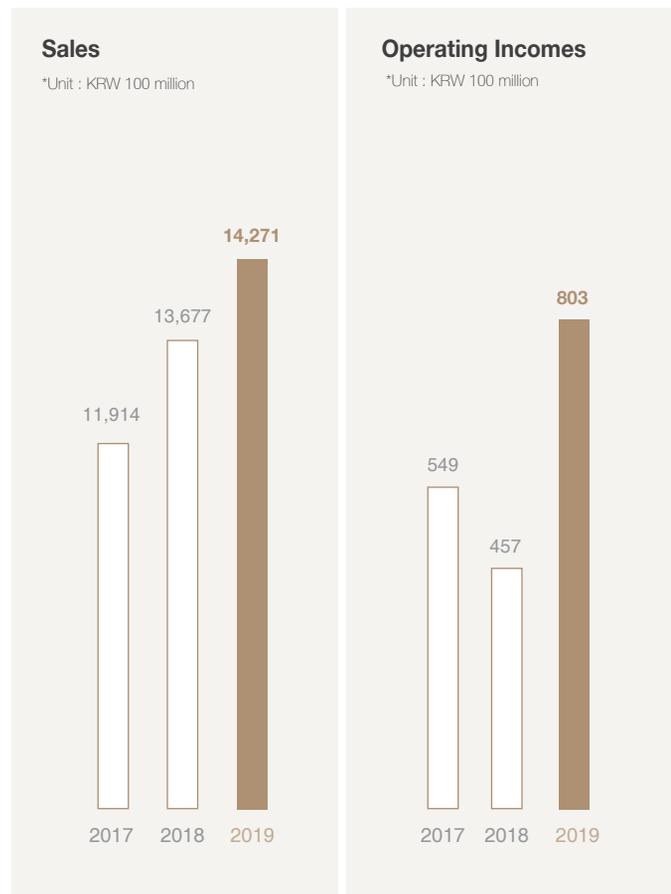
# FINANCIAL PERFORMANCE

## Performance and Plans

### Performance in 2019

SK chemicals has achieved a sales increase for the four consecutive years on the strength of growing sales of copolyester, bioenergy, and vaccines in the face of the global crisis of declining demand triggered by the rising raw material prices and US-China trade disputes. SK chemicals merged SK petrochemical, which manufactures the petrochemical-based basic chemical materials on May 1, 2018 to establish the vertical integration of the production of PETG, the eco-friendly and high-functional resin. Moreover, the increased biodiesel mandatory mixing rate from 2.5% to 3.0% since 2018, supported higher profitability of our bioenergy sector\*. Besides, our revenue has increased for three years in a row on account of favorable results from the pharmaceutical business and the optimization of operations. Despite the difficult surroundings, SK chemicals recorded a solid operating profit underpinned by growing sales and improved profitability. Yet, we saw a net income during the term in consolidated financial report due to the one-time cost process in accordance with our conservative accounting policy. SK bioscience, that was spun off on July 1, 2018 to drive a vaccine business, has seen the potential for a quantum jump coming with our progress ranging from the successful commercialization of 'SKYZoster,' the launch of 'SKYVaricella,' a varicella vaccine, achievement of a higher milestone income through transferring our own cell-culture technique to Sanofi Pasteur, and entry into the global clinical-stage for next-generation pneumonia vaccines. Although the delayed normalization of PPS business is giving a burden to our consolidated financial record, SK chemicals has been making desired progress through various endeavors such as installing a raw material recovery system and stir-fabrication equipment for enhancing each employee's performance.

\* As part of efforts to put our capabilities on core business, SK chemicals disposed of bioenergy business in May 2020. This report covers the operation and performance of bioenergy business until December 2019.



\* SK chemicals was spun off into a corporation as of December 1, 2017, but for the continuity of materials, we used SK discovery materials for the period until November 2017.

## Plans and Forecasts of 2020

In 2020, we plan to put our focus on the acceleration of growth and profit increase of eco-friendly resin business, which belongs to Green Chemicals Biz. while concentrating our capabilities on the development of new products and their application in response to the rapidly changing environmental paradigm. For our Life Science Biz., we are expanding existing product lines and diversifying product portfolio to promote growth in the PB (Pharma Business) while trying to repay the investments we have made in the bioscience areas over several decades, including vaccine and varicella vaccine so that we can make full-fledged profits. And at the same time, we will conduct diverse projects as planned. Through these endeavors, we will do our best to respond to changes and challenges so as to take a leap toward a global leading company providing environmentally friendly materials and healthcare solutions.



### Green Chemicals Biz.

**Future Market Forecast** | Demand and supply in each part of the supply chain and global economy affect the growth and profitability of the entire chemical industry. In recent months, the global spread of COVID-19 has put chemical companies in trouble and SK chemicals is not an exception, but the upside is that our efforts to make products and develop their application in response to the eco-friendly paradigm have paid off to some degrees. In the face of constantly rising eco-friendly issues, such as the mitigation of greenhouse gas emissions or weight lightening, we expect all of the countries across the globe to make efforts to cope with the issues under the same direction at their own pace. In particular, Europe is projected to be more stringent about regulations including the mandatory use of recycled plastic, which will drive global chemical companies into putting their capabilities on the development of their unique solutions enabling the reuse of waste plastic as materials for resource circulation while developing eco-friendly products in line with the paradigm of 'sustainability' and 'circular economy.' Rising demand for light materials is also expected to come due to an increase in EV and HEV. In terms of our business scope, we are replacing conventional plastic by taking advantage of our products and also constantly expanding the market for new containers based on environmentally-friendly materials, but we need to prepare for higher demand for being eco-friendly as well.

**Strategic Direction** | In existing businesses including copolyester, we will focus on raising price competitiveness through optimized operation based on digital transformation technique while increasing capacity utilization by discovering markets for new application. Besides, capitalizing on our capabilities acquired through the operation of the bioenergy business, we plan to keep investing in the business for new biomaterials, thereby paving the way for the transit into eco-friendly material company in the future.



### Life Science Biz.

**Future Market Forecast** | Domestic pharmaceutical business beefs up its efforts to respond to the government's medical insurance policy and drug pricing management, various regulations, and ethical and compliance activities. Although we expect a decline in pharmaceutical and healthcare market growth over the short term owing to the direct and indirect impact of COVID-19, the digital platform will be expected to create an opportunity on the other hand in the mid to long term. Domestic pharmaceutical companies are preparing to diversify their marketing activities available in a limited environment by building a multi-channel marketing infrastructure such as non-face-to-face marketing ones, and they are expected to put more efforts into expanding their competitive product portfolios and making inroads into overseas markets. Accordingly, M&A cases are projected to increase with unremitting and more aggressive investment in R&D and efficient internal operation. The growing threat of new epidemics and bioterrorism has given rise to the gravity of stable supplies of vaccines at the national level and the social safety net level. In particular, demand for high-growth and high value-added premium vaccines is expected to rise with economic growth and aging society. Moreover, following the government's plan for the self-sufficiency of vaccines and for the expansion of support for national vaccination projects, it is prospected that not only the domestic vaccine market but also the international vaccine market, especially among developing countries, will rapidly grow.

**Strategic Direction** | With the organization established with high efficiency and expertise in each field of pharmaceutical and vaccine business, we preemptively respond to swift changes in the pharmaceutical market. In particular, we plan to concentrate on the commercialization through R&D in the vaccine business (SK bioscience). Besides, we will further raise our status as a global pharmaceutical company by internalizing ethical management in compliance with international standards and securing domestic market leadership in all pharmaceutical activities, from marketing, production to R&D.

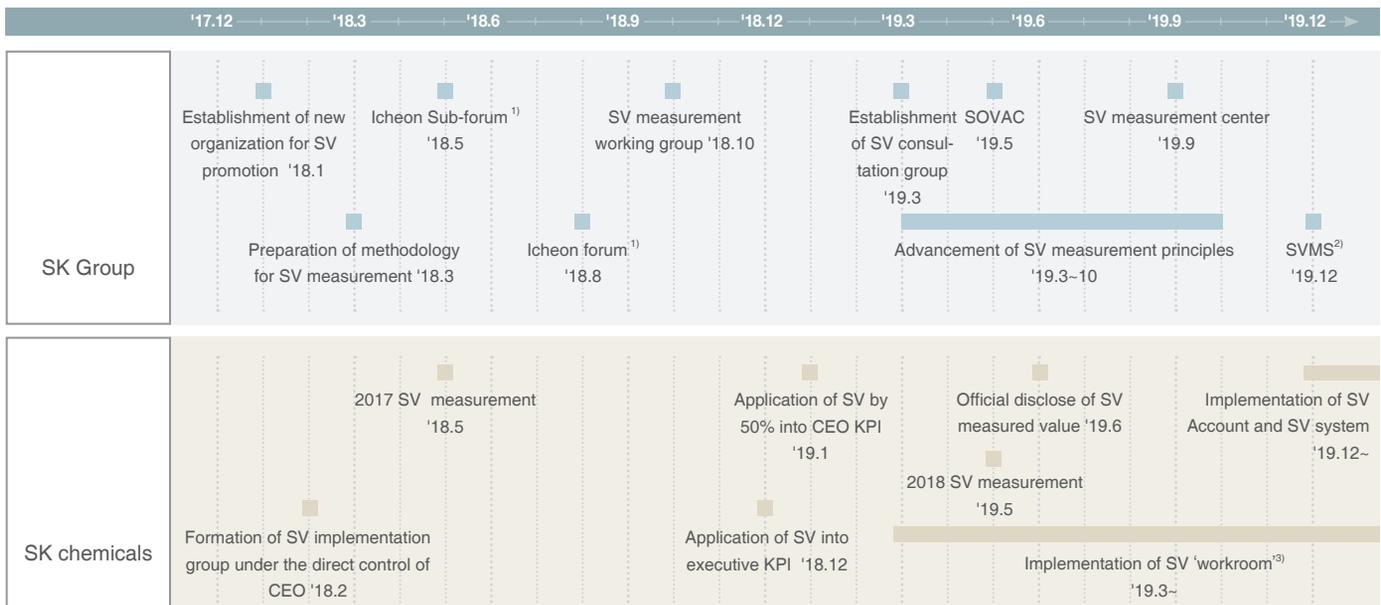
# OUR STRATEGY

## SK DBL

In order to meet growing expectations for SK chemicals to create corporate social value, we have been consistently finding ways to bear more responsibilities in all facets of all our management activities. As part of these efforts, we put Double Bottom Line (DBL) at the basic foundation of our corporate management to pursue and manage both economic and social value, rather than Single Bottom Line that only seeks for economic value, in order for effectively creating social value while faithfully fulfilling our social responsibilities. In addition, we will acquire trust and support from stakeholders by providing products and services that brings economic and social value.



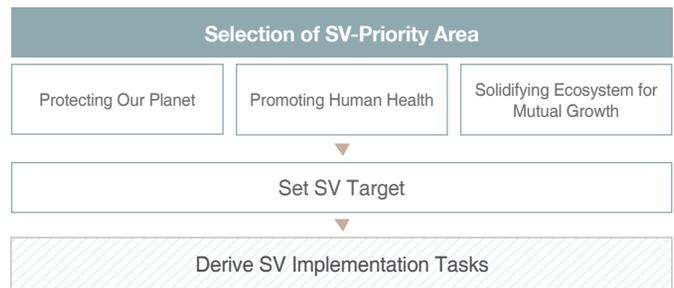
## Group and SK chemicals' SV Promotion Status



1) At the group level, agenda regarding SV is selected and implemented through annual expansion management meeting on June, Icheon Forum (on August, and CEO seminar in October.  
 2) SVMS: Social Value Measurement System, a management system for SV evaluation  
 3) SK chemicals' SV-related CEO consultative body

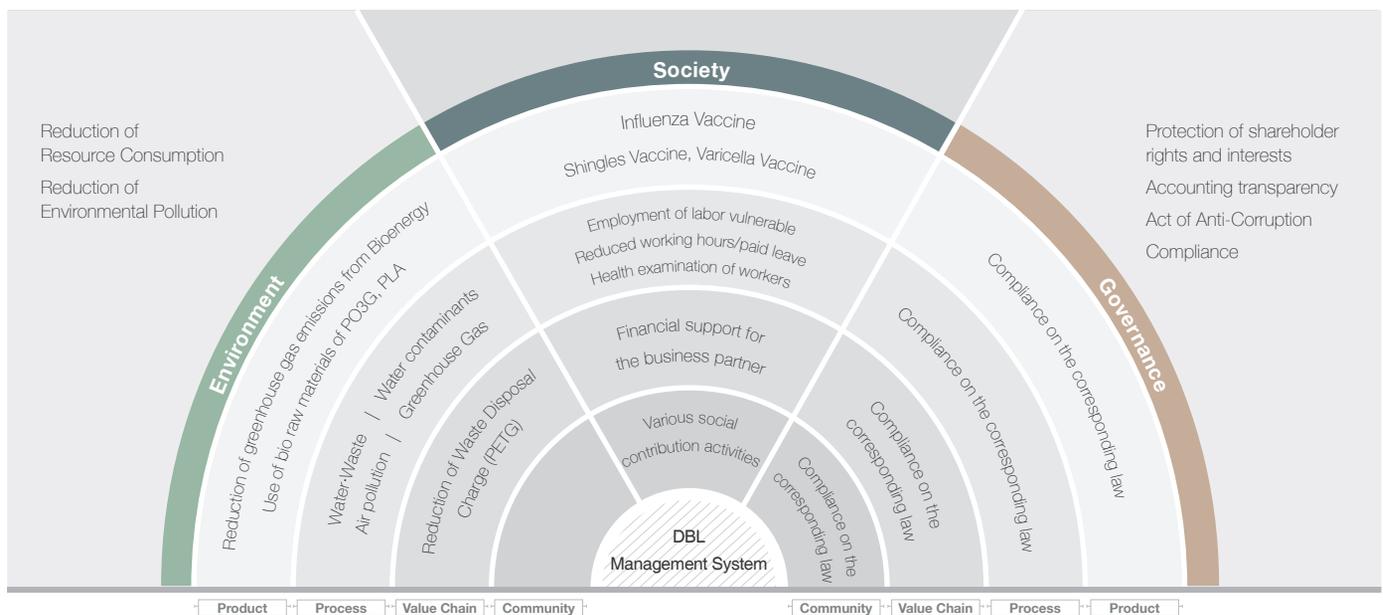
### DBL Strategy

SK chemicals continues to discover areas to focus and selects action plans to resolve social problems. In 2011, we selected priority areas for SV; ‘Protecting Our Planet’ and ‘Promoting Human Health,’ and ‘Solidifying Ecosystem for Mutual Growth’ specified in our mission and vision. Then, in order to grasp the process of each area, we established a system comprised of review, assessment, and reward. In addition, we set an internal and external communication system as well as a system to operate human resources and data.



### DBL Management System

Making the most out of our annual SK chemicals Sustainability Report, we select major implementation areas considering materiality assessment based on stakeholders’ awareness survey. Also, for further effective management of SV, we plan to put SV assessment item and toll in the KPI (Key Performance Indicator). For bringing out the fundamental changes, we have made SV-related tasks account for 50% of CEO evaluation since 2019. The selected key businesses by area and SV action plans in the research area are deliberated in PMS (Project Management System) and RPMS (R&D PMS). The SV implementation organization is in charge of SV promotion, greenhouse gas management, and CSR, and the meeting chaired by CEO is held once a month. SV-related data is systematically managed online, and SV training is provided to employees to form a consensus on social values.



## Purpose of Performance Measurement and DBL Achievement

### Business Social Value

SK chemicals uses Environmental, Social, and Governance (ESG) Criteria, a set of standards widely used for sustainability assessment when we evaluate our social performance through business activities. We put our focus on process, labor, and mutual growth when we measure our environmental and social performances except for product measurement. For environmental measurement, we measure the gross performance of the process including adverse environmental impacts, with the use of water resources and the emissions of pollutants (air/water pollutants, greenhouse gases, and waste) put as negative values. In terms of the measurement of labor and mutual growth in social criteria, the amount we improve our working environment and we achieve mutual growth are evaluated. Meanwhile, the absence of a measurement method forced us to put off governance evaluation, including measuring improvement in our governance and social costs, such as any legal violation, and we have continued to advance the methodology. While the group affiliates develop their own metrics to measure their products, SK chemicals also designed our own indexes for nine products; six products, including bio heavy oil, biomaterials and non-BPA materials, and three social products.

### CSR Social Value

This is an achievement we have made through our social contribution activities. Based on UN SDGs, we target three areas; 'being eco-friendly,' 'social welfare,' and 'spreading happiness' to make a contribution to the community. In this direction, SK chemicals conducts a variety of CSR programs ranging from the donation (gift or cash), educating elementary school students, assisting children and adolescents from low-income families, thereby contributing to our society in a tangible manner.

### Indirect Economic Value

This is an indirect contribution to our economy through our management activities transferring economic resources to our stakeholders. Defining our employees, customers, shareholders and the society as our stakeholders, we pay our employees wages, allocate dividends to shareholders and distribute economic value to society in the form of tax (corporate tax, local tax, etc). We recognize the value we deliver to our customers through products as direct achievement.

**Employment** | Our economic indirect contribution made through employment stood at KRW 132 billion in 2019, which is the amount of wages paid to a total of 2,026\* executives and employees. The indirect contribution expanded to KRW 147.1 billion if non-wage monetary benefits are included. The wage is based on the amount of earned income tax withheld. Non-wage benefits mean incentive bonus (IB), incentive, and grant for employees.

**Dividend Distribution** | SK chemicals also indirectly contributes to the economy through divided allocation to our shareholders, which amounted to KRW 6 billion in 2019. Dividend achievement is calculated based on dividends on the statement of changes in equity and dividends paid by subsidiaries to a parent company.

**Tax Payment** | SK chemicals created KRW 27.9 billion of economic contribution through tax payment in 2019. We added up the amount of corporate tax we paid stated on the income statement, national and local taxes which belong to taxes out of taxes and dues to calculate the total amount of taxes we paid.

\* The combined number of SK chemicals' employees and SK bioscience employees as of the end of 2019

## Survey on Stakeholders' Awareness of Social Value Area

SK chemicals conducted a survey to integrate the level of our stakeholders' interests by group (customer, business partners, shareholders, employees and local communities) into the measured value of SV. Since the conception of social value varies depending on stakeholders, we identified what types of social value are considered significant to each group and then discovered the relative weight of each measured area of SV. In the years to come, we will measure them to figure out whether we meet the expectation of the stakeholders in terms of SV performance and reflect the results in our operation.

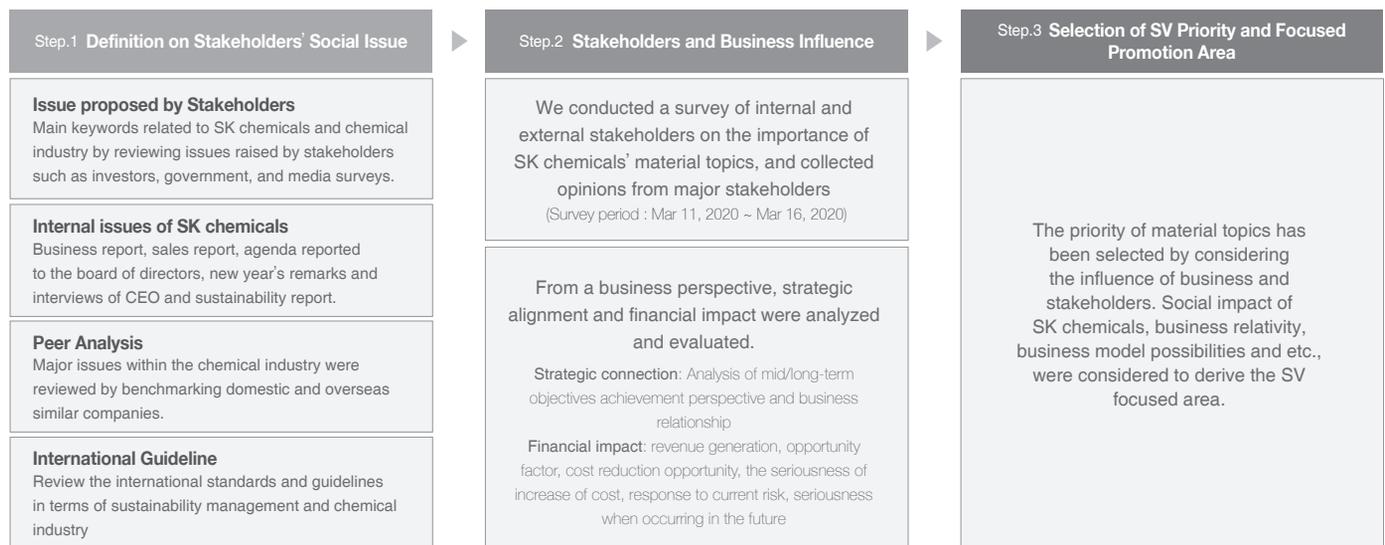
## SV Performance Measurement

Index		SV Creation Goal	Main Activity	2019 SV Creation	
Business Social Value	1 Environment	Product	Reduction of environmental pollution and SV creation through Green Chemicals Biz.	Reduction of environmental pollution	KRW 39.3 billion
		Process	Create SV and reduce greenhouse gas through environmental management	Systematic environmental management Reduction of greenhouse gas	KRW -58.9 billion
	2 Society	Quality of life (product)	Create SV and enhance health of human through Life Science Biz.	Disease prevention	KRW 44.8 billion
		Quality of life (Labor)	Healthy and stable life through enhancement of labor environment	Employment of labor vulnerable Quality life of Employees Safety and welfare of employees	KRW 2.3 billion
		Mutual growth	Expand sustainability of supply network through mutual growth	Establish the foundation of mutual growth Support strengthening of competitiveness Benefit Sharing	KRW 2.1 billion
	3 Governance		Create SV and strengthen transparency of business management through improvement of governance structure	Business governance structure Ethics management Compliance	(On progress)
CSR Social Value	4 CSR Program	Create SV through CSR activity	CSR strategy	KRW 0.5 billion	
	5 Donation		Representative CSR programs		
	6 Employee Volunteer		Donation performance Volunteer system Main volunteer activity		
Indirect Economic Value	7 Employment	Create SV through returning business profits		KRW 147.1 billion	
	8 Dividend Distribution		-	KRW 6 billion	
	9 Tax Payment			KRW 27.9 billion	

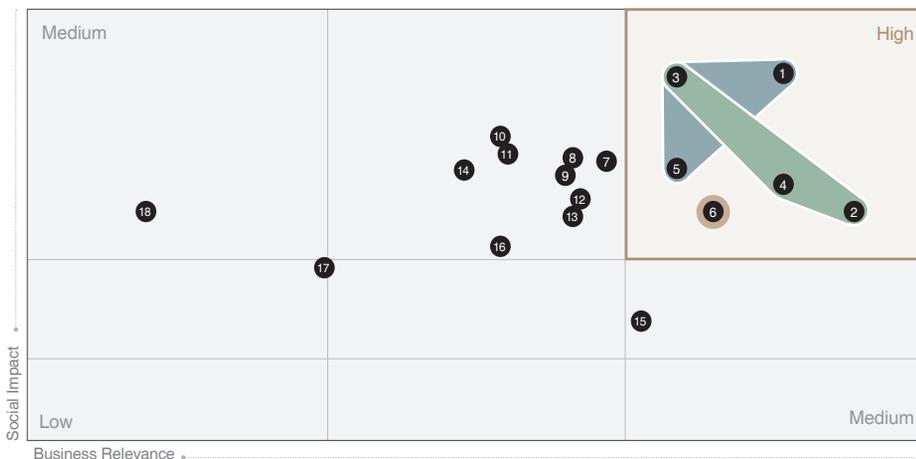
# SV MATERIALITY ASSESSMENT

## Materiality Assessment Process

SK chemicals conducted a materiality assessment to reflect our stakeholders' concerns as well as external and internal environments having impact on our sustainable management to our reports. We identified possible issues to be reported through looking into our management strategy and achievements, previous reports and best practices while complying with Global Reporting Initiative (GRI) Standards to conduct the assessment. Besides, we analyzed and reflected the level of stakeholders' influence, strategies from the perspective of our business and the level of financial influence, thereby generating material topics. The following is the procedure for materiality assessment.



## Materiality Assessment Result



### SV Priority Area of SK chemicals

- Protecting Our Planet**  
 Contribute to the establishment of a sustainable the Earth's environment  
 Effort to reduce environmental load and reduce pollution
- Promoting Human Health**  
 Contribute to the realization of 'Good Health and Long Life,' the dream of humans  
 Effort to develop disease preventive agents and treatments
- Solidifying Ecosystem of Mutual Growth**  
 Sharing capabilities (Shared infrastructure)

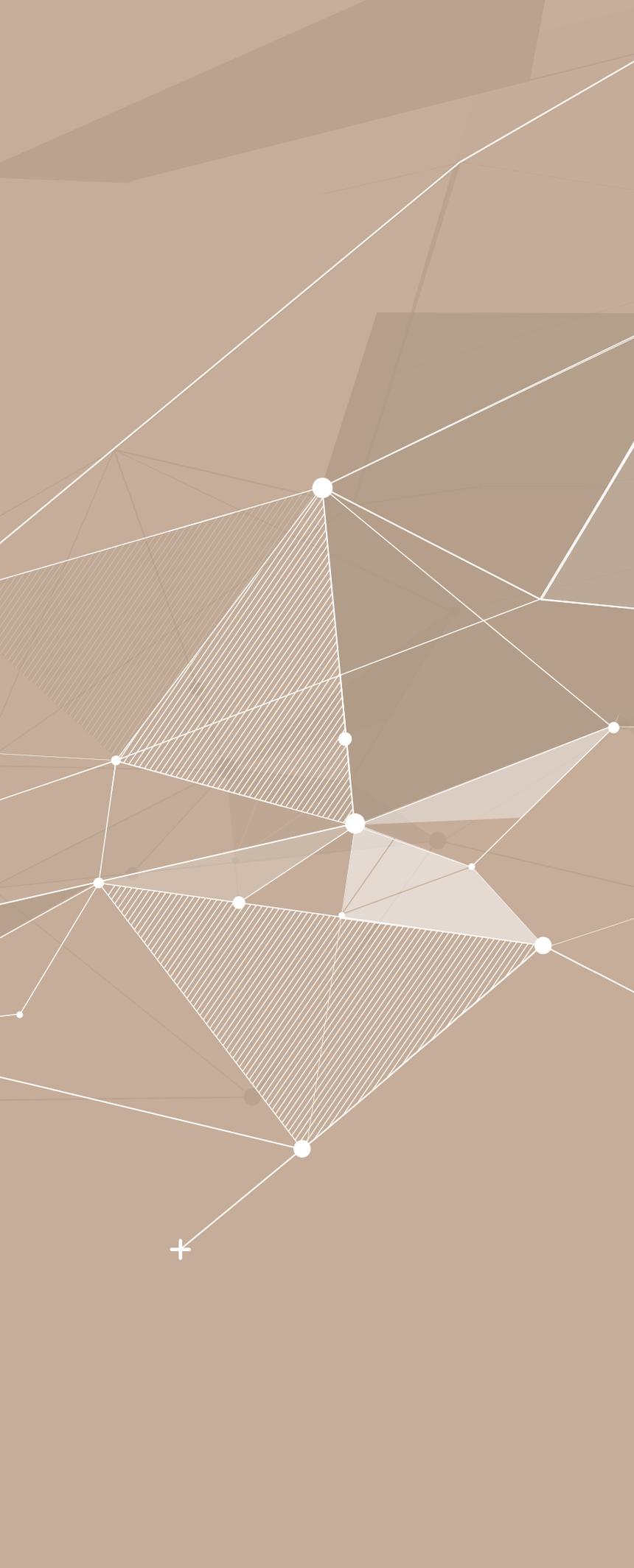
SK chemicals' SV Focus Areas

Topics			Reporting Boundaries		Evaluation		Major Activities of SK chemicals	Report Location	Page
Social Performance Classification According to SK DBL	SK chemicals' Material Topics for Sustainable Management	Materiality Ranking	Internal	External	Business Impact on SK chemicals	Influence on Stakeholders			
Business Social Value	1. Environment	Process/Products	2	●	●	94.44	75.93	Executing environmental management and managing targets	40
								Operation of Eco-friendly Business Sites	41
								Capitalizing on waste resources	42
		Process/Products	4	●	●	88.89	78.62	Contributing to greenhouse gas emissions mitigation through products	43
								Spreading a circular economy through recycling	45
								Reducing harmful chemical substances created through processing	46
		Process/Products	3	●		80.55	88.64	Making efforts not to use hazardous chemicals in making products	46
								Conducting research and development on protecting the earth	48
								Doing research and development on enhancing human health	59
	Quality of life (product)	Disease treatment and prevention	1	●	●	88.89	88.96	Making a contribution to disease treatment through developing medicines	54
								Contributing to disease prevention through vaccines	54
								Improving physical accessibility to pharmaceuticals	56
		Improving access to pharmaceuticals	5	●	●	80.56	79.88	Improving economic accessibility to pharmaceuticals	57
								Enhancing access to information on medicines	58
								Management of product quality and chemical substances	86
		Customer safety and product responsibility	10	●	●	66.66	82.57	Quality management according to the shelf life of drugs	87
								Customer safety and product responsibility	87
								Customer safety and product responsibility	87
	2. Society	Customer Satisfaction	14		●	63.89	79.83	Interaction with consumers for their satisfaction with goods and services.	80
								Customer Satisfaction	80
								Customer Satisfaction	80
		Employees and corporate culture	12	●		72.21	76.69	Securing the Talented	77
								Training the Talented	77
Innovation of Organizational Culture								78	
Occupational safety and health		11	●		66.66	81.90	Safety diagnosis and management	79	
							Establishment of safety and health management system and culture	78	
							Establishment of safety and health management system and culture	78	
Human Rights Management	18	●		38.86	75.95	Ban on discrimination against employees	85		
						Respecting the diversity of executives and employees	85		
						Respecting the diversity of executives and employees	85		
Mutual Growth	Mutual Growth	6	●	●	83.33	75.86	Mutual growth with partners	66	
							Strengthening suppliers' competitiveness	67	
							Strengthening suppliers' competitiveness	67	
3. Governance	Governance	17	●		52.77	70.76	Independence, expertise and diversity of BOD	82	
							Transparency of governance	82	
	Compliance	7	●		75.00	80.85	Compliance	83	
							Fair Trade	84	
							Ethics Management	84	
4. CSR program	Local communities	15		●	77.77	65.85	Social Contribution Strategy System	74	
							Social contribution activities including eco-friendly action, support for the marginalized and cultural assistance	74	
							Social value creation through donation	76	
							Voluntary works for local communities participated by employees	76	
Indirect Economic Value	7. Employment	Financial Performance	13	●	72.22	76.13	Job creation and retention for social value creation	18	
							8. Dividend Distribution	18	
							9. Tax Payment	18	
Others	Advancing management strategy	8	●		72.22	80.44	Development of management strategies including SK DBL, R&D Strategy, environmental management strategy and etc.	17	
							Stakeholder Engagement	20	
							Risk Management	15	

Excluding No-Regret actions, such as resolved risk factors and management activities, from SV focus areas

**WE CARE FOR  
THE FUTURE**





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## Healthcare

# PHARMA

Joins · Ginexin-F · Trast · Wondron

## 01 BACKGROUND

### Super-aged Society and Soaring Demand for Treatment

Aging population has been intensifying at an unprecedented pace since Korea entered into aged society in 2017. If the trend continues at this pace, Korea will enter into a super-aged society where one out of five people is aged 65 or above in 2025, and will see the highest proportion of people aged 65 or above in the world in 2045. The soaring number of senior citizens gives rise to various types of social problems including a sharp rise in sustenance allowance for the old. A key problem among them is a spike in the treatment need for geriatric patients. The World Health Organization (WHO) forecasts that there will be rapidly growing demand for the treatment for geriatric diseases including Parkinson's disease, dementia, stroke while chronic diseases, such as high blood pressure, diabetes and arthritis, will account for 70% of all illnesses. The Organization for Economic Cooperation and Development (OECD) has selected medicines for dementia, rheumatoid arthritis, and anticancer drug as specialty drugs since population aging is expected to trigger the increasing demand for them.

## 02 OUR SOLUTION

### Joins



Joins is the first locally registered as a new anti-arthritis herbal medicinal product. The results of five clinical tests conducted by five general hospitals including Seoul National University Hospital proved that it has the same anti-inflammatory effect as the existing anti-inflammatory drug while having fewer side effects. Furthermore, Joins is recognized as a fundamental remedy for arthritis with its effect on protecting cartilaginous tissue. The drug is one of SK chemicals' representative medicines that reached the sales of 1 billion capsules and KRW 400 billion of accumulated sales in 2019 over the past 18 years since its release in 2002.

inflammatory drug while having fewer side effects. Furthermore, Joins is recognized as a fundamental remedy for arthritis with its effect on protecting cartilaginous tissue. The drug is one of SK chemicals' representative medicines that reached the sales of 1 billion capsules and KRW 400 billion of accumulated sales in 2019 over the past 18 years since its release in 2002.

### Ginexin-F



Ginexin-F, a blood circulation enhancer, is our flagship brand, having the largest market share with KRW 400 billion of accumulated sales. With our patented technology, effective components, such as ginkgolide, are extracted from ginkgo leaves to make this medicine with effects of

reducing blood viscosity as well as expanding blood vessels. In 2010, we rolled out Renexin, the anticoagulant drug combined with 'cilostazol,' a clot buster which is used for Ginexin-F. The drug has been well received in the market with its enhanced efficacy with fewer adverse effects. On top of that, in March 2020, we were granted approval and permission for slow-released Renexin with better compliance and convenience than the existing one.

### Trast



Since its launch in 1996, Trast, a patch formulation for arthritis, has grown as a Korea's representative brand. The patch is applied directly to lesion, maximizing treatment effect of arthritis while minimizing adverse effects coming from the existing medicine. With the technology

of the Transdermal Drug Delivery System (TDDS), the patch delivers piroxicam, a nonsteroidal anti-inflammatory drug to inflamed area, maintaining its effective concentration so that its effect can last up to 48 hours.

### Wondron (Rivastigmine Patch)



Rivastigmine patch is a patch-type medicine for Alzheimer's disease, the first locally developed one by SK chemicals. The prominent benefit of the medication is to allow dementia patients having difficulty remembering the time and the frequency of the medications or swallowing pills to

take medication to attach this patch on their skins. We have obtained permission for sales as Wondron patch in Korea. In 2013, we obtained approval to sell the medicine as the first generic drug in Europe, which recognized SK chemicals for outstanding technology, having been a leader with the largest market share in the European market of generic drugs with the same ingredient. We were also granted sales approval for Rivastigmine patch from the governments of Australia and the Republic of Colombia in 2016, and Mexico and Jordan in 2017, and Canada in 2018 as well as from the U.S Food and Drug Administration. Currently, we are undergoing the procedure to win approval in Brazil so as to further expand our overseas sales.

## 03 SOCIAL VALUE CREATION

### Social Value Creation through Pharmaceutical Business

We strive to make sure that people can enjoy healthier and longer lives as well as better quality of lives through the production and supply of medical products. Especially, we expect that the pharmaceutical business will assume greater importance as we are entering into aged society since one of SK chemicals' merits is having geriatric medicines, which includes treatments for rare disorders. In Korea, rare disease is defined as a condition that affects fewer than 20,000 people, and domestically, it is estimated that around one million people suffer from rare diseases. In many cases, there are no remedies for rare diseases due to the small number of patients, and it also requires a long time to receive the final diagnosis. Besides, the diagnosis and treatment of rare disorders incur a tremendous amount of money, both economically and emotionally overburdening patients, which, in turn, prompts overall social cost. SK chemicals has played a contributing role in helping patients with a rare disease as well as reducing social cost through the development and supply of remedies for the diseases.



## Healthcare

# VACCINE

SKYCellfu · SKYZoster · SKYVaricella

## 01 BACKGROUND

### Spread of Infectious Diseases Caused by New Virus

Social turmoil always comes with the outbreaks of new variants of infectious diseases. In 2003, the outbreak of Severe Acute Respiratory Syndrome (SARS) incurred more than KRW 55 trillion of economic loss globally while the emergence of Middle East Respiratory Syndrome (MERS) brought about 38 deaths in Korea alone and caused more than KRW 6 trillion of social cost in 2015. The advent of Covid-19 at the end of 2019 has wreaked havoc on society, infecting around 8.38 million people in the world until the June 18 in 2020 and claiming more than 450,000 lives. Vaccine is indeed the most potent method to prevent infectious diseases. According to the International Vaccine Institute (IVI), the VROI of vaccine is 44 to 1, which means that a USD 1 investment leads to a saving of USD 44 of loss in the future. The high utility of vaccine prompts the World Health Organization (WHO), the governments and private organizations to inject tremendous funds into vaccine development. The global vaccine market is expected to grow by an average of 11% on a yearly basis and ultimately reach USD 103.6 billion in 2028.



**02** OUR SOLUTION

**SKYCellflu**  



In 2015, SK chemicals succeeded in commercializing SKYCellflu, a cell-cultured influenza vaccine, for the first time for adults in Korea, and for the first time for children in the world. In the following year, SK chemicals launched ‘SKYCellflu Quadrivalent’ to the market, created through the world’s first cell-culture technology. This medicine

enables the prevention of four types of human influenza viruses; two types of influenza A viruses and two types of influenza B viruses. The drug features two merits. First is the reduced production period to two or three months since it is made of animal cell, and the other advantage is the stable supplies regardless of the lack of fertilized eggs.

**SKYZoster**  



SKYZoster, the second developed in the world, is a live-attenuated zoster vaccine for adults over the age of 50. After overseas non-clinical studies proved the medication’s safety of toxicity, we conducted eight clinical trials to verify the effectiveness and safety targeting adults aged 50 or above, and the results proved non-inferiority.

SKYZoster has been well received in the market since its release, reaching one million doses of domestic sales in two years as of 2019 with a 46% market share.

**SKYVaricella**



SKYVaricella, the second locally developed, has proved its high immunogenicity and safety through multinational phase 3 clinical trials conducted by 19 clinical research institutes at home and abroad. In 2019, SKYVaricella obtained a pre-qualification (PQ) certification as a chickenpox vaccine for the second time in the world, achieving the result

faster than the usual period in a year and four months. Based on this accomplishment, we plan to go for international bids as well as to expand our presence in developing countries.

**03** SOCIAL VALUE CREATION

**Social Value Creation through Vaccine Business**

Increasing disease and the burden of medical expenses as result of it has given rise to the gravity of vaccines, which enables prevention before coming down with a disease. Our subsidiary, SK bioscience has put efforts into enhanced human health through developing diverse vaccines. Vaccine business has contributed to social value creation by generating the value of our people’s health through disease prevention while curtailing medical expenses of individuals and the country. On top of that, it has the meaning of the grip on vaccine sovereignty because we can supply vaccines needed for our people in a stabilized manner without being affected by external environments in this material area closely related to life.



Earthcare

# COPOLYESTER

SKYGREEN (PETG) · ECOZEN

## 01 BACKGROUND

### Plastic, Convenient Yet Environmentally Harmful

Plastic is widely used in diverse industries and daily lives thanks to its low price and convenience. However, the recycling rate for plastic waste is only at about 10 percent compared to its enormous amount of use, while plastic waste is abandoned without proper management, causing serious environmental problems such as soil, marine, and air pollution. PVC resin, in particular, contains chlorine within its molecule, which leads to the emission of chlorine gas, a hazardous gas during the processing. Moreover, phthalate plasticizer, which is used for its manufacturing, contains heavy metals such as lead and cadmium, resulting in the emission of harmful substances, including dioxin and furan severely damaging human health, during incineration to dispose of waste. It is also hard to be recycled, therefore large amounts of PVC are buried, which possibly contaminates soil and underground water if the buried PVC is exposed to water inside the soil and triggers the leakage of toxic substances. Accordingly, we have seen more stringent regulations on the use of PVC resin across the globe, and research on diverse materials that can replace PVC is underway.



## 02 OUR SOLUTION

### SKYGREEN (PETG)



SKYGREEN is a bisphenol A (BPA) free high-performance copolyester resin with exceptional transparency and chemical resistance. This eco-friendly product is rapidly replacing existing materials such as PC, PMMA, PVC, and so forth. Its outstanding processability and

formability make it possible to be used for various applications from daily necessities to industrial items including cases for cosmetics, electronic components, building materials and optical films. We have pursued the vertical integration from the production facility of CHDM, a source material, to the production line of copolyester resin, constantly expanding the business.

### ECOZEN



SK chemicals rolled out the world's first bio-based copolyester resin, called ECOZEN in 2009. ECOZEN is designed to supplement flaws of petroleum-based plastic so as to reduce its dependency on petroleum-based materials, thereby mitigating greenhouse gas emissions. Its exceptional heat resistance, high chemical

resistance and transparency allow this product used as materials for various items including electronics and food containers. In recent years, the scope of its usage has been expanded, ranging from vehicle's interior materials, premium cosmetic cases, food containers for preschoolers to credit cards.

## 03 SOCIAL VALUE CREATION

### Social Value Creation through Copolyester Business

SK chemicals' copolyester products can replace diverse plastic materials including PC, PVC, PMMA and PS. The safety of our BPA-free products also enables the products to cover various applications encompassing containers for food we eat and cases for cosmetics we touch. Among the products, copolyester PETG SKYGREEN and biocopolyester ECOZEN have been highly recognized in the world premium cosmetic container market for their safety without BPA, outstanding transparency and high chemical resistance. Likewise, our copolyester business doesn't contain endocrine disruptors having a grave impact on human health, such as BPA, thereby creating eco-friendly value not emitting endocrine disruptors even during the waste process as well as contributing to the health and safety of our end users.



## Earthcare

# ENGINEERING PLASTIC

ECOTRAN (PPS) · SKYTRA · SKYPURA · SKYPEL

## 01 BACKGROUND

### Super Materials Replacing Metals

Metals are strong and durable materials, having covered almost all uses for tools and equipment. Yet, metal is not easy to use and tricky to be processed in a way we desire. In 1960, with the aim of replacing metals, DuPont, an American company, produced Derlin, a Polyoxymethylene Homopolymer. In recent years, more and more engineering plastics, much lighter than metals, are processed and used in a way we want due to their outstanding strength, heat resistance and durability. These plastics cover applications in various fields ranging from daily necessities, electronics and components of automobiles and aircraft. Meanwhile, as part of efforts to expand the scope of use, technical development is actively underway. Efforts to protect users or consumers are also being made, including the development of diverse material combination technology such as special fiber reinforcement, especially putting focus on improving resistance to amine to prevent ignition or to restrain the spread of fire.

## 02 OUR SOLUTION

### ECOTRAN (PPS)



ECOTRAN is a high performance, heat-resistant and light material that can replace metals. Far from the existing super engineering plastics (PPS), this is an eco-friendly, light and high-functioning PPS with heat- and shock-resistance made through the process of which the use of chlorine are not allowed across all stages. Going forward, SK

chemicals continues to expand our business into overseas markets, putting our focus especially on the largest importer, China, as well as Europe, India and Southeast Asia.

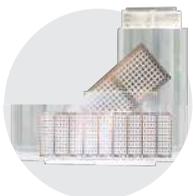
### SKYTRA



SKYTRA, our customized material brand, offers material compound solutions by compounding our eco-friendly and high-performing plastic materials to realize diverse properties. Environmental-friendly copolyester is used for various applications ranging from automotive interiors and insulators of electronics (washing machine, hairdryer, and printer), and recycled

PET is also utilized. By doing so, we provide functional value such as durability, heat resistance and chemical resistance. Furthermore, SKYTRA allows us to be in line with the trend in favor of the environment as well as to create environmental and social value.

### SKYPURA



SKYPURA (PCT\*), local-first developed material, is a super engineering plastic with excellent heat resistance bearing temperature more than 260 degrees, chemical resistance and durability enabling the maintenance of properties over a long time. SKUPURA is mainly used as a component of

LED module, which is gaining popularity these days owing to its high efficiency and low energy consumption, due to its prolonged reflexivity and fewer changes in properties against a source of light. For electrical use, PCT is utilized for connectors of electronics and automobiles and film-type electric circuits on account of its stability of insulation. Its low specific gravity and soft feel make the product develop into yarn for wig and synthetic fur. SKYPURA (PCT) won a prize from the Minister of Trade, Industry and Energy at 'Korea Technology Awards' in 2013, and obtained ten new technologies certification.

\* PCT : Polycyclohexylene dimethylene terephthalate : A type of polyester resin. PCT is a high polymer material combined with existing PET and CHDM.

### SKYPEL



SKYPEL is a polyester-based elastomer exhibiting hybrid properties with the elasticity of rubber and mechanical strength of plastic. Compared to other elastomers, SKYPEL maintains its elasticity at low and high temperatures (-40°C to 150°C) and exhibits prolonged durability. These properties make this

product cover many applications ranging from materials for electronics components, such as cables of automobiles' components including buffer materials, parts for engine and exhausters, and airbag covers. In recent years, recyclable artificial leather and cushion materials with outstanding air permeability and elastic restoring force have met the eco-friendly trend. Against this backdrop, we are further developing this plastic to be used in new applications to offer living convenience.

## 03 SOCIAL VALUE CREATION

### Social Value Creation through Engineering Plastic Business

We are creating a variety of eco-friendly values through our engineering plastic business as many as the uses of plastic. Our engineering plastics with the same strength as metals and excellent chemical resistance make automobile's components light, which leads to the less use of fuels and the mitigation of greenhouse gas emissions, thereby making a contribution to action on climate change. On top of that, we are not using chlorine, a harmful chemical substance, in stages of the production process while using recycled plastic as materials so that we can create social value.



Earthcare

# BIOENERGY

ECOPRIME DF · ECOPRIME HF

## 01 BACKGROUND

### Eco-friendly Fuel Saving the Earth

Fossil fuel such as coal, oil and natural gas is essential to our lives in the modern society, but it profoundly impacts on climate change and global warming as its mining process destroys the eco-system, and its incineration process emits greenhouse gases. Power plants fueled by fossil fuel also produce fatal heavy metals including mercury and arsenic. In recent years, the use of biofuel has been rapidly on the rise in response to these problems. Biofuel is derived from biomass, being produced through fermentation of grain, potato, sugar cane and sugar beet using microorganisms such as yeast or bacteria. Countries all over the world have been using more and more biofuel in the face of environmental degradation ranging from the depletion of fossil fuel, global warming and fine dust. The most famous biofuel made of biomass is bioethanol and biodiesel, which are blended with gasoline or diesel to be used as fuel for automobiles. The very first biofuel was made of edible crops, which triggered a social problem that is the rising price of crops. In recent years, non-edible lignocellulosic biomass is being used to respond to the issue. Research on biofuel derived from marine algae is also underway.



## 02 OUR SOLUTION

### ECOPRIME DF (Diesel Fuel)



SK chemicals has developed outstanding quality biodiesel, 'ECOPRIME DF' through our own production process. ECOPRIME is an eco-friendly alternative energy produced by the chemical reaction of animal fats and vegetable oils with methanol. This biofuel naturally degrades by more than 80 percent and also cuts down 2.9 tons of

CO<sub>2</sub> emissions per one ton during incineration. ECOPRIME is now supplied to domestic main oil refiners and we have diversified distributions with expansion into the biodiesel markets in the U.S. and Europe.

### ECOPRIME HF (Heavy Fuel)



Since 2014, SK chemicals has carried out a bio heavy oil pilot project aiming to offer alternative fuels to heavy oil power plants through the production of environmental-friendly fuels (animal and vegetable oil) emitting far less greenhouse gas emissions, and has completed legalization as of

March 14, 2019. The project enabled the replacement of fossil fuel (heavy oil for power generation), making a positive impact on air quality.

## 03 SOCIAL VALUE CREATION

### Social Value Creation through Bioenergy Business

SK chemicals began our bioenergy business in 2007. The business consists of two sectors; biodiesel in replace of light oil for automobiles and bio heavy oil substituting for heavy oil for power generation. The bioenergy business has been a vital contributor to the mitigation of greenhouse gas and fine dust emissions by having fossil fuel (diesel for vehicles, heavy oil for power generation) give way to eco-friendly fuel (animal and vegetable oil). SK chemicals measured the amount of greenhouse gas emissions we had reduced through the usage of non-fossil fuel for the measurement of social value created by our bioenergy business. The result showed us that the incineration of 1 ton of bioenergy can reduce 2.9 tons of carbon dioxide equivalent (CO<sub>2</sub>eq) compared to the same amount of fossil fuel. SK chemicals converts social value created by this business into monetary value by annually substituting the average price of carbon credit into the formula. Biofuel production requiring a vast amount of biomass gives rise to social concerns such as an increase in the international prices of crops like maize. To address the problem, we are recycling byproducts and waste generated during palm oil production and waste cooking oil in replace of edible crops like corn commonly used for bioenergy manufacturing. By doing so, we reduce waste, not negatively affecting agricultural product prices. In the years to come, SK chemicals' bioenergy business will enhance social value by replacing fossil fuel with biofuel used in marine and aircraft.

## Earthcare

# COATINGS & ADHESIVE

SKYBON

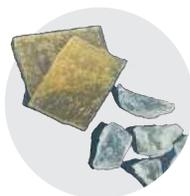
## 01 BACKGROUND

### Bisphenol A (BPA), Harmful Endocrine Disrupter in Daily Lives

Bisphenol A (BPA) is a substance used for the production of polycarbonate (PC) and epoxy resins. PC is a transparent and hard plastic which is a substitute for glass of water bottles, dishes and cups while epoxy is widely used in construction sites as adhesive or coating. Epoxy is also used for coating soft floors of public places, the joints of cell phone accessories and canned beverage, and the insides of canned goods. Likewise, BPA comes in very handy in our daily lives, but has negative impacts such as inducing precocious puberty, possibly affecting the growth or genital system of children by disrupting the release of sex hormones, and potentially causing female breast cancer or male sterility. Once human body intakes BPA, it is not easy to eliminate it since it is accumulated in fatty tissue. Thus, Korea has put in place more stringent criteria on BPA emission since 2008, and other countries including Canada designated BPA as a hazardous substance, imposing a ban on the use of it.

## 02 OUR SOLUTION

**SKYBON** 



SKYBON is a high molecular weight copolyester binder with outstanding chemical resistance, flexibility and adhesive strength on various basic materials such as metals, clothes and plastics. These properties make it used as materials for industrial adhesives and coatings. Especially, due

to its BPA-free profile, about 20% of its total sales have been sold for can coating and flexible packaging to companies at home and abroad including

the world's top three paint companies. Our organic solvent-free hotmelt product has excellent resistance to laundry, which makes it used for film adhesives for clothes thermal printing. We have seen annual growth at about 10% on average in its sales. Besides, its superior metal adhesion and flexibility also make it cover various coatings of the surface of home appliances including washing machine, microwave and refrigerator, with its market share accounting for 80% in the domestic market.

## 03 SOCIAL VALUE CREATION

### Social Value Creation through Coatings and Adhesives Business

SK chemicals has been creating social value by replacing hazardous chemicals with safe and eco-friendly plastic materials. What we focus on to substitute for is epoxy and bisphenol A. Bisphenol A, used for can coating, is known for disrupting the release of lust hormones as well as inducing diabetes, obesity and cardiovascular disease when it is eluted and own into the contents of canned goods. Our SKYBON is a substitute for this bisphenol A in can coating, thereby playing a contributing role in reducing the social cost incurred by this harmful substance.

## Earthcare

# COMPOSITE MATERIALS

SKYFLEX · IT Materials

## 01 BACKGROUND

### Carbon Composite Materials, a Key to Next-Generation Future

Steel and metal materials have been widely used in various fields ranging from automobiles, construction to machine industries due to its superb properties as well as affordable prices. However, the steel industry accounts for 24% of the total emissions of CO<sub>2</sub>, discharging 1.83 tons of CO<sub>2</sub> to produce 1 ton of steel. For this reason, the international community indicates the industry as an excessive producer of CO<sub>2</sub>. Along with this, climate issue coming with more strict environmental regulations across the globe on CO<sub>2</sub> emissions has attracted interests in eco-friendly materials in replace of steel. Against this backdrop, carbon composite materials, a representative high-strength carbon fiber reinforced composite, are emerging as a substitute for steel and metal materials. Carbon composites, a combination of plastic and carbon fiber, are stronger than steel and lighter than aluminum. These profiles make it cover various applications ranging from aerospace, smartphones, automobiles, constructional structure to mechanical equipment. We expect the domestic market to grow on the strength of the government's policy toward a transition into the hydrogen economy since carbon composites are core materials for this economy.

## 02 OUR SOLUTION

### SKYFLEX



SKYFLEX is prepreg, a carbon fiber-reinforced composite material. Carbon fiber is lighter than aluminum and more than 10 times stronger than steel with only a 20% weight of steel. These merits have expanded the scope of its use for making products lighter. Prepreg has

been used from sports and leisure goods, such as golf clubs, fishing poles

and bicycles, to industrial equipment parts including aircrafts, automobiles and industrial robots. In recent years, it is further expanding into wind blades, car parts, concrete structures and stiffeners.

### IT Materials



SK chemicals' high-purity solvent, developed based on the technical partnership with an American company, Honeywell and our own technology, is used in equipment analysis, super-precision synthesis of chemicals and electronics and biotechnology industry, being exported to

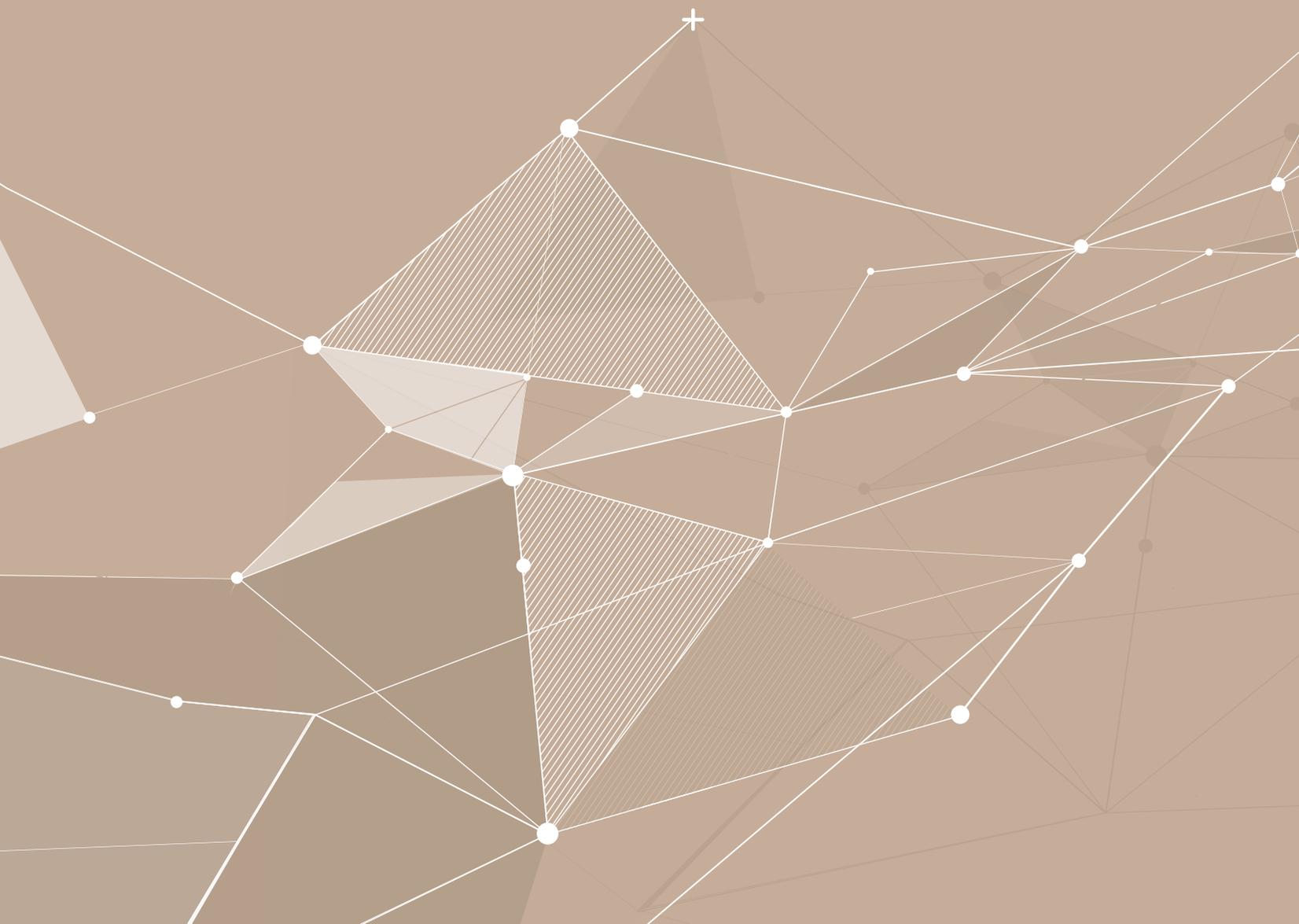
overseas countries across the globe including the U.S. and China. SK chemicals is also developing materials for OLED pixels and displays like LCD as well as precursors for semiconductors based on the technology of organic synthesis.

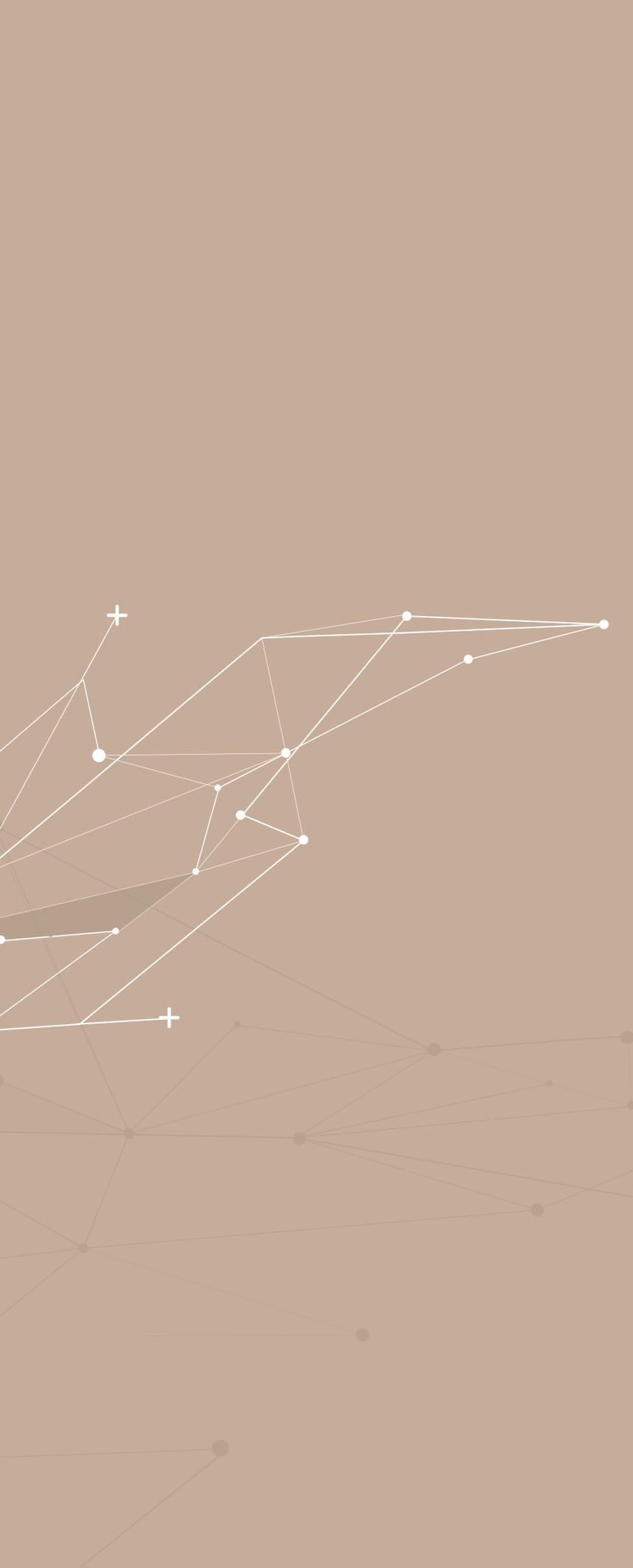
## 03 SOCIAL VALUE CREATION

### Social Value Creation through Composite Materials Business

SK chemicals' prepreg is being used for various applications for weight lightening since it is lighter despite of the same strength as steel. The replacement of steel with prepreg makes it possible to reduce the weight of vehicle, thereby curtailing the usage of fuels, which results in the mitigation of greenhouse gas emissions. Likewise, carbon composite materials are a vital contributor to curbing global warming, carrying out the same level of performance with smaller amount than that of existing fuels.

# SUSTAINABILITY FOCUS AREAS





Protecting Our Planet	38
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### + SK chemicals' Approach

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- 1 Energy saving through the operation of eco-friendly business sites
- 2 Making a contribution to the mitigation of greenhouse gas emissions through our products including biomaterials, bioenergy and copolyester
- 3 Spreading a circular economy through recycling resources and recycling-related new business
- 4 Expanding a circular economy and contributing to the reduction of harmful chemicals through eco-friendly products

### + SK chemicals' Performance Management

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- 1 Setting a reduction target of greenhouse gas emissions and management
- 2 Setting a sales target of environment-friendly products and management



# + n1 PROTECTING OUR PLANET

Despite global efforts to curb greenhouse gas emissions, we are seeing more damages due to abnormal weather conditions, such as draughts, floods, scorching heat and heavy snow, which inflicts damage as global warming has been intensifying. Against this backdrop, the international community has launched a new climate regime, and Korea has also actively joined the scheme, setting a reduction target of greenhouse gas emissions at 37% compared to the projection of emissions by 2030. These environmental changes have been bringing about rising demand for environmental management from society and more stringent regulations forcing companies to take into account impacts on the environment for their survival. In other words, companies face a situation where environmental protection, including proactive response to climate change, is not an option but a must.

#### Related UN SDGs



## 01 Focus Area

## Action on Climate Change

Eco-friendly Sales Target and Performance  
(Green Triple 40!)



SK chemicals has put up the minimization of environmental impacts made by our business and action on climate change for major issues. We have conducted a variety of activities so as to proactively respond to domestic and overseas regulations on the mitigation of greenhouse gas emissions.

### Systematic Mitigation of Greenhouse Gas Emissions

As part of efforts to cut back greenhouse gases, we strive to reduce greenhouse gases emitted by our business sites while effectively executing reduction activities in line with the 2030 Reduction Roadmap pushed by the government to minimize impacts derived from changing energy policies at home and abroad. SK chemicals' Ulsan Plant, that makes up the most of total SK chemicals' emissions, tries to cut down emissions by incinerating waste and capitalizing on biomass as well as adopting waste heat made from nearby plants. We put people in charge at our business sites in order to supervise greenhouse gas emissions and systematically do their work, monitoring emissions. The headquarters direct all emission-related works ranging from the operation of emission trading scheme to the formulation of long-term plans on the reduction.

**Environmental Management Target** | 'Green Triple 40!' is a target which is to reduce greenhouse gas emissions by 40% from the business as usual (BAU) level by 2020 and to increase the sales of eco-friendly products to 40% of our total sales. Through this quantitative target, SK chemicals will enhance the greenness of our products while minimizing environmental load created through our production process and business activities, thereby generating a new value for green growth. In terms of Green Culture, we are making efforts to raise the awareness of environment-friendly management activities and foster Green Plant through our Green Process while reinforcing our eco-friendly business competitiveness by formulating green business strategies and promoting new businesses from the perspective of Green Product.

**Environmental Management System Certification** | As part of efforts toward the systematic management of environmental management, SK chemicals obtained ISO14001 for the first time. ISO 14001, which is released by the International Standards Organization (ISO), is the international standards that specify requirements for environmental management systems encompassing environmental policies, implementation plans, correction measures, and sustainable improvement activities, and SK chemicals acquired the revised and more stringent version of this certification within the period in 2018. We also successfully underwent the follow-up inspection in 2019 and still maintain the strengthened standards. Besides, we acquired an additional certification for super engineering plastics produced by our compound production team.

### Operation of Eco-friendly Business Sites

SK chemicals has integrated a variety of eco-friendly technologies into our business sites in order to minimize greenhouse gas emissions and water resources consumption. On the basis of company-wide eco-friendly policies, we are taking into consideration environmental factors from the stage of construction, while setting an environment-friendly target for each workplace and putting efforts into achieving them.

ECO Lab - Building Energy Efficiency Certification (Non-residential buildings)\*



1<sup>st</sup> Grade

ECO Lab - Green Building Certification Criteria (GBCC)\*



1<sup>st</sup> Grade

ECO Lab - Leadership in Energy & Environmental Design (LEED)\*



Platinum Rating

\*Earned as of 2011

**ECO Lab** | We took into account possible impacts on the environment from the very first stage of construction design and adopted a total of 101 eco-friendly materials and techniques to build ECO Lab (headquarters). As a result, we reduced energy consumption by 44%, the use of water by 63% and CO<sub>2</sub> emissions by 31% from the level of existing business facilities, which is the equivalent of the effect of planting 94,000 pine trees a year. Our progress toward reduced environmental load has been recognized, being rated first in energy use efficiency in the category of building for business. On top of that, ECO lab received a Platinum rating through the U.S. LEED\*\* and earned 1<sup>st</sup> grade with the highest score in GBCC\*\*\*.

\*Results of joint-monitoring with SK Construction and the Korea Institute of Civil Engineering and Building Technology in 2011  
 \*\*LEED(Leadership in Energy & Environmental Design): Green Building Certification in the U.S.  
 \*\*\*GBCC(Green Building Certification Criteria) : Domestic Eco-friendly Building Certification

**L HOUSE** | We brought in 16 eco-friendly technologies to found L HOUSE (Andong), thereby economizing on energy use by 30%. This achievement in environmental reduction enabled us to win a gold rating from the U.S. LEED for the first time in the world as a pharmaceutical factory. L HOUSE is in compliance with Good Manufacturing Practices (GMP), stringent quality standards applicable to food, medicine and cosmetics manufacturing, while obtaining OHSAS-KOSHA 18001 certification, the certification for occupational health and safety assessment.

**Ulsan Plant** | With an aim of optimizing energy use and constantly saving energy, we formed a TF in 2019, and in the following year, Digital Transformation (DT) & Energy part was established. People in charge exchanged opinions on diverse energy saving methods with external experts, which resulted in a 2% reduction in energy cost from the 2019 energy cost plan. In 2020, we have produced 20 energy saving-related agendas and strived to accomplish them. We expect we can annually reduce energy cost by about KRW 3 billion through these efforts.



Ulsan Plant - Awarded Citation (Korea Energy Agency) in the 2019 Energy Saving through Partnership

2019 Energy Saving Performance

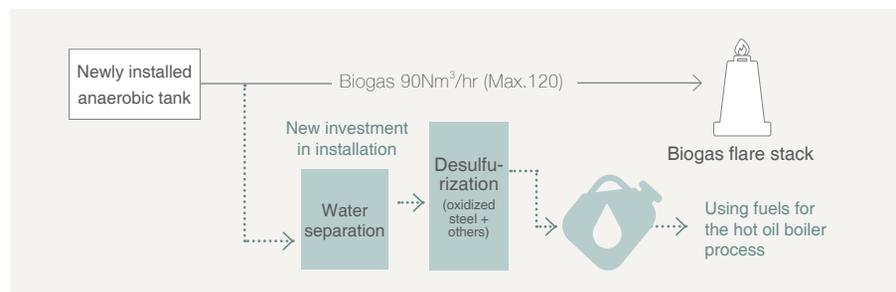
Activities	Content	Annual Energy Saving Cost
<b>Implementing thermal image and heat radiation diagnosis</b>	Conducting a Thermal image heat radiation diagnosis through an external agency for heat conservation and prevention of heat radiation.	KRW 210 million
<b>Enhancing the operation of large-capacity pumps and process boilers</b>	Figuring out how large-capacity pumps and process boilers consuming much electricity works to find ways to improve and optimize them.	KRW 460 million
<b>Replacing LED lights</b>	Replacing a total of 1,222 lights, turned on around-the-clock with LED lights in 9 processes.	KRW 80 million
<b>Saving electricity on cooling towers</b>	Optimizing the amount of cooling water to economize on electricity.	KRW 350 million
<b>Recovering waste heat during processes</b>	Recovering re-evaporated steam, generated during the process and abandoned, and high-temperature condensate water to save steam and the amount of water for industrial use.	KRW 400 million
<b>Instituting control systems for the optimization of processes</b>	Adopting Advanced Process Control (APC) to stabilize systematic process as well as to save energy.	KRW 210 million

### Mitigation of Greenhouse Gas Emissions through Waste Resources Utilization

SK chemicals recycle waste resources into energy so as to curtail resources loss as well as to minimize greenhouse gas emissions. The recycling of waste resources brings about two effects; environmental and cost saving effects.

**Recycling Methane Gas** | Organic matters contained in wastewater generate methane, a representative greenhouse gas, in the course of their decomposition. Methane is known for containing heat more effectively than carbon dioxide, making a greater impact on the planet. SK chemicals' Ulsan Plant had incinerated methane gases, created from the anaerobic tank at the wastewater treatment facility, at the incineration tower to solve the issue, but it was not enough to fundamentally resolve the problem since the incineration of methane also generates other greenhouse gases including carbon monoxide and carbon dioxide. Hence, SK chemicals plans to install water separator and desulfurization facility to make the best use of methane generated through the anaerobic tank as fuel for a hot oil boiler within the process from June 2020. Since wastewater generates the amount of methane gases (50Nm<sup>3</sup> per hour) equivalent to 10% of that of LNG fuel (500Nm<sup>3</sup> per hour), we are expecting the incineration of the generated methane at the hot oil boiler to save about KRW 270 million of fuel cost a year.

#### Recycling Process for Methane Gases



Eco Green Boiler(EGB)

**Eco Green Boiler (EGB)** | SK chemicals has used the boiler fueled by waste wood (In fact, an incinerator would be more proper term because boilers only use fuels allowed by the regulation.) called Eco Green Boiler (EGB) even before the governmental regulations on greenhouse gas emission took effective in 2010. Since the Intergovernmental Panel on Climate Change (IPCC) set a target of carbon dioxide emissions derived from waste wood at zero, the recycling of waste wood as fuels can contribute to the mitigation of greenhouse gas emissions. EGB incineration exhibits big volatility in steam production pressure, which makes it difficult to supply for the fields of production requiring stable pressure. To ameliorate this weakness, we installed a precision dispensing facility at Ulsan Plant in 2017 and succeeded in stabilizing production steam pressure. Currently, the plant is supplying steam used for DMT production through EGB, thereby we saved as much as 75,000tCO<sub>2</sub>eq of greenhouse gases in 2019 alone. Saving on electricity bills and increasing steam are worth KRW 1.01 billion.

**Reusing Waste Heat Generated through Processing** | We have been reducing greenhouse gases by recycling heat thrown away during processing. We recovered 235,640 tons of waste heat or steam generated through the PDH process of SK Advanced to use it as fuels, thereby cutting greenhouse gas emissions by 80,000tCO<sub>2</sub>eq compared to boiler fueled by bituminous coal.

Along with this, we installed a steam pipe stretching 6.2 kilometers between SK energy and Ulsan Plant located in the Ulsan Yongyeon Complex in 2013. Since then, we have offered surplus steam generated to SK energy through the pipe, which results in a 6,000 tons reduction in fuel fees as well as a saving of 14,000tCO<sub>2</sub>eq.

### Mitigation of Greenhouse gas emissions through products

SK chemicals is integrating eco-friendly technologies into the manufacturing process of diverse products, which enables us to mitigate greenhouse gases emitted during production stage and use. For example, we use substances derived from the nature rather than fossil fuels such as oil while replacing metals with lighter materials for weight lightening, thereby contributing to fewer emissions. Going forward, we plan to increase the ratio of products in favor of the mitigation of greenhouse gas emissions.



Production Facility for PO3G in Ulsan Plant

**Biomaterial (PO3G)** | Polyoxytrimethylene glycol (PO3G) is a bio polyol using a 100% bio propanediol, made of fermented corn starch, as a monomer. Its eco-friendly nature enables a 40% reduction in greenhouse gas emissions compared to the same amount of conventional petroleum-based polyol production. PO3G is used mainly for products that require elasticity, including polyurethane and spandex. Products made of PO3G have the advantages of being smoother and enhanced elasticity and abrasion resistance over existing products, making them more wearable with less deformation. PO3G is a 100% biomaterial-based without any inclusion of petroleum extracts, which makes it possible to release fewer greenhouse gases compared to the production of the same amount of conventional polyol. Accordingly, the global sports and fashion industries are showing a sign of expanding the application of PO3G to their goods, such as sneakers, fashion items and furniture. In response, SK chemicals is the first Korean company to produce PO3G, and now annually providing 200 tons of PO3G through our pilot facility. Meanwhile, the completion of the commercial facility will bring about 5,000 tons of PO3G supplies. SK chemicals is measuring the effect of PO3G, putting our focus on its social value with the calculation; the amount of PO3G sold multiplied by the amount of greenhouses gases reduced, with applying the average price of emission trading. SK chemicals will proactively respond to market changes in the eco-friendly material market, such as plastic regulations, which are expanding across the globe by reinforcing our core competence in the eco-friendly materials sector.

#### 🔍 Social Value of Biomaterial, PO3G

The amount of greenhouse gases reduced through PO3G use X the amount of PO3G sold X SCC\*

\*SCC(Social Cost of Carbon) : The Social Cost of Carbon (SCC) is the economic cost paid our society for a year, when a ton of greenhouse gases were emitted into the atmosphere. SK Group is measuring the social value of eco-friendly products through proxy values using the TIIM method of PwC based on SCC.



Reactor for Biodiesel Production

**Bioenergy** | Globally, chemistry related companies are forced to take up the challenge to produce eco-friendly products. Bioenergy products are environment-friendly fuels made with substances derived from the nature, emitting fewer greenhouse gases than burning diesel for automobiles or heavy oil for power generation. Bioenergy indeed plays an essential role in social value creation. Bioenergy business uses not fossil fuels but natural oils including animal fats and vegetable oils which are non-

Annual Biodiesel Production and Sale



**200**  
thousand tons

Annual Bio Heavy Oil Production and Sales



**100**  
thousand tons

edible ones. Non-edible oils include abandoned oils as well. Given that abandoned oils (fats and oils) prompt soil pollution, which is another social problem, the bioenergy business is playing a vital role in social value realization from the stage of raw material selection. The completion of our biodiesel plant in 2007 served as a platform for SK chemicals to produce a variety of biodiesels. In this way, we have made great efforts to our eco-friendly energy business eventually replacing conventional energy based on fossil fuel. On the basis of manufacturing technologies in regard to biodiesel, we have kicked off a business of bio heavy oil for power generation since 2014. On the basis of calculation, SK chemicals is now producing and selling 200,000 tons of biodiesel and 100,000 tons of bio heavy oil, creating environmental value through our eco-friendly energy business.

**Social Value of Bioenergy**

The amount of bio heavy oil sold X the amount of power generation converted X the ratio of our products among bio heavy oil used for power generation X the amount of greenhouse gases reduced X SCC

**Copolyester (ECOZEN)** | SK chemicals has developed ECOZEN made with raw materials extracted from natural substances, copolyester produced with waste plastics during the manufacturing process, and copolyester products that are recyclable. Substances extracted from vegetables are added to ECOZEN's raw materials used for conventional PET products. According to the international standards, raw materials derived from natural substances do not emit carbon dioxide during incineration or usage, which means we can reduce the same amount of greenhouse gases as that of substances derived from vegetables we used. In response to the rising global demand for environmental-friendly plastic as well as environmental issues, SK chemicals will continue to develop eco-friendly products.

**Social Value of Copolyester (ECOZEN)**

The content of bio raw materials within ECOZEN X the amount of ECOZEN sold X the amount of carbon dioxide reduced X SCC

Carbon Composite Materials



**Cost Saving  
Mitigating Green-  
house Gases**



**Carbon Composite Materials (Prepreg)** | Carbon fiber is lighter and harder than steel, which makes it cover diverse applications of sports and leisure sectors such as spacecrafts, aircrafts and bicycles. This material has emerged as a substitute especially for wind blades and vehicle frames for lightness. Being light is an essential contributor to curbing global warming as well as pursuing economic value since this property can cut down resources such as fuels and electricity, required for kinetic energy, thereby saving raw materials' cost while mitigating greenhouse gases. The market for light materials, which are used for the purpose of saving fuels, is expanding to propellers and frames of automobiles. SK chemicals sold about 38,000m<sup>2</sup> of carbon composite materials for wind blades in 2019, making a contribution to the advancement of renewable energy. Our carbon composite materials are also used for vehicle parts for weight lightening. Due to the difficulty of figuring out the accurate proportion of the materials used for a total weight of automobiles, we speculate based on the amount of carbon fiber materials sold, the application rate for automobiles and the amount of greenhouse gases reduced and the effect of greenhouse gases reduced.

\*Social Value of Carbon Composite Materials (Prepreg) : The value is speculated based on the amount of saved energy and that of reduced greenhouse gases, however, exact social value of carbon composite materials is yet calculated since the application rate of carbon fiber materials for automobiles is not accurate.

## 01 Focus Area

## Resources Circulation and Toxic Chemicals Reduction



Participating in 'K Show 2019'

\*K Show : The world's top 3 plastic fair with the U.S. National Plastic Exposition (NPE) and Chinaplas

We are currently seeing the emergence of harmful chemicals emitted by plastic recycling and plastic itself as a global issue across the globe and many chemical companies are swiftly responding through their businesses. SK chemicals is also making every effort to make our products favor the environment and also to ensure that the disposal process is environmental-friendly. To this end, we take advantage of raw materials extracted from natural substances for eco-friendly product production while capitalizing on recycling techniques during the disposal process.

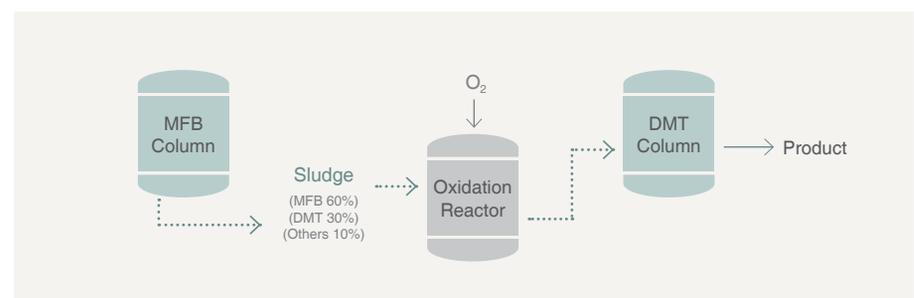
### Spreading a Circular Economy

Circular economy aims for economic growth with less environmental impacts for better lives as well as less resource consumption. It refers to an economic system, with a focus on resources circulation, where used resources are recycled so that waste is minimized going beyond a linear economy where used resources are disposed of. SK chemicals has contributed to spreading the circular economy through various efforts in terms of our products and process.

**Development of New Business Model for Waste Plastic Recycling** | There are two methods of waste plastic recycling; physical and chemical ones. Physical way is to clean waste plastics, and then combine them with newly produced products to manufacture quality products satisfying customers, whereas chemical way is to chemically decompose waste plastics to make them return to raw materials or initial production state of substances to manufacture the products. SK chemicals has developed two types of techniques; combining waste plastics with existing products and manufacturing recyclable goods. In 2020, we launched and began selling ECOTRIA, a product developed with the former type of technique as well as ECOZEN Claro, a product made with the latter type of technology. In addition, we have been striving to establish a domestic ecosystem for the supply of recycled plastic materials.

**MFB Recycling** | Methyl para Formyl Benzoate (MFB), a byproduct generated during the DMT production process, and DMT compounds are entirely discarded, which triggers an increasing waste issue. To solve the problem, SK chemicals has established recycling equipment allowing discarded MFB and DMT compounds to be converted into DMT. We developed recovery process, had it reviewed by the institute and completed its basic design in 2017, and in the following year, injected KRW 1.2 billion on establishing the equipment and began pilot operation. The facility has been up and running since 2019, resulting in 687 tons of reduction in raw materials and a 962 tons reduction in waste released.

#### Waste Recycling Process

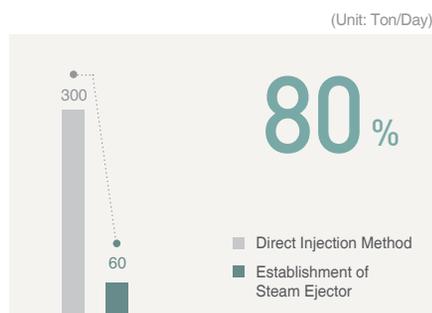


## Hazardous Chemicals Mitigation

A term, 'chemical phobia,' has been emerged due to numerous chemical-related accidents occurring in our daily lives, which indicates that consumers pay more attention and interests to chemical substances. Against this backdrop, SK chemicals strives to replace or not use harmful chemical substances in manufacturing our products that can possibly have negative impacts on human health or lead to environmental pollution, thereby taking the lead in cutting down hazardous chemicals.

**Recovery and Recuse of Methanol in Wastewater** | We recover and recycle 392 tons of methanol, which flows into wastewater from the cyclohexane dimethanol (CHDM) production process, to prevent the discharge of toxic chemicals into water systems in the vicinity. The water quality conservation act categorizes methanol as hazardous chemicals. Unprocessed methanol has adverse impacts on nearby water systems and even the process of wastewater, incurring additional cost. To solve this issue, SK chemicals installed a heat exchanger within the CHDM production process in 2019 so as to condense methanol contained in wastewater into the form of steam to recover. Recovered methanol gases are used as materials for DMT. By doing so, we expect the saving of KRW 243 million a year as well as the diminution in the cost of wastewater disposal.

Reducing Wastewater through Steam Ejector Installation



**Wastewater Reduction through Steam Ejector Installation** | We installed a steam ejector to replace direct water injection system with heat exchanger indirect cooling system since the direct system generates a large quantity of wastewater and VOCs. The steam ejector helps us reduce waste water and organic compounds in great quantities. In detail, the amount of wastewater generated is decreased by 80% from an average of 300 to 60 tons a day. Likewise, the installation of the device enables us to fundamentally resolve the emission of organic compounds which induces odor and air pollutions possibly leading to legal and environmental issues. SK chemicals plans to invest a total of KRW 1 billion in additional seven steam ejectors to spread a circular economy and continue to discover ideas for new environmental value creation and execution of them.

## Contributions through Products

We strive to minimize harmful chemicals generated during manufacturing and using products.

**ECOZEN** | ECOZEN is an eco-friendly product, a modified plastic made of raw materials extracted not from petroleum but natural substances. Some plastics are known for releasing endocrine disruptors harmful to human health when they are exposed to a hot liquid. However, ECOZEN does not emit bisphenol A (BPA), a hazardous endocrine disruptor, even in the event of exposure to hot liquid. This profile makes ECOZEN used for applications of tumblers or kitchen utensils for microwave that are sensitive to endocrine-disrupting chemicals.



ECOZEN

### Q Social Value of ECOZEN

The amount of ECOZEN sold (a substitute for a substance containing BPA) X the content of BPA within alternative substance X eco-cost (the marginal cost of BPA disposal)

**SKYBON** | Chemical products cannot avoid environmental issues, and our SKYBON products are thus making efforts to contribute to enhancing the environment. Our can coating product



SKYBON (can coatings)

among SKYBON products is the result from our efforts. Epoxy resin is widely used for coatings and adhesives, but it contains toxic substances. Especially, bisphenol A, a major raw material for epoxy, is a representative environmental hormone inducing diseases, such as breast cancer, prostate cancer and precocious puberty. This harmful profile has triggered the gradual expansion of ban on its use for food packaging especially in developed countries including Europe and the U.S. since the early 2000s. Particularly, Europe designated problem solving cost incurred by harmful substances as social cost, and calculates and shares the cost in accordance with agreed standards. The European Chemicals Agency (ECHA) estimated a social cost of bisphenol A at about KRW 20 million.

In this circumstance, SK chemicals will constantly develop substitutes for epoxy resins in the can coating sector for further social value creation. Besides, we are also working on the development of products with same functionality without solvent according to our plan to cut down the use of solvent and toxic chemicals.

#### Social Value of SKYBON

Ratio of can coatings replacing epoxy X the amount of can coatings sold X Cost of restricting BPA in Europe



PPS Applied Products

**PPS** | PPS is an engineering plastic with high performance and high heat resistance, making it possible to bear high temperature above 200 degrees Celsius. These excellent properties enable this plastic to cover various applications of automobiles, aircrafts and insulation materials. PPS with high heat resistance is also used to replace metals since it has the similar strength level of metal with much lighter weight. PPS is produced in only two methods by seven companies across the globe, and SK chemicals' own developed manufacturing technology is differentiated from the others. What makes our technology unique is to use far less industrial water as our manufacturing process does not have cleaning procedure, which is far from other technologies, which helps us create more social value by reducing water use. Apart from this technical method, we are generating social value through other efforts as well. We reuse iodine, a catalyst used during the process, thereby diminishing environmental loads through decreasing the possibility of iodine compounds emissions, a toxic substance.



## 01 Focus Area

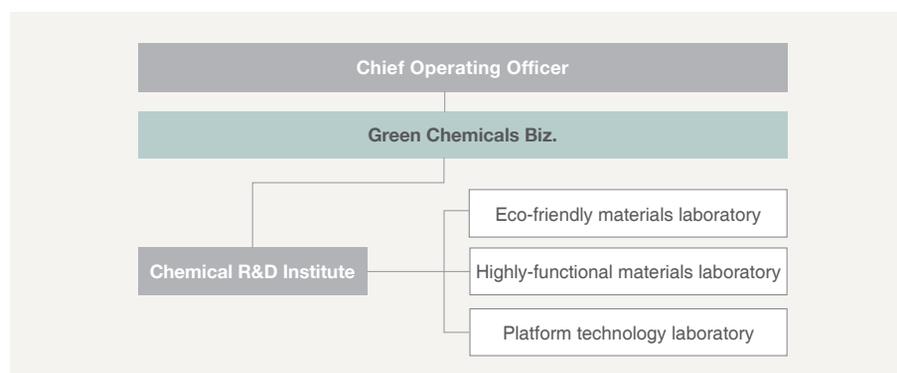
## Innovation and R&D for Global Environment Protection

Under the core value of 'Global Environment Protection,' we established our portfolio driven by products in three themes; energy saving, replacement of toxic substances and petroleum-free. To this end, SK chemicals Chemical R&D Institute is making a stride toward a top-notch global company in the eco-friendly copolyester sector by sharpening its technical competitiveness as well as spurring the super engineering plastic business to secure a competitiveness edge. Along with this, research and development is underway to identify new growth engines such as biomaterials in line with SK chemicals' mission.

### Research and Development System and Strategy

Our Chemical R&D Institute consists of three laboratories; eco-friendly materials, highly-functional materials, and platform technology laboratories. The eco-friendly materials laboratory is in charge of the development of various monomers/polymers manufacturing process, biodiesel and related products. The highly-functional materials laboratory is dedicated to advancing functional polymers such as super engineering plastics, elastomers and bioplastics. Based on advanced synthesis capability, the platform technology laboratory specializes in the development of adhesives and coating materials, discovery of new monomer, catalysts and additives, analysis of products and the development of noble analytical methods. In order to realize our mission, vision and accomplish mid- to long-term goals of R&D, we are dispatching our workforce to overseas renowned research institutes so that they enhance their capabilities and develop technologies we do not own, thereby actively promoting Open Innovation. We are also in partnership with domestic research institutes and experts for joint technology development.

Chemical R&D Institute Organization Chart



**Energy Saving** | Despite the emergence of renewable energy, we are still not free from absolute dependency on fossil fuel. Therefore, SK chemicals contributes to energy saving by developing the solutions of resources recycling, lightweight materials and highly-functional materials. We are also advancing polyester using recycled PET and/or recycled monomer as well as providing the solutions on substitution for metal parts of automobiles with super engineering plastics and carbon fiber composites.

**Substitute for Toxic Substances** | We are conducting research work on alternative substances in replace of toxicants like endocrine disruptors. Our polyester-based coating material is a representative alternative substance used as a substitute for epoxy resin causing bisphenol A. Epoxy resin is commonly used as coating materials on metal cans for food and beverage.

**Biomaterials** | Research on sustainable biomass replacing fossil fuel, expected to be depleted in the near future, has got the limelight as a promising future technology. SK chemicals already completed developing polylactic acid (PLA) using biomass-based lactic acid and polypropanediol (PO3G) using bio propanediol (PDO). Currently, we are producing 200 tons of PO3G annually through our pilot facilities. The production facility with the production capacity of 5,000 tons yearly is scheduled to be completed in 2021.

### R&D Cases

**Commercialization of PO3G** | As the eco-friendly PO3G market is expected to grow, major global sports and fashion industries are applying the material more to their products like sneakers, fashion, and furniture in response to market demand for being eco-friendly. SK chemicals' commercialization of PO3G is the first case in Korea and the second one in the world. We are preemptively responding to changes in the environmental-friendly materials market such as the restrictions on plastics that are globally expanding by sharpening our competitiveness in the eco-friendly materials sector.

**Development of Sustainable Packaging Solution** | We have developed a special transparent material that is recyclable by being sorted as PET materials. Although this solution is also being developed in other advanced competitors, SK chemicals developed our own material with highly accumulated polymerization technology. At the same time, we developed a transparent material that can be used for cosmetics containers based on our convergence technology combining PCR (post-consumer recycled)-PET and SK's own materials, thereby making a portfolio with a variety of physically recyclable transparent materials. On top of that, we currently set spurs to the development of transparent materials based on chemical recycled monomer as well as its production process in order to raise our sustainability and to overcome the limit of physical recycling.

**Development of artificial leather with polyester elastomer** | We have developed and commercialized a technology of producing artificial leather skin. We used eco-friendly polyester elastomer in replacement of conventional materials, solvent-based PU and plasticized PVC, for artificial leather, and our artificial leather with new materials will be applied to automobile interior materials, furniture, and bags.



PO3G Product



# INTERVIEW+

66

## Han-seok Kim

Head of Chemical R&D Institute

**Q** What is the role of SK chemicals' Chemical R&D Institute in terms of action on climate change?

**A** There are two key functions of the Chemical R&D Institute; research and development of materials and process. The research of process particularly focuses on ways to reduce resources and energy during the production process. Less resources and energy input goes beyond cost reduction and ultimately leads to climate change response.

**Q** Recently, We are seeing growing social concerns over a circular economy. What type of efforts SK chemicals make to spread the circular economy?

**A** Recently, we focus on the development of 'Sustainable Solution.' Solution based on physical recycling method has been receiving positive feedbacks since we showed it to brand owners last year, and we are currently researching and developing solution capitalizing

on chemical recycling method, which is the ultimate goal for us to reach. SK chemicals aims to become a leader in physical and chemical recycling by 2021.

**Q** What is the SK chemicals' approach to hazardous chemicals?

**A** Chemical R&D Institute is establishing a chemicals management system. With the establishment of an IT system, SK chemicals will provide guidelines for certification, registration, and management for chemicals from the search stage so that we can prevent any possible risks in advance while fundamentally ensuring compliance with laws and standards. Also, we make efforts to develop environmental-friendly clean products that are free from harmful substances such as bisphenol A. Going forward, we will further reduce hazardous chemicals in our products and process through our various innovation endeavors.



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# “ Byung-gyu Choi

Head of Energy &  
Composite Production  
Division in SK chemicals  
Ulsan Plant

**Q** What efforts does SK chemicals make to cut down on environmental pollution?

**A** The chemical industry always has to operate boilers for the production of steam necessary for the process, which becomes a cause of environmental pollution derived from its fossil fuel usage and emissions of greenhouse gas and fine dust. SK chemicals' Ulsan Plant has minimized the use of coal by operating Eco Green Boiler (EGB) producing steam with waste wood instead of coal that is commonly used in other sites. We also reuse biomethane gas generated in the course of wastewater treatment in LNG boilers in order to diminish the usage of LNG, fossil fuel. Ulsan operation site achieved about a 60% reduction in annual fine dust emissions by replacing boilers used in each process so as to cut the emissions of sulfur oxides (SOx) and nitrogen oxides (NOx) that are major inducers of fine dust. Furthermore, we have formed a dedicated

organization and engaged external experts to apply various ideas for optimizing energy uses in actual sites. In 2019, these efforts brought about the reduction in total energy usage in the Ulsan Plant by approximately 2.5%, reaping the feasible fruition. SK chemicals Ulsan Plant will continue to create environmental value through not only the reduction of greenhouse gases and air pollutants but the production of eco-friendly plastics such as products containing more than 30% of recycled plastics and PO3G, bioplastics using corns.

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### + SK chemicals' Approach

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- 1 Contribution to the treatment of disease through our pharmaceuticals
- 2 Contribution to the treatment of disease through our vaccines

### + SK chemicals' Performance Management

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- 1 Converting social value regarding disease treatment through vaccines into monetary value and management



# + n2 PROMOTING HUMAN HEALTH

The rapid aging of population is coming with social problems such as increased chronic diseases and higher medical expense burdens. Besides, the emergence of deadly viruses such as Ebola and SARS has come to the fore as serious social issues posing threat to human health. In particular, the recent outbreak of COVID-19 negatively affects overall real economy in the world, hampering economic growth, damaging global supply chain, and contracting exchanges of materials. As such, the sharp rise in aging population and diseases is a grave social concern threatening health and economy of all humans. The treatment and prevention of illnesses are the most critical matter for the sustainability of humanity, thus the continued research and development as well as active investment are more significant than anything else.

#### Related UN SDGs



## 02 Focus Area

## Treatment and Prevention of Disease



Renexin



Promac



Omed

SK chemicals strives to enhance human health through the development of various treatments and preventive medicines (vaccines). Through these efforts, we will contribute to saving medical expenses of both individuals and the nation while improving national health.

### Contribution to Treatment of Disease through Our Pharmaceuticals

SK chemicals has consolidated R&D pipelines centering on strengths in our pharmaceuticals business and improved efficacy and convenience of existing drugs in order to create social value by providing better medicines.

**Nervous system** | There are growing number of patients with nervous system diseases including dementia, Parkinson's disease, and epilepsy coming from the aging population, which leads to the higher needs for treatment. After the launch of Ginexin-F, a drug for peripheral arterial circulation disorder, containing an extract from ginkgo leaves, SK chemicals developed a new version, Renexin by combining antithrombotic and components from ginkgo leaves to improve compliance enhancement while reducing side effects. In addition, our product line-up was expanded with Renexin Tab that makes it easy for patients to take medicine with less frequency of intake. Rivastigmine patch, a dementia drug, acquired US FDA approval, demonstrating its high technology, and expanding its presence in the global market. SK chemicals is also applying our own specialized technology, a patch-type drug, into existing Parkinson's drugs. The development is ongoing with the name of SID1606. We are building a product line focusing on major nervous system diseases such as dementia, epilepsy, Parkinson's disease, and headaches.

**Musculoskeletal system** | Musculoskeletal disorders that accompany pain in the muscles and joints of neck, shoulders, back, and arms have a direct impact on daily life and mental health. Besides, as it is not included in a general examination, musculoskeletal disorders are not normally detected until it developed into pain. Unless it is not discovered early, it can degrade the quality of life. By developing and supplying our representative medications in joint inflammation including Joins, Korea's first anti-arthritis herbal drug, and Trast, based on our top patch-type technology, we are leading the way to improve the quality of life for arthritis patients.

**Digestive system** | Digestive organs turn the food we ate into energy sources for the body and supply it. Unfortunately, stress and irregular eating habits induce the growing number of patients with digestive disorders. SK chemicals contributes to the remedy for digestive diseases through our products including Promac, a drug for acute or chronic gastric ulcer, and Omed. The case of ranitidine, that the sales of ranitidine-contained products was suspended due to its possibility of cancer induction, has brought the safety of digestive medicines into the spotlight. Against this backdrop, SK chemicals' products are thoroughly managed in its safety and superior quality of ingredients, emerging as an alternative drug for conventional ones.

### Contribution to Treatment of Disease through Our Vaccines

SK chemicals makes strenuous efforts to develop and supply vaccines, which is the most effective and economical way for disease prevention. We have secured infrastructure and R&D platform technology for vaccine business (SK bioscience) through our consistent investment. Based on this foundation, we commercialized basic essential vaccines and premium vaccines that cannot

## SKYCellflu



Acquired  
**WHO PQ**  
 Certification for the first time in the world  
 (cell-cultured vaccine)

## SKYZoster



1<sup>st</sup>  
**Vaccine**  
 in Korea against shingles

## SKYVaricella



Acquired  
**WHO PQ**  
 Certification for  
 the second time in the world

be produced in Korea. SK chemicals will keep advancing vaccines to prevent illnesses with SK bioscience, thereby culminating in social value creation.

**Development of Influenza Vaccine** | Contracting influenza virus can claim the vast number of lives and incur economic losses at the national level. Therefore, preventive measures and research on treatment are extremely crucial. The World Health Organization (WHO) and epidemic experts in the world warn of the increased likelihood of pandemic of high-risk influenza viruses, and advice to take measures for prevention, early prediction, and detection. In April 2019, SKYCellflu Trivalent, self-developed by SK bioscience, received WHO's PQ (Pre-qualification) for the first time in the world as the cell-cultured influenza vaccine. SKYCellflu Quadrivalent also acquired PQ certification from WHO in December, 2019. SKYCellflu, the country's first cell-cultured adult influenza vaccine, and the world's first cell-cultured pediatric influenza vaccine, has almost half shorter production period compared to the conventional period, thereby having the advantage of allowing swift production in the event of a flu pandemic situation. According to the data analyzed by the US FDA and CDC on relative effects of flu vaccines between 2017 and 2018, quadrivalent cell-cultured vaccine showed 11% higher prevention effects than the quadrivalent fertilized egg vaccine.

**Development of Shingles Vaccine** | Health Insurance Review & Assessment Service says the number of shingles patients in Korea exceeded 730,000 as of 2019 with a 3 to 4% increase every year. Herpes zoster or shingles is a disease that causes severely painful rashes and blisters on the skin. The varicella latent in human nerves becomes active and brings out symptoms when the immunity is weakened. If it is not properly treated in the initial stage, pain lasts longer and it can cause complications such as meningitis in case the virus enters the brain nerve, so the prevention is of immense importance.

SK bioscience launched SKYZoster, a shingles vaccine made with its own technology in December 2017 in Korea, expanding the opportunity to get a vaccination domestically against shingles. SKYZoster is the first vaccine in Korea, and the second one in the world against shingles. Safety verified by overseas specialized nonclinical testing institutions, SKYZoster was developed through domestic clinical trials conducted by eight clinical institutions, including Korea University Guro Hospital, for about five years.

The total expenses of shingles treatment in Korea is growing every year by 6-10% at about KRW 168.7 billion as of 2019. In the market monopolized by MSD so far, SK bioscience's development of shingles vaccine is greatly meaningful in terms of expanding beneficiaries, cutting costs, and having the sovereignty of vaccines.

**Development of Varicella Vaccine** | Varicella is an acute viral disease caused by varicella-shingles virus, which may also cause shingles. Anyone of all age can come down with the disease, but children aged under 10 are the most vulnerable to varicella. Currently, varicella vaccine is included in the national immunization program for minors.

SKYVaricella, a varicella vaccine self-developed by SK bioscience was granted marketing approval from the Ministry of Food and Drug Safety in June 2018, and acquired WHO PQ certification in December 2019 for the second time in the world as a varicella vaccine. SKYVaricella conducted phase III multinational clinical trial toward a total of 299 children aged from 12 months to below 12 in 19 clinical institutions at home and abroad including St. Vincent Hospital of Catholic University of Korea for checking validity and safety of the product, and was confirmed high immunogenicity. The fact that more and more developing countries are simplifying the licensing process, such as shortening screening period and exempting due diligence, for drugs approved by the Korea Food and

Drug Administration will contribute to increasing overseas exports and reducing the mortality rate of newborns in developing countries.

**Development of Pneumococcal Vaccine** | Pneumococcus is one of the main culprits of invasive infections\* such as acute otitis media, pneumonia, bacteremia, and meningitis. 60-79% of bacterial pneumonia are caused by pneumococcus. Pneumococcal infections frequently occur in infants, children, and the elderly aged 65 and over who have weak immunity. The pneumococcal infections are a major killer of children in developing countries, resulting in yearly 1,200,000 deaths.

In 2014, SK bioscience made a contract with Sanofi Pasteur SA, a global company specializing in vaccine, for the co-development of next-generation pneumococcal conjugate vaccine. After the active research and development, we completed the phase I of clinical test in the U.S. in late 2019. The pneumococcal conjugate vaccine we are currently developing is a protein binding vaccine that is produced by combining certain pneumonia with the surface of polysaccharide of pathogenic bacterium causing pneumonia. It has shown the highest preventive effects among all existing pneumococcal vaccines so far.

With the recent spread of COVID-19, it is expected that the social interests and demand for pneumococcal vaccines will increase as a large number of infected patients suffer pneumonia. SK chemicals will contribute to lightening the burden of social disease through the development of pneumococcal vaccine.

\*Invasive infection : Germs invading tissues or cells of the body, causing infection

## 02 Focus Area

# Better Access to Drugs

Improving a drug accessibility is a key factor in universal medical security. To ensure enhanced accessibility, we need to reinforce physical accessibility by expanding the market so that consumers can purchase medicines easily when they need them, while economic accessibility should be improved as well in order that no one fails to buy drugs due to high cost. In addition, enhancing access to information is essential for consumers to become familiar with the proper usage and precautions of medicines.

## Improving Physical Accessibility

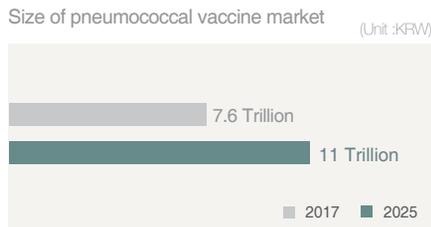
**Rivastigmine Patch Acquiring Marketing License from US FDA** | Recognized for our R&D technology, SK chemicals' patch-type dementia medicine, Rivastigmine patch was approved of selling as the first generic drug in Europe. Since then, it gained sales approval in Australia and Colombia in 2016, Mexico and Jordan in 2017, and Canada in 2018. Particularly in 2019, it acquired marketing license in the U.S. for the first time as the patch-type dementia drug developed by a domestic pharmaceutical company. Based on our global level of capabilities to develop and respond to approvals, we are going through approval systems in nations like Brazil and we are making inroads into major Southeast Asian countries.

**SKYCellflu Quadrivalent obtaining WHO PQ** | Following SKYCellflu Trivalent, SKYCellflu Quadrivalent also acquired WHO PQ (Pre-qualification) in December 2019. It is the world's first certification as a cell-cultured influenza vaccine, and we plan to actively participate in international bids for influenza vaccine based on the foundation.

**SKYZoster targeting global market** | As of December 2019, SKYZoster reached 1 million doses in domestic sales in just two years of the launch. We will further expand our market share with stable

Sales Approval for Rivastigmine Patch





Academic Symposium

supply of SKYZoster, which has made its presence in the market at a rapid pace, and push forward promotions in overseas markets starting from emerging markets such as Southeast Asia.

**SKYVaricella acquiring WHO PQ** | For the second time in the world as a varicella vaccine, SKYVaricella acquired WHO PQ (Pre-qualification) in December 2019. It applied for PQ certification held by WHO in September 2018 and passed highly demanding examinations. It was an achievement in 1 year and four months, which is much quicker than normal review period. With the basis of WHO PQ certification, we will actively engage in international biddings for varicella vaccine and enter markets in developing countries.

**SK-Sanofi next-generation pneumococcal conjugate vaccine completing the phase I of clinical test** | Next-generation pneumococcal conjugate vaccine, co-developed by SK bioscience and Sanofi Pasteur, has successfully completed the phase I of clinical trial in the U.S. As we made a KRW 5 million contract with Sanofi to jointly develop the next-generation pneumococcal vaccine, if the commercialization succeeds, it will be produced at SK bioscience's vaccine plant in Andong. According to Allied Market Research, a global market research firm, pneumococcal vaccine market globally was worth about KRW 7.6 trillion as of 2017, and it is projected to grow to about KRW 11 trillion by 2025.

#### Strengthening On-site Marketing |

**Enhanced MR training for delivering accurate and efficient medical information:** In order to give the latest and high-quality medical information and product description, SK chemicals operates a MR (Medical Representative) capacity-building training program. It includes the establishment and operation of both regular offline education and online training system. These efforts earned us the third place in awareness (IQVIA) among domestic pharmaceutical companies.

**Reinforced marketing for the unmet needs in the market:** Symposiums and lectures under diverse themes are held in order to alleviate the unmet needs in the market such as academic information on illnesses and medicines. In particular, online and offline symposiums with various contents provide recent information on diseases and treatment guidelines, assisting medical staff to offer optimal medical services.

#### Improving Economic Accessibility

**Establishment of Appropriate Drug Prices** | SK chemicals makes our utmost effort to alleviate economic burden of drugs for patients through securing reasonable insured prices while improving convenience by introducing and developing new drugs every year.

On November 26, 2019, SK chemicals won local marketing license for Ongentys (ingredient: opicapone), a Parkinson's disease medicine developed by Portuguese drug maker Bial, and plans to apply for an affordable insured price by surveying registered drug prices in other countries.

According to the data released by the Health Insurance Review & Assessment Service, about 110,000 people in Korea suffered from Parkinson's disease as of last year. In these circumstances, the introduction of new medical supplies in Korea can give the patients more options for medication. Besides, improved patients' health is expected to result in the efficient operation of health insurance asset by reducing pharmaceutical and medical expenses.

In addition, we strive to lower the economic burdens of drug expenses for patients through reviewing items in regard to the policy pushed for selective benefits expansion for extended coverage of health insurance.

## Strengthening Information Accessibility

**Provision of Drug Information** | SK chemicals supports Evidence-Based Medicine by offering formulated or gathered information of medicine and drugs to medical field. In 2019, we produced some 400 pieces of medicine and disease information and disseminated them to medical fields nationwide. We also operate a drug counseling center to provide standardized answers to medical professionals and patients, contributing to the safe and proper use of medicines.

Along with this, we hosted around 60 academic symposiums in the year of 2019 to provide a venue for medical experts in all fields to share and discuss their expertise and clinical experiences together. SK chemicals continues to plan and execute clinical research on new areas to create clinical basis for optimal medicine treatment, striving to satisfy consumers' right to know in line with changing regulations such as the Full Ingredient Labeling System for Drugs.



### Special Section

## Acquisition of WHO PQ and Greater Access to Drugs through International Cooperation

The WHO PQ (Pre-qualification) certification is a system to assess the quality, safety, efficacy and safety management capabilities of regulatory authorities of the country in order to qualify applicants for the supply of medical products to international organizations under the United Nations (UN) including the United Nations Children's Fund (UNICEF) so that they can provide a large quantity of drugs to developing or underdeveloped countries.

The large amount of supply to international organizations under UN including UNICEF and the Pan-American Health Organization (PAHO) has the effect of lowering costs on account of the economy of scale. Drug producers can supply their products at lower prices while international organizations can purchase more drugs to distribute to patients in developing and underdeveloped countries. Thus, the WHO PQ program enhances access to drugs within those countries. SK bioscience is to help improving drug accessibility in developing and underdeveloped nations by actively participating in international bids with varicella vaccine, SKYVaricella as well as SKYCellflu Quadrivalent and SKYCellflu, that are the influenza vaccines with WHO PQ certification.

On top of that, phase III trial of SK bioscience' pediatric enteritis vaccine for developing countries and typhoid vaccine is underway with the partnership with various international non-profit organizations including the Program for Appropriate Technology In Health (PATH) and the International Vaccine Institute (IVI) as well as the fund from the largest private foundation, Bill & Melinda Gates Foundation. SK bioscience strives for social value creation and greater access to medications across the globe so that patients in developing and underdeveloped countries beyond Korea can have access to quality vaccines they need at any time and in any place.

## 02 Focus Area

## R&D for the Promotion of Human Health

Development of COVID-19 Vaccine



Won a bid for a  
**National Project**

In order to promote the health of humanity, SK chemicals continuously invests in the research and development of pharmaceuticals and vaccines. We have formed a SK chemicals R&D Center since 2018 and selected SK bioscience CTO to focus on research and development in the pharmaceutical and vaccine areas, respectively.

### Strategic Direction for R&D

Our pharmaceuticals business aims at expanding our presence to the global market based on our own R&D capabilities. To do so, we have established and reinforced our product portfolio particularly centered on innovative improved new drugs using our patent or medication technologies such as patch technology that was recognized globally for its high capability and release-control medicine technology. Besides, we established a turn-around strategy for the R&D of synthetic drugs. It is to expand investment in open innovation for securing candidate materials for new drug development, thereby strengthening our R&D capabilities.

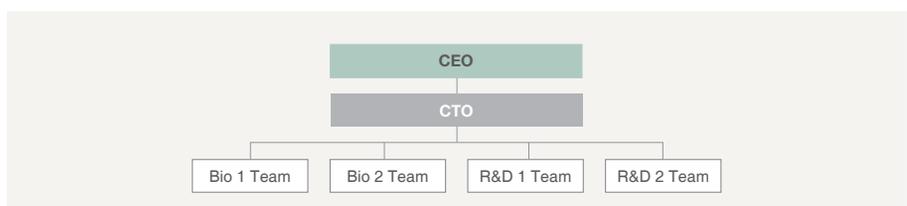
Capitalizing on the platform technology established through the commercialization of SKYCellflu, SKYZoster, and SKYVaricella, SK bioscience is enhancing the portfolio for preventive vaccines including basic vaccines and premium vaccines. In addition, SK bioscience began a vaccine research to cope with the recent pandemic virus, COVID-19.

### R&D Organizations

SK chemicals' PB (Pharma Business) musters our research and development capabilities on R&D center. We have been conducting basic research and planning new products revolving around R&D organization, while enhancing the capability of approval process and development in order to enter the global market and commercialize products. Besides, we are pursuing domestic and overseas development by exploring products with high medical effects in certain diseases and planning new products that meet the needs of the market so as to continuously secure pipelines and licensing-in of promising products in and outside Korea.

SK bioscience has reorganized its structure into two Bio teams so as to concentrate on the research and development in the field of vaccines since 2019. Each team has sharpened their own functions. Bio 1 Team conducts research activities for the commercialization of products, for example, the next-generation pneumococcal conjugate vaccines, which was applied for the phase II clinical trial to US FDA after successfully completing phase I clinical test, the typhoid vaccine, which is undergoing a global clinical test, pediatric enteritis vaccine, and cervical cancer vaccine. Bio 2 Team is in charge of discovering candidate ingredients for new vaccines and conduct research to broaden the scope product portfolio while checking and verifying the quality of products under research and development and analyzing the subjects of clinical test. In particular, SK bioscience recently won a bid for a national

SK bioscience R&D Organizational Chart



project for COVID-19 vaccine development, called 'Development project for synthetic antigen-based COVID-19 subunit vaccine.'

### Pharmaceutical Research Activities

With an objective of developing new drugs, SK chemicals established a Life Science Research Center in 1987. Since SK chemicals entered into pharmaceutical business, we have developed and launched various representative products. In 2002, we launched Joins, Korea's first herbal medicinal product and in 2011, we rolled out the world's first ODF(Oral Dissolving Film) for erectile dysfunction treatment Mvix S. Trast, a patch formulation for arthritis, has grown as a Korea's representative brand, achieving the revenue at KRW 10 billion since its launch for the first time as a Korean pharmaceutical business. SK chemicals' PB (Pharma Business) has strength in neurology diseases, and our Parkinson's drug and chronic arterial occlusive drug have been approved for sales and in preparation for launch in the market. Patch-type medicine for Parkinson's disease has been under preclinical study. Moreover, the dementia treatment patch with US FDA approval is on the way to approvals in Latin America including Brazil, seeking to boost exports. We also conduct joint research and development through open innovation, and we are continuing our efforts to build a new portfolio.

### Preventive Vaccine Research

Selecting vaccine sector as a growth engine for next-generation, SK chemicals focuses on the development of vaccines while expanding vaccine pipelines. Our top-notch vaccine plant, L HOUSE built in Andong, Geongbuk, is equipped with the infrastructure and production facilities for most of vaccines that can be developed in Korea with our basic technologies such as cell-culture, bacterial culture, genetic recombination, and protein-conjugated vaccine. With an achievement of research for 12 years, we completed our own vaccine business portfolio, and has successfully developed and commercialized a variety of vaccines, thereby having a high profile in the global vaccine field.

For preventive vaccine research, we are carrying out clinical research on pneumococcal vaccine that we are self-developing, pediatric enteritis vaccine, and cervical cancer vaccine. We have completed the phase I clinical trial for pneumococcal conjugate vaccine which was co-developed with Sanofi Pasteur, and pediatric enteritis vaccine and cervical cancer vaccine are in phase II trial overseas. Besides, our research center has been certified by the Ministry of Food and Drug Safety as a clinical analysis institution to strengthen our research capabilities internally.

### New Vaccine Research

Based on the existing vaccine research capabilities, we have conducted research on new vaccines for various infectious diseases in order to discover future business items. We particularly carry out research on a vaccine manufacturing platform that enables prompt response to emerging epidemic diseases.

### Current Status of R&D

Life Science Biz. invested KRW 98.4 billion as of 2019 for the facilitation of research and development. There are a total of eight ongoing R&D projects; 4 vaccine development tasks, 3 chemical treatments tasks, and 1 herbal medicinal product task. A next-generation pneumonia vaccine and a Parkinson's treatment have been developing in the much attention from the society, while a chronic arterial obstruction treatment being prepared to be launched in the herbal medicinal product market with the approval.

#### Pneumococcal Vaccine



## Phase I

of clinical test in the U.S. (completed)

#### Pediatric Enteritis Vaccine Cervical Cancer Vaccine



## Phase II

of clinical test overseas (ongoing)

#### Ongoing R&D Projects



**8** projects

	Name	Target Disease	Development Stage	Note
<b>Vaccine</b>	NBP613	Prevention of pediatric enteritis	Phase III clinical trial	
	NBP615	Prevention of cervical cancer	Phase III clinical trial	
	NBP618	Prevention of typhoid	Phase III clinical trial	Joint development
	GBP410	Prevention of pneumococcus	Phase I clinical trial	Co-development/ next-generation pneumococcal vaccine
<b>Chemical Drugs</b>	SID710	Dementia treatment	Approved from US FDA, applied for approval in Brazil	Europe's first generic release
	SID1606	Parkinson's treatment	Pre-clinical stage	Patch type
	SKP161	Parkinson's treatment	Approved	
<b>Herbal Medicinal Product</b>	SID142	Chronic arterial occlusion treatment	Approved	

### Being Selected as a Research Institute for COVID-19 Vaccine Candidates

COVID-19 emerged from Wuhan, China in December 2019, then began to rapidly spread into China and its neighboring countries. It soon became a global pandemic in just three months. The World Health Organization (WHO) on March 11 declared COVID-19 as a global pandemic. As of April 2, 2020, the statistics show more than 900,000 cases in 207 countries with an above 5% of fatality rate. SK bioscience has begun full-fledged research for vaccine development since February, and we are swiftly discovering vaccine candidates by making the use of various vaccine platforms based on our accumulated experience and technologies in vaccine development. The animal testing has already been initiated to evaluate the efficacy of vaccines, and currently we are accelerating the preparation of nonclinical and clinical trials considering commercialization. Furthermore, we were selected in a project to develop vaccine candidates by the Korea Centers for Disease Control and Prevention, reinforcing the vaccine development partnership with governmental agencies. We also promptly prepare for the rapid approval of vaccine with close information exchange with the Ministry of Food and Drug Safety.

#### R&D Timeline



# INTERVIEW+

## Jeong-hoon Kim

Vice President  
Office of Pharma  
Business Planning

**Q** What is the major achievements of SK chemicals' PB (Pharma Business) in 2019?

**A** The year of 2019 was a year that we upgraded our competitiveness of the pharmaceutical business through securing mid- to long-term growth engines and operational excellence as well as improving life cycle of existing products. We have earned the highest level in financial structure including product turnover, bonds, and inventory. Another accomplishment was to obtain approval for a patch-type dementia drug Rivastigmine patch from US FDA, which enables us to expand our sales into the U.S. market. This expansion is indeed a breakthrough in making inroads into the global market.

**Q** What are the major risk factors in pharmaceutical business and how does SK chemicals overcome them?

**A** Pharmaceutical industry is called 'regulation industry,' which indicates how much it is affected by various regulations such as insurance finance and drug price policy.

Accordingly, it is highly overarching to properly respond to numerous regulatory changes at home and abroad. On top of that, there are a variety of risks that cannot be controlled like sudden drug recalls. As things are very rapidly changing in diverse areas in recent years, the probability of uncontrolled risks is getting increased. The risks we are faced with today is unprecedented, and it is not easy to anticipate and respond to them in advance. Thus, SK chemicals is cooperatively responding to various new risks in partnership with related organizations, associations, and the industry. Going forward, we will raise the level of response through close cooperation with them.

**Q** What are the main objectives of PB (Pharma Business) down the road?

**A** We plan to reinforce our competitiveness in the treatment of nervous system, musculoskeletal system, and digestive system, which are the strength of SK chemicals' PB (Pharma Business.) We will further conduct effective and efficient on-site marketing activities by applying data-based operation excellence that is currently underlined in the production stage.



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## Justis Tae-jun Cho

Head of SK bioscience  
Strategy and Planning  
Office

**Q** What are the key achievements of SK bioscience in 2019 in terms of promoting human health?

**A** In 2019, our self-developed SKYCellflu Trivalent acquired WHO PQ certification for the first time in the world as a cell-cultured influenza vaccine, and SKYCellflu Quadrivalent also obtained WHO PQ, reaping the feasible fruition externally.

Besides, our shingles vaccine occupied a 40% market share in just two years since its launch in December 2017, contributing to securing the sovereignty of vaccines in Korea as a domestically produced vaccine. SK bioscience's technology was recognized in 2019 for the next-generation pneumococcal vaccine passing phase I clinical trial and successfully exported cell-cultured vaccine production technology.

**Q** What was the biggest challenge in the vaccine business of SK bioscience and what is the plan to cope with it?

**A** Development of new vaccines requires very long time for verification and numerous clinical cases and accumulated data. SK bioscience competes with large global pharmaceutical companies that have accumulated data for

over 100 years, as a latecomer in the global healthcare market.

Moreover, biopharmaceutical area is on-trend in the global pharmaceutical industry, yet it is still untrodden area with a high level of difficulty in new drug development. Against this backdrop, SK bioscience has reinforced our competitiveness in the global market by establishing 'Bioscience 2030 Strategy,' under the keyword of 'Sharp Knife.' 'Sharp Knife' meaning taking advantage of our strength more sharply, thereby boosting the productivity of research and development. Furthermore, we plan to carry out research and development activities for biopharmaceuticals and new preventive vaccines through expanded R&D pipelines.





### + SK chemicals' Approach

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- 1 Financial assistance for partner companies in their stable management
- 2 Educational support for partner companies in their competitiveness enhancement

### + SK chemicals' Performance Management

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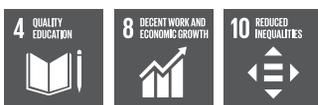
- 1 The amount of financial assistance for partner companies in their management
- 2 Monetization of social value created by companies participating in Project Lab



# + n3 SOLIDIFYING ECOSYSTEM FOR MUTUAL GROWTH

Along with the convergence of industries and digital technology development, the global competitive environment is shifting from competition among individual companies to compete for supply chain and competition among ecosystems. In order to gain a competitive edge in this fierce business environment, a company should help partner companies in the supply chain build their capabilities and sustain a balanced advancement with them. In terms of risk management, sustainable supply chain management is emphasized as a key factor affecting the reputation and sustainability of a company.

#### Related UN SDGs



03 Focus Area

# Coexistence with Suppliers

SK chemicals pursues an ecosystem for mutual growth not based on unilateral assistance but on mutually cooperative partnership. To improve the effectiveness of support for our suppliers, we have established a system for mutual growth promotion while operating a variety of programs ranging from financing, payment to advance and middle payment based on their needs.

## System for Mutual Growth

SK chemicals strives to spread mutual growth with suppliers and a fair-trading culture. We are supporting our suppliers' competitiveness by providing practical benefits encompassing technical, financial and manpower supports while building a system for mutual growth promotion for more efficient assistance. In 2019, we updated the list of good suppliers based on the reflection of their transaction performance and evaluation results in 2018 to provide them with tailored support programs.



Managing KRW 7.5 billion of SK Shared Growth Fund (As of 2019)  
Total of 8 Partners



KRW **2** billion  
of Financial Support

## SK Shared Growth Fund

SK chemicals is well aware of the significance of financing on time through decades of our business operations. Accordingly, we donated to form SK Shared Growth Fund in 2013, and since then, we have operated the fund to help our partners and suppliers run their businesses in a smooth and stable manner. SK Shared Growth Fund allows our suppliers to secure funds required for their operations and facilities at a lower interest rate than that of the market. In 2019, SK chemicals managed KRW 7.5 billion of funds, providing KRW 2 billion of financial support for a total of 8 partner companies.

## Subcontract Payment

To support our suppliers, SK chemicals implements policies of cash payment for subcontract expenses, payment to subcontractors within the shortest period and free support for financial funds. As a result, we have completed cash payment 48 days earlier than the legal standards as of 2019, thereby prompting an increase in the management stability and satisfaction level of our suppliers, which results in social value creation for them.

## Advance and Middle Payment

SK chemicals puts in place an institution of advance and middle payment aiming to stabilize our suppliers' cash flows. Suppliers in charge of equipment materials or construction can benefit from this institution when applying for advance or middle payments. We are also paying suppliers in cash so that their managements are stable.

## 03 Focus Area

## Sharpening Suppliers' Competitiveness

SK chemicals is in aid of our suppliers with various support programs including online and offline education, seminars and co-development so that our suppliers are equipped with top-level capabilities. Besides, we are providing comprehensive solutions by utilizing our infrastructure and network with our suppliers to allow SMEs' plastic products to be commercialized through Project Lab.

### Competitiveness Enhancing Training

SK chemicals spares no effort for actual social value creation. As part of these efforts, we provide a wide range of training programs including 'Mutual Growth E-learning,' 'Online Training,' 'SK Mutual Growth MBA,' and 'Mutual Growth CEO Seminar' in order to enhance our suppliers' competitiveness. Especially in 2017, we broadened the scope of beneficiaries of Mutual Growth Academy and Mutual Growth MBA targeting core talents, Mutual Growth E-learning, which began in 2006. We also newly established Mutual Growth CEO Seminar targeting CEO. In 2019, a total of 30 CEOs from suppliers participated in CEO Seminar while one middle manager took part in SK Mutual Growth MBA.



Mutual Growth CEO Seminar

### Provision of Safety Training

SK chemicals provides our suppliers with free safety training twice a year to raise the level of their safety management. One is for suppliers' supervisors and the other is for the entire members of them. Through the training, our suppliers could learn about the ways to prevent safety accidents through incident cases, relevant legal standards and SK chemicals' internal regulations on safety and emergency response system. In addition to the training, we inform our suppliers' representatives of changes in laws, internal standards and recent accident cases during the suppliers' council held every month.



Provision of Safety Training



Eco-friendly Wood Plastic Composite (WPC)

### Joint Development and Profit Sharing

SK chemicals is taking the lead in mutual growth, working together with SMEs having advantages in various fields for research and business development.

Especially, Wood Plastic Composite (WPC), an eco-friendly wood plastic co-developed with Dongha Group, has been recognized as an excellent example of mutual growth between a conglomerate and a SME. SK chemicals transferred our own eco-friendly new technology as well as cooperated closely with Dongha, a company specializing in synthetic wood, which results in the creation of this environmental-friendly material similar to natural wood in its texture and appearance. The product has outstanding water resistance and durability while exhibiting less deformation according to changing temperatures. It also bears weight 1.5 times heavier than the existing products. These profiles make it used for applications of mountain trails and for bicycle roads, lowering expenses for construction and maintenance.

SK chemicals participated in 'ANTEC 2018,' the largest conference in the plastic industry held in Orlando, Florida State, USA, with Dongha, and received much attention from people in the field. We are working together to make inroads into the global market. We recently cooperate with our customers in the cosmetics industry so that eco-friendly synthetic wood materials can be applied to cosmetic products. Moreover, we developed a 'coffee synthetic wood' material using waste coffee grounds instead of conventional wood.

### Creating an Environment for Mutual Growth with SMEs

SK chemicals has provided steam for SMEs in the vicinity of Ulsan Plant since 2004. For SMEs, securing steam requires steam generating equipment of certain scale as well as human and material resources to maintain it, which gives rise to higher cost burden. Against this backdrop, SK chemicals has offered steam to SMEs nearby our Ulsan Plant, thereby helping them solving their concerns over investment costs and fixed costs while saving our fixed costs due to the sales of surplus steam. By doing so, we are operating a mutually beneficial system for supply and demand of steam.

### Project Lab for Shared Growth

Project Lab, launched in 2018, is a program that comprehensively supports SMEs in the commercialization of their plastic products through our various infrastructure and network with our suppliers. In 2018, we signed MOUs with a total of 16 partners in various fields encompassing CAE\* interpretation, mold manufacturing, product molding, analysis and evaluation, and injection equipment and peripheral facilities. And this gives us more access to customers' needs for product development, including development plans and requirements for products, based on which, we can provide comprehensive solutions including technologies and know-how in and outside of SK from product design to production stage.

\* Computer Aided Engineering (CAE) : CAE is to evaluate in advance manufacturing, process and product performance by comprehensively processing information required for product manufacturing through computer

Co-operations in Project Lab



Project Lab takes into consideration social value created by SMEs we support beyond the primary social value we generate by assisting SMEs. A total of five projects regarding diverse social issues are ongoing so far in 2020, with SMEs in various fields working together for social value creation from response to safety and environment issues, such as fine dust, to business for the socially vulnerable. In 2019, we opened a Project Lab website to establish a system that provides solutions meeting the needs of our customers. Going forward, we will enhance technological capabilities of the members, reinforce the network to attract external capacity and raise platform establishment and operation competencies including Project Lab website so that more customers and service providers can find their partners to create social value we could not ever imagine.

Special Section

Major Cases of Project Lab

Through Project Lab, we provide optimal solutions by discovering customers' needs related to plastic, helping our customers address problems and make feasible performance. Since the establishment of Project Lab business, SK chemicals has promoted various projects together with our partner companies, and representative cases are as below.



Product for Food-Contact Use

Suggesting materials tailored to customer's needs > Using CAE > Designing a mold & supporting production > Making a prototype > Mass Production



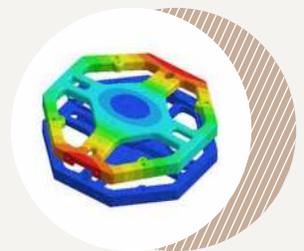
Electric Hand Prosthesis

Suggesting materials tailored to customer's needs > Using CAE > Designing a mold & supporting production > Making a prototype > Mass Production



Mechanical Braille Board

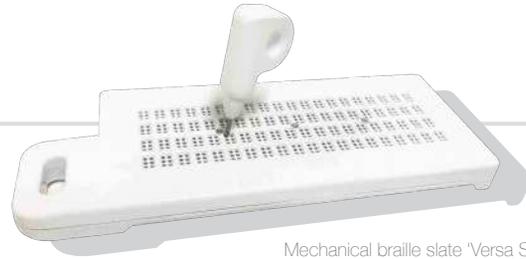
Suggesting materials tailored to customer's needs > Making a prototype > Mass Production



Base Isolation Table

Suggesting materials tailored to customer's needs > Making a prototype

## Overflow Sang-eon Kim, CEO



Mechanical braille slate 'Versa Slate'

**Q** Could you tell us about Overflow?

**A** Overflow is a social venture enterprise specializing in assistive technology for the visually handicapped. The word of 'overflow' means being filled and flowing over, which indicates not only profit generation but also social value creation. We aim to let good influences flow into people in need.

**Q** What social value do you think Overflow is creating?

**A** We largely create two kinds of values. I think Overflow helps handicapped people do their studies or jobs that people without a handicap have no trouble in managing. Our products enable the disabled to be a part of the community without a problem and ultimately improve the quality of their lives. As we think it is vital to listen to their voices in the field, we hired visually impaired people so that they can participate in the development of products in person. By doing so, we also contribute to social value, creating quality jobs for the handicapped.

**Q** What motivated you to join Project Lab, and what kind of help did you receive?

**A** SK HappyNarae recommended us to join Project Lab. We needed advice from experts when we were developing 'Versa Slate,' a braille slate and stylus enabling writing and reading without paper. It uses stylus to write Braille, which requires 480 flat pieces of the slate to be pressed by the same level of strength of stylus on the fixed state. But with the existing design, we had difficulty in commercializing the product due to a lack of durability and the level of completion. We were offered various ideas for the simplification of internal slate structure through Project Lab and the engineer in charge even gave us a design sketch, which helped us a lot.

**Q** Did those ideas contribute to the commercialization of the current version of Versa Slate?

**A** The current version of 'Versa Slate' has much improved from the initial idea, but we could reduce uncertainty with innovative ideas suggested by Project Lab. We will also source materials from SK chemicals. Now, we are about to begin a mass production. We are going to be offered eco-friendly materials or diverse raw materials for plastics suitable for our product to test at the production stage from SK chemicals.

**Q** What is Overflow's next target and what do you need to create a greater synergy?

**A** Overflow is to consider products and technologies from the perspective of beneficiaries rather than our perspective to display our capabilities. Once we solidify our ground in the visual disability sector, we plan to expand our business scope to the developmental and physical disability sectors. We are contemplating the way to create a world where people with a handicap and people without a handicap get along well. To create a better synergy, I think it would be better to cooperate as a partner over the development of several products rather than just one-time project for a certain product. I think it would be better if SK chemicals helps us promote our products for wider supplies.

# INTERVIEW+

## Jae-young Choi

Senior Director, Office of  
Financial Supporting

**Q** What efforts SK chemicals is making for mutual cooperation with suppliers?

**A** SK chemicals is well aware that the supply chain with sharper competitiveness plays an essential role in raising our sustainability, therefore helping our suppliers raise their competitiveness. The supports include financial assistance for their stable business operations and education assistance for their strengthened competitiveness. Furthermore, our own project for mutual growth, 'Project Lab,' supports our business partners in solving problems in all stages of business.

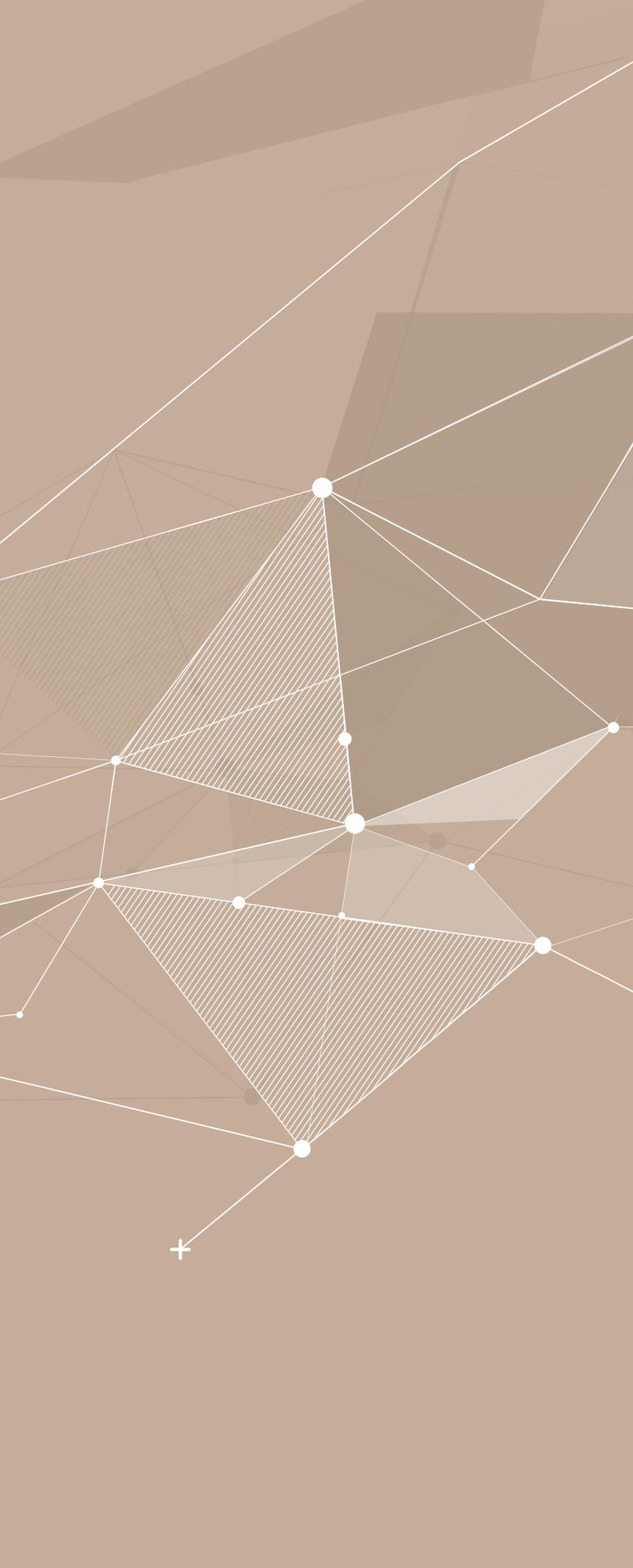
**Q** What are the SK chemicals' objectives for the establishment of an eco-system for mutual growth?

**A** There is no point in sustainable growth if we are the only one growing. Developing together with business partners has become a global standard. SK chemicals will do our best to derive empathy and sharing spirit from our mutually growing business sympathized by all and to conduct mutual growth activities pursuing win-win value so that the growth of the company will lead to the advancement of the society and our members' happiness.



# SUSTAINABILITY MANAGEMENT





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# Contribution to Local Communities

## System for Social Contribution Execution

### Direction for Social Contribution

Under the mission, 'We promote the health of humankind and protect the earth,' SK chemicals has conducted social contribution activities revolving around three themes; being eco-friendly, social welfare and spreading happiness. To be fully responsible as a global corporate citizen, we are carrying out social contributing activities aligned with the UN Sustainable Development Goals (UN SDGs)\*, thereby contributing to achieving sustainable development goals of the international community.

\* UN Sustainable Development Goals (UN SDGs): UN SDGs, which consists of 17 goals for nations, corporations and organizations to accomplish, were adopted by all 193 United Nations Member States in September 2015.

## Eco-friendly Social Contribution Business

### Happy Green School

With the purpose of spreading the gravity of the environment and the awareness of environmental protection, SK chemicals has conducted environmental education business since 2012. As part of the business, we have operated an environmental education program for children, Happy Green School. For the program operation, since 2012, we have trained a total of 150 employees as teachers who are dispatched to nearby elementary schools to provide education regarding eco-friendly environment tailored to the level of children. The program has been well received among students as evidenced by a total of 9,670 students taking the classes of the program in Seongnam and Ulsan elementary schools. Besides, our employees are using board games and teaching materials designed for the viewpoint of 3<sup>rd</sup>-grade primary school students to give better understanding of the value of the environment in an entertaining and easy manner. In 2019, we ran Happy Green School targeting a total of 1,950 children. And we were recognized for excellence in this business, obtaining a certificate for donation for education (Issue No. 2019-002) from the Ministry of Education. We are continuing to expand the program to all of our business sites in 2020.

### Myanmar Cookstove

SK Group is carrying out a project for the supply of cookstoves in coalition with Climate Change Center, an NGO, and Myanmar's Ministry of Agriculture, Livestock and Irrigation, and SK chemicals has also joined this business. Cookstove, a cooking device in the shape of stove made of cement, is designed to increase heat efficiency and reduce cooking time as well as greenhouse gas emissions and the amount of firewood used. Through this business, SK chemicals has contributed to an increase

in income and quality of life of Myanmar's people who suffer from the absence of electricity and gas while vitalizing their local economies and bringing jobs to them by hiring local talents for local production, distribution and management of cookstove. SK chemicals plans to supply about 18,000 of cookstoves every year for the next five years to residents in dry zones including Sagaing, Mandalay, and Magway, and we expect this project to reduce the amount of firewood used and greenhouse gas emissions, with the effect produced equivalent to planting 6.83 million pine trees every year.

## Supporting Business for the Marginalized

### Hope Maker

'Hope Maker' is our representative social welfare and social contribution business sponsoring children and adolescents from low-income families, supporting mentoring programs. We have run Hope Maker since 2012, supporting a total of 220 children and teenagers of 15 social welfare facilities in cooperation with SK gas. In addition to this business, each team has cooperated with 11 local welfare centers to support a total of 150 children and teenagers in their economic and cultural activities, and at the same time, we have done voluntary works in welfare centers. 'Home Maker School' is also one of those activities we have conducted, with a focus on the provision of career education and mentoring services to students, offering step by step and systematic career education by grade and consulting to students of elementary, middle and high schools.

### Domestic Business Sites' Social Contribution to Local Communities

**One Company Two Village Support** | Ulsan business site is making efforts for the smooth operation of cooperative business, meeting the needs of local residents. The business site set up sisterhood relationships with Geonam and Pyeongdong villages in Nam-gu, Ulsan City and has been doing volunteer activities during farming season and operating a communal weekend farm, purchasing crops produced by farms and supporting village festivals or tours for parents.

**Volunteer Club of Members** | Ulsan business site is operating a social contributing club 'group of beautiful people' as part of efforts to be actively involved in social contribution. Every year, the site donates through the Child Fund Korea to children in the local community in order to lend support to their healthy growth. The club plans to design social contributing activities in cooperation with the business site so as to conduct a variety of supporting projects.

# Interview



**Seung-hwan Lee, President of SEED CO-OP**

**Q Could you give us an introduction of SEED CO-OP?**

**A** SEED CO-OP is a social cooperative that 19 youth organizations and educational enterprises jointly established. The company has been running a platform business providing contents tailored to educational fields, with each member of the cooperative using their capabilities to support children in education regarding their careers and dreams.

**Q What makes the program, 'Happy Green School' and its teaching materials operated with SK chemicals unique?**

**A** We contemplated what content reflects the nature of SK chemicals' business well when we developed the program and teaching aids. We selected the global environment as a subject, putting our focus on the development of hands-on educational materials in the form of storytelling so that children can become self-motivated learners and have interests in learning.

**Q What changes can we expect from children through 'Happy Green School'?**

**A** Children know very well that the earth is ill, but they have limited access to technologies or methods for environmental cleanup in detail. That is where 'Happy Green School' provides experiences for children to be familiar with environmental improvement. By doing so, we give opportunities for children to think about the environment by themselves and practice activities.

**Q What is SEED CO-OP's next goal to achieve down the road?**

**A** SEED CO-OP aims to provide career and public education. Narrowing educational gaps between regions is our mission and we jointly develop and supply educational materials to close the gaps.

**Q What are required to create a bigger synergy created with SK chemicals?**

**A** We have created much synergy, but it will be better for us to maximize each side's expertise based on mutual trust.



**Jin-a Shin,  
Team Leader of Jung-top Welfare Center**

**Q How does 'Hope Maker' work?**

**A** We release a report on 'Hope Maker' activities every session, and based on which, we discuss what should be coordinated with SK chemicals. SK chemicals' executives and employees take care of children and interact with people in charge by paying visits to fields or using other diverse communication channels. As a result of the active communication, we plan to provide professional consulting, host meetings with parents and offer mentor education in partnership with youth foundations in 2020.

**Q What is the most rewarding moment in terms of the operation of 'Hope Maker'?**

**A** We release a report on 'Hope Maker' activities every session, and based on which, we discuss what should be coordinated with SK chemicals. SK chemicals' executives and employees take care of children and interact with people in charge by paying visits to fields or using other diverse communication channels. As a result of the active communication, we plan to provide professional consulting, host meetings with parents and offer mentor education in partnership with youth foundations in 2020.

**Q What is the most rewarding moment in terms of the operation of 'Hope Maker'?**

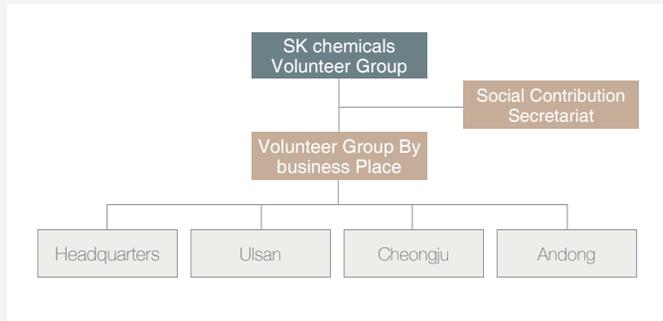
**A** That is when children are highly satisfied. When I see children having emotional stability or laying trust on their mentors and speaking their mind, I feel the most rewarded.

**Q As an organization in collation with SK chemicals, how sincere SK chemicals is when it comes to social contribution? And what area should be supplemented for a greater synergy?**

**A** SK chemicals is taking seriously the practice of sustainable social contributing activities. I am very impressed to see many of SK chemicals' employees serving as mentors for six to seven years and I know that it is impossible to do so without sincerity. Besides, for several years, the same person has been in charge of the business, which enables profound understanding and an increase in stability. This is a definite strength to produce a greater synergy. We hope SK chemicals to reach out to more children by complementing the efficiency of business operation including budget and infrastructure given the fact that this business supports until a child becomes an adult.

## Employees' Volunteer Works and Donation

### Volunteer Promotion System



### SK chemicals Volunteer Group

To fulfill our responsibilities as a corporate citizen, SK chemicals formed 'SK chemicals Volunteer Group' in 2004 with all of our employees participating in it. In 2019 alone, a total of 621 employees did a total of 2,195 hours of volunteer work. The volunteer group of SK chemicals consists of volunteer groups by business establishment such as headquarters, Life Science Biz., Ulsan, Cheongju and Andong business sites. The CEO leads the group, with the secretariat being in charge of proposing direction and developing programs for volunteer service and cooperating with external organizations. Based on this, we categorize our activities into diverse types; family, in-house, education, pro bono and effort so that our employees have options to select what they want to take part in.

### Social Contribution Investment and Support

		Unit	2017	2018	2019
Participation in Volunteer Activities	Number of volunteers	Person	1,629	932	621
	Hours of volunteer per person	Hours	7.2	3.7	3.5

### Happiness Sharing Season

SK chemicals has actively taken part in 'Happiness Sharing Season' operated by SK Group since 2005. In 2019, SK chemicals and SK gas held a 'Happiness Sharing Bazaar,' and profits coming from this bazaar were used for meal expenses for hungry children during the winter season. We also host a Kimchi-Making event with a SK affiliated company located in Seongnam City and shared 5,000 heads of kimchi with senior citizens living alone in Seongnam and 1,000 households of children involved in Hope Maker.

### A.Cure

Our business site is individually conducting A.Cure campaign, a river purification activity aiming to protect the eco-system. A.Cure is a compound word of 'aqua' and 'cure.' This campaign is to form a pleasant eco-system as well as protect water resources.



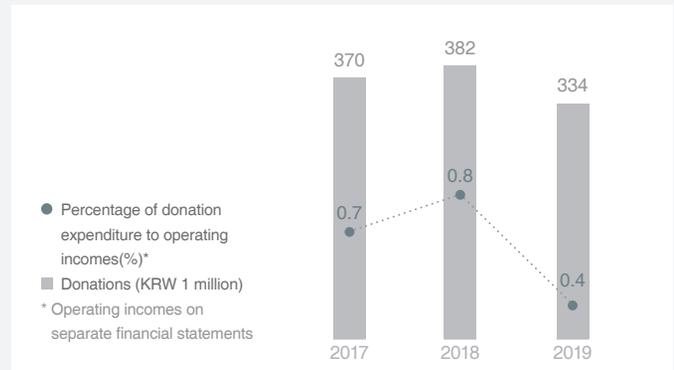
SK Happiness Kimchi-Sharing

A.Cure

### SK chemicals' Donation Performance

SK chemicals makes donations every year to share our economic achievements with more members of society. In 2019, we donated KRW 334 million (0.4% of the operating income). This is a net amount of donations excluding fund for labor welfare, monetary value of voluntary work and incidental expenses for the operation of CSR programs.

### Gross Donation Performance



### SK Pro Bono Talent Donation Activities

SK Pro Bono\* is a talent donating activity in which the entire SK Group participates. The activity is to share the expertise and technologies of the members of SK Group with social enterprises. We support the growth of social enterprises by giving our professional knowledge and talents back to society.

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

# Executives and Employees and Occupational Safety and Health

## Executives and Employees and Corporate Culture

SK chemicals strives to cultivate warm-hearted talents with expertise. To this end, we set our ideal talent as 'warm-hearted professionals' and operate a variety of educational and rewarding systems while creating a healthy corporate culture.

### Warm-hearted Professionalism

Warm-hearted	Self-esteem	We clearly understand the meaning and value of our work with the belief that we will improve the health of humans and protect the environment of our planet
	Community Spirit	We pursue value across the organization with emotional bonds between members and organizations
	Mutual Consideration	Based on our deep trust in each other and continuous interest in others, we actively recognize and support others to promote mutual development
Professionalism	Knowing my Job	We are constantly striving to acquire and understand our customer's expertise in technology and the market, and we are well aware of our business objectives and how we can achieve them
	Set Challenging Goals	We set great goals and strive to achieve better than the expected level
	Thorough and Enjoyable Practice	We are always carefully prepared with a sense of ownership, and we enjoy the process with a passion for work
	Transfer of Knowledge	We organize the experience and knowledge acquired from work and transfer them to the group to increase the capability of own and others

### Securing the Talented

SK chemicals has secured brilliant talents through the job-based recruitment method to respond to the rapidly changing Biz environment. In order to hire people with excellent expertise in job, we promote internship and industrial and academic scholarship student programs to verify the fitness for position while constantly networking with overseas talents through global recruiting. Following recruitment, we put in place a reasonable and fair evaluation and compensation system to provide an

environment where our talents are fully recognized for their performance and capabilities while offering training programs supporting their growth into 'warm-hearted professionals.'

### Training the Talented

**Training New Employees** | SK chemicals help our new employees adapt to the company through a systematic training program not only on our mission and vision but also on business and products. As part of efforts for their adaptation to the company and their jobs, field trips to business sites and social contributing activities are also given to our newcomers, which also serves as opportunities to expand networking with co-workers and seniors.

**Supporting System for Earning Degrees and Certificates** | For raising professional expertise and competency of employees, we operate a supporting system for earning degrees and certificates. Educational expenses for acquiring degrees or certificates related to the job at work are offered through selection procedures in order to encourage our employees to grow as recognized experts in the market.

**Training the R&D Talent** | AS part of efforts to reinforce R&D competencies, we have operated a short-term overseas training program through Open Innovation. Since we dispatched the first group of people at the end of 2018, we sent the second group at the end of 2019. SK chemicals continues to put our efforts and make a prolonged investment to strengthen our R&D capabilities

**Improving Leadership Capabilities** | SK chemicals endeavors to enhance leadership required for each level and duty. We provide our executives and team leaders with capability-enhancing training programs for evaluators so that they are equipped with desired capabilities as performance managers. In 2019, we trained our new team leaders and project leaders on required knowledge and systems through a training course for new leaders while assisting next-generation leaders in their leadership through a G2 (manager and deputy head of department) promotion course.

**Training Excellent Human Resources** | All employees of SK chemicals can receive diverse opportunities to develop their knowledge and skills required to perform their duty at work. In particular, outstanding employees selected through a fair process and in-depth discussion are given opportunities to sharpen their skills in schools or professional education institutions at home and abroad, and we provide necessary financial supports in their education so that they can solely focus on their academic training.

**Job Competency-Based Education** | SK chemicals has provided a variety of job competence training. In 2019, we gave education for the

purpose of internalization of competencies for strategy establishment in line with the Group’s directivity. The education with a focus on data analysis and problem deduction process attracted much attention from members of G1 (staff members to assistant managers) in marketing and supporting departments. In 2020, we will continue to strive to raise our employees’ job competencies by introducing the SK Group’s integrated learning platform called mySUNI.

**Fair Evaluation and Compensation**

SK chemicals has put in place Performance Evaluation & Coaching System (PECS), an IT-based performance evaluation system, since 2001. Evaluation is conducted on a quarterly basis so as to boost target achievement and strengthen capabilities and we evaluate our employees under the three directions; absolute evaluation, achievement and competency-oriented evaluation and process-oriented evaluation.

In terms of compensation, we provide both financial and non-financial rewards. Our financial reward includes basic pay, bonus and incentives according to the systematic system allowing employees to receive these rewards based on their performance. Non-financial one covers self-esteem, sense of fulfillment and recognition. For new employees, we pay the same wages without discrimination against their gender and age, etc. Later, different but reasonable rewards are given in accordance with the system.

**Innovating the ways of working**

**Enhancing Business Efficiency** | SK chemicals has established an IT system infrastructure for more efficient operations and management. We manage the working hours of our employees through the PC alarm system, which enables us to produce positive changes such as improved meeting cultures or fewer unnecessary works. Besides, we reduced and closed local sales offices and instead, operate business centers in order to minimize unnecessary work commutes, which leads to an increase in business efficiency.

**Simplified Positioning System for Horizontal Organizational Culture**

| SK chemicals has been preparing diverse systems to make sure that we are a horizontal corporate culture. Since 2018, we have simplified the positioning system and the title of ‘manager’ has been applied to the titles of all job grades. Besides, we shift from a uniform promotion and compensation system to an individual capacity-based evaluation and compensation one.

**Balance between Work and Life**

**Expansion of Flexible Work System** | To ensure a balance between work and life, taking into consideration the nature of each organization

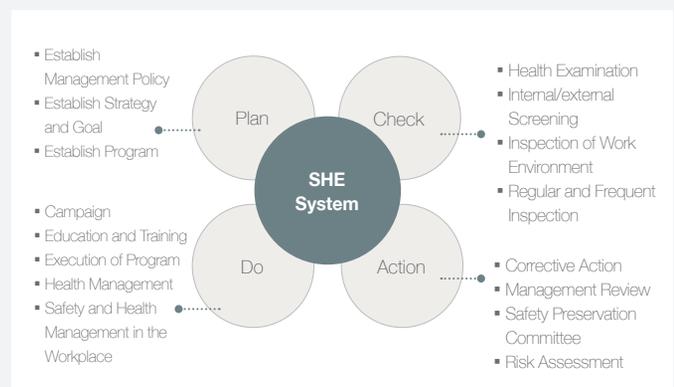
and job, we put in place staggered work hours so that our employees can freely adjust their start and end working hours. We set a certain number of days for communal annual leave to allow our employees to spend their time with families or on self-improvement and to recharge themselves. In addition to these, we adopt and conduct a variety of policies and systems such as monthly-based optional work system and PC alarm as part of efforts toward flexible and efficient working hours. Besides, we regard the time spent outside the business sites as working hours for sales force that gives them more flexibility to adjust their working hours.

**Family-Friendly Support** | To ensure that we are a culture where our employees strike a balance between work and family, we are making various institutional efforts, such as one-year reduced working hours for pregnant employees or employees with childcare, maternity leave for one year after childbirth and 10-days paternity leave. On top of that, we are operating a daycare center to prevent our employees from career break. We also provide financial assistance including funds for housing, tuition and celebration of children’s admission to school in order to reduce burdens incurred by childcare as well as to economic stabilization of our employees’ families. Four nights at condominiums are also given to our employees a year so that they can enjoy their leisure time with their families.

**Industrial Safety and Health**

**SHE (Safety-Health-Environment) System**

**SHE Business System** | SK chemicals has established and operated a structured SHE (Safety, Health, Environment) business system with strategic tasks and objectives based on ISO14001, OHSAS18001, KOSHA 18001, and many more. We also publicly declared our firm determination on safety, health, and environment in and outside company, establishing SHE corporate regulations to push forward consistent management. Through this, we defined the elements to be followed company-wide and prepared a management system tailored to each site through SHE procedure (a corporate regulation for sites).



**Safety Health Environment Governance** | based on the business management system, SK Group, SK chemicals, and SHE organization at site has operated and improved their management systems at their own level. SK Group's SHE organization supports all affiliates in raising their SHE level, and the company-wide SHE department plays as a coordinator with the business sites in terms of SHE targets at the group level and current SHE issues affecting the entire company. The SHE department at each workplace is at the core of SHE management system, carrying out the most direct and critical activities to prevent SHE accidents at the site. In addition, we annually conduct internal and third-party external audits in order to verify the validity and appropriateness of the SHE management.

### Safety Inspection and Management

The safety and environment inspection system in Ulsan Plant is specified in three areas; regular, focused, and specific inspections. There were a total of 14 regular, focused, and specific inspections during 2019, and once, we conducted a joint inspection with other affiliates of SK Group to detect and improve safety risks from various perspectives. We also carried out field-specific safety management after shutting down the entire plant for regular maintenance, special safety training for all employees, and patrolled intensively the construction sites, thereby completing the regular maintenance achieving 'no accident.'

On top of that, with an aim to confirm the safety of sites as well as to comply with regulations related to hazardous chemicals, we conducted an 'off-site risk assessment' on 11 operations including two investment corporate bodies, INITZ and ENTIS, and have set the 'Hazard Management Plan' in accordance with the evaluation results.

#### Safety Environment Diagnosis of Plant

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

### Establishment of Safety Culture

**Improving Safety Culture on Workplaces** | SK chemicals discusses ways to improve safety environment and shares best practices of other business sites through meetings and talks with managers in charge of safety and environment at Ulsan Plant and workshops for managers and operators. Particularly a workshop for operators in charge of safety and process at the worksite plays a significant role in securing safety of

operation through discussion on other outstanding cases and elements to be improved. Through these efforts, we have improved a number of cases; safety boots improvement, prevention of suffocation during operation, installation of slip-resistance on staircase, improvement of surveillance camera for operation, and advancement in identifying and managing wastewater. In addition, we are providing corporate-wide training for newcomers so that they can grasp better understanding of our SHE management system. We also include office workers in SHE training as they might have lack of SHE awareness unlike workers in production or research departments where SHE activities directly affect their work, and inform them on how to cope with pandemic diseases and natural disasters.

#### Introduction of Safety and Health Programs

<b>Safety Inspection</b>	Daily inspections on construction sites and dangerous production processes for the prevention of safety accidents.
<b>Safety Audit</b>	Internal audits on ISO and PSM
<b>SHE Performance Evaluation</b>	Clarifying company-wide KPI guidelines to evaluate SHE performance at plants and carrying out process assessment based on objectified data
<b>Industrial Safety and Health Committee</b>	Holding a meeting of the industrial safety and health committee every quarter to share the current status of safety with management and employees, improve safety and health-related issues, and collect opinions
<b>Safety Green Card System</b>	Dividing the level of safety management into a green, red and yellow card at the Ulsan Plant and applying the results to regular maintenance and construction site-related companies
<b>Safety 7 Rules</b>	Applying seven key safety rules to root out safety accidents for employees before entering the Ulsan Plant
<b>Safety and Health Programs for Coexistence and Cooperation</b>	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

### Enhancement of Professional Competency in Safety and Environment

| For the betterment of safety and environment management at our Ulsan Plant, we encourage workers in the field to participate in safety environment competency training conducted by safety environment specialized organizations including the Korea Occupational Safety and Health Agency, the Korea Chemicals Management Association, and the Korean Standards Association. In 2019, a total of 48 on-site workers took courses of Process Safety Management (PSM), chemical substance management, electrical facility safety inspection, facility maintenance and change management.

### Safety and Prevention of Environmental Accidents

Andong factory actively implements a domestic PSM system to prevent

serious industrial accidents, while putting in place a safety work permit system to prohibit risk factors during work in advance. We have prevented safety-related accidents by improving the work environment and conducting regular safety checks through the work risk assessment system and the identification of near misses. Ulsan Plant achieved an accident-free workplace by establishing a safety culture and a safety environment system as a key direction to prevent accidents through discovering risk factors, resolving risks in regard of regulations on safety and environment with compliance management, and improving education and training. We have made strenuous efforts to better the safety management level in 9 teams and 20 operations through providing training and conducting focused inspections and audits. As a result of these endeavors, we obtained 'S' grade in 2019 from the Ministry of Employment and Labor and the Korea Occupational Safety and Health Agency's PSM (Process Safety Management) out of four grades in PSM; P, S, M+, M-. Also, with a risk management plan in regard to chemicals, Ulsan Plant designs and implements external impact assessment and emergency response programs, then notifies related information to nearby residents. SK chemicals is striving to minimize damages in the event of chemical accidents by establishing related measures such as having plans for our own control and notification to residents in the vicinity of the plant.

### Employees' Health Management

SK chemicals offers regular medical checkups for all our employees. In particular, Ulsan Plant supports employees' health management by helping people discover issues with their health through medical checkups, individual interviews and regular follow-up management. We have also operated an anti-smoking support program and an obesity eradication program for preventing adult diseases, and introduced a walking 10,000 steps a day exercise program in 2019. These health-related support programs bring vitality to our employees' work life and work concentration beyond employees' health management.

#### Participation of Health Promotion Program

Program Name	Unit	2017	2018	2019	합계
Anti-smoking support program		3	5	1	9
Obesity eradication program	person	6	14	15	35
Walking 10,000 steps a day program		-	-	32	32
<b>Total</b>	person	9	19	48	76

### Response to Emergencies

SK chemicals has been prepared to cope with emergency situations based on emergency contact points and behavior guidelines by each business

site. In addition, various institutions have been established to minimize damage and loss in case of an emergency, and we are strengthening our ability to handle emergencies through regular simulation training. When the workplace is empty for a long term due to consecutive or corporate holidays, all employees monitor response system through emergency contacts, preparing for emergencies. At Ulsan Plant, we conduct emergency response drill by designating a department every month, raising the effectiveness by allowing employees in other departments to attend the training. Emergency response drill is regularly held eight times a year except for months of extremely cold (January, February, December) or hot weather (August). Along with it, we invested KRW 320 million in the introduction of a new latest chemical fire truck in replace of the existing old one, while reorganizing emergency scenarios and conducting drills with our own revamped fire-fighting team, thereby advancing the emergency response system.

## Customer-centered Management

### Customer Satisfaction

#### Green Chemicals Biz.

Green Chemicals Biz. of SK chemicals acquired GMP (Good Manufacturing Practice) certification on all products related to copolyester business with an aim to assure credibility and stability of our products to customers. In addition, we have developed ECOTRIA, the product containing PCR\*, to meet the needs of customers for recycled products. For raising the efficiency of customer complaint and grievance management, we developed a CRM (Customer Relationship Management) system. It has been widely operated across all Green Chemicals Biz. since July 2018, following the pilot operation in copolyester resin business in December 2017. In this way, we are continuously improving ourselves to make our system optimal. The CRM system records and manages all customer information, customer support issues, complains received and managed in a database. Details of the customer information, consultation, and complaint resolution are stored in the database through a structured reporting process. All data stored in the database is shared in real time with employees with an authority to modify. This lets each staff in charge of customer companies be able to systematically manage and respond to customers by making certain customer management activities in a form of dashboard\*\*. Our goal is to integrate the management through the combination of the operation of CRM system and ERP system so that various technology support items to customers, sample production history, and other issues related to customers are consolidated. We

strive to provide optimal new products and services tailored to customers based on information in the system. Through this customer management system, Green Chemicals Biz. effectively listens to and swiftly resolves customers' grievances regarding process defects and difficulties in the use of products. On top of that, information collected in the database are statistically analyzed to make it statistics for each period, and reported to CEO and each persons responsible for marketing, production, R&D, and quality management in order to actively integrate those into improvement in quality of products.

\* PCR : Post Consumer Recycled

\*\* Dashboard: User Interface (UI) function to centrally manage various information on the web, on a single screen.

### Life Science Biz.

SK chemicals' Life Science Biz. operates 'Voice of the Customer (VOC)' mainly led by the customer service center. The VOC is the process customers encompass accepting difficulties of the use of products, complaints of medicine defects and the resolution in accordance with SK chemicals' grievance handling regulations. With reasonable response and resolution to customers' voices, we do our best to gain confidence from our customers. All history of receipts and processing is recorded and managed in our complaint database, and details and statistics of customer consultation and responses are monthly reported to CEO as well as people in charge of marketing, production, R&D, and quality management according to the reporting system so as to reflect them in quality improvement of materials, packaging, and other factors.

	Unit	2017	2018	2019
The annual number of grievances accepted and processed in the DB	Case	45	39	45*

\*Two quality improvement cases in 2019 are included.

## Communication with Customers

### Green Chemicals Biz.

Our Green Chemicals Biz. communicates with customers by providing technology support. It is mainly proceeded by an internal system called Technical Service, which resolves quality problems of customer companies having technological difficulties by visiting them as a team comprised of sales members and R&D members. In addition, we utilize our Project Lab to help technical issues in small-sized companies, particularly social ventures and social enterprises.

### Life Science Biz.

Our Life Science Biz organizes regular events to efficiently provide accurate medicine information and meet the unmet market demand. As part of it,

we hold symposiums for a large number of customers and offer the latest trend and various key information on the medical industry.



Symposiums for Customers

## Protection of Customer Information

### Enhancing Information Security

For the prevention of corporation information leakage and the protection of customer information, SK chemicals makes our utmost effort to safely protect and manage precious information on customers and corporations through encryption of old DB, DB access control, and replacement of server access control system. Besides, we are establishing a systematic response system to effectively protect corporate information assets by enacting and revising information protection policies every year. In order to raise the security awareness of our employees and staff of partner companies, we regularly provide personal information protection and security training and have established online consent and training system to increase access so as to encourage more employees to participate. When a new solution is introduced, we toughen a safety review process for the safety of work solution and ultimately create a sustainable and safe work system through regular diagnosis management for vulnerabilities.

#### Interview Jin-wook Kim, team leader of Huvis

**Q** What areas do you want to improve in terms of cooperation with SK chemicals?

**A** I have no complaint in regard to SK chemicals' customer service since we are fully cooperating already. Yet, as legal regulations and social awareness of fine dust emissions from power plants rise worldwide, it is required to improve the performance of bag filters. It would be nicer if we improve functions of PPS resin.

**Q** What should be prioritized to create a greater synergy with SK chemicals?

**A** Above all, I hope SK chemicals to grow as a global chemical company with world-level competitiveness that can compete with other global large companies. The improvement in product competitiveness will soon lead to the better competitiveness of partner companies.

# Governance

## Corporate Governance

### Composition and Independence of BOD

As of March 2020, the Board of Directors of SK chemicals is comprised of two internal directors and four independent directors. In order to strengthen the BOD's function of check and balance against management, we make sure that independent directors account for more than 50%.

In accordance with the Commercial Law, directors are not allowed to hold more than one position of any other company, and also not to work for companies in conflict of interest.

Position	Name	Committee	Field of Expertise
CEO (Chairman of the Board of Directors)	Cheol Kim	- Management Committee	Management
		- Independent Director Nomination Committee	
CEO	Gwang-hyeon Jeon	- Management Committee	Management
Independent Director	Yang-ho Ahn		Administration, Finance
	Jung-soo Park	- Audit Committee	Economics
	Sung-hwan Moon	- Independent Director Nomination Committee	Management
	Hong-hee Cho		Finance

In 2019, SK chemicals held a total of 12 board meetings, and each agenda was reviewed and resolved in consideration of domestic and overseas market conditions. The Board of Directors is held to actively collect opinions of shareholders and stakeholders and reflect them to the management. Key agendas encompassing social, environmental, and economic areas are deliberated and voted. We notify date and location of the board meeting, agendas, and report issues to board directors through a BOD office at least five days before the meeting.

### Expertise and Diversity

When selecting a director, we recommend candidates for the position based on their career experience and expertise. We disclose qualifications, grounds for appointment, and requirements for independence of all directors. In addition, external directors consisted of experts in various fields, such as industry and economy, so that they can give opinions on their own area to support rational decision-making. SK chemicals has established and operated three sub-committees under the Board of Directors to raise the expertise of the BOD.

**Independent Director Nomination Committee** | It discusses the composition and operation of the committee for candidate recommendation.

**Audit Committee** | It makes suggestions from corporate audit plan formulation, execution, evaluation of results, follow-up measures to improvement plans while conducting audits on legislation, articles of association and matters delegated by the BOD. Comprised only of independent directors, it underlines transparency of operation and independence of the BOD.

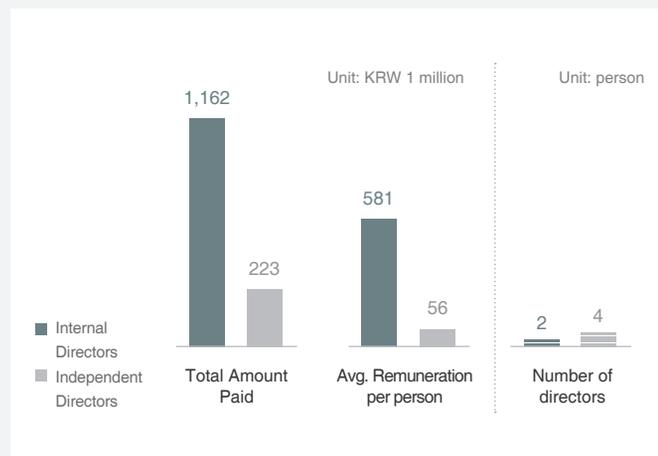
**Management Committee** | Comprised of two internal directors, it establishes measures for improvement in management performances leading to corporate development, as well as deliberation and resolution for management-related agenda.

## Transparency of Governance

### Evaluation and Remuneration

The reappointment of a director is decided at the time of termination of term after assessing his or her previous activities, while the presence rate is open to public to raise transparency. The remuneration of directors is subject to the approval of the general shareholders' meeting, and paid within the bounds of total directors' remuneration. The value of performance of duties decides remuneration of internal directors while independent directors' remuneration is set in accordance with the directors' payment procedure and evenly paid to them. Performance incentive is calculated by comprehensively assessing both metrics including sales, operating profit, and pre-tax profits, and non-metrics including leadership, expertise, and other contributions.

### 2019 Remuneration of Board Members



In 2019, a total remuneration approved for directors stood at KRW 5 billion, and overall KRW 1.4 billion was paid to two registered directors and four auditors, including one registered director, who was appointed in a shareholders' meeting in March and one auditor who was a resigned independent director. An average remuneration was KRW 230 million per person. If an individual remuneration for a director or an auditor exceeds KRW 500 million, it is reported to a quarterly report and a business report in accordance with related regulations.

### Transparent Disclosures

SK Chemicals holds general shareholders' meetings every year to share the current management status so that we can collect shareholders' opinions on the direction and management of the company and ultimately safeguard the interests of shareholders. Major management issues decided by the Board of Directors are immediately disclosed, and regarding information is provided to stakeholders including shareholders. In particular, key matters closely related to investor interests are open to public through the SK chemicals' website, the Financial Supervisory Service's electronic disclosure system, and the Korea Exchange.

Shareholder	No. of shares owned	Share ownership*	
Shareholders with 5% stake or over	SK discovery CO., LTD.	3,930,310	29.77%
	National Pension Service	851,540	6.45%
Minority shareholders	3,846,315	29.14%	

\* The ownership ratio is based on the total number of shares

### Favorable Environment for Shareholders

In line with the overall trend towards strong shareholder returns, we have consistently expanded dividends since the split in 2017, in consideration of various management environments including financial status and investment plans. Our dividend yield ratio is on the gradual rise in the strength of performance improvement. We aim to raise it to the level of average market yield ratio step by step over the long term in line with future earnings improvement.

Classification	Unit	2017*	2018	2019
Dividends per share (KRW/share)	Common stock	0	400	450
	Preferred stock	0	450	500
No. of stock dividends (thousand/share)	Common stock	11,579	11,568	11,730
	Preferred stock	1,458	1,458	1,457
Ratio of dividend to stock price(%)	Common stock	-	0.56	0.73
	Preferred stock	-	1.80	1.76

\*Dividend not paid in 2017 due to a split in December 2017

## Compliance

### Compliance Management

#### Compliance Management System

Corporate social responsibilities and more stringent legal regulations require us to expand the scope of our compliance management and responsibilities. Accordingly, SK chemicals operates a legal compliance support system in connection with the Fair Trade Compliance Program to ensure fair and transparent business operations and secure customer trust. By appointing the Head of Office of Legal Affairs as the manager of the Fair Trade Compliance Program, we conduct the program and follow-up inspections while encouraging employees to voluntarily comply with the laws and regulations. Besides, we have established and enforced the compliance control standard, the highest regulation in compliance activities by the resolution of the Board of Directors, and the compliance of related education and standards is monitored once a year, and reported to the Board of Directors.

#### Process for Compliance Support Activities

Prevention	Monitoring	Post management
<ul style="list-style-type: none"> <li>Providing regular consultation</li> <li>Supporting major projects</li> <li>Education for legal compliance</li> </ul>	<ul style="list-style-type: none"> <li>Checking whether employees comply with the standards for legal compliance/observing overall legislation</li> <li>Examining major points regarding compliance with legal risks</li> </ul>	<ul style="list-style-type: none"> <li>Analyzing results of activities for compliance control</li> <li>Implementing educational programs for compliance</li> </ul>

#### Response to Changes in Materials Management Laws

Chemicals are useful resources replacing natural resources, yet, if wrongly handled, there is a risk of accidents and can be harmful to people or the environment. In 2015, the Act on Registration, Evaluation, etc. of Chemicals, and the Chemical Control Act was enforced, and have been continuously revised for enhancing the management of chemicals. In 2017, the electric sales standards for reagent and chemicals for test and research were reinforced, and since 2019, all existing chemicals manufactured and imported over 1 ton became subject to registration. SK chemicals makes main departments responsible for each process of handling chemicals from procurement, research, production to sales in order to monitor safety of chemicals. In addition, we have established and regularly monitored a database of chemicals' information classified by each material. In 2019, we completed pre-report to government and are registering materials step by step so as to register all existing chemical substances handled.

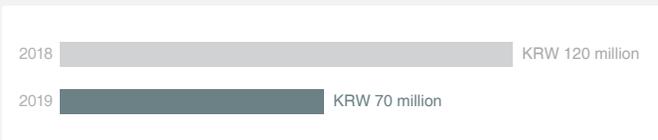
### Impact Assessment and Measures on Chemicals

The Chemical Control Act stipulates that all chemicals are required to be checked if they are hazardous. In the case of hazardous chemicals, external impact assessment, hazard management plan, and emergency response program should be designed and implemented, and information in regard to the substance should be notified to residents. We took all measures concerning five processes, based on which, SK chemicals established our own control plan and notify it to residents residing in the vicinity of our business sites, thereby minimizing possible damage in the event of a chemical accident.

### Response to Resources Circulation Act

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 the year of 2019, SK chemicals' Ulsan Plant's waste disposal charge dropped to KRW 70 million from the previous year. SK chemicals will continue its efforts to reduce waste generation and increase recycling rates throughout the process from production to distribution, consumption and disposal.

#### Waste Disposal Charge at Ulsan Plant



### Fair Trade

#### 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.

### Ethical 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.

#### Code of Ethics Structure

- SKMS** SK Management System
  - SK's highest value system, being a foundation of Code of Ethics
  - The SKMS basic philosophy consists of corporate vision, value, and management principle.
  
- Code of Ethics | Guidelines for Code of Ethics**
  - Concrete elaboration of practices for SKMS, stipulating the responsibilities of members for stakeholders
  - Detailed code of conduct for the compliance of the Code of Ethics, presenting the standard of ethical decision-making and behaviors
  
- FAQ**
  - Written in a form of questions and answers to make it easier for employees to understand and judge possible situations in the course of business

**SK chemicals Code of Ethics**

- ▶ 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.

**Corruption Reporting**

**Reports regarding Ethical Management** | In order to raise the transparency of our business and establish an ethical corporate culture, SK chemicals is receiving reports in relation to ethical management through various channels including the webpage (<https://ethics.sk.co.kr>), e-mail, phone call, and mail. There were a total of five online reports in relation to ethics and compliance in 2019, and 3 violation cases were found. The online reports were properly handled with proper answers and guidance. If a report is related to sexual harassment in the workplace, power abuse in and outside the organization, and violation of compliance, we regard them as a cause for serious disciplinary action, and the disciplinary committee can decide punishment heavier than suspension from work.

Report Channels	
SK ethical management website	<a href="https://ethics.sk.co.kr">https://ethics.sk.co.kr</a>
SK chemicals website	<a href="http://www.skchemicals.com">www.skchemicals.com</a>
SK chemicals intranet	<a href="http://www.mykm.co.kr">www.mykm.co.kr</a>
Group toktok	<a href="http://toktok.sk.com">toktok.sk.com</a>
E-mail	<a href="mailto:skchemicals.ethics@sk.com">skchemicals.ethics@sk.com</a>
TEL	+82-2-2008-2486
Mail	To the person responsible for ethical management in SK chemicals Compliance Team, 310, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea

**Procedures for Reports Handling** | SK chemicals thoroughly protects the identity of an informant and strives to protect the person from any

disadvantage or discrimination. If any disadvantage was derived from his or her reports, the informant can request for corrective and protective actions from compliance team, and the person who gave disadvantages will face serious disciplinary action above suspension. The reported case regarding ethical management is processed in a fair and transparent manner as below.

**Report Handling Procedure**



- 1 Website/phone/e-mail/mail/face-to-face talk
- 2 Deciding on investigators based on the rank of the subject and gravity of the case
- 3 Engaging related teams if necessary
- 4 Reviewing investigation results, reporting/approving opinions for measures, investigating more if the result is not sufficient
- 5 Giving feedback of results (if requested), asking disciplinary actions if grounds are sufficient

※ disciplinary procedure : Request for disciplinary action → Deliberation and decision-making in HR committee → Approval from CEO → Execution

**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, SK chemicals conducts 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 zero violations.



Declaration of ethical management

# Customer Safety and Responsibility for Product

## Green Chemicals Biz.

### Chemicals Management System

Ulsan Plant seamlessly manages hazardous chemicals through a chemical management process. The chemicals management process has six stages; pre-report to the government office, receipt of chemicals including hazardous substances, storage, use, disposal, and post-report to the government office. Activities of each stage are recorded. The report to the government office is done following a set of form, and all activities from receipt to disposal are being input in SHEQ system, while management history is recorded by each stage. On top of that, we have been operating Material Safety Data Sheet (MSDS), a producing and managing system since 2017 to provide safety information on products for customers.

### Registration

When importing or manufacturing chemicals, we need to submit hazards and harmfulness test data conducted in GLP, a designated laboratory by the government, annual amount expected to import or produce, and purpose of use materials to the government and register the substance so that it can be reviewed whether it contains harmful chemicals.

### Receipt of Hazardous Chemicals

When receiving toxic chemicals, we conduct inspections on handling facilities and external impact assessments, while executing hazard management plans, followed by submitting those materials to the authorities. We also keep the records on SHEQ system to manage history.

### Storage

Storage facility for harmful chemicals is built with appropriate materials for certain substances. In addition, it is located in the place where there is no obstacle to fire prevention, and its floor is corrosion-proof with the sufficient strength for pressure and weight. We also designate a manager to thoroughly manage harmful chemicals.

### Usage

We placed Material Safety Data Sheet (MSDS) inside the workplace where hazardous chemicals are handled and provide regular training. Individual safety gears such as gloves, clothes, glasses, and face covers for protection are provided and must be worn. It is managed by the designated manager for hazardous chemicals.

### Disposal

Harmful chemical waste is stored separately by attaching a label to a designated container, and regular worker training is carried out. The waste is handled by a contract company with waste disposal business permission by law.

### Post-report to the Government Office

In the event of a chemical accident occurs, we decide the rank of the accident by type and promptly report it without delay in accordance with the command system so that we can swiftly secure resources to cope with the accident. Also, we immediately report it to the government office to minimize damage in the area.

### Quality Management System

SK chemicals newly established QA team in October 2018 to raise the quality assurance capabilities through an integrated management of overall plants' QA and toll processing while making a consistent process and system. We have systematically reorganized and operated quality management process in Ulsan Plant under the control of QA team. Through this, we have not only maintained and managed existing ISO9001 (certified in 1994), a 2015 quality management system certification but also acquired IATF 16949, a 2016 automobile quality management system conformity certification, thereby establishing a quality management system that meets the international standards. Besides, we take advantage of a barcode system and an automatic releasing system to trace and manage our products, which is also used for the management of process and quality to eliminate customers' complaints.



## Life Science Biz.

### Quality Management Considering Product Life Cycle

We have joined the Pharmaceutical Inspection Convention and Pharmaceutical Inspection Co-operation Scheme (PIC/S) since 2015 and bindingly complied the Good Manufacturing Practice or GMP, the standard of manufacturing pharmaceutical products and quality management of them. Accordingly, we set a quality management system to improve quality in consideration of product life cycle based on risk analysis, preparing the foundation for meeting requirements of GMP.

### R&D Stage: Exporting technologies and acquiring marketing approval

With consistent R&D investment, SK chemicals is developing various products related to pharmaceuticals, vaccines, and blood derivatives. Moreover, we double our efforts for the production with global competitiveness by exporting technologies and obtaining marketing approvals.

### Preclinical Trial Stage: Minimizing animal testing

In the animal testing for evaluating the efficacy and toxicity of candidate substances before conducting clinical trials, we abide by related laws and conduct regular training in order to minimize the pain of animals and avoid using animals in testing, conducting ethical animal testing. In this regard, SK bioscience's L HOUSE founded the animal testing ethics committee comprised of three external members and four internal members. Held twice a year, it reviews animal testing plans for the year and approves them before the testing. In addition, we annually report history related to animal testing to the Ministry of Food and Drug Safety and the Ministry of Food and Drug Safety and the Ministry.

### Clinical Trial Stage: Complying with clinical trial regulations and raising value of existing products

Abiding by the domestic and international laws and regulations including Good Clinical Practice (GCP) and Investigational New Drug (IND), we have been safely developing products through responsible clinical trials. Besides, we make cooperation with clinical trial institutions and contract research organizations (CRO) for securing safety as well as raising quality of drugs. With an aim of reflecting opinions of stakeholders in relation to pharmaceuticals and respecting them more actively, while minimizing negative impact on the environment at the same time, we closely manage risk factors by classifying them into stages. We hire the best clinical trial

professionals to maximize the level of clinical trials and constantly monitor safety based on regular training and experience accumulated.

### Production Stage: Pharmaceutical quality management assurance system

We proceed with quality assurance (QA) and quality control (QC) processes by each site, L HOUSE in Andong and S HOUSE in Cheongju to manage quality of products. Quality Management System (QMS) is operated across all business sites and we try to unify the Quality Management Review (QMR). Our efficient operation of system through reviewing key management indicators and introducing computerized system will enhance our reliability required by international guidelines. In particular, S HOUSE in Cheongju, which is in charge of the production of synthetic drugs, completed the expansion and renovation in 2014 and received GMP approval. Also, our oral solid and patch received EU GMP, the European production management standard, proving once again our top-notch quality management capabilities. Furthermore, we have established a set of policies for training, complaints, grievances, modification, CAPA (corrective action & prevention action), return, and recall, after reviewing general regulations.

### Post-management Stage: Management of drug safety information and disposal of insoluble drugs

After launching a new drug, we keep observing its effectiveness and safety in a real treatment environment. To do so, side effects and drug efficacy information are collected from 600 to 3,000 patients, who have been treated with the drug for 4 or 6 years according to the re-evaluation standards of the new drug and the Pharmaceutical Affairs Act. We also gather abnormal cases through monitoring the new drugs on the market. Based on this, we continuously collect and analyze information. As such, we make our strenuous efforts for the safe and effective use of drugs, fulfilling our responsibility for drug safety. In addition, considering the environmental impact of insoluble drugs, we adopt a method of outsourcing disposal to a waste treatment company that has been approved or certified by the government in order to strictly manage insoluble drugs and carefully dispose of them in accordance with rules. From the collection of insoluble drugs to the complete disposal of them, each person in charge of the stage checks and confirms the disposal process in accordance with the government's guidance.

# APPENDIX



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# Financial Performance

## Consolidated Balance Sheet

	Unit	2018	2019
<b>Assets</b>			
Current assets		717,166,309,658	792,022,789,246
Cash and cash equivalents		45,286,768,519	183,975,936,156
Short-term trading financial assets		135,393,316,647	88,673,666,823
Trade receivables and other receivables		195,943,770,754	171,327,000,317
Inventories		328,951,762,092	330,606,087,802
Other current assets		11,590,691,646	17,440,098,148
Non-current assets		1,233,638,701,180	1,339,686,360,783
Long-term trading financial assets		46,786,467	1,040,369,549
Trade receivables and other receivables		0	883,548,359
Long-term investment	KRW	419,199,443	23,376,057,843
Long-term loans		10,984,840,000	10,596,800,527
Investment in the joint venture		6,711,986,415	8,776,408,020
Property, plant and equipment		1,103,321,131,405	1,165,064,920,158
Right-of-use asset		0	58,182,699,644
Intangible assets		38,341,453,801	37,429,393,743
Investment in properties		53,927,098,881	15,104,065,924
Other non-current financial assets		3,508,787,562	1,950,322,430
Deferred tax assets		16,377,417,206	17,281,774,586
Total assets		1,950,805,010,838	2,131,709,150,029
<b>Liabilities</b>			
Current liabilities		594,303,651,410	718,865,361,025
Account payable and other payable		230,195,332,597	231,781,907,093
Short-term borrowings		181,240,018,975	198,755,573,825
Current portion of long-term debt		143,559,822,603	241,571,981,995
Capital lease liabilities	KRW	980,078,199	11,534,922,051
Provisions		17,773,229,016	10,291,411,717
Current income tax liabilities		4,122,950,750	7,825,912,130
Other current liabilities		16,432,219,270	17,103,652,214

	Unit	2018	2019
<b>Liabilities</b>			
Non-current liabilities		630,940,893,842	694,137,496,145
Bonds		409,125,862,838	558,680,066,667
Long-term borrowings		176,582,600,000	72,909,200,000
Capital lease liabilities		3,961,583,104	46,935,964,988
Defined benefit liability	KRW	14,405,928,261	7,945,076,095
Provisions		541,844,890	7,595,408,331
Other non-current liabilities		25,957,604,673	0
Deferred tax liabilities		365,470,076	71,780,064
Total liabilities		1,225,244,545,252	1,413,002,857,170
<b>Equity</b>			
Parent company ownership interest		691,831,365,771	715,628,603,300
Capital		65,192,610,000	66,000,330,000
Capital surplus		668,175,712,895	264,314,596,680
Other reserves		-35,433,410,770	-9,889,506,203
Accumulated other comprehensive income	KRW	-3,115,429,018	-2,594,106,840
Unappropriated retained deficit		-2,988,117,336	397,797,289,663
Non-controlling interests		33,729,099,815	3,077,689,559
Total equity		725,560,465,586	718,706,292,859
Total liabilities and equity		1,950,805,010,838	2,131,709,150,029

## Consolidated Statements of Comprehensive Income

	Unit	2018	2019
Sales		1,367,719,213,257	1,427,185,610,647
Cost of goods sold		1,095,287,319,601	1,101,175,047,703
Gross profits		272,431,893,656	326,010,562,944
SG&A		226,698,244,297	245,672,745,089
Operating incomes		45,733,649,359	80,337,817,855
Other incomes		6,205,785,599	9,719,172,627
Other expenses		21,166,143,660	38,984,462,634
Finance incomes		22,288,997,620	25,984,691,261
Finance costs		49,583,627,402	56,250,132,354
Gains on equity method for investment in the joint venture		1,682,629,712	2,041,587,778
Earnings before taxes		5,161,291,228	22,848,674,533
Tax expenses (incomes)		21,581,039,208	17,827,120,724
Net income (losses)		-16,419,747,980	5,021,553,809
Other comprehensive incomes (losses)		-1,842,269,714	-4,036,863,352
Items that will be reclassified to profit or loss			
Unrealized gains and losses on equity method investment	KRW	33,894,100	17,308,041
Gains (losses) on overseas operations translation		-73,655,977	579,448,852
Losses on valuations of derivatives		-1,242,074,934	-76,943,579
Items that will not be reclassified to profit or loss			
Remeasurement of the defined benefit liability		-560,432,903	-4,556,676,666
Net total comprehensive income (loss)		-18,262,017,694	984,690,457
Attribution of net income (loss)			
Parent company ownership interest		6,028,110,051	10,597,438,664
Non-controlling interest		-22,447,858,031	-5,575,884,855
Attribution of consolidated total comprehensive income (loss)			
Parent company ownership interest		4,358,636,961	6,589,776,677
Non-controlling interest		-22,620,654,655	-5,605,086,220
Earning per ordinary share		457	802
Earning per preferred share		507	852

# ESG Performance

## ESG 100 Universal Standards

		Unit	2017	2018	2019
<b>102-2, 102-7 Scale of the Organization_Manufactured Products</b>					
Green Chemicals Biz.	Biodiesel	ton	149,918	182,078	208,140
	Vaccines	Dose	5,944,810	6,000,806	5,893,408
Life Science Biz.	Tablets	Tablet	582,524,653	578,340,985	631,933,562
	Patches	Patch	45,121,288	37,125,447	50,290,715
<b>102-8, 405-1 Total Number of Employees by Genders, Employment Type</b>					
No. of employees	Male	Person	1,329	1,529	1,588
	Female		366	410	438
No. of employees by employment type	Full-time	Person	1,633	1,898	1,961
	Contract-based		62	41	65
Composition of Executives	Male	Person	30	34	29
	Female		1	1	1
	Ratio of female executives		%	5	5
Composition of Managers	Male	Person	184	188	190
	Female		13	12	15
	Ratio of female managers*		%	6.6	6.4
Male	Headquarters (Eco Lab)	Person	729	797	832
	Ulsan Plant		366	487	496
	Andong Plant (L HOUSE)		132	140	156
	Cheongju Plant (S HOUSE)		102	105	104
	Headquarters (Eco Lab)		250	286	307
	Ulsan Plant		26	24	26
	Andong Plant (L HOUSE)		33	41	43
	Cheongju Plant (S HOUSE)		57	59	62
	Female				
* Ratio of female managers = No. of female executives / No. of total executives × 100					
<b>102-8, 405-1 Total Number of Employees by Plants</b>					
Full-time employees	Headquarters (Eco Lab)	Person	954	1,055	1,103
	Ulsan Plant		387	508	518
	Andong Plant (L HOUSE)		143	177	178
	Cheongju Plant (S HOUSE)		149	158	162
Contract-based employees	Headquarters (Eco Lab)	Person	25	28	36
	Ulsan Plant		5	3	4
	Andong Plant (L HOUSE)		22	4	21
	Cheongju Plant (S HOUSE)		10	6	4

	Boundaries	Unit	2017	2018	2019
<b>102-9 Total Number of Business Partners Managed</b>					
No. of business partners that are registered and managed	Company-wide	Business partner	1,013	954	962
Total procurements from business partners		KRW 100 million	7,814	7,825	7,273

**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	

	Unit	2017	2018	2019
<b>102-17, 103-2 No. of Cases Reported, Found and Addressed by Official Ethics Management Reporting Channel</b>				
No. of cases reported for the reporting period	Case	6	6	5
No. of cases addressed for the reporting period		6	6	5
Ratio of grievances addressed	%	100	100	100

**102-18, 33 Operation of the Board of Directors**

No. of regular meetings	Times	12	10	12
Issues voted down	Case	42	27	19
Issues passed		42	27	19

**102-18, 33 Engagement of the Board of Directors**

Attendance rate for executive directors	%	91	100	100
Attendance rate for independent directors		96	100	97

**ESG 200 Economic Performance**

	Unit	2017	2018	2019	2020 (Target)
<b>201-2 Eco-Friendly Sales (Environmental Management (Green Triple 40!))</b>					
Target of eco-friendly sales	%	31.0	34.0	37.0	40.0
Actual eco-friendly sales		40.0	43.2	45.0	

	Boundaries	Unit	2017	2018	2019
<b>201-3 Coverage of the Organization's Defined Benefit Plan Obligations</b>					
Size of retirement pension plan (Defined benefit, DB)	Company-wide	KRW 100 million	892	978	1,162
No. of employees covered by the retirement pension plan (Defined benefit, DB)		Person	1,548	1,256	1,637
<b>201-4 Financial Assistance Received from the Government</b>					
Government subsidiary	Company-wide	Case	0	0	0
Tax exemption		KRW 100 million	78	42	56

	Unit	2017	2018	2019
<b>203-2 Mutual Growth Cooperation with Suppliers</b>				
Amount of Shared Growth Fund for suppliers	KRW 100 million	75	75	75
Total amount of loans for suppliers		46	25.4	20.1
No. of suppliers with loans	Number	10	7	8
Number of partners with temporary or permanent shutdown transactions		0	3	0
<b>206-1 Anti-Competitive Behavior, Antitrust, and Monopoly Practices, and Non-Compliance with Laws and Regulations</b>				
No. of cases of anti-competitive behavior, antitrust, and monopoly practices, and noncompliance with laws and regulations		0	0	0
No. of non-monetary sanctions of anticompetitive behavior, antitrust, and monopoly practices, and non-compliance with laws and regulations	Case	0	0	0
No. of lawsuits of anti-competitive behavior, antitrust, and monopoly practices, and noncompliance with laws and regulations (lost lawsuits determined)		0	0	0

## ESG 300 Environmental Performance

	Unit	2017	2018	2019
<b>301-1, 2, 3 Materials Used by Weight or Volume</b>				
Ulsan Plant		494,415	659,645	439,381
Andong Plant (L HOUSE)	ton	265	305	340
Cheongju Plant (S HOUSE)		1,986	2,439	1,120

	Boundaries	Unit	2017	2018	2019
<b>302-1 Power Generation Using Renewable Energy</b>					
Solar heat	Head-quarters	MWh	8.3	8.4	7.8
Geothermal heat	(Eco Lab)	Gcal	35.6	36.2	69.6
<b>302-1 Energy Consumption within Company</b>					
Coals		ton	146,396	151,362	138,785
Waste wood		ton	60,386	64,558	67,947
Gasoline		kl	10	10	40
Diesel		kl	60	44	102
Biodiesel and synthesis gas		ton	3,060	2,815	2,952
LNG		1000m <sup>3</sup>	10,253	11,819	16,570
LPG	Company-wide	ton	88	32	4,709
Biogas		ton	12,282	10,686	9,565
Electricity		MWh	8,471	160,920	253,937
Steam		TJ	19	71	105
Propane		ton	7,617	13,111	7,548
Process waste heat		TJ	41	50	86
Limestone		ton	2,660	3,431	3,742
SF <sub>6</sub>		kg	900	900	0
<b>302-2 Energy Consumption Outside Company</b>					
Electricity	Ulsan Plant		1,442	1,123	474
Heat		TJ	4,002	3,132	2,687
		Unit	2017	2018	2019
<b>303-1, 2 Total Water Withdrawal and Consumption</b>					
Headquarters (Eco Lab)			66,990	55,316	69,470
Ulsan Plant		ton	8,017,246	8,645,644	8,903,323
Andong Plant (L HOUSE)			102,923	97,863	104,573
Cheongju Plant (S HOUSE)			26,388	49,957	50,671
<b>303-3 Total Water Withdrawal and Consumption from Underground, Recycled, and Reused</b>					
Headquarters (Eco Lab)		ton	2,576	3,236	3,633
Ulsan Plant			3,368,667	3,647,881	3,147,872

	Boundaries	Unit	2017	2018	2019
<b>305-1, 2 GHG Emissions</b>					
Scope1 emissions	Company-wide	tCO <sub>2</sub> eq	397,749	428,488	403,131
Scope2 emissions			81,389	165,944	119,053
<b>305-4 GHG Emission Intensity</b>					
Scope1 intensity ratio	Company-wide	tCO <sub>2</sub> eq / KRW 100 million	33.3	31.4	28.2
Scope2 intensity ratio			6.8	12.2	8.3
<b>302-4, 5, 305-5 GHG Emissions Target (Environmental Management (Green Triple 40!))</b>					
BAU emissions		tCO <sub>2</sub> eq	695,000	815,000	830,000.0
Target reduction		%	39.9	40.0	40.0
Actual emissions		tCO <sub>2</sub> eq	479,138	594,428	508,742
Actual reduction		%	31.2	27.1	38.7
<b>305-6, 7 Intensity of Air Pollutants Discharged</b>					
Dust	Ulsan Plant	mg/Sm <sup>3</sup>	3	4	4
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		4	3	3
Sulfur oxide (SOx)	Ulsan Plant		28	39	28
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		0	0	0
Nitrogen oxide (NOx)	Ulsan Plant	ppm	37	56	66
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		80	64	48
Volatile organic compound (VOCs)	Ulsan Plant		1	1	0
	Andong Plant (L HOUSE)		-	-	-
	Cheongju Plant (S HOUSE)		18	18	78
<b>306-1, 2 Total Water Discharge</b>					
Headquarters (Eco Lab)			27,029	27,363	32,095
Ulsan Plant		ton	809,642	961,637	992,370
Andong Plant (L HOUSE)			65,193	64,270	72,283
Cheongju Plant (S HOUSE)			19,577	24,281	29,974

		Unit	2017	2018	2019
<b>306-1, 2 Intensity of Water Pollutants Discharge</b>					
BOD	Ulsan Plant		3	1	1
	Andong Plant (L HOUSE)		83	107	81
	Cheongju Plant (S HOUSE)		4	1	3
COD	Ulsan Plant		14	18	16
	Andong Plant (L HOUSE)	ppm	45	64	58
	Cheongju Plant (S HOUSE)		19	13	17
SS	Ulsan Plant		2	2	2
	Andong Plant (L HOUSE)		35	36	65
	Cheongju Plant (S HOUSE)		11	11	10

<b>306-2, 4 Total Waste by Type</b>					
Amount of generated regular waste	Ulsan Plant		27,309	27,986	24,562
	Andong Plant (L HOUSE)		100	134	186
	Cheongju Plant (S HOUSE)	ton	187	153	186
Amount of generated designated waste	Ulsan Plant		6,805	7,408	7,152
	Andong Plant (L HOUSE)		59	79	92
	Cheongju Plant (S HOUSE)		1,849	1,852	2,173

		Unit	2017	2018	2019
<b>306-2, 4 Total Waste by Disposal Method</b>					
Incineration	Ulsan Plant		321	407	388
	Andong Plant (L HOUSE)		126	169	182
	Cheongju Plant (S HOUSE)		1,969	1,952	2,301
Reclamation	Ulsan Plant		7,449	7,139	4,523
	Andong Plant (L HOUSE)		0	0	0
	Cheongju Plant (S HOUSE)	ton	27	0	0
Recycling	Ulsan Plant		26,327	27,396	26,765
	Andong Plant (L HOUSE)		33	44	96
	Cheongju Plant (S HOUSE)		62	65	72
Marine emissions	Ulsan Plant		0	0	0
	Andong Plant (L HOUSE)		0	0	0
	Cheongju Plant (S HOUSE)		0	0	0
Recycling ratio	Ulsan Plant		77	77	84
	Andong Plant (L HOUSE)	%	20	26	35
	Cheongju Plant (S HOUSE)		4	3	3

	Boundaries	Unit	2017	2018	2019
<b>306-4 Transfer of Hazardous Waste</b>					
Amount of Hazardous Chemicals Usage	Ulsan Plant	ton	26,237	164,150	150,419
<b>306-1, 2 Environmental Investment</b>					
		Unit	2017	2018	2019
Headquarters (Eco Lab)			0	0	-
Ulsan Plant		KRW	27.4	147.2	30.4
Andong Plant (L HOUSE)		100 million	0	0	-
Cheongju Plant (S HOUSE)			0.9	0.6	0.3

## ESG 400 Social Performance

		Unit	2017	2018	2019
<b>401-1 Total Number and Rates of New Employees and Employee Turnover</b>					
<b>Number of Retirees and Turnover Rate</b>					
No. of new employees hired	Male		124	124	148
	Female		59	82	70
No. of retirees	Male	Person	128	68	97
	Female		55	59	52
	Total		183	127	149
Turnover rate	-	%	8.6	6.5	7.3
<b>401-3 Maternity Leave</b>					
Male	No. of employees who took maternity leave		0	3	3
	No. of employees who returned after maternity leave		0	2	2
Female	No. of employees who took maternity leave		28	30	29
	No. of employees who returned after maternity leave	Person	23	19	19
Male	Number of employees who have worked for more than 12 months since returning to work		0	0	2
Female	Number of employees who have worked for more than 12 months since returning to work		18	11	20

	Boundaries	Unit	2017	2018	2019
<b>402-1, 403-1, 4 Current Status of Labor Union and Labor-Management Consultative Body</b>					
No. of persons with membership of labor union and labor-management consultative body		Person	447	520	608
Ratio of membership of labor union and labor-management consultative body	Company-wide	%	26	28	31
No. of meetings of labor union and labor-management consultative body		Person	4	4	4
<b>403-2 Type of Injury, Occupational Diseases, Lost Days, and Absenteeism, Total Number of Work-related Fatalities</b>					
No. of accidents		Case	4	4	2
Death toll	Company-wide		0	0	0
No. of lost days		Day	155	325	28

		2017		2018		2019	
Unit		Eligible employees	Employee health screening	Eligible employees	Employee health screening	Eligible employees	Employee health screening
<b>403-3 Current Status of Medical Checkup Support and Implementation</b>							
Comprehensive medical checkup	Headquarters (Eco Lab)	503	492	862	861	560	547
	Ulsan Plant	382	379	241	241	525	522
	Andong Plant (L HOUSE)	94	34	12	12	175	175
	Cheongju Plant (S HOUSE)	49	49	155	155	58	58
General medical checkup	Headquarters (Eco Lab)	607	603	1,009	1,008	767	765
	Ulsan Plant	384	384	431	431	525	524
	Andong Plant (L HOUSE)	57	57	47	47	94	94
	Cheongju Plant (S HOUSE)	152	152	164	164	155	155
Special medical checkup	Headquarters (Eco Lab)	159	159	168	168	194	194
	Ulsan Plant	268	268	346	346	412	412
	Andong Plant (L HOUSE)	98	98	96	96	121	121
	Cheongju Plant (S HOUSE)	133	133	117	117	125	125

	Boundaries	Unit	2017	2018	2019
<b>404-1, 2 Training Hours and Investments for Employees</b>					
Annual average training hours per employee		Hour	271	244	54
Annual average training costs per employee		KRW	1,238,095	1,254,969	1,395,820
Total Training Hours	Company-wide	Hour	569,100	533,930	114,144
Total amount of investments in employee training		KRW 100 million	26	28	29

\* Data from internal training programs for employees of LS Biz. is not counted in 2019 performance.

	Boundaries	Unit	2017	2018	2019
<b>404-3 Ratio of Employees Receiving Regular Performance Review</b>					
No. of employees eligible for regular performance review		Person	1,222	1,270	1,337
No. of employees who received regular performance review	Company-wide	Person	1,105	1,175	1,254
Ratio of employees who received performance review		%	90.4	92.5	93.8
<b>405-1 Composition of Employees_Diversity of Employees</b>					
No. of disabled employee hired			23	20	19
No. of patriots and veterans hired	Company-wide	Person	36	36	33
No. of foreigners hired			4	2	0
<b>405-2 Percentage of salary by gender and position*</b>					
Administrative Position**	Company-wide	%	1.09	1.07	1.17
Non-supervisory Position			1.34	1.32	1.28
*Rate of average regular wage of male employees to that of female employees					
**Administrative position : Above manager position					
		Unit	2017	2018	2019
<b>413-1 Social Contribution Investment and Support</b>					
Amount of investment in social contribution	-	KRW 100 million	15	15	18
Volunteer activity participation	No. of employee volunteers	Person	1,629	932	621
	No. of volunteering hours per employee	Hour	7.2	3.7	3.5
		Unit	2017	2018	2019
<b>413-1 Theme-Based Social Contribution Performance</b>					
No. of employees for environmental training		Person	1,800	360	1,950
Hope Maker Membership		%	93	93	75
<b>418-1 Protection and Loss of Customer Personal Information</b>					
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

	Unit	2017	2018	2019	
<b>R&amp;D Investment (Green Chemicals Biz.)</b>					
Number of R&D employees	Person	149	148	149	
R&D investment	KRW 100 million	294	291	298	
Sales to R&D investment ratio	%	2.7	0	2.3	
Sales of new products	KRW 100 million	0	0	0	
Sales of new products to total sales ratio	%	-	-	-	
Sales	KRW 100 million	10,837	11,261	12,857	
<b>R&amp;D Investment (Life Science Biz.)</b>					
Number of R&D employees	Person	94	93	179	
R&D investment	KRW 100 million	335	326	384	
Sales to R&D investment ratio	%	10.4	9.4	9.3	
Sales of new products	KRW 100 million	10	15	0	
Sales of new products to total sales ratio	%	0.31	0.42	0.00	
Sales	KRW 100 million	3,231	3,487	4,129	
<b>R&amp;D Investment (SK chemicals, major affiliates)</b>					
Number of R&D employees	Person	243	241	328	
R&D investment	KRW 100 million	629	617	681	
Sales to R&D investment ratio	%	4.5	4.2	4.0	
Sales of new products	KRW 100 million	10	15	0	
Sales of new products to total sales ratio	%	0.07	0.10	0.00	
Sales	KRW 100 million	14,068	14,748	16,986	
<b>Intellectual Properties (accumulated)</b>					
	Boundareies	Unit	2017	2018	2019
Domestic	Patents		26	15	32
	Trademarks		6	3	4
Overseas	Patents	No. of patent	137	221	144
	Trademarks		3	1	9
Total			146	225	157

# Independent Assurance Statement

To the Readers of 2019 SK chemicals Sustainability Report :

## Foreword

Korea Management Registrar Inc. (hereinafter “KMR”) has been requested by of SK chemicals to verify the contents of its 2019 Sustainability Report (Hereby referred to as “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

Local Communities : 413-1

Customer Privacy : 418-1

This Report excludes data and 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' 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 provided detailed product information and facilitated the readers' understanding through easy-to-understand descriptions. Also, it presented the formula for calculating social value it created and the findings of the materiality assessment, increasing the reliability of the information provided. The company is advised to expand the scope of the report to its key subsidiaries for completeness.

### Our independence

With the exception of providing third party assurance services, KMR is not involved in any other SK chemicals' 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

E. J Hwang

# GRI Content Index

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# UN Sustainable Development Goals

(UN SDGs)

The United Nations Sustainable Development Goals (UN SDGs) are an international commitment for sustainable development. Comprised of a total of 17 sustainable development goals and 169 targets, UN SDGs contains universal targets for the international community to achieve, such as issues for humanity, environmental, economic and social problems to move forward a sustainable future.

As we fully endorse their goals and the sense of promotion, SK chemicals is striving our best to contribute to the achievement of SDGs. As a part of efforts, we selected 11 goals associated with the nature of our business out of 17 sustainable development goals. We have implemented related activities and plan to widen our scope of performances to be more involved in more goals in the years to come.

UN SDGs	Activities of SK chemicals
 <p>Ensure healthy lives and promote well-being for all at all ages</p>	<p>Contributing to disease treatment through pharmaceutical business</p> <p>Contributing to disease prevention through vaccine business</p>
 <p>Ensuring quality education and giving more opportunities for lifelong education</p>	<p>Supporting training for partner companies to strengthen their competitiveness</p> <p>Providing safety education for partners</p> <p>Offering an environmental education program for elementary school students</p> <p>Providing a career education program for low-income youth</p>
 <p>Ensure availability and sustainable management of water and sanitation for all</p>	<p>Reducing wastewater by establishing eco-friendly process and sites</p>
 <p>Ensure access to affordable, reliable, sustainable and modern energy for all</p>	<p>Supporting the use of energy through our Myanmar Cookstove supply project</p> <p>Utilizing renewable power such as solar and geothermal energy</p>
 <p>Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</p>	<p>Creating quality jobs through making support system and policies.</p> <p>Encouraging the growth of partner companies through financial support programs</p>
 <p>Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</p>	<p>Investing more in R&amp;D regarding the protection of global environment</p> <p>Rigorously investing in R&amp;D regarding the improvement of human health</p>
 <p>Reduce inequality within and among countries</p>	<p>Mitigating inequality through human rights system</p>
 <p>Ensure sustainable consumption and production patterns</p>	<p>Striving to recycle wastewater or waste materials generated in the course of production</p>
 <p>Take urgent action to combat climate change and its impacts</p>	<p>Establishing and practicing environmental-friendly goals</p> <p>Making efforts to mitigate greenhouse gas emissions by building and operating eco-friendly workplaces</p> <p>Striving to reduce greenhouse gas emissions by making use of wastes</p>
 <p>Conserve and sustainably use the oceans, seas and marine resources for sustainable development</p>	<p>Reducing marine pollution risks through the development of eco-friendly plastic products</p>
 <p>Strengthen the means of implementation and revitalize the global partnership for sustainable development</p>	<p>Promoting global partnership activities for sustainable management</p>

# About this Report

## Overview of Report

SK chemicals share our activities and performances in regard to sustainable management through the annual publication of sustainability report. The ninth sustainability report contains financial performance as well as non-financial achievement concerning social value creation.

## Principle of Report

This report complies with the core option standards of the GRI (Global Reporting Initiative) Standards guideline, and partially reflects the principle and contents of the International Integrated Reporting Council (IIRC)'s Reporting Framework. In addition, the principle of UN SDGs is contained in the report, and the financial data in this report abides by K-IFRS.

## Period of Report

This report covers activities from January to December of 2019. In terms of major sustainable management performance, it contains data for three years from 2017 to 2019 to give a better understanding for comparison. In addition, it partially includes data of 2020 or before 2019 if it is considered significant enough to make an impact on stakeholders.

## Scope of Report

The scope of this report encompasses domestic business sites, including headquarters, R&D institute, sites in Ulsan and S HOUSE in Cheongju as well as L HOUSE in Andong, which is the business site of SK chemicals' subsidiary, SK bioscience.

## Reliability of Report

In order to secure reliability, this report was subject to the verification by KMR on the basis of three principles (inclusiveness, materiality, and responsiveness) under AA1000AS. The result can be found on page 102 of this report.

## Additional Information

SK chemicals has published Korean and English versions of Sustainability Report with an aim of giving stakeholders access to information. This report can also be found on SK chemicals' website.

\* SK chemicals became a new corporation through equity spinoff as of December 1, 2017. However, for the continuity, this report applied the data of SK discovery for the data until November 2017.



To minimize impact on environment and use of natural resources, spot color and coating are avoided, and soybean oil is used for printing process.