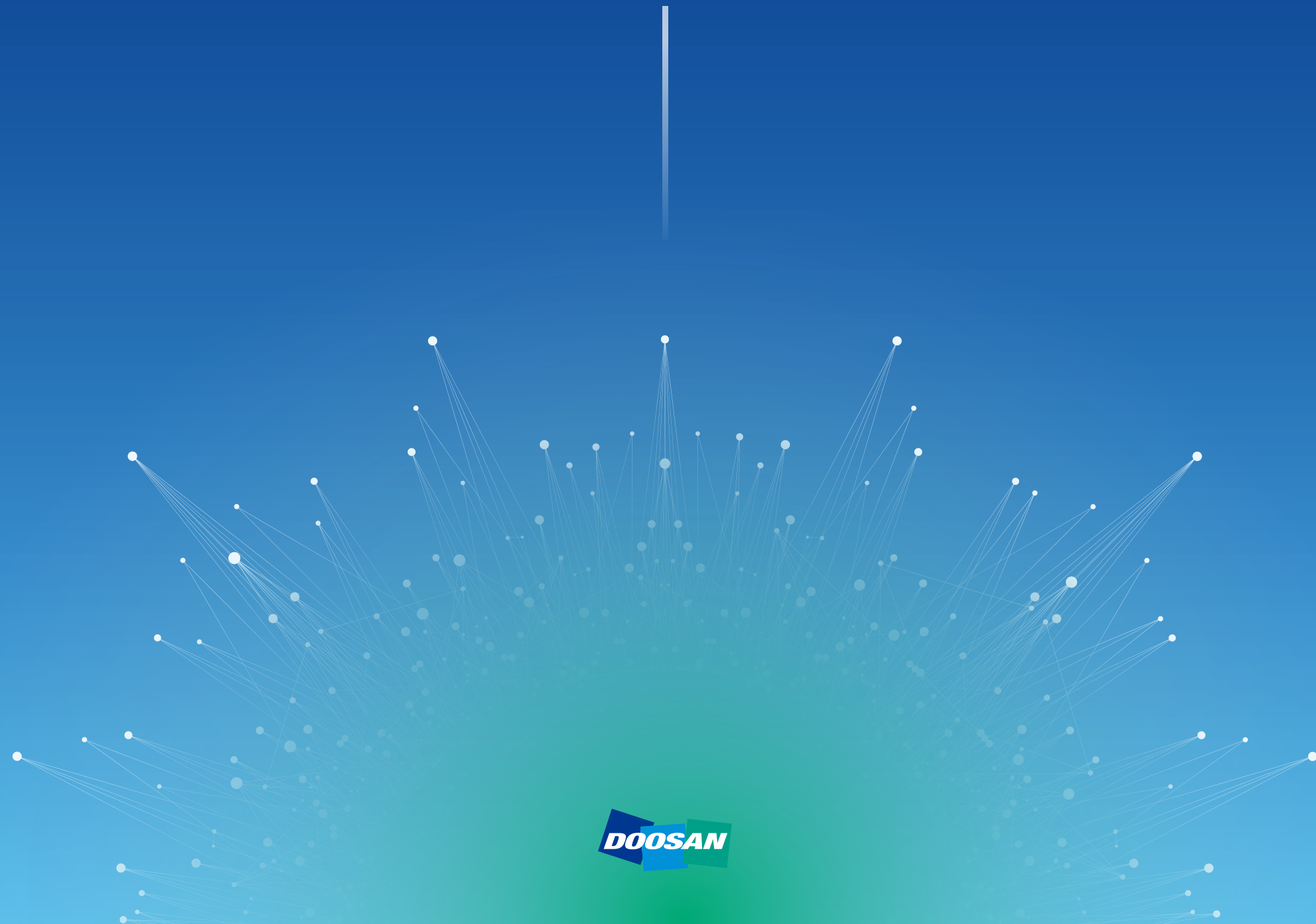


BUILDING YOUR **TOMORROW TODAY**

Doosan Corporation CSR Report 2019



BUILDING YOUR TOMORROW TODAY

Doosan Corporation
CSR Report 2019

About this report

Overview of the Report

Doosan Corporation has published its Corporate Social Responsibility(CSR) Report, which reflects the opinions of its stakeholders, every year since 2013 to share its achievements of the preceding year. The present 7th CSR report aims to transparently disclose Doosan's key CSR achievements of 2019 to its stakeholders.

Composition of the Report

This report consists of Design the Future, Spark the Growth, which introduces the company's major businesses and suggests future growth direction, and Value our Stakeholders, which reports on Doosan's social value and key CSR activities and cases by stakeholders. Major policies, management methods, activities and data related to corporate social responsibility can be found on CSR Policy & Performance and Appendix of 2019 Doosan Corporation CSR Report at Doosan website.

Reporting Period and Scope

This report presents Doosan's CSR achievements from January

1st to December 31st of 2019. Certain information in this report relates to activities in 2020 when they are deemed to have an important impact on decision-making. For some achievements, data is provided for more than three years so that trends may be more easily understood. This report also discloses the company's plans for 2020 and for the mid- and long-term, and based on these, our forward-looking statements as well. It presents the achievements and activities of all domestic worksites of Doosan Corporation, while also specifying details concerning overseas worksites.

Reporting Principle

This report has been prepared in conformance to the Core Options under the GRI(Global Reporting Initiative) Standards. The current guidelines for reporting can be found on pages 96-99 of this report.

Independent Assurance

DNV GL has verified the contents and publication process of this report. The assurance statement appears on pages 100-101.

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Cover Story

The dots and lines represent Doosan's future-oriented image: securing core technologies through challenge and innovation and growing into a global leader through continuous growth.

Message from the CEO



Doosan Corporation will strengthen its economic and social sustainability while continuing to lead change and innovation.

Dear Esteemed Stakeholders,

I would like to extend my sincerest gratitude for your everlasting encouragement and support for Doosan Corporation. I am very pleased to once again inform our stakeholders of Doosan's business performance and continued growth through this year's CSR report.

Doosan Corporation strives to provide innovative solutions and differentiated value based on its core capabilities and market insight to respond to this 'era of hyper-uncertainty'. In the past four to five years, we have seen external growth in our business. Doosan Corporation has proactively responded to the advent of digital transformation, 5G, and e-commerce, while actively exploring new future growth engines. To this end, we have set and implemented strategic goals for the sustainable growth of our business, focusing on the three major growth engines of 'Advanced Material & Energy,' 'Logistics Solutions' and 'Machinery.' In the advanced materials sector, we plan to secure a solid position in the global market, in line with the commercialization of 5G services and the rapid growth the IoT, autonomous driving and electric vehicle markets. As for the energy sector, we will implement a new business strategy to secure a competitive advantage during the golden window of the next three years, when the hydrogen economy is expected to grow rapidly. We will also strive to become a first mover to lead the logistics solutions market in increasing logistics complexity and automation trends. Finally for machinery, we will focus its capabilities on diversifying business and securing profitability in preparation for market contraction.




Doosan Corporation will strengthen its economic and social sustainability while continuing to lead change and innovation. We announced our own human rights policy based on the UN Human Rights Declaration last year, and we are now strengthening our human rights management system at both our domestic and foreign businesses. In addition, Doosan Corporation will take the lead in implementing shared growth to enhance the competitiveness of our suppliers, such as by building smart factories, strengthening management capabilities and providing consulting support. This year, we will establish an evaluation and management system to clearly identify CSR risks and create a management culture of social responsibility by enhancing the understanding of and consensus on CSR among all members. Doosan Corporation will strive to enhance its social value by first assessing the impact of CSR activities that affect stakeholders, including employees, customers, suppliers, local communities, and the natural environment, and then acting accordingly. Even when the business environment has been uncertain and difficult, Doosan Corporation has always faced the challenge and made a success story. Doosan Corporation will continue to transform itself into an organization that can communicate with our stakeholders based on mutual trust and realize creative results through drastic changes and reforms.

I cordially ask you, our esteemed and valued stakeholders, for your everlasting support of Doosan's ongoing efforts to realize a sustainable society.

CEO of Doosan Corporation, Vice Chairman
Hyun-soo Dong

Doosan Group

Introduction of Doosan Group

<p>Korea's Oldest Enterprise</p>  <p>Doosan is Korea's oldest company, with a 124-year history, and the fastest-growing company over the last 10 years.</p>	<p>An Innovative and Evolving Global Enterprise</p>  <p>Doosan enhances human lives by pursuing continuous innovation and change through its core ISBs(infrastructure support business), which are essential for building and operating social infrastructure.</p>	<p>A People-Centered Enterprise</p>  <p>Based on Doosan's people-centered philosophy, we strive to maximize the value of our customers, shareholders, and investors, and realize a higher level of customer satisfaction.</p>
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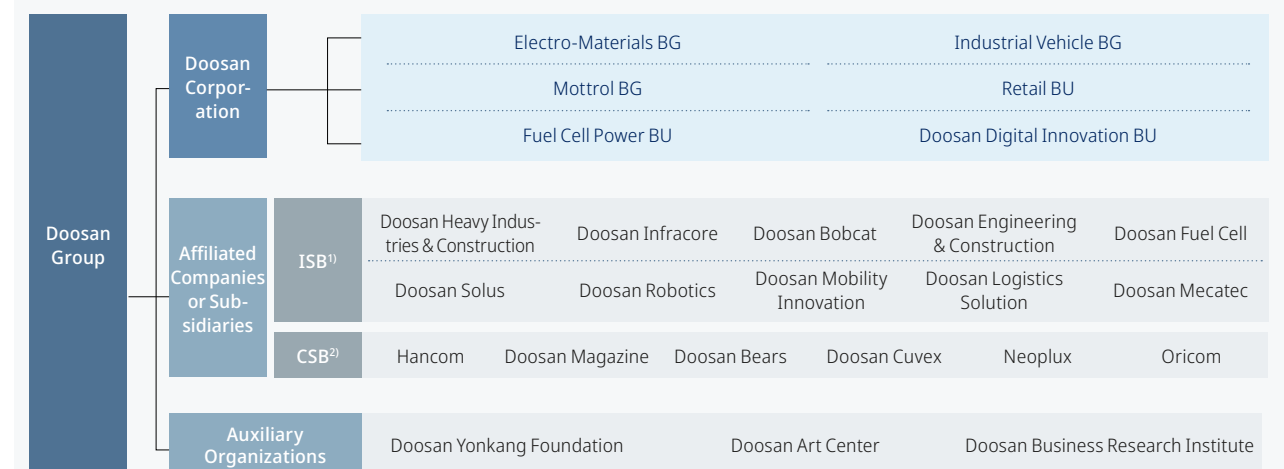
Proud Global Doosan



Talent-centered management, our source of global competitiveness

Establishing stream-lined processes to reach global standards

Organization of Doosan Group



1) Infrastructure Support Businesses 2) Consumer & Service Businesses
*These affiliated companies or subsidiaries may be partially different from those in the business report.




CEO Message
Introduction of Doosan Group
Introduction of Doosan Corporation

Doosan's Management Philosophy


Winning Team Doosan

Doosan's unique way of doing business represents a corporate philosophy, culture, and set of management principles we have developed with the aim of transforming our company into a 'Proud Global Doosan.' The unique way of doing business consists of the following three elements: the Doosan Credo, the People of Doosan('The Six Traits of Doosan People'), and the Doosan Credo Change Model(core competitiveness, and advancement and scientification of work methods), which serves as the foundation through which the People of Doosan realize the Doosan Credo.

Doosan Credo

 <p>A philosophy to be observed by Doosan People</p>	 <p>A charter that serves as the criteria and frame of reference for all business conduct and decision-making</p>	 <p>Composed of Aspiration and Core Values</p>
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Doosan Credo System





<p>Aspiration</p>  <p>Proud Global Doosan Winning Team! Doosan!</p>	<table border="1"> <tr> <td>People</td> <td>Cultivating People</td> <td>Integrity and transparency</td> </tr> <tr> <td>Inhwa</td> <td>Customers</td> <td>Technology and Innovation</td> </tr> <tr> <td>Profit</td> <td>Social Responsibility</td> <td>Safety and Environment</td> </tr> </table>	People	Cultivating People	Integrity and transparency	Inhwa	Customers	Technology and Innovation	Profit	Social Responsibility	Safety and Environment	<p>Core Values</p> <p>To establish a Proud Global Doosan, Doosan People practice the nine Core Values of the Doosan Credo on a daily basis, wherever they conduct business in the world. These Core Values cover the methods by which Doosan People should operate the company's business, the way they should treat and respect each other, and the way in which they should work with all of Doosan's partners.</p>
People	Cultivating People	Integrity and transparency									
Inhwa	Customers	Technology and Innovation									
Profit	Social Responsibility	Safety and Environment									

A Strong, Competitive Edge & Advanced Processes and Systems

To ensure a continuously strong performance, Doosan strives to secure a strong competitive edge while at the same time optimizing its ways of working through advanced processes and systems. This creates a virtuous cycle in which Doosan's people, the individuals who actually determine Doosan's performance as a company, are trained to pursue these same objectives. This positive feedback mechanism results in a winning team.

Doosan People

Regardless of whether they have exceptional capabilities or not, the term 'Doosan People' refers to all Doosan employees, who incessantly strive to enhance their capabilities while practicing Doosan's Core Values with the mindset of actively contributing to the organization. In addition, Doosan People respect and practice certain fundamental values, while placing great importance on the concept of talent. The intrinsic Traits of Doosan People may be summarized as follows:

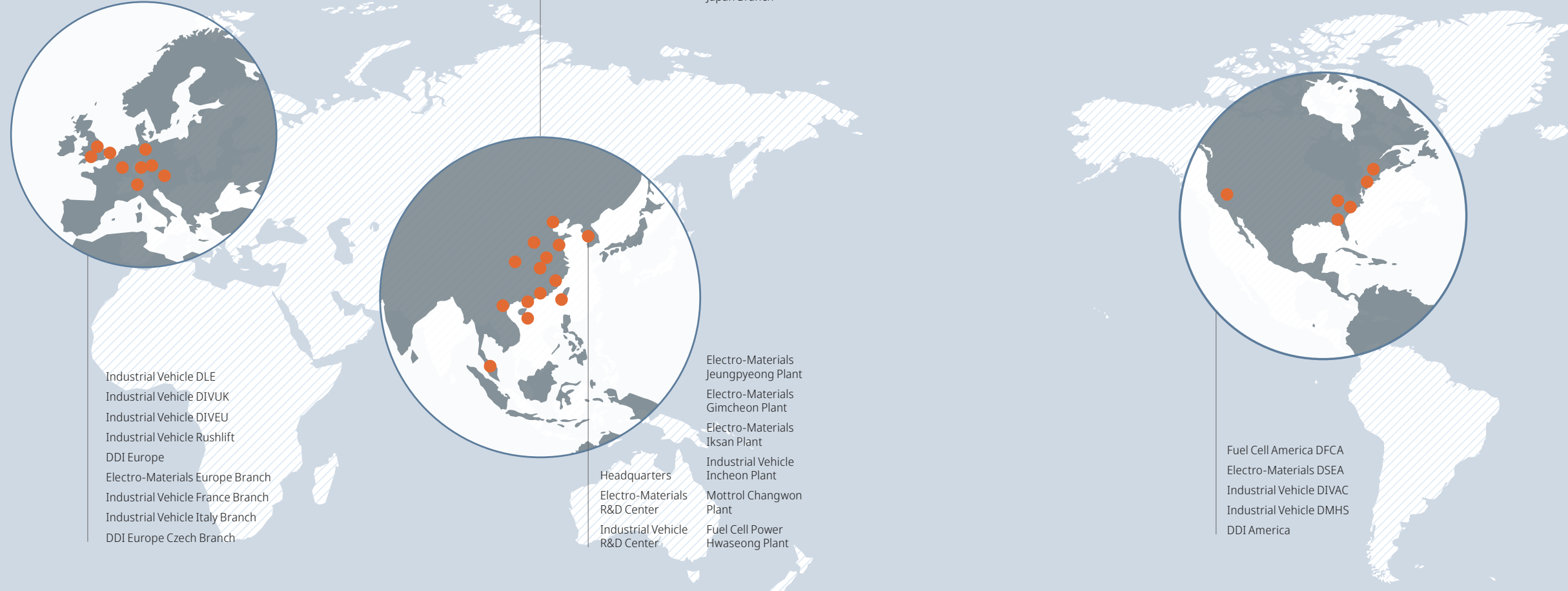
 Limitless Aspiration	 Cultivating Talent	 Inhwa	 Open Communication	 Tenacity & Drive	 Prioritization & Focus
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Introduction of Doosan Corporation

Doosan Corporation, the parent company of Doosan Group, oversees global network of Doosan Group across European, Asian and American markets, and at the same time, directly manages its businesses such as Electro-Materials BG, Industrial Vehicle BG, and Mottrol BG.

Date of Establishment	December 18th, 1933
Representative Directors	Park Jeongwon, Dong Hyunsoo, Kim Minchul
Business Areas	Electronic components/materials, forklifts, hydraulic parts, retail, fuel cells, biomaterials
Operating Countries	14 countries including Korea, China, the USA, and the UK
Headquarters:	275 Jangchungdan-ro, Jung-gu, Seoul, Korea

- Electro-Materials DSCS
- Industrial Vehicle DIVC
- Mottrol DMJC
- Electro-Materials DSC
- Electro-Materials Shen Zhen
- Electro-Materials DSH
- DDI China
- Electro-Materials DSES
- Electro-Materials Vietnam Branch
- Electro-Materials Taiwan Branch
- Electro-Materials Japan Branch



Europe

Materials	Branches	1
Machinery	Subsidiaries	4
	Branches	2
DDI	Subsidiaries	1
	Branches	1

Asia

Materials	Subsidiaries	5
	Branches	3
Machinery	Subsidiaries	2
	Branches	0
DDI	Subsidiaries	1

Korea

Materials	R&D Centers	1
	Production Plants	3
Machinery	R&D Centers	1
	Production Plants	2
Energy	Production Plants	1

Americas

Materials	Subsidiaries	1
Machinery	Subsidiaries	2
	Branches	0
Energy	Subsidiaries	1
DDI	Subsidiaries	1

Business Highlights

Total assets
 KRW **6,910.9** billion

Sales
 KRW **2,834.9** billion

Operating profit
 KRW **188** billion

Number of employees
4,984 persons

Including the overseas subsidiaries of Doosan BGs at the end of 2019

DESIGN THE FUTURE, **SPARK THE GROWTH**

The industry is undergoing a paradigm shift. Doosan is expanding its investment in new and growing markets and businesses to keep pace with rapidly changing market conditions while focusing on its capabilities. Doosan Corporation is increasing its value by strengthening its economic sustainability through the diversification of its business portfolio and the continuous search for new growth businesses, with a focus on those with a high growth potential in the future.

Doosan Corporation, Preparing for the Future 10

Foundation for Sustainable Growth 12

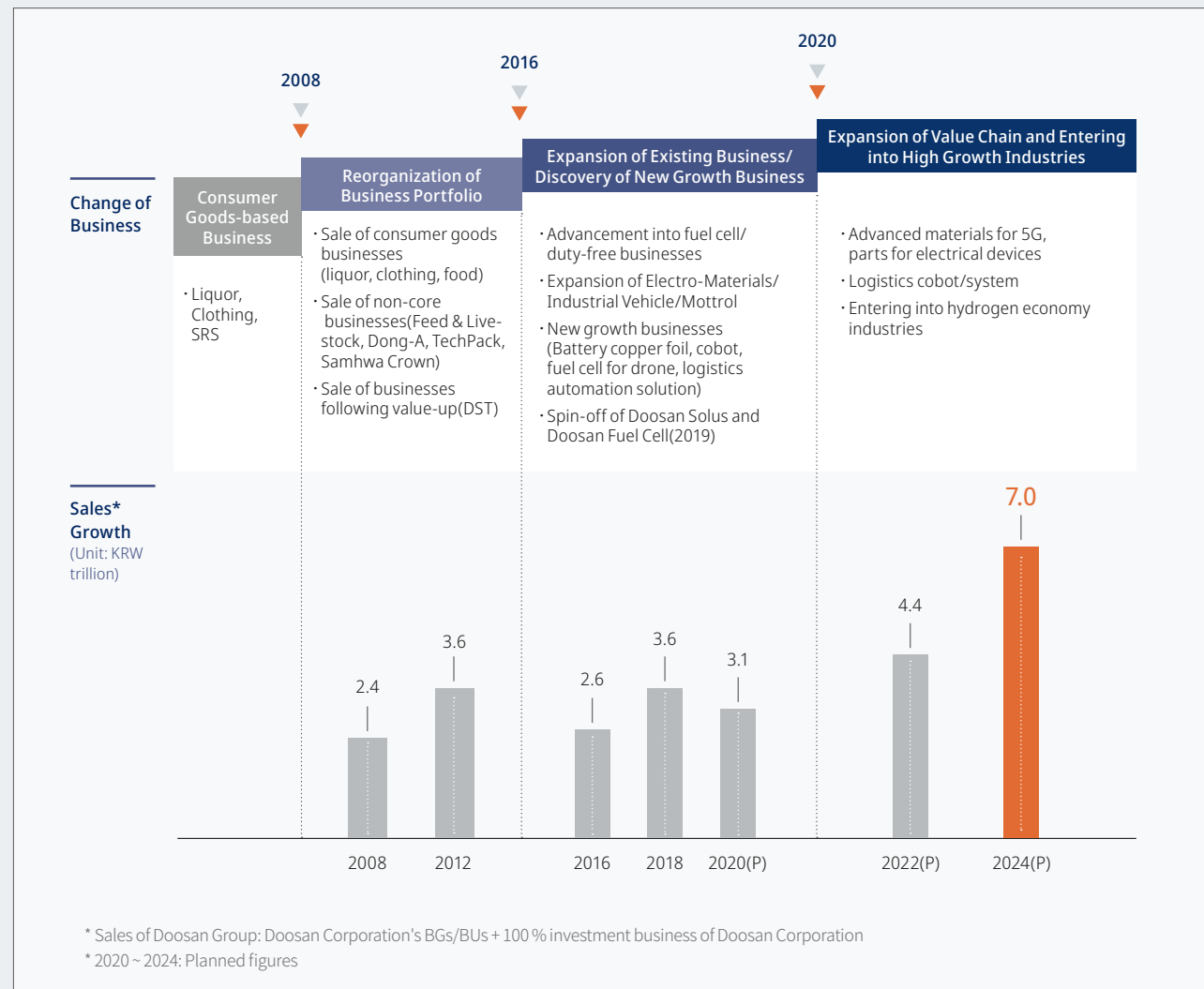
Quantum Leap to Lead the Hydrogen Economy 30

Doosan Corporation, Preparing for the Future

Continuous Change and Growth

Doosan Corporation continues to grow by adapting its business portfolio to the market environment and customer needs. We reorganized our business portfolio through the sale of our non-core consumer goods-oriented businesses in the first decade of the millennium, and expanded the scope of our finished parts and solutions businesses in the materials and parts field in the 2010s. We have been actively investing and entering into future high-growth industries. As a result, four of our businesses, Battery Copper Foil, OLED, Bio Materials, and Fuel Cells for Power Generation, which had been seeing steady growth, were listed as separate corporations to attract large-scale early investment.

This change in our business portfolio, along with the discovery of new growth businesses, was the result of continuous proactive reaction based on close analysis of the market. But Doosan Corporation is not satisfied with these achievements. We are still strengthening our competitiveness in the materials business to guard against future changes in the market environment, including increased demand for high-end eco-friendly materials and a surge in demand for logistics automation systems. We are also expanding our business to logistics solutions, Cobots, and fuel cells for drones. Based on this, Doosan Corporation is providing innovative solutions and differentiated values to B2B customers and end users, and has continued to increase the company's value through investments in technology. Doosan Corporation will create another future by expanding the value chain and entering the high-growth industries.



Doosan Corporation, Preparing for the Future
Foundation for Sustainable Growth
Quantum Leap to Lead the Hydrogen Economy

Strategic Direction for Strengthening Business Competitiveness

Doosan Corporation will promote its business based on its main strategic directions for securing business competitiveness, strengthening global competitiveness, and expanding its business platform. We will continue to develop products that can lead market change and secure manufacturing competitiveness through digital transformation in order to boost our business competitiveness. In addition, Doosan Corporation plans to expand to new regions and customers in global businesses. We will also expand our business platform to prepare for the future through investment and stabilization in new businesses such as robotics, logistics, and drones.



Strategic Direction for Future Growth

Doosan Corporation has divided its business areas into three business groups by promoting projects that utilize existing capabilities and analyzing which industrial groups are likely to grow rapidly in these areas. We will expand our materials business into advanced materials for 5G based on our existing business capabilities, and produce fuel cells for residence and buildings in line with the market's demand for eco-friendly energy. Doosan Corporation will expand its total logistics solutions business with a focus on existing business areas, such as cobots, and industrial/logistics drones. In addition, we will enter into new high-growth businesses, such as downstream business and next-generation electric drive systems.

	Market Trend	Key Business Area	BG/BU and Investment Business of Doosan Corporation
Advanced Material & Energy 	<ul style="list-style-type: none"> 5G, autonomous driving/electric vehicles, AI, IoT, AR/VR Eco-friendly energy <p>» Increase in demand for high-end and eco-friendly materials</p>	<ul style="list-style-type: none"> Network boards Materials for semiconductors Materials for electrical equipment and fuel cell Fuel cell for residences/buildings 	<ul style="list-style-type: none"> Electro-Materials BG Fuel Cell Power BU
Logistics Solution Provider 	<ul style="list-style-type: none"> E-commerce based Complex/automated logistics <p>» Rapid increase in logistics automation systems</p>	<ul style="list-style-type: none"> Total logistics solution Electric forklifts, cobot, fuel cell for drones 	<ul style="list-style-type: none"> Industrial Vehicle BG Doosan Logistics Solution* Doosan Robotics Inc.* Doosan Mobility Innovation*
Machinery 	<ul style="list-style-type: none"> Stable growth in the aftermarket services Increased demand in emerging markets <p>» Growing demand in emerging markets</p>	<ul style="list-style-type: none"> Engine-powered forklifts Forklift downstream business Hydraulic and electric drive system 	<ul style="list-style-type: none"> Industrial Vehicle BG (Logipia) Mottrol BG

* 100% subsidiary of Doosan Corporation

Electro-Materials BG

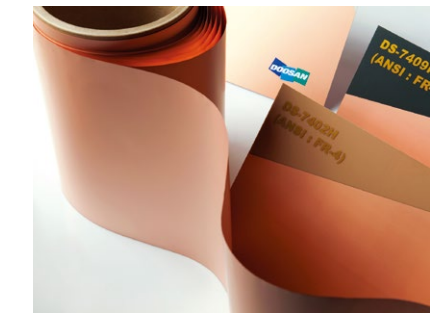
ELECTRO-MATERIALS BUSINESS GROUP



Electro-Materials BG produces and supplies CCL(Copper Clad Laminate), which is a core material for printed circuit boards, an essential part of electronic products. Doosan's CCL is growing into a foundation for technological advances in high-tech electronic devices, such as smartphones, semiconductors, and telecommunication equipment. In particular, Electro-Material BG is continuing to improve its competitive edge as the world's only supplier with a full line up of high-end CCL, including PKG CCL for semiconductors, NWB CCL for telecommunication equipment, FCCL for smartphones, and CCL for electrical devices.

In addition, it is mass-producing electrodes, a key material for fuel cells, to secure competitiveness in the renewable energy business. We are improving our sustainability by building future-oriented portfolios for 5G, eco-friendly cars, and energy.

Main Products and Services

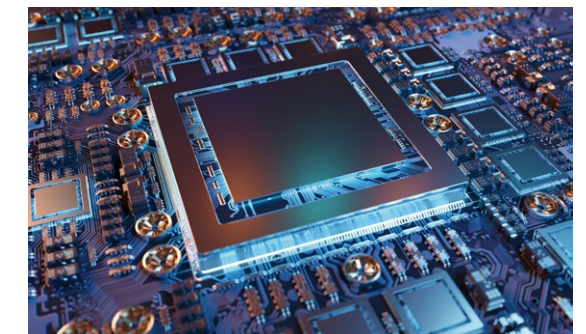


Network Substrate CCL

Network Substrate CCL is high-function CCL used in wired and wireless communication equipment such as servers and base stations, which increases the demand for low-loss product technology to minimize electrical signal loss for high-capacity and high-speed communication. Our low-loss technology is considered one of the best in the world.

Fuel Cell Electrode

Electrode, a key material of fuel cell produced by EM BG, is supplied to Doosan Fuel Cell. We are strengthening our business competitiveness by internalizing raw materials in the fuel cell business.



IC Package Substrate CCL

The IC package substrate CCL market is divided into CCL for memory semiconductors, such as DRAM and NAND, and for non-memory semiconductors, such as CPU, GPU, and AP. It is high-end CCL that can be used in microcircuits for high-temperature semiconductor processes and high-integration circuit design.



Flexible CCL

Flexible CCL is used in smart devices and wearable products, such as smartphones, smartwatches, and wireless earphones. It is ideal for optimal circuit design for small devices due to its flexible characteristics, and its application has expanded to various new technologies, such as foldable phones and electric vehicles.



Market Status and Outlook

Existing Business

Mobile products, a key application area of Electro-Materials BG are maintaining an annual average growth rate of 2% with changes in the paradigm of the Fourth Industrial Revolution such as Internet of Things(IoT), servers, electric cars, and 5G. In particular, the market for high value-added products like network and semiconductor CCL are expected to grow further. In keeping with the era of 5G, new products have been developed to meet the demand for high-performance materials with ultra-high frequency and low loss. In addition, the size of the renewable energy market is expected to grow in developed countries based on policy trends such as global restrictions on carbon emission.

New Business

Currently, Electro-Materials BG is expanding its business into promising industries(automotive electronic components/energy). It is also exploring new markets, such as autonomous driving radars and communication boards such as ADAS(Advanced Driving Assistant System), as high growth in the electric car market has led to a paradigm shift in the automobile industry.

2019 Major Achievements

Secured Business Competitiveness

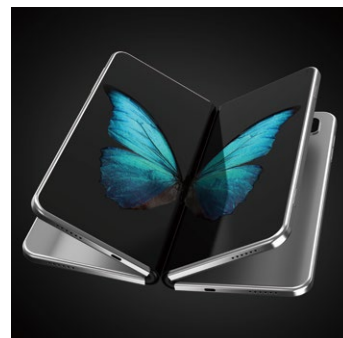
Electro-Materials BG accelerated entry into the CCL market for non-memory semiconductors and increased sales of high-end NWB(Network Board). It has strengthened its developmental and manufacturing competitiveness for mass-producing 5G products, a key material for the future, improving both yields and productivity.

Strengthened Global Competitiveness

Electro-Materials BG's business accounted for 37% of overseas sales, rising 1% from the previous year. In particular, it further expanded business in the newly-entered Chinese market and achieved additional sales of KRW 46.6 billion in 2019. In addition, Electro-Materials BG strives to strengthen our global competitiveness through localization by expanding Changshu plant in China to respond to issues such as short-term delivery.

New Business

As mass production of electrodes has stabilized, Electro-Materials BG is gaining business competitiveness by internalizing raw materials production through synergy with Doosan Fuel Cell. It has completed setting up of mass production facilities at its Iksan Plant for the commercialization of CPI(Colorless Polyimide) film, a key material for foldable smartphones. Electro-Materials BG has secured approval from global automakers for new materials for secondary battery parts for electric vehicles, and will set up a production base in Vietnam in 2020. In addition, it will continue to discover and nurture new items in promising industries.



Doosan Corporation, Preparing for the Future

Foundation for Sustainable Growth

Quantum Leap to Lead the Hydrogen Economy

Business Strategy

5G Materials

Electro-Materials BG plans to develop new market materials for 5G, such as next-generation high-frequency low-loss products and antenna materials, as major items for future business. When base stations and terminals for 5G start to hit the market, the demand for high-performance materials with ultra-high frequency and low loss is expected to rise. Therefore, Electro-Materials BG is moving fast to become a first mover based on its top-tier loss technology.



Electric Vehicle Materials

The future automobile market is evolving from internal combustion engines based on diesel and gasoline to electric vehicles based on eco-friendly raw materials. In order to increase sales in the electric vehicles and electronics fields, Electro-Materials BG has developed materials to expand electrical devices and improve fuel efficiency for the smartification and electric control(EVs, HEVs*) of electric vehicles.

*HEV(Hybrid Electric Vehicle)



Energy Materials

Electro-Materials BG is focusing on developing 2-stack products and internalizing key materials to strengthen its fuel cell electrode business. The miniaturization of fuel cells has allowed for the development of long-range drones as future markets. Accordingly, Electro-Materials BG has secured potential markets for electrodes for fuel cells and completed mass-production facilities for electrodes.

Industrial Vehicle BG

INDUSTRIAL VEHICLE BUSINESS GROUP



Known for manufacturing Korea's first forklift in 1968, Industrial Vehicles BG has secured more than 50 % of the market share in the domestic market, and has grown into a global logistics equipment manufacturer that exports forklifts to more than 100 countries from its six business sites, including sales subsidiaries, in USA, Belgium, UK, China, and Germany.

Industrial Vehicle BG is evolving into a data-based total solution provider by building a digital platform that incorporates ICT technology to enhance sustainability. It plans to secure future growth engines and maximize profitability by strengthening its forklift rental and second-hand purchase, and providing customized products and service.

Main Products and Services



Diesel/LPG Forklifts

Industrial Vehicle BG has a line-up of 1.5 to 30 tonne diesel models and 1.5 to 7 tonne LPG forklifts. These forklifts enable high-efficiency logistics at various worksites thanks to their climbing capacity and high power output.

Electric Sit-Down/Stand-Up Forklifts

Industrial Vehicle BG has a line-up of 1.5 to 5 tonne models for sit-down and 1.3 to 2.5 tonne models for stand-up forklifts, and offers two power source options: lead storage and lithium-ion batteries. These forklifts are eco-friendly, with low noise and vibration, making them perfect for indoor work such as moving food and cold storage. Lithium-ion battery forklifts have a longer battery life and are easier to maintain than lead-battery electric forklifts, and hence dramatically reduce operating costs for customers and create a safer working environment without the generation of harmful gases during charging and discharging.



Warehouse Equipment

The warehouse equipment of Industrial Vehicle BG consist of various line-ups, including 1.3 to 6.0 tonne order pickers, pallet trucks, stackers, and tow/transportation vehicles that provide excellent mobility in small spaces with their compact size and minimal turning radius.



Doosan Corporation, Preparing for the Future
Foundation for Sustainable Growth
 Quantum Leap to Lead the Hydrogen Economy

Downstream Business

Downstream business, including forklift rentals, the trade in used forklifts and maintenance services, provides options for users to quickly and easily access forklifts and to meet changing product usage needs. Industrial Vehicles BG provides a variety of options, from ownership to sharing, with a range of customizable products and services that incorporate digital technology.



2019 Major Achievements

In 2019, Industrial Vehicle BG recorded the highest sales(KRW 900 billion and 25,000 units) in its history thanks to an increase in dealer support and stronger sales channels, along with continuous improvement of product competitiveness and successful efforts to develop new markets. By setting up an S&OP(Sales & Operations Planning) advancement project for managing not only its existing production enhancement system, the MES(Manufacturing Execution System), but also customer/market information, sales, production and inventory planning, Industrial Vehicle BG has raised its operational capacity to the next level.

2019 was an important year when it came to setting the foundation for the mid- to long-term vision of Industrial Vehicle BG, which showed achievement in both product and business areas. Industrial Vehicle BG declared itself a 'comprehensive logistics service leader' to employees and stakeholders, and introduced a full warehouse logistics equipment line-up. Is also announced areas for creating synergy with DLS in order to secure its business direction as a total solution provider, which encompasses not only forklift manufacturing but also downstream services and logistics automation solutions. It is working its on AGF(Automatic Guided Forklift) business in response to the growth of the logistics market and unmanned/automated needs. With the development of its own dedicated vehicles and synergy with suppliers who can deliver and install them, Industrial Vehicle BG has already received orders for actual projects.

Market Status and Outlook

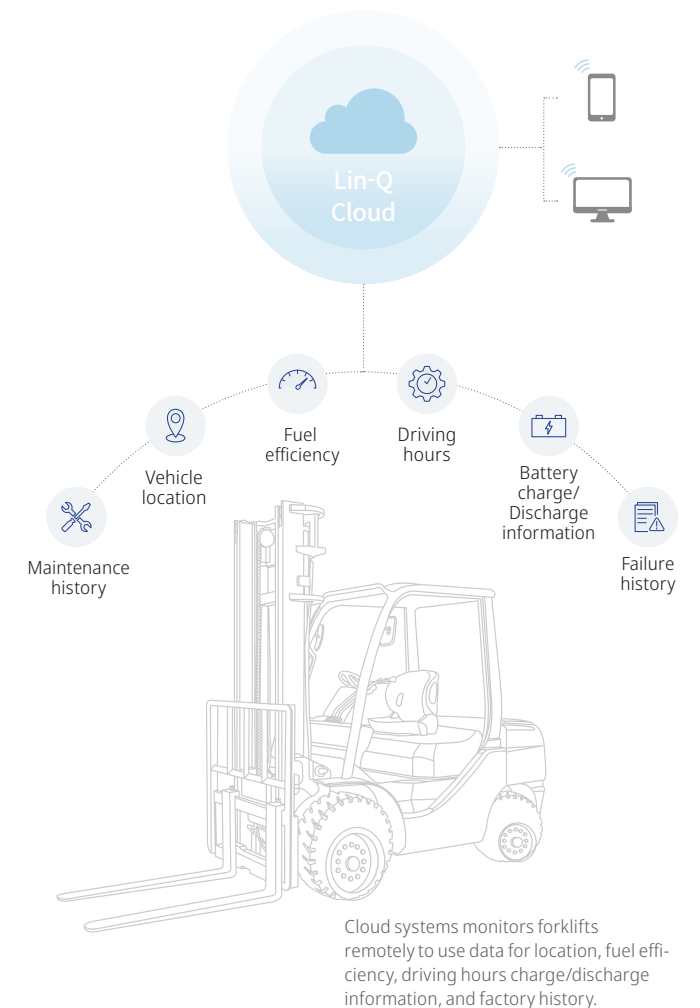
The forklift market has been showing a growth trend in developed countries, even in the face of intensifying price competition due to excessive supply. The demand for battery-operated forklift trucks has grown as regulations on diesel emissions have been strengthened owing to the growing concern over atmospheric pollution. The demand for smaller-sized warehouse equipment has also grown, as it is suitable for large retail and warehouse businesses. Such market trends are expected to persist along with the shared economy, increasing use of renewable energy and the Fourth Industrial Revolution based on ICT.

Industrial Vehicle BG will strengthen its downstream business, including purchasing, usage, and service, to provide value to customers throughout the entire service life of its products, and lead the shared economy and innovation in ICT-based logistics services. By building a digital platform based on ICT technology, Industrial Vehicle BG will grow into a total solution provider that can provide customized products and services based on data.

In terms of products, a full line-up of electric and logistics equipment has been established with the addition of new models. A model with an economic engine for China and other emerging markets has been developed and already sold more than 1,000 units. Based on the competitiveness of these products, it has a high-end/economic product line-up that encompasses engines, electric vehicles, and logistics equipment to meet the needs of various customers. Industrial Vehicle BG has built the foundations for a great leap forward thanks to the stabilization of Doosan Logipia, which opened in 2018.

Business Strategy

Industrial Vehicle BG plans to strengthen dealer support and develop stronger sales channels while continuing to explore new markets based on the improvement of product competitiveness, which has been the company's driving force of continuous growth over the last 50 years. Industrial Vehicle BG will develop technologies and innovate products to improve customer experiences, expand its downstream business area to supply customized services and rentals based on ICT technologies such as big data and platform, and continue to drive its future growth engines and maximize profitability. The company aims to achieve sales goal of KRW 2 trillion by 2025 through enhancement and innovation.



Mottrol BG

MOTTROL
BUSINESS GROUP



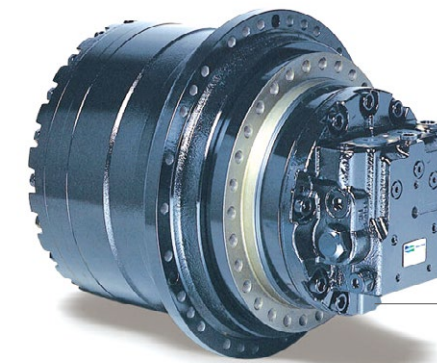
Since its advancement into the unexplored hydraulic industry of Korea in 1974, Mottrol BG has grown into a leader in the hydraulic industry. To consolidate its position as a leading global manufacturer of components, it has established a full line-up of hydraulic products including travelling motors, swing motors, main pumps, and main control valves for heavy construction equipment.

Doosan Corporation, Preparing for the Future
Foundation for Sustainable Growth
Quantum Leap to Lead the Hydrogen Economy

Main Products and Services

Hydraulic Components

As a hydraulic components manufacturer with over 40 years of experience, Mottrol BG has a production capacity of more than 35,000 hydraulic product units per month. Its range of products includes travelling motors, swing motors, main pumps, and main control valves for heavy construction equipment. In addition, Mottrol BG carries out systematic quality, environmental, and safety management of its products. In particular, its travel device for excavators was designated a World-Class Product by the Ministry of Commerce, Industry, and Energy, proving its excellence.



Travel Device

With a built-in, automatic 2-speed function, built-in hydraulic brakes, a built-in shockless function at start/stop, and an embedded anti-cavitation function, Mottrol BG's travel device provides powerful output torque, excellent controllability and high reliability.

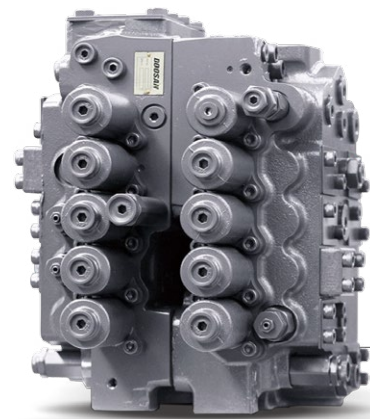
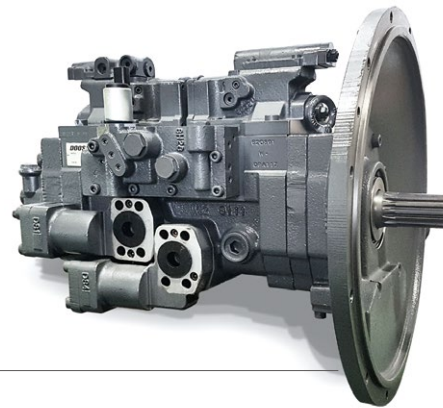
Swing Device

Mottrol's powerful swing device incorporates a relief valve with an embedded shockless function, built-in mechanical brake valve, anti-cavitation function, and reverse swing protection valve, all of which cumulatively ensure high performance and fatigueless operation.



Main Pump

Developed in 2001, the DPA Series pumps have various features. Compared with the T5V series of the same class, the total length has been shortened by 30%. Also, the new model has adopted the newest low-pulsation, low-noise technology, which can be applied to various types of heavy equipment in combination with various control methods(flow control, power control, power shift control, and electronic control). Various attachments are available with an optional high-pressure gear pump. The low-noise and high-efficiency DPA Series swash plate pumps offer a firm foundation for environmentally friendly design.



MCV(Main Control Valve)

The MCV controls the flow route of hydraulic oil from the pump in order to operate actuators, such as the travel motor, swing motor, or cylinders. This 2-block MCV meets customers' diversified requirements, with excellent controllability and extendibility.



Market Status and Outlook

China's construction machinery market, a major target for our hydraulic components, has continued to grow since 2016 due to the country's increased investment in real estate and infrastructure as well as increased demand for the replacement of old equipment. Market size is expected to remain steady in 2020 due to the Chinese government's continued investment in construction. The expansion of mid- to long-term urban readjustment projects may result in increased demand for small- and medium-sized equipment. In addition, the industry is expected to grow due to increased investment in infrastructure in emerging markets such as India and Southeast Asia. Mottrol BG is striving to become a global total parts supplier by taking advantage of market opportunities based on the knowledge of hydraulic pressure and competitive new products it has accumulated over decades.

Doosan Corporation, Preparing for the Future

Foundation for Sustainable Growth

Quantum Leap to Lead the Hydrogen Economy

2019 Major Achievements

Secured Business Competitiveness

Mottrol BG recorded sales of KRW 562.7 billion in 2018, the highest annual sales since its foundation in 1974. In particular, the market share of Mottrol BG in China, which has the largest market size for excavators, reached 19.7%, expanding its grip on the market. Mottrol BG was able to achieve this result by improving production capacity, reducing costs, improving quality and strengthening competitiveness through new product development to meet growth in demand.

Strengthened Global Competitiveness

Mottrol BG continues to expand its market share in China by strengthening local sales promotions and expanding local production through its China subsidiary. Mottrol BG has secured a bridgehead for new markets/customers by promoting sales of its travel devices through European companies and dealers and expanding its global market share. Meanwhile, sales of hydraulic components have been strengthened through alliances with Indian equipment makers and partners, allowing entrance to the Indian market. Mottrol BG plans further expansion into emerging markets such as India and Southeast Asia, which are expected to grow in the future.



Business Strategy

Mottrol BG plans to develop new series and expand its product line-up by improving cost, performance, durability, and reliability compared to existing products to strengthen product competitiveness of hydraulic components for heavy construction equipment. Mottrol BG aims to expedite global sourcing and continuously expand production at its subsidiary in China to strengthen its business competitiveness. It also plans to increase its global market share by further spreading its business to non-excavator market and expanding its supply to global construction heavy equipment manufacturers including those in India and North America.

New Business

Mottrol BG plans to launch new business to respond to future technological trends and secure new growth engines. It plans to develop and commercialize electric/electronic products in accordance with the strengthening of environmental regulations and demand for low-noise and high-efficiency products.

Retail BU

RETAIL BUSINESS UNIT



With a broad experience and deep understanding of multinational customers, Doota Mall-major shopping and tourist destination, and Korea's leading fashion mall-is visited by over 9.1 million local and foreign shoppers annually. The seven story fashion mall houses over 210 boutique stores that sell a wide range of products, providing a perfect one-stop shopping experience. Retail BU offers the best customer satisfaction with its differentiated services at Doota Mall.

Main Products and Services

With the slogan, 'Fast & First Fashion,' Doota Mall always strives to provide the most pleasant and efficient shopping environment and deliver the highest level of customer satisfaction by keeping facilities up to date. Doota Mall aims to provide customer satisfaction through its innovative business strategies, and was the first fashion mall to offer a fixed price system, install information centers for foreign visitors, and deploy floor managers.

2019 Major Achievements

Doota Mall has attracted a variety of global concept stores as it carries out a renewal of the entire building to attract more customers and strengthen the identity of the mall. Doota Mall offers its unique products, differentiated from other commercial centers, with a focus on sports brands that are growing in the market. It is increasing customer satisfaction by attracting designers and Dongdaemun-based brands with product planning abilities and providing products that reflect the latest trends at reasonable prices in order to strengthen its grip on the fashion sector, which is the core strength of Doota.



Market Status and Outlook

The online market is expected to continue to grow due to advantages such as convenience of purchase and diversification of items, while the offline market is expected to remain stagnant, except for outlets/complex shopping malls. Strengthening its online-based business portfolio is the most important goal for Retail BU in the market. Therefore, Retail BU is striving to continue its growth and development by strengthening MD capabilities in high growth categories such as sports, and enhancing competitiveness focusing on online business.

Fuel Cell Power BU

FUEL CELL POWER BUSINESS UNIT



Fuel Cell Power BU was founded in 2003, and is the first company in Korea to lead the fuel cell for residences/buildings. It is a global top-tier fuel cell company that has secured core technology such as stack and reformer design and manufacturing, fuel converter and system integration. It remains committed to government subsidy project for residence/building fuel cells and to supply building equipment in the mandatory installation of renewable energy to satisfy the Korean government's renewable energy plan.

Main Products and Services

PEMFC

(Polymer Electrolyte Membrane Fuel Cell)

A polymer electrolyte fuel cell is a type of fuel cell that uses a polymer electrolyte membrane which can be permeated by hydrogen ions.

Features

- Free start/stop and real-time on/off operation
- Can adjust the amount of power generation in the system according to the power demand
- Installable in indoor and outdoor spaces
- Less time and space required for installation compared to other energy sources



Market Status and Outlook

The domestic fuel cell market is forecast to grow based on the hydrogen economy promotion roadmap announced by the government in 2019. Japan has steadily expanded its fuel cell market to 50,000 household items, thanks to subsidy policies. Both the private and public sectors in Europe, including those of Germany, have started to invest in technology development for fuel cells and hydrogen, with the goal of building a fully independent fuel cell ecosystem without subsidies. Fuel Cell Power BU plans to take the lead in producing stable and clean high-efficiency fuel cells through continuous technological development and investment based on market status and policy direction.

2019 Major Achievements

Fuel Cell Power BU has laid the foundation for providing various products in buildings/homes fuel cell market by developing SOFC products for buildings as well as PEMFCs, currently being mass-produced. It is seeking to enter global markets such as China, which has high demand for eco-friendly distributed generation as well as the Korean market, which is a major market, and will respond by developing locally customized models based on thorough market analysis in order to increase sales of fuel cells for residence/building.

Foundation for Sustainable Growth

Digital Innovation BU

DIGITAL INNOVATION BUSINESS UNIT



Digital Innovation BU is in charge of providing a comprehensive range of IT services, including IT consulting, system integration, business systems and IT infrastructure services, to all Doosan Group companies around the world. It utilizes SI and added service businesses, and provides IT services to enable the globalization of Doosan Group.

Main Products and Services

Digital Innovation BU is in charge of providing a comprehensive range of IT services, including IT consulting, system integration, business systems, and IT infrastructure services, to all Doosan Group companies.

Digitalization Service

Utilizing digital technology through ways of working, AI & data analysis to support the business innovation of customers and creating opportunities for new revenue through digital marketing technology

Platform/IT Infrastructure Development and Operation

Building/maintaining IT infrastructure for system operation, performing system conversion to a public cloud, providing PaaS/SaaS service based on its digital platform, and building/operating an open innovation system for internal and external collaboration

Application Development and Operation

Developing applications and providing digital services for smart manufacturing, smart engineering, supply chain management, robotic process automation, and financial cost management

Market Status and Outlook

With AI, RPA, big data and other intelligent technologies, all systems, industries and stakeholders are now connected to the network. It is expected that drones and robots that can interact with the environment and people will be developed, and AI technology will be applied in the digital factory area, where advanced AI plants will be developed. In addition, RPA technology will be expanded mainly around simple repetitive tasks. New convergence services will be reviewed, and data utilization and protection will be strengthened through reforms to ICT regulation.

2019 Major Achievements

In 2019, Digital Innovation BU provided total IT services to Doosan Group affiliates, including digitalization services, application development and operation, and platform/IT infrastructure development and operation. It plans to enhance its infrastructure and train specialist personnel in order to support the digital cloud transformation of Doosan Group companies. Digital Innovation BU strives to provide IT services that truly contribute to the reinforcement of customer values.

* PaaS: Platform as a Service
 ** SaaS: Software as a Service

Design the Future Spark the Growth

Doosan Corporation, Preparing for the Future

Foundation for Sustainable Growth

Quantum Leap to Lead the Hydrogen Economy

Doosan Robotics INC.



Doosan Robotics is a specialized robot solution provider that leads the cobot(collaborative robot) market. It was launched in 2015 as one of Doosan Group's new growth engines and core businesses. It developed cobots with in-house technology and completed mass-production facilities with a yearly capacity of 10,000 units at the end of 2017. Doosan Robotics is recognized both domestically and in overseas markets such as Europe, the United States, and China, for its outstanding technology. It is currently accelerating its expansion into the global market.

Main Products and Services

Doosan Robotics has a line-up of collaborative robot arms for a variety of processes with maximum work envelopes ranging from 900 mm to 1,700 mm and with payloads ranging from 6 kg to 15 kg. Cobots are equipped with a high-performance 'torque sensor' that detects forces in each of six joints. Doosan Robotics cobots are widely used in manufacturing and production processes such as assembly(screwing, gears), pick & place, polishing and debugging, secondary actions for machine tools, inspection, gluing/bonding, secondary actions for plastic injection, packaging and palletizing, and pressure printing.

Market Status and Outlook

Market interest in Cobots continues to grow due to difficulties in securing manufacturing personnel, improvement of production efficiency through labor hour distribution between workers and robots, avoidance of potentially harmful physical work for elderly workers, and increased on-site automation needs. According to the 2019 ABI Research cooperative robot market report, the cobot market is expected to grow at an average annual rate of 52% until 2024, to approx. \$4.7 billion(USD).

2019 Major Achievements

Doosan Robotics aims to sell 15,300 units in 2023, or 10% of the global cooperative robot market, by expanding sales channels and product line-ups, and strengthening product competitiveness. It is currently expanding its market from Germany, China, United States, and Korea to new countries, planning to develop additional channels by expanding sales territories within existing markets, and searching for new sales targets. In addition, Doosan Robotics will create new demand by launching pairing families of cooperative robots, such as AGV, AMR and Vision, and strengthen its product competitiveness, including UX(User Experience) innovation through SW differentiation.



Doosan Logistics Solutions

Doosan Logistics Solutions was established in 2019 following the acquisition of Samo Logistics Information, which has supplied logistics automation software to the domestic distribution and manufacturing industries since the 1990s. It has been leading the WMS(Warehouse Management System) and WCS(Warehouse Control System) markets in Korea with its in-house technology and has further expanded its business scope to system integrators, which supply logistics automation equipment using advanced software. Doosan Logistics Solutions will become the best total solution provider by supplying advanced logistics automation equipment and enhancing software in a variety of industries to meet customer needs.

Main Products and Services

Doosan Logistics Solutions integrates software technologies and automated hardware systems that control and manage all processes at logistics centers, including designing and consultation. It provides turnkey solutions or individual product development/services upon customer request.

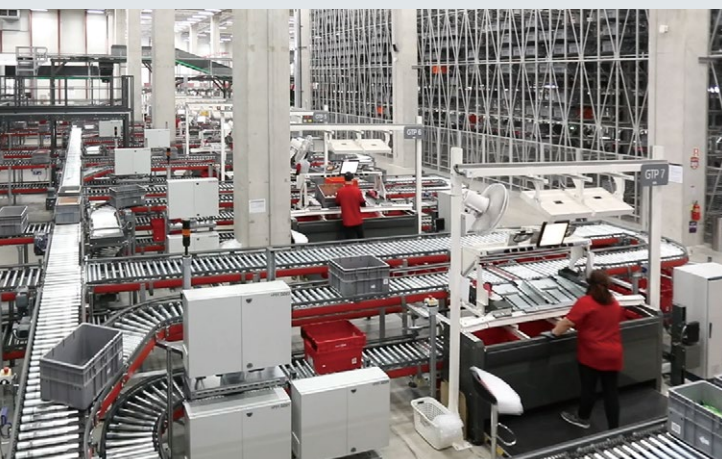


Market Status and Outlook

Explosive growth in online sales channels, the aging of the population, increased labor costs, and intensified competition among shipping companies are driving the need to introduce automation technologies to logistics centers. Demand for logistics automation solutions in Korea and Asia is expected to continue to grow by five to ten percent over the next ten years. In particular, the demand for high-end automation systems for large retailers and e-commerce will expand to manufacturing industries.

2019 Major Achievements

Since its establishment in 2019, Doosan Logistics Solutions has been selected as a provider of total solutions for new logistics center projects by Korean and Thai customers. In 2020, it set a goal of winning a large Korean SI projects with its supplier, Knapp, an Austrian company.



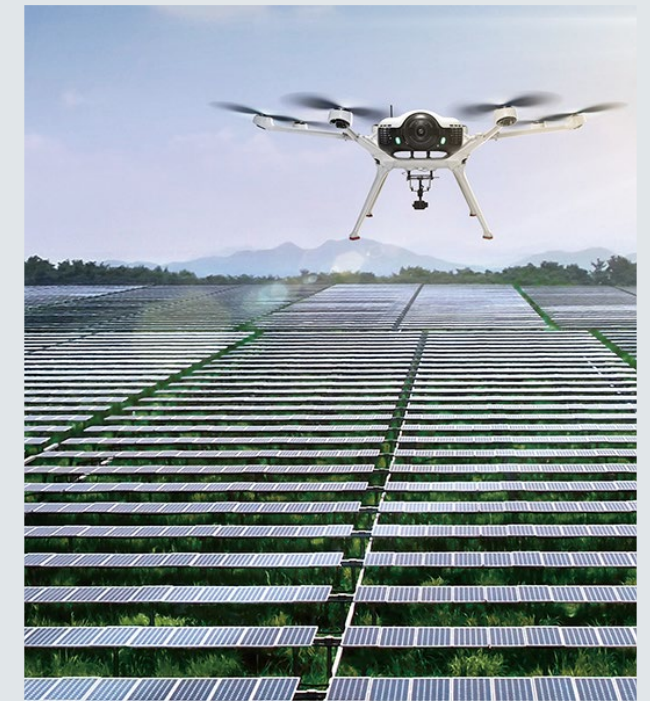
Doosan Mobility Innovation

DMI(Doosan Mobility Innovation) focuses on the mobile application of fuel cells and strives to drive growth of the UAV (Unmanned Aerial Vehicle) industry by providing stable, long-distance flight solutions. DMI developed and commercialized the world's first compact, lightweight mobile fuel cell pack based on decades of accumulated source technology. DMI aims to provide customers with reliable, durable fuel cell packs and to create optimum business solutions that can be used in a wide variety of industrial environments.

Main Products and Services

Fuel cells are eco-friendly products that use hydrogen, a natural gas, as an energy source. Their energy density is approximately three to four times higher than that of batteries. The flight time of drones with existing batteries used to be less than 30 minutes, but with the DMI fuel cell pack, this has been increased to more than two hours. With the advantage of innovative, long-distance flights, the fuel cell pack for drones is expected to be utilized in various industries for managing facilities, such as solar/wind power plants, monitoring forest diseases and pests and forest fires, transporting emergency supplies over long distances, and surveying road/port traffic.

In addition to its line-up of hydrogen fuel cell packs, Doosan Mobility Innovation has three types of drones optimized for them, and on top of the long-haul capability of its fuel cell packs, it also provides hydrogen charging and delivery services. We have established a hydrogen supply system that customers can use conveniently through linked mobile apps.



Market Status and Outlook

As the long-distance BVLOS(Beyond Visual Line of Sight) market is expected to become more active in the mid to long term, Doosan Mobility Innovation plans to expand into the BVLOS flight platform business including logistics to develop its business. In this way, it plans to secure end-to-end solution capabilities for different industries through cooperation and outsourcing with various companies across its value chain.

The logistics drone market is expected to show the highest growth potential. Doosan Mobility Innovation is working with various companies such as DDI to secure a drone control solution to prepare for the logistics market. It plans to build an integrated logistics drone solution by expanding its product line-up and linking its drones with intelligent SW.

In addition, Doosan Mobility Innovation plans to diversify its mid-to long-term business platforms by developing small-sized forklifts and unmanned logistics vehicles through the application of its DMI power module. To this end, it is preparing to participate in relevant national projects and to form a technical committee within Doosan Group to secure extra-large class, water-cooled fuel cell technology. Once this technology is secured, DMI will be able to establish a bridgehead for the development of flying cars, or PAVs (Personal Air Vehicle), in the future.

Special Report

Quantum Leap to Lead the Hydrogen Economy

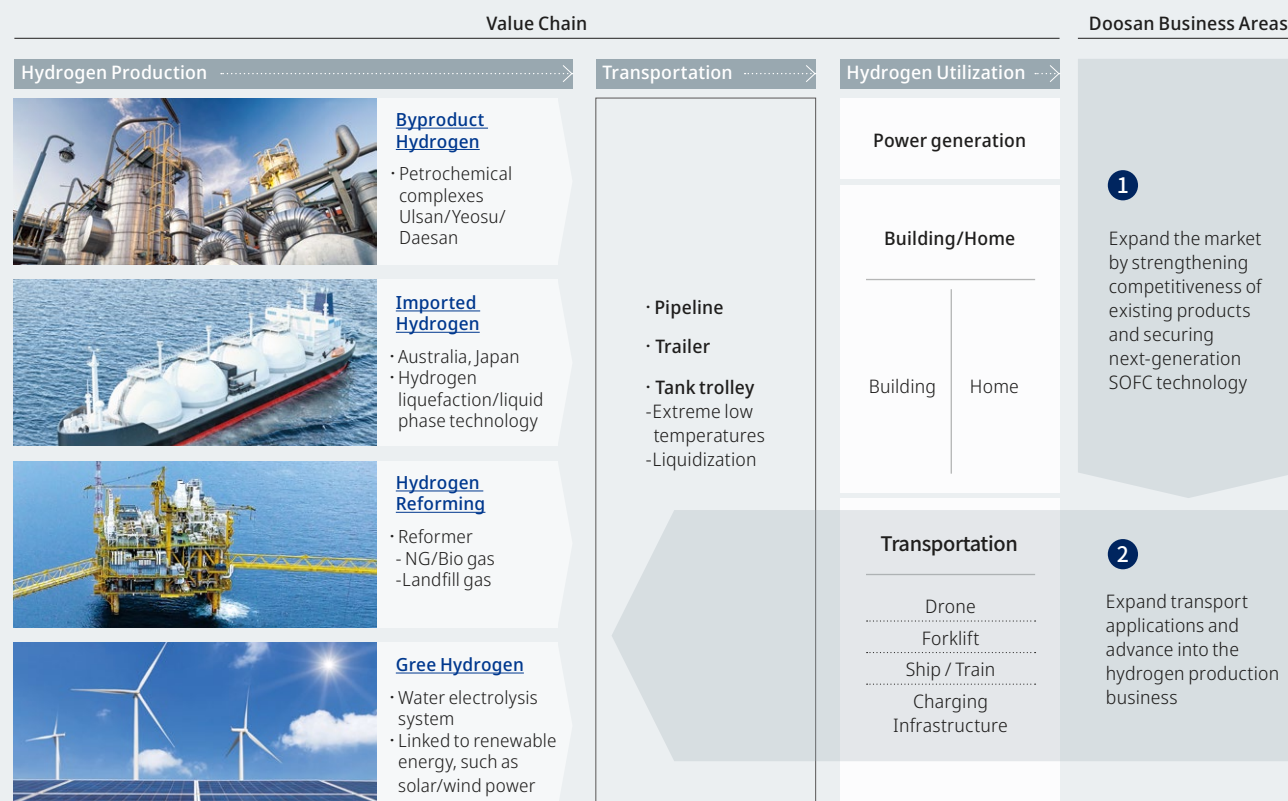
Climate Change and the Hydrogen Economy

Climate change, caused by the burning of fossil fuels, has a significant impact on the environment, society and the economy. Global regulations on natural disasters, ecological changes and greenhouse gas emissions caused by climate change require a switch to new energy sources. Hydrogen is emerging as an alternative, next-generation energy source. Countries are beginning to establish economic and industrial structures(production, storage, distribution and utilization) that use hydrogen as their main source of energy. In Korea, various market opportunities are expected to emerge based on the government's hydrogen economy roadmap. According to this roadmap, hydrogen-based fuel cells are projected to supply 15 GW(307.6 MW in 2018) for power plants and 2.1 GW(5 MW in 2018) for residences/buildings by 2040. Doosan Corporation recognizes the growth of the hydrogen industry under the hydrogen economy roadmap as a business opportunity, and is working to secure a competitive technological advantage and to develop various applications. It will grow into a leading company in the hydrogen industry and push forward the change to an eco-friendly society.

Key Competencies and Business Areas of Doosan Corporation

Doosan Fuel Cell was established in 2014 when Doosan Corporation acquired CEP(ClearEdge Power). It has become a leading company in fuel cells for power generation by winning 300 MW in orders by 2019, including for the world's largest byproduct hydrogen power plant in 2018. In particular, with the possession of the proven PAFC¹⁾ technology, we have secured synergy and life cycle safety. In 2019, it has signed a joint development agreement with Ceres Power, a British fuel cell technology company, to develop high-efficiency SOFC²⁾ for buildings, strengthening the opportunity to expand its fuel cell portfolio and strength in power generation using hydrogen. SOFC is a technology designed to meet existing demand for both heat and electricity, as well as for high-efficiency electricity. Doosan Corporation has been able to respond to various market demands by securing high-efficiency SOFC technology. The hydrogen industry covers the entire value chain, including production, storage, transportation and utilization of hydrogen. Doosan Corporation plans to expand its business throughout the value chain through continuous investment in the hydrogen industry. In particular, our hydrogen fuel cell business will be expanded into various transportation applications beyond its current drone business. In addition, we aim to enter into hydrogen production market in the long term.

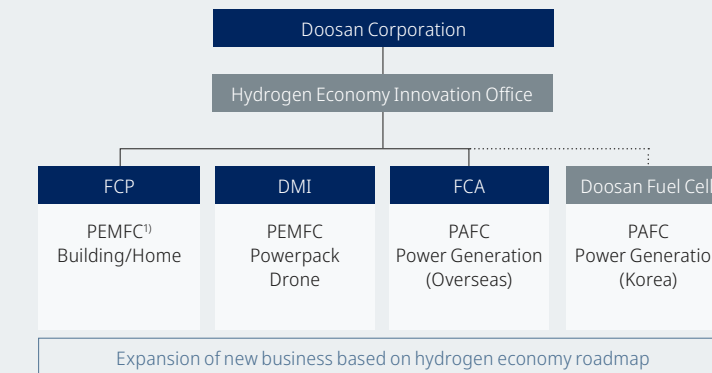
1) PAFC: Phosphoric Acid Fuel Cell
2) SOFC: Solid Oxide Fuel Cell



Doosan Corporation, Preparing for the Future
Foundation for Sustainable Growth
Quantum Leap to Lead the Hydrogen Economy

Role and Direction of Hydrogen Economy Division

In 2019, Doosan Corporation established its Hydrogen Economy Innovation Office(HEIO) as an enabler to present mid- to long-term growth directions for fuel cells based on Korea's hydrogen economy roadmap, capture business opportunities and create new business in the hydrogen economy. The aim of HEIO is to enhance synergy in the development of new products as well as technology by organizing the functions of scattered R&D organizations and strengthening cooperation in Doosan Group.



1) PEMFC: Proton Exchange Membrane Fuel Cell

Enhancement of Competitiveness through SOFC Development & Commercialization

- SOFC System Development(Building/Power Generation)
- Securing mass-production SOFC technology
- Responsible for national projects for development of power generation systems

Discovery and Promotion of Hydrogen Economy Business Model

- Enhancement of company-wide R&D capability
- Alignment of Doosan Group's hydrogen economy business direction
- Expansion of transport application
- Mid- to long-term hydrogen production technology

Stakeholder Interview



Hae-weon Lee, Vice President
Hydrogen Economy Innovation Office,
Doosan Corporation

Q. Following the Korean government's announcement of a roadmap for the hydrogen economy, various policies have been implemented to vitalize the hydrogen industry. Please tell us about the future growth of the hydrogen industry.

A. Building a hydrogen supply chain that can promote mass production and consumption is a prerequisite for the hydrogen economy. We need continuous government and private investment leading to technological development, industrial investment and expansion of supply in order to achieve the national vision and goals. The Korean hydrogen industry is focused on building and expanding the hydrogen supply chain in the short term, but this focus will be shifted to clean and green hydrogen in the long term. The recently-announced regional energy policy is expected to promote the expansion of distributed power generation and the decentralization of energy policy. The role of hydrogen fuel cells will vary, depending on the distribution of energy resources and energy demand in regions.

Q. Please tell us about the direction of Doosan Corporation's hydrogen business.

A. Doosan Corporation hopes to contribute to reducing greenhouse gases by improving the economics of hydrogen fuel cells through continuous technological development and investment to expand supply and improve energy efficiency. Doosan will add high-efficiency SOFCs as a new platform, in addition to with PEMFC and PAFC, the core platform technologies of fuel cells. Various forms of hybridization between platforms will be promoted according to the application purpose and area and based on the specific platform technologies. Hydrogen fuel cell technology will be applied to more areas, including hydrogen drones. Fuel cell powerpack for drones offers new business models for industrial vehicles and construction machinery for Doosan Group under increasingly powerful environmental regulations. The world's first byproduct hydrogen(PAFC) fuel cell plant is about to be completed, and the development of PAFC Tri-Gen, which can produce electricity, heat and hydrogen at the same time, is accelerating. Doosan Corporation entered the sector as a fuel cell business, but ultimately aims to strengthen its position as a leading company in the hydrogen economy and create another leap forward through the production of clean hydrogen, an alpha and omega in the era of the hydrogen economy.

VALUE OUR STAKEHOLDERS

Doosan Corporation focuses its capabilities not only on economic value but also on social value creation. We are engaged in various activities to promote sustainability to communicate with various entities and stakeholders that are closely related to Doosan Corporation's management activities such as employees, customers, business partners, local communities, and the natural environment.



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Create Social Value





Measurement of Social Value

Doosan Corporation strives to properly communicate its business innovation performance and continuous growth process to its stakeholders. We aim to measure the impact of these on stakeholders, which include employees, customers, business partners, local communities, and the natural environment, in order to enhance our role as a company that contributes to society through continuous growth and development and based on solid business ethics. Changes in value for social and environmental impacts that are not represented in our financial statements are measured and monetized for easy understanding by stakeholders. Measurement results are used as performance indicators to enhance the value of Doosan. Doosan Corporation will continue to carry out management activities to enhance social values and communicate with stakeholders.

Measurement Results

Of the social value created by Doosan Corporation in 2019, the area of People, which is measured the change in value of human resources, totaled KRW 159.9 billion. The overall figure fell year

on year due to a decrease in the total number of employees following the spin-off of Doosan Solus and Doosan Fuel Cell. However, increase in new employment in line with the efforts to sustain decent work is worth noticing. Efforts to create a safer working environment have further increased the quality of People value. The area of Planet, which is measured by the impact of business activities on the global environment, saw a 6% year-on-year increase in minus impact. The Partners area, where our impact on shareholders, customers, partner companies, local communities and government agencies is measured, shows that the company's positive contribution to society has increased by about 14 % year-on-year through an increase in dividend yield, expansion of activities to support shared growth for suppliers, and continuous community contribution activities. Despite the spin-off of some business units, Doosan's total social value in 2019 was approximately KRW 459.0 billion(5% increase year on year) similar to the previous year, showing that the positive trend is continuing. Doosan strives to increase its social value based on the impact on its stakeholders.

Areas of Value Measurement	Social Impact	
	Positive(+)	Negative(-)
 <p>People Doosan's differentiated and sustainable performance can only be achieved through talents and the growth of talents. In addition, a safe and clean environment is very important to social value, as it is a duty to our families, society, customers and shareholders.</p>	<ul style="list-style-type: none"> · Employment · Wages and benefits 	<ul style="list-style-type: none"> · Safety factors
 <p>Global Environment As a member of both the community and society at large, Doosan should not cause environmental damage. Instead, we are taking the lead in protecting the global environment alongside the rest of humanity. Environmental protection is not just a matter of corporate image, and it is an area that fulfills our duty in the community and creates more social value.</p>		<ul style="list-style-type: none"> · Greenhouse gas emissions · Waste discharge · Water usage · Air pollutant emissions
 <p>Partners Doosan understands how everything we do serves the interests of our partners. For us, one important area of social value is to build a foundation for long-term success by respecting the interests of all our partners, including shareholders, customers, suppliers, communities and government agencies.</p>	<ul style="list-style-type: none"> · Dividends, capital expenses, taxes · Purchase from suppliers, Support for suppliers · Investment in and donations to local communities 	<ul style="list-style-type: none"> · Violation of fair trade
 <p>Profit Doosan provides high-quality products and services to its customers, and generates fair and high profits for its shareholders.</p>	<ul style="list-style-type: none"> · Securing business competitiveness · Strengthening global competitiveness · Expanding the business platform 	

Create Social Value

Our People

Our Planet

Our Partners

CSR Achievements and Plans

Stakeholder Interview



Jae-hyuk Lee,
Professor at
Korea University

Q. What do you think about Doosan's measuring its social value?

A. It is a meaningful attempt to measure the social value created by Doosan Corporation through management activities and major products. However, it is necessary to constantly think about whether social value can be verified objectively and what activities might be needed to build more social consensus. In addition, it is important to use the results of social value creation strategically. I suggest that Doosan not only to present its social value as backward-looking data, but also incorporate it into forward-looking plans. I expect that Doosan Corporation will be well-equipped to respond to new trends and external demands related to social value.

Activities to Increase Value	Value Created(unit: KRW billion, YOY)
<p>Employment, Wages and Benefits · Realization of decent work through human rights management, Women's Council, leadership competency training, and training performance analysis</p> <p>· Employee communication activities, etc.</p>	<p>159.9 (9% decrease)</p>
<p>Workplace Accidents · IoT-based EHS facility inspections, safety inspections for suppliers</p> <p>· EHS leadership activities, Occupational Health and Safety Management Systems(ISO 45001) certification, employee health programs, etc.</p>	
<p>Greenhouse Gases, Water, Wastewater, Waste, Atmospheric Environment · Investment in waste heat recovery facilities, savings of idle power consumption at production facilities, waste source responsibility management system, and expansion of investment in resource recycling facilities</p> <p>· Response to and monitoring of new environmental regulations, management of water use and discharge water, management of air pollutants, etc.</p>	<p>-16.4 (6% decrease)</p>
<p>Shareholders · Introduction of quarterly dividend system in 2018</p> <p>· 7.3% in cash dividend yield based on common stock(increase of 162% compared to 4.5% the previous year)</p>	
<p>Impact on Customers · Promotion of Quality Committee improvement of quality indicators, and implementation of Quality Academy</p> <p>· Expansion of customer communication channels, strengthening of information management systems, etc.</p>	<p>315.5 (14% increase)</p>
<p>Impact on Suppliers · Shared growth funding, Support for building smart factory and consultation</p> <p>· Evaluation and management of supply chain CSR</p>	
<p>Impact on Local Communities · Measurement of social contribution impact and promotion of representative volunteering activities</p>	
<p>· Securing business competitiveness: Improvement of manufacturing quality capacity, cost reductions, application of digital transformation</p> <p>· Strengthening global competitiveness: Developing market-leading products and promoting diversification of local customers</p> <p>· Expanding the business platform: Discovering future growth engines</p>	<p>533.8 (850% increase)</p>

Social Value
459.0
(5% increase)

* Net income for 2019 reflected KRW 554.9 billion of discontinued operating profit from Doosan Solus and Doosan Fuel Cell.



01 OUR PEOPLE

WHY IT IS IMPORTANT

The world is facing a new industrial paradigm shift based on the Fourth Industrial Revolution, and hyper-uncertainty is emerging due to the rapidly changing business environment. In this management environment, the importance of selecting and nurturing key talents that will lead the company's future is gradually increasing. In addition, the company's efforts to improve the satisfaction of its employees are gradually expanding, such as providing employees with safer and more comfortable working conditions and introducing various in-house systems to guarantee work-life balance.

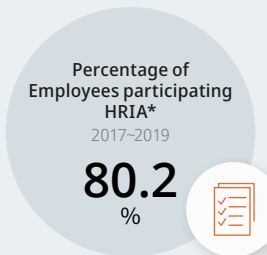
HOW WE RESPOND

Doosan Corporation is pursuing long-term growth based on its 2G strategy(Growth of People, Growth of Business) of nurturing talented people, and is committed to realizing a virtuous circle in which corporate growth provides opportunities for individuals to grow. In addition, we are carrying out various activities, such as creating a safe working environment, strengthening human rights management, and realizing a happy organization for employees based on a corporate culture that respects them.



Link to Materiality

- Realization of a desirable organizational culture for workplaces
- Development of employee capabilities
- Implementation of a safe working environment
- Respect for human rights



*HRIA: Human Rights Impact Assessment

Realizing a Desirable Organizational Culture

Decent work through human rights management

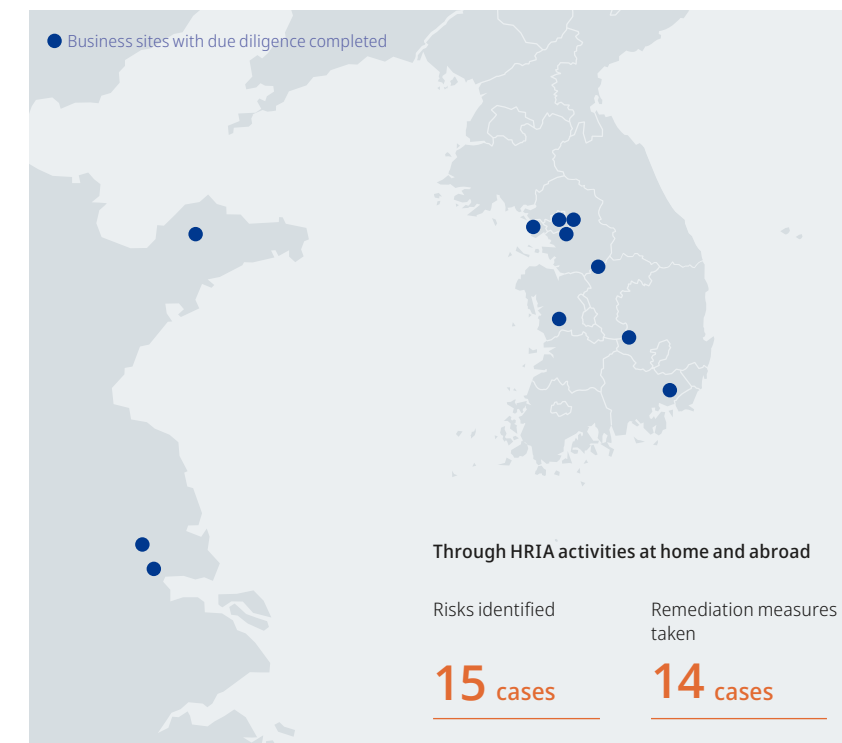
Human Rights Impact Assessment (HRIA)

Through human rights impact assessments, we actively identify potential human rights violation issues in the areas of discrimination, forced labor, wages, working hours, child labor, freedom of association, consumer human rights, information security. Doosan conducts these assessments for all its BGs/BUs and suppliers in all countries where Doosan is in operation. Human rights impact assessments have been conducted on approx. 80.2% of the total number of employees in the last 3 years, and we aim to complete it for 100% of employees by 2021.

Due diligence

Due diligence consists of the assessment, improvement and communication of human rights risks. In 2019, Doosan Corporation established a human rights due diligence plan and conducted assessment on four domestic and Chinese corporations. We selected five major areas(human rights management, fair treatment, prohibition of forced labor, respect and communication, and organizational culture) out of the top ten areas of human rights impact assessments.

Human Rights Due Diligence



Human Rights Monitoring Process

- 01 Commitment of Human Rights Policy**
- 02 Risk & Impact Assessment**
Preparation of Company-wide Human Rights Assessment System
1. Establish assessment areas
2. Establish assessment scope
3. Establish assessment period & plan
4. Summarize assessment result
- 03 Preventive & Mitigating Actions**
Plan for Risk Prevention Measures Based on Assessment Results
1. Take institutional actions for vulnerable areas
2. Educate and communicate
- 04 Performance Assessment & Disclosure**
Review and Reporting of Human Rights Management Assessment
Disclosure of Human Rights Management

Human Rights Due Diligence at Chinese Corporations

Doosan conducted interviews with 26 core employees at its Chinese corporations as part of human rights due diligence. Significant feedback was collected. Short- and medium-term management measures were established to resolve issues that were raised and to implement systematic preventive & mitigation measures.

Mid- to Long-Term Tasks from Due Diligence at Chinese Corporations

01 — Reorganize grievance process and guidance for employees	02 — Enhance human rights education
03 — Provide summer vacation bonus for welfare promotion	04 — Strengthen communications with Korea HQ

Establishing Happy Corporate Culture through Women's Council

Women's Council

Doosan's Women's Council was established in 2014 with the aim of creating a family-friendly and healthy corporate culture in which gender equality is realized. In the early years, the Women's Council focused on programs for establishing a culture of gender equality and developing women's leadership. It now plans and implements various programs to promote the well-being and happiness of Doosan's employees.

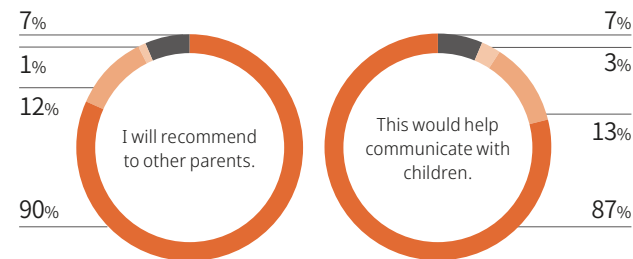
In 2019, we received a great response from employees regarding various programs that were implemented to increase their emotional resilience, such as, 'Welcome! First Time With a Millennial?', which dealt with how to understand the generation gap within an organization and deal with related issues, and 'Welcome! First Time With an Adolescent?' to help employees strengthen communication with their teenaged children.



Better Parent Project

'Welcome! First Time With an Adolescent?', presented by the Women's Council, was a special lecture on better parenting for employees and spouses who were having difficulty communicating with their adolescent children or who wanted to develop a stronger relationship with their children. The special lecture was attended by 140 employees and spouses of Doosan Corporation along with their adolescent children, and a special external speaker was invited to help them strengthen their communication with one another.

Satisfaction Survey for 'Welcome! First Time With an Adolescent?'



● Strongly agree ● Agree ● Neutral
● Disagree ● Strongly disagree ● No response

* Survey of 110 participants 'Welcome! First Time With an Adolescent?'

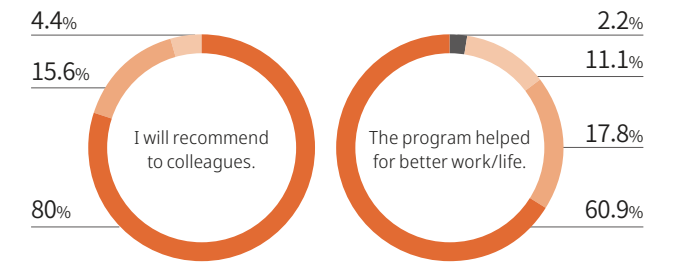
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Overcoming Generation Gap in Organization

As of the end of June 2019, 57% of Doosan's office workers born after 1981. 'Welcome! First Time With a Millennial?', a special lecture, was prepared to help create a better organizational culture by improving the understanding generational differences. Eighty employees participated in the lecture. Doosan's employees got to understand the differences between generations from a demographic perspective and had time to talk about our organizational culture and the future.



Satisfaction survey for <Welcome! First Time With a Millennial?>



● Strongly agree ● Agree ● Neutral
● Disagree ● Strongly disagree ● No response

* Survey of 45 participants 'Welcome! First Time With a Millennial?'

Stakeholder Interview



Jae-yeon Park
CEO of Replus Humanlab

Q. How should corporate culture develop?

A. The business environment is changing, with telecommuting and teleworking becoming more common due to recent environmental factors such as COVID19, technological advances in mobile devices and remote solutions, and the millennial generation, who are familiar with telecommuting and teleworking. Keywords like flexibility, autonomy, and responsibility, which are ideal notions about organizational culture, are rapidly being realized due to such environmental impacts. In the end, I think the biggest issue relating to organizational culture will be <how to communicate with 'autonomy' and 'responsibility' in a situation where 'uncontact' is accelerating, and how to create 'real performance' through 'flexible adaptation'>.

Q. What do you think about Doosan's projects, 'Better Parent' and 'Overcoming Generation Gap in Organization,' to create a happy organizational culture?

A. A happy organizational culture is formed through a close link between roles of parents and leaders. Parents of unhappy families cannot be happy at work. If they are not happy at work where they spend much time, their personal life can't be happy either. 'Work-life balance' cannot be achieved if employees cannot focus on their work when they are annoyed. I think that a true work-life balance is achieved through mutual respect and relationships. Children and parents should work hard for safety, but solve their problems while maintaining mutual respect. Team members and leaders should work hard for personal growth, but also consider organizational growth, also while maintaining mutual respect. That's because the important invisible string of trust is the biggest variable in maintaining trust between people. Doosan Corporation should review mutual respect and consider promoting internal programs.

Developing Employee Competencies

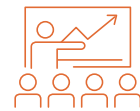
Leader Competency in Responding to Hyper-Uncertainty

Doosan Corporation has operated various training programs to foster leaders who can respond quickly to changing business conditions. In 2019, we created a training programs to enhance the strategic decision-making capabilities of our leaders from a financial point of view.

A total of 143 business team and part leaders participated in the training programs. Those leaders acquired future growth insights for their business based on the strategic perspective of the organization's vision, and learned financial decision-making skills by gaining understanding of financial acumen.

This program, comprised of education and workshops, was conducted to help team leaders identify how the BGs tasks worked in conjunction with Doosan's enterprise management strategy. We plan to strengthen our leadership's innovation capabilities to create a consensus on innovation and promote quantitative and qualitative growth in our business in this era of hyper-uncertainty.

Leader Training Curriculum for Future Growth Insights



Leader Training Curriculum for Future Growth Insights

143 persons

Leader training to build the right future strategy

"It was a very meaningful time for Doosan leaders to discuss its strategic direction related to the company's future growth. If the related education continues to be developed regularly, it will be a good nourishment to strengthen the company's strategic competitiveness."

Comment from a participant



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Employee Training Based on Impact Analysis

Doosan Corporation conducts an impact analysis on training courses for employees to provide better quality education. This education impact analysis measures the degree of on-the-job application as well as organizational and job transfer rates as key factors. The results are reflected in the planning and improvement activities of our employees training courses. Doosan Corporation has conducted scientific anal-

ysis on how our MBA program has affected the growth of junior leaders and has been upgrading trainings since 2013 to better understand effectiveness of the Junior MBA program at enhancing the capabilities of our junior leaders.



Impact Analysis of the Junior MBA

Work Relevance

The support or promotion factors needed to successfully apply the content learned through the training program are continuous stimulation and motivation.

Obstacles

Both participants of the training program and their managers select a heavy workload during Junior MBA, which can act as an obstacle to the effectiveness of program.



Workplace Safety Management

Advancing Site Safety Management

Doosan Corporation has set strengthening 'field safety' as its top priority and is making its management system more sophisticated. Electro-Materials BG extends the MOC(Management of Change) process to all manufacturing processes in order to proactively identify potential risks and prevent accidents.

The existing EHS impact assessment process for new or changed production facilities and processes has been divided into three phases through the MOC process. Doosan Corporation does its best to identify and eliminate potential hazards through risk assessments prepared at each stage: before order, before construction, and after construction.

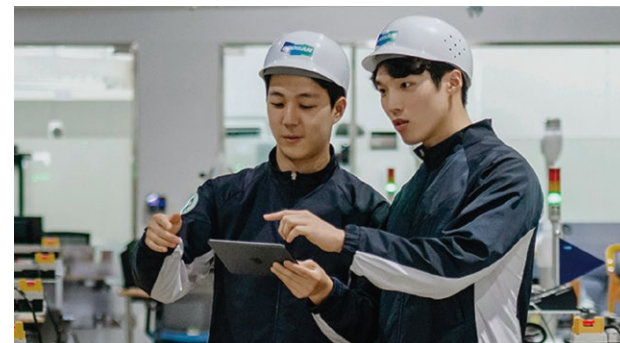
MOC(Management of Change) Process

Description	Before Order	Before Construction	After Construction
Responsibles	Change Management Committee	Safety Planning Approval Committee	Final Approval Committee for Change
Activities	<ul style="list-style-type: none"> · Determination of MOC class (class 1 to 3 according to risk) · Confirmation of possible risks (discussion of related laws, changes, EHS issues, etc.) · Conducting a risk assessment in advance 	<ul style="list-style-type: none"> · Construction safety plan and work safety analysis · Identification of risks before construction (daily check for all workers) · Issuance of daily security work letter 	<ul style="list-style-type: none"> · Inspection before operation and preparation of punch list · Establishment of a work improvement plan · Preparation and amendment of SOP · Training of new workers

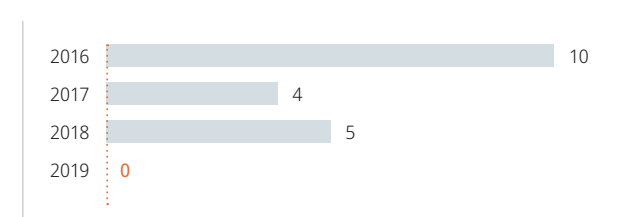
Supporting EHS Activities of Suppliers

Doosan has established and operated four major directions to strengthen employee safety management of its suppliers and achieved zero accidents in 2019. We share EHS management capabilities and major regulation changes through regular EHS sessions and conduct joint inspections to identify and resolve potential risks at worksites. In addition, we strive to manage risk assessment, safety and health education, and technical support for suppliers at the same level as those of Doosan Corporation through Win-Win Safety and Health Cooperation Program. Doosan Corporation plans to support EHS not its in-house suppliers but also outside suppliers(secondary suppliers).

Four Strategies for Safety Management of Suppliers



Accidents by In-house Suppliers (unit: cases)



* For 1,700 employees of 94 in-house suppliers.

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Doosan Corporation operates the Win-Win Safety and Health Cooperation Program with its suppliers to strengthen EHS support activities. We strive to implement disaster-free worksites by managing the safety and health levels of suppliers, covering risk assessment, support for safety and health training, and guidance on safety and health technology. In addition, we operate health promotion programs for suppliers based on prevention activities for stress, as well as for mental, cardiovascular, and musculoskeletal disorders, etc. Doosan Corporation is fully committed to safety and health management activities for its employees, including the employees of its suppliers.

Risk Assessment and Management



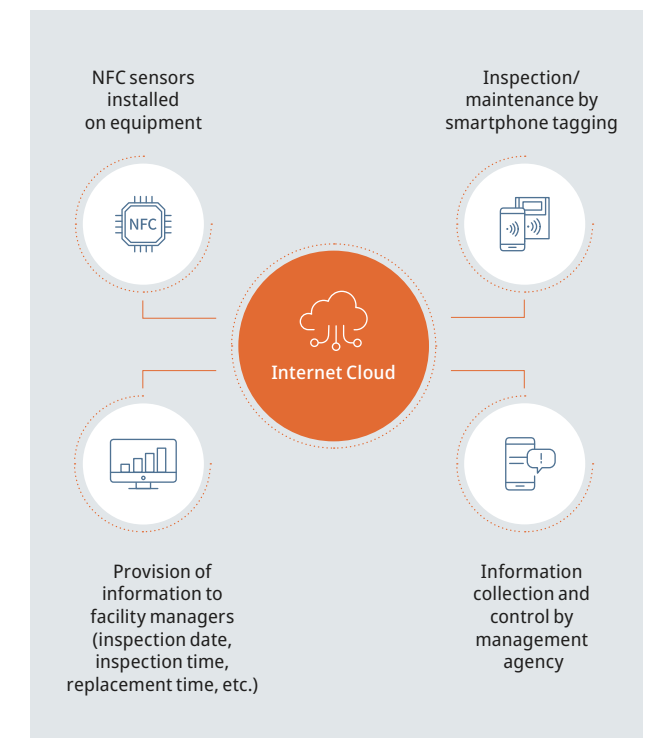
Health and Safety Risk Assessment

- ➔ Doosan's risk assessment team conducts assessment jointly with suppliers.
- ➔ Identify potential risks based on the 4M principle (machine, man, management, media)
- ➔ Classify identified risks according to frequency and intensity, and develop improvement plan and activities in case of high-level risks

EHS Facility Inspection Powered by IoT

Mobile EHS inspection system with IoT technology has been introduced to realize a safe working environment. The system uses tablet devices and beacon* location technology to inspect equipment within scope of operators. The EHS inspection system is now undergoing at Electro-Materials Gimchen plant and will be gradually expanded to all worksites. Doosan Corporation will upgrade the EHS inspection system.

*What is Beacon technology? It's a smartphone near-field communication technology for browsing equipment at close range based on the user's location and connecting them to smartphone programs.



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02 OUR PLANET

WHY IT IS IMPORTANT

Environmental pollution issues, caused by the expansion of corporate production/consumption activities, are a global challenge. Accordingly, various members of society, such as nations and corporate citizens, are seeking different solutions to solve the environmental problems that are emerging globally. Environmental legislation is expanding in major developed countries subject to CSR, such as the EU, and demands for disclosure of relevant information through various channels are gradually increasing.

HOW WE RESPOND

Doosan Corporation aims to minimize the impact of its corporate activities on the global environment. To this end, we are carrying out activities to reduce greenhouse gas emissions based on energy reduction, and various other activities to proactively respond to government regulations, including reducing air pollutant emissions at worksites.



Link to Materiality

- Efforts to reduce greenhouse gas emissions and energy use
- Increased resource circulation and recycling

Sales Ratio of Eco-friendly Products

60 %



Total Investment in Facilities for Reducing Environmental Impact (Domestic worksites)

KRW 6 billion

3.1times ↑ compared to 2018

Energy Savings (5 major worksites)

KRW 640 million



Efforts to Reduce Greenhouse Gas Emissions and Energy Use

Reduction in GHG Emissions Based on Energy Reduction Activities

As demand and regulations for reducing greenhouse gas emissions and improving air quality have increased, Doosan Corporation is carrying out greenhouse gas reduction activities through its Energy Management Committee, which was established in 2018. As all BGs became subject to the government's GHG and Energy Target Management System, Doosan Corporation has established energy saving plans for BGs and is promoting investment and reduction activities to achieve GHG goals.

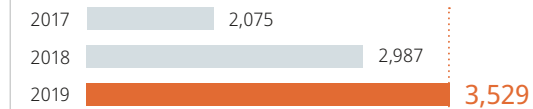
In 2019, the amount of electricity used at Doosan's worksites in energy-intensive management was 87,322 MWh, which was 18.1% less than that of the previous year. Doosan makes efforts to reduce greenhouse gases based on energy reduction activities and increased investment in facilities.

Improving Energy Efficiency of Production Facilities

Doosan Corporation is expanding activities to improve the efficiency of its production facilities in order to meet GHG management targets. In 2019, energy KPIs were established to introduce a unit performance management system and to discover energy waste factors. Electro-Materials BG reduced LNG usage by improving the operational efficiency of incinerators and improved power efficiency by removing unused pipes when changing the cooling water pipes of cooling the tower. In 2020, Doosan Corporation plans to focus on energy saving activities at five major businesses with high power consumption, including Electro-Materials Jeungpyeong, Iksan and Gimcheon plants and Mottrol BG to enhance the system for improving energy efficiency.



Electric Power Savings at Major Worksites* (Unit: MWh)



*Worksites with high power consumption subject to intensive energy management: Electro-Materials BG's Jeungpyeong, Iksan and Gimcheon plants and Mottrol BG

Investment in Energy Saving Equipment (Mottrol BG, investment in heat recovery equipment)

KRW 460 million



Idle Power Management Savings

Our Energy Management Committee has set idle electric power savings of air conditioners and isothermal humidifiers as a key point for energy savings and GHG emission reductions, and is conducting related systematic management activities.

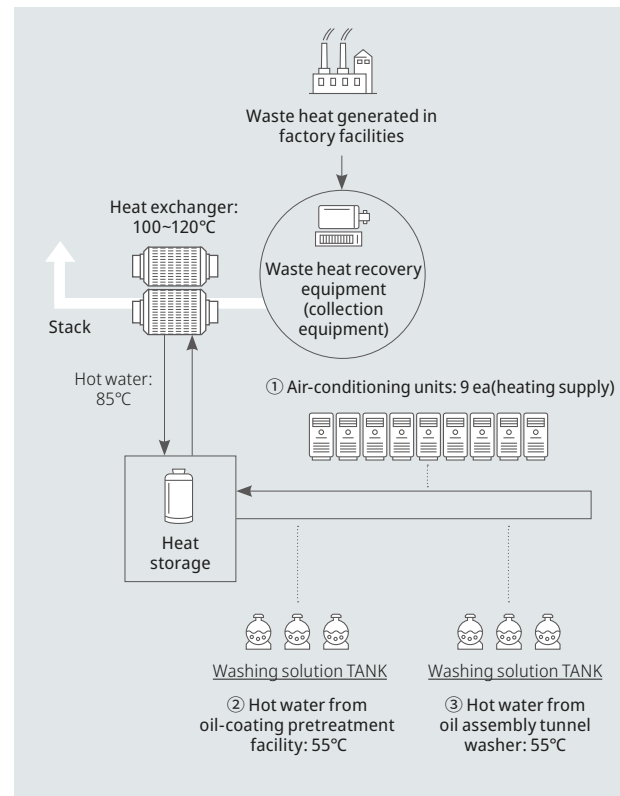
At Electro-Materials BG, 74% of power is consumed by the air conditioning facilities used to control indoor temperature and humidity. Electro-Materials BG's Jeungpyeong plant saved 471,627 kW of energy by adjusting the load of the air conditioning/temperature resistor. Electro-Materials BG's Gimcheon plant saved 593,154 kW of energy by adjusting fan/motor operation and raised the basic temperature of the air conditioner by 2°C.



Investment in Heat Recovery Facilities

Mottrol BG introduced an eco-friendly facility for recycling high-temperature exhaust gases from air pollution prevention facilities and uses them for energy saving activities. The facility realizes energy savings by collecting waste heat through the heat exchanger from collector and by supplying it to the surrounding air-conditioning and heating system. Energy saving is expected to reduce greenhouse gas emissions by 331 tCO₂ (air conditioner KRW 125 million) per year. A total of KRW 460 million was invested in the facility installed in June 2020. Doosan Corporation plans to invest in facilities that can reduce energy and greenhouse gas emissions.

Heat Recovery System

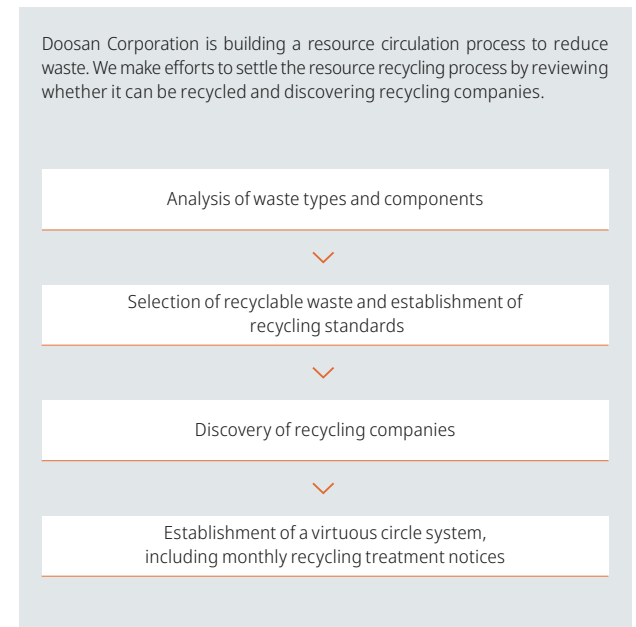


Resource Circulation

Advanced Resource Circulation System

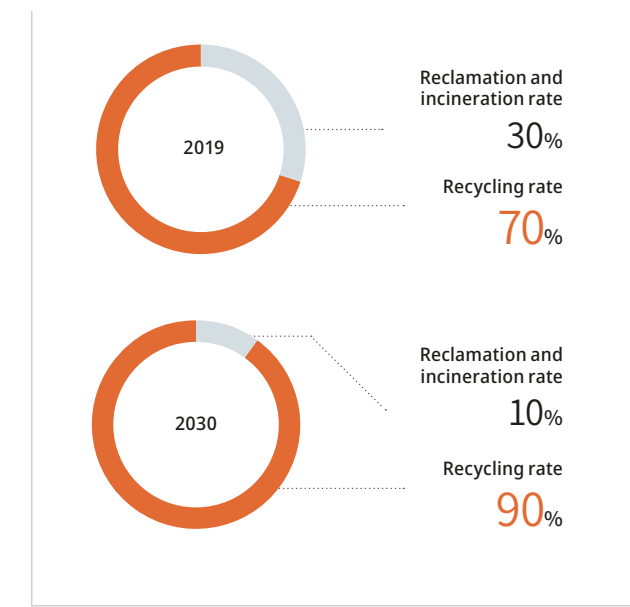
Doosan Corporation has established a waste recycling-based resource recycling process to minimize waste generation in its business activities and to establish a resource circulation system that can recycle unavoidable waste as much as possible. We have established a resource circulation initiative to gradually expand our recycling rate for waste from 70 % as of 2019 to 90 % by 2030 as we put into practice management activities to minimize our environmental impact. Doosan Corporation has established a responsibility management system for waste sources of BGs to enable us to proactively respond the Framework Act on Resource Circulation. A resource circulation goal is set for BGs such as Electro-Materials, Mottrol and Industrial Vehicle BGs. The amount of waste generated is managed according to the BG and the process. Doosan Corporation has established emission goals for its BGs by selecting waste that needs to be reduced, preparing a material balance analysis of emissions performance and establishing improvement measures. In 2019, we reduced the amount of waste we produced by 1,000 tons compared to that of 2018(based on the total domestic volume of regular and hazardous waste).

Establishing a Resource Circulation Process Based on Waste Recycling

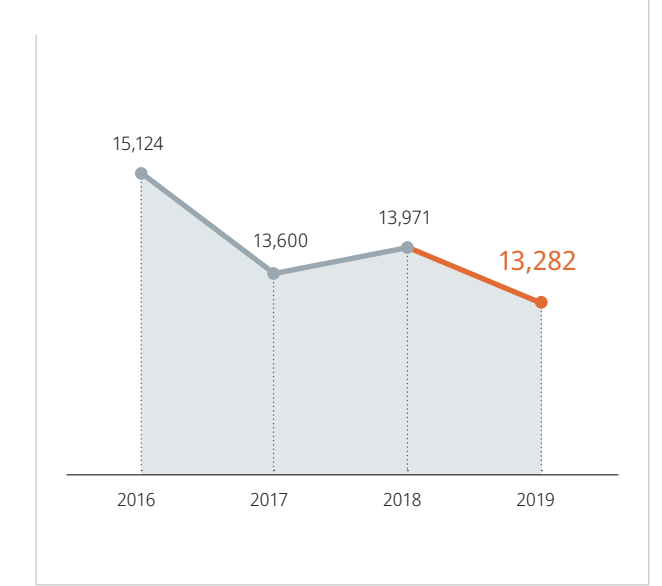


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Resource Circulation Initiative(2030)



Waste Generation (Domestic Waste Generation, unit: ton)



Stakeholder Interview



Il-kyu Lee, Director
Korea Environmental Industry and
Technology Institute

Q. What do you think about Doosan's energy savings and greenhouse gas reduction activities?

A. In terms of business, Doosan's fuel cell business can make an important contribution to the hydrogen economy. In terms of internal management, Doosan's Energy Management Committee, operated by its BGs, is the main body for the energy management plan and activities to reduce greenhouse gas emissions through energy management. I hope that Doosan makes more efforts to raise awareness of the environment among employees.

Q. How do you think corporate resource recycling should be activated?

A. The concept of a circular economy pursuing sustainability through resource saving and recycling has been spreading around Europe, especially in the EU. The most important concept in the circular economy system is the recovery of resources from existing products and their utilization in manufacturing, without any collection of new resources. I hope Doosan Corporation will continue to pursue innovative technologies that can reflect measures to facilitate recycling after disposal for all products manufactured and produced by the company.



03 OUR PARTNERS

WHY IT IS IMPORTANT

Companies are corporate citizens and members of their community. To achieve sustainable growth, they must grow and develop together with their supply chain and local communities. Mutual growth and sharing can be done by anyone, but not by everyone. The practice of sharing with partners and local communities will be an important foundation for realizing a sustainable society.

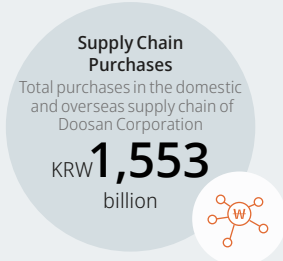
HOW WE RESPOND

Doosan Corporation is engaged in a number of different activities to grow with its various stakeholders. We carry out activities based on the needs of our partners such as supporting smart factories for shared growth, and upgrading social contribution activities aligned with business to practice sharing with local communities. We are also focusing our capabilities on quality management activities through our Quality Committee to enhance customer satisfaction.



Link to Materiality

- Highest-level quality management
- Support for shared growth and strengthening of CSR activities
- Social contribution aligned with business



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Competitive Enhancement through Supplier Support Programs

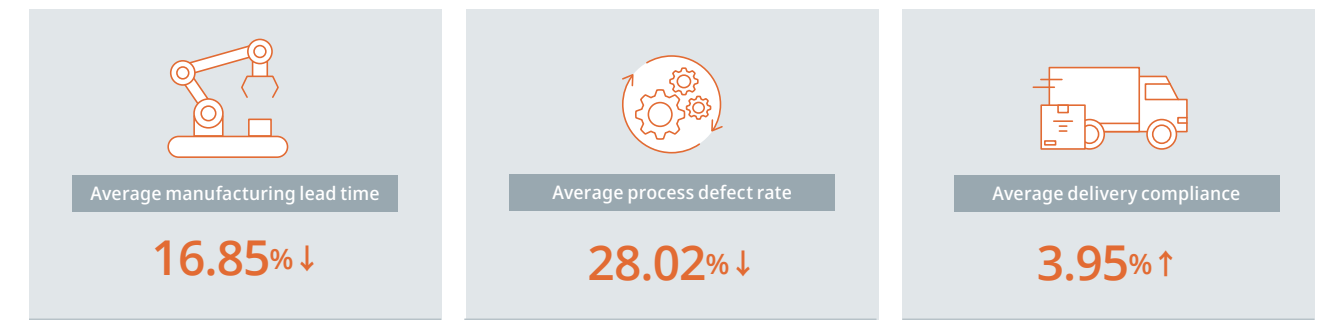
Support for Smart Factories

Doosan is working with the government to support small- and medium-sized suppliers in building smart factories with the aim of strengthening their competitiveness for productivity improvement. In 2019, a total of eight small and medium-sized suppliers selected by BGs were supported of KRW 800 million through Doosan's support project to secure standardization and efficiency of production processes.

The selected suppliers have introduced smart factory systems tailored to their plant facilities and processes. Some suppliers established new integrated Manufacturing Execution System(MES) and real-time Programmable Logic Controller(PLC) using remote management devices. Doosan has achieved quality stabilization and standardized processes for suppliers' products.

Achievements in Supporting Smart Factories

The eight suppliers who participated in the support project established smart factories in their desired locations. They received substantial support in enhancing their core competitiveness in processes, including manufacturing cost reduction, productivity improvement, and process defect rate reduction.



Establishment of Integrated Management Execution System

One of Industrial Vehicle BG's suppliers benefited from Doosan's smart factory support project, and realized productivity improvements in their production facilities with the introduction of the Integrated Management Execution System(MES), which controls process automation machine facilities and related equipment in real time.

This supplier reduced their manufacturing lead time from 180 hours to 160 hours, and manufacturing costs by 3 % through the introduction of a smart factory. In addition, their delivery compliance rate improved from 95 % to 98 %. Doosan Corporation will expand support for small- and medium-sized suppliers in building smart factories, while strengthening their competitiveness and solidifying Doosan's value chain.



Consulting Support for Suppliers

Doosan is conducting consulting support activities to strengthen the manufacturing competitiveness of its major suppliers. In addition to minimizing the burden on suppliers through full cost support, to ensure the active participation of suppliers and more effective consulting operations, core themes were selected in consideration of the urgency and expected effects, which were determined through prior assessments of suppliers.

In 2019, with consideration for urgency and expected effects, three to four themes were selected(i.e., improving productivity, redefining the quality control system, optimizing the operation of raw materials and subcontractors, analyzing business profitability, establishing inventory operation plans, etc.). Then, three to eight months of professional consulting were conducted for ten suppliers to reduce costs, improve quality levels, and strengthen manufacturing competitiveness.

Description	Consulting Task
Industrial Vehicle	<ul style="list-style-type: none"> Analysis of purchase and improvement of raw materials/calculation of inventory turnover rate Re-establishment of labor cost rate for each facility according to actual operations
	<ul style="list-style-type: none"> Analysis of quality defects and drawing up of improvement measures Analysis of purchases and review of activities for improving raw materials/simplifying welding companies
	<ul style="list-style-type: none"> Purchasing analysis and activities to improve key materials Establishment of FCU product unit price system/detailed profit analysis on monthly closing
	<ul style="list-style-type: none"> Establishment of standard time for can manufacturing and improvement of productivity Improvement of defects in painting and can manufacturing/analysis and improvement of steel plate purchasing
Mottrol	<ul style="list-style-type: none"> Review of possible integration of parts processing purchase Establishment of cost basis and calculating labor cost rate/inventory classification standard
	<ul style="list-style-type: none"> Redefining production performance management system/preparing costing standards Organizational maintenance and establishment of performance management indicators for each departments
Electro-Materials	<ul style="list-style-type: none"> Preparation of manufacturing process standardization and facility management manual Reduced production time/improved yields, and establishment of PQ system by products
Fuel Cell	<ul style="list-style-type: none"> Improving work processes and logistics/process quality control system Establishing a worker certification system
Bio	<ul style="list-style-type: none"> On-site inspection and documents based on the Occupational Safety and Health Act and the Toxic Chemicals Control Act Establishment of a KPI management system/shortening of work preparation time Establishment of quality assurance documents and matching processes(process QA/QC system)

Stakeholder Interview



Gun-sin Park
CEO Sung Sin Industries Co., Ltd.

Q. How should large companies support for their suppliers and develop shared growth activities?

A. Doosan Corporation has been carrying out various shared growth activities since last year, which have helped its small- and medium-sized business partners strengthen their innovation activities and problem-solving capabilities. The representative mutual growth program that I received from Doosan Corporation was a consulting support program for strengthening global competitiveness. Outside professional consultants were dispatched to my company, and PSM was promoted for about four months to reduce costs. I was able to learn more systematic inventory management methods and improve my business profitability analysis capabilities. Innovative training for full-time employees has helped them develop a mind for change. If these activities are expanded from primary to the secondary and tertiary suppliers, it will be more effective in strengthening the overall competitiveness of the industry.

Q. Is there anything you want related to Doosan's partner support activities in the future?

A. I was able to access funds at very low interest rates through a shared growth fund created by Doosan with financial institutions. This fund helped me deal with the difficult economic environment that has arisen due to COVID-19. I was able to lay a foundation for enhancing cost competitiveness by establishing a wage rate and cost management system through the management consulting. In addition, support programs for health checkups and funeral services for employees of Doosan's suppliers and their spouses are very popular among employees. I hope that mutual growth will be upgraded to strengthen the technology management of suppliers and the programs that can solve the problem of manpower shortages at small- and medium-sized enterprises in conjunction with large companies.

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Realization of the Highest Quality Control

Advanced Quality Control System

Doosan Corporation realizes customer satisfaction based on products that deliver superior quality and best solutions. We have been operating the Quality Committee since 2015, and have conducted mutual exchange between BG/BU based on the committee. The Quality Committee, consisting of three BGs, is expanded to nine BGs and invested companies, and is engaged in quality innovation activities based on quality data analysis and quality working group competency activities.

In 2019, quality diagnosis activities were carried out at BGs, and the quality system was upgraded by discovering related risks. Risk and diagnosis findings from quality diagnosis activities were presented as the main agenda of the Quality Committee and horizontal discussion activities were carried out. Doosan Corporation will do its best to upgrade its BG-specific quality management system based on the Quality Committee and maximize customer satisfaction through products.

Key Activities of the Quality Committee

- Improvement of vulnerable systems at each BG
 - Horizontal deployment of key items derived from quality diagnosis results(standard operations, change point management, traceability)
- Spread of quality data analysis techniques to all BGs
 - Contribution of data analysis to generating results
- Operation of professional human resources training courses
 - Support for mutual cooperation of BGs through QRS*, based on current status

*QRS: Quality Review Session



Supporting Tasks to Improve Quality Indicators

Doosan Corporation selects major tasks for each BG/BU to improve quality KPIs for each business sector and manages them at the company level. Major tasks are selected by the Quality Committee. Each BG/BU shares its status/target and actively discusses related issues in order to establish a quality indicator improvement task. Established improvement tasks are continuously managed through regular inspection processes.

Support Process for BG/BU Quality Index Improvement Tasks

Quality Committee		Implementation
Sharing current status/target tasks	Discussing/establishing support measures	Implementing/supporting improvement tasks
Sharing improvement tasks to achieve annual quality index goals for each BG	Discuss/establish support measures for quality indicator improvement tasks	Provide full-time support under established support plans

Supporting Collaboration on Key Tasks for Each BGs

BG/BU	Major Tasks	Co-work Partners
Mottrol	Upgrade of quality system	Industrial Vehicle/ Electro-Materials
Fuel Cell	Strengthening of the supplier management system	Electro-Materials/Industrial Vehicle/Mottrol
Bio	Promotion of process improvement/stabilization	Electro-Materials
FCP	Improvement in field quality through data management	Quality Committee
Industrial Vehicle	Reinforcement of DCA/ Kansei quality	Quality Committee

Improving Personnel Competency through Quality Academy

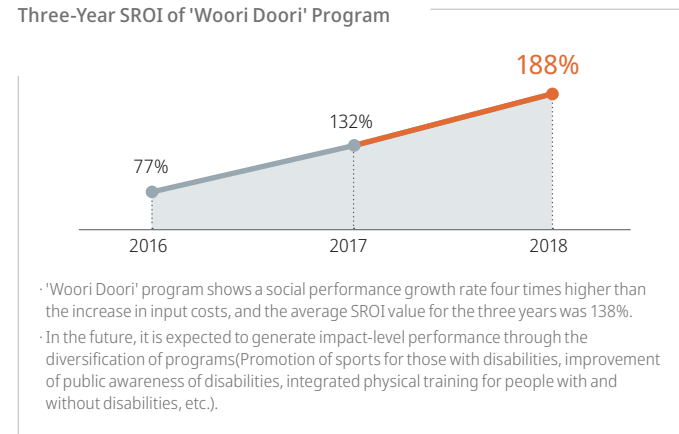
Quality Academy courses are operated to improve the quality management capabilities of employees. Doosan's Quality Academy courses provide a quality competency training system for each position, focusing on basic to advanced quality training courses. The quality management skill of quality personnel is improved through practical training courses that can be applied immediately in practice.

The basic quality course is an essential training course for all working-level staff who are in charge of quality control, and participants learn data management and quality problem solving skills to improve process quality. The advanced quality course is a selected and advanced course, focusing on FMEA(Failure Mode & Effects Analysis) contents based on third-party cases.

Advancement of Social Contribution Projects

Social Value of Representative 'Woori Doori' Program

Doosan Corporation measured the quantitative social contribution performance of the 'Woori Doori' sports program for youths with disability for three years(2016-2018). Doosan measured SROI(Social Return on Investment) for the 'Woori Doori' program and quantified the benefits to beneficiaries. Doosan Corporation was able to see how much the 'Woori Doori' social contribution project has contributed to society.



*What is SROI?

SROI was developed by REDF(Roberts Enterprise Development Fund), a USA private foundation that invests in employment-type social enterprises, and spread by the NEF(New Economics Foundation), a third-sector research institute in the U.K. It is a framework that can quantify the concept of ROI used in economics by applying it to values in a wide range of areas, including various societies and environments.

Formula for Calculating SROI

$$\frac{\text{Monetization of social performance}}{\text{Input cost}} \times 100 = \text{Social Value}$$

Formula for Calculating Outcome

Benefit	Description of indicator	Formula
Promotion of basic physical strength through participation in the programs	Converting the class time and number of classes that youths with disabilities participated in the program to improve basic fitness into the cost that would be paid to participate in a similar program	Program unit price × Number of classes × Number of participants
Improving social adaptation skills through participation in cultural and arts programs	Converting the class time and number of classes that youths with disabilities participated in the program to improve social adaptation skills into the cost that would be paid to participate in a similar program	Program unit price × Number of classes × Number of participants
Reduced medical expenses due to improved basic physical strength and athletic ability	Measured medical expenses saved by improving basic physical strength and motor skills and health through participation in programs by youths with disability	Reduced annual medical expenses × Number of participants in the program for persons with development disabilities who participated in sports activities
Understanding Social Conflict and Improving Perception of Disability	Cost to acquire an individual's understanding and knowledge of society to alleviate social conflicts (improvement of awareness of disability)	- Average social education costs for those in their 20s through 50s × Number of employees participating in volunteer work - Average social education costs for those in their 20s × Number of participants in volunteer work for college students
Increased income of stakeholders (professional program instructor) compared to other programs	Increased income of professional instructors through Woori Doori program to improve the effectiveness and quality of programs where instructor fees are set higher than other programs	Increase in Income × Number of classes × Training time × Number of instructors
Increased institutional income and promoted sponsor programs	Support for Korean Society for Rehabilitation of persons with developmental disabilities to promote the program and network of related organizations for youths with disabilities	Actual payment cost = External income and promotion effect

SROI Measurement Methodology for 'Woori Doori'

Input Calculation	Input Resources · Calculation of project costs, manpower, time, etc.
Activity Analysis	Major Activities · T-ball program, new sports, field day, etc.
Output Calculation	Performances · T-ball program: 359 sessions conducted, 917 employees volunteered, etc.
Outcome Calculation	Benefits for People · Improving physical strength/sociability/social adaptation skills of youths with developmental disabilities · Improving awareness of employees and university student volunteers of disabilities · Increased income for program instructors and related agencies *SROI measurement area: monetization of significant achievements among direct changes to the beneficiary
Impact Calculation	Expected Long-term & Indirect Changes · Promoting sports for disabilities, improving public awareness of disabilities, growing up as a healthy society for youths with development disabilities, etc.

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'Woori Doori' Sports Program for Youths with Disability

'Woori Doori' is a sports program designed to help youths with development disabilities who usually lack the opportunity to experience group sports or build physical strength and improve social skills. For youths with disabilities in Seoul, Incheon, Iksan, and Changwon areas, where Doosan subsidiaries are located, a group of volunteers participated in the program and provided T-ball* coaching.

Classes are organized according to the guidance of professional instructors, and a group of volunteers composed of Doosan employees and college students participated in the program. Youths with development disabilities gathered together at the end of the year for a sports day. In 2019, 220 youths with disabilities took part in 146 T-ball training sessions, and 275 employees(586 hours) participated in the training. In addition, the program received the Mayor's Award for Social Contribution in Seoul.

* T-ball: A new sport where a polyurethane baseball on a T-shaped stick is hit without a pitcher.



'Tomorrow Lab,' Youth Convergence Education Program

Tomorrow Lab, a youth convergence training program, is a scientific education program for middle and high school students aimed at fostering convergence thinking and problem-solving skills among teenagers. The curriculum for middle school students will be held in the first grade class under the 'Free Year Policy'* and consist of a 16-week course to learn the principles of science in life and industry, and to devise new applications to solve future social problems using existing industrial products(e.g. excavators, robotic arms, wind generators, etc.) through design thinking techniques.

The curriculum for high school students is operated as an autonomous club activity. We provide project-type activities for producing products alongside Doosan's employees that can solve social problems uncovered by students under the annual theme of the Sustainable Development Goals(SDGs). In 2019, a total of 267 students from 9 middle schools and 15 high schools in 5 regions participated to develop their dreams and abilities in science and engineering.

*Free School Year Program: It has been implemented in Korea since 2020 to help students reduce burden of exams and find their dreams and talents during first-year of middle school.



Stakeholder Interview



Kyung-woon Lee
Vice President Plan M

- Q. What do you think about Doosan Corporation's representative social contribution project, 'Woori Doori'?**
- A.** 'Woori Doori' is important because it focuses on the problems of youths with disabilities, which are relatively underrepresented in corporate social contributions, and because it has been operated according to a long-term plan, as can be seen in its four-year history. It is also a great achievement in terms of business scalability to carry out programs for elementary school students with disabilities. Beyond just measuring the effectiveness of the annual program, I think it was a timely attempt to verify that the project is achieving its actual business objectives and to measure social performance. If the 'Woori Doori' project is expanded through cooperation with disabled groups or disabled sports organizations in the future, it will become a representative sports program for disabled youths at home and abroad.

Q. What should we do to upgrade SROI measurement in social contribution?

- A.** There were parts that could not be quantified despite the qualitatively meaningful results due to the lack of clear prior research on the social performance and measurement of the 'Woori Doori' project. If research is conducted to secure objective reliability in the social performance and measurement of social contribution projects, especially when there is a need for numericalization, it is possible to quantify more accurate results. Also, I think it is important to focus on the problems that are found in the process of producing results rather than simply evaluating the high and low results, and to always keep in mind that improved social performance is the essential measurement.

- Create Social Value
- Our People
- Our Planet
- Our Partners
- CSR Achievements and Plans**

CSR Achievements and Plans

	Activities in 2019	Plans in 2020	Mid- to Long-Term Plans	Performance Indicators in 2019			
 Promotion of Employee Value	<ul style="list-style-type: none"> Declaration of human rights policy Establishment of a human rights impact assessment system and expansion of the system to overseas business sites Settlement of the 52-hour work week system Expansion of Women's Council activities 	<ul style="list-style-type: none"> Expanding human rights management practice and inspection system Expanding the coverage of human rights evaluation Development and review of mandatory human rights management programs Expanding the system for work-life balance and laying the foundation for activation 	<ul style="list-style-type: none"> Monitoring potential human rights risks in all worksites Achieving 100% in taking actions to mitigate potential human rights risks Continuous improvement of system/culture for work-life balance 	<table border="1"> <tr> <td> Turnover rate(Voluntary turnover rate of regular employees) 5% Mid- to long-term Target 2% </td> <td> Performance of human rights impact assessment from 2017 to 2019 Participation rate of employees 80.2% </td> </tr> </table>	Turnover rate (Voluntary turnover rate of regular employees) 5% Mid- to long-term Target 2%	Performance of human rights impact assessment from 2017 to 2019 Participation rate of employees 80.2%	
Turnover rate (Voluntary turnover rate of regular employees) 5% Mid- to long-term Target 2%	Performance of human rights impact assessment from 2017 to 2019 Participation rate of employees 80.2%						
 Human Resource Development and Respect for Diversity	<ul style="list-style-type: none"> Expansion of key training programs <ul style="list-style-type: none"> Strategic/financial courses for leaders, Insight training for top technicians, etc. Evaluation and improvement of on-the-job application Expand maternal protection program and create a foundation for expanding employment of disabled workers CEO's signing support for UNGC WEPs (Principles of Strengthening Women's Competency) 	<ul style="list-style-type: none"> Strengthening leadership/job training of newly established subsidiaries Expanding and improvement of on-the-job application Improving job development and recruitment process for people with disabilities 	<ul style="list-style-type: none"> Verification and upgrade of impact measurement of job/technical training Introduction of education ROI evaluation and indicator management Strengthening diversity and establishing a culture of gender equality 	<table border="1"> <tr> <td> Average hours of training per employee 44 hours Mid- to long-term Target 74 hours </td> <td> Continue to work rate for 12 months after childcare leave 75% Mid- to long-term Target 85% </td> </tr> </table>	Average hours of training per employee 44 hours Mid- to long-term Target 74 hours	Continue to work rate for 12 months after childcare leave 75% Mid- to long-term Target 85%	
Average hours of training per employee 44 hours Mid- to long-term Target 74 hours	Continue to work rate for 12 months after childcare leave 75% Mid- to long-term Target 85%						
 Safe and Healthy Worksites	<ul style="list-style-type: none"> Establishing a monitoring system for accident prevention Upfront investment and improvement Supporting in-house suppliers to raise EHS competency and awareness 	<ul style="list-style-type: none"> Establishing EHS management culture for in-house suppliers and expanding EHS support for outside suppliers 	<ul style="list-style-type: none"> Spread EHS culture in business sites abroad Introduction of unsafe behavior monitoring program 	<table border="1"> <tr> <td> Rate of occupational accidents 0.06% </td> <td> Lost-Time Injuries Frequency Rate(LTIFR) 0.28% </td> </tr> </table>	Rate of occupational accidents 0.06%	Lost-Time Injuries Frequency Rate(LTIFR) 0.28%	
Rate of occupational accidents 0.06%	Lost-Time Injuries Frequency Rate(LTIFR) 0.28%						
 Response to Climate Change	<ul style="list-style-type: none"> Sharing and benchmarking best practices through the Energy Management Committee Discovering continuous energy saving items and sharing information 	<ul style="list-style-type: none"> Reduce GHG emissions by 10% year on year through energy saving activities Increase awareness of members responding to climate change 	<ul style="list-style-type: none"> Establishing greenhouse gas inventory for overseas worksites Establishment of strategies for climate change 	<table border="1"> <tr> <td> Energy savings 3,529 MWh </td> <td></td> </tr> </table>	Energy savings 3,529 MWh		
Energy savings 3,529 MWh							
 Shared Growth and Fair Trade	<ul style="list-style-type: none"> Expand target for CSR risk assessment and eliminate supplier sustainability risk Spread of Doosan CSR policy on supply chain Strengthen training and inspection, and establish infrastructure for fair trade Establish a win-win cooperation system and programs with suppliers 	<ul style="list-style-type: none"> Expanding sustainability assessment and improving supply chain risk management Continuous spread of CSR policies for overseas suppliers Strengthening competencies of purchasing/shared growth workers Expanding competitiveness of business partners and implementing practical programs 	<ul style="list-style-type: none"> Expanding the sustainable supply chain system Advanced supply chain evaluation system Expansion of support for secondary and tertiary suppliers Expansion of communication channel 	<table border="1"> <tr> <td> Comprehensive evaluation of shared growth index Mid- to long-term Target Most excellent </td> <td> Supplier support for bridging the gap KRW 2.2 billion </td> <td> Fair trade training 1,208 persons </td> </tr> </table>	Comprehensive evaluation of shared growth index Mid- to long-term Target Most excellent	Supplier support for bridging the gap KRW 2.2 billion	Fair trade training 1,208 persons
Comprehensive evaluation of shared growth index Mid- to long-term Target Most excellent	Supplier support for bridging the gap KRW 2.2 billion	Fair trade training 1,208 persons					
 Eco-friendly R&D	<ul style="list-style-type: none"> Re-establish the definition of eco-friendly products and calculate the sales ratio of eco-friendly products Environment-friendly impact analysis Benchmarking of best cases on eco-friendly products reported in CSR reports. 	<ul style="list-style-type: none"> Disclose best cases on 'innovative eco-friendly products' in CSR report Further discover cases for the development of eco-friendly products Analysis of eco-friendly certification cases and possibility of expansion of certification 	<ul style="list-style-type: none"> Declaration and promotion of expansion of eco-friendly products 	<table border="1"> <tr> <td> Sales ratio of Eco-friendly products 60% </td> </tr> </table>	Sales ratio of Eco-friendly products 60%		
Sales ratio of Eco-friendly products 60%							
 Ethics Management	<ul style="list-style-type: none"> Establishing ethics training system Reflecting the results of ethical management level assessment Spreading ethical culture Strengthening internal communication 	<ul style="list-style-type: none"> Enhancement of ethics training system Establish a high-risk corruption assessment system Strengthen the global ethics management Level up of ethical culture for employees Strengthen communication with external stakeholders 	<ul style="list-style-type: none"> Compliance system assured by a third party Carry out regular campaigns to raise awareness Strengthen global ethics management Establish an ethics management system for audit and feedback 	<table border="1"> <tr> <td> Ethics management training 3,119 persons </td> </tr> </table>	Ethics management training 3,119 persons		
Ethics management training 3,119 persons							
 Social Contribution	<ul style="list-style-type: none"> Strengthening the social contribution subcommittee Establishment and operation of the social contribution portal Introduction of new social contribution activities to promote employees' participation 	<ul style="list-style-type: none"> Invigorate in-house communication for social contribution activities Introduction of a promotion system for employees' participation 	<ul style="list-style-type: none"> Improving the social contribution operation system Development of the UN SDGs-linked program Building a platform and providing support for volunteering activities 	<table border="1"> <tr> <td> Participation rate of social contribution 46% Mid- to long-term Target 53% </td> </tr> </table>	Participation rate of social contribution 46% Mid- to long-term Target 53%		
Participation rate of social contribution 46% Mid- to long-term Target 53%							
 Personal Information Protection	<ul style="list-style-type: none"> Establishing a company-wide management system Enhancement of customer information protection Internalizing a culture for personal information protection 	<ul style="list-style-type: none"> Establishing a roadmap and performance management system Inspection on the status of personal information protection for domestic users Creating a culture to better understand personal information protection Provide supervision and consultation for trustees 	<ul style="list-style-type: none"> Promote participation in information protection Cooperation with suppliers for personal information protection Operation of a global response center Response to global standards and certifications 	<table border="1"> <tr> <td> Personal information protection training rate Basic training for employees 1,835 persons(100%) </td> <td> Advanced training for person in charge 151 persons </td> <td> Customer information leak 0 case </td> </tr> </table>	Personal information protection training rate Basic training for employees 1,835 persons(100%)	Advanced training for person in charge 151 persons	Customer information leak 0 case
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CSR POLICY & PERFORMANCE

Doosan Corporation responds to global regulations and initiatives in the economic, social and environmental sectors to minimize negative impacts that may occur through corporate management activities.

In particular, we are gradually upgrading our internal policies, guidelines, and systems and creating various achievements in each CSR areas.

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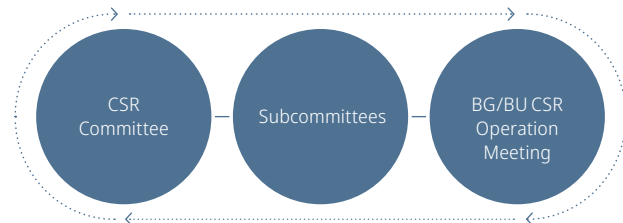
CSR Strategy and Key Activities

CSR Value Structure

Doosan Group declared its firm resolution to practice CSR management and create a 'Proud Global Doosan' on the basis of 'Doosan Credo'. Moreover, to anticipate and promptly respond to various CSR requirements and standards within and outside of Korea, a group-wide CSR strategy has been established consisting of clearly-defined objectives and missions, with four key areas and ten priority tasks. Doosan Corporation has been practicing CSR management based on Doosan Group's CSR value framework. In particular, as the necessity of increasing business value through CSR is growing within society, we have added 'CSR Value Creation' and expanded the CSR area, which used to focus on CSR risk management activities such as meeting legal regulations and industrial standards, to understanding and creating social values.

CSR Governance

Doosan's CSR decision-making assembly consists of the CSR Committee, CSR Subcommittees, and BG/BU-level CSR Operation Meeting, which is operated in accordance with the initiative body.



CSR Committee

As Doosan's supreme decision-making body, the CSR Committee develops CSR strategic directions, reviews CSR-related management activities, and inspects the progress of improvement tasks and implementation plans. The CSR Committee is composed of representatives from all of the company's BGs/BUs, its Corporate Center, and its Administration Center, as well as executives from its key departments. The CEO of Doosan Corporation serves as the chairperson, with the relevant officers assuming responsibility for seven subcommittees, which oversee human rights, EHS, R&D, shared growth, ethics, personal information, and social contributions. The BG/BU heads participate in the CSR Committee as members to enable each business division to aggressively promote CSR activities. The CSR Committee holds two meetings per year, which serve as a forum for designing improvement plans through in-depth discussion of key CSR issues.

Sub-committee

Seven CSR subcommittees have been formed for the fields of human rights, EHS, R&D, shared growth, ethics, personal information and social contributions, and they discuss relevant CSR issues on a quarterly basis. Related matters are shared at the BG/BU Operation Meeting and reported to the CSR Committee.

BG/BU CSR Operation Meeting

The entire BG/BUs of Doosan Corporation separately runs operation meetings for discussing CSR issues and making decisions periodically. An operation meeting is supervised by the head of each BG/BU and carried out by the executives and relevant team leaders every quarter. During the meeting, contents discussed at CSR Committee and Subcommittees are shared, and key activities to be handled at BG/BU level are established for improvement activities.



Key CSR Activities

Operation of the CSR team

Doosan Corporation operates a CSR team dedicated to carrying out CSR management more effectively. The CSR team diagnoses the CSR management activities in order to survey economic, environmental and social risks and opportunities, and identifies and carries out improvement tasks for each subcommittee and BG/BU based on this. In addition, the team establishes the direction of CSR operation at the company level and identifies CSR trends frequently to share with the management and subcommittees.

External Communication of CSR Performance

Doosan Corporation publishes its CSR report each year in order to transparently communicate its achievements and plans with all its internal and external stakeholders. Doosan prepares for the DJSI(Dow Jones Sustainability Indices) assessment, which comprehensively evaluates the economic, social and environmental performance of global companies around the world, and has been included in 'DJSI Asia Pacific', which refers to businesses of the Asian region in the top 20 %, for six consecutive years. Doosan has been rated A or above since 2011 in the ESG(Environment, Social, Governance) evaluation conducted by the Korea Corporate Governance Service. In 2019, Doosan disclosed its company-wide and product-unit social value measurement results in its CSR report. It is carrying out various activities to expand external communication related to Doosan's social responsibility management. Based on these efforts, Doosan's CSR report has achieved remarkable results in several sustainability report awards. In 2019, Doosan's CSR report won awards in two categories at the CRRAs(Corporate Register Reporting Awards), and won a platinum rating at the Spotlight Awards at LACP(League of American Communications Professionals).

Description	2017	2018	2019
DJSI Assessment DJSI Asia Pacific for 6 Consecutive Years			
ESG Evaluation	A	A+	A

Establishment of Sustainability Risk Management System

Doosan Corporation has established and improved its sustainable management direction through activities of the subcommittees of the CSR Committee, which establishes enterprise-wide policies and strategies. It has promoted sustainable risk-reduction activities that may arise at Doosan's BGs and investment company. Doosan Corporation encourages its worksites to conduct voluntary diagnosis and improvement through the Doosan Sustainability Risk Management System(which includes risk level) as well as four key areas: ① Respect for People, ② Reliable Operations, ③ Responsibility in Engagement, ④ CSR Value Creation. Doosan's sustainability risk management is divided into three tiers according to BG/corporate risk impact levels and considering the size and value chain of each business. Self-diagnosis and on-site diagnosis in each group are operated separately by time period. Doosan's sustainability risk management continues to check the risk level of its worksites by conducting improvement tasks according the risk level of issues indicated in the diagnosis. It is expected to become an effective program for responding to global regulations, which have been rapidly changing and constantly strengthening in the global market.

Doosan Sustainability Risk Management



Classification of Tier	Business Size		Value Chain			Risk Impact
	Sales	Employees	Planning	Production	Business	
Tier 1	High impact on stakeholders for production and sales when any risk is incurred					High
Tier 2	Medium impact on stakeholders for production and sales when any risk is incurred					Medium
Tier 3	Low impact on stakeholders for planning and corporation when any risk is incurred					Low

Collection of Stakeholder's Opinions

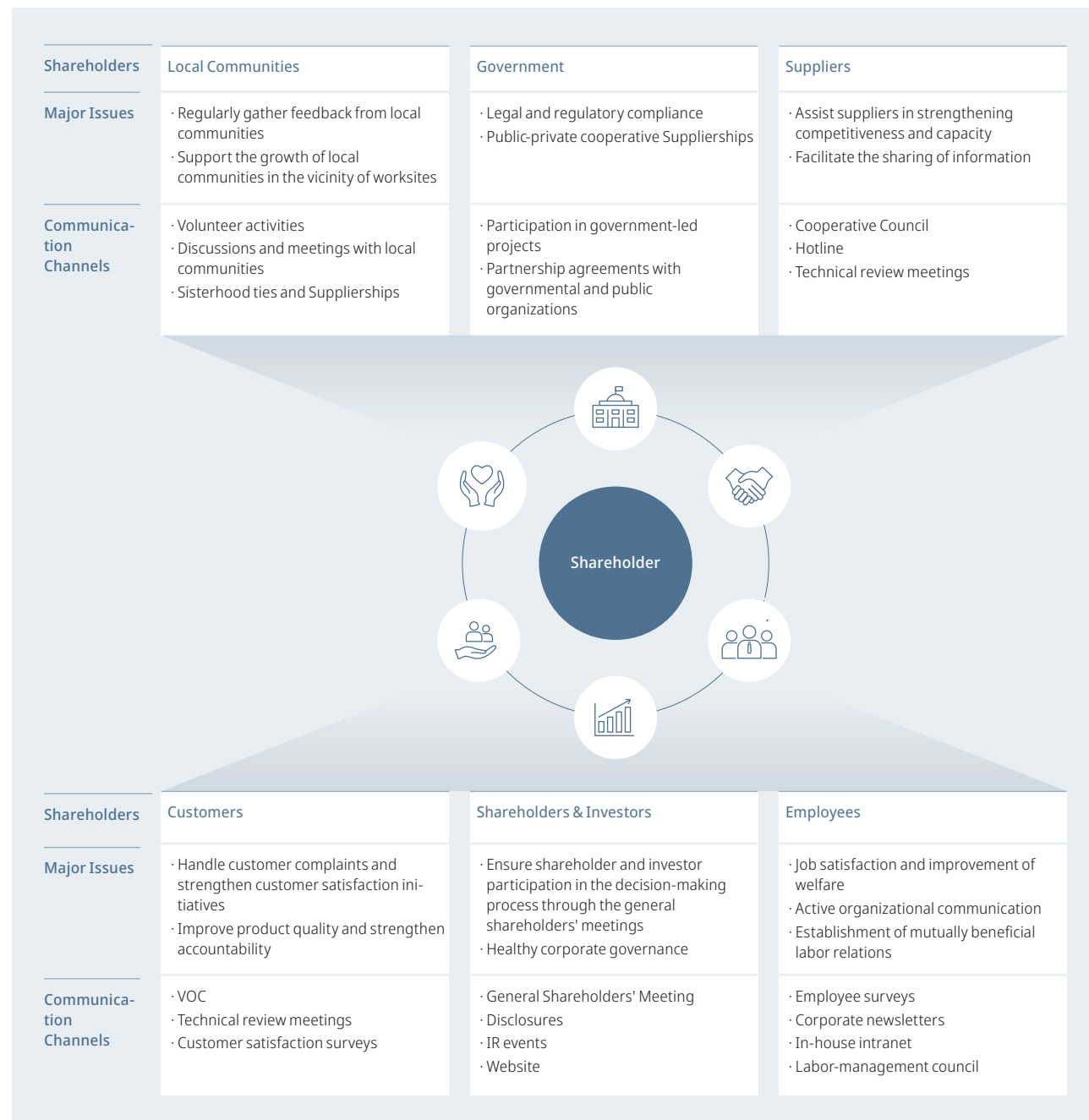
Stakeholders

Doosan Corporation defines its stakeholders as those who wield direct or indirect influence on its business activities. Based on this definition, key stakeholders include shareholders, investors, customers, employees, suppliers, local communities, and government agencies. Based on our classification system, we are carrying out various activities to expand stakeholder communication.

Activating communication with stakeholders

Doosan Corporation consistently employs diverse communication channels to listen to the opinions of stakeholders and reflect them in its management. The outcomes of stakeholder participation are reflected in Doosan's management activities. Furthermore, the achievements of our major activities are disclosed transparently in our annual CSR Report. In addition, Doosan Corporation conducts a materiality test every year with the participation of its stakeholders in order to identify essential key issues for sustainable management.

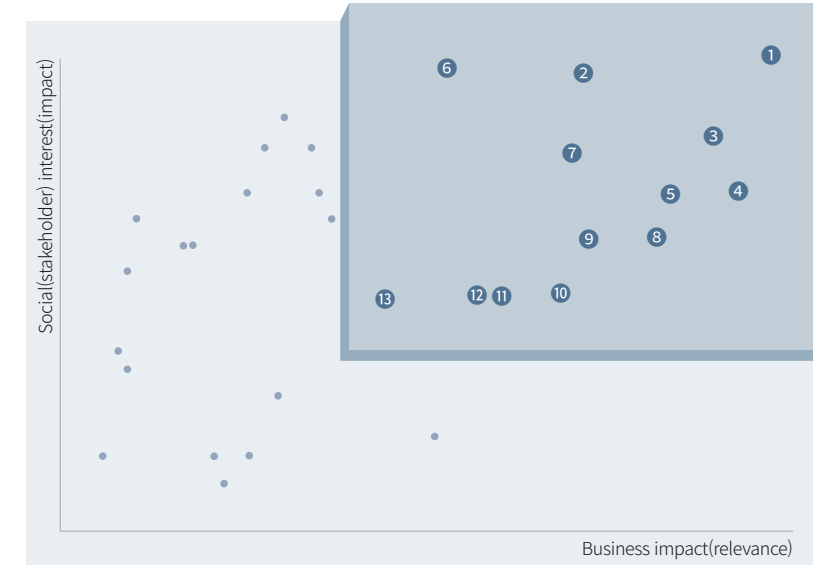
Channels for Stakeholder Engagement



Materiality Test

Doosan Corporation conducts a materiality test every year with the participation of its stakeholders in order to identify essential key issues for sustainable management in terms of the economy, the environment, and society. The materiality test for the 2019 CSR Report was conducted in a four-step process: 1) Building CSR issue pool 2) Prioritizing issues 3) Identifying issues 4) Communicating issues. International standards related to CSR(GRI Standards, DJSI, KCGS ESG Evaluation, ISO 26000, UNGC) were considered for the materiality test. Issue priority was evaluated based on media research, global benchmarking, and Doosan Corporation's internal data analysis.

Materiality Map



Core Issues from Materiality Test

Number	Category	ISSUE
1	Economy	Securement of new growth engines
2	Economy	Highest-level quality management
3	Economy	Increased investment in R&D
4	Environment	Development of environmentally friendly products and services
5	Society	Realization of a desirable organizational culture for workplaces
6	Society	Realization of a safe work environment
7	Economy	Creation of economic performance and improvement of financial security
8	Environment	Efforts to reduce greenhouse gas emissions and energy use
9	Society	Attraction of key talents and enhancement of employee competencies
10	Society	Alignment of CCI activities with business
11	Society	Support activities for Suppliers
12	Environment	Increased resource circulation and recycling
13	Society	Respect for Human Rights

Report of Core Issues

Core issues selected by the Materiality Test are disclosed in the Doosan Corporation CSR Report in the categories of People/Planet/Partners.

Core Issues	People	Planet	Partners
Related Issues	<ul style="list-style-type: none"> Realization of a desirable organizational culture for workplaces Respect for Human Rights Development of director and employee capabilities Implementation of a safe working environment 	<ul style="list-style-type: none"> Efforts to reduce greenhouse gas emissions and energy use Increased resource circulation and recycling 	<ul style="list-style-type: none"> Highest-level quality management Support for shared growth and strengthening CSR activities Alignment of CCI activities with business
Business Relevance	In these constantly changing market conditions and this age of limitless competition, our fundamental competitiveness comes from the competencies of our employees. Implementing a good organizational culture and attracting key talented people are major priorities for the company's future sustainability.	We are facing extreme environmental problems, such as air pollution and climate change, due to high carbon-emission businesses. In particular, waste reduction through resource circulation has become a major issue recently. Efforts to reduce environmental impact have become a major concern for stakeholders, and the environmental management system has become a core element of corporate risk management.	Collaboration with stakeholders in the value chain is an essential element of corporate management for global business competitiveness. Managing a company in such a way that it meets the needs of various stakeholders, including customers, Suppliers, and communities has become an essential activity.
Key Stakeholders	Employees	Local Communities	Customers/Suppliers/Local Communities
Page	Employees(36-43p)	Local Communities(44-47p)	Customers/Suppliers/Local Communities(48-53p)

Governance

Transparency of Governance

The Board of Directors(BOD) is responsible for deliberating and voting on major business issues and making decisions on matters stipulated by laws and corporate by-laws, matters delegated by the general shareholders' meeting, and other important matters related to the company's basic management policies and operations. Doosan selects its outside directors from among professionals who can supervise company management objectively from an external perspective. As of the end of 2019, the Board consists of seven directors, of which three are internal directors and four are outside directors. There are three committees established under the Board, which are composed wholly of outside directors: the Audit Committee, the Internal Transaction Committee and the Outside Director Candidate Nominating Committee. The average tenure of director is 4.2 years.

BOD Operations

Doosan Corporation makes decisions on major agenda items and integrates shareholders' feedback into the decision-making process through the BOD for more careful deliberation. Pursuant to the applicable laws, Doosan allows all directors to participate in the decision-making process by means such as real-time voice communication, whereby directors are deemed present at the relevant BOD meeting. The BOD can host ad-hoc meetings when deemed necessary, and can also delegate a portion of its authority to the BOD committees to ensure swift and efficient decision-making, in which cases thorough reviews are performed and details on deliberations and outcomes are reported to the BOD. Meetings of the BOD are convened when a majority of the directors are present, and decisions are made based on the concurrence of the majority of directors. When a quorum with weighted voting is required by laws and regulations, such a quorum is held. Directors cannot vote by proxy, and any director with personal interest in certain agenda items cannot vote when that agenda is raised for voting. In 2019, the BOD met ten times with an average attendance rate of 95 %.

Directors

Description	Name in Full	Major Career	Duties	Date of First Appointment	Term of Office
Inside Directors	Jeongwon Park	(Present) Chairperson of Doosan Corporation	CEO, President of Board of Directors	2016	4years
	Hyunsoo Dong	(Present) Vice Chairperson of Doosan Corporation	CEO	2018	2years
	Minchul Kim	(Present) President of Doosan Corporation	CEO	2018	2years
Outside Director	Sunggwon Chun	(Present) Advisor to Kim & Chang Law Firm, (Former) Director of Seoul Central District Prosecutor's Office	Audit Committee, Internal Transaction Committee	2019	1years
	Bokhyeon Baik	(Present) Professor at Seoul National University Business School, (Present) Vice Chairperson of Korea Accounting Information Association	Audit Committee, Internal Transaction Committee, Outside Director Candidate Nominating Committee	2019	1years
	Doohee Lee	(Present) Professor at Korea University Business School (Former) Dean of Korea University Business School	Audit Committee, Outside Director Candidate Nominating Committee	2018	2years
	Hyoung Joo Kim	(Present) Professor at Seoul National University, Engineering College (Former) Senior Director of Development Fund at Seoul National University (Former) Head of Informatization Division at Seoul National University	Audit Committee, Internal Transaction Committee, Outside Director Candidate Nominating Committee	2017	3years

Independence of the BOD

The BOD maintains three or more outside directors, thus satisfying its own target, namely, that outside directors should always make up the majority of all directors. In this way, balanced and objective decision-making is facilitated, while the checking function of the BOD is reinvigorated. Directors who have interests in specific matters are restricted from voting on such matters. There are three committees under the BOD(including the Audit Committee), each of which is composed solely of outside directors so as to ensure independence and transparency. For the Audit Committee to perform audits effectively, the committee may request a report of the company's operations or an investigation into the status of its corporate assets. If deemed necessary for auditing, the committee may also request relevant employees or external auditors to attend meetings while seeking advice from experts, at the company's expense.

Procedure and Standards for the Appointment of Outside Directors

To fully enable the BOD's role in promoting checks and balances, Doosan preserves the independence of its outside directors pursuant to the stringent requirements set forth by commercial law. Outside director candidates are nominated by the Outside Director Candidate Nominating Advisory Group, which is composed of three external experts, and the total number of candidates is maintained at less than two times of the number of outside directors to be selected at the general shareholders' meeting. Further, the nominated candidates are recommended to the Outside Director Candidate Nominating Committee. The Outside Director Candidate Nominating Committee, consisting of three outside directors, reviews the candidates' suitability based on considerations such as establishing transparent corporate governance and enhancing the expertise of the BOD, and selects the most qualified persons from among the outside director candidates nominated by the Outside Director Candidate Nominating Advisory Group. The selected candidates are appointed as outside directors after approval of the general shareholders' meeting.

Approval of Key Matters

The BOD approves key management issues, including the disposal or transfer of important assets and the borrowing of assets worth large amounts pursuant to the relevant statutes or internal regulations. In 2019, the BOD approved 58 cases that were referred to it, including the 83rd Annual Financial Statement and the Business Report. The details of such issues are disclosed in the Business Report and other related documents to ensure transparency.

Diversity of Outside Directors

Doosan Corporation strives to secure the diversity of its board members in terms of expertise as well as individual capabilities based on various procedures for organizing its BOD. In particular, Doosan organizes the BOD to make decisions on its management with consideration for diverse viewpoints, including gender, specialization, industrial experience, and origin. Doosan has no female outside directors, but we continue to make efforts to expand the number of female directors on the list of candidates for outside directors.

Evaluation and Compensation

Directors' compensation is determined within the director compensation limit approved by the general shareholders' meeting. Outside directors receive a standard fixed pay, whereas inside directors receive a compensation package, consisting of salary, incentive pay, and severance pay, which is determined in a fair and transparent manner in accordance with the executive management policy.

Stakeholder Communication

The BOD interacts with Doosan's stakeholders through internal and external communication channels such as disclosures and IR events. To promptly provide management information to shareholders and stakeholders, decisions made at the general shareholders' meeting and key decisions on business operations are disclosed immediately.

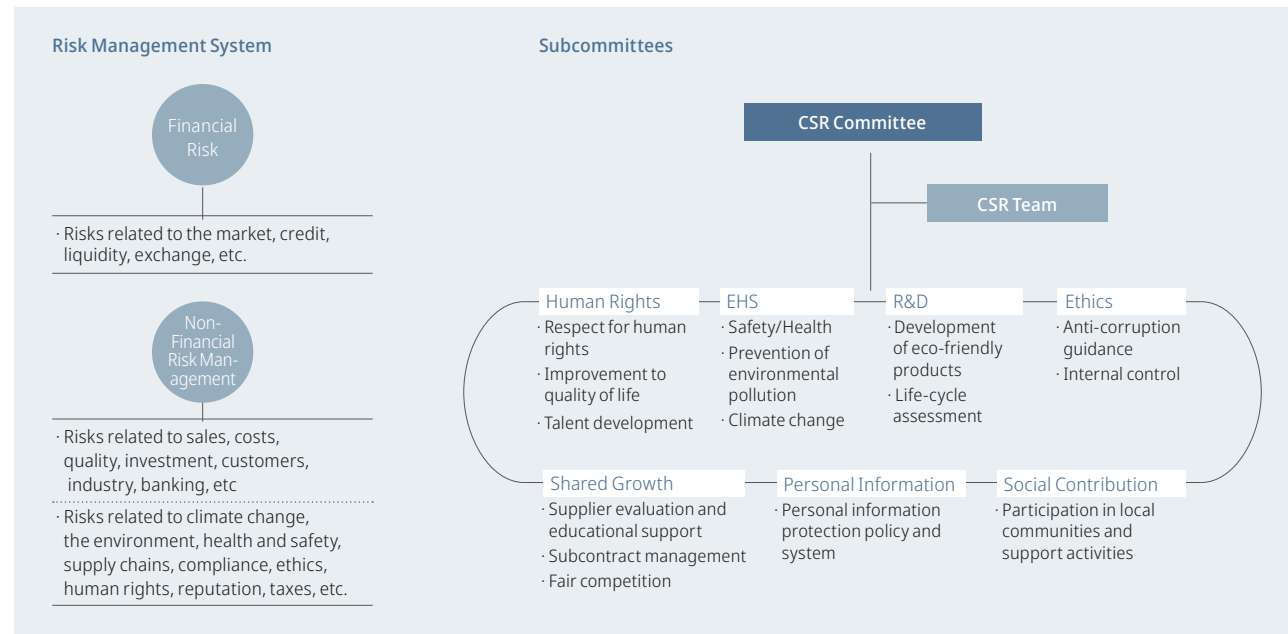
BOD Committees

Description	Audit Committee	Internal Transaction Committee	Outside Director Candidate Nominating Committee
Members	Doohee Lee, Seonggwon Cheon, Hyoung Joo Kim, Bokhyeon Baik	Seonggwon Chun, Hyoung Joo Kim, Bokhyeon Baik	Doohee Lee, Hyoung Joo Kim, Bokhyeon Baik
Responsibilities	Audit the company's accounting and business operations and review the operational status of the internal accounting management system	Deliberate on and approve internal transactions pursuant to fair trade law	Nominate outside director candidates
Description of Activities	Review the outcomes of accounting audits performed by external auditors, provide consultations on non-audited services, review the operational status of the internal accounting management system, etc.	Approve inter-affiliate transactions, etc.	Nominate outside director candidates, etc.

Risk Management

Risk Management System

Doosan Corporation carries out risk management for all business activities at all its worksites across the world. Risks are classified into financial and non-financial categories for more systematic enterprise-wide risk management.



Management of Financial Risk

Doosan Corporation focuses on financial risk management with the aim of improving its financial structure and enhancing efficiency in the use of funds in order to facilitate stable and continuous management in conditions where risks are likely to arise in connection with the market, credit, liquidity, and exchange rates. In particular, the company focuses on improving its financial structure and enhancing its fund management efficiency. Financial risk management is primarily led by the Treasury Team, which sets financial risk thresholds and management policies by closely working with other relevant teams, while identifying, evaluating, and hedging financial risks. In addition, Doosan aims to minimize the impact of potential financial risks through regular monitoring.

Management of Non-Financial Risks

Non-financial risks are managed by dividing them into business and sustainability risks. Each of Doosan's BGs/BUs manages business risks in-house, while sustainability risks are managed by the CSR team at the Corporate Center which oversees all BGs/BUs in collaboration with the relevant departments. Also, Doosan Corporation's CSR Committee sits twice a year. At the CSR Committee, the CEO of Doosan Corporation, the heads of the BGs/BUs and the directors of subcommittees inspect enterprise-wide activities and achievements related to sustainability risks, and identify and manage factors requiring improvement.

Internal Control System

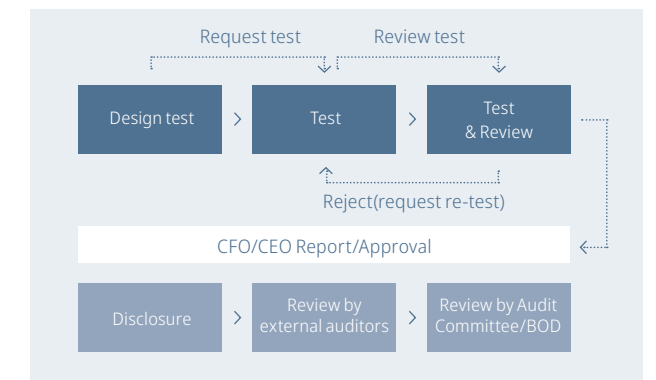
Doosan Corporation operates internal control assessment systems to secure the transparency and reliability of information. In 2018, strengthened by revisions to the 'the Act on External Audit,' it conducted a full redesign of its internal accounting management system with external auditors in response to the external auditor's audit of the operation of the internal accounting management system. The internal accounting management system, which reflects the revised best practices, has further strengthened the level of management of accounting transparency and risk.

The DICAS(Doosan Internal Control Assessment System) includes not only internal accounting management systems, but also items related to operational efficiency and compliance, as Potential hazards subject to monitoring and control. It assesses every aspect of the company's business operations, including, but not limited to, finance, sales, purchasing, and production. All BGs/BUs of Doosan Corporation perform an interim and end-of-tern internal assessment for each team, whereupon an independent external auditor inspects their performance. The outcome of the assessment is reported to the Audit Committee and the BOD via the CFO and the CEO based on the internal accounting management system and the Act on External Audit.

In 2019, Doosan Corporation prepared a management system to diagnose/evaluate corruption risk level by BG and to identify the initial signs of risks before they occur by defining core risks that affect the overall company. Doosan Corporation completed an upgrade of its internal accounting management system by reflecting internal and external changes in the DICAS.

Doosan Corporation is strengthening its internal control assessment systems not only in Korea but also at overseas businesses. Risks have been managed for overseas branches and corporations in the Americas and Europe through internal control items since 2018. In 2020, Doosan Corporation will enhance the transparency and reliability of accounting information by checking and improving local processes.

Internal Control Assessment Procedure and Structure of Executive Authorization



Emerging Risk

Emerging risks mean risks with high uncertainty that can occur over the long term. These emerging risks must be identified and managed preemptively, as they can have a significant impact on business. Doosan is promoting the long-term stability of management by building an emerging risk management system. We identify emerging risks by

analyzing the political, economic, social, technological, legal, regulatory, and environmental factors of the macroscopic environment related to company business. Furthermore, we constantly implement and monitor plans to mitigate each risk after determining its priority based on the time of possible occurrence and the potential impact on business.

Key Emerging Risks	Changes in Technology	Fluctuations in Markets and Business	Procurement of Raw Materials	Climate Change and Environmental Risks
	<ul style="list-style-type: none"> Market changes attributable to new technological trends 	<ul style="list-style-type: none"> Global economic downturn and slow growth of existing main markets Intensified price competition due to excessive supply Emergence of new competition elements 	<ul style="list-style-type: none"> Supply imbalance of imported raw materials(if the export of raw materials is limited by supplying countries based on the prioritization of domestic industries) 	<ul style="list-style-type: none"> Strengthening environmental regulations Depletion of fossil fuels/unstable supply Change of business/product/technical regulations
Potential Impact on Business	<ul style="list-style-type: none"> Business falling behind in the market as it fails to capture new growth opportunities in a timely manner 	<ul style="list-style-type: none"> Decreased sales of existing main products Decreased profitability due to decline in selling prices and competition to secure supply volume Decrease in market share 	<ul style="list-style-type: none"> Disruption of production due to shortage of raw materials Customer dissatisfaction and damage to corporate image due to failure to deliver ordered products in a timely manner 	<ul style="list-style-type: none"> Loss of market opportunities due to failure to comply with environmental regulations Loss of product utility due to depletion of fossil fuels/unstable supply Unsustainable product/technology development or business due to changes in regulations
Risk Mitigation Activities	<ul style="list-style-type: none"> Analysis of market opportunities for technological changes Introduction of the Product Development Roadmap and Technology Development Roadmap 	<ul style="list-style-type: none"> Reshuffle of product portfolio: Focus on high-performance, high value-added products Expansion of business lines: Provide total solutions across the entire value chain, veering away from existing business lines Focus on increasing sales in overseas/emerging markets 	<ul style="list-style-type: none"> Diversification of supply channel of raw materials 	<ul style="list-style-type: none"> Update of the Product Development Roadmap and Technology Development Roadmap to reflect environmental impacts Promotion of product innovation using alternative energy sources Continuous pre-monitoring of business/product/technical regulations

Anti-Corruption · Ethical Management · Fair Trade

Anti-Corruption and Ethical Management

Doosan's Code of Conduct

To ensure sustainable growth and fulfill its corporate social responsibility, Doosan has enacted its Code of Conduct, which serves as the guiding principles for employees in the performance of their duties. Doosan's Code of Conduct comprises Inhwa, a customer-centered business philosophy, and transparent management. Doosan encourages its suppliers as well as all its employees to comply with the Code of Conduct. Doosan has also enacted detailed regulations and adhered to the Code of Conduct so as to embed the code in the daily work and life of its employees.

*Click the following link for further details concerning Doosan's Code of Conduct <https://www.doosan.com/kr/csr/csr-code/?menu=code-ofconduct>

Anti-Corruption and Ethics Education

To enhance the ethical business mindset of its employees, Doosan Corporation conducts ethical business education each year and collects sworn statements from all of its employees and other interested parties requiring them to observe the Code of Conduct. In addition to educational programs on ethical business practices, including online and offline training and workshops, in 2019, Doosan provided online education for office workers and offline education for technical workers at overseas subsidiaries in seven different languages: English, Chinese, French, Vietnamese, German, Czech, and Korean.

We plan to expand education on the Code of Conduct throughout the year through general meetings and discussions for suppliers, and additionally conduct face-to-face education not only for employees of newly established subsidiaries and new employees, but also for those who have not completed online and offline trainings. In addition, we will consolidate the foundations for ethical management and compliance through special education by key work function(purchasing, financing, etc.).

Corruption Risk Management System

In 2019, Doosan Corporation established the Corruption Risk Management System to diagnose/evaluate corruption risks for each BG. The level of compliance management has been strengthened through comprehensive consideration of the possibility of occurrence and business impact of corruption items and the preparation of improvement plans for vulnerable areas. In addition, Doosan Corporation prepared a management system for diagnosing/evaluating core risks for each BG and to identify the initial signs of risks before they occur by defining core risks that affect the overall company. These core risks will be managed by team members, team leaders, and executives.

Doosan's ethical management level will be assessed by third parties(anti-corruption agencies, UNGC, etc.). We will strengthen our foundation for ethical management and compliance based on benchmarking of advanced companies.

Anti-Corruption for Suppliers and Employees

Doosan conducted an anonymous questionnaire survey on 543 of its suppliers with the goal of preventing corruption and malpractice by analyzing the status of the ethical business practices of their employees. In addition, we assessed the level of ethical business performance and anti-corruption behavior of all our employees and shared improvements with relevant departments to reflect the establishment of the anti-corruption evaluation and management system. Furthermore, we carried out activities for improving leader awareness(spreading cases of social issues, etc.), delivering ethic letters(special days, such as holidays), and opening a supplier communication channel(hotline), to ensure that our ethical business policies are reflected throughout the value chain.

Whistleblowing System

Doosan has set up an internal confidential reporting system to establish transparent and fair ethical management. By keeping the details of reports confidential, Doosan protects informants and ensures that they do not suffer any disadvantages. Major issues are investigated and reported to the CEO and the Audit Committee. Doosan Corporation operates a cyber whistleblowing center through its website, where anyone can file a report either anonymously or under their real name. In 2019, it received twelve tip-offs concerning violations of Doosan's anti-corruption policies or Code of Conduct. Based on these reports, Doosan improved its internal business processes, conducted preventive education, and took disciplinary action against those concerned.

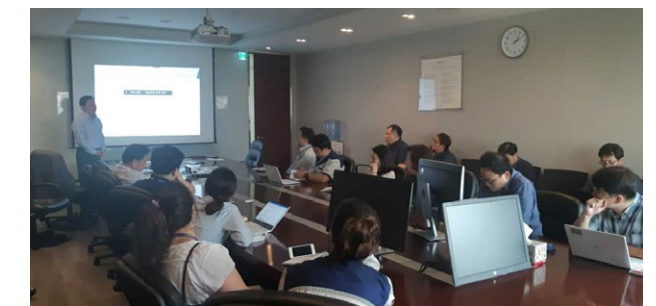
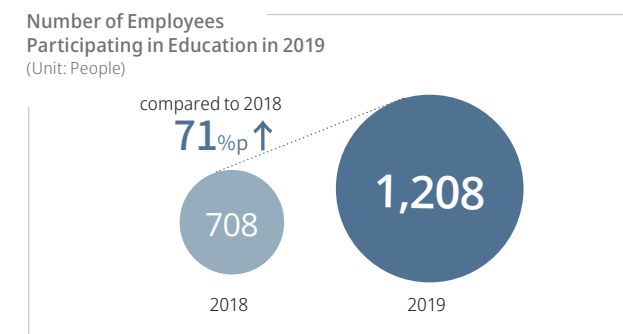
Fair Trade

Program for Compliance with Fair Trade Regulations

Since 2004, Doosan Corporation has operated a compliance program for fair trade regulations in order to promote transparent and legitimate business activities and foster a culture of compliance with fair rules while also fulfilling its corporate social responsibility. In 2019, we strengthened our program of compliance with fair trade regulations and prevented violations of the law in order to fulfill our social responsibilities to stakeholders, including suppliers. We provided our 1,208 employees with education on the 'Fair Transactions in Subcontracting Act,' the 'Fair Agency Transactions Act,' and 'Act on Fair Transactions in Large Franchise and Retail Business,' and on the shared growth mindset to prevent violations of the law and abuse of power. Doosan plans to continue providing such education for its employees while strengthening the monitoring of fair trade practices and applying latest laws to the fair trade manual for employees.

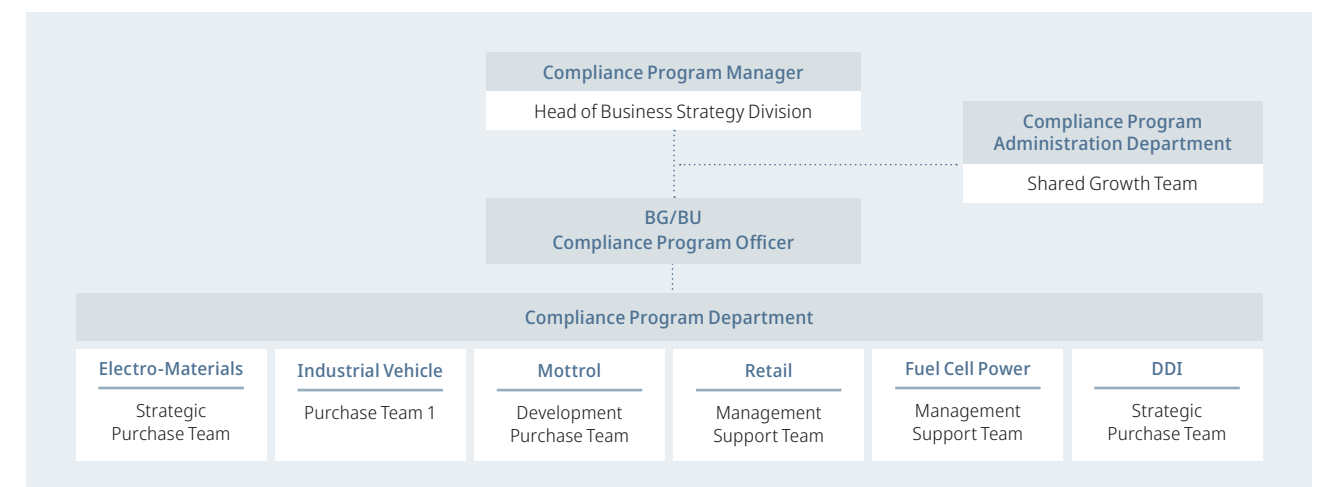
Strengthening fair-trade activities for Suppliers

Doosan Corporation established its 'Partner Data Request System' to transparently disclose the entire process of requesting, receiving, using and disposing of technical data to suppliers in order to fundamentally solve the recent social problem of illegal technology acquisition from suppliers. We recognize our suppliers as true business partners and in order to protect their technical data, we have made efforts to promote their rights and interests by encouraging them to use the 'Technical Data Escrow System' and providing support for all expenses of the escrow system. In addition, Doosan Corporation has enacted its 'Four Major Practices for Fair Trade' to strengthen its internal inspection system related to fair trade, and regularly monitors and improves fair-trade for all BGs.



Employee Education for Fair-Trade

Organization of the Fair-Trade Compliance Program



R&D

Enhancement of Technological Competitiveness

Market-Based Technological Competitiveness

Doosan Corporation practices technology-oriented management to lead innovation in technologies, products, and solutions based on market and customer requirements and analysis of rapidly changing technology trends. Doosan steadily explores and preemptively secures innovative technologies in order to develop, in a timely manner, market-leading products according to its mid- and long-term business strategies. All of Doosan Corporation's BGs/BU regularly establish a PRM¹⁾ and TRM²⁾ with specific action plans, and have reoriented their mid- and long-term growth objectives towards rapid growth and a highly profitable business portfolio, based on an analysis of changes in the markets and the technological environment.

1) PRM(Product Roadmap) 2) TRM(Technology Roadmap)

Enhanced Ability to Practice Technology-Oriented Management

To enhance its ability to practice technology-oriented management, Doosan operates various assemblies organized and managed by the CEO. Mid-and long-term technological strategies based on market and technology trends are established through PRM/TRM sessions, which is our core system of technology-oriented management. Furthermore, the periodic R&D Project Review Session inspects newly-started projects and the progress of ongoing R&D projects. In addition, sustainable growth is promoted at our Technology Management Summit through

Technology-Oriented Management System

PRM/TRM	<ul style="list-style-type: none"> Analysis of market/technology trends → Development of mid- to long-term technological strategies
Review of R&D Projects	<ul style="list-style-type: none"> Inspection of core task achievements and risks → Enhancement of execution capability for R&D projects
Review of New Product/Technology Development	<ul style="list-style-type: none"> Application and enhancement of new development processes → Preemptive development of products/technologies
Technology Management Summit	<ul style="list-style-type: none"> A forum for discussing technology-oriented management and business innovation, guided by Doosan Corporation's vision and the pursuit of sustainable growth → Presentation of innovation examples of leading companies and brainstorming to find directions for technology-oriented management → Sharing of the execution processes and outcomes of technology innovation
R&D Projects Review	<ul style="list-style-type: none"> Inspection of core task achievements and risks → Enhancement of execution capability for R&D projects

the sharing of division-wide performance and future technology trends.

In 2019, the Technology Committee was established to expand technological cooperation, including by finding and clarifying growth engines among BGs. We are conducting various activities, led by R&D executives in the mechanical/logistics field, to expand business opportunities in advanced materials to prepare for the era of 5G and electric vehicles, in energy to prepare for the hydrogen economy, and also in logistics solutions.

Establishment of an Enterprise-Wide Integrated IP Strategy

Doosan Corporation has established an enterprise-wide IP strategy in connection with its mid- and long-term R&D road map(PRM/TRM), and secured an IP-based system to enhance R&D. It releases new market-leading products by first analyzing the patents of competitors and clients during the R&D planning stage and then pioneering differentiated technologies and strategic IP.

Development of Environment-Friendly Products

Initiatives for the Development of Eco-Friendly Products

Electro-Materials BG is focusing its efforts on developing eco-friendly materials in the field of electronic products. It has created an eco-friendly product portfolio in its R&D road map to develop products based on eco-friendly materials(lead-free, halogen-free, dust-free materials, EV batteries, low-power display materials, etc.). In addition, products are designed to use fewer hazardous ingredients in the development stage, avoid the use of toxic solvents and manage environmental factors according to the EHS impact assessment(hazardous raw materials, raw material MSDS, etc.). In the intermediate development stage, hazardous substance review tests(RoHS II¹⁾, SVHC²⁾, etc.) are applied to verify that products do not violate international restrictions on hazardous substances. As a major achievement in the development of eco-friendly materials, BG developed eco-friendly and halogen-free products with halogen-free middle loss and halogen-free ultra-low loss features applicable to high-capacity, high-speed and high-function 5G network equipment, as well as BPA-free(bisphenol A-free) products that can be used in fingerprint recognition modules. In 2020, the BG will start developing technologies based on materials that may be applied to batteries for electric vehicles, contributing to the supply of eco-friendly electric vehicles and thereby helping to preserve air quality.

1) RoHS II: Restriction of Hazardous Substances Directive adopted by the EU to restrict hazardous substances in electronic and electrical equipment
RoHS 6 major hazardous substances (lead, mercury, cadmium, hexavalent chromium (Cr6+), PBBss, PBDEss) + four Phthalates (DEHP, BBP, DBP, DIBP)
2) SVHC: Substances of Very High Concern

Customer Satisfaction Management

Customer Communications

Customer Communication Channels

Doosan strives to strengthen the management of customer satisfaction by expanding communication channels with customers and reflecting customers' opinions.

As part of its drive to reduce the number of customer complaints, Electro-Materials BG has promoted various weekly Q-Day activities at the initiative of the quality department. Q-Day is a quality improvement activity with the aim of sharing quality-related issues and discussing solutions and improvement measures. Electro-Materials BG carries out activities to meet customer satisfaction management through quality improvement.

Mottrol BG was able to shorten its response time for settling customer claims by improving its system for monitoring the entire process, from the receipt of a claim to the final resolution. In addition, it is steadily improving customers' perceptions of its product quality by strengthening its network with customer companies at home and abroad and by actively reflecting customers' voice.

Fuel Cell Power BU ensures that after-sales service requests are promptly processed upon receipt through the VOC process. It has also established a system whereby the improvement points identified through the VOC—by operating weekly quality and service meetings—are reflected in market & product requirements for both product improvements and the development of new products for customers.

Fuel Cell Power BU has established a pre- and post-service management system to achieve the best service delivery by expanding customer communication. Pre-service minimizes inconvenience to customers by proactively responding to product abnormalities through preemptive responses based on regular monitoring activities, while post-service provides a 24-hour call center and immediate response system to respond major component failures. The BG conducts a 'Happy Call Satisfaction Survey' to improve customer satisfaction and continues to improve service quality by improving service guidelines based on A/S results.

Industrial Vehicle BG develops eco-friendly products by enhancing energy efficiency and fuel economy, minimizing emissions of harmful gases, and increasing the replacement cycle of consumable parts. It plans to develop new products that meet the strengthened European emissions regulations(EU Stage-V), and sequentially release 2.5 ton, 4 ton, 7 ton and 16 ton diesel products from August 2020. These new products minimize resource use and waste discharge by increasing the change intervals of engine oil(from 1,000 to 2,000 hours)¹⁾ and powertrain oil(from 500 to 1,000 hours). BG continues to develop technologies for improving the energy efficiency and performance of eco-friendly electric forklifts, such as its permanent magnetic motor system and the hydraulic electronic power steering system.

1) For diesel 2.5-ton class

In 2017, Mottrol BG established plans and objectives for the development of products that meet the requirements of international environmental regulations, including REACH and RoHS. In particular, the use of parts that contain hexavalent chromium(Cr6+) is entirely prohibited. In response to EU standards that will prohibit the use of parts with lead content exceeding 0.1 wt% starting in 2024, BG selected the development of eco-friendly lead-free copper alloy materials, starting with valve plate material, a key material for hydraulic equipment. Since 2018, it has been developing these eco-friendly materials step-by-step, every year. The development of the eco-friendly lead-free copper alloy materials project has been selected as a new technology development task for expanding lead-free materials to all lead-containing parts for hydraulic equipment by 2024.

Bio BU has obtained COSMOS, an international eco-friendly certification, for its two types of ceramide products. COSMOS is an eco-friendly certification managed by five European certification bodies. Doosan Corporation secures customer trust and product competitiveness through the certification of natural ingredients and organic raw materials.

As an eco-friendly company, FCP BU has developed 1 to 10 kW PEMFCs(proton-exchange membrane fuel cells) using various fuels, including natural gas, liquefied gas, and auxiliary gas, and has developed 25 to 100 kW medium PEMFCs using hydrogen fuel to expand its domestic and overseas market share. In addition, it signed a joint development agreement with Ceres Power of the UK in 2019 to develop high-efficiency 10 kW SOFCs. The biggest benefit of SOFC is that it can secure approx. 60 % of power generation efficiency, which is 15 % more than those of the PEMFCs produced by FCP. Improved power generation efficiency will significantly reduce fuel costs and CO₂ generation. Korea has limited land and renewable energy resources, and FCP expects that distributed power generation using hydrogen fuel cells, a new energy source, will continue to grow.

Information Security / Personal Information Protection

Customer Listening Activities in the Development Process

In the development process, Doosan has made it possible to improve both customer satisfaction and product value.

Industrial Vehicle BG holds a monthly Quality Conference at which the departments in charge of sales, quality assurance, and R&D get together to discuss how to provide the best products to satisfy customer requirements. In addition, it reflects customers' opinions in its products by hosting a quarterly Product Advisory Group, which is composed of the sales and dealer councils of the headquarters, as well as a service manager meeting and a meeting of senior sales personnel. In particular, the BG has conducted quality evaluation of vehicle prototypes with excellent salespeople and high customer contact in the development stage of new products and delivered VOCs(voices of customers) to the R&D team to reflect customer needs in product development activities. To this end, Industrial Vehicle BG operates user tests, and has established a prosumer system and diversified channels for listening to VOCs. In 2019, it will develop and implement a QRN(Quick Response Network) platform to accurately and quickly provide the services desired by customers using local maintenance companies with outstanding service capability in addition to the existing dealer system.

Mottrol BG supplies optimized products through close communication with customers, from the initial review of specifications to the mass-production stage. To that end, the BG develops products that reflect customers' opinions through technology exchange meetings, promotions, and development processes.

DDI BU has introduced a design thinking methodology across the enterprise to provide customer-oriented digital services. Through this methodology, it is able to identify customers' demands and to reflect those demands in system development and improvement in order to realize customer satisfaction. In addition, the BU is changing its way of working from the traditional waterfall to Agile development to fill the gap between customers and developmental organizations to drastically reduce the development period and to ensure higher operational stability and quality. It helps departments change rapidly through internal professional Agile coaches, and more than 50 employees were trained to carry out Agile projects throughout the year as Scrum Masters.¹⁾ The BU measures customer satisfaction through a CSI(customer satisfaction index) and an NPS (net promoter score), and is introducing a global survey platform to more systematically and accurately analyze customer voice.

¹⁾Personnel trained to carry out projects based on Agile methodology and to contribute to realizing project quality and customer satisfaction

Establishment of an Information Security System

Information Security System

Security control is a type of IT service that entrusts security experts with efficiently carrying out the company's IT information security operations. Doosan Corporation conducts 24-hour monitoring, security solution policy setting, detection, analysis, and response to intrusion attempts based on its strong computer security system. Doosan Corporation acquired ISMS(Information Security Management System) certification, which is nationally authorized, for the first time in 2013 to protect information assets and information and communication networks, and has been reviewed annually and maintained the certification. We regularly hold a 'Security Diagnosis Day' in which employees perform self-inspections as a means of establishing a culture of information protection and security-accident prevention in daily life. Every year, we conduct online education and information protection campaigns and distribute security newsletters to spread security regulations, accident prevention methods, and major cases. Doosan Corporation appointed executive-level a CISO to manage information security. The CISO reports the activities and performance of information security to the management.

Security Diagnosis Day Checklist

Security Diagnosis		
Security Diagnosis/Measure	PC/VDI/Life Security	Personal
	Information System	Department
	Trade Secrets/Documents	
	Facilities/Regions/Entry	
Enhancement of Information Security Awareness	Critical Security Management	Security Officer
	Security Newsletter	

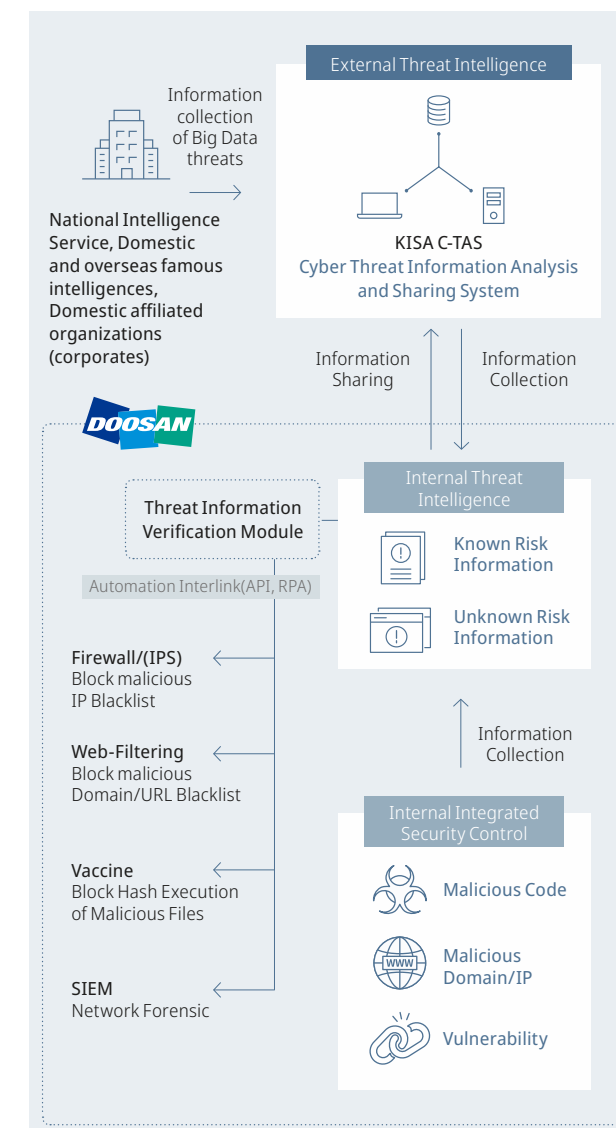
Doosan's Security Control Management Area

Description	Major Work
Hacking detection and monitoring	<ul style="list-style-type: none"> · 24 X 365 security event monitoring · Notification of signs of infringement
Support for infringement incidents	<ul style="list-style-type: none"> · Analysis of cause and damage in case of a hacking accident · Support for recovery of infringement accidents and establishment of measures to prevent recurrence · Support for cooperative response with external agencies (KISA, National Cyber Safety Center, etc.)
Report	<ul style="list-style-type: none"> · Daily inspection report on security control operation status and security system
Help Desk	<ul style="list-style-type: none"> · Emergency reports, such as reports on data infringement accidents

Building TI(Threat Intelligence)

TI(threat intelligence) is a concept based on big data analytics that has emerged as the security market shifts from defensive security to offensive security. In 2019, Doosan Corporation established a Korean threat intelligence system called C-TAS(Cyber Threat Analysis and Sharing) with KISA(Korea Internet & Security Agency) as part of upgrading its security controls. It systematically collects cyber threat information(information on malicious code, the command control server, vulnerability and infringement analysis), and strengthens automated information sharing and preemptive prevention of threats among related agencies through comprehensive analysis.

Doosan's Threat Intelligence Architecture



Protection of Customers' Personal Information

Doosan has set the protection of its customers' personal information as a key management objective. Doosan continuously supplements its internal management plan and personal information protection regulations by identifying the enactment and change of domestic and foreign personal information protection regulations in order to secure its customers' personal information. In particular, Doosan ensures compliance and prevents information leakage by applying strong technical and administrative protection measures at all life cycle stages. In addition, we conduct an annual analysis, performance inspection and audit of our personal information system and specialists, and improve and manage the identified vulnerabilities. In the last six years, Doosan has experienced no customer data loss or personal information leaks.

Internalization of a Culture of Personal Information Protection

Online training is provided to all employees, while advanced training is provided to personal information protection managers. In addition, Doosan conducts various activities such as putting up posters, card news, and distributing newsletters to spread the culture of personal information protection.



Posters to Enhance Awareness of Personal Information Protection

Quality Management

Enhancement of Quality Management Systems

Doosan Corporation strives to satisfy the quality requirements of its global customers by acquiring the relevant quality certificates.

Electro-Materials BG operates its quality management system from the design stage based on IATF-16949¹⁾ certification. The BG has strengthened its 4M change point quality verification system for when 4M(man, machine, material, method: the 4 main elements of the production process) changes are made. In addition, it conducts co-work activities such as technical meetings with suppliers and visiting suppliers to provide quality guidance during the evaluation of their samples to improve the quality of raw materials supplied by Suppliers.

As for Industrial Vehicle BG, it has improved its existing TQC system in order to rebuild it into an ISO 9001 QM system and implement customer-oriented quality management policies to achieve customer satisfaction. As a result, all Korean business units and overseas factories have obtained ISO 9001 QM System certification along with 320 Suppliers. Industrial Vehicle BG will carry out various guidance support policies to expand the certification of Suppliers.

Mottrol BG has promoted an SAP Project to secure data reliability for manufacturing quality capacity enhancement. It has prepared a foundation for promoting data analysis activities for customer satisfaction. Mottrol BG operates a quality management system based on ISO 9001.

Fuel Cell Power BG conducts quality management based on ISO 9001, KGS Design Group Inspection, KS, and other quality management system certifications. It also reviews the field quality issue VOCs as a core task, and promotes improvement activities. In addition, the BG promotes KGS(Korea Gas Safety Corporation) certification to diversify of fuel cell dealers. It also has a problem solving activity system for worst items in parts, processes, and field quality.

DDI BU has established and operates its quality management system based on ISO 9001 and ISO 20000(International Standards for IT service). The BU has strengthened internal and quality control of IT processes by automating development environment such as configuration management and distribution management. It is preparing to upgrade the existing quality management system to advanced methods based on DevOps, and will apply it step by step.

1) The latest AS9100 certification, Quality Management System for Aerospace Industry, under ISO 9001

Thorough Management of Quality

Industrial Vehicle BG carries out quality innovation projects for all domestic and foreign workplaces in order to upgrade quality control activities. It has established the Q-Cost management system and manages it effectively by setting 64 internal and external failed cost items. Q-Costs are loss costs occurring from quality issues. The BG will operate the system stably until 2021 through continuous management. In addition, Industrial Vehicle BG has introduced a unique problem-solving technique through the operation of SENX-(speed engineering-x) education and tasks to improve the company's capability in solving endemic problems. It has also built a mobile app for customers to report quality issues. A function for operating a GPS-based QRN(quick response Network) has been introduced for pilot operation in the Pyeongtaek region. In 2019, QR App v2.0 was launched after collecting various VOCs to improve ease of use, functions and stability.

Mottrol BG runs a campaign to internalize the quality culture for enterprise-wide quality innovation activities. The BG has held a quality innovation resolution conference for all employees and Suppliers, carried out quality theme improvement activities, and shared success and failure cases of internal and external process improvement. The quality innovation resolution conference for Suppliers decided to focus on compliance with key standards for quality innovation and 4M change management.

Bio BU produced an English version of its quality control regulations in 2019. In particular, this BU responds to global quality standards for cosmetic raw materials and pharmaceutical raw materials, and plans to obtain GMP certification for health functional foods in 2020. To this end, it is implementing integration of its quality control manual and planning to bring all products up to the level of pharmaceutical raw materials. In addition, the construction of RTDB3) and HMI4), started in 2019, will be carried out in 2020 to analyze the association of quality data, which will be applied to the cosmetics raw material line first and then expanded to other processes.

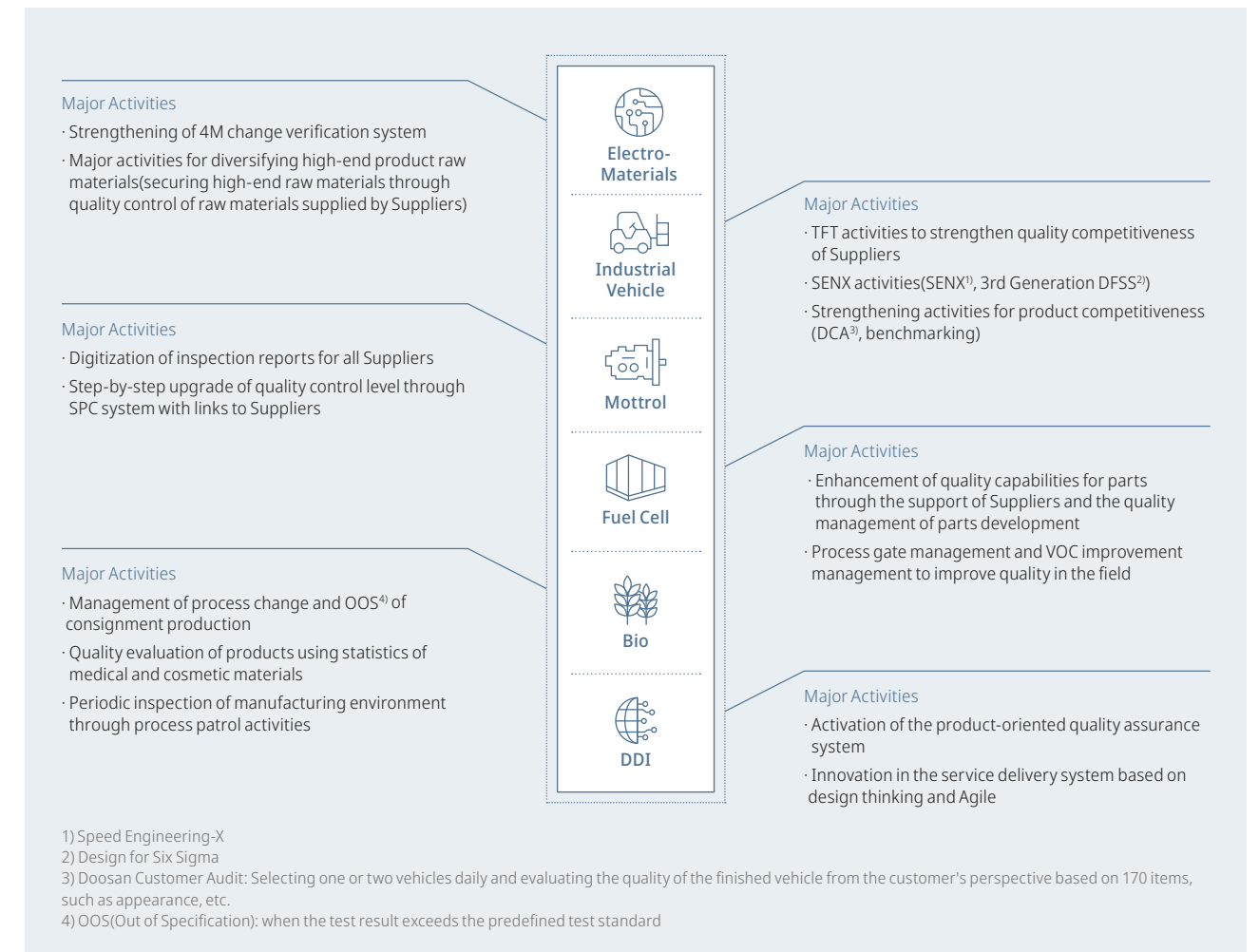
DDI BU will deliver the best results to customers by applying its product-oriented quality assurance system, which includes performance testing, operational control, code static analysis, and open source software verification for the IT systems to be developed. To this end, the BU has increased awareness of developer quality and secured verification techniques for new technologies such as micro-service, IoT, and embedded software through TDD(Test-Driven Development) initiatives. In addition, it has established an RPA(robotic process automation) system to ensure IT service integrity, and 24/7 detection of faults and server performance degradation, and plans to expand the scope of automated inspection activities.



2019 Mottrol Quality Innovation Resolution Conference

1) RTDB(Real-Time Data Base): A program for real-time collection and saving of data
2) HMI(Human-Machine Interface): A touch screen for controlling machines at automobile sites

Key CSR Activities



Talent Management

Human Rights Management

Human Rights Policy

Doosan Corporation respects the human rights of not only its employees but of all stakeholders engaged with its management activities, and advises third parties, including suppliers, to practice human rights management at the same level. The human rights policy of Doosan stipulates that basic human rights be guaranteed, regardless of a person's origin, gender, ethnicity, or other conditions. As a member of the UN Global Compact, we abide by the 10 principles of Global Compact in the areas of human rights, labor, the environment and anti-corruption, establish and practice human rights management and due diligence based on internationally-recognized principles of human rights that, such as the Universal Declaration of Human Rights and the UN Guiding Principles on Business and Human Rights: Ruggie Framework.

To prevent human rights violations that may occur in the business process, Doosan has established a human rights management system as described below. In case of human rights violation, we make our best efforts to carry out rectification measures. We aim to grow with society through sustainable improvement activities.

- 1 Ensuring Employment Non-Discrimination, and Freedom of Association and Collective Bargaining**

We strive to avoid any unjust discrimination regarding employment based on gender, religion, disability, age, social status, region of origin, etc. Furthermore, we recognize workers' freedom of association and collective bargaining, and do not pursue any punitive action against workers for labor union activities.
- 2 Prohibition of Forced Labor and Child Labor**

We do not accept any form of forced labor that may occur in business activities, and abide by the minimum age for employment set by the country of business. We follow the minimum employment age prescribed by laws of the country of business and in the case that we find we have hired a minor, we take immediate remedial measures to prevent all wrongful labor practices that damage human dignity.
- 3 Securement of Industrial Safety and Management of Responsible Supply Chains**

We strive to maintain a safe working environment and follow environmental, health and safety laws and standards that apply to our workplaces. In addition, we adopt separate safety and health measures for pregnant women, the disabled and other vulnerable workers. We establish and continuously check policies and guidelines related to the CSR risks of our supply network. We also monitor all business partners.
- 4 Protection of Human Rights and Environmental Rights of Local Residents**

We respect local residents' rights to life and freedom of relocation, as well as their individuals rights related to safety and property ownership. In addition, we adhere to a principle of preventive approach to environmental issues and systematically implement plans to prevent, mitigate, and control serious environmental damage and environmental disasters.
- 5 Protection of Customers' Human Rights**

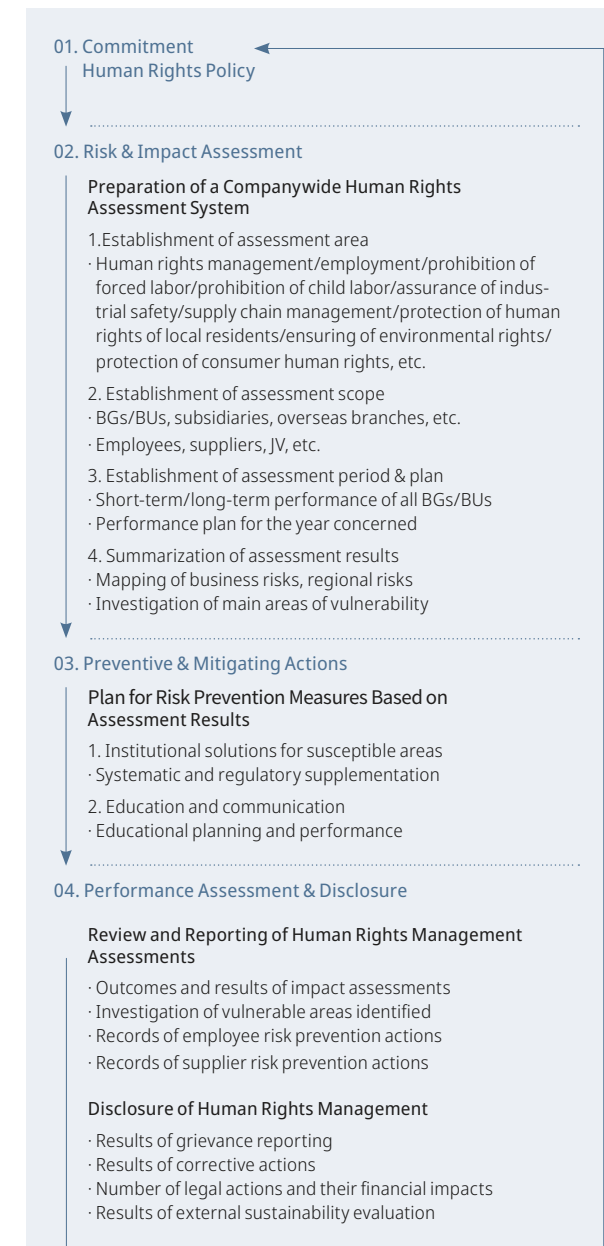
We pay careful attention to marking design and manufacturing conditions and other indications on products in accordance with legal standards in order to prevent product defects from causing damage to the life, health, or safety of customers. In the case that damage is detected after a product is launched in the market, we notify customers of the risk and recall the product immediately. Moreover, we take necessary measures to protect all personal information collected by our company based on our policy of respecting the privacy of customers and employees.

Doosan operates an online whistle-blowing center(<https://ethicshelpline.doosan.com/cbrpt/frontView.do>) on our website to prevent possible human rights violations occurring in business processes. We protect whistle blowers through confidentiality principles and handle all issues quickly and fairly. Doosan will take the lead in supporting and respecting human rights principles as a Proud Global Doosan.

System for Implementation and Review of Human Rights Management

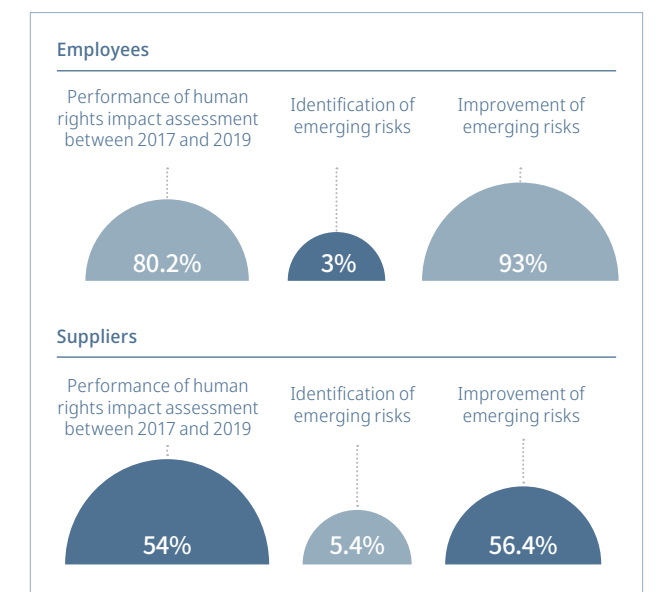
Doosan operates a human rights management system to prevent human rights violations that may occur in business processes, including the supply chain, as follows. Through human rights impact assessments, we actively identify potential human rights violation issues in the areas of grievance mechanisms, discrimination, forced labor, wages, working hours, child labor, freedom of association, consumer human rights, information security, and privacy, and continue to apply improvement activities.

System for Implementation and Review of Human Rights Management



Human Rights Impact Assessment

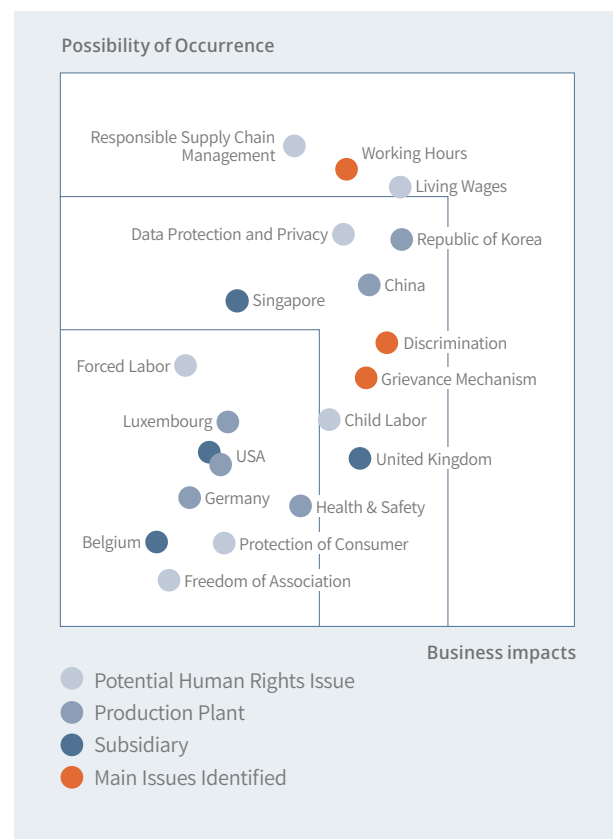
Doosan conducts assessments on all its BGs/BUs to investigate negative impacts and major areas of vulnerability related to human rights issues. Human rights impact assessments are conducted in priority order by analyzing human rights risks, the gravity of human rights risk issues and business activities for each country in which Doosan's businesses are present. Approximately 80 % of branches, based on the total number of employees, have been assessed in the last three years and we aim to reach 100 % by 2021.



Grievance Process

Doosan has introduced a grievance mechanism as an early warning system for obtaining information related to human rights. We operate an ombudsperson program and various grievance channels to provide necessary assistance through counseling on complaints raised by employees. Each program provides an opportunity for members to make appeals based on our three principles of grievance redressal: protection of anonymity, prevention of disadvantage and feedback. In 2019, Doosan expanded the organization of its grievance system. It improved grievance mechanisms and provided guidance to employees at its China corporation. In 2020, Doosan will continue to improve the grievance redressal process by strengthening the grievance system, expanding the number of ombudsmen, and educating counselors.

Analysis Map of Emerging Human Rights Risks



Employee Communication

Vision Sharing Workshop

Doosan Corporation shares Doosan's vision with its leaders through the Doosan Leader Workshop for Change and Innovation. In 2019, Doosan Corporation operated a workshop for leaders under the supervision of the heads of its BGs/BUs to build understanding and consensus on the vision and to discuss ideas about the desirable roles of leaders. We have been educating our members on how to think about what employees should do in connection with their work to keep their business growing.

Conference for Acknowledging Achievements and Sharing Exemplary Cases

Doosan Corporation organizes an annual conference to acknowledge achievements and share exemplary cases and lessons learned during the year. This conference was started in 2016 and has grown into an annual event. Awards for fundamental competitiveness(R&D/business growth), advancement and science(OE advancement/innovation at manufacturing sites), credo value, and Doosan talent fostering(executive/team leader/team member/CA¹⁾) were presented. A winning concert was organized to share members' stories. The conference is an opportunity to motivate members and work toward the better performance of the organization.

1) CA: Change Agent

Education for Overseas Corporations

Doosan Corporation conducts education for overseas subsidiaries in order to establish ways of working based on the Doosan Credo. This education strengthens our employees' sense of belonging by linking the strengths of individuals to the organization and ensuring the involvement of participants in discussions on the future image of the organization. Doosan Corporation will continue its efforts to build its future through cooperation with members by overcoming regional boundaries.

A Labor-Management Culture Based on Mutual Trust

Doosan Corporation practices a harmonious labor-management culture for mutual growth through regular communication and various internal and external joint events with labor unions. In addition, we listen to employees' opinions periodically through various communication channels for employees, such as Doosan Credo Time, ombudsmen, and various surveys, and reflect their opinions in management activities and organizational operations. Doosan Corporation promotes an organizational culture where all employees participate in the growth of the company through quarterly management briefings.

Leadership Education

Doosan Corporation's Junior MBA

The 6th term of Doosan Corporation's Junior MBA Course was organized to enhance the long-term perspective and competencies of employees and assistant managers who will become leaders in the future. This course comprises a blend of online and offline lectures on strategy, financing, accounting, marketing, and personnel organization. Participants can gain a broader view of business and cultivate professional knowledge through team-based and individual tasks related to the business strategies of Doosan Corporation. In addition, a special lecture has been added to introduce employees to the 4th Industrial Revolution, online marketing strategies of leading companies, and technology trends of the times. The last part of the course is a business management simulation that offers learners a chance to experience corporate management. In the 6th term of 2019, 24 juniors from 8 BGs/BUs/affiliates under Doosan Corporation participated in the course. Doosan Corporation will continue the Junior MBA Course in 2020 to equip its young employees with an in-depth learning and practical education experience in business administration.

Courses for Promoted Personnel of Chinese Corporations

Doosan Corporation operated a course for newly-promoted general managers and assistant managers at Electro-Materials BG Changshu Corporation, Industrial Vehicle BG Yantai Corporation and our Mottrol Jiangyin Corporation in June and July of 2019. A course for new general managers was held at the Electro-Materials BG Changshu Corporation with 15 personnel attending, and a course for new assistant managers was held at the Industrial Vehicle BG Yantai Corporation for 14 trainees. Each two-day course covered the new roles and the mindset required for newly-promoted personnel, and included a factory tour and time for Chinese corporate employees to interact with each other. After the training, one participant said, "It was an opportunity to find both my problems and solutions," and "I was able to understand the content of the training more deeply through discussions between different corporations, and it was really helpful to share my views on work and leadership." Doosan Corporation has operated annual promotion courses for newly promoted general managers at its Chinese corporations since 2018 and will continue to provide training.

Emotional Intelligence Leadership Training for Managers

Bio BU provided emotional intelligence leadership training to all team and part leaders to strengthen their leadership. They spent time getting to understand their role as a team leader, self-awareness, and how to control their emotions. We conducted a total of two sessions, in June and August of 2019, and one 1:1 coaching session.

Team leaders who participated in the training evaluated it as useful for helping them understand how emotional intelligence can greatly affect the performance of an organization and how to motivate team members by stimulating their emotions.

Training for Technical Field Managers

Doosan Corporation has been providing various training programs for technical field managers to strengthen their leadership skills since 2017.

Our technical field manager training consists of five courses: the part leader course, new field manager course, field manager I, field manager II, and stepping-stone course. In 2019, 187 field managers and juniors from Electro-Materials BG, Industrial Vehicle BG, Mottrol BG, Fuel Cell Power BG and Bio BU completed these training courses. In particular, the field manager I course consists of programs to help develop self-awareness, to establish change plans, and to encourage action by diagnosing the leadership of field managers. Doosan Corporation will provide various programs to improve the leadership capabilities of its technical field managers.

Skill Level-Up Course for Retail BG Sales Managers

Retail BG is offering a skill level-up course for sales managers to improve their leadership, communication, and performance management skills, during its reorganization into a performance-oriented sales management organization. This course was conducted five times for 36 trainees from April to July of 2019, and they could learn and practice reporting know-how that can be applied directly in the field, such as sales reporting, and to understand the indicators necessary for performance management.

Leadership Program for Continuous Performance Management (Situational Leadership)

DDI BU has introduced a CPM(continuous performance management) whereby the performance of its members is managed at all times to improve effectiveness in the rapidly changing business environment. In addition, it has implemented a situational leadership program for 37 leaders to ensure the stable establishment of CPM. This way, leaders can develop the ability to provide effective coaching and feedback for different members and situations.

Job Education

Production Academy to Strengthen Manufacturing Competitiveness

Doosan Corporation has developed a production academy for office workers engaged in manufacturing in order to strengthen their competitiveness. Twenty employees participated in the four-day production academy, which consists of four courses: understanding of manufacturing, site improvement, productivity improvement, and digital trends. In-house experts developed and lectured on a practical, case-oriented curriculum aimed at enhancing site operations. Doosan Corporation provides on-the-job training for field workers using various cases from Doosan and around the globe. In 2020, we plan to provide on-the-job training with more contents and three times as many cases studies.

Mottrol BG Technical Field Power-Up 1

Mottrol BG conducted 53-hour field power-up course from April to December for 12 juniors with the goal of fostering next-generation leaders. This course covered communication, creative thinking, product technology, and understanding quality systems, and provided opportunities for employees to improve their innovation capabilities through project planning and other tasks.

Business English Writing Course

A business English writing course was provided for sales, purchasing, and R&D staff who actively communicate with overseas customers in English. The course was run six times from June to October and had a total of 44 participants. They composed emails related to their jobs and had them corrected. The trainees conveyed their opinion that "the training course was practical, not lecture-oriented, so it was a highly satisfying as we could use the skills immediately after returning to work." Doosan Corporation plans to launch a variety of language programs next year to help its employees communicate actively with global customers.

Digital Job Competency Assessment

DDI BU defined digital job competency with 329 items in the eight areas of ICT, business package, AI, big data, cloud, IoT, consulting, and project management, and conducted a digital job competency level assessment for the entire DDI PI&IT job group to accelerate the digital transformation. The BU carries out activities to enhance its digital job competencies by sharing knowledge and experience of internal experts for chapter organization, core competency-based CoP, and certification acquisition.

Agile Basic Course

DDI BU conducted two Agile basic courses for 53 prospective trainees with the goal of fostering Agile concept, philosophy, and development methodologies, which are the basic skills for innovative way of working. The participants got to understand the concept of the Agile framework, development methodologies, and the Scrum needed for projects, and took part in practical exercises related to Agile, such as writing backlogs and planning Sprints. In 2020, this course will be provided on the topic of how to work in Agile and various methodologies that can be applied in practice.

EHS Management

Environmental Management

Response to and Monitoring of New Environmental Regulations

Global public awareness of and interest in environmental issues such as environmental pollution, water shortages, natural disasters and climate change have increased significantly over the years. Along with this interest, efforts to solve the problems, such as policies and regulations, are ongoing at the national level. In particular, the importance of environmental management at companies is being heavily emphasized. In this regard, Doosan has deployed an environmental management system designed to minimize the impact of company business on the environment. It preemptively responds to government regulations and trends by steadily monitoring business activities and surveying their impact on local communities. Furthermore, the company has conducted in-depth expert research to secure essential EHS capabilities and enhanced its execution ability through its participation in EHS activities. Based on these activities, there were no serious violations of environmental laws in Doosan Corporation in 2019.

Stewardship of Hazardous Chemical Substances

Doosan Corporation strives to create a safe and clean workplace through the tighter management of hazardous chemicals.

Electro-Materials BG has obtained a business license for harmful chemical substances in order to comply with related laws and regulations, and conducts statistical and emissions surveys on a regular basis in accordance with the legal requirements. Employees of all worksites periodically attend education courses on the safe handling of chemical substances and the importance of systematically wearing personal protective gear. In addition, the company has continuously invested in facilities to ensure that it complies with all chemical substance management laws in all of its business sites. In 2019, improvements were made to factory walls as part of continuous efforts to meet legal requirements. By checking the material information of imported chemicals, the BG ensures that the safety management of chemical substances entering the company complies with all the legal procedures. The company has also strengthened its management level by introducing a chemical management system.

Mottrol BG introduced SAP ERP to minimize the use of hazardous chemicals by preliminary impact assessment at the chemical purchase planning phase to pre-validate the replacement or non-use of chemicals.

Waste Management

To reduce the volume of discharged waste, Doosan separates its waste according to nature and state, and then processes it in accordance with the law under its 'Allbaro System¹⁾'. For the legal treatment of waste generated by various processes, Doosan periodically

educates and evaluates the vendors responsible. It also maintains a consistent effort to reduce the volume of waste discharged by its processes. Last year, Electro-Materials BG reduced waste by about 48 tons compared to 2018.

Response to Climate Change

Doosan regularly discloses information related to the greenhouse gas emissions of its facilities and controls these according to the IPCC Guidelines and the government's own guidelines. Doosan's statements on greenhouse gas emissions and energy consumption and its plans for monitoring them are verified by a third party each year. In particular, we have set reduction targets for our workplaces and have steadily promoted energy saving and greenhouse gas reduction activities to achieve the targets set by the government, as regulatory targets were shifted from the GHG emissions trading scheme in Electro-Materials BG to the GHG management target in all BGs.

Doosan has established an Energy Management Committee to fulfill its responsibility toward addressing climate change. The Energy Management Committee holds four annual meetings to share and provide information on cases of energy savings among the BGs. Electro-Materials BG's Jeungpyeong and Gimcheon plants were able to reduce idle power usage by 88,289 kWh. Mottrol BG expects to achieve a reduction of 331.6 tCO₂/year by investing KRW 460 million in a waste heat recovery system that can recover waste heat by painting environmental pollution prevention facilities.

Control of Air and Water Pollutants

Doosan keeps the atmospheric pollutant emissions generated at its worksites at less than 50 % of the standard allowed under the relevant statutes. In particular, Electro-Materials BG conducts self-measurement of major pollutants twice a month and, starting in, plans to further measure pollutant emission concentrations and improve facilities, as air pollutant emission standards continue to be strengthened. Mottrol BG invested KRW 500 million in installing electrostatic collection equipment for oil scattered during processing. This equipment collects and reuses more than 200 liters of scattered oil per month to prevent air pollution and save on raw material costs. In addition, Electro-Materials BG manages the water pollutant concentration of its final discharge water to keep it below 50 % of acceptable standard for water resource risk management in order to reduce stable water supply and water depletion risks.

¹⁾Allbaro System: As the IT-based waste management system of the Korean government, it controls the entire set of processes for waste management, right from discharge to transportation, to the final treatment.

Management of Environmental Investments

Doosan Corporation operates a system for the management of environmental expenditures to internalize its environmental management system. Our environmental investments are mainly focused on the installation or replacement of pollution-prevention and environmental-protection equipment and on the construction of wastewater treatment stations and waste storage warehouses. In 2019, Electro-Materials BG invested KRW 2,330 million in maintenance at its wastewater treatment plant, with improvements to the walls of facilities that handle harmful chemical substances and the installation of a low NOx burner. Mottrol BG invested KRW 460 million in the installation of dust collectors for organic painting and a waste heat recovery system.

It evaluated the potential risks of 494 aboveground/underground environmental protection facilities that store oil and chemicals to address potential risks of environmental accidents, and established monitoring methods and cycles for each evaluation grade. Monitoring was improved through visual inspection(R&R, periodic work-book entries), sensors, water level fluctuation measurements, and flow checking. Equipment that could not be installed on the ground was cleaned, coated or double-structures to prevent environmental accidents.

Health and Safety Management

EHS Leadership Activities

Doosan Corporation has strengthened voluntary EHS management among the heads of its organizations based on the top management's deep interest in and support for EHS. All leaders personally perform diverse EHS leadership activities, including EHS field inspections, safety dialogues, and EHS meetings. Through these measures, there has been an effective increase in the safety awareness of all our employees, thus contributing to the prevention of safety accidents at our worksites.

Creating Safe Worksites Together

Doosan Corporation has deployed a mutual cooperation system with our suppliers in order to establish safe and healthy worksites. In 2019, Electro-Materials BG's Iksan and Gimcheon plants, Industrial Vehicle BG, and Mottrol BG participated in the 'Win-Win Safety and Health Cooperation Program,' which is systematically operated for a total of 28 suppliers and includes safety and health-related education and support for hazard assessment.

Response to ISO45001 Certification

Doosan Corporation carries out systematic safety and health management activities based on its occupational health and safety management systems(ISO 45001:2018). We are preparing to change our existing OHSAS 18001 certification to ISO45001. Thus far, Electro-Materials BG Jeungpyeong, Gimcheon and Iksan plants, Industrial Vehicle BG, and our Mottrol BG have already completed the certification transition.

Basic Compliance with EHS Rules

All of Doosan Corporation's worksites carry out activities designed to ensure basic compliance with the EHS rules and prevent the recurrence of safety accidents caused by non-compliance with those rules. Based on a risk assessment of the worksite and processes at hand, each worksite selects items that must be observed, without fail, in order to prevent accidents. By linking these to periodic education, publicity, inspection, and citation, all employees are naturally encouraged to comply with the safety rules with an advanced level of safety awareness.

Expansion of Prevention Program for Musculoskeletal Disorders

Doosan Corporation operates musculoskeletal disease prevention program for health of its employees at workplaces and investigates the Potential hazards of musculoskeletal systems.

Electro-Materials BG conducted measurement and consultation on musculoskeletal Potential hazards for 296 people, including employees of its Suppliers, and provided a pain management program that prescribed individual exercise methods.

In addition, Mottrol BG operates a program for its employees as well employees of its Suppliers in conjunction with acupuncture/drug treatment and individual exercise prescriptions. Treatment support activities were provided to 134 people, including employees of its Suppliers.



Musculoskeletal Disorder Prevention Program

Shared Growth · Supply Chain CSR Management

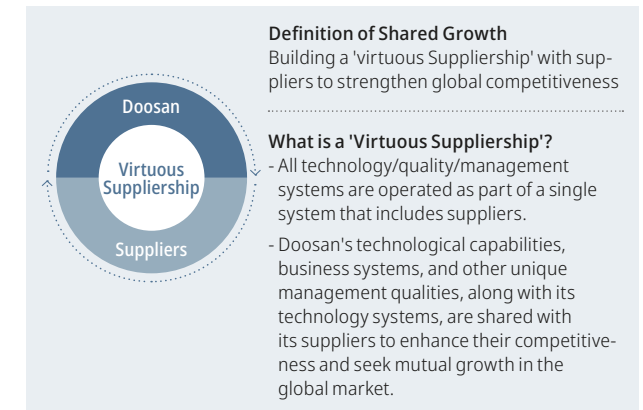
Supply Chain Management

Doosan Corporation is strengthening the sustainability of its supply chain through two strategies: increasing the competitiveness of the entire supply chain through shared growth with suppliers, and identifying and improving sustainability risks in the supply chain in advance.

Establishment of a Shared Growth System

Doosan Corporation has a vision of 'Building a virtuous Suppliership with suppliers.' Doosan's technological capabilities, business systems, and other unique management qualities, along with its technology systems, are shared with its suppliers to enhance their competitiveness and seek mutual growth in the global market. Doosan Corporation established a Shared Growth Team to strengthen the competitiveness of its Suppliers, which was done at the BG-level in the past.

Doosan Corporation's Philosophy of Shared Growth



Diffusion of Shared Growth Culture

Doosan Corporation held a Fair Trade and Mutual Growth Agreement Ceremony with 100 major Suppliers and Dong Hyun-soo, Vice chairperson of Doosan Corporation and Chairman of the Shared Growth Committee, in April 2019. We prevent risk related to the Fair Trade Act through a fair-trade compliance program and promote support activities to strengthen the competitiveness of our Suppliers. In addition, Doosan Corporation strengthens communication through regular meetings with Suppliers, conducts supplier visits by Doosan's CEO and executives, listens to the difficulties and suggestions of Suppliers and reflects their opinions in its management. We also promote shared growth, not only for our primary Suppliers, but for our secondary Suppliers as well.

Mutual Growth Through Support to Strengthen the Competitiveness of Suppliers

Doosan Corporation provides free management consulting to strengthen the global competitiveness of its Suppliers, and conducts various shared growth activities, including supporting smart

factory construction projects and supporting capacity building through education. Our management consulting program provides innovative solutions for cost reduction, inventory management, quality improvement, and process management, supporting ten Suppliers in 2019. A smart factory construction project is provided to eight Suppliers based on worksite needs such as MES and PLC. 200 employees of Suppliers completed Doosan's training programs on finance, EHS, leadership, etc., to strengthen their capabilities.

Continuous Operation of Programs for Closing the Gap

Doosan Corporation has conducted a variety of programs for closing the gap between small and medium-sized companies since 2017. It provides KRW 100,000 per month to secondary suppliers and in-house subcontract workers, while providing the same support to SME employees who are in charge of cleaning and security. The beneficiaries of primary and secondary suppliers can get welfare benefits such as holiday gifts. In 2019, Doosan Corporation provided KRW 2.2 billion(KRW 1.5 billion for closing the gap and KRW 0.7 million for mutual growth incentives) through the gap relief program.

Fair and Transparent Selection in the Supply Chain

Doosan Corporation conducts sustainability assessments in addition to price, quality, and financial status evaluations for the trade item in question when selecting companies that wish to do business with Doosan. Sustainability assessments are carried out transparently in accordance with the registration procedures on the Doosan website. They are carried out based on internal regulations that reflect the terms of compliance announced by the Fair Trade Commission. Doosan Corporation strives to ensure that these regulations are applied fairly to all companies that wish to do business with Doosan. We conduct a regular evaluation of quality, delivery date, price, and other sustainability factors for suppliers with a transaction volume above a certain amount that have been registered as regular Suppliers. Key suppliers are selected based on their strategic importance and transaction size. Field diagnosis and improvement plans are carried out on key suppliers. Doosan Corporation supports shared growth activities for the capacity-building of suppliers.



Purchase Status(performance of remaining corporation after spin-offs of October 1, 2019)

Description	Number of suppliers	Purchasing ratio	Geographical category	Purchasing ratio
Total	1,321	100%	Korea	72%
Manufacturing	1,035	90%	Japan	13%
Service	306	10%	China*	9%
Key suppliers	171	62%	North America	3%
			Europe	3%
			Others	0%

*For China, Hong Kong and Taiwan are included.

Management of a Sustainable Supply Chain

Doosan has enacted and applied its Guideline for Sustainable Supply Chains for suppliers since 2015 in order to secure a sustainable supply chain. This Guideline includes contents related to labor and human rights, safety and health, the environment, ethics and fair trade, general management, posting of guidelines and compliance, etc. It is up to Doosan's Suppliers to agree to and apply the guidelines. The full text of the guidelines can be found on the Doosan e-procurement website.

Doosan Corporation had devised and implemented conflict mineral management policies in order to participate in the international community's efforts concerning conflict minerals. Based on our conflict mineral management policies, we identify products that may include 3TG(tantalum, tungsten, tin and gold). We request our suppliers to verify places of origin based on BOMs,¹⁾ and we were able to confirm that no conflict minerals have been used in our verified product group(application components of industrial vehicles, casting materials, etc.). Doosan will continue to carry out monitoring for the possible presence of 3TG through BOMs from the R&D stage and reinforce the process of verifying the place of origin.

1) Bill of Material

Definition of Doosan's High-Risk Worksites

- 01 — Worksites with a high possibility of causing environmental accidents/pollutions or violating environmental regulations
- 02 — Worksites with a high possibility of employees or stakeholders causing/suffering legal/physical damage through issues/accidents related to human rights/safety/ethics
- 03 — Worksites that cannot carry out normal operations due to sanctions or punishments

Sustainable Purchase Strategy

For the management of sustainable supply chains, Doosan operates a purchasing strategy to reduce worksites with a high possibility of environmental accidents/pollution. Doosan has established a purchasing strategy that reflects ESG elements in addition to quality,

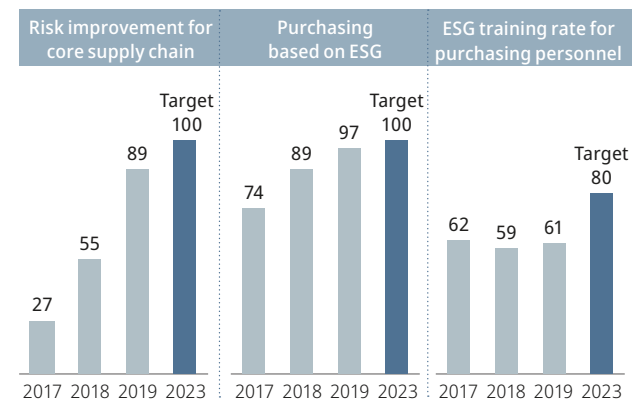
delivery and price.

Doosan intends to increase the transparency of its supply chain for sustainable purchases. To this end, we strive to identify and improve issues across our supply chain based on the opinions of Suppliers. First of all, Doosan conduct an annual code of conduct compliance survey of key stakeholders in its supply chains. This helps to improve code of conduct compliance in our supply chains. In addition, we collect opinions from suppliers on possible problems in the business relationship with the company and reflect them in our purchasing policy. In addition, we operate a hotline(080-850-3398) for open communication with suppliers, and visit key suppliers to collect their opinions.

Creating a safe working environment is one of our most important strategic goals. This can increase the safety of supply chains and ultimately enhance the sustainability of the entire supply chain by eliminating quality costs, supply-demand setbacks, etc., caused by accidents. Doosan operates its Coexisting Cooperation Program for the safety management of suppliers' workplaces. In 2019, Mottrol BG's mutual growth program obtained the top 10 % S grade from the Korea Occupational Safety and Security Agency. In addition, for suppliers found to have vulnerabilities as a result of sustainability evaluation, we visit their sites to assess the vulnerabilities and help them establish a better working environment through improvement activities. In addition, we provide practical supplier training programs, such as programs on labor management and EHS, to help improve the working environment of our Suppliers.

Doosan is strengthening the sustainability assessment of its supply chain to comprehensively support all of these activities. Doosan Corporation has conducted its SSAP(Supplier Sustainability Assessment Program) for key suppliers, which make up 90 % of all suppliers, over the past three years. As a result, 22 out of 40 companies, that are subject to the improvement plan, have improved over the past three years, and 8 out of 9 companies have improved in 2019.

Supply Chain Management Goal(KPI) Unit: %



Social Contribution

Under its vision of becoming a 'Global Sustainable Company on the World Index by 2025,' Doosan Corporation is carrying out social contribution activities to enhance the competitiveness and corporate value of the community.

Support for the Growth of People

Under its vision of commitment to people, Doosan is contributing to fostering talent for the future so that socially vulnerable groups(children, adolescents, single mothers, etc.) can grow as members of society.

Funding programs collect contributions from employees and the company matches these at a one-to-one ratio. As of 2019, we had spent approximately KRW 1.5 billion on support programs for vulnerable social groups and communities, which were selected through the Employee Funding Committee and Executive Social Contribution Committee.

Didim Seed

Doosan Corporation supports the financial and emotional independence of children in childcare facilities who, under the Child Welfare Act, are required to leave the facilities and go out on their own when they reach the age of 18. In 2019, we donated KRW 168 million to the Korean Social Welfare Council. These funds were credited to the

Didim Seed Child Development Accounts of 350 children at 15 childcare facilities nationwide. In addition to financial support, Doosan Corporation also supports mentoring programs to strengthen the self-leadership capabilities of 60 children at 8 childcare facilities nationwide. Our employees serve as mentors to help children in childcare facilities so that they can grow up to be healthy members of society through education and play.

Youth Start

We provides scholarship for college freshmen from underprivileged backgrounds to enable them continue their studies. The 2019 scholarship program provided approximately KRW 100 million in scholarships to 40 students. We conducted volunteer activities with employee to make flowerpots for the elderly and patients in the vulnerable class. In addition, our employees support the continuous growth of scholarship students by introducing books, listening to their concerns and giving advice.

Mother's Future

We operate a self-sufficiency support program for single mothers who are raising their children under social prejudice and economic difficulties. In 2019, we provided employment and job education expenses to 40 single mothers. Through sectoral coaching and mentoring support, 22 beneficiaries succeeded in obtaining qualifications and finding a job.

Doosan Social Contribution Strategy



Support for Local Communities

Doosan Corporation is contributing to support the future growth of communities so that businesses and society can grow together.

Doosan Day of Community Service

We have held our annual 'Doosan Day of Community Service,' when our employees around the world promote sharing activities for local communities. In April 2019, 1,973 employees from eight countries conducted various volunteer activities, including furniture making, facility maintenance, and environmental cleanup, for communities and neighbors near local worksites.

Sharing Tea with Love

Sharing Tea with Love is a CSR program that has been in existence since 1991, delivering warmth to soldiers serving on the front line. We delivered 8,000 boxes of instant coffee and monetary donations in 2019, and the total number of tea cups delivered to the 360 military camps around the country so far has reached 39.2 million.

Mugunghwa Planting Project

Doosan has been operating the Mugunghwa Planting Project to promote the beauty and excellence of 'mugunghwa,' the national flower of Korea. We have created mugunghwa parks at Hongc-

heon Namgung Eok Memorial Hall, Gungjeong-dong Mugunghwa Garden, and the Seoul Botanical Garden since 2016. In 2019, our employees visited Gungjeong-dong Mugunghwa Garden to learn about the Mugunghwa Planting Project, the species and history of mugunghwa, and conducted volunteer activities such as pruning and cleaning up fallen and withered flowers for the maintenance of mugunghwa.

Capacity Utilization





We actively share our capabilities, resources, and business values with society and do our best to play a role as a member of the society through voluntary participation.

'Dadok-Georim', a Reading Support Program

DDI BU operates 'Dadok-Georim,' a reading support program for children at child-care institutions designed to promote their intellectual and social development. Reading teachers and employees volunteered at Eden I Ville and participated in fairytale narration and craft/drawing activities related to the books for the children.

Principles of Charitable Contribution and Sponsorship

Doosan Corporation operates its Social Contribution Committee to promote transparent and appropriate donations based on the following principles.

<p>Donation </p> <p>The company defines 'donation' as an amount that it provides to an individual, group or institution, regardless of whether it is called a support payment or sponsorship money.</p>	<p>Disclosure </p> <p>Donations made by the company are disclosed to the public through the business report and CSR report.</p>
<p>Social Contribution Committee </p> <p>The company has established and operates its Social Contribution Committee as a body to deliberate and decide on all matters related to donations.</p> <p>The Committee consists of the Chairperson of CSR Committee, the CFO and the Legal Affairs Officer, and it reviews all donations of more than KRW 10 million.</p> <p>It also deliberates and decides upon the purpose, type of charitable foundation, amount and use of donation money.</p>	<p>Prevention of Risk </p> <p>The company avoids risks that may arise from donations through the Social Contribution Committee by:</p> <ul style="list-style-type: none"> - Ensuring corporate contributions are not used as bribes. - Identifying the justification and assessing the appropriateness of new charitable foundations. - Preventing donation and sponsorship risks that can be perceived as political contributions.

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Economy

Financial Performance

Category	Unit	2016	2017	2018	2019
Balance Sheet					
Total assets		3,744,673	3,950,029	4,734,223	4,752,376
Current assets		810,638	980,974	1,176,134	921,195
Non-current assets		2,934,035	2,969,055	3,558,089	3,831,181
Total liabilities		1,632,123	1,750,271	2,428,715	2,607,723
Current liabilities		1,042,961	1,319,120	1,404,103	1,705,581
Non-current liabilities		589,161	431,151	1,024,613	902,143
Total equity		2,112,550	2,199,759	2,305,508	2,144,653
Capital stock		134,838	134,846	134,846	123,738
Capital surplus		678,233	680,215	734,169	797,120
Other capital adjustments		-428,592	-395,601	-343,557	-1,146,809
Accumulated Other Comprehensive Income		39,338	48,546	137,013	201,356
Retained earnings	KRW million	1,688,734	1,731,753	1,643,037	2,169,247
Total liabilities and equity		3,744,673	3,950,029	4,734,223	4,752,376
Income Statement					
Operating revenue		2,067,136	2,624,829	2,919,401	2,060,705
Sales		1,887,802	2,530,569	2,822,149	2,038,497
Dividend profits		179,334	94,260	97,252	22,208
Operating expenses		1,841,764	2,348,072	2,666,038	1,898,783
Cost of sales		1,476,840	1,932,771	2,163,103	1,633,647
Selling, general and administrative expenses		364,924	415,301	502,935	265,135
Operating profit		225,371	276,757	253,363	161,921
Non-operating profit		42,678	90,329	45,221	51,806
Non-operating expenses		113,753	114,347	115,898	117,642
Income before income taxes		154,297	252,739	182,686	96,086
Income tax expense		495	47,638	24,073	17,190
Income from continuing operations		153,802	205,100	158,613	78,896
Income/Loss from discontinued operations		-	-	-	554,907
Net income		153,802	205,100	158,613	633,803

Credit Rating

Category	Unit	2016	2017	2018	2019
Credit Rating	Korea Investors Service Inc.	A-	A-	A-	BBB+
	Korea Ratings Corporation	A-	A-	A-	BBB+
	NICE Information Service Co.	A-	A-	A-	BBB+

Distribution of Economic Outcomes(as of December 31 of the year)

Category	Unit	2016	2017	2018	2019
Investors	Interest expenses	382	423	566	737
Shareholders	Dividend	913	1,004	1,771	1,024
Customers	Sales(excluding dividend payouts)	18,878	25,306	28,221	20,385
Suppliers	Purchasing expenditures	13,003	14,416	14,623	15,527
Employees	Salary, severance pay, benefits, etc.	2,896	2,857	3,079	2,735
Government	Taxes and utility charges, corporate tax expenses	44	516	335	234
Local Community	Donations, expenses related to corporate community involvement	74	73	57	75
Total		36,189	44,595	48,653	40,717

R&D

Category	Unit	2016	2017	2018	2019	
R&D	R&D investments	KRW 100 million	630	880	875	653
	R&D ratio of investment to sales	%	3.2	3.7	3.3	2.9

Customer Satisfaction

Category	Unit	2016	2017	2018	2019
Customer Satisfaction Index(Electro-Materials BG)	Points	3.5	3.5	3.9	3.6
Customer Satisfaction Index(Mottrol BG)		3.8	3.6	3.7	3.5

Anti-Corruption/Ethical Management

Category	Unit	2016	2017	2018	2019	
Ethical management education	Education hours per capita	No. of hours	1.0	1.0	0.9	0.8
	Education participants	Persons	2,295	2,056	2,231	1,865

Sustainable Supply Chain

Category	Unit	2016	2017	2018	2019	
Sustainability of Supply Chain	No. of key suppliers		342	235	180	247
	No. of suppliers subject to sustainability assessment	No. of companies	121	123	127	178
	Total purchases from suppliers		13,003	14,390	14,623	15,527
	Purchases from key suppliers	KRW 100 million	7,474	9,668	6,942	9,651
	Total purchases from SMEs		6,309	6,930	7,093	7,648

Environment

Environmental Investment(Domestic/Overseas)

Category	Unit	2016	2017	2018	2019	
Environmental Investment and Expenses	Total	101.1	88.2	110.7	120.9	
	Domestic	KRW 100 million	72.6	61.9	70.4	105.2
	Overseas ¹⁾		28.6	26.3	40.4	15.7

1) Scope of overseas data collection: Changshu, CFL, DLE, DIVC, DMJC, DFCA.(For 2019, data collection for DFCA is excluded.)

Air Pollutants(Domestic/Overseas)²⁾

Category	Unit	2016	2017	2018	2019
NOx Emissions	Tons	58.2	55.4	65.8	66.8
SOx Emissions		1.2	1.0	2.1	2.2

2) Scope in 2019 is limited to data from Korean worksites and Electro-Materials Changshu and Mottrol DMJC from overseas worksites.

*Some historical data has been changed due to changes in scope of overseas data collection.

Water Use(Domestic/Overseas)

Category	Unit	2016	2017	2018	2019
Total Water Use		967	1,011	1,042	1,084
Domestic	Total	500	515	502	533
	Water supply	427	457	419	443
	Groundwater	73	58	83	89
All other sources	Thousand Tons	0	0	0	0
Overseas ³⁾	Total	467	496	540	551
	Water supply	414	416	444	470
	Groundwater	0	0	0	0
	All other sources	53	80	96	82

3) Scope of overseas data collection in 2019 is Changshu, Solus, DLE, DIVC and DMJC(excluding DFCA).

Discharge of Wastewater(Domestic/Overseas)

Category	Unit	2016	2017	2018	2019	
Discharge of Wastewater		415	413	433	513	
Wastewater	Domestic	Thousand Tons	168	179	184	208
	Global		247	234	249	305
Chemical Oxygen Demand(COD) ⁴⁾	ppm	21	22	32	35	
Biochemical Oxygen Demand(BOD)		18	16	17	12	

4) Scope of COD and BOD is limited to Korean worksites.

Consumption of Resources¹⁾

Category	Unit	2016	2017	2018	2019	
Consumption of Key Raw Materials		56,588	65,097	80,766	63,585	
of Key Raw Materials	Total	56,588	65,097	80,766	63,585	
	Copper foil	6,501	5,634	5,062	4,195	
	Glass fabric	20,125	18,042	16,920	14,711	
	Epoxy resin	10,066	9,679	11,441	6,047	
	Steel plate	3,503	4,178	5,120	5,103	
	Casting materials	Tons	16,196	27,230	41,943	32,977
	Egg yolk powder	104	124	92	111	
	Ethanol	19	56	41	161	
	Acetone	32	106	78	200	
	SUS plate	19	21	31	36	
SUS tube	5	6	9	10		
Steel sheet	18	21	29	34		
Use of Recycled Materials		45	141	104	318	
Consumption		45	141	104	318	

1) Limited to domestic worksites

Waste Generation(Domestic²⁾/Overseas³⁾)

Category	Unit	2016	2017	2018	2019	
Waste Generation		18.1	18.0	17.6	17.3	
Waste Generation by Type	Domestic total	15.1	14.7	14.0	13.3	
	Domestic general waste	8.1	6.3	6.7	6.0	
	Domestic Hazardous waste	7.0	7.5	7.3	7.3	
	Overseas total	3.0	3.3	3.6	4.0	
	Overseas general waste	1.9	2.2	2.2	2.4	
	Overseas Hazardous waste:	1.0	1.1	1.4	1.6	
Waste Generation by Discharge Method	Domestic recycling	Thousand Tons	9.7	10.3	10.9	10.0
	Domestic landfill	0.7	0.5	0.4	0.4	
	Domestic incineration	4.7	3.0	2.7	2.9	
	Overseas recycling	2.8	2.8	2.8	3.2	
	Overseas landfill	0.0	0.2	0.2	0.2	
	Overseas incineration	0.2	0.3	0.6	0.5	

2) Korean waste emission figures may differ from those reported in the past due to changes in the method of calculating emissions for the Doota building and Yeongang building.

3) Scope of overseas data collection in 2019: Changsu, CFL, CFAPZ, DLE, DIVC, DMJC. For the overseas data, DFCA was excluded.

GHG Emissions(Domestic/Overseas¹⁾)

Category	Unit	2016	2017	2018	2019
GHG Emissions		172.4	189.8	179.1	183.6
GHG Emissions		81.6	86.0	83.5	84.3
		28.9	25.1	23.4	25.0
		52.7	60.9	60.1	59.3
		90.8	103.8	95.6	99.3
		10.1	8.9	8.3	7.5
		80.6	94.9	87.3	91.9
GHG Intensity		7.4	6.4	5.6	7.8
		4.3	3.4	3.0	4.1
		20.2	23.3	24.9	30.2
GHG Emissions		139.9	151.1	147.4	147.2
by BG/BU		4.2	6.2	6.1	5.9
		7.5	9.1	10.2	9.9
		9.8	11.1	3.7	2.7
		2.7	4.2	3.6	10.8
		1.9	2.1	2.5	2.0
		6.3	6.0	5.4	5.1

1) Scope of overseas data collection: Changshu, CFL, DIVC.(Among the overseas data for 2018-2019, DFCA was excluded.)

2) Including Corporate Center, Administration Center, and DDI

Energy Consumption(Domestic/Overseas³⁾)

Category	Unit	2016	2017	2018	2019
Energy Consumption		2,312	2,442	2,459	2,493
Energy		1,646	1,725	1,643	1,695
Consumption		1,061	1,189	1,185	1,212
by Type		564	481	400	432
		21	55	58	51
		666	717	816	798
		533	550	563	597
		133	167	252	201
Energy		0.99	0.82	0.77	1.00
Intensity		0.86	0.68	0.58	0.83
		1.50	1.62	2.1	2.43

3) Overseas Data Collection Scope Changshu, CFL, CFAPZ, DLE, DIVC, DMJC, DFCA.(Among the overseas data for 2019, DFCA was excluded.)

* Among the overseas data for 2018, CFAPZ was added, but DFCA was excluded due to credibility problems for the collected data.

Social Performance

Composition of Human Resources

Category	Unit	2016	2017	2018	2019
Number of	Total	3,789	5,522	5,648	4,984
Employees	Domestic	3,789	3,600	3,902	3,385
	Global	N/A	1,922	1,746	1,599
Domestic	Electro-Materials	1,265	1,251	1,315	1,210
by BG/BU	Industrial Vehicle	520	546	585	565
	Mottrol	484	460	511	516
	DDI	464	432	453	479
	Holding company/CC/ Administration center	433	292	289	291
	Retail	327	249	287	224
	Fuel Cell	223	292	371	100
	Bio	73	78	91	0
Overseas	Asia	N/A	786	705	785
	Europe	N/A	490	680	419
	Americas	N/A	646	361	395
By employment	Total	3,789	3,600	3,902	3,385
Type	Full-time	3,447	3,541	3,779	3,306
	Contract	342	59	123	79
By gender	Total	3,789	3,600	3,902	3,385
	Male	3,134	3,067	3,265	2,809
	Female	655	533	637	576

*Personal resource data are calculated based on the tax payee at the end of 2019 and may differ from the figures reported in the business report.

** Employment type and gender data are based on domestic employees

Employee Diversity

Category	Unit	2016	2017	2018	2019
Ratio of Female Employees		16.47	14.81	16.32	17.02
Ratio of Female	Total	N/A	9.42	10.62	12.09
Managers	Senior managers	N/A	0.00	0.00	1.27
	Middle managers	N/A	10.15	11.36	12.77
	Junior managers	N/A	18.65	20.23	20.21
Basic Salary and	Supervisory position	95.50	96.36	95.90	94.67
Compensation Ratio of Female,	Non-supervisory position	92.15	77.13	78.79	95.27
Compared to Those of Male					

* Senior managers are at or above the executive level, middle managers are department managers and section managers, and junior managers are section chiefs and staff.

** Supervisory positions consists of department managers and section managers. Non-supervisory positions consists of section chiefs and staff, except for office support/professional/specialty positions.

Employment and Turnover

Category	Unit	2016	2017	2018	2019
New Recruits	Full-time	371	259	286	296
	Contract	226	74	118	84
Employment	Disabled	50	42	47	46
Diversity	National merit recipients	32	44	38	37
Turnover rate(Full-time)	%	5.8	4.7	6.1	5.3

Labor Practices

Category	Unit	2016	2017	2018	2019
Union Membership Rate ¹⁾	%	78.8	79.1	78.8	78.6

1) Union membership rate = Number of employees enrolled in labor unions / Number of total employees

Performance Evaluation

Category	Unit	2016	2017	2018	2019
Rate of Employees Subject to Performance Evaluation ²⁾	%	99.8	99.8	100	99.5

2) For white-collar employees

Health and Safety

Category	Unit	2016	2017	2018	2019	
Rate of Occupational Accidents	Employees	Rate of occupational accidents per million hours	0.15	0.25	0.26	0.06
LTIFR³⁾	Employees	Rate of occupational accidents per million hours	0.98	1.38	1.29	0.28
LTIFR⁴⁾	Suppliers	Rate of occupational accidents per million hours	0.00	0.00	0.67	0.00
OIFR⁵⁾	Employees	Disease rate per million hours	0.16	0.00	0.13	0.14

3) Approval criteria for industrial accidents

4) LTIFR(Lost Time Incidents Frequency Rate): Total number of incidents / Total working hours * 1,000,000

5) OIFR(Occupational Illness Frequency Rate): Total number of diseases / Total working hours * 1,000,000

Development of Employee Capabilities

Category	Unit	2016	2017	2018	2019
Total Training Expenses	KRW million	5,685	4,728	4,802	5,838
Total Training Hours	Hours	189,532	103,487	118,301	108,086
Training Expenses per Capita	KRW 1,000/ Person	1,365	1,313	1,271	1,766
Training Hours per Capita		82	46	49.2	44
Education Status¹⁾					
General education	Hours/Persons	70.7	34.6	32.3	40.5
Ethical management education		1.0	1.0	0.9	0.8
Anti-sexual harassment education		1.3	1.3	2.6	1.8
Compliance program education		2.1	1.4	0.3	0.6
Information security education		5.4	4.6	8.8	0.7

6) The total training hours per person is not equivalent to the sum of training hours per person by specific training course.

Childcare Leave and Pension Support

Category	Unit	2016	2017	2018	2019
Childcare Leave					
No. of employees on childcare leave	Persons	33	39	56	51
No. of employees returning to work after childcare leave		24	29	35	36
Continue to work rate for 12 months after childcare leave		13	20	21	27
Retirement pension					
Funds under management	KRW million	122,749	128,396	150,250	171,265
Defined benefits(DB)	Persons	3,329	2,828	3,346	3,052
Defined contributions(DC)		29	39	36	121

Human Rights

Category	Unit	2016	2017	2018	2019
Human Rights Education	No. of hours	3,111	2,968	6,180	4,407
Employees Participating in Human Rights Education		100	100	100	100
Suppliers Subject to Human Rights Assessment	%	6	8	7	11

Type of Community Involvement Activities

Category	Unit	2016	2017	2018	2019
Total		7,400(100)	7,288(100)	5,747(100)	7,512(100)
Charitable Contribution	KRW million	753(10)	1,079(15)	660(11)	573(8)
CCI Investments	(%)	6,196(84)	4,621(63)	4,505(78)	6,443(86)
Commercial initiatives		450(6)	1,389(19)	384(7)	283(4)

Investment Type of Community Involvement

Category	Unit	2016	2017	2018	2019
Total		7,400(100)	7,288(100)	5,747(100)	7,512(100)
Cash donation	KRW million	6,847(93)	6,525(90)	4,462(78)	6,168(82)
Donation in kind		216(3)	86(1)	87(2)	11(0.1)
Cost of employee's contribution activities	(%)	237(3)	200(3)	198(3)	213(3)
Operating cost		100(1)	476(7)	1,000(17)	1,121(15)

Participation in Community Involvement Activities

Category	Unit	2016	2017	2018	2019
Employee Volunteering	Persons	2,564	2,242	2,328	2,755
Volunteer Hours	Hours	9,199	7,623	7,255	7,929

Business Association Expenditure

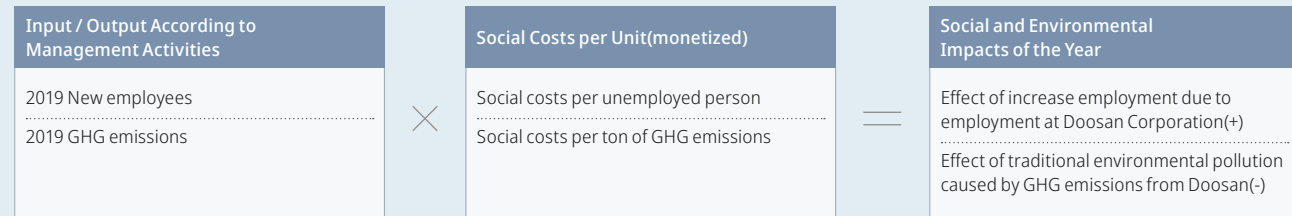
Category	Unit	2016	2017	2018	2019
Total Expenses		855.4	675.8	828.7	608.9
Major Expenses in 2019					
	KRW million				
Korea Employers Federation					91
Incheon Chamber of Commerce and Industry					80
North American Forklift Association					66
H2KOREA					50
Korea Industrial Technology Association					15

* As of December, 2019

Social Value Measurement

Measurement Method

We measured the social value generated for the year by using input/output data from management activities and statistics/research data on domestic/international social costs to convert social and environmental impact into a monetary value.



Measurement Indicators

Description	Indicators	Impact	Measurement Results(KRW 0.1 Billion)			Main Activities	
			2018	2019	Growth rat(%)		
People	Welfare and Employment	Wages and benefits	+	11,647	1,470	-11%	Increase of individual income through employee salary and welfare(based on the Business Report)
		Employment growth	+	125	130	4%	Contribution to the reduction of unemployment through the provision of jobs
	Safety Accident Impact	Number of deaths	-	0	0	-	Social cost due to industrial accidents
		Industrial accidents	-	5	1	-80%	
People Total				1,767	1,599	-9%	
Planet	Greenhouse Gas Impact	Total emissions	-	50	51	3%	Social costs related to GHG emissions
		Water Impact	Water use	-	17	19	12%
	Wastewater discharge		-	5	6	27%	
	Waste Impact	Incineration	-	5	5	2%	Social costs of emission by type for waste generated by business activities
		Landfill	-	0.5	0.5	-4%	
	Impact of Air Pollutants	SOx emissions	-	0.8	0.8	5%	Social costs of emission by type for air pollutants generated by business activities
NOx emissions		-	67	69	22%		
Fine dust emissions		-	14	19	33%		
Planet Total				154	164	6%	
Partner	Contribution to Suppliers	Purchase amount	+	910	1,012	11%	Contribution to the creation of a shared growth ecosystem through increased purchases from suppliers
		Support for shared growth	+	11	133	1,189%	Shared Growth Support Fund and amount supported
		Inhibition of shared growth ecosystem due to unfair practices	-	0	0	-	Inhibition of shared growth ecosystem due to violation of the Fair Trade Act(penalty)
	Corporate Community Involvement	Charitable contributions	+	7	6	-13%	Social value contributed to community education, infrastructure and the environment through social contribution activities and donations
		CCI investments	+	47	67	42%	
		Commercial initiatives	+	4	3	-26%	
	Shareholders	Dividends	+	1,024	1,000	-2%	Increased shareholder value through payment of dividends(based on the Business Report)
	Investors	Payment of interest	+	525	763	45%	Increase investor value through payment of interest(based on the Business Report)
The Government	Corporate tax	+	241	172	-29%	Contribution to secure government funding through proper payment of taxes(based on the Business Report)	
Partner Total				2,769	3,155	14%	
Social Value				4,381	4,590	5%	

* Social value is measured with KPC, a special institution for sustainable management. Quantitative social benefit and cost are divided into positive and negative impact based on statistics and research data from Korea and abroad.

UN Global Compact

We at Doosan Corporation joined the UN Global Compact in 2014 and have been abiding by its 10 principles in the four areas of human rights, labor, the environment, and anti-corruption. We are committed to realizing corporate social values and continuing to grow sustainably by constantly challenging ourselves to create future value through innovation and by making sincere efforts as a global corporate citizen.



10 Principles

1 2	Human Rights	Principle 01. Businesses should support and respect the protection of internationally proclaimed human rights; and Principle 02. make sure that they are not complicit in human right abuses.	37p, 74-76p
3 4 5 6	Labour	Principle 03. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining; Principle 04. the elimination of all forms of forced and compulsory labour; Principle 05. the effective abolition of child labour; and Principle 06. the elimination of discrimination in respect of employment and occupation.	74-76p
7 8 9	Environment	Principle 07. Businesses should support a precautionary approach to environmental challenges; Principle 08. undertake initiatives to promote greater environmental responsibility; and Principle 09. encourage the development and diffusion of environmentally friendly technologies.	44-47p, 68-69p, 79-80p
10	Anti-Corruption	Principle 10. Businesses should work against corruption in all its forms, including extortion and bribery.	66p

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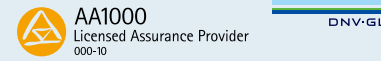
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Independent Assurance Statement



Introduction

Doosan Corporation("Doosan") commissioned DNV GL Business Assurance Korea Ltd.("DNV GL"), part of DNV GL Group, to undertake independent assurance of Doosan corporation CSR Report 2019 (the "Report"). The directors of Doosan have sole responsibility for the preparation of the Report. The responsibility of DNV GL in performing the assurance work is to the management of Doosan in accordance with the terms of reference. DNV GL's assurance engagements are based on the assumption that the data and information provided by the client to us as part of our review have been provided in good faith.

Scope and basis of assurance

Based on non-financial data and sustainability activities and performance data generated in 2019 from Doosan's headquarters and domestic facilities, we have evaluated the adherence to AA1000 Accountability Principles(AP) 2018¹ and assessed the quality of sustainability performance information. We have reviewed that the Topic-specific disclosures of GRI Sustainability Reporting Standards 2016 which are identified in the materiality determination pro-

cess; DNV GL performed our work using AA1000AS 2008 with 2018 addendum and DNV GL's assurance methodology VeriSustainTM 2(Version 5.0) which is based on our professional experience, international assurance best practices. DNV GL provides Type 1 and the moderate level of assurance. But some environmental performances have been verified by Type 2. The assurance was carried out from May and till July 2020. The site visit was made to Doosan's Headquarters in Seoul, Korea. We undertook the following activities as part of the assurance process:

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

Limitations

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

No	Material Topics	GRI Disclosure
1	Securing new growth engines	N/A
2	Highest level of quality management	N/A
3	Increased investment in R&D	N/A
4	Development of environment-friendly products and services	N/A
5	Realization of a desirable organizational culture for workplaces	N/A
6	Workplace safety management	403-4
7	Creation of economic performance and improvement of financial security	201-1
8	Efforts to reduce greenhouse gas emissions and energy use	302-1, 4
9	Development of director and employee capabilities	404-1, 3
10	CCI activities aligned with business	413-1
11	Support for shared growth and strengthening CSR activities	414-2
12	Increased resource circulation and recycling	306-2
13	Respect for Human Rights	412-1

1) AA1000 AccountAbility Principles 2018: Internationally accepted, four principles-based framework and guidance that organisations can use to identify, prioritise and respond to sustainability performance and responsibility.
 2) The VeriSustain protocol is available upon request at DNV GL Website(www.dnvgl.com)
 3) DNV GL Code of Conduct is available from DNV GL website(www.dnvgl.com)

Conclusion

On the basis of the work undertaken, nothing comes to our attention to suggest that the reported data and information disclosed in the Report do not give a fair representation of Doosan' sustainability performance. Further opinions with regards to the adherence to the Principles are made below;

The Principle of Inclusivity

Doosan has identified 6 internal and external stakeholder groups such as Shareholders and Investors, Customers, Employees, Suppliers, Local Communities and Regulators. Doosan engages with the stakeholders at the company and business unit levels through various channels. The Report provides the definition of stakeholder, expectations and requests by key stakeholders, and communication channels. Doosan reflects the results of its stakeholder engagement activities in its management activities. The activities and performance of key stakeholders are disclosed through the Report.

The Principle of Materiality

Doosan has conducted the materiality assessment to prepare the Report. 35 various issues have been derived by analysing the topics covered in various global initiatives and standards, media research, global benchmarking and internal data analysis. The issue pools were used to rate the material topics in terms of business relevance and impact on the stakeholders. 13 material topics are prioritized accordingly. Doosan has divided material topics identified in the materiality assessment into 3 reporting categories(People, Planet, Suppliers) and presented the management approach and major performances for each stakeholder issue in the Report. Doosan discloses the prioritized material sustainability topics in a comprehensive and balanced way.

The Principle of Responsiveness

The 'CSR Achievements and Plans' section of the Report in which Doosan's 2019 activities, plans, and performance indicators are addressed helps stakeholders understand Doosan' sustainability management. In addition, the Report discloses the key performance and results in 2019. The Report is prepared in a comparable, comprehensive, and timely way using the reporting principles.

The Principle of Impact

The Report presents the direct and indirect impacts of material topics identified materiality assessment. Doosan identifies, monitors and assesses the impacts of material topics to stakeholders. Doosan has presented business relevance and key stakeholders corresponding to the respective material topics. In addition, Doosan measures social values by taking into account not only financial

performance but also the impact on all stakeholders. As a result, Doosan discloses corporate social value as an effort to upgrade the level of social responsibility management.

Quality on sustainability performance information

DNV GL have reviewed the reliability of the disclosure data - water consumption, general and hazardous waste generation. We have interviewed the person in charge, reviewed the process of gathering and processing data and test information on a sampling basis. The person in charge can explain the source and process of the data identified above, which is considered traceable. The intentional error or misstatement is not noted from the data and information disclosed in the Report. Data owners were able to demonstrate the origin and interpretation of the data in a reliable manner. The data was identifiable and traceable.

Competence and Independence

DNV GL applies its own management standards and compliance policies for quality control, in accordance with ISO/IEC 17021:2015 - Conformity Assessment Requirements for bodies providing audit and certification of management systems, and accordingly maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements. We have complied with the DNV GL Code of Conduct³ during the assurance engagement and maintain independence where required by relevant ethical requirements. This engagement work was carried out by an independent team of sustainability assurance professionals. DNV GL was not involved in the preparation of statements or data included in the Report except for this Assurance Statement. DNV GL maintains complete impartiality toward stakeholders interviewed during the assurance process. DNV GL have no other contract with Doosan and did not provide any services to Doosan in 2020 that could compromise the independence or impartiality of our work.

July 2020
Seoul, Korea

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

Greenhouse Gas Verification Statement

Scope of verification

Doosan Corporation's GHG Emission and Energy Consumption Statement in 2019

External Review of Report

The verification was performed based on the Administrative Guidelines for the Greenhouse Gas Target Management System(Ministry of Environment Notice No. 2016-255), the Greenhouse Gas and Energy Target Management System Operating Guidelines(Ministry of Environment Notice No. 2016-104), and implementation plan and relevant criteria distributed to NGMS.

Verification Procedure

The verification was planned and performed according to the procedure set forth under the Administrative Guidelines for the Greenhouse Gas and Energy Target Management System. In particular, the verification was performed at a reasonable level of assurance.

Limits of Verification

Based on the above verification, the sampling method was applied according to the verification plan recognized by the National Institute of Environmental Research for the greenhouse gas emission statement, related data, information, systems provided by Doosan Corporation. The verification implies inherent limits that may occur in the process of applying the standards and methods.

Verification Opinion(Qualified/Conditional/Disqualified)

2019 Doosan Corporation's GHG Emission Statement contains errors due to the above verification limits. The materiality test of Doosan Corporation's greenhouse gas emissions revealed that they satisfy the criteria for 5% or less based on their volume. Therefore, we hereby present a qualified opinion on the Doosan Corporation's greenhouse gas emissions.

※ Materiality Calculation Method = [Total amount of greenhouse gas emission due to uncorrected errors(%) / Total greenhouse gas emissions reported in the statement] × 100

Comprehensive opinion

Doosan Corporation's GHG Emission and Energy Consumption in 2019 were appropriately collected, prepared, and reported in accordance with relevant guidelines. We confirmed through verification that emission of major emission facilities(facilities that account for more than 95% of the total amount of greenhouse gas emissions) and small emission facilities were calculated without omission.

29 April 2020
Korea Foundation for Quality, Inc
KiSeung Jung



Volume of greenhouse gas emissions of Doosan Corporation

Unit: tCO₂e

Scope(Based on the Definitions under the Administrative Guidelines for the Greenhouse Gas Target Management System)	2019
Volume of directly emitted greenhouse gases(Scope 1)	25,046
Volume of indirectly emitted greenhouse gases(Scope 2)	59,297
Total volume of greenhouse gas emissions	84,343

*There is a difference between the total emitted volume of greenhouse gases and the total emitted volume of worksites(trimmed amounts of total volume of greenhouse gases from worksites are added up.)



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