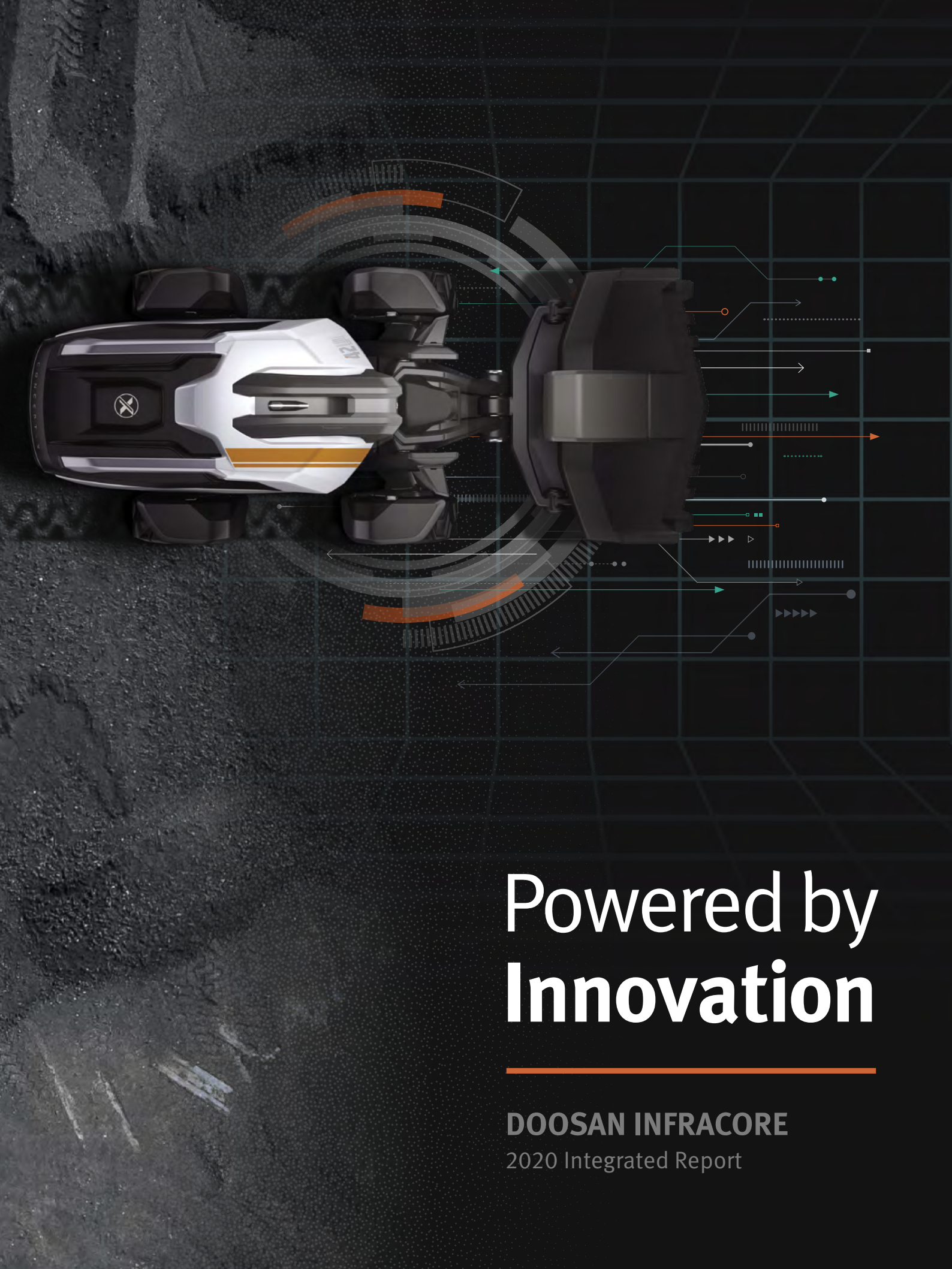

Powered by **Innovation**

DOOSAN INFRACORE

2020 Integrated Report

About This Report

Reporting Purpose Doosan Infracore strives to embody environmental, social, and governance (ESG) management in its overall corporate management. To this end, we publish an integrated report to disclose our financial and non-financial performance results generated through the interaction of diverse ESG factors, based on which corporate values are created. This is Doosan Infracore's nineth Integrated Report, and continued discussions and improvements are taking place for more effective and transparent disclosure of information.

Reporting Process Some 30 departments related to the company's strategy, R&D, production, sales, investor relations, and communications have participated in the planning of this Integrated Report in order to enable comprehensive reporting on Doosan Infracore's financial and non-financial performance as well as social and environmental values, with a particular focus on 2020 performance results and future plans of the company.

Reporting Period This report presents quantitative data about the company's performance during the 2020 calendar year. However, the company's qualitative activities mentioned in the report, including the composition of the BOD, include developments recorded until the end of April 2021.

Reporting Scope This report is mainly on the activities and accomplishments made by the company's worksites in Korea and China. Some qualitative activities, however, include those undertaken at the company's overseas worksites. The ESG Facts & Figures section includes the quantitative outcomes of the worksites in Korea and China for the last three years.

Reporting Principle Global Reporting Initiative Standards (Core Option)

External Assurance This report has been assured by Samil PwC, an independent assurance service provider, to ensure the propriety and integrity of the reporting processes as well as the accuracy and credibility of its contents. The Independent Assurance Report is attached in the Appendix section.

Disclaimer This report contains details of some future activities, events and situations based on the company's plans and estimations of future financial outcomes, which may turn out to be inaccurate in the event of changes in the global business landscape. The plans and estimations draw upon the best information available at the time of completion of this report, with due consideration given to future business environments as well as the company's elaborate business strategies. Doosan Infracore, therefore, would like to remind its stakeholders that this report contains some predictions that may be affected significantly due to the risks, uncertainties and other factors involved in the company's global operations.

Reporting Method

Printed Material
This report is published in Korean, English and Chinese to communicate better with our global stakeholders

PDF
This report is available in PDF format which can be downloaded at www.doosaninfracore.com

Contact Us

Doosan Infracore
ESG Team
North 17F, Bundang Doosan Tower, 155 Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do (13557), Korea
E-mail: di.esg@doosan.com

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Doosan Infracore

A world-leading company in infrastructure solutions based on world-class competitiveness

2020 Financial Highlight

(Unit: KRW million; based on consolidated financial statements)

Sales	7,934,105
Operating Income	658,599
Total Assets	12,026,887
Total Equity	4,488,999

Company Profile

Ever since its establishment in 1937, Doosan Infracore has grown into a leading machine manufacturing company in Korea. Its product line-up includes construction equipment, engines, a variety of attachments, and utility equipment, and based on its world-class competitiveness, Doosan Infracore is moving forward to become a global leader in the infrastructure solutions.

Company Name	Doosan Infracore Co., Ltd.
Year Founded	1937
CEO	Sohn, Dong Youn
Main Business Areas	Production and sales of construction equipment and engines
Employees	4,467 (Including overseas worksites; as of December 31, 2020)

Business Overview

Construction Equipment

The Construction Equipment Business Group has supplied high quality medium and large heavy equipment to industrial sites since 1977, contributing to the development of the global infrastructure industry. It has prestigious global brands, such as Doosan, Bobcat, and Geith, with product line-up ranging from excavator to wheel loader and articulated dump truck (ADT), and established production and sales bases as well as distribution network across the globe, positioning itself as a global construction equipment company.

Excavator

A reliable partner that demonstrates top performance with superior power Our excavators, ranging from small to medium and large-sized excavators, provide optimal performance and work efficiency, irrespective of the environment. We guarantee top customer satisfaction with small excavators that offer strong excavation power and convenience and medium and large-sized excavators that demonstrate maximum productivity with enormous power in addition to outstanding durability and fuel efficiency.

Wheel Loader

Excellent capabilities that stand out in tougher conditions Doosan Infracore's wheel loaders provide strong power and excellent agility that ensure that their outstanding performance and efficiency stand out, all the more so in the toughest conditions. They guarantee the highest equipment operation rate and increased revenues by offering perfect quality and a higher level of durability.

ADT

Stability and power enabled by Doosan's unique original technology Our articulated dump trucks (ADTs) guarantee stable and powerful driving performance and top productivity even under extremely challenging conditions, an outcome of applying Doosan's unique original technology that enhances traction. We set new standards for ADT technologies, offering excellent durability, fuel efficiency, and convenient maintenance.

Special Equipment

Customized solution optimized for diverse work environments We offer improved work productivity and a safer working environment by providing specialized equipment solutions that are suitable for customers' diverse work sites and conditions.

Attachment

Optimized design that maximizes excavator and wheel loader performance Our highest quality attachments ensure the best performance by improving equipment productivity and usefulness in customers' diverse working environments, enhancing customer satisfaction and value.

Engine

Established in 1958, the Engine Business Group produced the first diesel engine in Korea and has continued to expand its business portfolio. It supplies diesel and gas engines for buses and trucks, power generators and ships, as well as various industrial engines across the world. Based on its product line-up that meets increasingly stringent world-wide environmental regulations, it is providing technologies and solutions that contribute to creating a better life, emerging fast as the world's top-tier engine manufacturer.

Generator Engine

The heart of electricity that lights the entire world Applied to emergency and commercial generators, our engine products offer strong power and outstanding durability, and are supplied to all places around the world that need electric power.

Off-Highway Engine

Best power solution for various kinds of industrial equipment, including agricultural machinery and construction equipment We provide the best products and services that are optimized for customer equipment and are in line with customer demand and perspectives.

On-Highway (Automotive) Engine

Technological prowess that protects the environment and boasts top performance and efficiency Our automotive engines adopt high-quality, eco-friendly, and customized designs with high fuel efficiency and power, thus satisfying customers and reaching all parts of the world.

Marine Diesel Engine

60 years of milestones, proven quality in the global market Our marine engines offer a high level of fuel efficiency and durability, enabled by know-how that has been accumulated over a long period. They are installed in diverse vessels, including fishing trawlers, yachts, pleasure boats, and cruise liners, and are favored by customers across the globe.

Parts & Service

Outstanding quality and service that satisfy global customers Genuine Doosan parts improve engine performance and extend service life based on top quality. We offer truly satisfying services to global customers by ensuring strict inventory management and prompt supply of parts.

Growing into the most innovative company based on 80 years of milestones, and "Powered by Innovation"

Company History

Doosan Infracore was founded in 1937 as "Chosun Machine Works," the first large-scale machine manufacturing plant in Korea, and has grown into a global company by achieving many records of "first" and "best" in around 80 years. As we move into the Fourth Industrial Revolution, we are further accelerating the pace of innovation toward the most innovative company, setting new records of "first" and "best," thereby creating new value through smart technology, and leading the market.

THE BEGINNINGS

The birth of machinery industry in Korea

1937
Established Chosun Machine Works

1958
Produced a diesel engine for ships

1963
Launched as Korea Machinery Industries Corp.

1975
Completed the construction of the diesel engine factory in Incheon – one of the largest in Asia

1976
Company name was changed to Daewoo Heavy Industries & Machinery Ltd.

1981
Established the Central R&D Center

1985
Developed SOLAR, the company's excavator model developed in-house

1986
Began mass production of four models of the STORM engine – the company's own model

1995
Developed the ultra-compact excavator SOLAR007

2001
Daewoo Heavy Industries & Machinery was listed

GLOBAL MOMENTUM

Paving the way for a global company

2005
Launched Doosan Infracore Co., Ltd.

2006
Established Doosan Infracore China Investment Co., Ltd – a holding company in China

2007
Acquired the compact equipment business (Bobcat)

Awarded the USD 2 Billion Export Tower on Trade Day

Released the DX210W, a 21-ton next-generation excavator

2008
Acquired Moxy Engineering A.S., a Norwegian articulated dump truck company (currently DIN)

Released the DX225LCA to respond to emerging markets

2009
Published the company's first environmental report

2010
Completed the construction of Gunsan Construction Equipment Plant

Began managing greenhouse gas and energy targets

SUSTAINABLE GROWTH

A global leader opening a new chapter of sustainability

2011
Published the company's first sustainability management report

Created Sustainable Management Part and Social Contribution Part

2013
Joined the UN Global Compact

Published the company's first integrated report

2014
Set the Code of Conduct

Completed the construction of the Global R&D Center in Incheon

2015
Facilitated the operation of the CSR Committee

2016
Completed the advanced Incheon Excavator Plant

Doosan Bobcat was listed on the KOSPI

2017
Launched DoosanCONNECT™ globally

Established Lovol Doosan Engine Company Joint Venture (LDEC JV)

2018
Demonstrated 5G remote control of ultra-long-distance construction equipment

2019
Held a Concept-X demonstration event showcasing the future autonomous construction site

2020
Launched XiteCloud, an integrated construction site management solution

Doosan Infracore
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CEO Message

We are fully committed to strengthening our ESG management.

Sohn, Dong Youn

Chief Executive Officer
Doosan Infracore Co., Ltd.

In 2020, Doosan Infracore endured unprecedented challenges, including a global economic downturn, the COVID-19 pandemic, and company sell-offs. Nevertheless, we exceeded market expectations by achieving sales of KRW 7,934.1 billion. In addition, we expanded our presence in the global market and achieved sales growth in Korea while also bringing about changes in the mini excavator market.

Outlook and Plans for 2021

2021 will be no easier, with COVID-19 remaining a threat, logistics costs and commodity prices rising, and constrictions in the supply of semiconductor parts. In the face of these difficulties, Doosan Infracore will look to its fundamentals and strengthen corporate resilience. We will prepare for a new future by ensuring fundamental competitiveness, fostering an innovative mindset, and strengthening ESG management.

Ensuring Fundamental Competitiveness

We will develop fundamental and distinctive competitiveness in products, solutions, quality, and service. We will expand our line-up of compact construction equipment, strengthen the parts business, widen our presence in North America and Europe, and make other efforts to diversify our portfolio. We will also accelerate the pace of developing new technologies for the future, including electric excavators, hybrid powertrains, engine aftertreatment, and Concept-X.

Fostering an Innovative Mindset

The construction equipment industry is no longer restricted by the boundaries of the machinery industry. Instead, it is evolving into a total solution provider, combining machinery with cutting-edge technologies such as big data and AI. Doosan Infracore is therefore finding new ways of thinking, including collaboration with highly diverse partners, such as game and hi-tech companies, as well as digital marketing while accelerating the pace of digital transformation. We have overhauled our integrated data management systems to ensure data-driven decision-making and collaboration, and created the DI 360 – a data-based collaboration platform. These innovations will enable us to innovate every day and grow further.

Strengthening ESG Management

ESG competence has become a key factor in corporate management, which is why Doosan Infracore places the highest priority on the social and environmental impact of our business operations and products. We are therefore committed to contributing to the resolution of global issues and helping our local communities by leveraging our technological prowess. In particular, the construction equipment industry must actively respond to the issue of climate change, including the trend towards the electrification of construction equipment. Doosan Infracore is actively responding to the climate change issue and electrification trend by developing eco-friendly technologies, and will make changes to create better value for future generations. Moreover, we will continue to engage in activities which enhance our corporate sustainability, including advanced labor-management relation, safe and healthy business environment, and fair partnerships with suppliers.

Doosan Infracore will make proactive efforts to all the challenges we face, and will transform obstacles into opportunities for progress. I look forward to your ongoing interest and support, as we continue along the path of our new journey.

Our Business Model

Doosan Infracore strives to maximize its corporate value by effectively investing its financial and non-financial resources in its value chain. We actively address social and environmental issues related to our business operations, while pursuing our vision of becoming a "Global Leader in Infrastructure Solutions" as a means to ensure sustainable growth and contribute to social development.

Capital Input

Financial
Funds that are generated through management, investments or financing, and that can be used by an organization to produce products or provide services

Manufactured
Manufactured articles, such as facilities and buildings, that can be used by an organization to produce products or provide services

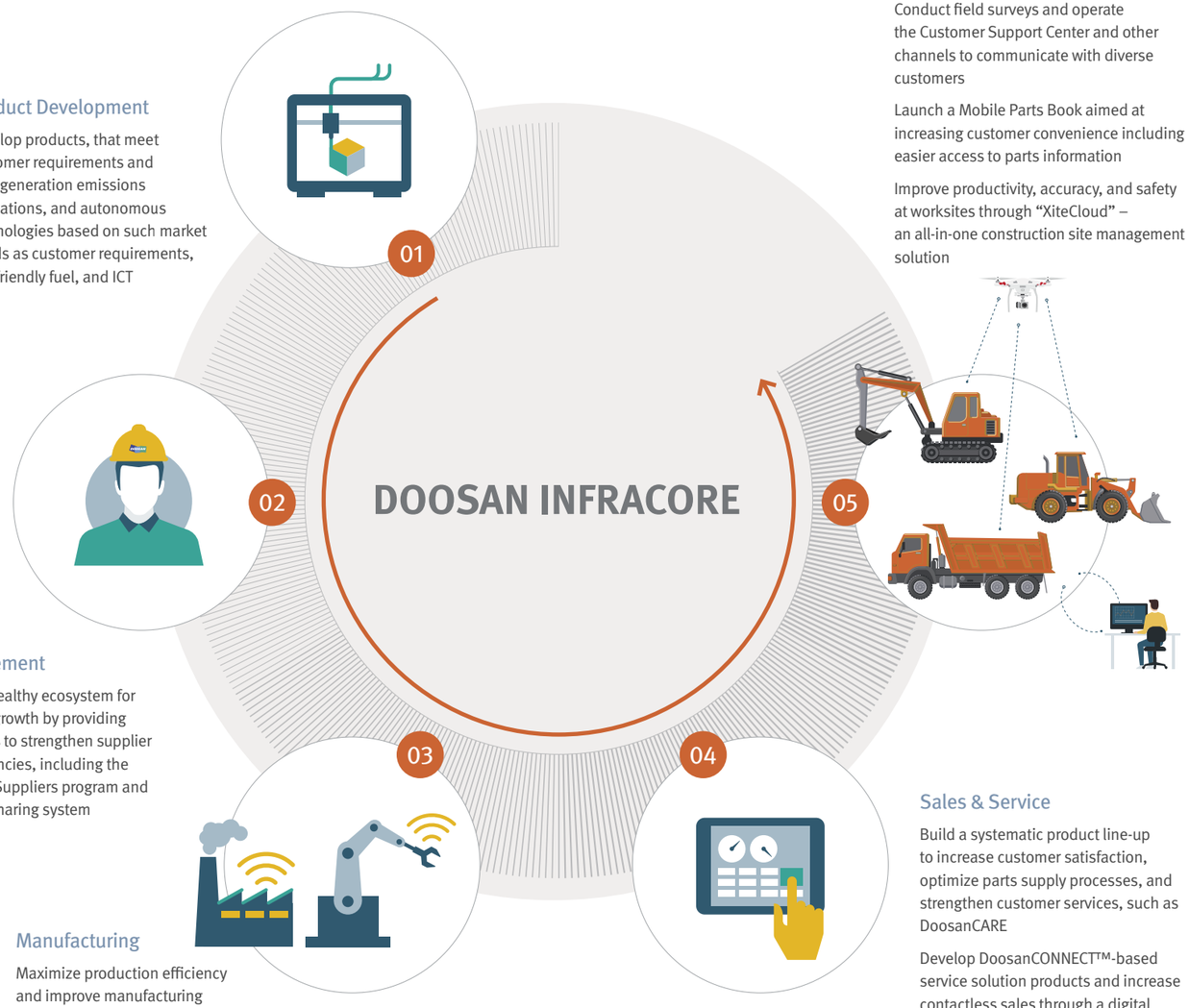
Intellectual
An organization's knowledge-based intangible assets, such as patents, copyrights, software, rights, and licenses

Human
Members' capabilities and experiences that drive innovation and allow the understanding, development, and execution of an organization's strategies

Social/Network
Stakeholder relations and trust, and other intangible assets related to brands and reputation developed by an organization

Natural
All environmental resources, both renewable and non-renewable, that can be used to provide products or services

Value Chain



Product Development

Develop products, that meet customer requirements and next-generation emissions regulations, and autonomous technologies based on such market trends as customer requirements, eco-friendly fuel, and ICT

Procurement

Build a healthy ecosystem for win-win growth by providing programs to strengthen supplier competencies, including the Leading Suppliers program and benefit sharing system

Manufacturing

Maximize production efficiency and improve manufacturing competitiveness through the Global Manufacturing Execution System (GMES)

Sales & Service

Build a systematic product line-up to increase customer satisfaction, optimize parts supply processes, and strengthen customer services, such as DoosanCARE

Develop DoosanCONNECT™-based service solution products and increase contactless sales through a digital platform

Increase equipment operation and management convenience based on the smartphone app "MY DI"

In-use (Product & Solution)

Conduct field surveys and operate the Customer Support Center and other channels to communicate with diverse customers

Launch a Mobile Parts Book aimed at increasing customer convenience including easier access to parts information

Improve productivity, accuracy, and safety at worksites through "XiteCloud" – an all-in-one construction site management solution

Key Performance In 2020

Financial[1]

Sales KRW 7,934.1 billion
Decreased by 3.08% year-on-year due to sluggish market affected by the COVID-19 pandemic but on the back of the V-shaped recovery in China and gradual recovery of global demands

Operating income KRW 658.6 billion

Debt ratio 167.9%
Net debt ratio improve by 15% year-on-year mainly attributable to the improvement of working capital and decrease of net income of Doosan Bobcat

Manufactured

Production facility investments KRW 150.3 billion
Investments to increase production capacity and improve the plant environment

Production

Excavators and wheel loaders	26,740
Engines	83,153

LTIR[2] 0.61

OIFR[3] 0.107

Intellectual

Domestic and overseas intellectual property rights[4]

Applications (including 2,768 patents)	4,285
Registrations (including 1,839 patents)	3,224

Percentage of R&D on autonomous technologies among R&D projects of the company 38.2%

Human

Training expenses per person KRW 400,000

Training hours per person 37.6
Continued to offer online-based trainings in response to COVID-19-induced situation where face-to-face training was postponed or cancelled

Employee turnover rate 1.40%

Social/Network

Involved in UN Global Compact since 2013

Corporate community involvement (CCI) investment KRW 8.91 billion

Leading Suppliers (cumulative) 38
Operated programs designed to help our suppliers improve their own capabilities and secure fundamental competitiveness

Natural

Energy consumption[5] 1,730 TJ

Greenhouse gas emissions 90,447 tCO_2eq

[1] Based on consolidated financial statements
[2] LTIR (Lost Time Incidents Rate): Number of incidents involving more than one-day closure of workday per 100 workers, Total number of lost time cases/Total number of hours worked by employees * 200,000 (Number of incidents is based on incidents by employees of Doosan Infracore)
[3] OIFR (Occupational Illness Frequency Rate): Number of workers who have occupational illness and other related illness/Total workers (Number of workers is based on employees of Doosan Infracore; and application of calculation formula of the Korea Occupational Safety and Health Agency)
[4] Based on consolidated entities as of 2020 year-end
[5] Based on business sites in Korea

Performance Review & Outlook

2020 Performance Summary

200,000 +
Accumulated number of excavators produced by the Chinese subsidiary

XiteCloud
Received the Minister of Land, Infrastructure and Transport Award at Smart Construction Challenge 2020

48V mild hybrid powertrain
Successfully completed an equipment application test

ECUBE Solution
A total solution provider of aftertreatment system

DI360
Opened a big data-based work platform

DooEco
Established an IoT-based integrated environment monitoring system

11 consecutive years
Listed in the machine and electric equipment categories of DJSI Korea

A
Rated Class A in the ESG Evaluation by the Korea Corporate Governance Service

2019 Integrated Report
Received Grand Award (Cover Category) and Gold Award (Non-English Category) at the 2020 ARC Awards

Sales	Operating Income	Net Income
7,934.1	658.6	285.1
KRW billion	KRW billion	KRW billion

Performance Overview

The global construction equipment market has enjoyed strong growth momentum since 2016 on the back of a worldwide economic recovery and increasing demand for repurchases. This trend continued in 2020, despite the impact of COVID-19, with the market growing thanks to increased replacement of equipment with new products in Korea and government-led infrastructure investments in China. Going forward, the solutions business, driven by the ever-diversifying requirements of customers, is expected to play a bigger role. In addition, digitalization in construction sites will be accelerated, which in turn will lead to more opportunities for new digital-based businesses.

The global engine market also has grown since 2016 thanks to the booming market for construction equipment in China and stable demand for gasoline engines from the oil & gas industry, fueled by strong oil prices. COVID-19 caused an inevitable downswing in the engine market, but a steady recovery is now expected. There will be growth opportunities generated by a number of diverse factors, including market entry opportunities in line with stricter standards for exhaust emissions, growth in the high-power large engine sector, and increased demand from Southeast Asia and other emerging markets. In response, engine manufacturers around the globe are increasing cooperation, optimizing their business structures, and implementing targeted growth strategies for each product and region. In addition, engine electrification has been expanding to include off-highway engines, which will result in growth in demand for the powertrains of the future such as hybrid, full electric, and fuel cell.

Doosan Infracore is striving to enhance stakeholder and corporate value through ESG-based management. We reorganized the dedicated CSR organization which had been in operation since 2011 into the ESG Team in 2021, and the CSR Committee which was set up in 2015 became the ESG Committee in order to ensure preemptive responses to issues surrounding ESG. We have also aligned our core business with the UN Sustainable Development Goals (SDGs) as a way to contribute to social development through cooperation between advanced economies and developing nations as well as the development of new technologies, supported by fundamental analysis on how to create a sustainable future for both the company and wider society. In addition, Doosan Infracore analyzed the social value of Concept-X, our advanced solution for future unmanned construction sites, by using KPMG's "True Value" methodology, which was followed by the evaluation of social and environmental value of electric excavators, using PwC's "TIMM" methodology, in our preemptive efforts for the ESG-based management.

Financial Performance

1. Business Performance

Sales decreased by 3.08% year-on-year in 2020 to KRW 7,934.1 billion as market stagnation in the first half of the year owing to COVID-19 was balanced out by a steady recovery in global demand in the second half of the year, especially in Korea and China. Operating income decreased by KRW 181.8 billion to KRW 658.6 billion, and net income declined by KRW 110.6 billion to KRW 285.1 billion.

Sales Records

(Unit: KRW million; based on consolidated financial statements)

	2018	2019	2020
Sales	7,730,108	8,185,840	7,934,105
Cost of sales	5,936,246	6,273,219	6,205,896
Gross profit	1,793,862	1,912,621	1,728,209
Selling and administrative expenses	945,734	1,072,224	1,069,610
Operating income	848,127	840,397	658,599
Other non-operating income	36,084	13,936	26,127
Other non-operating expenses	63,697	63,837	47,580
Net income before income tax	616,426	603,009	448,255
Income tax expense	222,257	207,311	163,181
Net income	394,170	395,698	285,074

Sales

(Unit: KRW billion; based on consolidated financial statements)

Operating income

Net income

2. Financial Status

As of the end of 2020, Doosan Infracore's total assets stood at KRW 12,026.9 billion, up KRW 688.3 billion year-on-year. Liabilities increased by KRW 466.8 billion to KRW 7,537.9 billion, while shareholders' equity rose by KRW 221.4 billion to KRW 4,489.0 billion.

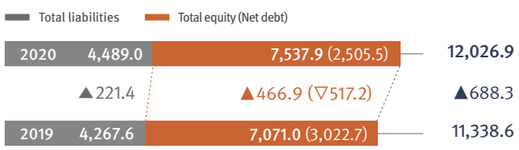
Financial Conditions

(Unit: KRW million; based on consolidated financial statements)

	2018	2019	2020
Current assets	4,426,822	4,304,912	**5,049,615**
Non-current assets	6,602,345	7,033,681	**6,977,272**
Total assets	11,029,167	11,338,593	**12,026,887**
Current liabilities	3,778,574	4,484,420	**3,882,643**
Non-current liabilities	3,429,778	2,586,621	**3,655,245**
Total liabilities	7,208,352	7,071,041	**7,537,888**
Total equity	3,820,815	4,267,552	**4,488,999**

Financial Conditions

(Unit: KRW billion; based on consolidated financial statements)



3. Performance by Business

3.1. **Construction Equipment** Despite the global construction equipment market stagnation due to COVID-19, sales of Doosan Infracore grew in 2020, mainly attributable to strong demand in Korea and China. The Korean market grew thanks to increased exports of used equipment and a rise in demand for replacement. Demand from emerging markets remained stable, with severe stagnation in the first half of the year being followed by major infrastructure investments in many countries in the second half of the year. The advanced markets, such as North America and Europe, were down slightly for the year because of the concerns over COVID-19, but is recovering steadily mainly led by mini excavators. The Chinese market grew significantly thanks to state-led increases in infrastructure investments and rising demand for replacement equipment following the implementation of tighter environmental regulations.

In 2020, Doosan Infracore continued to expand its dominance in Korea and increased market share in advanced economies by strengthening sales channels in North America and launching new customized products in Europe. In China, we became the first foreign company to produce a cumulative 200,000 excavators, and also increased sales of customer-tailored new products and special equipment. In addition, Doosan Infracore launched "MY DI," a smartphone application which offers customers support services needed across the entire construction equipment lifecycle, ranging from purchase to operations and end-of-life disposal. We also widened our digital-based solutions business by launching "XiteCloud," an all-in-one construction site management solution which enhances productivity and efficiency at construction sites.

Demand for construction equipment contracted around the world in 2020, excluding Korea and China, due to the impact of COVID-19. Despite fierce competition in China, Doosan Infracore retains a strong position in the market. Sales at our Construction Equipment Business Group (BG) recorded a year-on-year increase of 2.58% to KRW 3,229.8 billion, but a decrease in operating income of 6.58% to KRW 262.5 billion.

Construction Equipment

(Unit: KRW million)

	2018	2019	2020
Sales	3,254,939	3,148,433	**3,229,782**
Operating income	283,417	281,029	**262,528**

3.2. **Engine** The engine market in 2020 was stagnant, with COVID-19 driving down demand for finished equipment, including engines for commercial cars and power generators, and Chinese competitors engaging in aggressive price policies. As a result, engine manufacturers generally saw lower sales. Nevertheless, Doosan Infracore strived to minimize this negative impact by focusing on existing customers, winning new customers across all product groups, and pioneering new markets. We launched Stage V engines which meet stringent new European exhaust emissions standards, began production at Lovol Doosan Engine Company Joint Venture (LDEC JV) in China, and established a joint venture for aftertreatment solution business in our continued efforts to identify areas for new growth.

In addition, Doosan Infracore is actively seeking out future business opportunities. To this end, we are expanding cooperation with world-renowned engine manufacturers such as MAN and PSI, launching a full hybrid prototype, and establishing a plan for the commercialization of electric powerpacks. Substantial R&D and support investments are being put into the development of electronic engines and aftertreatment solution in response to tougher standards on exhaust emissions and environmentally harmful substances. Preparations are also being made for the business opportunities of the future, such as the setting up of additional gas engine production line-ups to respond to the expansion of the alternative fuel market and the development of new technologies to better respond to future powertrains.

In 2020, Doosan Infracore's Engine BG posted sales of KRW 466.2 billion, a year-on-year decrease of 19.36%, and operating income was KRW 2.2 billion, down 97.32%.

Engine

(Unit: KRW million)

	2018	2019	2020
Sales	532,350	578,143	**466,220**
Operating income	105,660	82,353	**2,207**

4. Cash Flow & Solvency

Cash flows from operating activities in 2020 amounted to KRW 1,050.8 billion, a KRW 483.4 billion increase from the previous year, while cash and cash equivalents rose by KRW 907.3 billion from KRW 756.2 billion at the beginning of the year to KRW 1,663.5 billion at the end of the year.

Liquidity risk rises in the event where the counterparty of a payment agreement forgoes its contractual obligation due to a liquidity issue, or where the company becomes unable to raise funds for normal operations. Doosan Infracore establishes three-month and annual fund balance plans to predict the balance of funds in sales/investment/financial activities, and secures and maintains an adequate level of liquidity in advance against unexpected liquidity risks.

Cash Flow

(Unit: KRW million; based on consolidated financial statements)

	2018	2019	2020
Cash flows			
Cash flows from operating activities	837,778	567,418	**1,050,847**
Cash flows from investing activities	(312,848)	(339,375)	**(503,165)**
Cash flows from financing activities	(422,558)	(549,790)	**428,938**
Cash and cash equivalents			
Cash and cash equivalents, beginning of the year	943,481	1,053,016	**756,173**
Cash and cash equivalents, end of the year	1,053,016	756,173	**1,663,459**

5. Production Assets

Facilities and equipment in the consolidated financial statement include land, buildings, structures, machinery and assets under construction. As of the end of 2020, the company's book value of facilities and equipment stood at KRW 1,851.5 billion, a year-on-year decrease of KRW 19.9 billion. In 2020, newly accumulated acquisitions and capital expenditures stood at KRW 210.0 billion, and accumulated depreciation at KRW 165.1 billion.

6. Intellectual Assets

Doosan Infracore is expanding R&D investment with the aim of securing product competitiveness and laying a solid foundation for long-term growth, and carrying out R&D activities that are aimed at creating a distinct technological advantage for the company and establishing an advanced engineering process. Doosan Infracore's R&D Division consists of three units – heavy product development, which undertakes research into the company's key products, such as excavators and wheel loaders; engine product development, which develops engines that meet emissions and fuel efficiency regulations; and the Institute of Technology, which is in charge of next-generation smart solution development and product design, high-strength metal development, and virtual verification/analysis for improved hardness – and strives to secure distinctive technologies.

Based on non-consolidated financial statements, Doosan Infracore's R&D expenses in 2020 recorded KRW 136.2 billion, equivalent to 5.02% of total sales. As of the end of 2020, the number of intellectual property rights applications made in Korea and overseas by consolidated entities had reached 4,285, and the number registered totaled 3,224.

Non-Financial Performance

1. Social Performance

1.1. **Customers** Doosan Infracore continuously strives to improve customer satisfaction. In support of this commitment, we are developing specialty equipment, operating Customization Plants that assemble machinery to custom orders, expanding the line-up of genuine and economy parts, optimizing global parts supply networks to be centered around Parts Distribution Centers (PDCs), and developing and mass-producing engines which meet next-generation emissions standards.

In 2020, Doosan Infracore launched "MY DI," a smartphone application for the operational management of construction equipment, which provides all information and services that customers need for the optimal operation of their equipment. It can be connected to DoosanCONNECT™, a cutting-edge IoT solution which remotely monitors the status of construction equipment in real time, which enables customers to check the location information and operational status of their construction equipment, the replacement cycle for major parts, and repair history just by using a smartphone. This results in greater convenience right across the equipment lifecycle, from purchase to end-of-life disposal.

1.2 **Employees** Doosan Infracore runs a human rights risk management system which protects the human rights of its employees and other stakeholders. Our wide-ranging activities in this area include distributing manuals on the prevention of risks relating to human rights, operating a human rights protection center, providing employee education about human rights, instituting the Women's Council, and conducting online employee surveys. In 2020, we announced a policy declaration on human rights based on an agreement between labor and management. We also undertook a bi-annual evaluation on awareness of the importance of human rights, the results of which showed that human rights awareness at Doosan Infracore had increased since 2018. These results were posted on the company's internal portal. We also provided education to all employees on gender equality, the treatment of people with disabilities, and the prevention of workplace harassment.

1.3 **Suppliers** Doosan Infracore helps its suppliers become more competitive by running a variety of programs centered on technological development, quality management, and financial support. We also run the Doosan Supplier Excellence Program (DSEP) to develop Leading Suppliers, and to help suppliers strengthen their fundamental competitiveness. In 2020, Doosan Infracore supported the application of manufacturing execution system (MES) in order to enhance productivity and efficiency of suppliers, and also provided technical support consulting aimed at improving their environment, health, and safety (EHS) management. We assessed safety standards at suppliers, and supported the implementation of additional safety measures where necessary, and we aim to prevent occupational accidents through a close partnership with suppliers. To this end, we run the "Safety and Health Symbiotic Cooperation Program" which consists of various sessions regarding safety training, risk assessment, and technical assistance in risk management. Through the program, we help our suppliers identify, evaluate, and improve risk factors and support them to adopt higher safety standards through the provision of safety banners and EHS guidelines.

1.4 **Local Communities** As a global corporate citizen, Doosan Infracore runs a wide range of social contribution activities as a way to grow in partnership with its local communities. Since 2012, we have been running the "Dream School" program to help young people develop confidence for their future career prospects. The program offers activities whereby young adults can explore future careers and undertake self-development under the tutelage of employee volunteers and professional coaches. As part of our support for local communities by using its business expertise, we have been running the "Junior Engineering Class" in which employee volunteers nurture the young scientists of the future in local communities by sharing their R&D experiences. In 2020, despite the COVID-19 pandemic, we continued the Dream School and Junior Engineering Class activities using an online video system. Although direct employee participation was restricted, we undertook a range of activities in response to the needs of local organizations, and provided support where necessary. Doosan Infracore will continue its community activities based on its enduring interest as a member of communities where its business has prospered.

2. Environmental Performance

Doosan Infracore has complied with all laws governing carbon emissions trading since it began its participation in the trading system in 2015. Prior to that, in 2010 the Incheon Plant was designated by the Korean government as a workplace with greenhouse gas (GHG) and energy target management systems. As part of our efforts to reduce energy consumption and GHG emissions, in 2018 we launched the GHG/Energy Reduction Council that takes a central role in operating the Energy Management System (EMS) and managing its performance; establishing a mid- to long-term road map in preparation for the coming enforcement of the carbon trading system; and setting emissions reduction targets and drawing up action plans for the goals, all as part of our detailed response to climate change. In 2020, our GHG emissions were 90,447 tCO_2eq, a year-on-year reduction of 19% on the back of our energy-saving investments and activities.

Outlook for 2021

1. Financial Outlook

1.1. **Construction Equipment** In 2021, Doosan Infracore will strengthen its fundamental competitiveness in order to generate stable profits, irrespective of market conditions. Advanced economies are forecast to grow strongly as existing construction projects are resumed post-lockdown and government economic stimulus packages lead to more infrastructure investments. In response, we will increase sales and profitability by expanding our sales channels, launching new products, and winning large orders from major customers. In emerging markets, we expect sales growth on the back of increasing government's investment, recovering commodity prices, and attracting customers through such dual line-up of mechanical/electronic products. In China, we will expand sales of large-sized models and line-up of special equipment, create more online business opportunities, and continue to bolster sales channels.

Doosan Infracore will enhance both quality and service competitiveness, improve work processes, and increase efficiency through the digital transformation of the entire value chain. In our efforts to continue our growth pace, we will expand our product line-up, strengthen the parts business, reorganize the channel structure, and improve sales activities, thereby expanding our market dominance. We will also develop new growth businesses by further upgrading and commercializing core technologies for the autonomous operation of construction equipment developed through the Concept-X project.

1.2 **Engine** In 2021, the Engine BG aims to continue to grow despite market uncertainties by further expanding its line-up of large electric engines for ships/generators, winning more orders from existing major customers for Stage V engines, and entering new global markets. In addition, Doosan Infracore will further enhance customer satisfaction by strengthening the parts business and the service network, boost price competitiveness by improving productivity and optimizing the cost structure, and create new business opportunities in the upstream and downstream of our value chain.

2. Non-Financial Outlook

At the 50th Anniversary Davos Forum held in Switzerland in January 2020, world leaders shared ideas on topics such as climate change, the environment, and sustainable business, with the theme of "Stakeholders for a Cohesive and Sustainable World". As this theme implies, stakeholders will be connected faster and in more complicated patterns as the trends of the Fourth Industrial Revolution unfold, which in turn will make the way how companies communicate and cooperate with their stakeholders become more important.

Doosan Infracore identifies stakeholder interests and requirements relating to ESG by conducting annual materiality analysis and commissioning external ESG evaluations, and based on the findings, we devise work plans and annual ESG tasks for each department. Doosan Infracore has launched four new strategic ESG tasks for 2021 which include developing employee survey on corporate culture, managing the compliance with REACH and RoHS, upgrading indices for carbon emissions and resource management, and establishing a company-wide climate response system.

Doosan Infracore is keen to closely correlate its corporate and social values, and to increase its ability to create social value. To this end, we applied KPMG's "True Value" methodology to identify the social value generated in the course of our business operations in 2018 and 2019. In 2020, we analyzed the social value of "Concept-X," an integrated construction site solution which brings together such cutting-edge technologies of the Fourth Industrial Revolution as autonomous driving, 5G remote control, 3D measurement using drones, and technologies that forecast or detect breakdowns of equipment. In 2021, we used PwC's "TIMM" methodology in order to assess the social and environmental value of the electric excavators that will be released in the near future. Going forward, Doosan Infracore will fully internalize ESG by reviewing more ways to integrate ESG factors into our business operations, providing support to ensure that ESG management is put into practice, and measuring the social value of our business, with the aim of achieving sustainable growth.

ESG Management

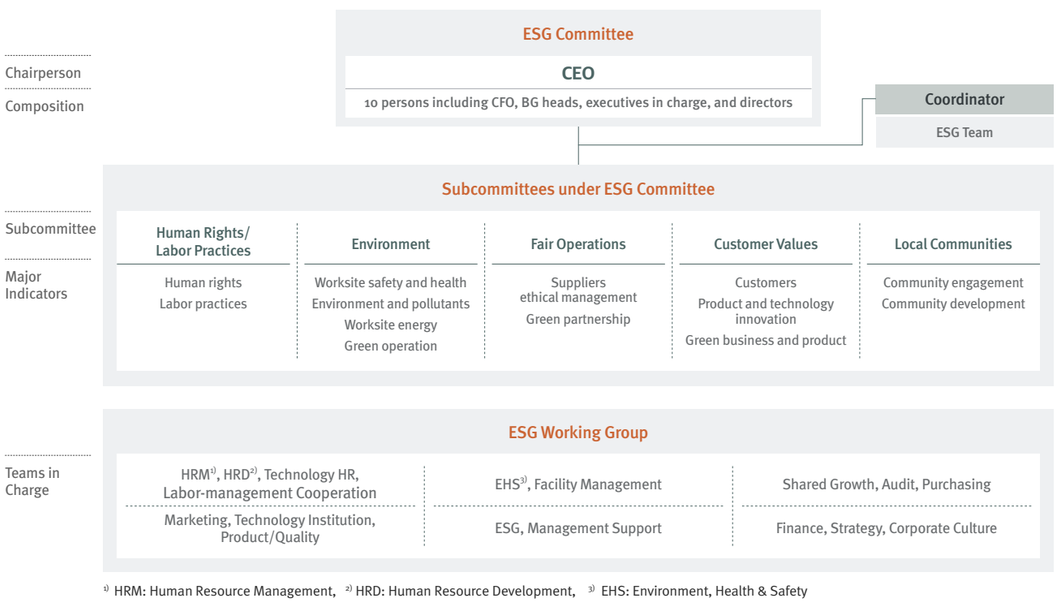
ESG Implementation Organization

Doosan Infracore establishes ESG implementation plans, in cooperation with its business sites around the world, led by the ESG Team and ESG Committee at its headquarters in Korea. The ESG Team, as a coordinator responsible for promoting the company's overall ESG initiatives, is in charge of establishing ESG strategies, identifying stakeholder issues, diagnosing ESG levels at domestic and overseas business sites, identifying strategic ESG tasks, monitoring ESG activities, and responding to external evaluations.

The ESG Committee is the top decision-making body related to ESG strategies/policies that selects major ESG issues based on the company's materiality analysis, reviews relevant opportunities and risks, and then selects and monitors strategic ESG tasks.

The ESG Committee is held three times a year, with participation by Business Group (BG) heads and division heads, who are key top management, under supervision of the CEO. Discussions are held on issues of five subcommittees – human rights/labor practices, environment, fair operations, customer values, local communities. The subcommittees are flexibly organized and operated according to strategic ESG tasks, thereby improving efficiency in decision-making and implementation. Once the ESG Committee makes decisions about major issues, including identification, operation, and process of ESG strategic tasks, the Working Group draws up and implements specific action plans. Among our overseas worksites, the Chinese subsidiary formed the CSR Committee in 2017. Chaired by the regional director, the Committee operates and examines tasks at our worksites in China.

ESG Implementation Organization



[1] HRM: Human Resource Management, [2] HRD: Human Resource Development, [3] EHS: Environment, Health & Safety

ESG Strategies and Strategic Tasks

Annually, Doosan Infracore integrates the outcomes of the materiality analysis, external ESG evaluation, and company-wide ESG diagnosis to derive and execute its ESG strategic tasks. In 2020, we derived new tasks for building smart factories at suppliers and increasing awareness of ESG-related issues, in addition to the task of 48V mild hybrid powertrain development in relation to decarbonization/ alternative fuel products. With the ESG Committee taking the lead, all relevant departments worked in unison to execute the tasks. The ESG strategic tasks that were finalized at the first ESG Committee in 2021 are nine tasks which include such new tasks as establishing a company-wide climate response system, upgrading indices for environmental and resource management, and managing the compliance with REACH and RoHS, in addition to upgrading the previous year's tasks.

Doosan Infracore has developed a sustainable value framework in 2019 in consideration of its sustainability issues, social value, corporate competitiveness, and strategic tasks, to align our mid- to long-term strategies with ESG directions, and plan to manage and disclose its performance with regard to the 14 key indicators by 2025. Details on the sustainable value framework can be found on pages 18-21.

ESG Strategic Tasks by Year

	2019	2020	2021
ESG Governance	• Establish a Sustainable Value Framework and identify indicators	• Set CSR directions and increase employee awareness	• Establish a company-wide climate response system
Human Rights/Labor	• Establish management system and strengthen a monitoring system to promote human rights: Conduct advanced human rights education for relevant departments and provide human rights consultation for each organization	• Establish management system and strengthen a monitoring system to promote human rights: Declare the Human Rights Policy and strengthen human rights management system	• Establish management system and strengthen a monitoring system to promote human rights: Continue to offer human rights education • Develop employee survey on corporate culture
Environment	• Reduce GHG emissions	• Establish a mid- to long-term roadmap for the reduction of GHG emissions	• Upgrade indices for carbon emissions and resource management
Fair Operations	• Strengthen CSR management system of supply chain: Identify suppliers with high CSR risks, and support improvement activities	• Help leading suppliers bolster their competitiveness by building smart factories	• Help leading suppliers bolster their competitiveness by building smart factories
Customer Value	• Expand service solutions: Diversify service products, customize local services, and increase the number of countries where the services are available • Innovation: Demonstrate the Concept-X and develop a new business model • Create prerequisite technologies for hybrid powertrain • Manage the pre-qualification of new products: Enhance quality management ahead of the mass-production of new products that meet EU Stage V and China's Stage IV emissions standards	• Focus on decarbonization and develop alternative fuel products • Develop autonomous technology • Develop the 48V mild hybrid powertrain • Improve preventive quality and strengthen global governance	• Focus on decarbonization and develop alternative fuel products • Develop the 48V mild hybrid powertrain • Manage the compliance with REACH and RoHS • Stabilize quality of new products that meet the Stage V Emission Standards

Stakeholder Engagement

Strengthening Communication with Stakeholders

DEFINITION OF STAKEHOLDERS Doosan Infracore discloses its key management issues, performance results, and future directions through its integrated reports, disclosure materials, websites, annual general meeting (AGM) and BOD meetings, while continuing to collect and listen to stakeholder opinions through a wide range of communication channels. For more systematic stakeholder engagement and communication, Doosan Infracore defines its major stakeholders, identifies and addresses their interests and issues, and discloses its activities and outcomes through various communication channels.

Communication Channels and Responses for Stakeholders

	Communication Channels	Major Issues	Responses
Shareholders/ Investors	• Annual general meeting (AGM) • Disclosure materials • Investor relations (IR) information on the company website • Conferences • IR meetings	• Profitability and a dividend policy • Strengthen disclosures • Sound corporate governance • Business opportunity and risk management	• Share the company's mid- to long-term business directions • Make earnings announcements and provide IR materials • Hold analyst meetings
Customers	• Field surveys • Voice of Customers (VOCs) • Call centers • Joint workshops • Integrated customer management systems	• Prompt customer complaint handling and feedback • Make improvement to product quality, performance, safety, and convenience • Strict customer data privacy policy • R&D investment and the improvement of technological capabilities • Differentiated customer service • Develop eco-friendly, high efficiency products	• Product presentation through exhibitions and dealer meetings • Tasks aiming for eco-friendly products • Incorporate VOCs into products through the New Product Development (NPD) process • Enhance customer accessibility by providing dealers with online information and strengthening dealer management system • Increase customer satisfaction through the Happy Call and dealer service training
Employees	• Labor-Management Council • Grievance handling system • Intranet • Dialogue with the executives	• Fair evaluation and compensation • Education and competence development • Work-life balance • Positive labor relations • Active communication within the company	• Human resources development based on the Functional Competency (FC) system • Operate the Women's Council • Publish a human rights risk prevention manual and provide education on human rights
Suppliers	• Supplier Council • Supplier education • Consulting, technical support for suppliers	• Share more information with suppliers • Expand support to improve suppliers' capabilities through financial, technology, education, environment, and ethical management support • Strengthen fair trade	• Foster Leading Suppliers • Financial support for suppliers • Operate the Shared Growth Hotline • Share CSR guidelines with suppliers
Local Communities (the environment, NGOs, etc.)	• Meetings with residents • Workshops for working-level staff in charge of corporate community involvement (CCI) • Sisterhood relationship with island regions	• Eco-friendly products and production processes • Improve worksite and surrounding environments, and prevent pollution • Establish environmental management system • Communicate with local communities • Facilitate economic development of local communities	• Operate Dream School • The Doosan Day of Community Service • Conduct CCI activities for local communities
Central/Local Governments	• Participate in national projects • Operate joint programs	• Comply with laws and regulations • Public-private partnership	• Regulatory monitoring and internal compliance • Suggest improvement measures through participation in related organizations' activities • Participate in the government's public policy projects
Media	• Press releases • Press conferences • Regular meetings • Business site visits (field trips)	• Prompt and accurate information sharing	• Issue press releases in a timely manner • Press reporters' news coverage • Find feature items and provide them to the media

Materiality Analysis

Materiality Analysis Process

Doosan Infracore implements a materiality analysis process every year to derive key issues by analyzing matters that stakeholders are interested in, matters that require improvement, and impact of corporate activities. The company selected a pool of a total 22 issues based on GRI Standards, UN SDGs, other international standards and guidelines, social issues, and information on ESG management in the same industry, after which the company identified priority by putting together the results of analyzing the level of social interest in the selected issues and their business impact. This report discloses our approach to the material issues that were derived through a materiality analysis and major outcomes.

STEP 01 — SELECTION OF THE ISSUE POOL

- Diagnose all departments related to ESG at domestic and overseas business sites in a bid to assess our internal ESG competencies, identify areas to improve, and select internal ESG issues
- Identify types of ESG issues and the degree of the stakeholders and international communities' interest by analyzing the media coverage as well as ESG-related international standards, guidelines, and external evaluations
- Form a pool of issues by collecting internal and external stakeholders' opinions on ESG issues, and benchmark industry peers to identify global responses

STEP 02 — PRIORITIZATION

- Evaluate each issue's business impact[1] and level of social interest[2], and combine the results to determine priority

STEP 03 — REVIEW AND FEEDBACK

- The ESG Committee, consisting of top executives, reviews the relation between top priority issues and business activities, and approves the validity of selected core issues and ESG strategic tasks for each respective year
- All material issues are discussed and managed by the Committee year around in view of the progress of respective ESG strategic tasks, with other issues managed by relevant business units in connection with those of industry peers and relevant social changes

[1] Business significance: Reflect management strategies, managerial view, pending ESG issues, and stakeholder issues
[2] Social interest: Reflect the level of media interest, material issues in the same industry, and global initiatives

Results of Materiality Assessment

MATERIAL ISSUES

1	Market response capabilities for stable growth
2	Digital transformation and technological innovation
3	Development of eco-friendly technologies and expansion of eco-friendly products
4	Product stewardship and customer satisfaction
5	Global market strategy and product portfolio enhancement
6	Human rights, diversity, and labor practices
7	Communication and cooperation with stakeholders
8	Human resources development
9	Workplace health & safety
10	Value chain win-win cooperation
11	Reduction of energy consumption and improvement of energy efficiency
12	Response to climate change
13	Issues related to M&A
14	Management of value chain sustainability
15	Water and waste management
16	Resource efficiency
17	Contribution to local communities
18	Support for employee welfare and benefits
19	Governance transparency and independence
20	Ethics management and compliance
21	Management of hazardous chemical materials
22	Responsible sourcing of raw materials

Material Issues

Regarding the five material issues identified to be high in the level of social interest and business impact, Doosan Infracore examines each issue's potential risks and opportunities from external factors and discloses the strategic tasks it has implemented as a response and subsequent outcomes.

	Issues	Potential risks & opportunities	2020 performance	Future directions	Page
1 **Market response capabilities for stable growth**	Global market uncertainty is steadily rising, and a company must continue innovation and secure growth drivers to maintain a stable business foundation amid changes in the external environment.	· There may be negative impact on global industry and economic stagnation in the event of a global lockdown due to a pandemic, such as COVID-19. · The construction market may grow at lower rates as investment and development slow down. · Reliance on specific markets/products can be a negative factor to financial soundness.	· Increased market share in advanced markets, including North America and Europe, over the previous year on the back of stronger channel competitiveness · Diversified product portfolios to include GMEX (Global Mini Excavator), special equipment, and line-up of large-scale engines · Reviewed the value chain from the ESG perspective to contribute to business resilience	To increase business resilience amid market fluctuations, fiercer competition, and crisis situations, such as COVID-19, Doosan Infracore makes continuous efforts to diversify its product portfolio, identify new income sources, and expand its presence in advanced markets. In addition, it will continue to carry out company-wide efforts to internalize the ESG perspective in overall business.	P. 28-39 **OUR STRATEGY** Growth and Soundness
2 **Digital transformation and technological innovation**	Technologies of the Industry 4.0 are changing the future of the construction equipment industry. Cognitive and decision-making abilities through AI and increased connectivity using 5G and IoT are contributing to increased productivity and stability of the construction industry. In addition, it is promoting productivity improvements through data-based decision-making and innovation.	· Increased efficiency of the manufacturing process, enhanced safety, and reduced environmental impact on the back of autonomous construction sites can be a foundation for social value creation. · Innovative technologies, applied to the construction industry, enable manufacturers to expand opportunities to create value by providing integrated construction site solutions, going beyond product innovation. · Data-based decision-making and operational innovation enable a company to secure capabilities required for agile responses to change.	· Launched XiteCloud: Combined measurement and establishment of construction plans with the cloud platform, and received the Minister of Land, Infrastructure and Transport Award at Smart Construction Challenge 2020 · Developed autonomous element technologies · Opened DI360, a big data-based business platform, and established a system for integrated analysis of data of 12 business systems	Doosan Infracore makes preparation for the commercialization of its integrated construction site management solution that includes autonomous equipment. It also aims to transform to a comprehensive solution-providing company from a traditional manufacturer, and will internalize such innovation through digitalization of overall business areas.	P. 52-65 **OUR STRATEGY** Innovation and Digitalization
3 **Development of eco-friendly technologies and expansion of eco-friendly products**	As climate change grows in significance, consumers are showing greater interest in eco-friendly power sources and products' environmental impact. A company therefore should strive to reduce the environmental impact of its products from the development phase of the product life cycle.	· There is a worldwide movement to declare carbon neutrality, and major investment companies are including climate change-related content in shareholder letters. · Taxonomy on eco-friendly products, internal combustion engine-related regulations, and exhaust gas regulations are becoming stricter across the globe, and thus there is a need for strategies and product development investments to respond to this trend.	· Develop eco-friendly power sources: Unveiled a prototype electric excavator at CONEXPO 2020, successfully completed an equipment application test for a hybrid powertrain, and established an E-Powerpack development roadmap · Launched an engine aftertreatment solution business, ECUBE Solution: Established a JV for aftertreatment technologies that process harmful substances generated during engine combustion · Launched the high-performance, eco-friendly Euro 6 engine	To contribute to global efforts to counter climate change, Doosan Infracore will establish a strategy for eco-friendly technology, develop technologies, and sell eco-friendly products, which will in turn strengthen its market position. Through these business activities, it seeks to create social and environmental value in addition to financial value.	P. 52-65 **OUR STRATEGY** Innovation and Digitalization
4 **Product stewardship and customer satisfaction**	Quality management, proactive service, and reflection of customer opinions are extremely important for continued customer value enhancement. Providing distinctive customer value also has a positive influence on establishing a sound market presence and reputation.	· Digital technology can be a foundation for customer value creation. · There is a need for customer management that overcomes geographical limits under pandemic circumstances.	· Provided the Smart Maintenance service using DoosanCONNECT™, and strengthened remote monitoring of equipment status and preventive maintenance · Launched "MY DI," a smartphone application for construction equipment operation management: Enabled to provide customer supports across the construction equipment lifecycle, ranging from purchase to end-of-life disposal · Doosan Guidance Application: Developed a remote maintenance support solution using augmented reality (AR)	Providing distinctive customer value will enable us to build trust and continue to grow in the global market. Doosan Infracore will therefore make continuous efforts to innovate customer experiences and provide responsible services.	P. 40-51 **OUR STRATEGY** Product and Market
5 **Global market strategy and product portfolio enhancement**	For a global manufacturing company to increase the ability to influence markets, it is required to produce products that can satisfy each market's regulatory standards and demand, offer high quality, and have service channel competitiveness.	· Attempts to develop products, increase investment, and improve service quality, aimed at satisfying diverse market expectations, lead to strengthened fundamental competitiveness.	· Implemented a value-selling strategy that offers such solutions as consulting and services in addition to product sales · Sold special equipment that reflected regional requests	Doosan Infracore will secure fundamental corporate competitiveness, including products, quality, channels, and services, with the goal of maximizing customer value and expanding its market dominance.	P. 40-51 **OUR STRATEGY** Product and Market

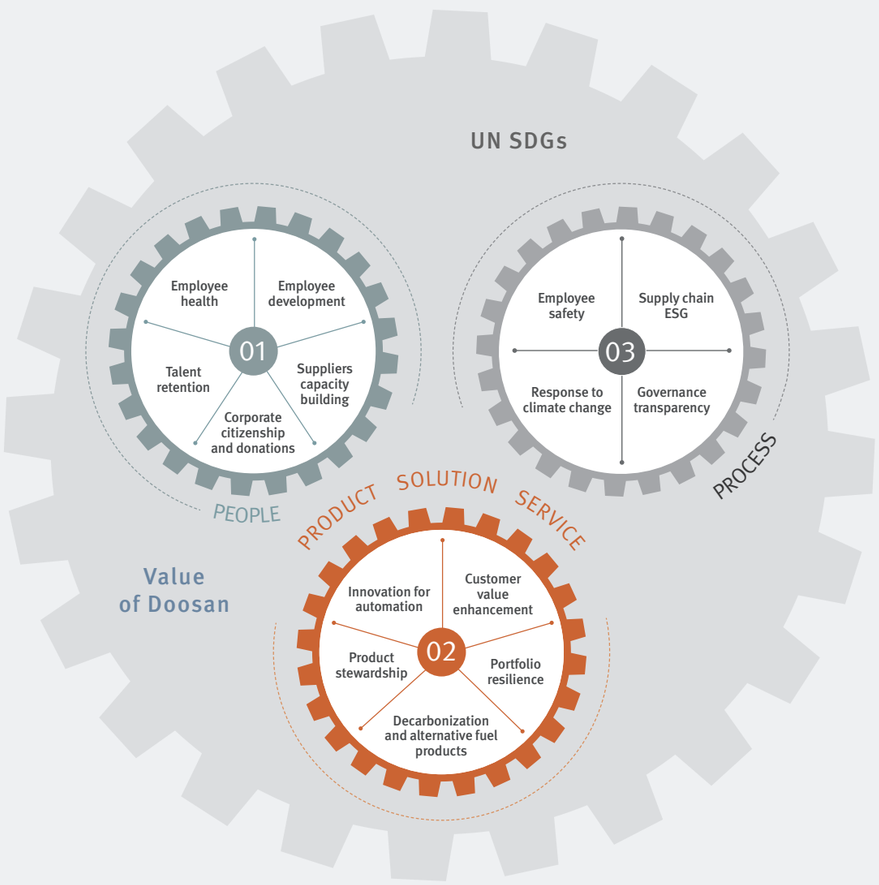
Doosan Infracore Sustainable Value Framework

Doosan Infracore recognizes the importance of ESG management and reflects it in overall business activities. In 2019, we launched the "Sustainable Value Framework," describing our mid- to long-term ESG strategies and objectives, as a way to manage financial and non-financial performance in an integrated manner. Based on Doosan Infracore's value and UN Sustainable Development Goals (SDGs) value, we derived a framework consisting of three areas and 14 indices through major external indices, including SASB[1], MSCI ESG Ratings[2], and SAM CSA[3], results of materiality analysis, and participation by relevant internal departments. The Sustainable Value Framework will be managed as a key performance index in accordance with the mid- to long-term strategic tasks. Believing that the integrated management of mid- to long-term financial and non-financial performance will contribute to the basis of sustainable growth, Doosan Infracore will continue to disclose such performance results through 2025.

[1] Sustainability Accounting Standards Board: Industry-specific material issue and standard reporting index established by the US Sustainability Accounting Standards Board (SASB) to promote a comprehensive understanding of the sustainability of corporations

[2] Morgan Stanley Capital International ESG Ratings: Index established by Morgan Stanley Capital International (MSCI) for evaluating corporate performance in ESG areas

[3] SAM Corporate Sustainability Assessment: Corporate sustainability assessment methodology used by S&P Global and SAM to assess corporations' economic, environmental and social risks and opportunities, and related strategies



01 PEOPLE

Activities that provide sound environment, technology, and capability to stakeholders

Employee health

Occupational Illness Frequency Rate (OIFR)[1]

2019	2020	Target
0.315	0.107	N/A

Major activities: Operated programs for hearing preservation and musculoskeletal system protection

Commitment: Promote employee health and welfare through the continuous management of occupational illness — P. 88

Suppliers capacity building

Cumulative no. of Doosan Supplier Excellence Program (DSEP)[2] participants

2019	2020	Target
32	38 companies	Achieved

Major activities: Helped suppliers establish a manufacturing execution system (MES) in connection with the government program on disseminating smart factories

Commitment: Establish the basis for joint growth by providing training and consulting for supplier competency development — P. 91

Corporate citizenship and donations

CCI[4] and CCI investment per sales

2019	2020	Target
8.64	8.91 KRW billion	N/A
0.28	0.33 %	N/A

Major activities: Continued to carry out social contributions through contactless activities under COVID-19 circumstances

Commitment: Contribute to establishing a sustainable local community through partnership and support as a responsible corporate citizen — P. 111-114

Employee development

Annual training hours and expenses per employee

2019	2020	Target
40.6	37.6 hours	N/A
750	400 KRW 1,000	N/A

Major activities:
- Provided most of trainings on-line due to COVID-19
- Launched a data expert course to nurture experts in response to digital transformation, and operated an AI community
- Operated an internal job skill academy based on the Functional Competency (FC) system

Commitment: Aim for organizational and individual growth by helping employees develop job skills and fostering talents — P. 104-107

Talent retention

Turnover rate[3]

2019	2020	Target
1.10	1.40 %	N/A

Major activities:
- Operated various communication channels to enhance employee satisfaction through communication, including an on/offline grievance handling channel, Human Rights Protection Center, company website, anda in-house portal
- Operated various systems for work-life balance (flextime, reduced working hours, family care leave, etc.)

Commitment: Offer quality jobs to local talent and a great workplace to employees — P. 102-103, P. 107-109

[1] OIFR (Occupational Illness Frequency Rate): Number of workers who have occupational illness and other related illness/Total workers (Number of workers is based on employees of Doosan Infracore; and application of calculation formula of the Korea Occupational Safety and Health Agency)

[2] Doosan Infracore's supplier support program (Suppliers for which MES establishment support was provided can overlap with DSEP participation suppliers)

[3] The turnover rate calculation formula was changed, and accordingly 2019 data was revised and disclosed

[4] CCI: Corporate Community Involvement including donation

02 PRODUCT, SOLUTION, SERVICE

Activities that innovate products, solutions and services for sustainable growth

Innovation for automation

Ratio of projects related to autonomous technology to all research projects

2019	2020	Target
28.3	38.2 %	Achieved

Major activities: Developed technological capabilities through continued research in the areas of assist (driver assist), safety, prognostics and health management (PHM), and X-Center (comprehensive control system), which are key factors of autonomous solutions

Commitment: Lead industrial innovation by improving construction industry site efficiency and safety using autonomous technologies — P. 58-59

Decarbonization and alternative fuel products

- Engine: No. of CO_2 reduction research projects
- Construction equipment: Ratio of electro-hydraulic applied models[2]

2019	2020	Target
45	53 cases	Achieved
8.7	9.8 %	Achieved

Major activities: Successfully tested the application of the mild hybrid powertrain (H24) to equipment

Moved forward with E-Powerpack commercialization

Commitment: Contribute to easing climate change impacts by securing carbon emission reduction technologies and leading the development of relevant products — P. 42-43, P. 54-57

Customer value enhancement

Smart Maintenance Managed Hours[1]

2019	2020	Target
201,862	1,096,327 hours	Exceeded

Major activities: Increased the number of countries in which the Smart Maintenance service was adopted from the previous year (from 7 countries in 2019 to 11 in 2020)

Commitment: Increase the customer base of the Smart Maintenance service, helping customers efficiently and stably use Doosan products — P. 50

Product stewardship

Sales of remanufactured parts

2019	2020	Target
770	650 KRW million	Not met

Major activities: Implemented the remanufactured parts business and engine overhaul parts program from the perspective of machine lifetime care

Sales went down from the previous year owing to a market downturn due to COVID-19 in 2020

Commitment: Contribute to responsible production and consumption by applying sustainability standards to the production, sales, consumption and discard phases — P. 31

Portfolio resilience

New business-related activities

Major activities: Established Clue Insight Inc.

Signed an MOU on mutual cooperation to develop a construction process simulator with Unity, a game engine development company

Commitment: Contribute to the industry's sustainable development through open innovation, M&A, strategic alliance, new business development and partnership — P. 38-39

03 PROCESS

Activities that increase positive impacts within the value chain for sustainable development

Employee safety

Lost Time Incidents Rate (LTIR)[3]

2019	2020	Target
1.17	0.61	Achieved

Major activities: Outcome of strengthened safety management (Safety-Keeper, special budget for EHS)

Strengthened EHS leadership activities (Field Safety Patrol by leaders)

Reduced changes, such as a change in jobs

Commitment: Promote employee health and welfare at industrial sites through active accident management — P. 85-87

Response to climate change

Reduce carbon emissions in production[5]

2019	2020	Target
112,186	90,447 tCO_2eq	Achieved
0.036	0.033 tCO_2eq/KRW million	Achieved

Major activities: Adopted high-efficiency facilities (boilers and air compressors)

Moved forward with reducing worksite environmental risks and increasing operational efficiency by building an IoT-based integrated monitoring system (DooEco)

Commitment: Contribute to easing climate change impacts by integrating carbon emission target management into company strategies and plans — P. 81-82

Supply chain ESG

No. of companies subject to supplier ESG evaluation[4]

2019	2020	Target
116	- companies	N/A

Major activities: Identified ESG high-risk suppliers through an on-site assessment (OSA) that is conducted every other year

The OSA planned for 2020 could not be conducted due to COVID-19, and will be postponed and carried out later

Commitment: Support suppliers in strengthening ESG capabilities to prevent relevant risks and build the foundation for sustainable joint growth — P. 92

Governance transparency

Ratio of outside directors and BOD attendance rate

2019	2020	Target
4/7 (57.1%)	5/8 (62.5%) persons	N/A
92.9	97.1 %	N/A

Major activities: Recommended and appointed directors appropriate for establishing transparent governance and enhancing BOD expertise through the Outside Director Candidates Recommendation Committee

Attended meetings using remote means, including video and voice

Commitment: Enhance long-term corporate and shareholder value by building a basis for sound and transparent governance — P. 70-71

[1] Refers to cumulative operation hours of equipment within the Smart Maintenance contract period. The 2019 performance includes the performance of emerging markets and Europe. Future service product development and expansion may lead to a change in calculation criteria (program was launched in 2019 and therefore the 2019 performance is set as the baseline).

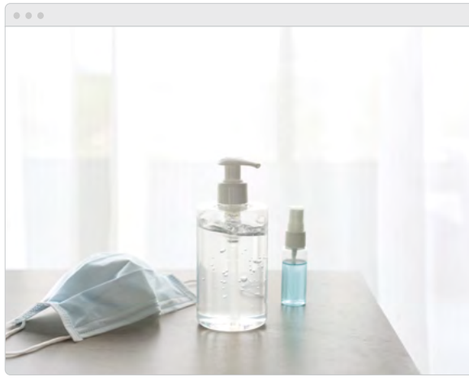
[2] Total number of models is based on mass-produced excavator models as of the end of each year, including domestic and overseas, and derived models). The application criteria may be adjusted to future changes in the model calculation method. All construction equipment was used as the parameter when information was disclosed in 2019, but the parameter calculation criterion was changed to excavators. Accordingly, the Year 2019 performance was revised and reflected.

[3] LTIR (Lost Time Incidents Rate): Number of incidents involving more than one-day closure of workday per 100 workers, Total number of lost time cases/Total number of hours worked by employees * 200,000 (Number of incidents is based on incidents by employees of Doosan Infracore)

[4] Supplier ESG inspection is conducted every other year. Thus, the goal for 2024 is reflected as the goal for 2025.

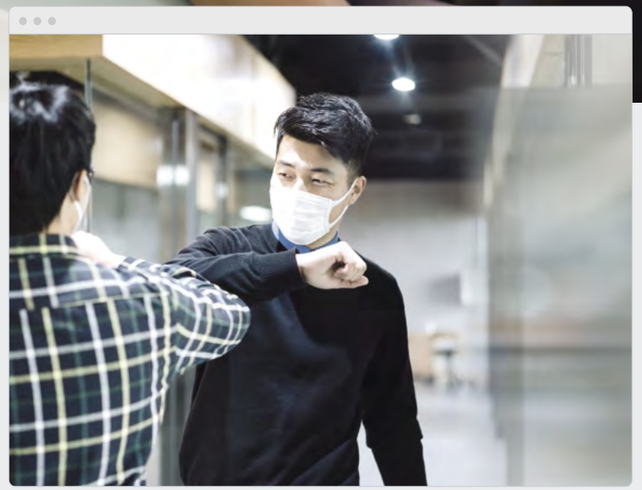
[5] Regarding reducing carbon emissions and improving emission intensity during production, some figures are subject to change, as defined goals are to undergo an additional review.

Special Report



COVID-19 Response

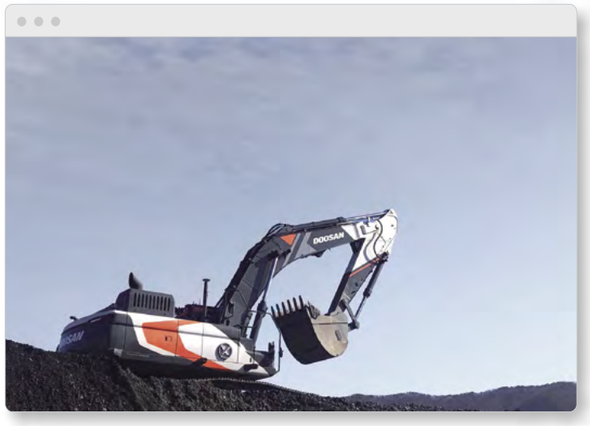
The rapid spread of COVID-19 in 2020 caused unprecedented upheaval for people, local communities, and businesses across the globe. It was difficult for companies to ensure business continuity management (BCM) due to the severe restrictions on the movement of people and logistics, and the resultant unpredictable supply chains. Doosan Infracore strived to overcome these difficulties by transparently disclosing information regarding BCM and employee protection, conducting businesses in a creative manner through digitalization, and working in unity with local communities.

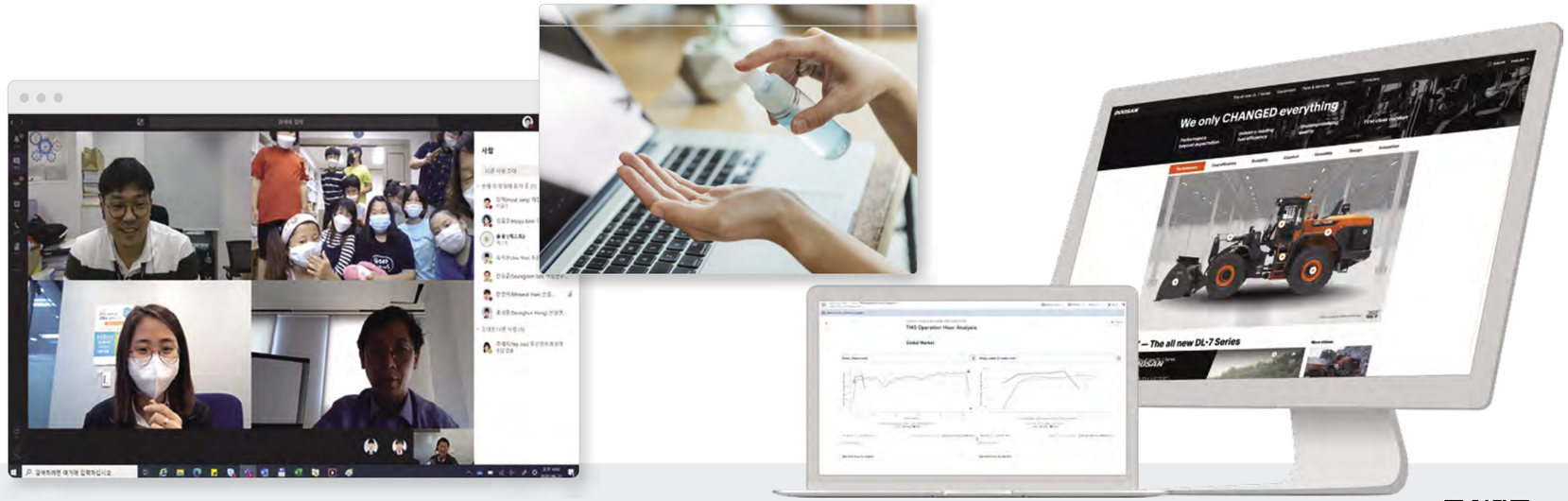


Establishment of an Emergency Response System

In order to respond rapidly to the threat of COVID-19, Doosan Infracore set up an Emergency Committee, chaired by the CEO, in February, when COVID-19 began to spread in earnest in Korea. We have also established emergency response systems which are being managed by company headquarters on a regional basis. In addition, we have set up an internal COVID-19 Emergency Operations Center (TF: EHS, HR, general affairs, communication, and production-related departments) which has established reporting and response measures for each emergency situation, provided detailed information on COVID-19 prevention to all employees, and shared any information in full. We set out detailed rules on how to prevent COVID-19, and shared guidelines on how to respond in the event of an emergency with all employees. Details on internal COVID-19 testing were disclosed through the information-sharing network of the emergency situation room.

Doosan Infracore distributed the same detailed response guidelines to employees, families, and in-house suppliers. This systematic response has enabled employees at Doosan Infracore and in-house suppliers to carry out their work in a safer environment.





Digital-based BCM: Minimizing Business Impact

DATA PLATFORM Business trips became difficult in 2020, making it hard for employees in sales, product support (PS), aftermarket (AM), and other areas in which customer contact is vital to obtain and respond to the latest and accurate market information. Doosan Infracore therefore improved remote access to information by using DI360, a data platform using big data lake which brings together company-wide value chain information such as SAP and MES with sensor information from our telematics system (TMS). Based on the information thus obtained, we analyzed information on equipment operations, before and after COVID-19, which enable us to ascertain the current state of the global market and estimate when the market will recover. Our data platform also allowed us to undertake contactless market analysis from our own offices, thus minimizing the negative impact caused by COVID-19.

DIGITAL MARKETING The construction equipment industry tends to communicate with its customers directly or at large expos, which was changed as a result of the pandemic. Even before COVID-19, Doosan Infracore had used YouTube, social media, and other digital channels to communicate with its customers. In order to actively expand customer channels, Doosan Infracore took part in online expos and open houses to conduct marketing activities for its products. In particular, our European subsidiary created a 3D virtual showroom on its website, giving 360-degree views of the DL-7 series wheel loader launched in 2020, and now it is expanding the number of models whose information is available at the 3D virtual showroom. This enabled more information about new products to be shared in a highly effective and persuasive manner, using diverse and creative methods to inform customers even in circumstances that made it difficult to meet them in person. As a result of these efforts, the European subsidiary achieved its record-high wheel loader market share in 2020.

Establishment of a Safe and Flexible Work Environment

REMOTE WORK AND DATA SECURITY Doosan Infracore established guidelines on remote work to better respond to the COVID-19 pandemic and to ensure employee safety. Employees worked from home by using Microsoft 365 (Teams, OneDrive, and other applications), that we had adopted in 2018, and both internal and external meetings (with customers, suppliers, and other external counterparts) were made contactless through Teams. This process has enabled us to efficiently work from home through remote meetings and collaboration. In addition, we actively responded to data security issues due to remote work by using a strengthened version of the Microsoft 365 Security Service to prevent leaks of internal materials, thereby strengthening preventive management of potential information security issues in a remote work environment.

WORK ENVIRONMENT MANAGEMENT In order to prevent the spread of COVID-19, Doosan Infracore promoted telecommuting, and has also introduced a system whereby employees work at different hours to reduce density in work locations. In addition, all visitors at every business site are tested for a fever, and non-contact thermometers have been distributed to all business sites to monitor if employees have a fever. Hand sanitizers are offered to be used regularly in all offices, in the field, and at other facilities. We also undertake regular and frequent disinfections, provide safe commuter buses, have installed cough shields at in-house cafeterias and meeting rooms, and have taken a range of other measures to protect our employees.

Combating COVID-19 in Partnership with Stakeholders

SUPPLIERS In order to ensure a safe work environment for employees of in-house suppliers, Doosan Infracore has offered KF94 masks, hand sanitizers, and non-contact thermometers to all in-house suppliers, especially those whose jobs necessitate considerable face-to-face contact such as security guards and cleaners. In addition, we participated in the Korea Technology Finance Corporation's preferential guarantee business, aimed at supporting SMEs experiencing difficulties in raising funds due to the COVID-19 pandemic, in partnership with other construction equipment manufacturers and aircraft manufacturers.

LOCAL COMMUNITIES Doosan Infracore has continued to help local communities remain safe in their daily lives throughout the COVID-19 pandemic. We provided some 7,900 masks to families who were experiencing difficulty in obtaining masks when supply was tight at the beginning of the pandemic. These families included low-income residents in one-room housing in Seoul and local residents in Incheon, where our business sites are located. Existing programs in support of future generations, including Dream School (mentoring-based youth dream-nurturing program) and Junior Engineering Class (education program for the principles of science through creation activities), were able to go ahead by using video meeting platforms, social media, and other digital technologies. In addition, a KRW 1 billion donation was made at the Group level to Hope Bridge and provided quarantine equipment for medical staff and quarantine officials.

Virtual Showroom
DL-7 Series | Doosan Infracore Europe

OVERSEAS BUSINESS SITES Doosan Infracore delivered construction equipment, medical supplies, and donations to Wuhan in China, where COVID-19 was first detected. We dispatched 40 excavators along with drivers and a service team to help in the construction of the Huoshenshan and Leishenshan emergency specialty field hospitals for COVID-19 patients. We also delivered medical supplies, including protective clothing and masks, and other relief donations worth around RMB 1.1 million (KRW 186 million).

Established in 1937 as a first large-scale machine manufacture in Korea, Doosan Infracore has been creating records for “first” and “best”. As we are ushering in the Fourth Industrial Revolution, Doosan Infracore is becoming an innovative company which creates new value and leads markets by adding digital technology to our unrivaled reputation, supported by the corporate slogan of **“Powered by Innovation”**.

OUR STRATEGY

GROWTH & SOUNDNESS 28

PRODUCT & MARKET 40

INNOVATION & DIGITALIZATION 52

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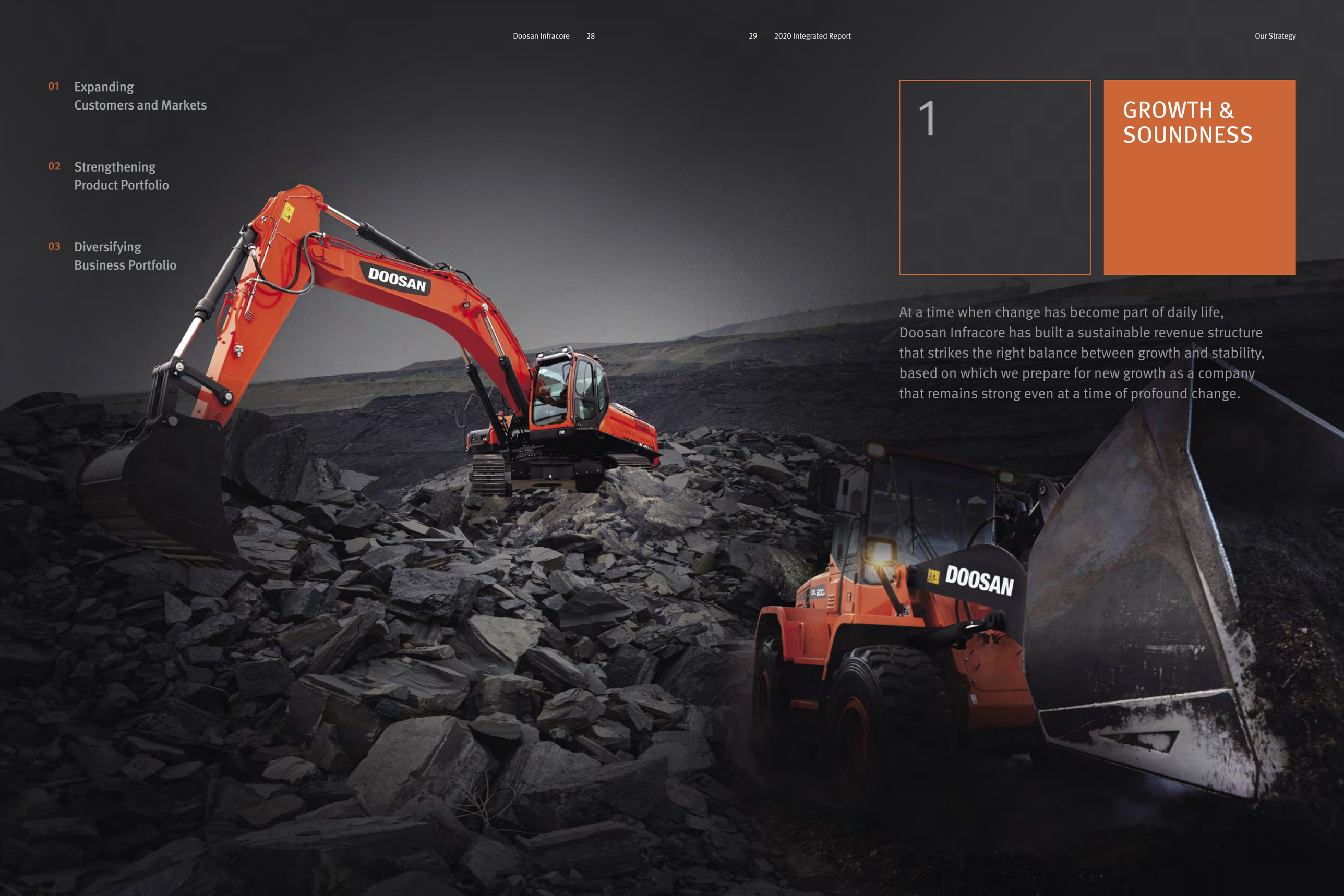
GROWTH & SOUNDNESS 28

PRODU MARKE 40

01 Expanding Customers and Markets

02 Strengthening Product Portfolio

03 Diversifying Business Portfolio



1 GROWTH & SOUNDNESS

At a time when change has become part of daily life, Doosan Infracore has built a sustainable revenue structure that strikes the right balance between growth and stability, based on which we prepare for new growth as a company that remains strong even at a time of profound change.

01

Expanding Customers and Markets

Enhancing Market Competitiveness

Doosan Infracore focuses on securing diverse sales sources to establish a stable revenue generation, while steadily increasing its presence in advanced markets. Advanced markets tend to be generally more stable, so that we strive to enhance competitiveness in the markets. To this end, in North America, we have expanded our dealer base, implemented customer-tailored programs, and improved service responses in our efforts to strengthen sales competitiveness. In Europe, we are improving service responses by supporting new dealers and allocating more authority to sales departments based on an aggressive sales strategy. In addition, we are responding to the order of customers through its Customization Plants, which assemble semi-finished products from Korea according to specific customer requirements. We are also increasing customer satisfaction by optimizing parts distribution through the Parts Distribution Centers (PDC).

DL380-7, a wheel loader launched for the European market in 2020

The construction equipment markets in North America and Europe have grown on the back of rising energy demands and increasing infrastructure investment, but were nonetheless held back by COVID-19. As a result, our sales declined, but our market share went up on the back of a strong channel competitiveness.

In January 2021, Doosan Infracore received an order for 221 excavators from BEAULOC, a major French construction machinery and equipment leasing company. 12 models have been ordered by BEAULOC, including the 22-ton, 16-ton, and 8-ton models, and the excavators will be used at sites across France, including for construction and roadworks. BEAULOC manages more than 420 construction machineries, and had purchased a total of 250 Doosan Infracore excavators in 2016, 2017, and 2019. This major deal is recognition from BEAULOC of the performance superiority and ease of maintenance of Doosan Infracore's equipment, as well as its residual value.

The construction equipment market in China experienced a downturn for around two months at the beginning of 2020 owing to COVID-19, but then quickly recovered thanks to increased infrastructure investments by the Chinese government and demand for equipment replacement, leading to a record large market size. In May, June, and November 2020, Doosan Infracore had the highest market share among foreign multinational corporation (MNCs) in the market. In October 2020, Doosan Infracore China Corporation reached 200,000 units of cumulative excavator production after 26 years in China, thereby becoming the first MNC to reach this landmark. We also continued to launch new products that are customized for the Chinese market, including the 6-ton low-end wheel excavator. Moreover, we ran stricter equipment inspection campaigns and offered online live service trainings to around 7,300 dealer employees across China, with an aim to enhance customer satisfaction. As a result of these efforts, Doosan Infracore sold 18,686 excavators in China in 2020, a year-on-year increase of 22.4% from 15,270 units sold in 2019, and it was also the largest figure for sales volume in ten years, after achieving sales of around 16,700 units in 2011. Doosan Infracore's market share in China has risen from around 13% in 2015 to approximately 23% by the end of 2020.

The excavator market in China is expected to grow further as the Chinese government continues to make substantial infrastructure investments. Doosan Infracore will therefore further expand its sales channels, and build market share through distinctive product as well as service and marketing strategies.

Expanding AM Business

Doosan Infracore has been expanding its aftermarket (AM) business in order to build a sustainable revenue structure that can weather a slowing market. In 2020, we focused on the provision of the machine lifetime care, operational innovation based on digital transformation, and strong AM marketing activities. As a result, 2020 sales increased by 5.4% year-on-year to KRW 259.5 billion (excluding special equipment and attachments).

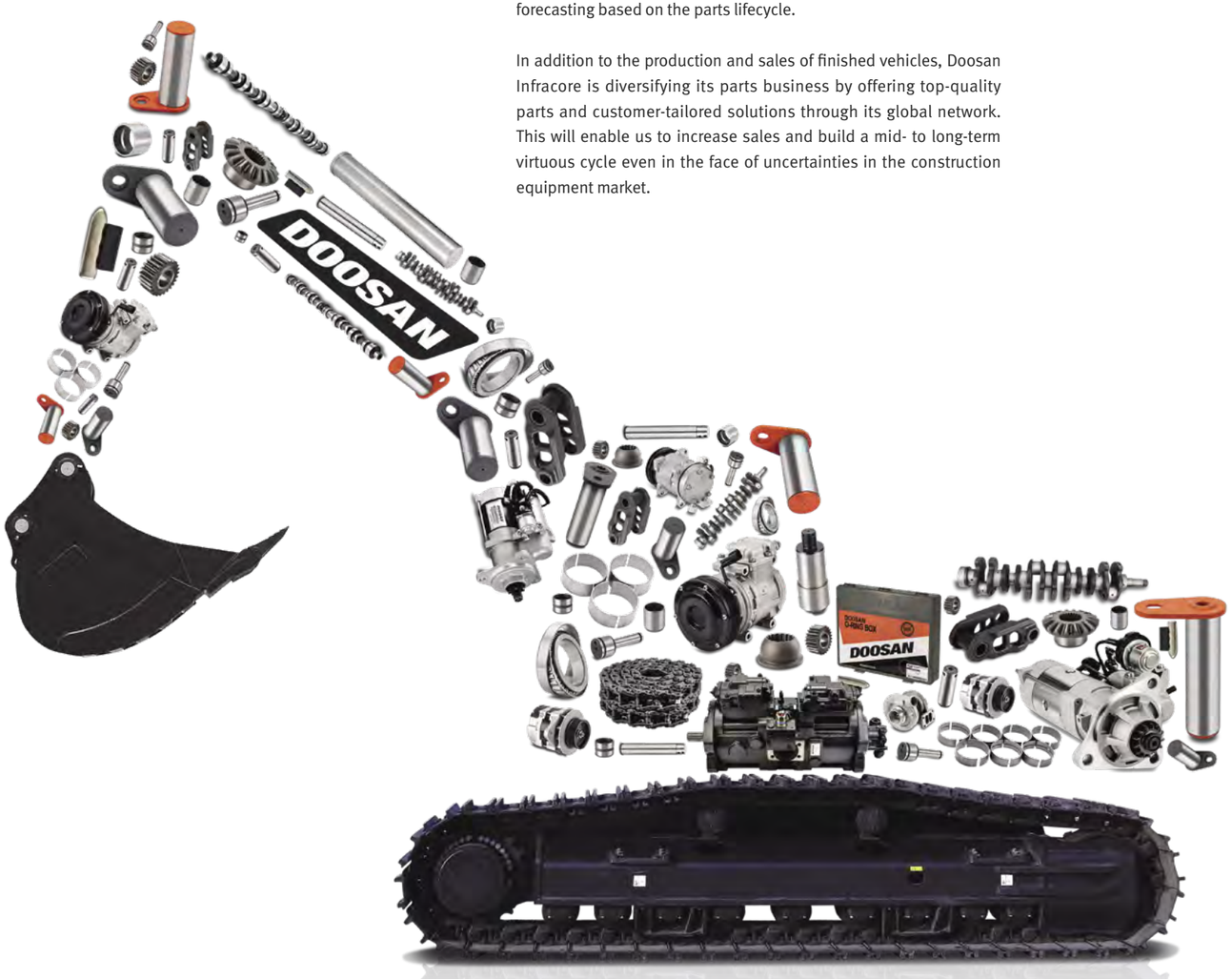
Machine lifetime care begins with defining the parts that are needed and the services to be provided, depending on the period of ownership. Based on this, Doosan Infracore ensures that customers are provided with the required parts and services in a timely manner, enabling them to maintain their equipment in optimal condition by having appropriate parts at the appropriate time, which in turn increases the residual value of the equipment. We will expand the lifetime care-based parts business to include customers outside their warranty period. In the aspect of machine lifetime care, our AM business will include remanufactured parts and engine overhaul parts. The remanufactured parts business involves collecting key equipment parts, disassembling and reassembling them to make them the same as new, and then reselling them. In 2020, a new process related to the use of key engine parts was established through collaboration between the Heavy BG and Engine BG. The remanufactured parts business previously involved collecting parts through customers and dealers in different countries, but this new process has enabled us to build an additional channel for obtaining key parts, which in turn is expected to improve both customer response and corporate profitability.

In order to maximize its capabilities in parts distribution, Doosan Infracore operates ten PDCs in eight countries, keeping in stock a total of over 150,000 parts. We have been making continuous efforts to improve the operational efficiency of the PDCs and their responsiveness to customer demand, thereby enhancing customer satisfaction. To ensure more efficient parts distribution, we have integrated the previous system, whereby each regional PDC sought to anticipate demand and manage inventory, into a global planning system whereby headquarters centralizes planning and manages inventory. In addition, Doosan Infracore is implementing a range of measures to improve parts demand management. These include a manufacturer managed inventory (MMI), through which headquarters anticipates demand based on actual sales data from dealers, and recommends the right parts to dealers.

Doosan Infracore uses a big data visualization program, which enables data visualization, predictive analysis, real-time and dynamic analysis, and location and streaming analysis, thereby quickly analyzing customer data. We completed application to all retail sales items of dealers that use MMI after May 2020, and the number of days of safety stock retention that is calculated by the system after application went down 12.6%, while the distribution rate continues to rise steadily. Going forward, Doosan Infracore will continue to improve the MMI system through on-going monitoring and upgrades.

Doosan Infracore is focusing on service solutions and e-commerce in order to further expand the market for parts and services. To this end, we have developed the “Mobile Parts Book” app, which gives users easy and convenient access to information on Doosan parts, and also improved it by adding a cart function that allows customers to request parts estimates from dealers through the app, thereby increasing parts sales and thus expanding foundation for e-commerce operations. In addition, we are striving to increase visibility throughout the AM value chain, and to improve demand forecasting based on the parts lifecycle.

In addition to the production and sales of finished vehicles, Doosan Infracore is diversifying its parts business by offering top-quality parts and customer-tailored solutions through its global network. This will enable us to increase sales and build a mid- to long-term virtuous cycle even in the face of uncertainties in the construction equipment market.



DX60W ECO, a 6-ton low-end wheel excavator launched for the Chinese market in 2020

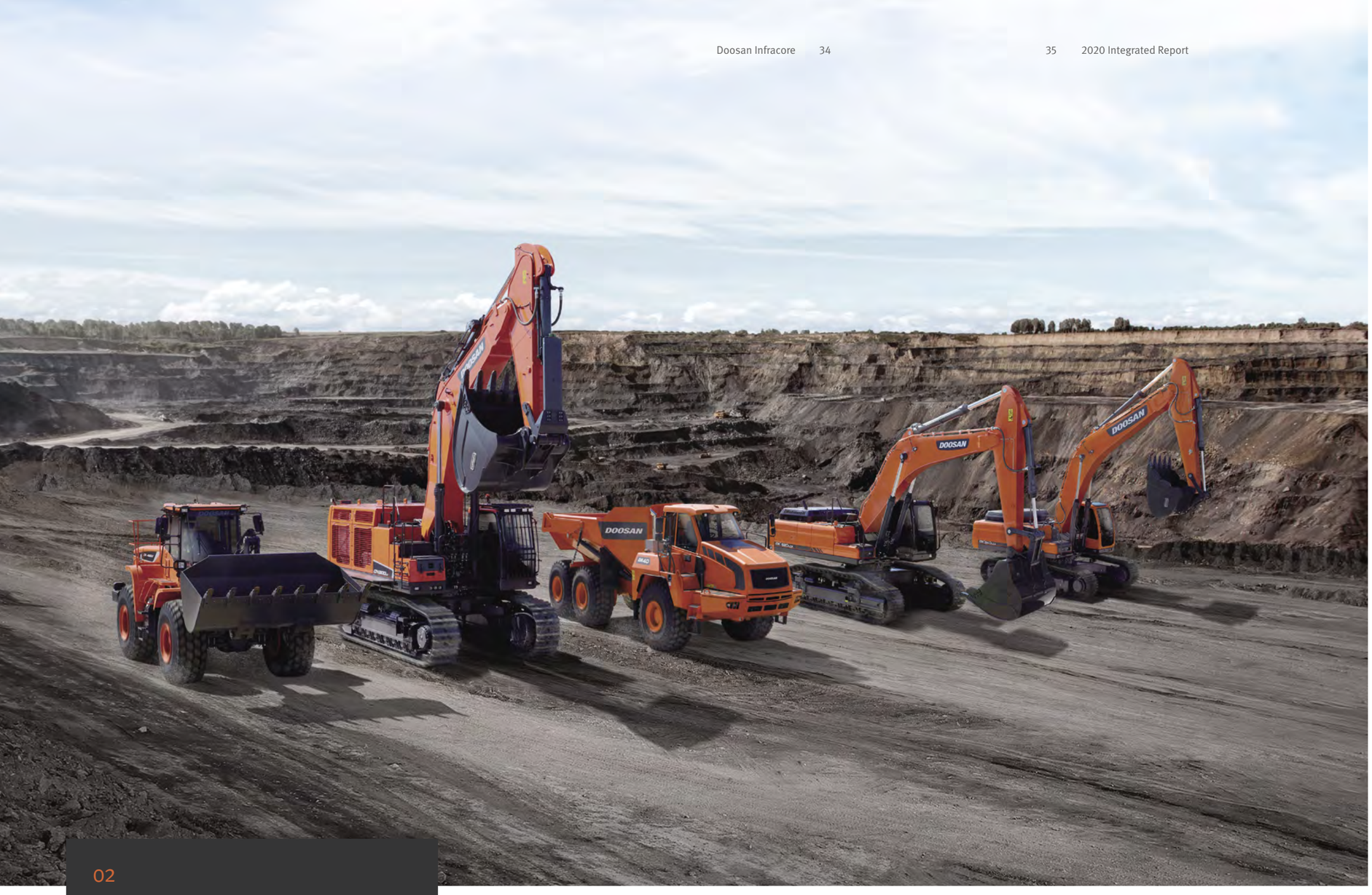
Increasing External Sales of Engines

Doosan Infracore has been making continuous efforts to diversify customer base for external sales of engines in order to respond to changes in the global engine market and ensure stable sales even in a slowing market. To this end, we are expanding into the automotive, ship, and power generation sectors, while also developing technologies relevant to upstream and downstream of engines, hybrid powertrains, electrification, and other future-based businesses. In particular, we are developing such new products as the compact G2 Stage V[1]-standard engine which meets next-generation emissions standards, which will enable us to secure long-term supply contracts and attract large captive customers. We have signed engine supply contracts with three global companies – KION Group of Germany in 2017, Baoli of China and Arbos of Italy in 2019. In 2020, we won an order from YTO, the leading agricultural machinery company in China, for around 3,000 engines to be fitted in tractors for export to Europe. In April 2021, we received an order for 15,000 engines from Linde China, a forklift manufacturer.

In 2017, Doosan Infracore established Lovol Doosan Engine Company (LDEC) in partnership with Lovol, China’s largest agricultural machinery company, and will work in unison so that LDEC will be able to achieve the optimal performance by suppling off-highway and generator engines in China and entering emerging markets. In 2019, Doosan Infracore also successfully extended a contract to supply engines to Power Solutions International (PSI), a US-based manufacturer of power generator engines with whom we had been doing business since 2008. Accordingly, we will supply 8.1-liter to 22-liter natural gas generator engines to PSI through to 2023. After tuning Doosan Infracore’s engines to meet North American emissions standards, PSI sells the engines to major power generator companies, as well as to companies in the oil and gas industry.

Despite the considerable efforts made by Doosan Infracore to increase external sales, sales in 2020 decreased in the key markets of North America and Europe, mainly attributable to the stagnation caused by COVID-19, and sluggish demand for power generator engines as oil prices fell. In these challenging circumstances, we are focusing on existing customers, while also actively looking at opportunities for the future, such as hybrid powertrains and the E-Powerpack.

[1] Stage-V: Exhaust gas regulations put into effect by the EU in 2019 to restrict PM emissions by diesel engines



02

Strengthening Product Portfolio

Launching Region-specific Equipment

Korea In 2019, Doosan Infracore launched the 1.7-ton DX17Z-5 in order to retain its competitive edge in the fast-growing Korean market for mini excavators. Previously in this market, products imported from Japan had a market share of around 90%. However, the DX17Z-5 offers superior performance compared to competitor products in terms of excavation power, rotation speed, and operating angle. Its minimum width is also only 950 mm, making it very useful in tight spaces. As a result of this outstanding product power, sales volumes for the DX17Z-5 increased by 192% year-on-year as of September 2020.

In addition to the mini excavator, Doosan Infracore also launched the DX800LC in Korea in 2020. The DX800LC is a flagship ultra-large 80-ton excavator that has already been recognized overseas for its performance and quality. It combines all the latest technologies, including "smart power control," an integrated electronic hydraulic system that was independently developed by Doosan Infracore. World-leading aftertreatment technology is also applied, making it eco-friendly. In addition, the DX800LC features the intelligent boom function, which eases the impact on equipment in order to maximize safety, and All-around view monitoring (AVM), which enables a 360-degree view of the equipment's surroundings at a single glance. Moreover, DoosanCONNECT™ is a standard feature of the DX800LC, enabling the remote monitoring of the equipment's location, its operational status, and the status of its major parts.

In 2021, Doosan Infracore is launching upgraded versions of 13 models in the Korean construction equipment market, including three large excavators of 30 tons or more, three mid-size wheel excavators, four mid-size crawler excavators and three 5-ton mini excavators. The 2021 5-ton wheel excavator has improved safety by increasing the counterweight at the back of the equipment, while the 5-ton crawler excavator offers increased efficiency by enabling complex movements to be quicker and smoother when working with heavy cargo. For all models of 14-tons and above, various convenience devices are applied to further upgrade the cockpit space, and DoosanCONNECT™ is offered as standard, thus enabling smarter equipment management. In addition, a wide range of attachments are offered as options, including a clamp, a rotational link, and a tilt rotator, making the equipment more useful in different work conditions. In particular, the 2021 models of the 14-ton and 16-ton excavators have adopted the center high mounted stop lamp (CHMSL) – a lighting signature[1] of the automobile industry – to improve safety. The CHMSL is a brake light placed at the top center of the rear of automobiles and construction equipment, and blinks to attract attention and prevent accidents.

Doosan Infracore sold more than 4,000 products in Korea in 2020, including excavators and wheel loaders, which represents year-on-year growth in sales volume of around 18%.

China In 2020, in response to the favorable conditions in the Chinese market, Doosan Infracore launched the DX60W ECO, a new 6-ton low-end excavator. Wheel excavators offer greater mobility than crawler excavators, making them more suitable for work in downtown areas. The DX60W ECO is tailored for the Chinese market, including through its enhanced price competitiveness. It incorporates a high-efficiency hydraulic control system to ensure smooth, precise operation, and to increase fuel efficiency. It also enables quick work transitions in different work environments, including excavating earth, evening out surfaces, and moving heavy cargo. Improvements made to the overall structure and to the design of parts have resulted in outstanding durability and greater convenience in maintenance as well. The DX60W ECO has earned excellent evaluations for its performance, convenience, and fuel efficiency, and is expanding its market share by increasing sales online, including through the WeChat app. We will continue to create new opportunities for growth in the Chinese market through customized new products and special equipment.

[1] Lighting signature: A lighting device that adopts a distinctive design element to be differ from other products

Advanced Market In May 2020, Doosan Infracore launched the DL-7 series, a line-up of next-generation wheel loaders with improved performance and greater efficiency, in the European market. A wheel loader is used to scoop up and move soil, sand, wood, and other materials, and the DL-7 series was planned from its initial stages to meet Stage V regulations, the latest European emissions standards, as a full change model of the existing model for the first time for the past ten years. It features the largest bucket in its class and has significantly improved engine power and fuel efficiency, as well as better steering and electronic control systems in terms of both performance and efficiency. The DL-7 is equipped with a strengthened axle which gives stability even when carrying heavy loads, and it also has substantially improved durability for the main parts in the hydraulic power system and the operating compartment. The glass window has been widened to minimize front and side blind spots, resulting in a wider range of vision and better safety. After the launch in Europe, we plan to launch the DL-7 in markets across the globe, and on the back of its superiority, we expect to increase product awareness and further expand its customer base in global markets.

Emerging Market Doosan Infracore is planning to launch 26 models in emerging markets in the near future, all of which will be full change models of previous models. The full change models boost increased fuel efficiency enabled by applying a virtual bleed-off (VBO)[1] system to existing mechanical engines or by equipping an electronic engine. It would help to respond to variety of customer needs in a market where only mechanical engines were available. The launch of next-generation models in emerging markets will enable us to respond actively to customer requests and to further solidify our position in these markets.

Expanding Customized Special Equipment

Doosan Infracore is developing new markets by offering a wide range of special equipment customized for working conditions and worksite requirements, with the goal of improving work productivity and creating a safe work. Based on analysis of regional markets and usage required at worksites, the company has introduced a variety of special equipment product lines, including material handler, amphibious excavator, demolition equipment, log loader, and giant ripper, thus diversifying its product portfolio.

Doosan Infracore's telescopic dipper has a large 38-ton excavator at its base, and is equipped with a long arm and a sliding cabin, allowing excavating and loading up to 30 meters underground. It features outstanding safety, so that it is useful for digging at underground sites and for building foundations in congested areas in city centers. Doosan Infracore has received many inquiries about using the telescopic dipper in urban construction sites, and it was recently used for a subway construction project in Busan.

In 2020, Doosan Infracore launched the DX600PD-9C, a pile driver, in the Chinese market. A pile driver is special equipment that is used to drive a long pile down into the ground. The DX600PD-9C is a hydraulic pile driver that was produced using Doosan's in-house technologies, and is used for installing piles in the foundations at construction sites. Its offers outstanding fuel and operational efficiency, and causes zero damage to the piles being driven in. Thanks to these advantages, it is being widely used in high-speed railways, real estate, construction engineering, and other projects. We will continue to strengthen our special equipment business to meet the diverse requirements of customers.

Expanding the Line-up of Large Engines

Doosan Infracore has been making continuous efforts to expand its line-up of large engines, including automotive engines and marine engines. In March 2020, we launched an 11-liter Euro 6 electronic engine designed for commercial vehicles in Korea, and Tata Daewoo Commercial Vehicle Company has rolled out "PRIMA" trucks installed with the new engine. Doosan Infracore's DX12 engine will be equipped to 25 truck models soon to be launched by Tata Daewoo Commercial Vehicle Company.

Until recently, marine engines and power generator engines were mostly mechanical. However, there is increasing demand for electronic engines, and Doosan Infracore has actively embraced this trend by moving forward with a transition to electronic engines. We launched the DX22 power generator electronic engine in June 2020, and plan to launch the DX22 Tier-2 engine in 2021. We are also developing an electronic version of the DX15 engine. In addition, we are cooperating with global engine manufacturers to expand the line-up of large engines. In 2020, we worked with MAN Engines of Germany to supply 12/24-liter marine engines through an original development manufacturing (ODM) arrangement, and we are now selling these engines after obtaining certification.

[1] VBO: Technology that optimizes engine control by using an electro-hydraulic system

DX12, an electronic engine for marine

03

Diversifying Business Portfolio

Digital-based Solution Business

With the emergence of the Fourth Industrial Revolution, the machinery manufacturing industry is striving to create new business opportunities through solutions based on digital technologies. The construction equipment industry is also moving beyond the sales and maintenance of its products by offering more value to customers through improvements in productivity, safety, and convenience.

Doosan Infracore is looking to the future of construction sites by focusing on unmanned construction solutions (autonomous equipment and control systems) which will improve productivity and safety at construction sites, and help to relieve manpower shortages in an aging society. We are also creating solutions based on electrification and telematics, and to this end, specialists at Doosan Infracore are cooperating with external experts to develop new technologies and businesses.

In January 2020, Clue Insights Inc., the first start-up established by Doosan Infracore, participated at CES 2020, and was named an Honoree in the "Tech for a Better World" category. Clue Insights Inc. is a new business spin-off, launched in the form of in-house venture, and it uses the "Clue" application to analyze telematics information from construction equipment, enabling more efficient equipment operation.

Strengthening Aftertreatment Solutions

As countering climate change gains greater importance, emissions standards are steadily becoming stricter across the globe, which in turn is increasing demand for exhaust gas treatment devices. In response, Doosan Infracore has been developing new technologies for exhaust gas aftertreatment, such as "No-DPF Tier 4". This solution is based on "Ultra Low Particle Combustion," our proprietary and patented combustion technology, and it meets Tier 4 emissions standards without the need for a diesel particulate filter (DPF). No-DPF Tier 4 can be used in a wide range of equipment thanks to its outstanding power output and fuel efficiency, and its ability to make engines more compact compared to other engines in the same class. It also delivers high durability and reliability for it is designed to withstand extreme operating conditions. SCR on DPF (SDPF)[1] is an exhaust gas aftertreatment technology which integrates SCR and DPF in response to Euro 6 vehicle emissions standards. It will be applied in the mass production of non-road engines in response to Stage V standards.

Doosan Infracore recognized the growing importance of after-treatment solutions, and established "ECUBE Solution"[2], a joint venture (JV) for engine aftertreatment business, in 2020. ECUBE has established a business model through which it will provide a total solution, including products and technologies of aftertreatment, to the global engine market. The JV will begin full-scale operations in the second quarter of 2021, beginning with the supply of aftertreatment solutions for Doosan Infracore engines. It already has a potential customer in the overseas power generator engine market, and is completing preparations to begin supplying at the end of 2021. ECUBE expects the aftertreatment market to continue to grow rapidly, especially after 2025 when emissions standards become stricter across the globe. It is therefore putting together a new solution based on the global quality aftertreatment technologies accumulated over many years. Going forward, Doosan Infracore will be active in minimizing environmental impact of our products by preparing development plans for new products which reflect next-generation emissions regulations, setting up related strategy for developing aftertreatment technologies, and launching solutions.

Supported by its vision of becoming a "Global Leader in Infrastructure Solutions," Doosan Infracore will continue to increase its global competitive advantages, and will actively seek out new businesses in order to create new sources of revenue and growth for the future.

[1] SDPF: A technology that considerably reduces the total volume of the catalyst by coating SCR catalyst in the DPF

[2] ECUBE Solution: Means to solve a cubic equation (E_3) of E that consists of Emission, Efficiency, and Economy

01 Strengthening Product Competitiveness

02 Innovating and Diversifying Sales Channel

03 Improving Service Reliability

2 PRODUCT & MARKET

Outstanding and distinctive products, and the insight to understand markets enable businesses to stay ahead and continue to grow. Doosan Infracore is building strong momentum for growth by enhancing product competitiveness and and diversifying sales channels.

D34, a G2 engine

01

Strengthening Product Competitiveness

Strengthening Eco-friendly Product Development

Doosan Infracore is focusing on new technologies and advanced products with a goal of improving its product competitiveness and building a foundation for sustainable growth. We are establishing a mid- to long-term roadmap for product development by reflecting such customer requirements as fuel efficiency, performance, and durability, while also taking such trends into consideration as eco-friendly power, autonomous technology, and safety in preparation for the future market. Doosan Infracore fully recognizes the importance of eco-friendly market opportunities and is preparing for the transition to carbon neutral markets by developing alternative fuel solutions and engine electrification as well as by increasing fuel efficiency and productivity of equipment.

Responding to Emissions Regulations Doosan Infracore has established a mid- to long-term roadmap for developing new models, based on which we are responding preemptively to next-generation emissions standards around the globe by expanding our engine line-up. We responded to the scheduled enforcement of EU Stage V emissions standards by developing the compact G2 Stage V pilot engine in 2017 based on the latest combustion technologies, and then began mass production at the end of 2019. The compact engine applies Doosan Infracore's upgraded Ultra Low Fuel Consumption (ULFC)[1] technology, and also uses SCR on DPF (SDPF) technology in order to meet stricter particulate matter (PM) standards.

Developing Alternative Fuel Solutions Gas engines, that use such eco-friendly alternative fuels as LPG and CNG, emit 90% fewer PMs compared to diesel engines, and almost no CO_2. We apply high-efficiency combustion technologies to the gas engines, so that they can be used for multiple uses in various regions. Eco-friendly alternative fuel solution is a technology through which combustion system using gas as a fuel is applied to diesel engines, and it increases compatibility of gas engines with diesel engines, while still benefitting from the unique strength, durability and reliability of diesel engines, which enables the gas engines to be used for a long time without minor breakdowns. In addition, we have increased our competitiveness in eco-friendly alternative fuel solutions by developing CNG stoichiometric air-fuel ratio[2] technology. Global OEMs have been expanding their response to the stoichiometric air-fuel ratio following the implementation of Euro 6 – Europe's latest emissions regulations for vehicles. Moreover, as the Euro 7, a new emissions standard which will be come into force, will set even stricter regulations on NOx, CH_4, and CO_2, while customers are demanding that CNG engines deliver as much power as diesel engines, the development of stoichiometric air-fuel ratio technology is therefore being accelerated. In response, Doosan Infracore is developing new stoichiometric air-fuel ratio engine technologies, including combustion optimization, reducing heat loads, improved high temperature materials, multi-fuel injection, and EGR ratio optimization.

Preparing for Electrification The construction equipment industry is traditionally focused on production and fuel efficiency, however, of late the need to reduce carbon emissions in using products has been gaining importance. In response, Doosan Infracore strives to reduce CO_2 emissions while increasing fuel efficiency by continually expanding the use of electro-hydraulic systems. In addition, we are utilizing electrification technologies such as the hybrid powertrain and E-Powerpack, which will enable us to develop and mass produce electric excavators and other electric equipment.

Doosan Infracore is committed to technological development of its own and open innovation in collaboration with others. Going forward, we will enhance product competitiveness and prepare for the markets of the future by reflecting the needs of customers, society, and the environment in our technological development.

Enhancing Product Quality

Improving PDCA[3]-based Process Operations In 2018, Doosan Infracore created the Quality Management Team, dedicated to diagnosing and verifying the quality management system (QMS) at the corporate level its construction equipment and engine businesses, further strengthening its QMS and risk management system. The company has redefined the diagnosis system for its ISO9001:2008-based QMS and is implementing the upgraded operation procedures by reviewing internal and external changes; implementing tasks identified through the QMS diagnosis and improving the verification of improvement measures; and expanding the scope of diagnosis to include other areas besides production, purchase, and quality. The new QMS reflects stakeholder needs and expectations, risk management, and other factors required by the latest ISO9001:2015 standards, and thus consists of both items common to departments throughout the organization and specific diagnosis items for each work area.

Starting in 2019, Doosan Infracore has undertaken regular annual QMS diagnoses of its business groups and sales/service units. It has also built a corporate-wide QMS system which has created a virtuous cycle of identifying tasks through diagnosis, monitoring the execution of tasks, and verifying the improvements made. Progress monitoring is conducted quarterly, with reports made to the CEO to ensure that the implementation of tasks is supported at the company level. We examine the implementation of systematic business processes in all departments and ensure compliance with QMS standards for the efficient operation of QMS diagnosis and management system. We also continue to conduct diagnose process operations from the PDCA perspective, identify tasks, and make improvements.

1) ULFC: An innovative technology, patented by Doosan Infracore, that optimizes fuel combustion while increasing power

2) Stoichiometric air-fuel ratio: Chemical formula for the theoretical value regarding the perfect ratio between fuel and oxygen for complete combustion. A catalytic converter works most efficiently near the stoichiometric air-fuel ratio.

3) PDCA: Method to achieve a goal by repeatedly executing a cycle of plan-do-check-act (PDCA)

At a time when business uncertainties continue to increase, Doosan Infracore has in place an advanced risk management system which enables the integrated and preemptive management of potential and actual emerging risks throughout its value chain. Since 2019, we have identified the key risks for each function within our construction equipment and engine businesses, set out response strategies, put into place preemptive risk management, and undertaken detailed monitoring. In 2020, we improved our quality management process and implementation in order to meet customer expectations regarding quality and to enhance our fundamental competitiveness.

In 2021, Doosan Infracore will continue to improve its business operation based on quality management process at the company level while ensuring the competitiveness of parts quality. To this end, we will improve the quality management systems of suppliers, including by providing them with quality management diagnosis and consulting, in addition to further upgrades of our own internal QMS diagnosis and risk management.

Improving Preventive Quality Doosan Infracore is focused on making improvements in quality, aimed at ensuring fundamental competitiveness and increasing customer value, by "observing the basics of quality" with a particular focus on its plants and suppliers. In 2020, we conducted activities aimed at improving preventive quality, in line with new product launch, strengthening quality management at our plants and suppliers, and creating a culture where basics are standards are observed. In our efforts to strengthen preventive quality of new models, we run the Product Validation Complete (PVC)[1] system and conduct new vehicle assessment, and thus preemptively detect quality issues. In addition, we are continually improving initial quality (IQ) and warranty quality (WQ) by operating the production trial check (PTC)[2] system to improve preventive quality at our plants.

Digital Data-based Quality Management System In 2019, Doosan Infracore built the digital-based Statistical Process Control (SPC) system which improves quality management at suppliers by automatically receiving SPC data from them in real time and monitoring it to assess process management capabilities. We installed the system at ten suppliers in 2019 and another ten in 2020, and we expect to install the SPC system for more suppliers in 2021 in order to upgrade their quality management systems. The preemptive elimination of quality issues at suppliers will enable us to improve the initial quality of our products and enhance work efficiency.

Moreover, as we are ushering in the Fourth Industrial Revolution, we will use big data to forecast potential quality issues caused by the real-life working environments of our customers, and the length of time that their equipment is being used. We will then undertake preemptive inspections and use telematics systems for remote diagnosis, thus preventing any quality issues from arising with customer equipment.

Verifying Equipment Performance and Durability In 2019, Doosan Infracore completed the construction of the 300,000 m² Boryeong Proving Ground, the largest of its kind in Korea, which has enabled the more systematic and advanced verification of the durability and performance of its construction equipment. The Boryeong Proving Ground consists of three proving grounds which are identical to actual working environments for construction equipment, as well as a mountain driving road, which enables the simultaneous testing of up to 20 units of construction equipment. In addition, "accelerated durability specialization testing" is available, so that the durability testing period can be shortened. This facility includes various other proving grounds, such as driving, salvage and traction power, and noise testing, as well as a dome. The environments which replicate actual work sites enable construction equipment to undergo real life evaluation, and also facilitate regulatory testing. The Boryeong Proving Ground has upgraded Doosan Infracore's product competitiveness by improving the performance and durability of its construction equipment. Going forward, we will use the Boryeong Proving Ground as our "smart construction equipment research complex," testing and demonstrating smart equipment with cutting-edge technologies and developing technologies for the environment and customer safety.

Improving and Expanding Production

Doosan Infracore run the Customization Plants in Europe and North America in order to better respond to customer requirements and to increase efficiency at its production facilities. We established our first Customization Plant, the Europe Customization Plant (EuCup), in Rotterdam in the Netherlands in 2016, followed by the North America Customization Plant (NaCup) in Savannah, Georgia, USA in 2020. Production at the Customization Plants is based on the semi knock-down (SKD) method, which involves importing the main body and frontally-positioned parts such as arms and booms, then assembling them to produce finished products to meet exact customer specifications. The SKD method reduces the time it takes to supply products to customers, lowers logistics costs, and enables us to make timely responses to local customer needs. In 2020, EuCup further improved the flexibility of local supply by adding capacity for two model and 11 option specifications. Also in 2020, Doosan Infracore built an integrated global plant dashboard which measures production and inventory around the world. Going forward, we will use this dashboard to establish a supply system which responds quickly to customer needs through the faster and more reliable supply of finished vehicles and parts.

[1] PVC: Report on completing vehicle verification

[2] PTC: Process for securing preventive quality and suppressing new defects by carrying out prior verification activities before application of major changes to mass production

02

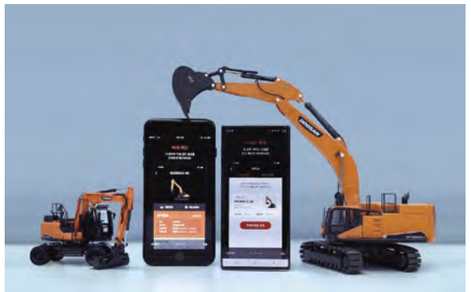
Innovating and Diversifying Sales Channels

Expanding Value-selling

With competition intensifying in emerging markets, Doosan Infracore approaches its customers with a focus on the distinctive value of its products. This value-selling strategy offers solutions, such as product consulting and other value-added services, and is based on an in-depth understanding of customer requirements and the need to focus on delivering product value, thereby building trust with our customers. We have developed marketing materials which explain the particular advantages of our products from the perspective of total cost of ownership (TCO) and productivity. These materials and other marketing supports have increased dealer and sales understanding of our equipment, which is enabling the implementation of our value-based strategy. In 2020, despite the COVID-19 pandemic, we developed contents on new models launched in emerging markets and digital-based solutions, and provided online trainings. Thanks to these efforts, we attracted new customers and signed highly-profitable fleet deals around the globe.

The Middle East and Africa Doosan Infracore signed a number of fleet deals in the Middle East and Africa in 2020. At a bidding held by a Saudi Arabian construction company in September 2020, we won a contract for the supply of ten units of the DX520LCA 50-ton excavator. The DX520LCA has been optimized in accordance with customer requirements, and earned positive assessments for its performance, price, and service back-up. The Saudi construction company has purchased some 50 units of Doosan Infracore equipment since early 2020, including ADTs, 70-ton excavators, and wheel loaders. We also attracted other major customers, including signing contracts to supply 54 excavators to an equipment rental company in Turkey and 35 excavators to a large construction company in Qatar. We also received an order from a mining company in Ghana for 20 excavators to be used in a gold mine. We are continuing to sign contracts in 2021 as well, including the supply of 27 units of equipment to a mining company in Oman, 35 excavators and wheel loaders to a large construction company in Morocco, and 35 wheel loaders for an agricultural project led by the government of Egypt. The market remains sluggish in the Middle East due to falling oil prices and COVID-19, however we have been maintaining a regional market share of more than 10% by launching competitive new products, actively promoting DoosanCARE, our integrated customer-tailored service solution, and making other efforts to attract major new customers.

Asia and South America In 2021, Doosan Infracore signed a contract with the construction company in Hong Kong which is running the project to expand the third runway at Hong Kong International Airport. Under this contract, we will supply 50 mid- to large-sized excavators, including 30 units of the DX340LC model and 20 units of the DX480LC model. We also signed a fleet deal consisting of 38 excavators and wheel loaders with a mine development and engineering company in Thailand, and received an order for 20 mini excavators from a dairy company in Vietnam. These contracts confirm Doosan Infracore's strong growth in Asian markets. Moreover, the company is actively advancing into the Latin American market, and recently won an order for 16 excavators and wheel loaders from a construction company and rental company in Colombia.



"MY DI" smartphone app

Going forward, we will continue to strike the right balance between stable growth and strong profitability by upgrading our unique value-selling strategy applying it to more actual sales sites.

Digital Marketing

Digitalization has been substantially accelerated by the unprecedented circumstances surrounding the COVID-19 pandemic. Doosan Infracore has been undertaking contactless sales activities, based on its digital platforms, aimed at promoting customer communication over the last few years, and thanks to these efforts, we were able to continue ongoing communications with dealers and customers, even during the pandemic.

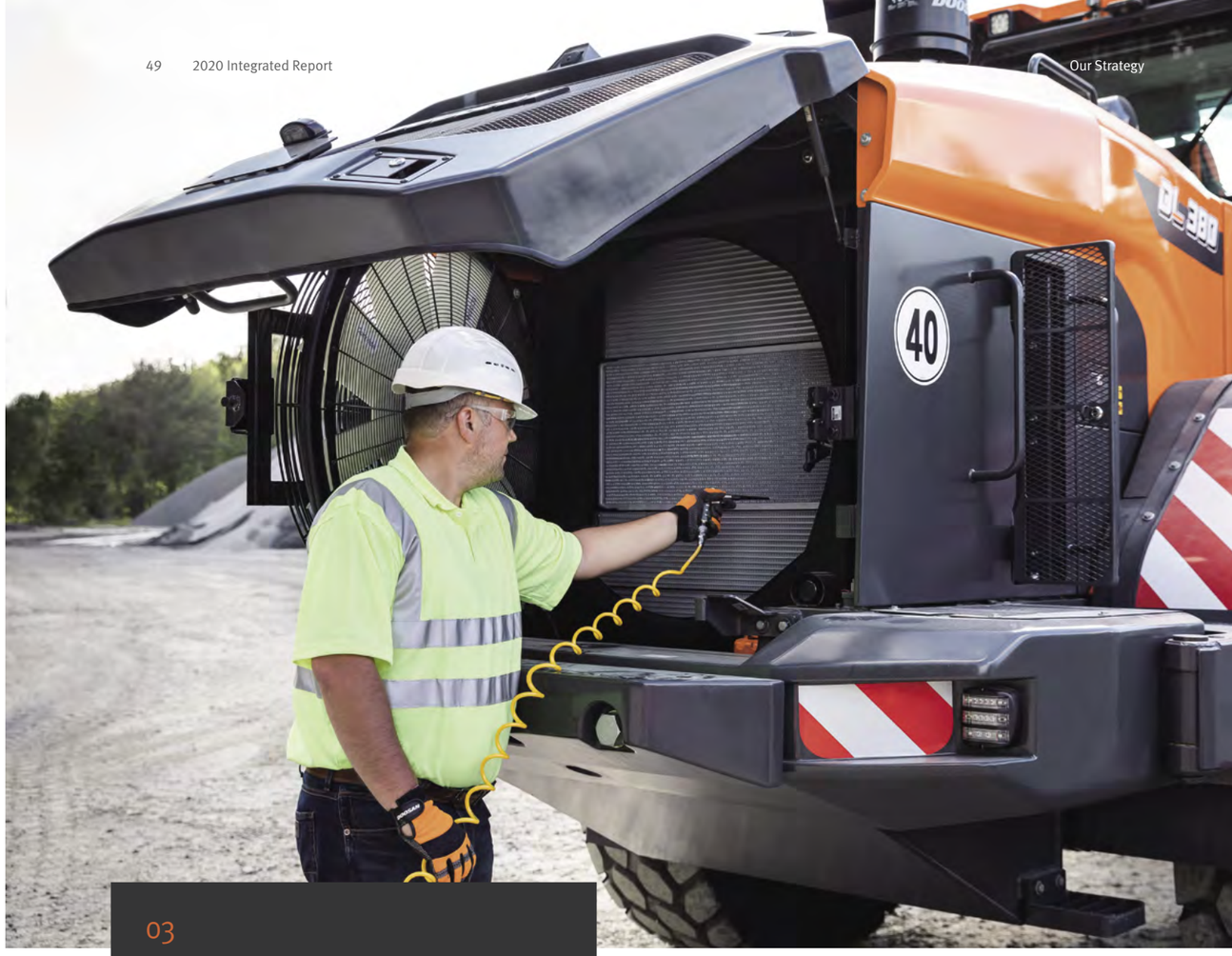
Doosan Infracore launched "MY DI," a smartphone app which supports the operations management of construction equipment. MY DI helps customers across the entire construction equipment lifecycle, ranging from purchase to operations and end-of-life disposal, and provides all information and services that customers need for the optimal operation of their equipment. In particular, it can also be linked to DoosanCONNECT™[1] for real-time information concerning the location and operational status of equipment, as well as giving information about the replacement cycle and repair history of major parts, which enables more convenient operation and management of equipment. MY DI can also be used to search for specifications, prices, purchase conditions, and other information regarding equipment and parts, and to make reservations for repairs and advice sessions at dealers. In addition, location-based data from a mobile phone enables rapid service to be provided by nearby dealer and service networks. We will provide essential information about the use and management of our equipment through a video which users can understand with ease. We will also add an e-commerce function to MY DI to provide one-stop services, including the purchase of parts, and will continue to further expand online communications, thereby providing differentiated services.

Since 2016, Doosan Infracore's Chinese subsidiary has been using WeChat, the largest mobile messenger service in China, and other online channels to provide information about new and used products and parts to its customers, to help them manage their equipment. This advanced online marketing strategy supported the Chinese subsidiary in selling more than 1,100 units of finished vehicles and KRW 25 billion in parts in 2020. In 2020, the Chinese subsidiary built an integrated data platform, in partnership with Alibaba[2], which enables more effective digital marketing across the entire purchasing lifecycle by integrating customer- and equipment-related data that was previously managed by eight different in-house systems. This platform has substantially upgraded the data-based digital marketing capabilities of the Chinese subsidiary and preemptively built operation base. This has enabled additional value creation, such as effective marketing activities that target customers who are segmented in relation to finished vehicles and parts for each step of business, advancement of customer credit rating using a system, forecasting of equipment quality issues, and advancement of receivables risk management. In addition, in 2020 the subsidiary expanded its PR and customer support activities in China through live broadcast content using social media platforms such as TikTok and Kuaishou, including a live broadcast which provided technical training and information about finished products and parts.

Doosan Infracore released the new Mobile Parts Book app, which has substantially enhanced accessibility to information about parts. The previous parts book contained plans, parts numbers, and other data for each product, and was an average of 600 pages long for each piece of equipment, as it was only available to customers in paper form. The Mobile Parts Book app has improved user convenience, allowed rapid information updates, and enabled better customer follow-up. In 2020, we added a function which allows users to ask for parts estimates and to inquire about inventory, and then receive estimates directly from dealers. This additional digital-based sales channel has enabled us to directly ascertain customer requirements, and we will continue to use digital-based content and activities as a tool for enhancing customer value.

[1] DoosanCONNECT™: A cutting-edge Internet of Things (IoT) solution that remote monitors the status of construction equipment

[2] Alibaba: Company running Alibaba.com, the world's largest online shopping mall, that is headquartered in China



03

Improving Service Reliability

Doosan Infracore strives to build trust with the customers who use its equipment by offering more value. To this end, we are going beyond existing standardized service programs, offered through follow-up services and regular services, and looking into new ways to preemptively provide customer-specific services.

Machine lifetime care involves identifying customer needs according to the lifecycle of their equipment, and then providing preemptive service programs. Machine lifetime care offers preventative services, for a longer period than existing service programs, and thus maximizes efficiency and minimizes maintenance costs, providing better value to customers.

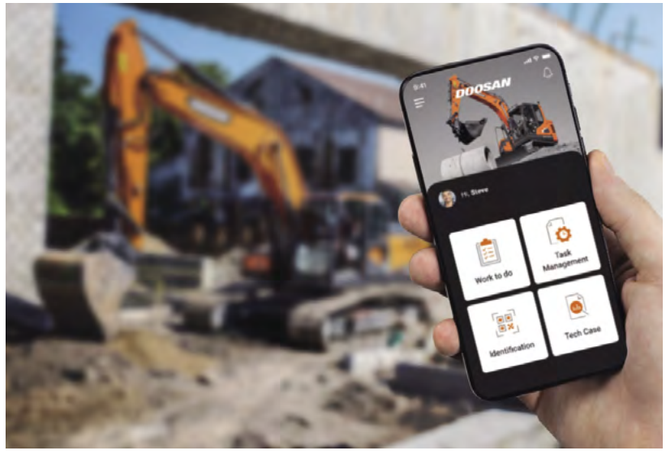
In 2020, organizations in charge of after market (AM) and product support (PS) functions of the company established a system to offer optimal customer services and derived tasks, which will be executed in 2021. Going forward, we will provide machine lifetime care by using the Smart Maintenance service more widely, building a Machine Monitoring Center, and upgrading DoosanCARE, and will strengthen our service channel competitiveness, all in our efforts to solidify trust in the market.

Providing Digital-based Services

Launched in 2015, DoosanCONNECT™ enables users to remotely monitor and diagnose their equipment through IT devices on such information as the environment in which the equipment is, how much work has been completed, how efficiently it is operating, and the status of consumables and parts, including if any of them need to be replaced. This has been generating substantial amount of data, based on which we conduct big data analysis to provide service solutions, thereby enabling convenient equipment management.

"Smart Maintenance" is a distinctive service solution program which provides preemptive the Smart Maintenance to customers based on the data on equipment status and operations collected through DoosanCONNECT™. Launched in 2019, it is now available in 11 countries worldwide, and we sell Smart Maintenance service solutions that are regionally-tailored based on customer requirements in each region. In addition, as a way to actively use Doosan CONNECT™-based services and reflect customer needs in each region, we are taking the lead in building a Machine Monitoring Center which will enable us to combine existing service solutions and also provide customers with standardized monitoring services, thus giving customers better and more preemptive service.

Doosan Infracore has developed a mobile service app for dealers in order to identify a real-time history of equipment repairs from dealers worldwide and provide additional support for dealer operations. Technicians in each region can share real-time information on repair requests and results, and dealers can manage all technician activities. The app thus increases dealer and technician efficiency, and enables the company to identify in a timely manner product-related issues from right around the world.



Mobile service app for dealers

AR-based maintenance support solution

Doosan Infracore is currently developing Doosan Guidance Application, a maintenance support solution, using augmented reality (AR) technology. By using AR technology in developing diverse content, we aim to provide basic information for convenient and intuitive equipment diagnosis and maintenance to offer quick maintenance support and strengthen maintenance capabilities, even for unskilled users. In cases where service support by our headquarters is needed, personnel at the service site can use Doosan Guidance Application to display equipment, and then technicians can use the AR function to check the cause of the breakdown and provide guidance on how to solve the issue. At a time when personnel movement remains significantly restricted due to COVID-19, the Doosan Guidance Application will offer high-quality non-face-to-face services. Going forward, we will continue to develop and launch advanced services using ICT.

Upgrading the DoosanCARE Program

As part of its tailored customer services, Doosan Infracore offers the DoosanCARE program whereby service experts visit customers, irrespective of whether they have on-going issues with products or warranties, to offer consulting and training on equipment management. In 2020, it was difficult to visit customers in person, but we continued to provide all necessary service content to our major customers, and maintained customer contact points wherever possible. The DoosanCARE program enables us to listen directly to customer opinions, and thus to increase efficiency by quickly identifying any problems. Doosan Infracore is continuing to find new ways to maximize customer satisfaction by improving the DoosanCARE program.

Enhancing Service Channel Competitiveness

Doosan Infracore has been making continuous efforts to enhance its global customer service capabilities by strengthening dealer service evaluation and training systems. In 2020, we amended the Global Dealer Service Operation Guide in order to standardize services in each region, and established a direction and training system to nurture global dealer service personnel aimed at expanding the base for providing stable services. In addition, we completed the establishment of the Dealer Service Assessment Tool (DSAT) based on content of the Global Dealer Service Operation Guide, enabling us to use the same standards to evaluate dealers in all regions and derive tasks for improvement. We also set out a standardized curriculum and training guidelines in order to define the required skill levels for service personnel, and then applied these worldwide. With new models being launched in each region in 2021, an increase in demand for training from dealer service personnel is expected. We will therefore continue to upgrade the expertise of our dealer service personnel by providing online training and technical support amid the COVID-19 pandemic, thus enhancing customer value through the quality service.

3 INNOVATION & DIGITALIZATION

Digitalization is one of the mega trends that cannot be stopped and is essential in enabling any company to thrive. Doosan Infracore is developing digital competitiveness by adding digital solutions to its existing capabilities as an equipment manufacturer, thus taking the lead in change and innovation brought about by digitalization.

01 Clean Technology

02 Autonomous Solution

03 Digital Transformation

Non-financial value has been gaining importance when measuring the value of companies. Global climate change, the COVID-19 pandemic, and the recent emphasis on environmental, social, governance (ESG) have all made environmental and social value central to corporate sustainability. Advanced global companies are combining new technologies related to the Fourth Industrial Revolution with their existing businesses while also striving to resolve social and environmental issues. Doosan Infracore's strategy is to contribute to the resolution of issues within the construction equipment industry and to help with climate change through technological innovation.

H24 – Doosan Infracore's mild hybrid powertrain

01

Clean Technology

H34 mild hybrid powertrain

Hybrid Powertrain

Global mobility markets are rapidly transitioning to eco-friendly fuels, which is expected to be applied to off-road engines as well, with the necessity for fuel efficiency improvements to meet Tier 5 standards leading to increased demand for electrification. The construction equipment industry is part of this trend for more eco-friendly power sources, including hybrid, and it is forecast that a shift to electrification, especially for compact equipment, will be accelerated according to the analysis of recent eco-friendly policy, market, and competitor trends. Doosan Infracore has been developing various hybrid powertrains since 2017. We began the development of mild hybrid powertrain technology in July 2018, and successfully created a prototype in August 2019.

Doosan Infracore's hybrid powertrain has an electric motor and a 48V battery pack in addition to the internal combustion engine. When little energy is needed only the engine is used, but when more output is required, the engine and electric motor are used together, which increases energy efficiency and power while reducing CO_2 emissions. After the building of the H24 prototype in August 2019, we successfully completed an equipment application test in June 2020. The H24 combines a 48V battery pack electric motor with the 2.4-liter displacement G2 engine to achieve performance equivalent to that of a 3-liter engine. The equipment application test was performed to determine whether there were issues when the hybrid powertrain was applied to actual equipment, and to look for ways to optimize performance. The evaluation was carried out on the Bobcat Tele Handler, equipped with a 3-liter G2 engine, making it suitable for performance comparisons following the application of the H24 powertrain. The Tele Handler equipped with the H24 started up and drove efficiently, and bucket work was also successful. Doosan Infracore's hybrid powertrain has been recognized for its innovation, and was selected as one of 11 noteworthy new products in 2020 by "Diesel Progress," a British engine magazine.

Doosan Infracore is also developing the H34 model, which has the 3.4-liter D34 engine as standard. The H34 can replace a 4.4-liter engine, and we successfully completed an equipment application test at the end of November. We now plan to develop hybrid powertrain technology for mid- to large-sized equipment, combining the same eDrive Module (eMotor, inverter, HCU, battery) with the D34 engine to create the hybrid line-up equivalent of a 4-liter engine.

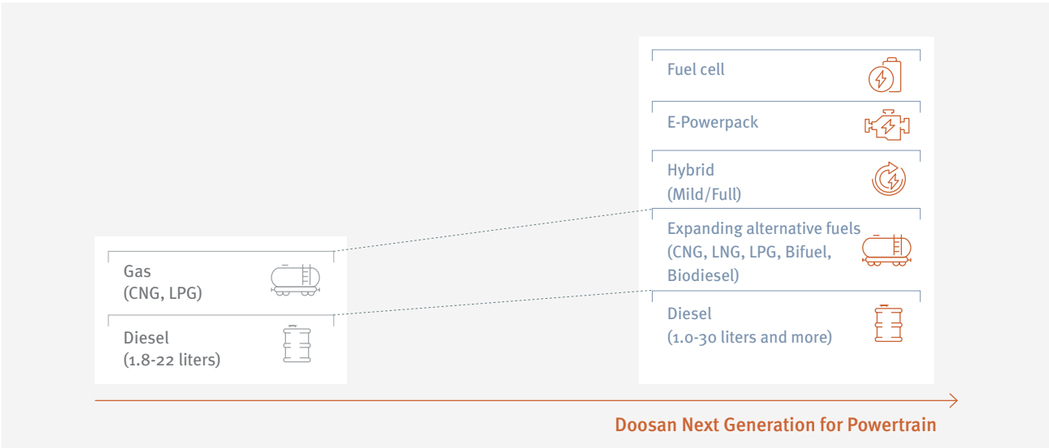
At CONEXPO 2020 in March, we exhibited a DL200 wheel loader equipped with the H34, which attracted considerable interest from visitors. Beginning with detailed testing of the mild hybrid powertrain prototype in 2021, Doosan Infracore is now preparing for the next generation of internal combustion engines, including the mass production of full hybrid powertrains and the E-Powerpack as well as the commercialization of fuel cell.

E-Powerpack

Discussions are being held in some European countries about prohibiting internal combustion engines and making "zero emission construction sites" mandatory. As a result, there is greater demand for zero emissions construction equipment and the electrification of the types of compact equipment that are mainly used in downtown areas. In response, Doosan Infracore is going beyond low-carbon technology to develop electric power sources.

In 2020, Doosan Infracore created the E-Powerpack organization as part of its Technology Institution. Following detailed analysis of potential demand for electric off-road equipment, including construction equipment, we are now developing and commercializing battery packs and EV components for industrial use. After product development and preparations for market release in 2021, we plan to begin mass production in the second half of 2022. By creating the eco-friendly power sources of the future, such as the hybrid powertrain and E-Powerpack, we will grow into a total power solution provider.

Clean Technology Directions for Doosan Infracore Engines



Electric Excavators

Investment companies and global communities pay ever-greater interest in climate change, and the transition to a low-carbon economy is constantly accelerating. Doosan Infracore has identified the global trend towards carbon neutrality, which is why it has fully prepared for electric equipment. At CONEXPO 2020 in Las Vegas in March 2020, we unveiled a pilot version of DX17Z-5, a 1.7-ton mini electric excavator powered exclusively by an internal battery pack which supplies power to an electric motor that drives the hydraulic systems. Electric excavators generate less vibration and noise than diesel equipment, and increase maintenance convenience because there is no need for the various consumables (fuel, engine oil, filters) associated with diesel engines. Above all, there are no emissions of carbon and air pollutants, ensuring significant improvements in the environmental impact of worksites. We aim to commercialize our electric excavator by 2023.

DX17Z-5 introduced at the CONEXPO 2020

Economic, Social, and Environmental Value of Electric Excavators

Doosan Infracore examined the changes and value that electric excavators can generate in the near future, using PwC's "TIMM" methodology to measure their economic, social, and environmental value, and will communicate the outcome of analyses with our stakeholders.

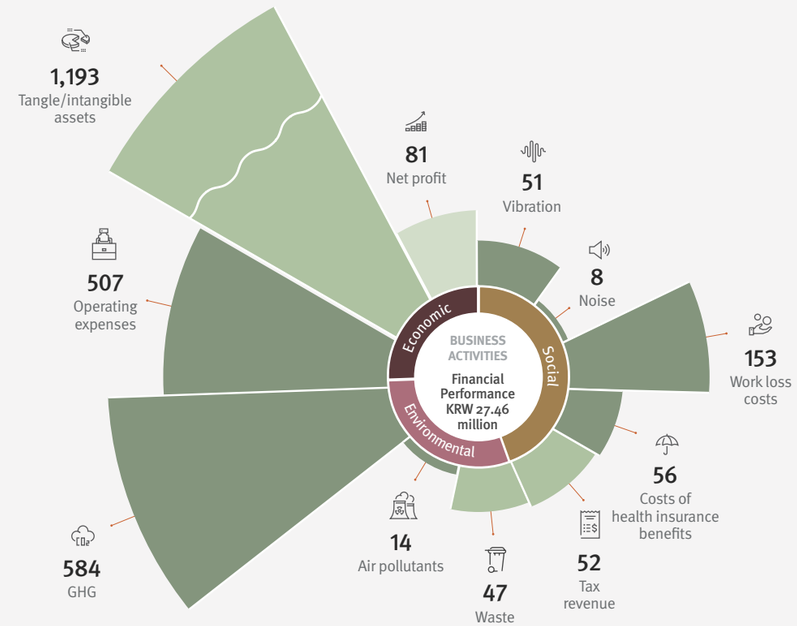
In order to actively respond to the eco-friendly markets of the future, Doosan Infracore established the E-Powerpack roadmap in 2020, and began the development of an electric excavator which runs solely on battery power. We will accelerate our pace of adopting eco-friendly energy and will continue to lead the Korean construction equipment industry through the advance into the new E-Powerpack business. We analyzed the economic, social, and environmental value of our 3.5-ton diesel excavator and the electric excavator throughout their respective lifecycles[1], in order to measure the value of the electric excavator expected to begin mass production in 2023, and then calculated the improvements created by the electric excavator. The result confirmed that each 3.5-ton electric excavator created an impact value[2] of around KRW 27.46 million.

Major Premise and Considerations of Value Measurement

1. Value was measured based on a reasonable hypothesis by using the company's own performance data as the basis and by utilizing existing research and official statistics from national institutions and international organizations. As such, monetary value for the corresponding year may change in the future. In addition, because the integrity of the results cannot be fully verified, they cannot be regarded as part of an official financial disclosure.
2. Doosan Infracore developed the prototype model of the 1.7-ton electric excavator in 2020, and plans to mass produce the 1.7-ton and 3.5-ton electric excavator after 2023. As such, where it was not possible to confirm actual raw data for the products in existing conditions, we used 1) actual measurements from equipment with similar specifications and 2) estimates for the time of mass production.
3. Where it was difficult to confirm proxy data that could reasonably reflect product impact, we excluded the respective index from the measurement to ensure credibility of the results. In cases where there were multiple proxy data, we used data with the highest credibility for the calculations. When a significant difference in credibility could not be determined, the most conservative data was used.
4. Indices which cannot be managed by Doosan Infracore, including the environmental impact of energy sources, product assembly and transport, were excluded from the measurement to ensure credibility of the results.
5. In the case of the acquisition of tangible/intangible assets, measurements were made for new investments only, excluding current investments.
6. Tax benefits which may arise from product development were excluded from the measurement. We reflected the taxes paid by people employed in product development (excluding production workers because accurate estimates were not possible) ahead of full-scale mass production in 2023.
7. In the case of the waste index, recycling handling costs were excluded from the measurement because the recycling market for electric batteries is in its early stages compared to diesel engines, and so reasonable comparisons of the costs that arise in the recycling process are difficult. Measurements were therefore made assuming reductions in the use of resources through raw material recycling.
8. For noise measurement, the noise value of an electric excavator was measured using mule equipment, before the prototype equipment, and was measured without the use of sound-absorbing materials or other noise reduction measures. Noise levels in actual mass-produced products are expected to be lower.

Impact Valuation (Unit: KRW 10,000)

VALUE CHAIN: Supply Chain · Operation · Use Phase



Value Add-up

Approximately KRW 27.46 million

Creating a value of KRW 27.46 million per each electric excavator from the economic, social, and environmental perspective, compared to the diesel excavator

(Assuming average usage of 750 hours a year for 5 years)

ECONOMIC VALUE The production of electric excavators will expand sales channels and diversify the products of our suppliers, thus increasing their net income, and the creation of this win-win value will lead to stable growth. As the products are used, we can reduce or eliminate the expenses from diesel engine consumables such as fuel, engine oil, and filters, thus substantially lowering the fixed costs involved in product maintenance and contributing to improvements in economic efficiency for our customers.

SOCIAL VALUE R&D, production, and quality management of electric excavators will increase employment and wages, generating additional income for those employed and increasing government tax revenues. As products are used, levels of noise and vibration are reduced compared to diesel excavators, thus improving drivers' psychological and physical health and minimizing inconvenience to nearby local communities. Compact electric excavators are mainly used in downtown areas, where residents are highly sensitive about air pollution issues, and using an electric excavator is effective for preventing impact on the human body, such as respiratory disease of drivers and nearby local residents that is caused by discharge of air pollutants. This also reduces costs related both to drivers missing working days and to government health insurance expenditures resulting from care for respiratory disease.

ENVIRONMENTAL VALUE An electric excavator equipped with the E-Powerpack has substantial environmental value. It reduces greenhouse gases (GHG) compared to the use of a diesel engine, and minimizes the environmental impact on air, water, and soil from ecotoxicity[3], acidification[4], and eutrophication[5]. By responding to climate change, it can prevent other damages such as the destruction of ecosystems and deterioration in food supplies. It also enables the easier and more compact collection and recycling of waste from battery raw materials, which helps with preventing the depletion of resources and promoting a circular economy.

1) Assuming average usage of 750 hours a year for five years
2) The difference in economic, social, and environmental value between the 3.5-ton electric excavator and the diesel excavator
3) Phenomenon whereby chemical substances negatively impact the function, stability, and life forms within an ecosystem
4) Phenomenon whereby water and/or soil become acidic due to an increase in hydrogen ions
5) Excessive growth of nutrients in aquatic ecosystems such as rivers and oceans, leading to green tide and red tide algae

Details on the impact valuation of electric excavators are available in the "Electric Excavator Impact Valuation" Report, published separately.

02

Autonomous Solution

The global construction industry accounts for at least 10% of global GDP. However, it is low in productivity and has high accident rates relative to other industries, mainly due to the amount of equipment and skilled workers required, and the inevitable wait and idle times. Production efficiency and safety are therefore extremely important topics in the construction industry.

In order to tackle these challenges at construction sites and to add new value, Doosan Infracore has been running the Concept-X project which combines IT and AI technologies to create autonomous construction sites, and in 2019, we successfully completed a demonstration based on Concept-X at the Boryeong Proving Ground. After the demonstration, we used KPMG's "True Value" methodology to calculate the value that will be generated by the adoption of Concept-X at construction sites. This analysis forecast that Concept-X would decrease total construction time by around 32.9%, and would increase economic, social, and environmental benefits by some 36%.

The key elements of autonomous solutions are Assist, Safety, Prognostics and Health Management (PHM), and the X-Center comprehensive control system. Doosan Infracore continues to further develop the technological capabilities needed to bring about the future of autonomous construction sites.

Assist

With the construction industry developing information and communication technology (ICT)-based construction technologies, Doosan Infracore is developing the 3D machine guidance (MG) and machine control (MC) technologies, based on the cloud. This will add productivity and convenience to existing product strengths, and will give us technological competitiveness in vital areas of autonomous solutions. 3D MG precisely measures the 3D information collected through sensors attached to the main body and operating compartment of an excavator, and sends the outcomes to the operator. MC is a technology which enables even an operator who is not a skilled excavator operator to carry out difficult work by setting up a fixed work trajectory. If the excavator's movements run counter to the defined work range, MC automatically takes control of the equipment. Doosan Infracore will make advanced functions such as MG, MC, and weighing[1] into standard functions, and will also develop additional "Assist" functions, such as swing assist and virtual-fence.

Safety

Safety is the most important factor at autonomous sites. Doosan Infracore is moving beyond just providing audible warnings to operators and nearby workers by offering interactive safety for operators, nearby workers, the work environment, and the equipment itself through controls which proactively avoid the occurrence of dangerous situations. In 2021, we launched the transparent bucket system, which allows the operator to see what is happening in front of the bucket through a monitor in the cockpit. This innovative system records images in front of the wheel loader using cameras installed at the top and bottom of the equipment, and then uses a curved projection to display the combined images to the operator in real time. Due to the large bucket, the front of the wheel loader becomes blind spots, resulting in a high risk of a safety accident. With the transparent bucket function, the operator can easily check the blind spots to prevent accidents. It also significantly improves efficiency by enabling forward viewing through the monitor during loading and unloading, or when carrying soil and sand. Doosan Infracore has applied many other cutting-edge safety systems to its construction equipment, including Around View Monitor (AVM) which enables the operator to view the equipment's surroundings using a monitor, and a rear warning system which uses ultrasonic sensors, thus taking the lead in creating safe construction sites.

PHM

An unexpected equipment breakdown at an unmanned construction site where vehicle control will become universal can cause economic losses and risks. PHM is a technology which enables autonomous equipment to self-diagnose its operational status and identify potential breakdowns, thereby ensuring seamless operations. PHM uses big data analysis, deep learning, and AI technology based on actual data from equipment usage. The goal of PHM technology is to prevent and manage equipment downtime by guaranteeing the soundness of equipment, thus increasing worksite efficiency and productivity. Doosan Infracore is currently developing an integrated equipment soundness management system which will provide timely information on the status and history of equipment, and will help with maintenance through a direct connection to product support (PS) staffs and dealers. This integrated technology, taking into consideration the specific characteristics of construction machinery and worksites, will prevent unexpected malfunctions, thus making equipment more competitive.

X-center

X-center is a comprehensive control system for the integrated monitoring and management of the entire worksite, including generating digital data at the site, establishing plans based on the analysis of data, and delivering commands to equipment. After establishing a work plan through measurement, design, and analysis, X-center analyzes worksite data and orders unmanned equipment to carry out specific work. X-center will be used in collaboration with XiteCloud, which was launched in 2020, to develop a digital solution which can be applied to all construction site processes, enabling Doosan Infracore to offer distinctive services through the efficient use of equipment data. In doing so, we will continue to contribute to improved productivity and safety at construction sites.

[1] Weighing: System which automatically measures the weight of a load and informs the operator

Transparent bucket launched by Doosan Infracore for the first time in the world

Digital technologies are driving innovation across the entire construction industry. Companies are pursuing innovation and changing how they work by collecting and analyzing data through digital technology, strengthening connectivity, and improving visibility. Digitalization is progressing more slowly in the construction industry compared to other industries, and the industry requires more innovation and effort to enhance safety. In addition, eco-friendliness in the face of climate change is now of vital importance to the industry. Digital transformation therefore may provide an opportunity to resolve these challenges in an effective and cost-efficient way, which is why companies must digitalize their business, operations, and their way of working.

03

Digital Transformation

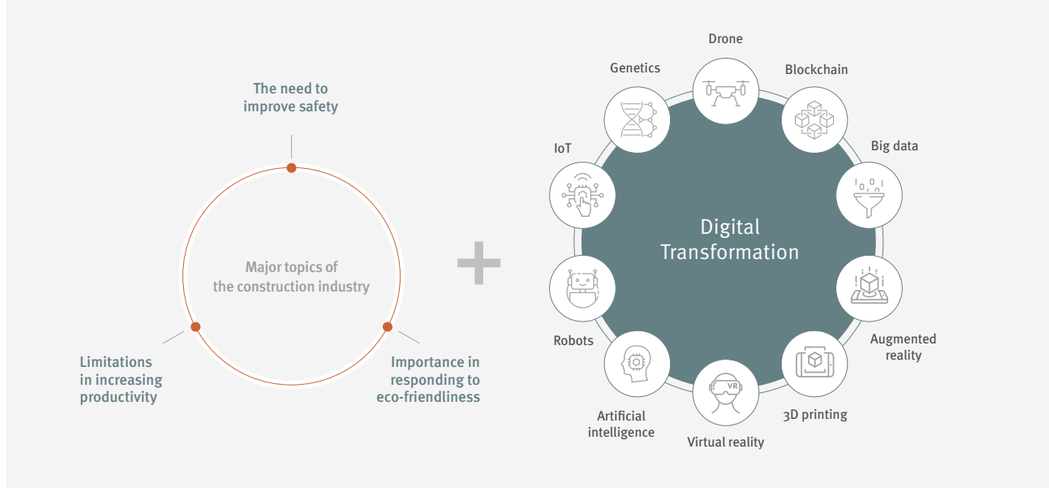
DL-7 series wheel loader equipped with the transparent bucket function

Digitalization of Business

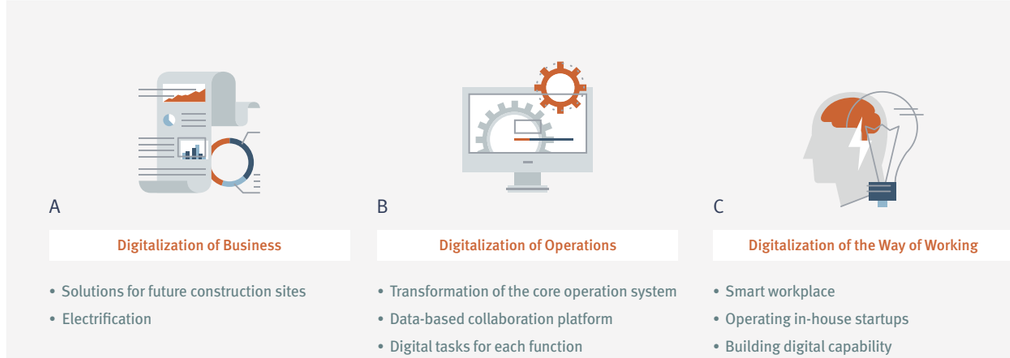
Doosan Infracore's digitalization is progressing forward with striking the right balance between business, operations, and the way of working. Digitalization of our business is taking place through equipment electrification and establishment of future construction site solutions. We are developing engine and powertrain electrification technologies while also establishing a plan to commercialize eco-friendly electric construction equipment using the technologies. In addition, we are leveraging our technologies, experiences, and innovative ideas to commercialize digital solutions for the construction industry of the future, including the all-in-one smart construction solution, support for mixed fleet management, and an equipment lifecycle management platform for our customers.

In May 2020, Doosan Infracore released "XiteCloud," an all-in-one smart construction solution. XiteCloud brings together 3D measurements taken by drones, calculations on the amount of earthwork, and the layout of the construction site, and connects them to an exclusive cloud platform which devises a work plan for optimal efficiency at the worksite. Bringing together diverse and dispersed tasks such as measurement, topography analysis, equipment operations, and construction management, and then managing them on a single platform reduces costs and working time while also improving work accuracy, which in turn leads to improved productivity.

Digital Transformation of the Construction Industry



Digitalization of Doosan Infracore



In June 2020, Doosan Infracore signed a service contract for XiteCloud with the construction company in charge of the earthworks at a multi-purpose residential complex, which is part of the public housing preparation project of Korea Land & Housing Corporation in Seoul. We used three-dimensional modeling to analyze the status of the 50,000 m^2 multi-purpose residential complex site and produced an earthworks calculation report, while at the same time providing cloud platform services. We have also signed a XiteCloud service contract with the company in charge of construction work at a housing development project in Incheon, on a site covering 4.07 million m^2. This site has many mountainous areas, so that measuring construction and earthwork volumes could have taken up to two weeks using traditional measurement methods. However, XiteCloud was able to handle the task in two days, using three-dimensional drone measurement and its earthwork analysis platform, and enhanced productivity through systematic construction management.

XiteCloud

Logo of "XiteCloud," a smart construction solution developed by Doosan Infracore

Doosan Infracore equipment based on XiteCloud is seen excavating at the Smart Construction Challenge 2020 contest

On the back of advanced technology, XiteCloud won the Minister of Land, Infrastructure and Transport Award, which is the top prize, in the "earthwork automation and advanced surveying" contest of the "Smart Construction Challenge 2020" hosted by the Ministry of Land, Infrastructure and Transport. Thanks to the technologies developed in-house and the experiences accumulated at domestic and overseas housing sites, plants, and mines, we analyzed earthwork volumes quickly and accurately using the XiteCloud-based analysis platform. In the earthwork automation competition, we completed the road excavation work rapidly and accurately using the machine control[1] device installed in our excavator, and we were the only participant in the contest to use such technology. We also showcased high-precision GPS, advanced sensors, and Korea's first 3D tiltrotator[2]-based integrated machine control technology. Although Doosan Infracore's excavator was the smaller than others in the contest, it completed the earthwork quickly, and was also highly regarded for its accuracy, especially when operating on uneven slopes. XiteCloud's outstanding efficiency and utility are winning recognition in the Korean market, and we expect to launch it in advanced markets, including Europe, in the near future.

Following the release of XiteCloud, Doosan Infracore will launch more advanced solutions in the coming years, with the aim of commercializing a comprehensive control solution for the entire autonomous construction site by 2025. We will make active efforts to increase productivity, improve safety, and adopt eco-friendly technologies, thereby taking the lead in shaping the new future of the construction industry.

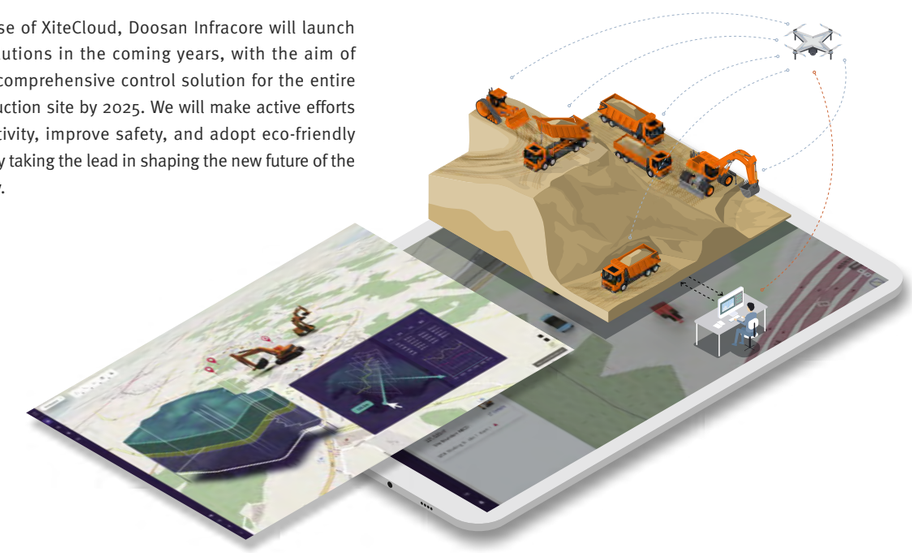
Digitalization of Operations

The construction equipment market is highly volatile, so that a decision-making system for accurate forecasting and appropriate response is vital. While previous decision-making tended to be based around experiences, there has recently been growing importance of reasonable and quick data-driven decision-making well as information-sharing and communication. Data-driven decision-making requires the digitalization of internal information, so that using data becomes a part of daily working life. Establishing a data-driven decision-making system involves collecting data that is created through key internal systems (S4/HANA, GMES, GPDM, SCM, CRM, etc.) in the data lake of DI360, a collaboration platform, and managing the data in an integrated, organic way to enable data-driven decision-making. Doosan Infracore is moving forward with digitalization of operation that enables such data-driven decision-making.

To enable data-driven decision-making, key internal systems must be digitalized and standardized, and those systems must also be connected and integrated. All areas of the business must be digitalized, including production planning and manufacturing history; systems for defining and managing internal information standards must be established; information about production in the plants must be connected; synergy must be created through integration and compatibility between plants. Doosan Infracore increased decision-making speed and efficiency by introducing cloud/in memory-based S/4HANA into enterprise resource planning (ERP) systems across all sectors. The adoption of S/4HANA has improved business processing speeds, including financial settlement processing, by an average of 20-fold, leading to faster business lead times and greater innovation through the analytic use of data.

[1] Machine control: A semi-automated technology which enables the operator to excavate according to a set track

[2] Tiltrotator: An attachment which enables the excavator bucket to rotate freely, instead of just moving vertically or horizontally



Doosan Infracore is innovating in every step of the value chain. We have improved production management by integrating the Global Manufacturing Execution System (GMES), and have enhanced product development through Global Product Data Management (GPDM). We improved supply chain management (SCM) through scenario-based demand forecasting, and undertook better customer relationship management (CRM) by expanding the number of retail customer contact points and building a digital channel. DI360 simplifies the use of key internal systems, meaning that data visibility has been enhanced throughout the value chain.

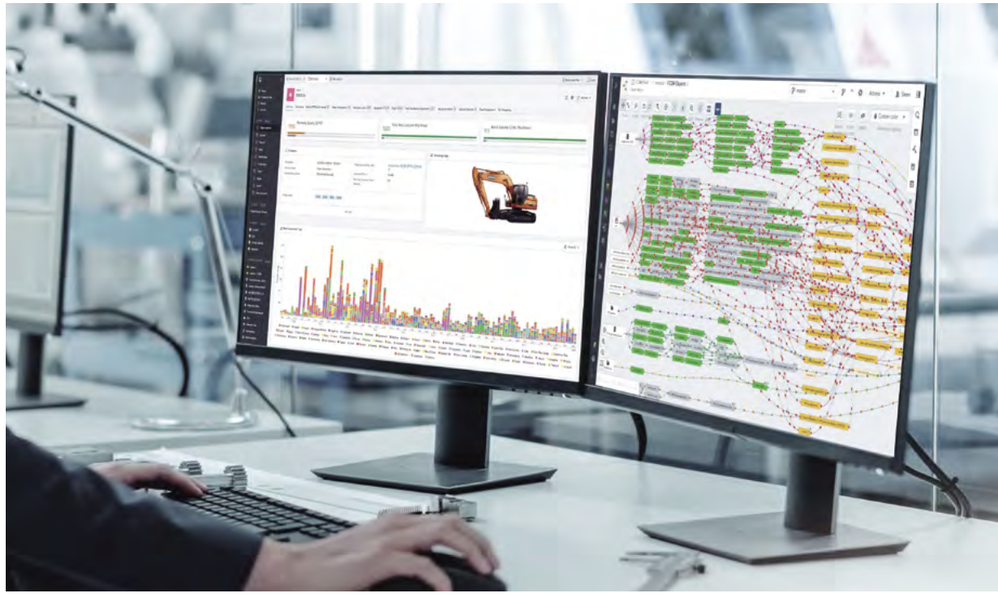
In 2019, Doosan Infracore formed a strategic partnership with Palantir, a US-based unicorn startup[1] specializing in big data, that provides a professional big data platform and offers support for corporate productivity and quality enhancement as well as risk management. In partnership with Palantir, we completed the establishment of the DI360 in February 2020. DI360 has enabled Doosan Infracore to ensure end-to-end data visibility throughout the value chain, which in turn has allowed authorized employees to easily access and analyze data, strengthened inter-departmental communications and increased management efficiency.

Effects of DI360

Before DI360 was available, information about customers' operation times for equipment and market information were managed separately, resulting in excessive time being required for data requests and collection. It also made data processing more difficult, with different data processes being needed depending on the purpose of the request. DI360 has enabled data-driven decision-making across all work processes, ranging from SCM and Field Claim & Quality Management (FCQM) to production, R&D, and AM. The adoption of DI360 has enabled users to view information on the status of equipment operations, markets, inventory, and customer claims in one place. It has also enabled quick processing through a high-performance server and a wide range of visualization analysis materials.

One example of the benefits of DI360 is in relation to claims and quality management where we have applied a standardized analysis technique on the integrated collaboration platform, and thus reduced analysis time. As a result, we were able to expand the target and scope of the analyses, and ultimately to improve quality levels. In SCM, we can now manage risk through data-based guidelines. In sales and marketing, there was previously a need for repetitive work to unify standards when analyzing the market for a new model, since standards were different according to period, region, and product group. However, DI360 enables the immediate analysis of as much as ten years' worth of materials in the form of standardized information, and allows quick filtering according to the requirements of the analyst, which in turn enables more rapid and accurate decision-making. In R&D, it is now possible to view, at a single glance, data from all areas of R&D, including product development and parts. This has resulted in better data accessibility and enhanced operational efficiency.

In addition, Doosan Infracore is executing digital tasks using data from every part of its business. Since 2019, we have been focusing on corporate-wide logistics innovation in order to optimize logistics visibility and efficiency all the way from suppliers to dealers. We are therefore collecting more shipping information, expanding the logistics infrastructure, reducing logistics costs, and establishing an integrated procurement and transport system. In sales, Doosan Infracore has adopted manufacturer managed inventory (MMI), enabling the company to forecast the parts replacement cycle through data provided by Doosan Infracore and its dealers, and then recommend the right parts to dealers, allowing them to avoid excessive inventory. Real-time information-sharing via MMI has thus improved parts supply and customer satisfaction while reducing inventory costs.



Digitalization of the Way of Working

When digitalizing business and operations, it is vital to change the way of working by the employees who actually handle business and operations. Doosan Infracore is therefore focused on establishing a digital working environment, operating in-house start-ups, and strengthening digital working capabilities. The digital working environment will enable efficient communications with subsidiaries and hundreds of dealers across the globe. It will also allow employees to collaborate through the efficient sharing of information. In 2018, we adopted Microsoft 365, a cloud-based work platform, to improve office productivity and enhance employee communications through simultaneous access to documents and the use of the cloud. This advanced digital working environment has enabled business continuity even as employees worked from home during the COVID-19 pandemic. In particular, Teams, one of the key tools in Microsoft 365, has facilitated efficient real-time communications between all business sites, both in Korea and overseas.

Doosan Infracore aims to launch products in a short period and maximize customer value through rapid internal decision-making and flexible, agile operations. We are therefore offering such solutions as XiteCloud and Clue Insights, enabling us to respond rapidly to the fast-moving product development cycle within the increasingly digitalized construction equipment industry.

As this digital transformation progresses, the digital literacy of employees is essential. Doosan Infracore therefore focuses on improving its employees' digital literacy. To this end, the company encourages its employees to use the DI360 data platform for their daily work, while also striving to foster digital experts through such efforts as data analysis education and the AI Community. Since its launch in 2020, DI360 has applied some 400 types of automated analysis to daily work. Doosan Infracore is therefore offering data analysis training courses connected both to individual work tasks and to the identification of new projects. There is also a knowledge-sharing community, mainly led by 140 AI experts with specialist knowledge. These data training courses and the AI Community are continually generating ideas that can be applied at actual worksites. For example, in order to check the quality of a welding, an inspector must manually check it using an ultrasonic device. This requires time after the completion of the welding process, and it also results in varying quality depending on individual skills of each inspector. The AI Community suggested collecting electric current and voltage data from the welding robots and then using an AI algorithm to conduct real-time monitoring of quality during the welding process itself. The welding process and inspection thus take place simultaneously thanks to AI, resulting in lower costs and more consistent quality.

Going forward, Doosan Infracore will encourage everyday innovation by using data-based collaboration which will enable all employees to make better decisions and maximize work efficiency.

[1] Unicorn: A start-up assessed to have the corporate value of at least USD 1 billion

OUR RESPONSIBILITY

Doosan Infracore strives to grow in not only economically but also socially and environmentally right ways based on its sound and transparent governance system. As there is a growing recognition that ESG management is essential in achieving sustainable growth, Doosan Infracore is responding to climate change and resolving issues that local communities face today through innovation for a better tomorrow, under its corporate slogan of **“Powered by Innovation.”**

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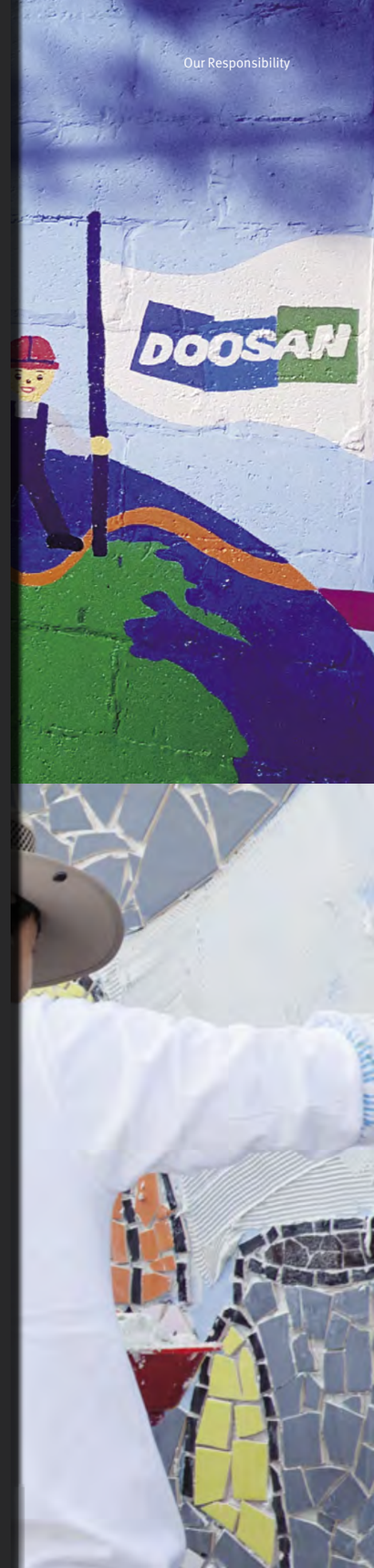

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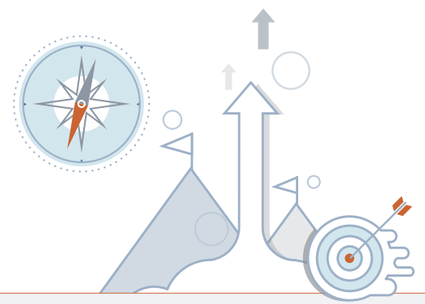
Governance

Doosan Infracore strives to enhance transparency in its decision-making process and protect the rights of shareholders and various other stakeholders. To this end, we have developed an independent governance structure under the principle of checks and balance.

Percentage of outside directors (Unit: %)		
57.1	62.5	N/A
2019	2020	Goal for 2025

BOD meeting attendance rate of the directors (Unit: %)		
92.9	97.1	N/A
2019	2020	Goal for 2025



OUR APPROACH

Doosan Infracore has built a healthy and transparent governance structure by ensuring the independence and expertise of its Board of Directors (BOD), centered on independent outside directors, and by establishing an internal decision-making system led by the committees within the BOD. We transparently disclose a variety of information related to corporate governance, including the composition of the BOD and the Board's major resolutions, through our website and a series of corporate reports.

SUSTAINABLE VALUE FRAMEWORK

Progress | **Governance transparency**

Doosan Infracore maintains our BOD composition above legal standards and is in active in the Board operations, to build a foundation for a healthy and transparent governance structure and to increase our corporate value as well as shareholder value. To this end, we are managing the number of outside directors in composing our BOD and their attendance at the Board meeting.

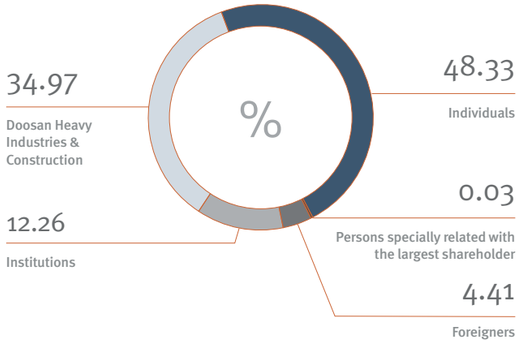
Corporate Governance

Composition of Shareholders and Equity

Doosan Infracore is one of major affiliates of Doosan Group, with 37 consolidated subsidiaries (based on business reports) being operated across the globe. As of the end of 2020, the number of shares issued stood at 215,931,625, of which the largest shareholder, Doosan Heavy Industries & Construction, owned a 34.97% stake.

Ownership Structure

(As of December 31, 2020; Based on number of shares issued)



Shareholders with 5% or More Shares

(As of December 31, 2020)

Shareholder	Ownership
Doosan Heavy Industries & Construction	34.97%
National Pension Service	7.21%

* Doosan Heavy Industries & Construction, the largest shareholder of the consolidated entities, made a decision, in accordance with a BOD resolution dated February 5, 2021 and a BOD resolution dated March 19, 2021 to spin off some assets, liabilities, personnel, and contractual relations that are not directly related to the businesses of the consolidated entities and then sell parent company's common shares, etc. owned by Doosan Heavy Industries & Construction. Other details regarding this decision are available in the following public announcements.

- Major management matters related to investment decision (Feb. 5, 2021)
- Report on major matters (corporate spinoff and merger decision) (Mar. 19, 2021)

Shareholder and Investor Communication

Communication Channels Doosan Infracore actively seeks out the expectations and demands of its shareholders, investors, customers, and other stakeholders when making key decisions. We strive to attract investments in the global market by earning recognition for our genuine values in terms of growth potential and technological prowess. To this end, we have established an investor-friendly investor relations (IR) strategy and carry out shareholder-friendly communication. In addition, we hold company briefings and securities investment conferences, and also invite institutional investors to our worksites to offer them diverse and reliable information.

Protection of Minority Shareholders Doosan Infracore has adopted and operates a paper ballot, an electronic voting system, and an electronic proxy solicitation system, aimed at protecting voting rights of its minority shareholders. When sending out notices of an annual general meeting (AGM), we enclose paper ballots so that shareholders can exercise their voting rights if absent. Their votes are valid under the condition that they arrive at the company one day prior to the date of an AGM.

Disclosure of Corporate Information

Doosan Infracore complies with all applicable legal disclosure requirements. We also strive to disclose information in a balanced manner, concerning our financial and non-financial activities, through the voluntary disclosure of our compliance program (CP) status and ESG activities.

STATUS OF DISCLOSURE ACTIVITIES

- Financial: Disclosure of provisional statistics on sales performance; Quarterly and biannual reports and statements of affairs; Disclosures relevant to AGM and special shareholder meetings; Disclosure of changes in the shareholding structure; and Disclosure on the Online Provision of Enterprises Information (OPNI) system operated by the Korea Fair Trade Commission, etc.
- Non-financial: Satus of CP operations; Disclosure of ESG activities including integrated reports; and Disclosure of information through company presentations, etc.

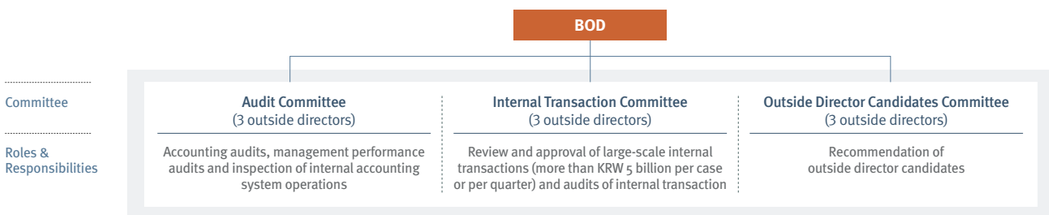
Operation of an Independent BOD

Composition and Operations of the BOD The Board of Directors, as the company's highest decision-making body, has been delegated the right to make decisions related to corporate management from shareholders in accordance with the relevant laws and the company's Articles of Incorporation. It is also in charge of checks and balances for the transparent management through its independent decision-making practices regarding the company's long-term growth and major management issues. Doosan Infracore composed its BOD to consist of two internal and three outside directors who were transparently appointed through an AGM held on March 25, 2021. (Three internal and five outside directors before March 25, 2021)

Outside directors are appointed through the Outside Director Candidates Committee in consideration of their ownership of the company's shares, potential conflicts of interest, careers with the company's competitors, diversity and stakeholder representativeness. As of the end of December 2020, the average tenure of the Board members is 3.625 years.

There are three committees under the BOD which are entirely composed of outside directors – the Audit Committee, which is responsible for guaranteeing the transparency and independence of audit procedures; the Internal Transaction Committee, which is designed to improve the transparency of corporate management through the establishment of CP; and the Outside Director Candidates Committee, which has the authority to recommend outside directors.

Intra-organizational Decision-making System



Composition of BOD

(As of March 25, 2021)

Position	Name	Background of appointment	Recommended by	Transaction with the company	Relationship with the largest shareholder or major shareholder	Area of activity (work in charge of)	Whether reappointed	No. of reappointments	Notes
Internal Director	Park, Yong Maan	Chairman of Doosan Infracore	BOD	N/A	Specially related person	Overall company-wide management Chairman of the BOD	O	1	Appointed on March 27, 2019
Internal Director (CEO)	Sohn, Dong Youn	President of Doosan Infracore	BOD		Specially related person	Overall company-wide management	O	2	Appointed on March 25, 2021/ Appointed as the CEO
Outside Directors	Yoon, Sung Soo	Financial expert	Outside Director Candidates Committee		N/A	Work related to overall company-wide management	O	1	Appointed on March 25, 2021
	Lim, Sung Kyoon	Financial expert	Outside Director Candidates Committee		N/A	Work related to overall company-wide management	X	–	Appointed on March 24, 2020
	Lee, Deuk Hong	Legal expert	Outside Director Candidates Committee		N/A	Work related to overall company-wide management	X	–	Appointed on March 24, 2020

* The tenure of a director is by the end of AGM for the third fiscal year after his/her appointment.

** On March 25, 2021, internal director Go, Seok Bum and outside directors Han, Seung Soo and Yoon, Jeung Hyun retired at the end of their term of office. On March 25, 2021, internal director Sohn, Dong Youn and outside director Yoon, Sung Soo were reappointed.

*** As of March 25, 2021, the BOD is composed of five members – two internal and three outside directors.

BOD Activities in 2020 All directors are allowed to participate remotely in the BOD meetings via telecommunication devices capable of transmitting audio and video data. Directors shall not delegate their authority to a proxy. Directors with a vested interest in a particular agenda item are prohibited from voting on it so as to maintain transparency in the decision-making process. In 2020, the BOD held nine meetings during which deliberations and resolutions were made on a total of 29 agenda items, including the company's business performance, an inspection of internal accounting system operations, and the operation of CP and plans for 2020, and donation approvals. The average attendance rate of the directors in 2020 was 97.1%.

BOD Evaluation and Remuneration The remuneration of internal and outside directors is determined within the limits approved by the AGM. The internal directors are paid according to a performance-based compensation system that links their compensation to their management performance. Directors receive performance bonus based on the management performance of their respective self and organization in addition to base annual pay according to their executive grade. The outside directors' performance evaluation is based on their attendance at BOD and committee meetings, industry expertise, level of contribution, and performance at the Board meetings. This is reflected in an evaluation by the Outside Director Candidates Committee when an outside director is subject to reappointment after the end of his/her term. To ensure their independence from the management and controlling shareholders, members of the Audit Committee receive remuneration only as directors and are prohibited from receiving any other types of compensation.

The total amount of approved pay for directors and auditors in 2020 was KRW 15,000 million, of which KRW 1,898 million was actually paid, with the average compensation per person standing at KRW 211 million. The actual payment amount was calculated based on the pay for three registered directors and six members of the Audit Committee who were paid from January to December 2020. It includes payment until retirement of the outside directors who retired in 2020 and payment starting from the appointment of a new outside director.

Board Meetings Held in 2020

Order	Date	Agenda items	Approval	Number of attendees: Internal directors	Number of attendees: Outside directors
1	Feb. 10	Report on the 2019 business performance	-	3(3)	4(4)
		Report on operational performance of compliance and fair trade compliance in 2019	-		
		Approval of 2019 financial statements and business report	Passed		
		Approval of 2020 management plan	Passed		
		Matters on appointing a member of the Outside Director Candidates Advisory Group	Passed		
2	Feb. 28	Report on the status of internal accounting system operations in 2019	-	3(3)	4(4)
		Report on the inspection of the internal accounting system in 2019	-		
		Report on the 2019 audit	-		
		Approval of convening of the 20th AGM and purpose of the meeting	Passed		
		Matters on adopting the electronic voting system	Passed		
		Approval of security-backed loan	Passed		
3	Mar. 24	Approval of payment guarantee for overseas subsidiary debt	Passed	3(3)	5(5)
		Matters on appointing a member of the Internal Transaction Committee	Passed		
		Matters on appointing a member of the Outside Director Candidates Committee	Passed		
4	Apr. 23	Report on the business performance for the first quarter of 2020	-	3(3)	5(5)
		Approval of transaction with the affiliate	Passed		
		Approval of self-dealing transaction with Doosan Engineering & Construction	Passed		
5	Jun. 02	Matters on the issuance of foreign guarantee bonds	Passed	3(3)	5(5)
		Matters on the issuance of non-guaranteed private placement corporate bonds	Passed		
6	Jun. 12	Approval for participating in Doosan Cuvex's capital increase	Passed	2(3)	4(5)
7	Jul. 24	Report on the business performance for the first half of 2020	-	3(3)	5(5)
		Matters on the issuance of non-guaranteed private placement corporate bonds	Passed		
		Approval for investment in establishing a JV for engine post-processing solution	Passed		
8	Oct. 29	Report on the business performance for the third quarter of 2020	-	3(3)	5(5)
		Approval of delegating the debenture issue to the CEO	Passed		
		Approval of donations	Passed		
9	Dec. 21	Approval of delegating the debenture issue to the CEO	Passed	3(3)	5(5)
		Approval of safety and health plan for 2021	Passed		
		Approval of donations	Passed		

Integrity & Risk Management

Doosan Infracore has set the Code of Conduct which is applied to all of its employees. We run our business based on "Inhwa," meaning harmony between people, transparency, innovation, and a customer-centric management, and thus enhance corporate competitiveness and fulfill our corporate social responsibilities.

OUR APPROACH

Doosan Infracore practices transparency in its management through various and immediate disclosure of company information to its stakeholders. We go beyond simple compliance to implement truly ethical management as the basis for all decisions taken within the organization. A strict system of internal controls enables us to run our business transparently, while we secure the safety of management environment through preemptive risk management.

Ethical Management

Ethical Management Policies

All employees at Doosan Infracore are required to adhere to the Code of Conduct, and third parties such as suppliers are strongly recommended to comply with the guide of principles. Doosan Infracore's employees are responsible for ensuring that they have a full understanding of all related laws and internal regulations, including the Code of Conduct. The company-wide operation system is connected to the ERP, e-procurement, evaluation of internal control, and fair trade compliance systems as a way to improve the transparency and efficiency of its business activities. The Audit Team is in charge of auditing ethical management of the company, while the Internal Control Team develops the internal control system and evaluates its operations.

Completion rate of ethical management training in 2020

Korea 99.5%

China 99.1%

Communicating and Promoting Ethical Management

We disclose the Code of Conduct on our website and operate a cyber reporting center that can be accessed easily by our internal and external stakeholders. To prevent recurrence of Code of Conduct violations, we clearly identify the process and cause of issues that arise during the work process, and shares a white paper. Moreover, to maintain a transparent ethical management system, we urge new employees to sign a written oath pledging their compliance with the Code of Conduct. We also require new suppliers to submit a written oath pledging not to engage in unethical business practices. Team leaders, part leaders, and higher level managers, as well as executives are required to write and submit a statement of interests form on an annual basis, with an aim to remind them of the strict compliance standards. In 2020, all respondents required to submit the statement complied with the obligation. In addition, the CEO sent a letter to suppliers and we held general supplier meetings to explain about our ethical management policy and to encourage our suppliers to practice ethical management.

Training on the Code of Conduct is designed to raise employees' awareness of ethical business practices and control the ethical risks involved in their business transactions in advance. Doosan Infracore provides the training to all employees, and notifies them of major ethical management issues by posting the details on the bulletin board of each business site. We expanded the scope of our online training to include managers of our Chinese subsidiary in 2017 in addition to managers at our domestic business sites, and have been continuing to do so.

Establishment of Fair Trade Practices

Doosan Infracore adopted the compliance program (CP) in 2002 to ensure transparent business operations and fair competition. To build a culture of fair trade and horizontal transactions meeting global standards, we disclose the CEO's declaration on compliance and four major pledges – contract for mutual prosperity between the conglomerate and small and medium-sized businesses, partner selection/operation, establishing/operating the internal subcontract deliberation committee, and issuing and keeping the document, which is desirable in the subcontract – on our website.

In 2019, Doosan Infracore upgraded its "Sanctions Process for Employee Violations of Fair Trade Laws and Regulations" by revising the regulations concerning the fair trade compliance program, thereby establishing an effective means of sanctions on employees who violate the Fair Trade Act. We also developed and opened the "Subcontractor's Technical Data request Management (STDM)" which is an integrated technical data management system, to prevent requests to suppliers to provide technical data without any justifiable reasons and misuse (leakage) of technical data that are prohibited by the Fair Transactions in Subcontracting Act, and to protect suppliers' technical data.

STDM is an integrated system that allows employees to create a technical data request form on the system, send the form to a supplier after receiving internal approval if there is a justifiable reason, and receive the data, after which the received technical data is automatically discarded once the purpose of use and the period expires. This has enabled us to comply with a lawful process for requesting technical data to suppliers and prevent risks of violating the Fair Transactions in Subcontracting Act.

In 2020, we monitored the compliance with subcontracting laws in areas, such as the imposition of price cuts and order cancellations, and continued to monitor work processes related to technical data. For cases which we had doubt over violation of laws, we internally took corrective actions in a timely manner, while reducing the monitoring cycle and adding the number of times of monitoring to make process improvements aimed at preventing recurrence. Moreover, we are providing training on fair trade-related laws to enhance employees' compliance mindset, prevent violations of fair trade-related laws, and deal with any violations promptly. Even in the COVID-19 circumstances, we provided company-wide training that could be participated in by a greater number of employees through online training, while reducing the number of offline training, to increase training credibility and efficiency. As a result, a total of 882 employees participated in the training on the basics of subcontracting-related laws and dealers-related laws. In addition, we identified trends of regulatory authorities, decree decisions[1] of the Fair Trade Commission, and amendments to relevant laws, and communicated the information to relevant employees through email, Intranet, and other means.

In 2021, we will continue to make enormous efforts to build a stable and solid compliance system by inspecting and improving overall work processes related to subcontracting, ranging from bidding to sales. We will build a system of conducting prior work discussions and follow-up work inspections, aimed at establishing fair trade order, continue to provide trainings, and improve work processes, all in our efforts to prevent violations of fair trade-related laws and fully establish an organizational culture of compliance as a participant of free and fair market order.

Compliance with the Anti-graft Law

In Korea, the "Improper Solicitation and Graft Act," also known as the anti-graft law, went into effect on September 28, 2016. Intended to prevent public officials' corruption, the Act applies to employees and their spouses of all public institutions, including constitutional agencies, central administrative agencies, and local governments, schools, and media outlets. The Act forbids improper solicitations to public officials and other relevant persons, and prohibits them from accepting financial or other advantages. Doosan Infracore has been carrying out various activities to raise awareness among employees, such as providing education on the prohibition of solicitation to all its employees in Korea and expatriate employees in China. We also have a relevant organization in place to conduct regular monitoring and offer necessary legal advice.

Internal Controls

Audit and Monitoring

In line with the increased scope of the company's management and responsibility with the expansion of its overseas business and the adoption of the International Financial Reporting Standards (IFRS), Doosan Infracore has been operating an independent audit team in China for audit and monitoring since 2012. The Audit Team at our headquarters in Korea is working to increase overseas subsidiaries' accounting and management transparency based on respect for subsidiaries' responsible business management.

Internal Accounting System

Doosan Infracore established the Doosan Internal Control Assessment System (DICAS), an internal control evaluation system, in 2006, with the goal of improving its operational transparency and work soundness, and has been operating an internal accounting system. Since 2019, we have been carrying out control assessments, including company-level control, work-level control of sales, purchasing, production, inventory, finance, quality, and general, in addition to IT control, by reflecting the "Act on External Audit of Stock Companies (hereinafter referred to as the External Audit Act)." Assessment results are reported as stipulated in the External Audit Act. Our Chinese subsidiary has been operating the internal accounting system since 2014, and plans to apply the External Audit Act amendment in accordance with matters stipulated in the Act.

[1] Decree decision: Decision rendered by an administrative appeals agency, such as the Tax Tribunal, rather than the court, after deliberating a civil complaint

Corruption Risk Assessment

Corruption risk assessment is an internal control system through which a company identifies potential corruption risks and manages the changes required in response to actual risks. Doosan Infracore conducts corruption risk assessments on 31 items, including unfair financial reporting, asset misappropriation, and corruption. We reflect the results of these assessments in our internal accounting management system, and in the implementation of annual internal audit plan, thereby managing related risks.

Internal/External Reporting Systems

Doosan Infracore has a number of internal and external reporting channels which enable the reporting of any unethical acts or behavior, including the receipt of money and bribes, involvement in unfair business practices, corruption, and any violations of related laws and internal regulations such as the Code of Conduct. These channels include the website, the Cyber Reporting Center[1], postal mail, telephone, fax, email, and in-person visits. The Cyber Reporting Center is available in Korean, English, and Chinese, and Doosan Infracore employees or any external stakeholder can file a report under their real name, or anonymously. The company guarantees the confidentiality of the identity of the person making the report and its contents, and it also prohibits any measures being taken against the person making a report in good faith. Matters being reported are processed rapidly, and the whistleblower is notified of the results and the measures to be taken, with these measures also shared within the company to improve awareness of the importance of ethics.

Information Security

With the rapid development of information and communication, the importance of information security is increasing substantially as security threats related to personal and corporate information rise exponentially. Doosan Infracore has responded to potential issues around information security and cyber terrorism by strengthening its IT security systems, identifying potential risk factors, and increasing employee awareness of the risks and appropriate responses.

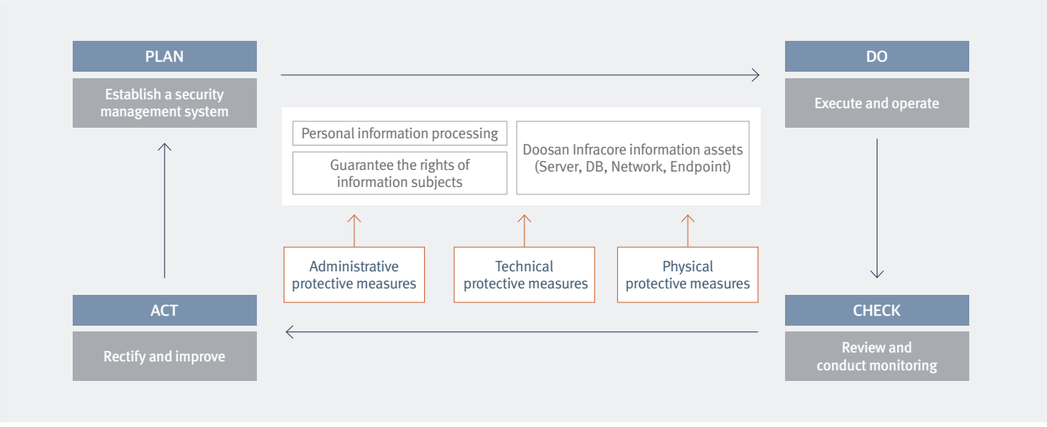
We operate an integrated and advanced IT system, to strengthen our information security, with the Doosan Group Data Center obtaining Information Security Management System (ISMS) certification every year since first being certified in 2013. We also conduct business continuity planning (BCP) drills so that we can be prepared to respond to any attacks on the business promptly and effectively. In addition, our Information Security Part conducts regular in-depth risk assessments on the information protection management systems to identify vulnerabilities and make improvements.

In 2015, we fully upgraded the information security policy, that had been originally established in 2013, by dividing it into general security regulations and detailed guidelines covering personnel security, protecting trade secrets, security management for information assets and devices, information system security, facility security, audit security, security incident response, and cloud security. Since the upgrade, we have been updating the policy, if needed, after an annual review, and share the information security policy on the internal company portal. In addition, all employees must attend annual information security training, which covers email security, the prevention of leaks of information after retirement or changing jobs, managing trade secrets, managing PCs, and personal information management.

Doosan Infracore has appointed a Chief Information Security Officer (CISO) to define the roles and responsibilities of the key personnel within the company's information security systems. In the event of an issue arising with information security, all employees involved are required to report it to their department head and to the Information Security Department in accordance with the company's security incident response guidelines. The Department will then take action, according to the process for each type of incident involved.

[1] Cyber Reporting Center: ethicshelpline.doosan.com

Information Security System



Risk Management

Integrated Risk Management

Risk Management Organization Doosan Infracore identifies potential risks and countermeasures against such risks, and discusses risk prevention at the monthly management meetings and at ESG Committee meetings with participation from senior management. In the monthly management meeting, the CEO and key executives discuss several issues such as short-term financial, non-financial, and emerging risks, and establish appropriate countermeasures. Meanwhile, in the ESG Committee, held three times a year, the committee members identify mid-to-long-term non-financial and emerging risks against our company and minimize the impacts of potential risks by setting countermeasures based on our ESG strategic tasks.

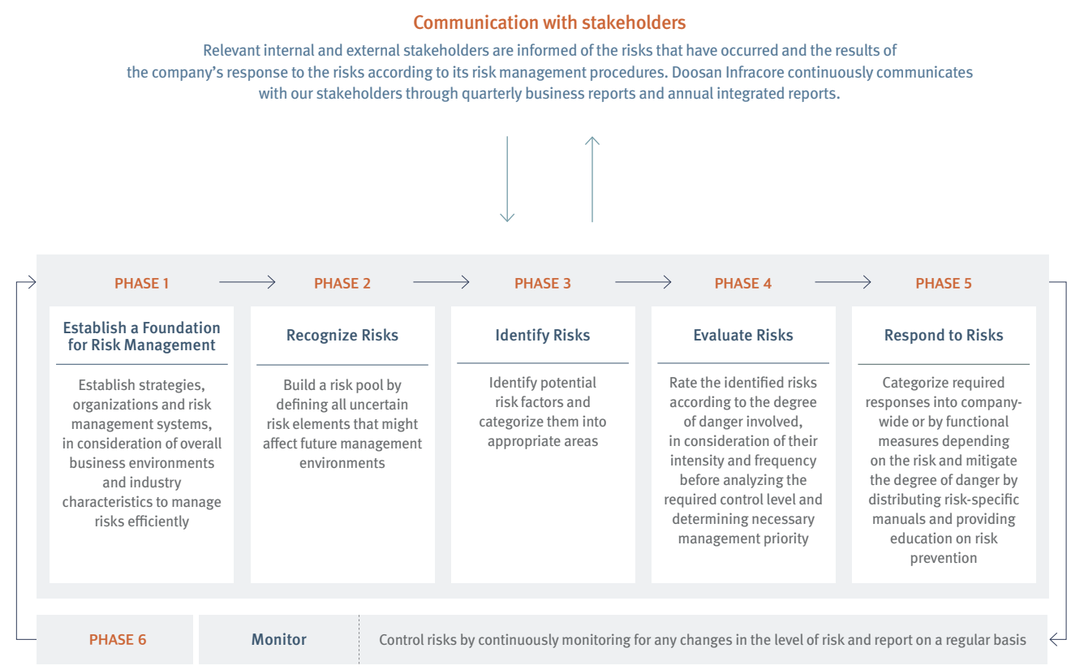
Risk Management Process Doosan Infracore has established a risk management process which is designed to enable its executives and working-level employees to detect potential risks threatening corporate value and profits, and to take prompt actions. The risk management processes ensure effective risk controls through various elements, such as identification of risk factors, assessment of the potential impacts of risks on the company, establishment of countermeasures, monitoring of changes in risk levels, and constant reporting based on a coherent reporting system.

Scope of Risk Management

Financial Risk Doosan Infracore has classified our financial risks into four types – market risk, credit risk, liquidity risk, and capital risk – and monitors and manages them by risk type.

We monitor the market risks based on foreign exchange and interest rates. Foreign exchange risks are related to future transactions, existing assets and liabilities, and investments in overseas operations. We undertake hedge trading to reduce volatility in profitability due to the effects of changes in foreign exchange rates. Interest rate risks are related to adjustable rate deposits and loans. We minimize external loans through our reserve funds, reduce high interest rate loans, improve the borrowing structure, monitor changes in interest rates, and establish countermeasures.

Risk Management Process



Credit risk arises from transactions or investment activities when customers or business partners do not follow the conditions of the relevant business agreements. It may also arise from cash, cashable assets, derivatives, and deposits in banks and other financial institutions. Doosan Infracore manages our credit risks with the goal of minimizing losses under our credit policies. For credits in which default is anticipated at the end of the fiscal year, we properly assess the risks and addresses the results in our consolidated statements of financial position.

To prevent liquidity risk arising from a lack of liquidity or difficulties in financing due to abnormal operations, we establish three-month and annual funding plans to predict the funding required related to sales, investments, and financial activities, and to secure and maintain the required liquidity in advance.

Capital risk management involves the maintenance of an optimum capital structure to ensure our capabilities to provide our shareholders and other stakeholders with corporate profits while reducing capital expenditure. We maintain our capital in alignment with our debt ratio. We also manage capital risks by adjusting our dividend paid to shareholders, repaying share capital, and issuing new shares and selling assets to reduce debts.

Risk type	Responsive measures
Market	Manage exchange rate fluctuations, interest rates, and price risks
Credit	Manage credit risks and minimize losses through safeguard measures in bonds
Liquidity	Establish quarterly and annual financial balance plans
Capital	Reduce capital costs and manage liabilities

Non-financial Risk Non-financial risks are categorized into product, ethics and compliance, the environment, safety, and disaster risks, and Doosan Infracore has established a preemptive risk response system for each. We strive to improve customer safety and satisfaction through a range of activities aimed at improving product quality in cooperation with our suppliers, while also making continued efforts to ensure customers' safe use of our products.

We make ethical management the basis of decision-making by establishing the Code of Conduct and conducting activities to promote CP. In addition, we undertake preemptive risk management based on transparent management, thereby ensuring the safety of our management environment.

To avoid risks due to pollutant discharge and environmental accidents, Doosan Infracore uses resources more efficiently, reduces the environmental footprint of its business sites, and strengthens its systems for preventing environmental accidents based on the EHS management systems.

Doosan Infracore minimizes safety risks and increases employee awareness of health and safety by focusing on preventative action and offering extensive health and safety training. offering extensive health and safety training. We have expanded our health and safety management systems to include our suppliers and outsourcing companies, thereby strengthening the monitoring system of safety accident. We have also made it mandatory for all visitors to our business sites to watch safety training videos. As required by the Group-level business continuity management (BCM), we have established response manuals and emergency notification systems for 20 essential items of infrastructure in each area. This enables us to respond promptly to threats to employee safety.

Risk type	Responsive measures
Product quality	Establish a quality management system; manage quality indicators; and help suppliers strengthen their quality management
Ethics and compliance	Establish ethical standards; operate reporting channels for violations of the Code of Conduct or CP; conduct audits; and provide employee ethics training
Discharge of pollutants, complaints, and environmental accidents	Establish an environmental management system; obtain ISO 14001, an international standard for environmental management system; and manage environmental pollutants and disclose relevant information
Workplace fire and safety accident	Engage in risk factor self-management activities; enhance fire safety management (operation of the Disaster Prevention Center); provide safety training; and run programs to boost safety management of suppliers
Natural disasters and man-made hazards	Build the BCM and run BCM drills

Emerging Risk With society changing faster than ever before, new and diverse economic, environmental, and social risks continue to emerge. Doosan Infracore, therefore, analyzes the trends shaping the global economy and consumer sentiment, as well as changes in culture and institutions. Based on the analysis results, it identifies emerging risks, that are relevant to the company, and implements countermeasures in its business operations.

Emerging Risks

Risk type	Details	Responsive measures
Global economic slowdown	• Construction equipment and engine industries are business areas that are significantly impacted by changes in demand of front-end industries, including the energy industry, construction business, and automobiles business. Demand is considerably influenced by economic trends and national SOC investment policies. • In particular, the prolonged COVID-19 situation since 2020, the global economy is forecast to contract, leading to economic stagnation.	• Aim for entry into new markets so as to diversify the company's global portfolio (Construction equipment: Strengthen performance in advanced markets, etc.) • Review and respond to market, credit, liquidity, and capital structure risks through monthly management meetings
Stricter product environmental regulations	• Enforcement of emissions regulations for commercial goods and vehicles by country and continent • The accelerating introduction cycle of new emissions regulations not only in advanced markets but also in China and emerging markets, with the level of standard increasing	• Establish company-wide goals for developing and applying eco-friendly technologies and expanding related research • Monitor the trends of strengthening emissions regulations by country and continent; and develop new engine products, such as engines that meet EU Stage V and China's Stage IV emissions standards • Develop hybrid powertrains • Establish a development roadmap for the E-Powerpack
Personal information protection and information security	• Increasing security threats related to personal and corporate information, such as hacking and smishing techniques, following the development of information and communication technologies and the resulting sharp rise in the number of users • Increasing risks of human rights violations in case of leakage of massive personal information collected, handled, and stored by a company	• Conduct a risk assessment of the information protection management system, led by the Information Security Part, to identify vulnerabilities and take prompt actions; and provide information security training for employees; and obtain the Information Security Management System (ISMS) certification
Worsening climate change	• Increasing frequency and intensity of extreme weather events, such as heavy rain/snowfall, typhoons, and heat and cold waves, due to climate change • Increasing limit on business operations and logistics due to extreme weather events • More strict regulations related to energy and greenhouse gases, such as the energy target management system and the emissions trading system in line with climate change emerging as a major global agenda item	• Establish a climate change response system: Form the GHG/Energy Reduction Council; manage EMS operation and performance; and establish a mid- to long-term roadmap for the emissions trading system • Set a mid- to long-term greenhouse gas reduction target and monitor the relevant performance
Pandemic	• A pandemic that is impossible to control caused by the onset and quick spread of viruses, parasites, germs, bacteria, etc., resulting in threats to employee health and material damage • Increasing possibility of supply, logistics, and shipping issues due to a global lock-down	• Establish "Rules on managing responses to infectious disease" and strengthen the infectious disease response process to protect employees in the event of an emergency • Strengthen business continuity management by using a data platform, digital marketing, Microsoft365, and others that are based on digital transformation
Depletion of natural resources	• Difficulties in raw material supply owing to a sharp rise in consumption of major natural resources (cobalt, manganese, etc.) and reckless mining	• Derive key management risks by business group, and establish strategies on responding to the risks by analyzing and assessing the risks

Environment, Health & Safety

At Doosan Infracore, environmental values and safety culture are non-negotiable principles in achieving sustainable growth.

OUR APPROACH

Doosan Infracore is striving to use resources more efficiently and to minimize its environmental footprints by reducing pollutant discharge based on its company-wide integrated environment, health & safety (EHS) management system. We also participate in global efforts to respond to climate change by making continuous improvements to energy efficiency and managing greenhouse gas (GHG) emissions. Moreover, we have been establishing a safer work environment by raising the safety awareness of all employees and rigorously controlling risk factors at all worksites.

ESG Strategic Task for 2020

Establish a mid-to long-term roadmap on GHG emissions

Doosan Infracore strived to effectively respond to the second phase of the national emissions trading scheme from 2018 to 2020, thereby securing a stable and sustainable base for the scheme. To this end, we carried out a series of "GHG emission reduction" activities, led by the GHG/Energy Reduction Council, with the participation of all relevant departments. We have also established a mid-to long-term roadmap on GHG emissions to respond to the third phase of the national emissions trading scheme from 2021 to 2025.

Activities and Achievements	Established and operated the GHG/Energy Reduction Council; established and implemented the investment plan for GHG reduction, and submitted opinions to the government by forming a business council
Plans	Establish GHG emission forecasting and responsive measures, and discover investment items related to GHG reduction and energy conservation

SUSTAINABLE VALUE FRAMEWORK

Progress | **Response to climate change**

Doosan Infracore will contribute to the climate change response by integrating our carbon emissions target management into our corporate strategies and plans.

CO_2 emissions in the production processes

(Unit: tCO_2eq)

2019	2020	Goal for 2025
112,186	90,447	96,404

CO_2 emission intensity in the production processes

(Unit: tCO_2eq/KRW million)

2019	2020	Goal for 2025
0.036	0.033	0.024

Progress | **Employee health**

Doosan Infracore aims to reduce the occupational illness frequency rate (OIFR) and improve the health and wellbeing of its employees by implementing active illness management.

OIFR[1)]

2019	2020	Goal for 2025
0.315	0.107	N/A

[1)] OIFR (Occupational Illness Frequency Rate): Number of workers who have occupational illness and other related illness/Total workers (Number of workers is based on employees of Doosan Infracore; and application of calculation formula of the Korea Occupational Safety and Health Agency)

Progress | **Employee safety**

Doosan Infracore strives to build a safe working environment for its employees and reduce the lost time incidents rate (LTIR) at its worksites through active incident management.

LTIR[2)]

2019	2020	Goal for 2025
1.17	0.61	0.54

[2)] LTIR (Lost Time Incidents Rate): Number of incidents involving more than one-day closure of workday per 100 workers, Total number of lost time cases/Total number of hours worked by employees * 200,000 (Number of incidents is based on incidents by employees of Doosan Infracore)

Integrated EHS Management

EHS Management Strategies

In 1995, Doosan Infracore established the EHS Management Policy in order to share key elements of its environmental management strategies both internally and externally. We amended the Policy for 10 times to set the current one which consists of five specific principles, including the operation of the EHS management system, through which the company promotes company-wide participation in EHS management. In addition, we declared our EHS management vision of becoming a "Global Leading Green Company," and established and implemented five strategic tasks in our efforts to achieve sustainable growth. The annual EHS plan and key tasks that are established every year based on the Management Policy are managed as a KPI of the executive in charge, production-related executive, and the EHS Team, which is the relevant exclusively-responsible organization.

EHS Management System

Doosan Infracore has been enhancing the level of its EHS management by systematizing relevant organizations under the EHS Policy and strategies, operating an EHS management system at its global business sites, obtaining international certifications, reviewing the status of implementation and managing performance, and operating an EHS IT system.

We make continuous efforts to better respond to changes in the internal and external environment, such as stricter EHS regulations in Korea, increased demand for corporate social responsibility, the upward trend in the rate of safety accidents, and more focus on on-site inspections by external organizations. To this end, we have set our EHS directions for 2020 as strengthening fundamentals that remain sustainable even amid changes in the internal and external environment and building an EHS culture where employees can protect safety independently. Based on the directions, we focused on preemptively responding to compliance and regulations, managing risks, strengthening leadership and EHS capabilities of top management, and establishing an emergency response system. Our focus in 2021 will be to establish an ESG culture through innovative change, respond to climate change, minimize environmental impact of business sites, upgrade the integrated environment monitoring system, aim for advanced compliance, re-establish the safety and health management system, and fully establish a safety culture.

5 Strategic Tasks for EHS Management

Global Leading Green Company

01 Operate the EHS Management System	02 Grow together with suppliers	03 Respond to climate change	04 Expand eco-friendly products	05 Expand communication with society
• Conduct evaluation on Leading EHS Management indicators • Obtain certification of EHS management systems at overseas business sites • Strengthen EHS competencies	• Achieve win-win growth in EHS with suppliers and in-house contractors	• Strive to reduce GHG emissions • Spread a culture of GHG reduction	• Develop eco-friendly products • Expand the production of eco-friendly products	• Disclose environmental management information • Strengthen social contribution activities related to EHS

EHS Policy

Operation of the EHS System

We establish, operate, and continue to develop a system designed to improve EHS impacts of our products, activities, and services.

Compliance with EHS Regulations

We adhere to national and international EHS regulations and agreements, establish strict internal management standards, and faithfully implement them.

Development of Eco-friendly Technology to Boost Customer Safety

We develop eco-friendly technologies that place top priority on our customers' health and safety, and then preserve resources and energy to actively contribute to sustainable environmental conservation and fight against global warming.

Realization of Zero Occupational Accident

We create a pleasant and safe people-centered work environment, improve the health and quality of the lives of all our employees and suppliers, and thus achieve a zero-accident workplace. In addition, we focus on minimizing our environmental impact and carrying out pollution prevention activities to contribute to environmental conservation.

Communication with Stakeholders

We expand communication with our stakeholders and disclose EHS performance transparently to continue to grow as a trusted and respected company that fulfills its social responsibilities.

EHS Organization In response to the expansion of our overseas business sites and the increasing concerns over global environmental issues, the EHS units at overseas business sites of Doosan Infracore work in unison for systematic and effective EHS management, with central roles performed by the EHS Team at the Incheon Plant, which is the company's head office. Moreover, we established a global EHS governance in 2017, and have been strengthening the EHS support and management by building a company-wide EHS risk management system, sharing our EHS policies, and establishing a joint response system for global issues related to REACH and climate change. In 2020, we formed a COVID-19 response system, which enabled us to quickly respond to the global pandemic. In 2021, we will build an EHS governance system for the global production corporations including DIN, thereby sharing EHS data and conducting "Doosan EHS Rating System (DSRS)"[1] evaluations.

We also hold monthly EHS steering meetings by Business Group to discuss EHS issues and share the progress of EHS goals. The ESG Committee, composed of the CEO, BG heads, and a Division Head in charge of general supervision, makes decisions on EHS-related policies, plans, and activities. In November 2019, the "EHS Session" was created to check the progress of the company's EHS targets and to further raise leaders' interest. In 2020, we held an EHS Session in each half of the year (first half of the year: Doosan Infracore, second half of the year: The Group and Doosan Infracore), with the CEO and executives in charge of production in attendance, and shared information on amendments to safety and environment-related laws, key implementation plans that reflect these changes, and the status of EHS by business group. We will continue to hold the EHS Session in 2021 to share information on and discuss EHS issues, strategic direction, and implementation plans.

Managing the EHS Management System Doosan Infracore has put an EHS management system in place based on international standards, and examines the operation of its EHS management system and the level of compliance with relevant laws and regulations by conducting internal and external inspections every year.

Environmental Management Certified Worksites

Korea (Incheon, Gunsan, Ansan, Boryeong) China (Yantai)	ISO 14001
Korea (Incheon, Gunsan, Ansan, Boryeong)	ISO 45001

Our global business sites continue to put efforts in minimizing environmental pollution and damage that can arise from corporate activities by earning such international standards as the ISO 14001 environmental management certification and ISO 45001 standard for health and safety, and thorough safety inspections on hazardous machines and equipment and the Process Safety Management (PSM) system. They also remove industrial accident risk factors. In 2020, our business sites in Korea received follow-up inspections in line with the continuous monitoring system of the ISO 14001 certification and passed for conformity. Also, the previous OHSAS 18001 certification was changed into the ISO 45001 international standard certification to result in higher public confidence, and we established and amended accordingly.

Self-evaluation of Global EHS

To further upgrade our EHS management and strengthen EHS fundamentals, Doosan Infracore conducts DSRS evaluations as well as evaluations on compliance with EHS laws and regulations. Developed on the basis of global standards and in consideration of business characteristics, the DSRS is a basis to build and operate an advanced EHS system and create an EHS culture shared by all employees.

Each year, we conduct EHS compliance evaluations for all our business sites to prepare them for external assessments and inspections, while ensuring that they always comply with relevant laws and regulations. The evaluation is carried out through field guidance to review the proper use and management of dangerous machines, equipment, and chemicals, as well as the status of safety training progress. Evaluation results are linked to the management by objectives (MBO) of relevant executives and the integrated reward system by duty type, which in turn is increasing employee awareness and identifying areas where improvement is needed, thereby leading to actual improvements. We have been conducting two EHS compliance evaluations per year at the business sites in Korea and China, and of the in-house suppliers since 2018. In particular, one of the two evaluations is carried out through the self-assessment to improve worksite execution capability in complying with laws and regulations. In 2021, we plan to conduct an autonomous safety diagnosis and evaluation under the supervision of the team leaders and site managers so as to make a compliance culture to take root at its worksites. We will also conduct compliance assessments including our suppliers.

[1] DSRS: The EHS evaluation system developed by Doosan Group to evaluate the EHS level of its worksites quantitatively and to encourage them to make improvements; Doosan Group has made adjustments to the ISRS applied by global leading companies to suit its own circumstances.

EHS Performance Management Doosan Infracore has developed company-wide EHS management evaluation indicators and applied them to our business sites in Korea and China. We also manage the indicators through an annual performance analysis in a bid to continuously improve and develop our EHS performance. In addition, we strive to improve the execution capability of our EHS management system and raise the standards by reflecting the EHS management evaluation to the performance indicators of the executives of related departments. We will further strengthen our execution capabilities by strengthening required competencies based on clear EHS standards and systems linked to our value chains, such as purchasing and production, and by applying EHS management to all business operations.

EHS IT System Doosan Infracore has established an EHS IT system for more systematic EHS management. Leveraging the system, we manage EHS information in real time and analyze them comprehensively to respond to areas which need to be strengthened or improved. In 2019, we complemented our existing EHS IT system by adding such functions as laws/standards, chemicals, laboratory safety, firefighting facility management, and employee health checkup history management, and thus developed the "DooGreen" system, with the goal of supporting on-site EHS activities. In 2020, we overhauled standards in line with the DooGreen system, and addressed shortcomings that were discovered in operating the system. In 2021, we will advance the system through an upgrade for improvements to user convenience based on the voice of employees survey.

In order to secure business continuity by responding to the increasingly strict environmental regulations and preventing environmental accidents, Doosan Infracore established "DooEco," an integrated IoT-based monitoring system, to reduce environmental risks while increasing the operational efficiency. DooEco is an integrated management platform that uses a long range (LoRA) network-based IoT platform. In April 2020, it integrated previous environmental facility monitoring systems into a single platform and expanded monitoring targets to maintain environmental facilities, including dust collectors, in optimal state. This has enabled us to stably control pollutant emissions, and to take immediate measures, such as shutdown, in the event of a pollution spill outside a business site caused by an abnormal or emergency environmental accident. We plan to further upgrade the DooEco system in 2021 so that we can detect spill accidents on internal roads, in addition to facilities, to automatically shut down floodgates. Also, investments will be made to forecast environmental impact on local communities using information on weather conditions surrounding plants.

Climate Change & Environmental Resources

Energy Management and Responses to Climate Change

Global warming and climate change caused by an increase in GHG emissions is influencing the ecosystem as well as all areas related to humankind, including industrial activities. To preemptively respond to climate change risks and opportunities, Doosan Infracore forecasts GHG emissions based on our annual production plan, and makes investment in improving energy efficiency and carries out activities to achieve the target. We are also expanding the development and sales of highly energy-efficient, low-carbon products, including electric excavators. The quantitative data on our energy consumption and GHG emissions over the past three years is found in the "ESG Facts & Figures" section (pages 121-122) of this report.

Energy Consumption in 2020 (Korea)

(Unit: TJ)

1,730 TJ

Fuel	Electricity
364.053	1,368.954

* Total energy consumption is the sum of each energy's consumption rounded off to the nearest tenth, and therefore there may be singular number difference.

Improving Energy Efficiency

Doosan Infracore makes continuous efforts to identify and implement energy conservation tasks, establish an energy intensity management system, and continually upgrade the energy management system (EMS) to reduce energy consumption and improve energy efficiency at our business sites. Based on these activities, we laid the groundwork for energy-related information reporting that would enable us to monitor the energy consumption and costs, monthly energy consumption trends by energy source, and energy intensity performance in relation to production. Our energy conservation efforts in 2020 include optimizing compressed air supply pressure, applying a high-efficiency motor (IE[1] Grade 4), applying an inverter for control, and installing high-efficiency lighting. Aligned with our corporate-wide digital transformation strategy, we are participating in a Factory Energy Management System (FEMS) national project as a company in demand, and plan to identify items over the next five years for diverse energy-saving and management. As a result of such investments and improvements, the energy intensity of Doosan Infracore has improved by 9.6% as of 2020 year-end compared to the 2017 figure, despite COVID-19 circumstances.

Responsible Response to Climate Change

GHG Emissions Management In managing GHG emissions at business sites in Korea, their energy consumption (electricity, LNG, etc.) is gauged by plant and production line, and the data is analyzed through the integrated EHS IT system to identify monthly emissions amount. Given the characteristics of the company's assembly processes, indirect emissions from purchased electricity account for about 73.5% of its total GHG emissions. In 2020, our total GHG emissions decreased by around 19.4% year-on-year to 90,447 tCO_2eq.

GHG Emissions in 2020 (Korea)

(Unit: tCO_2eq)

90,447 tCO_2eq

Incheon Plant	Gunsan Plant	Ansan Parts Distribution Center	Seoul Office	Leased Office Building (Icheon)	Boryeong Proving Ground
71,443	14,936	1,572	515	118	1,863

* Total energy consumption is the sum of each energy's consumption rounded off to the nearest tenth, and therefore there may be singular number difference.

Response to Emissions Trading Doosan Infracore was designated as subject to the Korean government's GHG & Energy Target Management System in 2010, and fulfilled all the legal obligations by 2014. During the first phase of the emissions trading scheme from 2015 to 2017, we kept our total GHG emissions at around 68% of the quota allocated by the government, recording 313,383 tCO_2eq. Only the Incheon Plant is subject to the second phase from 2018 to 2020, and the plant is now managing its emission allowances. During the second phase of the emissions trading scheme from 2018 to 2020, we kept our GHG emissions at around 74% of the sum of the government-allocated quota and credit that was carried forward, thus stably responding to the system.

Doosan Infracore is striving to lay a foundation for the operation of the emissions trading system and set the direction for responding to the system from the mid- to long-term perspectives, such as preemptive trading. To this end, we have been taking actions to reduce our GHG emissions and to respond to the emissions trading system in a phased manner, as part of our strategic ESG tasks, every year since 2017. In 2020, we set "establishment of a mid-to long-term roadmap for GHG emissions" as one of our ESG strategic tasks, based on which we forecast future credit demand per internal and external scenario, formed a carbon asset portfolio (purchase, internal/external reduction, etc.), and set a direction for responding to climate change in connection with our business models. We also responded to the government's quota for business sites for the third phase of the emissions trading scheme from 2021 to 2025 and engaged in SWAP trading for remaining credit. In 2021, we plan to take part in the Carbon Disclosure Project (CDP), which is a global initiative to counter climate change.

[1] IE: International Efficiency, motor efficiency grade

Improving Resource Efficiency and Reducing Environmental Impact

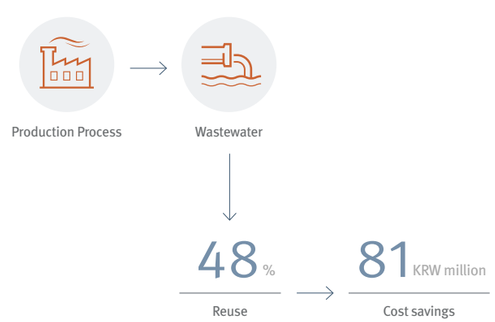
Doosan Infracore explores better ways of using limited resources more efficiently while striving to minimize the impact of its business activities on the environment and local communities. To this end, the company has adopted various ways of promoting the eco-friendly use of resources and conducts activities to reduce the discharge of pollutants. In 2021, we plan to use the outcome of an environmental impact assessment based on the material balance for each process, and thus establish a goal for each department regarding significant environmental impact and make improvements, thereby improving efficiency in using resources in the production process.

Doosan Infracore manages the emissions of pollutants more strictly than required by laws in all relevant areas. As a result, there were no cases of environment-related violations and fines in 2020. The quantitative data on the company's resource use and discharge over the past three years is found in the "ESG Facts & Figures" section (pages 121-123) of this report.

Improving Efficiency in Resource Use

Water Consumption As extreme weather, such as drought and heavy rainfall, becomes more frequent, the importance of managing water resources has been increasing. Our Incheon Plant, as part of its efforts to reduce water consumption, changed its way of allowing water to flow constantly to prevent pipes from bursting due to freezing weather conditions, and now does so only when burst pipes are anticipated through daily patrols. The Plant has been also operating a wastewater recycling system designed to recycle the effluent discharged from its wastewater treatment facility and reuse it for the manufacturing processes, and has continued to find more ways to use recycled effluent. It reused 48% of its wastewater for manufacturing processes and others in 2020, thereby saving KRW 81 million on its water bills and protecting water resources. It also established a wastewater reclamation and reuse system that enabled it to reuse 5,227 tons of water in 2020. In addition, a separate rainwater-harvesting system was built to reuse 339 tons of rainwater for landscaping and coolants.

Wastewater Reuse (Incheon Plant)



Reuse and Recycling of Waste To ensure the efficient use of limited resources at all of its business sites in Korea and China, Doosan Infracore pursues design optimization, checks its plant facilities, and maintains them in the optimal operational state, thereby conserving resources in its daily operations. In Korea, we have been implementing the resource recycling policy, which has enabled us to reuse at least 96% of the waste in 2020. In 2021, we aim to obtain Zero Waste To Landfill (ZWTL)[1] certification, thus receiving recognition for our waste reduction efforts, and seek to establish a system that enables continued improvement activities. We will also expand the waste recycling company pool, and establish priority bid participation criteria for recycling companies, through which we will improve recycling and waste treatment methods.

Management of Environmental Pollutants

Water Quality Management All wastewater generated from production processes goes through a series of physical, chemical, and biological treatment process at the waste-water treatment facility, and is purified before final discharge. Pollutants deposited at plant sites can be discharged into the ocean with rainwater. Doosan Infracore therefore operates non-point pollution source reduction facilities to remove the environmental risk of polluting nearby ocean waters. Clean rain water is discharged after going through a vortex device and a fiber-type filter. In addition, there are extra water gates on general drains, thereby building a system that blocks the spread of pollution at the source even in the event of an unexpected leakage of hazardous substances. The Incheon Plant reduced the amount of chemicals used for wastewater treatment, separately treated non-degradable wastewater, and made other improvements by conducting a technical diagnosis of its wastewater treatment practices in 2018. It also installed a COD for measuring raw wastewater, which enabled the measurement of the concentration of influent wastewater, and thus improved raw wastewater concentration, thereby reducing discharge of water pollutants. Our Incheon Plant and Gunsan Plant carried out dehydrator performance improvement construction to manage the wastewater treatment sludge[2] water content, resulting in reduced waste. Also, management of non-degradable wastewater is resulting in increased wastewater treatment efficiency.

More than 48% of the wastewater at the Incheon Plant goes through in-house treatment and is reused, resulting in minimized outside discharge of pollutants. Wastewater of the Incheon and Gunsan Plant is purified at a legitimate wastewater treatment facility which then flows into each respective local government's sewage treatment plant for retreatment. Doosan Infracore also set an internal standard on discharging water pollutants at around 40% of the legal requirement, as part of the efforts to comply with environmental laws and regulations.

[1] ZWTL: US Underwriters Laboratory (UL) certification
[2] Wastewater treatment sludge: Waste in sludge form that contains water that is created in the process of purification treatment of wastewater using chemicals and microorganisms

Management of Air Pollutants and Odors Air pollutants, such as NOx, SOx, dust, and volatile organic compounds (VOCs), are from electric furnaces and painting process. To minimize damage to local communities and reduce environmental hazards, Doosan Infracore sets up dust collectors, new painting facilities, and concentration catalytic oxidation facilities at each worksite unit, while also investing in the replacement of old boilers. In addition, we conduct strict measurements, more than the self-pollutant measurement cycle that is legally required, monitor pollutants, and set a standard so that pollutants are emitted at less than 40% of the legal requirement. We have been carrying out monitoring along the worksite border and nearby areas since 2017 for systematic odor management, and also plan to make investments starting in 2021 to upgrade prevention facilities aimed at reducing the total amount of dust.

Management of Soil Contamination In 2010, Doosan Infracore conducted a voluntary soil contamination survey of the areas where facilities that cause soil contamination were operating in the Incheon Plant, and completed soil remediation in those areas over the following three years. In 2013, we extended the survey scope to the areas surrounding all our worksites. There has been additional voluntary soil remediation work since 2014 which was completed in August 2018, receiving confirmation from the municipal government.

Strengthening Environmental Emergency Response System

Doosan Infracore has established an emergency response system against environmental spills, including a pollutant leakage block system at the Incheon Plant and spill monitoring system. We increased the number of floodgates to six to minimize the risks of pollutant leakage by rainwater. We also further strengthened our infrastructure to respond to the risks by installing pollutant detection sensors, building automatic water gate shutdown systems, replacing old wastewater pipes, and strengthening environmental accident monitoring system through the improvement of mark-up management of environmental facilities. In 2020, we expanded the existing infrastructure for spill incident, and thus completed the establishment of DooEco, an IoT-based integrated environmental monitoring system. DooEco enables optimal operation of facilities that prevent pollutants from leaking into the air and water systems, and also prevents spill incidents before they happen. In addition, we strengthened our ability to respond to environmental accident emergencies, such as inviting and holding a presentation for an illegal discharge monitoring team in the Dong-gu area. There was neither spills to outside the company nor serious environmental accidents in 2020. Our plan for 2021 is to further upgrade the integrated environmental monitoring, conduct an emergency drill and build an infrastructure in preparation for spills to outside the company, and continue to engage in activities to reduce total discharge volume.

Reducing Environmental Impact on Local Communities

Doosan Infracore has intensified its efforts to minimize environmental impacts on local communities, and thus making continued improvements for a clean living environment. In 2015, we set up a digital signboard to display information on air pollutants in the Incheon area with two other companies in the area. We fulfill our obligations as a corporate citizen by engaging in precautionary management of factors that may cause resident complaints, such as foul odors, as well as making continuous investments in local communities, including the Hwasu wharf improvement project near the Incheon Plant.

Safety & Health

Enhancing Worksite Safety Risk Management

With the amendment of the Occupational Safety and Health Act, effective as of January 16, 2020, the responsibilities of employers have been increased so that they are subject to a shutdown and/or suspension of business in the event of an industrial accident in any of their workplaces including those of their suppliers. Operating losses may be incurred as the scope of the contractor's liability has been extended to all business sites, and the operations of an entire site may be suspended in the event of a serious disaster.

To achieve zero accident in the workplace, Doosan Infracore has established such mid- to long-term goals as the establishment of a disaster prevention system, internalization of self-management activities for risk factors, and facilitation of compliance monitoring and evaluation. Accordingly, we have been making concentrated efforts to further improve our safety devices so as to prevent serious disasters; promote a safety culture based on close cooperation between labor and management as well as with suppliers; and strengthen relevant organizations and workforce.

Prevention-focused Worksite Safety Management

Safety Training Doosan Infracore provides safety education aimed at encouraging voluntary participation and capacity building of its employees. To this end, we run training programs designed to promote EHS leadership by job title, increase employee awareness, cultivate knowledge, and encourage self-development. We planned to expand our supervisor training from 16 hours of online training to 8 hours of online training and 16 hours of offline training in 2020, but it was difficult to have training sessions due to COVID-19. In 2021, we will create a small-group, non-face-to-face training curriculum, to minimize impacts caused by COVID-19. We will continue intensive training programs for supervisors (team leaders, part leaders, and senior technicians), align the facility/construction/technical position training system with human resource development (HRD), provide training to suppliers, and take other such measures to operate EHS training courses in line with our training programs, while also producing and distributing an EHS handbook to increase employee knowledge of EHS regulations.

Worksite Hazard Management Doosan Infracore implements a discussion-based risk factor identification process with its employees to encourage them to manage risk factors by themselves in the first place by observing and improving potentially hazardous behaviors. In 2020, we strengthened self-management activities for risk factors, and thus identified hazardous behaviors and safety risk factors and made improvements.

Acquisition of Safety Zone Certification Doosan Infracore's business sites in Korea are all certified by the government in terms of disaster safety with the Incheon and Gunsan Plants' acquisition of the Safety Zone Certification in December 2014 and November 2015, respectively. Awarded by Safety Zone-CERTI® and supervised by the National Fire Agency, the Safety Zone Certification is the only voluntary corporate safety evaluation system in Korea and entails a comprehensive evaluation of building design, construction, and maintenance.

Acquisition of the Safety Zone Certifications

Our Incheon Plant received a detailed evaluation in 2020 on six safety areas, including the safety management system, firefighting, building/fire proof, dangerous goods, machine/electricity/gas, and evacuation/natural disaster, from experts in the field of disaster and safety, and actively made improvements for matters that were pointed out. As a result, it received an A grade, which is an improvement from the previous grade, and obtained the Safety Zone Certification for the third consecutive time in December 2020 following 2014 and 2017. The Certification is valid for three years. Doosan Infracore is the first in the machinery industry to maintain the Safety Zone Certification three consecutive times. Based on the belief that investments in safety and firefighting are not expenses but a must to protect our employees, we will further expand the awareness of the importance of fire and disaster prevention and systematically and efficiently manage safety facilities based on the Safety Zone Certification.

Response to Process Safety Report Evaluation Worksites with large hazardous, dangerous facilities have risks of fatal industrial accidents, so that they are required to operate the Process Safety Management (PSM) system. Accordingly, they create a report on comprehensive, scientific prevention activities, such as process risk assessment and establishment of a safe operation and emergency plan, and submit to the government, after which the government examines and reviews the report and has the respective worksite implement preventive activities to prevent fatal industrial accidents. Doosan Infracore carried out an internal audit on the PSM of its Incheon Plant and Gunsan Plant, and based on the results of the internal audit, the company identified improvement measures, such as increasing supplier safety training, expanding the scope of job safety analysis (JSA), and revising safe work permissions, and continues to inspect the implementation status.

Expansion of Safety Management Culture

Doosan Infracore believes that the safety awareness of its employees is the most important factor in preventing safety accidents, along with efforts to improve facilities. We, therefore, actively implement programs and operate systems in which both our employees and those of the suppliers participate so as to strengthen the safety culture.

Building a Culture of Safety Doosan Infracore continues to engage in safety culture activities, aimed at achieving zero accidents, by monitoring the "EHS 3-3-3 Basic Rules" that define three safety rules that all workers must comply with and by making improvement in the safety area. Each month, the heads of Business Groups provide safety reports to employees. We have designated April as Health and Safety Month during which we strive to improve safety and raise safety awareness through education sessions, promotional campaigns, and inspections. Visitors to our worksites are required to watch a video on safety precautions first to raise their safety awareness.

Support for Suppliers' Safety Management Capabilities Doosan Infracore has been implementing "Symbiotic Cooperation Programs" since 2012 to help its suppliers boost their safety management capabilities under one of its EHS principles – "We aim to create a pleasant and safe people-oriented working environment, improve the health and quality of life of all employees, including those of our suppliers, prevent losses, and thus ultimately realize a zero-accident workplace." Launched by the Ministry of Employment and Labor in 2011, the Symbiotic Cooperation Program is designed to urge large companies to help improving the health and safety capabilities of their suppliers to prevent industrial accidents through continuous cooperation. In 2020, we improved risk factors and evaluated risks at supplier business sites, provided safety and health training and guidelines, and helped with relevant items. In particular, we focused on promoting the Safety Observation System (risk factors self-control), a scheme for removing potential risks based on concentrated daily monitoring by not only field supervisors but also working-level employees, so that suppliers themselves can identify risk factors and work on them.

Safety Management for Outsourced Projects Doosan Infracore is further strengthening safety management to prevent supplier safety accidents during outsourced projects at its worksites. The company operates a daily on-site patrol to check on-site safety status and reports the results to the management. It also runs the "Safety Walk" program every month in which executives, production managers, and EHS officers carry out a safety patrol and come up with improvements, thereby managing potential safety risks.

In January 2021, a worker of a facility management service provider had a serious falling accident at the Incheon business site, and an investigation is in progress regarding the incident. Irrespective of investigation results, Doosan Infracore is engaging in stronger safety management activities for the safety of all suppliers and visitors that enter the company premises. Right after the accident in January 2021, we conducted a total inspection on company buildings and made improvements to all environmental factors that may lead to recurrence of the same type of accident, and also strengthened the safe work plan and approval process. In addition, we will create the Safety Culture Part under the EHS Team to carry out safety culture projects and field-tailored training with the goal of strengthening internal awareness of the safety culture, while increasing the number of personnel in charge of supervising construction sites and safety patrol personnel as part of efforts to strengthen supervision of field safety management.

Emergency Response System

Fire Response As the number of fires related to electricity, overheating, and dust increases, Doosan Infracore has been upgrading its firefighting facilities and improving its firefighting capabilities. In December 2019, the Incheon Plant, having been chosen as the representative workplace within the jurisdiction of the Incheon Central Fire Department, conducted a "Self-Defense Forces Firefighting Training Assessment" involving a total of 500 employees. The assessment is a fire drill led by Incheon Metropolitan City to strengthen the initial response and firefighting capability in the event of a fire. The Incheon Plant conducted evacuation, fire suppression, and emergency drills following a hypothetical firefighting scenario in which its R&D center is hit by an earthquake. Following the fire drill, it had trainings on the risks of smoke inhalation, an air mat experience, how to operate a fire extinguisher, and cardiopulmonary resuscitation.

In 2020, to minimize losses in the event of a fire, we installed oil mist detectors and fire extinguishers in the painting process, thereby establishing an initial fire suppression system. We also upgraded our fire prevention system by identifying and removing fire hazards in advance through the installation of motion-detection CCTVs in blind spots such as underground machinery rooms, as well as installing proper firefighting facilities when building new buildings and expanding facilities. In 2021, we will upgrade our drills to better handle fire suppression, fire truck entry, and lifesaving, with a particular focus on such processes with a high probability of a fire as painting and commissioning. We will also strengthen our prevention system so that we can respond quickly and efficiently by developing an emergency response scenario for each department.

In January 2020, there was a fire in a large engine test room at the Incheon business site, and electricity is presumed to be the cause. Before the incident, all internal materials were replaced with incombustible materials or noncombustible materials as a fire prevention measure, preventing the fire from spreading into other areas. As a result of the emergency response training that is conducted every year, around 200 employees who work in the building quickly evacuated and there were no casualties. In 2020, we made facility improvements to prevent fire, such as replacing all old cables, securing additional fire escapes, and installing additional sprinklers, while continually making efforts to enhance our ability to respond to emergencies, such as strengthening fire accident response scenarios. In 2021, we will continue fire prevention measures and emergency response training.

Industrial Accident Rate Management

The traditional method used to calculate the industrial accident rate does not faithfully reflect the incidence of minor accidents. Doosan Infracore, therefore, began to use the LTIR[1], TRIR[2], and LWSR[3] indicators in 2018, which allowed the company to identify minor accidents that resulted in lost time as well as those who received treatment at the company or its suppliers. By doing so, we aim to prevent minor accidents from repeating and becoming a major accident, and to further strengthen supplier's safety management. Accident rate indicators are managed as a major key performance indicator (KPI) of respective executives, based on which we plan to further promote a safety management culture.

We analyzed accidents that had occurred at our worksites in the past three years, and found that conventional accidents, such as jamming, fall, and bump, have been occurring continuously, with unstable practices and behaviors being the root cause of 65% of such accidents. We will, therefore, focus on preventing accidents due to unsafe practices and behaviors by enforcing compliance with the on-site safety rules and behavioral requirements, expanding site inspections and facility improvements, and strengthening the safety culture based on employee participation.

[1] LTIR (Lost Time Incidents Rate): Number of incidents involving more than one-day closure of workday per 100 workers, Total number of lost time cases/ Total number of hours worked by employees * 200,000

[2] TRIR (Total Recordable Incidents Rate): Number of recordable incidents that require treatment for injuries or illness per 100 workers, Total number of injuries and illnesses/ Total number of hours worked by employees * 200,000

[3] LWSR (Lost Workday Severity Rate): Number of lost work days experienced per 100 workers, Total number of lost work days/ Total number of hours worked by employees * 200,000

Enhancing Employee Health Management

Responding to COVID-19

In response to the COVID-19 pandemic in 2020, we provided masks to our employees and in-house suppliers, disinfected business sites, set up hand sanitizers and thermometers, while also establishing "COVID-19 response guidelines" that reflected guidelines of the Korea Centers for Disease Control and Prevention and strictly observing the guidelines, as part of our efforts to create a safe work environment.

Activities to Prevent Infection To prevent the spread of COVID-19, Doosan Infracore provided masks to its employees as well as in-house suppliers, set up hand sanitizers and thermometers, and installed thermal imaging cameras right when COVID-19 first emerged. In addition, we reviewed various situations in advance based on quick information-sharing and precise decision-making, and established "COVID-19 response guidelines" that includes response measures for each phase of the spread of the disease as well as the reporting system in the event of an emergency and employee behavior standards. To prepare for similar situations in the future, we have established rules on infectious disease response management, and strengthened the infectious disease response management process to respond to regular infectious disease, such as seasonal infectious disease. Thanks to these efforts, none of Doosan Infracore employees was tested positive for COVID-19 in 2020. We plan to continue activities for prevention of infection until the situation comes to an end.

Preventing the Spread of Infection To prevent the spread of COVID-19 in the event of a confirmed case, Doosan Infracore has established a process for each situation and continued to share the content with employees and in-house suppliers aimed at raising their awareness of the infectious disease. When an employee, an employee's family, and a person who came into close contact showed symptoms, the company provided paid leave and enabled telecommuting for self-quarantine and disinfected the work site of the person who showed suspicious symptoms. As a result of these measures, even when an employee's family member, in-house supplier employee, commuter bus driver, and other persons who came into close contact were tested positive for COVID-19, there were no cases where COVID-19 spread inside the company.

Employee Mental Health Care To address negative psychological symptoms, such as anxiety and depression, from the prolonged COVID-19 situation, we added a psychological quarantine program to "DooHug," an in-house counseling program. Through the psychological quarantine program, professional counselors who are stationed at the Incheon and Gunsan business sites provide counseling to employees, mainly on employees' psychological isolation resulting from self-quarantine and concerns over how others may view them, establishment of relations with superiors or colleagues as changes occur at work, such as telecommuting, and conflicts that arise as time spent with family increases. In addition, employee family counseling is provided in connection with an outside counseling center.

Improving Employee Health Management

Occupational Disease Prevention Doosan Infracore strives to prevent occupational diseases such as noise-induced deafness and musculoskeletal disorders, and to strengthen implementation capabilities at its worksites. To this end, we hold a monthly meeting of the Musculoskeletal Disorder Improvement Working Council, which is composed of labor union officials, worksite managers, and employees in charge of EHS and production, to discuss physical load risks and identify ways of making improvements. We also arrange for medical professionals to visit worksites regularly as part of our efforts to improve employees' health and boost their morale. As the number of workers suffering from hearing problems, such as noise-induced deafness, has been increasing, Doosan Infracore has set a strategic direction to fundamentally minimize noise-generating processes while also offering high-quality earplugs and other protective gears, and providing education on the proper use of them. In addition, with the increasing amount of surface particulate matter around the country, we have developed response guideline that calls for the provision of protective gears and proper work breaks starting at the stage of caution. In 2020, we carried out various preventive activities for each type of occupational disease by monitoring our working environment through health risk assessment; expanding the activities of the Musculoskeletal Disorder Improvement Working Council to prevent musculoskeletal disorders; conducting regular inspections on harmful factors (every 3 years); and assessing the risks of brain and cardiovascular diseases.

Health Management Programs In helping its employees manage their health, Doosan Infracore operates various health promotion programs, including the installation of automated external defibrillators (AEDs) and the preparation of a low sodium diet menu. Whenever a healthcare issue such as the spread of an infectious disease arises, we operate the Emergency Situation Room and promptly offer the relevant information on preventive measures to our employees. We pay for mandatory vaccinations for six diseases – yellow fever, cholera, malaria, typhoid, hepatitis A, and tetanus – designated internally for employees who go on business trips to countries with limited healthcare.

IT System for Health Checkup History Management
In 2019, Doosan Infracore developed and launched "DooGreen," an integrated EHS IT system that includes an employee health checkup history management function. The system enables the management of company-wide health checkups and the related training schedules to prevent employees from inadvertently skipping their regular medical checkups and education, while preventing legal risks related to a lack of special checkup data. In addition, we offer support at the company level through the system as a way to help our employees improve their health by managing their personal health checkup-related items, including health checkup history management, management of chemicals used for each task, and management of working environment measurement results.

Programs to Manage Job Stress Doosan Infracore conducts stress surveys to manage the mental health of its employees, and runs a professional stress management program, with a particular focus on high-risk employees, based on statistical analysis. We ensure that our employees can access counseling services whenever necessary through the psychological counseling office within an affiliated clinic and an external counseling center linked to the company. Launched in April 2014 for the first time among affiliates of Doosan Group, "DOOHUG" is a professional counseling service offered in partnership with an external professional institution. It provides employees with professional counseling services about not only their work-related concerns but also personal worries, including their families and childcare. We keep all DOOHUG counseling details and personal information strictly confidential, and pay all of counseling expenses. Moreover, we run a "healing program" for teams by moving beyond counseling services for individuals.

In 2020, Doosan Infracore conducted a "Psychological Health Test" for all of its employees to diagnose their stress level, including job stress, and provided support for employees with a high level of stress. The supportive measures include a total of 4,395 cases of counseling services to 612 persons as of the end of 2020 through its in-house counseling center and an outside counseling center, a healing program, visiting counseling services to Doosan Tower, and relevant education programs. In addition, we provided training and conducted stress assessments aimed at protecting the psychological health of emotional workers, while offering professional training as part of our Employee Assistance Program (EAP). In 2021, we will continue conducting employee surveys (job stress index, etc.) and analyses, and expand the DOOHUG program by providing tailored, concentrated care for the psychologically vulnerable, supporting the resolution of family conflicts, and providing care for such employees who have experienced an accident (person who was in an accident and person who witnessed an accident) and who are responsible for customer services.

Certified as Excellent Worksite in Employee Health Promotion

In October 2019, the Incheon Plant was re-certified by the Korean Ministry of Employment and Labor and the Korea Occupational Safety and Health Agency for its excellence in promoting employees' health, following its initial certification in 2013 and the recertification in 2016 (evaluation period: 3 years). The Gunsan Plant was first designated as an Excellent Worksite in Employee Health Promotion in November 2015, and re-certified in February 2019 in recognition of its exemplary in-house health promotion activities customized for the characteristics of workers, including a health management program, a musculoskeletal disorder prevention program, and a job stress prevention program. The Excellent Worksite in Employee Health Promotion certification is the most important health industry-recognized certification, which involves a comprehensive evaluation of 40 items in six areas, such as organizational culture, health promotion activities and programs, and environmental management. Designated worksites are awarded the benefit of being exempted from supervision by the Ministry of Employment and Labor for the next three years. Going forward, Doosan Infracore will continue employee health promotions as part of its efforts to create a better workplace.

Suppliers

Doosan Infracore strives to grow into a global company based on the principle of building a "virtuous cycle of partnerships" that enables the company to achieve win-win growth with its suppliers.

OUR APPROACH

Doosan Infracore considers win-win growth with suppliers as a primary source of its competitiveness. We, therefore, share our technology, quality, and management systems with our suppliers to strengthen their competency and build a virtuous cycle of partnerships. In addition, we help them improve ESG capabilities in an effort to fulfill our roles and responsibilities in building a sound economic ecosystem.

SUSTAINABLE VALUE FRAMEWORK

People | **Suppliers capacity building**

Doosan Infracore leads the win-win growth with its suppliers by expanding the Doosan Supplier Excellence Program (DSEP) program which is designed to provide training, consulting, and other supports to help suppliers strengthen their competitiveness.

Cumulative No. of DSEP participants[1] (Unit: Company)

2019	2020	Goal for 2025
32	38	52

[1] Suppliers that have participated in MES establishment support from 2020 to 2021 can overlap with previous DSEP participants

Progress | **Supply chain ESG**

Doosan Infracore makes continuous efforts to conduct ESG inspection for its core suppliers and help them make improvements as a way to prevent risks and lay solid foundations for win-win growth.

No. of companies subject to supplier ESG evaluation[2] (Unit: Company)

2019	2020[3]	Goal for 2025
N/A	N/A	125

[2] Supplier ESG inspection is conducted every other year. Thus, the Year 2024 goal is reflected as the Year 2025 goal.

[3] The supplier ESG inspection planned for 2020 will be postponed as it requires an onsite inspection but could not be conducted due to COVID-19

Strengthening Suppliers' Competitiveness

Doosan Infracore focuses on enhancing its overall competitiveness in purchase and production by helping its suppliers boost their competitiveness. To this end, we provide a range of support programs, including financial support, competency enhancement training, and on-site guidance. In addition, we are implementing the Leading Supplier (LS) project to help our core suppliers grow into small giants based on the Doosan Supplier Excellence Program (DSEP), a system for fostering suppliers

Fostering Leading Suppliers

Doosan Infracore conducts an annual survey of core suppliers according to the criteria for core suppliers defined by the analysis of transaction dependency and supplier relationship segmentation. We help them have the capability to supply quality products at competitive prices on time by making innovative improvements in the areas of plant operations, quality assurance, and manufacturing technologies. We also make continuous efforts to foster them to become Leading Suppliers with top level competitiveness in the local market, setting a benchmark for other suppliers. The LS project aims not only to solve problems that suppliers are facing but also to raise their fundamental competitiveness by enabling them to secure supply capacity and quality competitiveness in terms of a comprehensive ranking evaluation (supplier evaluation) through one- to three-year support programs. To foster 52 Leading Suppliers by 2025, Doosan Infracore has selected and supported a total of 38 suppliers from 2014 through 2020.

In 2020, Doosan Infracore focused on supporting the establishment of a manufacturing execution system (MES) at its suppliers that increases production efficiency through integrated management of real-time data, including production plan, material flow, and quality information, in a single platform, in connection with the government's Smart Factory Supply and Diffusion Project, to quantify LS activities. In 2021, we will support the establishment of MES at five suppliers, while working on fully rooting down pre-established MES efficiently. We will make continuous efforts to provide support so that suppliers can strengthen their quality capabilities and competitiveness.

Expanding Participation in the Benefit Sharing System

The benefit sharing system is an agreement made between large companies and small and medium-sized enterprises (SMEs) to improve suppliers' capabilities to deliver high-quality goods on time and share the benefits. It is an iconic model for the creation of a healthy corporate ecology. Doosan Infracore collects suppliers' suggestions regarding new product development, parts localization, quality improvements, and design changes through the benefit sharing system. We then reflect good suggestions into our products and share the outcome, thereby creating win-win partnerships with our suppliers. In 2020, among supplier suggestions, we registered 13 cases of the benefit sharing system and completed three cases, and in 2021 we plan to reflect and manage benefit sharing performance as a KPI of executives in charge of purchasing. Going forward, Doosan Infracore will extend the scope of our benefit sharing system to include not only first-tier suppliers but also second-tier suppliers, to enhance our fundamental competitiveness as well as that of our suppliers, create synergy, and establish a fair subcontracting culture.

LS Development Stages

Year One → **Year Two** → **Year Three**

Intensive guidance and cultivation for overall improvements in the entire DSEP module

Stage 1	Stage 2	Stage 3	Stage 4
Diagnosis	**Planning**	**Development**	**Sharing**
Identify capabilities required to be improved by diagnosing factory operations, quality assurance, and manufacturing technologies	Draw up plans by Doosan Infracore's experts and supplier staff to address the identified capabilities	Carry out improvement activities according to the DSEP for one year and offer supplier staff training	Share improvements at the supplier conference held every October

Year Two: Post-management through DSEP maturity evaluations and continuous management

Year Three: DSEP re-evaluation to enhance self-reliance and re-launch of the LS program for necessary suppliers

Strengthening the ESG Competencies of Suppliers

Doosan Infracore has established systems and programs designed to enable its suppliers to lay the groundwork for their response to ESG issues, including ethical management, fair trade, human rights, environmental protection, and social problems.

Strengthening ESG Management System of the Supply Chain Doosan Infracore has developed the "Supplier CSR Guidelines (2015)," which consists of 27 clauses under 10 categories, such as labor, human rights, health and safety, environment, ethics, and fair trade, and distributed the Guidelines to its suppliers in the form of newsletters and booklets. We also reflect the Guidelines in our purchase policies to ensure that consistent principles are applied not only to diagnose and evaluate but also to purchase, based on which we urge our suppliers to engage in practical ESG activities. The Supplier CSR Guidelines is available at Doosan Infracore's website.

Reflecting ESG Elements into Supplier Evaluation Doosan Infracore reflects such ESG elements as employee training, labor management, environmental management, and regulatory compliance, in the evaluation and registration of its new suppliers at all of its business sites in Korea and China. In the area of EHS, in particular, such as environment and health, we evaluate the status of building foundations and level of practices including the establishment of relevant systems and improvement in risk factors. We also have been conducting on-site EHS assessment of new suppliers prior to their registration since 2015.

Activities to Support and Improve Suppliers' ESG Management For more systematic ESG management of its supply chain, Doosan Infracore has established criteria to define core suppliers and set standards in 2018, based on which it surveyed their status; conducted an on-site assessment (OSA) on their response to ESG issues, such as human rights protection, ethical management, and EHS; and identified suppliers with high ESG risks. The OSA that was planned for 2020 was postponed to the first half of 2021 due to COVID-19. Through an OSA on 164 suppliers, we will identify suppliers with high ESG risks and help them make improvements. Going forward, we will enhance ESG management capabilities of our suppliers through comprehensive supplier evaluation linked to the ESG evaluation and improvements.

Supplier EHS Consulting In 2020, Doosan Infracore chose 28 suppliers among its major suppliers and provided comprehensive EHS consulting. There are four EHS technical support areas for which we offer consulting – environment (wastewater, air pollution prevention facilities, permission and approval, etc.), safety (factors that cause serious accidents and deaths, such as a fall and heavy items), firefighting (fire and explosion risk factors, such as painting and handling of dangerous items), and electricity (high-voltage current accident factors, such as transformers and panel boards) – based on which we conducted an inspection to identify the status at ten suppliers. We temporarily stopped consulting activities as COVID-19 spread increasingly in December 2020, but plan to resume consulting for the suppliers that were to receive support in 2020 as soon as the social distancing level eases. We will also continue to expand the target of support to raise suppliers' EHS management level to above global standards.

Diverse Supplier Support Programs

Competitiveness Enhancement Programs

Supporting the Enhancement of Suppliers' Competitiveness An exclusive team, composed of dedicated staff from the Supplier Development Team and Shared Growth Team, visits suppliers if necessary, to help them conduct innovative activities. In 2020, 248 Doosan Infracore employees – 2.5 times as many as planned at the beginning of the year – helped suppliers with their innovation efforts for more than five consecutive days[1]. Specifically, our staff helped suppliers improve their manufacturing competitiveness by providing support in the areas of quality, delivery deadline, cost improvement, and technology, while supporting their recruitment through a job fair.

Management Doctor System Doosan Infracore is an active participant in the Management Doctor System which is currently being promoted by the SME Support Center of the Federation of Korean Industries (FKI). Suppliers recommended by large companies are selected through a review process, whereupon experts from three parties – large companies, suppliers, and the FKI's management consulting team – help them improve management environments and solve problems.

Industrial Innovation Campaign 4.0 Industrial Innovation Campaign 4.0 is one of Doosan Infracore's leading programs for win-win growth. Through this program, consultants are dispatched to our suppliers to provide them with practical assistance with their production innovation and smart factory operations, based on our financial contributions. The Campaign entered its second phase in 2019 following the successful completion of the first phase in 2018. We will help some 50 suppliers for the next five years to increase their productivity, thereby making practical improvements in their performance.

Competency Building Training for Suppliers' Staff Doosan Infracore reflects its suppliers' feedback into the Supplier Academy, a customized training program to help suppliers secure competitiveness, and offers the program every year. In 2020, 37 people from 19 suppliers benefited from the Supplier Academy in eight areas, including production quality, Industry 4.0, import/customs clearance, and intellectual property rights. To further increase training effects in 2021, we will create courses on Industry 4.0, logistics, laws, design, and quality, based on demand survey results, while offering both internal and external training programs in consideration of training efficiency and expanding non-face-to-face training.

Seminars for Suppliers Doosan Infracore has been holding the "Seminar for People in Charge" for its suppliers twice a year since 2017, to introduce its win-win growth programs, motivate suppliers to actively participate in and take advantage of the programs, and help them build competency. At the seminars held in 2019, we introduced our leading programs for win-win growth with suppliers; shared information on suppliers' technical data management system and the Occupational Safety and Health Act; and discussed suppliers' measures to respond to the amendment of the Act. In 2020, we could not hold seminars for suppliers due to COVID-19, however, in our efforts to deliver information to suppliers amid the pandemic, we will regularly distribute joint growth trend news starting in 2021 with the goal of delivering necessary information to suppliers and hold online-based supplier seminars.

Financial Support

In Korea, Doosan Infracore helps its suppliers enhance their financial soundness by providing them with four types of financial support – direct support, indirect support, mixed support, and special support.

Support for the Creation of Sound Corporate Ecosystem

Beginning in 2017, Doosan Infracore has been running a supplier support program that helps reduce the wage gap and increase welfare benefits for the employees of its second- and third-tier suppliers[2], in-house subcontractors[3], and service providers. For the employees of those companies, we provide them with KRW 1.2 million per year (KRW 100,000 per month for each person) to reduce their wage gap in the form of Win-Win Encouragement Funds while also offering high school tuition fees to their children and allowing them to use our daycare center free of charge to enhance their welfare benefits.

[1] Criteria of the Korea Fair Trade Commission: 5 days = 1 person (1 day = 8 hours, based on the time and attendance criteria)

[2] Second- and third-tier suppliers: Suppliers that depend more than 35% in terms of sales on Doosan Infracore's first-tier suppliers that count on the company by more than 35% in terms of sales

[3] In-house subcontractors: Employees of in-house subcontractors (except for large companies and foreign enterprises)

Financial Support for Suppliers in 2020 (Korea)

Programs			Amounts supported
Direct Support	Facility Investment Fund	Provided suppliers with interest-free facility investment funds	KRW 2.3 billion
	Financial Support for Shaping Fixtures	Provided financial support for shaping fixtures to enhance product competitiveness	KRW 20.2 billion
	Win-win Encouragement Fund	Removed the wage gap for second-tier/third-tier supplier and small in-house subcontractor workers	KRW 2.0 billion
Indirect Support	Network Loans, Family Corporate Loans	Helped suppliers receive loans to fund operations with low interest rate based on deposits	KRW 30.0 billion
Mixed Support	Shared Growth Special Fund	Helped suppliers receive loans to fund operations with low interest rate based on deposits	KRW 78.5 billion (raised) KRW 72.8 billion (loaned)
Special Support	Shared Growth Special Fund for the Industrial Innovation Campaign 4.0 (KOFCA)[1]	Made contributions to shared growth programs for second- and third-tier suppliers	KRW 300 million
	Contribution to Win-Win Supporters		KRW 100 million
	Credit Guarantee Agreement for Suppliers	Signed an MOU on win-win agreement guarantee to support parts suppliers	KRW 1 billion

[1] KOFCA: Korea Foundation for Cooperation of Large&Small Business, Rural Affairs

Establishing a Culture of Win-win Growth

Building Win-Win Partnerships

Doosan Infracore has set "building a virtuous cycle of partnerships for shared growth with our suppliers" as the motto for shared growth to strengthen our global competitiveness and grow together with our suppliers. The virtuous cycle of partnerships aims to include all of our suppliers in the unique technology-quality-management system, which is designed to enhance our technological capabilities and upgrade business practices internally. This integrated operation system enables Doosan Infracore and its suppliers to build an even stronger partnership by improving the competitiveness of the overall system ranging from production to supply and by sharing the profits generated through the improvements with suppliers. The virtuous cycle of partnerships also means that we go beyond the previous relationship with our suppliers that is limited to purchasing and subcontracting. We have determined to implement the win-win growth strategy at the company level, and then have been making continuous efforts to build the virtuous cycle of partnerships including by linking detailed plans to our business plans, reflecting performance results into the evaluation of our top executives, and establishing an effective monitoring system. To build a virtuous cycle of win-win growth, the Supplier Development Team and the Shared Growth Team take the lead in helping suppliers improve their jobs and technical competencies while enhancing their financial soundness, while also actively communicating with them through the Integrated Cooperation Council.

Win-win Growth System

Vision	Shared Growth as Global Enterprises
Shared Growth Programs	Competitiveness enhancement programs Profit sharing / Financial support Support for joint advance into overseas markets Enhancement of communication
Shared Growth Policy	Build a virtuous cycle partnership enabling shared growth with suppliers
Organization in Charge	Competitiveness Enhancement Support Center (composed of in-house experts in shared growth, fostering of suppliers, purchase, quality, and R&D)

Motivating Win-win Growth Doosan Infracore reflects the win-win growth performance of the relevant executives in the evaluation of their management by objectives (MBO), and it also reflects the findings of the benefit sharing system in the MBO of executives in charge of purchasing to promote the system. Furthermore, to encourage suppliers to participate in win-win growth activities, we reflect their involvement in win-win growth and relevant performance in the comprehensive supplier evaluation.

Strengthening Communication with Suppliers

To enhance communication with its suppliers, Doosan Infracore operates a "Shared Growth Hotline" while also holding agreement ceremonies and meetings. The CEO visits our second-tier suppliers twice a year to listen to their concerns and find solutions to their problems. The CEO was not able to visit suppliers due to COVID-19 in 2020, but we plan to resume the activities once the social distancing level is eased. In China, senior executives attend a meeting with suppliers twice a year, share the purpose of shared growth, and encourage commitment to realizing Win-win growth.

Integrated Cooperation Council For active and effective communication with suppliers, Doosan Infracore launched the Integrated Cooperation Council in 2015. The Council meets twice a year to share the company's business plans, quality policies, and the latest global trends including environmental restrictions, and to align the strategies of the company with the suppliers and strengthen mutual exchanges.

Grievance Handling Channel for Suppliers Doosan Infracore has established the Shared Growth Hotline on its company website in the Shared Growth section, through which people may express their overall opinions and grievances about the company's trade practices and shared growth activities or request related programs. In addition, we have put diverse communication channels in place, such as telephone, fax, and postal service, and notifies to our suppliers. All communication made through the Shared Growth Hotline is kept strictly confidential, and for those wishing to maintain their anonymity, the Hotline can be used anonymously. We also make sure that no one faces retaliation for submitting a grievance, and critical issues are reported to the CEO and relevant executives.

Product Quality & Stewardship

Doosan Infracore provides world-class products, parts, and services with the goal of maximizing customer value.

Sales of remanufactured parts (Unit: KRW million)

2019	2020	Goal for 2025
770	650	1,500

OUR APPROACH

Doosan Infracore offers customers better value through products that take into account not just performance but also customer safety and environmental impacts. In addition, we focus on improving product quality, enhancing customer services, and having more dialogues with customers to become a company trusted by customers.

SUSTAINABLE VALUE FRAMEWORK

Product, Solution, Service | **Product stewardship**

Doosan Infracore is committed to responsible production and consumption by integrating the concept of sustainability into the entire product life cycle ranging from production to sales, utilization, and disposal.

Customer- and Environment-centered Product Development

Strengthening Product Responsibility

Doosan Infracore is committed to securing customer safety and minimizing environmental impact throughout the entire process ranging from product development to production and sales. To this end, we strive to ensure customer safety and convenience from the product planning and development stage, and also focus on expanding the development of eco-friendly products in order to minimize the environmental impact of product manufacturing and use. In addition, we aim to contribute to the improvement of human rights and the environment in areas that produce conflict minerals by continuously monitoring the use of conflict minerals in our products.

Compliance with International Safety Standards Doosan Infracore sets up new product development and verification plans at the planning stage by reviewing various countries' technical regulations and international standards on safety and environment, including fire, noise, rollover, electromagnetic compatibility, and toxic chemicals. We also reflect the guidelines set forth in major technical regulations when setting up our product development objectives, such as the "Rules on Construction Machinery Safety Standards" of Korea, the "Machinery Directive" of Europe, and the "Guobiao (GB) Standard" of China. We also ensure that our products are manufactured to meet the regulations of the markets to which they will be exported. Moreover, we have established the Global Product Compliance Council (GPCC), through which we share information on the latest trends in global safety regulations and standards and discuss preemptive responses to any changes.

Management of Hazardous Chemicals Doosan Infracore makes various efforts to respond to hazardous chemicals regulations, including the EU's REACH/RoHS 3, and the "Act on the Registration and Evaluation etc. of Chemical Substances" and the "Chemicals Control Act" of Korea. We conducted a total inspection on hazardous chemicals used throughout our work processes in 2015; conducted a study on the possibility of replacing some of hazardous chemicals, and replaced or removed 11 types of chemicals subject to management under The Chemicals Control Act in 2016; and developed a world-leading process and IT system to respond to REACH/RoHS 2 and completed the roll-out at Doosan Infracore China Corporation in 2017. In 2018, to cope with even stricter regulations systematically, we created a cross function (CF) team for company-wide hazardous chemicals management and operations; established a policy to manage restricted materials; distributed work process guidelines to the relevant departments; developed alternative materials to respond to RoHS 3; established response processes at overseas subsidiaries; input new REACH/RoHS 3 substances and requested renewal. In 2019, we reduced the use of hazardous chemical substances included in the Candidate List of Substances of Very High Concern (SVHC), Annex 17, and RoHS 10 Restricted Substances, and worked on responding to the SCIP[1] required by the European Chemicals Agency (ECHA). In addition, we have extended the applicable laws and regulations to include California Proposition 65 and other international agreements in addition to REACH/RoHS 3 so as to avoid regulatory obstacles in import/export of products. As one of ECHA's detailed measures on controlling the generation of wastes, it has become mandatory to make an SCIP database report on finished products that contain SVHC on January 5, 2021. We therefore developed an SCIP database report automation system that is based on the Doosan Infracore Chemicals Management System (DICMS), an in-house hazardous substance management system, in 2020, thereby preemptively responding to stricter regulations.

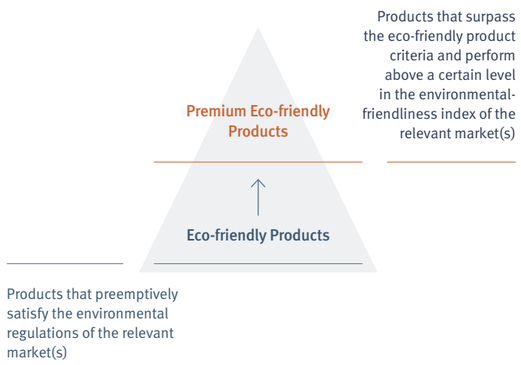
The scope of application of the relevant regulations has been extended from finished products to include parts. In response, Doosan Infracore included supplier's obligation to REACH/RoHS 3 in the basic purchase contract form to raise suppliers' awareness of the importance of hazardous substance management. We also have been making continuous efforts to assist suppliers with training and on-site guidance to improve the management competency of their staff, and helped them establish the management process. In 2020, we provided on/offline trainings on REACH and DICMS, and 59 people from 48 suppliers participated in the training. In 2021, we will continue to encourage supplier participation in responding to regulations and provide diverse training to help them enhance relevant capabilities.

Conflict Mineral Management Conflict mineral refers to four minerals – tin, tantalum, tungsten, and gold – that are mined in 10 war-torn countries in Africa, including the Democratic Republic of the Congo, Sudan, Rwanda, Burundi, Uganda, Congo, Zambia, Angola, Tanzania, and Central Africa Republic. Armed forces in these countries are believed to be caught up in conflict as they are raising funds through the mining and distribution of the minerals, which in turn causes human rights issues, such as loss of human life, human rights abuses, child labor, and sexual violence, in addition to serious social problems including environmental pollution. The international community, therefore, has been requiring companies to disclose the origin of the minerals they use in their production processes, and to eradicate the use of conflict minerals. As a responsible corporate citizen, Doosan Infracore strives to ensure that no conflict minerals associated with armed forces in the conflict areas are included in its supply chain. Furthermore, all suppliers that do business with Doosan Infracore are required to make sure that they do not use conflict minerals in their manufacturing processes and to submit certificates of origin if needed.

Expanding Eco-friendly Products Doosan Infracore is conducting its business based on its corporate philosophy which defines minimizing environmental footprint as a corporate responsibility through which the company can create values. Following this corporate philosophy, we established definition and management standards for eco-friendly products in 2015, and reflected the eco-friendly product management process in our new product development process and completed an upgrade of the environmental friendliness index in 2016. At Doosan Infracore, products that preemptively meet mandatory environmental regulations of each market in five areas – fuel efficiency, durability, noise control, safety, and emissions control – are defined as eco-friendly products. The portion of eco-friendly products in 2020 increased by 3.4%p year-on-year to record 90.7%.

[1] SCIP: Substances of Concern In articles as such or in complex Products

Classification of Eco-Friendly Products



Responsible Customer Service

Preemptive Response for Customers

Doosan Infracore has been solidifying its relationship with customers based on trust by acting ahead of customers' requests. We provide information on products for customer safety and increased convenience, and carry out voluntary preemptive correction measures.

Providing Information for Customer Safety Doosan Infracore complies with regulations of each country related to increased customer safety, including Safety Standards and the Product Liability Act, and takes all the necessary actions to prevent related accidents. To ensure safe operation and maintenance of our products, we provide customers with safety labels of three levels – danger, warning, and caution – according to the severity of the safety risks involved. We also specify matters that are critical to customer safety in a product manual. Doosan Infracore complies with ISO 9244[1] for the safety labels attached to its construction equipment and provides operator manuals for its machinery under ISO 6750[2].

Preemptive Correction Measures Preemptive correction measures are improvement measures carried out by manufacturers after making notices to customers without any external pressure. To better manage its preemptive correction measures, Doosan Infracore not only utilizes local staff at its overseas business sites but also dispatches its experts from the head office to any location in the world. Construction equipment must be able to withstand rough work environments. We therefore repeatedly check the whole range of equipment features, from the performance of the specialty parts to simple malfunction, when performing preemptive correction measures, and make corrections so that the product can be delivered to customers in the best possible state. In addition, we frequently manage the major correction measure status using a system for quicker preemptive correction measures.

In March 2013, construction equipment and excavators were designated by law as a subject to a recall in Korea. The voluntary recall involves a company making a direct report if it discovers an issue and officially implements preemptive correction measures. In December 2017, Doosan Infracore voluntarily chose one of its products as a subject of a recall for it found possible defects in the lower heater of the fuel filter which may cause an inflow of moisture into an inner pin, damage it, overheat the fuel filter and thus make the filter stop functioning. We sent out a recall notice to customers and offered repairs free of charge at designated maintenance centers or locations preferred by consumers.

[1] ISO 9244: International standard specifications on general rules regarding construction equipment safety labels

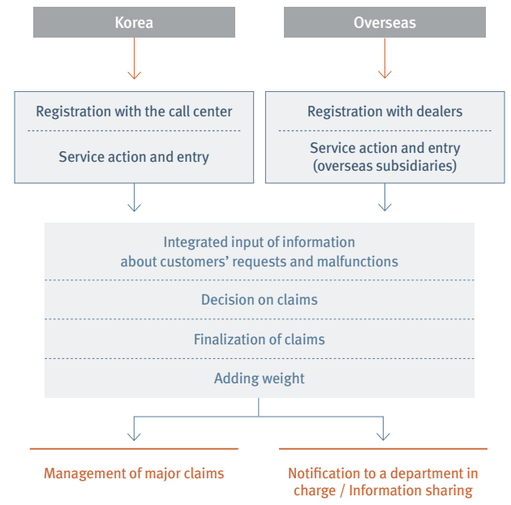
[2] ISO 6750: International standard specifications on the format of construction equipment manuals (guidance and content)

Process to Reflect Customer Feedback

Collecting and Responding to Customer Feedback Doosan Infracore collects and promptly handles customer feedback and requests through its dealers and direct visits to major customers. We also regularly hold meetings to share the voice of customers (VOC) in which major suppliers participate, and thus use them as opportunities to analyze and apply market trends. In Korea, the Customer Support Center receives customer requests, and assigns personnel who are in a position to quickly visit customers through the global positioning system (GPS). This is followed by the "Happy Call" with customers one day after to check final progress. To smoothly provide services to customers, we have built a one-stop after market (AM) service system from sales to end-of-life disposal, and continue to enhance our dealer service training. We have also expanded trainings for office and field staff of the Customer Support Center to be quarterly basis in line with a new product release. As an outcome of such efforts, we achieved 97.7% of claim settlement ratio within the timeline required by customers.

In China, dealers receive customer feedback and requests through the Service Call Center and aim to handle them within 24 hours and complete their services within seven days. VOCs are reflected in product design and quality improvement. Doosan Infracore provides various online and offline trainings to enhance the technical capabilities of its dealers' service personnel. Approximately 20 emergency service engineers make two-month training visits to around 30 dealers throughout China to provide training on mechanical repairs and maintenance while also helping to solve technical issues of the company's C (Chinese) models. As a result of these efforts, in 2020 we achieved 92.2% in claims processing rates, handled within 24 hours, for all models. We also made improvements for 82% or 27 cases out of 33 design-related VOCs.

Customer Feedback Collection and Handling Process



Standardizing Product Post-sale Management Services Doosan Infracore offers customers the 4-One Service – One Hour Contact, One Day Repair, One Touch Repair, One Plus Service – to deal with product malfunctions and provide technical assistance, thereby realizing customer satisfaction. We strive to provide One Touch Repair on the day when requests are made while also making continuous efforts to improve our technical capabilities and service procedures and to build a comprehensive customer support system that leaves no blind spot unaddressed and supplies parts in a timely manner.

Customer Satisfaction Management Doosan Infracore has been standardizing its customer services to improve the overall customer service quality, and providing all the service personnel with customer satisfaction (CS) trainings to foster them into CS experts. In addition, we conduct CS surveys through Happy Call services in Korea and China, and strive to keep the satisfaction level above 4.5 points on a scale of 1-5 points. In 2020, the level of satisfaction in Korea stood at 4.65 points.

NPD Process Doosan Infracore has set the New Product Development (NPD) process in place with the participation of company-wide value chain departments, such as purchasing, quality, production, AM/PS, sales, and finance, in addition to R&D, to reflect VOCs into new product development. We had collected customer opinions of diverse perspectives in our global business sites in Korea, China, Europe, and North America to establish the NPD 4.0 in 2013, which was further improved by reflecting perspectives in terms of laws, safety, and quality, and they are currently operating the upgraded NPD 6.0. They engage in strict management of the observance of laws, safety, quality, as well as value that is provided to customers, throughout all steps of product development.

In 2019, we established the "DI Project Management System (PMS)," an integrated system to better manage new products and technology development tasks. DI PMS is a platform-type integrated task management system that targets entire NPD and New Technology Development (NTD) processes of the company. It digitalizes the information accumulated during the development process, which enables us to manage our NPD and NTD gate as well as project schedules and issues. It also supports efficient resource allocation and quick decision-making of our leaders. We made such improvements as gate management efficiency through the implementation of the stage 2 in 2020, and plan to move forward with the stage 3 implementation in 2021. In 2022, when all the work is completed, we anticipate to secure global top-tier project management competitiveness, including government support task management, approval process in connection with the company-wide approval system, and the adoption of change control process, in addition to the previously-established stage gate for company-wide development task management and project management.

Building Customer Trust in Marketing and Sales

Responsible Marketing Policies Doosan Infracore sets and complies with proactive and responsible customer service policies to build customer trust and enhance its product values. For responsible marketing, we provide the latest product information via our website and social media channels, along with unique brand guidelines to serve as the yardstick for marketing and communication activities, including advertising and sales promotions. We comply with legislation related to sales, marketing, and information security, and were not subject to any sanctions for falsehood including exaggerated advertising practices in 2020.

Quality Stabilization and Standardization

Foundation of Quality Management

Quality Policy To achieve its vision of developing into a "Global Leader in Infrastructure Solutions," Doosan Infracore has set a quality policy that consists of four elements – developing reliable products that reflect market and customer demand while observing domestic/overseas laws; securing stable product quality by complying with technical standards and work standards; quickly and fundamentally resolving quality issues from the customer perspective; and enhancing service competitiveness. We then established a customer-oriented quality management system based on which we set mid- to long-term and annual quality goals as well as detailed execution plans at the company level, in our continuous attempts to put quality at the center of everything we do.

To strengthen its quality management throughout the entire value chain, Doosan Infracore has established and been operating a diagnosis and management system for its quality management system (QMS) that enables the company to assess the level of its quality management in the production, purchasing/quality, R&D, sales, and service sectors and to derive improvement measures. Our plan for 2021 is to stabilize new product quality while focusing on strengthening prior production defect detection capabilities and enhancing suppliers' parts quality competitiveness to substantially improve quality costs. In preparation for prolonged COVID-19 circumstances, we will establish and implement non-face-to-face quality management measures. We will continue to improve our quality management capabilities, and foster internal quality experts such as Design For Six Sigma (DFSS) and Red-X, to secure fundamental competitiveness, and achieve zero-defect quality that is equal to the level offered by global, advanced companies.

Company-wide Integrated Quality Conference Doosan Infracore has been holding the Company-wide Integrated Quality Conference, participated by the CEO, every month since 2010 with the goal of attaining the highest quality from a customer's perspective. The conference agenda reflects the result of the product quality analysis and shares improvement points and responses.

Quality Improvement Index Management Doosan Infracore focuses on making innovations in parts quality and improving product perfection to produce products that meet customer needs. We have selected initial quality and warranty quality as indicators for customer recognition, and set an ambitious goal to increase customer satisfaction through quality management.

Project Tracking System The Project Tracking System (PTS) is Doosan Infracore's system for managing quality projects. Using PTS, the company checks the progress status of the projects related to market quality, process quality, and advance quality; responses to VOCs; and improvement effects to help the company make improvements to quality and accelerate the pace of improvement. In 2020, we focused on improving work efficiency and established a constant monitoring system by reviewing weekly pending issues, using quality conference, and registering daily claim issues, and will continue to manage quality issues in 2021.

Quality Management System

Strengthening Preventive Quality

In 2020, Doosan Infracore put its concentrated efforts in making rapid and considerable quality improvements in a drive to secure fundamental competitiveness and increase customer value. To raise the level of the product quality by 2% compared to the current level, we are implementing tasks aimed at quality improvement, and striving to substantially improve costs related to global claim occurrence. In 2021, we will analyze quality problems that have occurred previously by using big data in line with the Fourth Industrial Revolution to predict quality problems associated with customers' working environments and/or equipment operation time. In addition, we will focus more on strengthening preventive quality through the preventive inspections and TMS-based remote diagnosis service so as to prevent quality issues.

Strengthening Quality at the Parts Production Stage

In order to minimize the number of defects at the production stage, Doosan Infracore has been making continuous efforts to improve parts quality in partnership with its suppliers. On the back of such efforts, our warranty quality, which serves as a quality index of construction equipment parts, has improved by 11% and 16% in Korea and China, respectively, over the previous year. In addition, we assign different reporting obligations according to the business type of each supplier, while enhancing quality management through pre-inspections, as a way to prevent fluctuations in quality due to personnel change and process improvement. We also hold the worst quality supplier meetings to raise suppliers' awareness on the importance of quality and urge them to implement quality-first policies.

Doosan Infracore conducts quality audits customized to each supplier's level of quality and business type to help them improve quality, and inspects their quality systems, processes, and products on a regular basis to prevent quality defects and ensure the consistency in quality management. In 2020, we conducted on-site assessment (OSA) and quality inspection audit for 64 suppliers, and in 2021 we will select 22 suppliers that need quality improvements and make concentrated efforts to help them improve their quality level. Going forward, we will continuously prevent quality issues by diagnosing and checking quality risks in advance, including cases of transfer of suppliers' contractual status, and modifications in design or processes.

Enhancing Supplier's Quality Management

Doosan Infracore has put the statistical process control (SPC) system in place and analyze data to prevent quality defects and ensure stable manufacturing processes. We completed the establishment of the system at 20 suppliers in 2020, and plan to build the system at 17 suppliers in 2021. Through the operation of the SPC system, we expect to make continuous improvements in fundamental quality and reduce warranty costs; enable quality data analysis based on big data; secure data reliability by automating data input; and improve work efficiency through the automated transfer of suppliers' quality information.

Employees

Doosan Infracore fosters talented people who support fundamental values of the company, are committed to enhancing their competitiveness, and act in the right way.

SUSTAINABLE VALUE FRAMEWORK

People | **Talent retention**

Doosan Infracore manages its employee turnover rate as part of its efforts to attract and retain outstanding talent, create socially decent jobs, and create a great workplace for its employees.

Turnover rate (Unit: %)

2019	2020	Goal for 2025
1.10	1.40	N/A

People | **Employee development**

Doosan Infracore helps its employees develop their capabilities to achieve both corporate and personal growth. To this end, we conduct efficient training activities for employee competency development while managing training hours and expenses per person.

Training hours per employee (Unit: Hour)

2019	2020	Goal for 2025
40.6	37.6	N/A

Training expenses per employee (Unit: KRW 1,000)

2019	2020	Goal for 2025
750	400	N/A

OUR APPROACH

Based on a corporate culture where employees are considerate of others and diversity is respected, Doosan Infracore helps its employees achieve personal growth at their own pace according to the Functional Competency (FC) system while applying reasonable standards and principles and providing fair opportunities. Through this, we have been creating a mutually beneficial cycle in which people grow, and the growth of people in turn leads to the growth of the business. In addition, we are building a sound corporate culture and win-win labor-management relations with the aim of standing proud.

ESG Strategic Task for 2020

Establish management system and strengthen monitoring to enhance the human rights mindset

Since 2017, Doosan Infracore has been building a human rights management system focused more on preventive measures through its ESG strategic task of "establishing management system and strengthening monitoring to enhance human rights mindset." We are also going beyond the existing post-management enhancement efforts and education on human rights, and instead we are diagnosing the organization's awareness level on human rights, developing a due diligence tool to prevent human rights violations, and taking other preventive activities in advance.

— Activities and Achievements: Established and announced the human rights policy declaration; provided human rights education to all employees (gender equality, improving disability awareness, anti-workplace bullying statutes); ran the "Building Healthy Partnership Together" program for employees in contact with suppliers; and executed the WTD (Winning Team Dynamics) course to promote mutual respect within the organization and team building

— Plans: Continue to provide online human rights education; provide off-the-job training on human rights to all technical staff; develop and conduct an organizational culture survey; and run organizational development programs using WTD course

Human Rights and Diversity

Respect for Human Rights

As a participant of the UN Global Compact (UNGC), Doosan Infracore supports the UNGC's 10 Principles on Human Rights, Labour, Environment, and Anti-Corruption, and complies with the International Bill of Human Rights and the International Labour Organization (ILO) Declaration on Fundamental Principles and Rights at Work. Moreover, we respect the human rights of comprehensive stakeholders, including our employees and suppliers. We do not tolerate any type of verbal abuse, violence, sexual harassment, or other improper acts that violate the spirit of "Inhwa," meaning harmony between people, in interactions within our organization and with suppliers. Doosan Infracore runs reporting channels, such as the Human Rights Protection Center (Help Line) and the Internal Reporting Center to report verbal and physical abuse. In the event of a violation, the Personnel Committee will take immediate action according to the relevant regulations and provide education to ensure that the same violation is never repeated and to build up human rights awareness.

Enhancing the Management of Human Rights Risks As a global company, Doosan Infracore is committed to fulfilling its responsibilities regarding human rights. To this end, we have set the establishment and implementation of human rights risk management system as one of our strategic ESG tasks, managed by the concerted efforts of the ESG Committee. To identify the status of human rights within the organization, we reviewed the reports received through our reporting channels and the outcomes of our focus group interviews, and established a process for responding to violations of human rights based on the results of our studies. We also distributed human rights risk prevention manual. To raise awareness concerning the importance of the human rights of our employees, we expanded the existing Gender Equality Center into the Human Rights Protection Center. In addition, we have continued to provide on/offline education to our office workers and technicians, customized to their different working environments, since 2017 with a goal of enhancing employee awareness of human rights. In 2020, we established a human rights policy declaration on 13 items in accordance with government guidelines, and reached an agreement with the labor union.

Types and Details of Human Rights Violations

Type[1]	Details	Type[1]	Details
Discrimination	Gender	Verbal and physical abuse	Verbal abuse and violence
	Age, position, and employment type		Sexual harassment
	Country of origin and race		Alienation and bullying
	Marriage and childbearing		Invasion of privacy

[1] The types of human rights violations are based on the company's code of conduct and guidelines on the creation of a sound organizational culture.

We conducted a survey of all of our leaders and office workers to diagnose their level of human rights, aimed at identifying potential human rights risks and preemptively strengthening preventive measures. The results of the survey, which is conducted every other year, were disclosed by comparing them with the results of the previous survey, and information was shared on what factors were needed to fully establish a desirable organizational culture. In addition, we operated an organizational development program, "Winning Team Dynamic (WTD)," for new leaders and for members of specific departments. The program is structured to increase cooperation and build a positive organizational culture through mutual understanding, respect, and better communication between employees. It earned highly positive responses from participating employees, and we will expand the WTD program to include an online program so that more organizations can participate in it without any spatial constraints, thereby establishing a corporate culture where human rights are fully respected.

In 2021, we will develop organizational culture survey questions and conduct a survey, in addition to continually providing human rights education, so as to identify employees' level of understanding, participation, and satisfaction towards the organization and functions and derive tasks for improvement. By doing so, we will strengthen the human rights management system and organizational culture.

Grievance Reporting Channels and Handling Processes Doosan Infracore strives to prevent and properly handle sexual harassment and any other verbal and physical abuse in the workplace. To this end, we are operating the Help Line at the Human Rights Protection Center (previously called the Gender Equality Center), while also providing all employees with education on gender equality, including prevention of sexual harassment. We identify employees' grievance through diverse channels, such as the Human Rights Protection Center, the Internal Reporting Center, and the Cyber Reporting Center on the company website, and promptly respond to them. We protect the privacy of the informant by maintaining anonymity, and handle the grievances under the relevant company regulations and procedures. As a result, Doosan Infracore has handled all major grievance reports filed in Korea in 2020.

Human Rights Policy Declaration

We respect the human rights of not only our employees but also all other stakeholders with whom we have established relations in our business activities, and recommend the same level of human rights management to third parties, including suppliers. We demand our suppliers and major business partners to fulfill obligations regarding human rights protection, and monitor compliance.

As a member company of the UN Global Compact, we observe the 10 Principles on Human Rights, Labour, Environment, and Anti-Corruption. We also declare open support for human rights principles that are internationally recognized, including the Universal Declaration of Human Rights and UN Guiding Principles on Business and Human Rights; Ruggie Framework, and make utmost efforts to comply with the principles.

We have established and implement a human rights management system to prevent human rights violations that may occur in business processes as follows. In the event of a human rights violation, we make utmost efforts to take remedial measures, while engaging in continuous improvement activities to become a company that grows with society.

1. **Non-discrimination in employment and guarantee of freedom of association and collective bargaining** In employment, we prevent discrimination on grounds of gender, religion, disability, age, social status, or region of origin, etc. In addition, we recognize workers' freedom of association and freedom of collective bargaining, and do not take any disadvantageous action on grounds of labor union activities.
2. **Prohibition of forced labor and child labor** We do not acknowledge any form of forced labor that may occur in business activities, and comply with the minimum employment age that is set by the country where we do business. We comply with the minimum employment age stipulated in laws of the country where we do business, and take immediate remedial measures when we become aware of employment of a minor. In this way, we prevent all wrong labor practices that harm human dignity.
3. **Guarantee of occupational safety and responsible supply chain management** We maintain a safe work environment; observe environment, health, and safety-related laws and standards that are applied to business sites; and take separate safety and health measures for pregnant women, the disabled, and other vulnerable workers. We establish and continually examine supply chain CSR risk management policy and guidelines, and monitor compliance of all business partners. We also end business relationship with a supply chain that does not take corrective action for a serious human rights violation.
4. **Protection of human rights and environmental rights of local residents** We respect the right to life, freedom of movement, personal safety rights, and property ownership rights of local residents in the area where we operate. In addition, we adhere to the principles of the precautionary approach with regard to environmental issues, and prevent or ease serious environmental damage and environmental disasters, and establish and implement plans to control damage and disasters.
5. **Protection of customers' human rights** We take necessary caution according to statutory standards in product design, manufacturing, and indication so that no harm is caused to customer life, health, and safety due to a product defect. In the event of damage, we inform customers of the danger and quickly recall the product. In addition, we respect our customers' privacy and take necessary measures for security of personal information that we collect.

We have the Cyber Reporting Center on our website in place to prevent human rights violations that may occur in business processes, and protect whistleblowers in accordance with our confidentiality guarantee principle and quickly and impartially handle the matter.

To become Proud Global Doosan, we take the lead in supporting and complying with human rights principles.

Respect for Diversity

Protection of Employee Diversity As of December 31, 2020, there were 4,467 employees across the globe at Doosan Infracore, including 2,791 in Korea. Given the characteristics of the machine manufacturing industry, it is not easy to recruit female employees. We however strive to eliminate bias by having our female engineers take part in the interviews for recruiting. To foster the personal growth of female staff, we do not discriminate against female staff in their job assignments, nor do we place any restrictions on their assignments. The number of female employees is on the rise, so is the percentage of female managers.

Providing Fair Opportunities As specified in the Ethics Charter, people at Doosan are respected for their individual characteristics. Their employment, evaluation, and compensation are not discriminated against the grounds of gender, religion, disability, age, social status, country of origin, nationality, ethnic backgrounds, race, skin color, physical conditions, marital status, pregnancy, childbearing, family type or status, ideology, political opinions, sexual orientation, educational backgrounds, or military service. Doosan people are also not treated unfairly depending on their personal relationships with the company's officials based on their academic or geographical backgrounds.

Women's Council Doosan Infracore expanded the scope of its Women's Council, launched for the Technology Division in 2014, to company-wide in 2017, thereby listening to the voice of female employees and sharing information on gender equality from an unbiased perspective. In 2021, we will run programs designed to realize gender equality and collect opinions of a wide range of minority groups, including millennials, thereby establishing a horizontal organizational culture where diversity is respected.

Human Resources Development

Doosan Infracore has established a human resources development system, with a particular focus on the right balance between leadership and expertise, aimed at fostering "global leaders who can lead the way in organizational changes and innovation." Individual employees develop their training plans according to their strength and competency levels, and participate in various education programs suited to their growth path.

Global HR Information System

Doosan Infracore has been standardizing and streamlining its HR systems, processes, standards, and data. Accordingly, we launched a new HR system called "MY HR" in March 2017 to integrate some 50 HR systems that had been previously used by different subsidiaries in various countries around the world. MY HR is a globally integrated one-stop HR system designed to handle various HR tasks, such as Doosan Competency Model (DCM), management by objectives (MBO), and development plan (DP), as well as training applications. It is available to all Doosan Infracore business sites in Korea, China, the U.S., and Europe. All employees have the right to create or view personal information about themselves and their team members (if they are managers) through MY HR. They are thus required to sign the Pledge of Personnel Information Protection to promise to handle and process the personnel information of themselves and their team members according to certain principles.

HRD System

Leadership College	Professional College
Offer a leadership course to which unique characteristics of Doosan are reflected	Offer a professional developmet course for each function to strengthen fundamental competativeness
↓	↓
Develop global leaders who have internalized the value of Doosan	**Develop experts who will enhance the company's fundamental competitiveness and take the lead in innovations**
Orientation Program Understand Doosan and its philosophy	**Functional Competencies** Diagnose the level of functional competency and nurture
Introduction to New Roles Understand new roles and core competencies	**Expert Program** Strengthen expertise of each function in phases
Build-up Program Develop common leadership capabilities	**Faculty Program** Develop in-house instructors and facilitators
Business Fundamentals Enhance capabilities of global communication and basic business management	**Compliance & Regulatory** Understand statutory and corporate regulations

Enhancing Functional Competency

Doosan Infracore has put a sophisticated Functional Competency (FC) development system in place, with a focus on headquarters and Chinese subsidiary, in consideration of individual employee's unique skill sets and capabilities. We also encourage our employees to devise their education plans according to the result of their FC assessment.

Building the FC Development System FC enables employees to define the competencies they need to perform their duties successfully and to set their roadmap for personal growth in line with their level of competencies. Doosan Infracore operates an FC-based HR education and development system to help its employees become experts in their respective fields. We have been implementing the FC diagnosis, aimed for systematic nurturing of function experts, since 2012. From 2019 to 2020, we updated diagnosis items to the latest version by reflecting the latest technology and work area expansions per function. In addition, based on FC diagnosis results, we are providing the FC Level-up program that is specialized for each individual, such as work-based development, training support, and organizational culture activities. In particular, we adopted the R&D master system to present a growth vision to R&D staff and to secure R&D experts who would lead future technologies. 11 internal R&D staff proven to have top technical skills were honored as masters and are provided with active support so that they can perform roles as a technology pioneer and also nurture successors. In 2021, we will further upgrade the in-house academy course, aligned with the FC system, and establish an online platform to provide quality content with the aim of expanding our expert pool.

To nurture its technical staff to a high level of expertise and competitiveness in their respective fields, in 2014 Doosan Infracore set up a draft FC system for technical staff based on National Competency Standards (NCS)[1]. This was followed in 2017 by competency assessments across 11 technical categories, and the implementation of an FC-based HR development plan, including the building of an FC diagnostic system and the launch of job training linked to the FC system in 2018. In 2019, the FC diagnostic system was completed for all 11 job categories, and new job training courses were launched based on the results of the diagnostics. NCS-based training program and self-diagnostic tools have enabled us to manage technical job competency more systematically. By systemizing the job competency of technical staff, we have also established a more systematic expert fostering process. Doosan Infracore became the first major Korean company to apply the NCS to its employee skill diagnostics system, and its NCS-based FC development system for technical staff was recognized as a pioneering case by the Human Resources Development Service of Korea in January 2020 and will be shared throughout the industry. In 2020, we developed and operated a new course to which the results of FC diagnosis were reflected, with the goal of strengthening production and quality competencies, and expanded the sharing of results, thereby increasing employee understanding. In 2021, we will adopt the micro learning platform to build a mobile-based learning infrastructure so that all employees can access the learning platform without having to use a PC. We will also accelerate the pace of developing contents for micro learning to nurture technical experts based on the FC system.

Competency Development Trainings Doosan Infracore operates in-house Functional Academy aimed at strengthening employees' fundamental competitiveness based on the FC system and to provide solutions that enable them to secure fundamental competencies. Internal experts design their own lectures to offer practical help, and every year, we develop new courses while also updating the exisiting ones by refelecting technology trends. Employees can participate in the Function Academy courses anytime anywhere by using diverse smart devices, including their personal IT equipment, enabling them enjoy self-directed learning.

As set out in the company's digital transformation direction, Doosan Infracore offers courses to help foster experts with business acumen and theoretical skills in data analysis, management, and utilization. The "DRAW (Digital Edge Reinforcement at Work)" course was launched in 2018, followed by the "FIDAS (Field Data Scientist)" course in 2019 to nurture in-house data experts. In 2020, we adopted the FIDAS Advanced course that connects in-depth machine learning and business projects, thereby establishing a course to nurture data experts. Even in the circumstances where offline training was limited due to COVID-19 in 2020, we used online live classes and thus fostered more than 80 digital personnel. We also adopted the "AI Community," a self-directed AI learning group, to share and diffuse knowledge and experiences as a way to support data-based decision-making. In 2021, we will upgrade the FIDAS course, adopt new courses, and continue to make other efforts to become a data-driven decision company.

In December 2017, Doosan Infracore launched "CELL (Community of Employee-Led Learning)," a new employee learning support system, to promote and support employees' self-directed, small-group, job-related learning activities. A CELL consists of 3-10 employees who choose the education contents and methods they want to develop, and undertake autonomous learning on this basis for 5 months. The CELL had run 6 classes by the end of 2020, participated by 1,851 employees in 265 CELLs. In 2021, we will further strengthen field learning activities by expanding the hybrid-type CELL that is jointly participated in by office and technical employees, supporting patent-related activities, and additionally supporting technology development tasks.

In-house Function Academy Operations

(As of December 2020)

Risk type	Responsive measures	No. of employees who completed the courses in 2020
R&D	Machinery/electrical and electronics/material technology, design tool, patent, operation practice, etc.	633
Production/ Quality	Welding, quality management system, statistical quality management, etc.	82
Sales & Marketing	Introductory sales, understanding products, negotiating, marketing, outline of new products, etc.	-

Developing Global Talent

Leadership Training Leaders play a central role in shaping the future of the organization to which they belong. Doosan Infracore, therefore, offers a wide range of advanced leadership programs, including the Leader Coaching Program and Junior Group Competency-Strengthening Course, to help employees understand and learn about leadership that is needed for each position. Since 2019, we have been offering the one-on-one coaching program to nurture next-generation leaders and the Leader Group Coaching Course that helps team leaders strengthen their ability to execute coaching, which led to positive changes of leaders. We also conducted employee survey on their level of perception of change to verify coaching effectiveness. In particular, we confirmed around 14% leadership improvement effects in case of Leader Group Coaching. In addition, we have been offering on/offline simulation course for junior group employees since 2019 so that they understand the company's value creation structure and the impact their work has on the company by experiencing business in environments that are similar to the actual environment and to help them develop business insight. More than around 100 employees completed, which was offered six times, by 2020. We will continue the one-on-one coaching program in 2021 while developing a customized program to support new leaders in our continuous efforts to nurture next-generation leaders. We will also continue to strengthen the Winning Team Dynamics course to diffuse positive energy within the organization.

Pre-training for Overseas Expatriates In 2020, all language courses were offered online due to COVID-19. Through online live classes, we continued to run "Let's Do Biz English," a course designed for employees to learn and practice business English so that they can immediately use it in actual work. We also have developed a nine-week intensive Chinese learning program offered online for employees who will be working as an expatriate in China. The language courses are run based on a process of selecting employees so that the courses are provided to employees who need them for work in connection with their respective function. We offer a separate e-learning program for employees seeking to improve their language skills in a self-directed way. In 2015, Doosan Infracore launched "Global Mobility Support (GMS)," a collaboration website, to provide expatriates with information about various regulations, welfare benefits, and tips intended to help them enjoy a pleasant life overseas. We also run on/offline programs tailored to our employees and their family members.

[1] National Competency Standards (NCS): The systemization of the knowledge, skills and processes required to perform various jobs at industrial sites in Korea

HRD System for Technical Staff

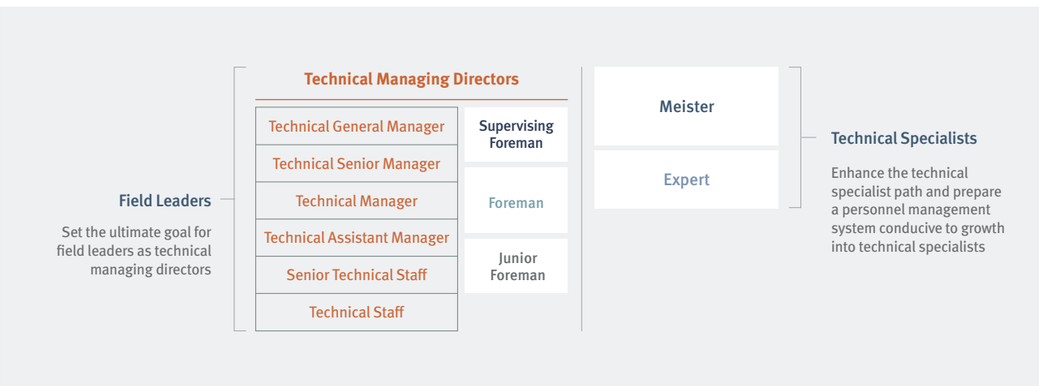
System to Foster Technical Staff Doosan Infracore has been building human resources development (HRD) systems for its technical staff to encourage them to pursue personal development and have a clear vision. To this end, we have been making continued efforts including by reforming the systems for the job assignment, promotion, and competency evaluation; launching courses to develop technical experts; establishing an FC system; operating the change agent (CA) system for technical staff; and conducting global benchmarking. In 2012, we introduced the position and promotion system so as to present our technical staff with a vision for personal growth and pride in their individual ability and status. With the introduction of the assessment system for technical staff, leaders became aware of the importance of nurturing their team members' competency, while team members were encouraged to develop their own strengths. We also established technical specialist courses designed to help our technical staff further develop their job competencies to be acknowledged as an Expert or Meister, which in turn provide them with opportunities for growth. In addition, technical staff plays an important role in resolving issues within the organization through CA activities by assisting the company's top management in identifying issues we face. We also provide learning and growth opportunities through global benchmarking to improve competencies of individual technical staff which also contributes to further enhancing our organizational competitiveness. In 2016, we overhauled our FC-based HRD system in cooperation with field leaders and changed the titles of our technical staff from entry-level employees to managers, thereby bringing about positive effects of raising their social status.

Doosan Infracore established its Career Development Paths of Technical Staff by creating a technical managing director system and strengthening the existing technical expert system, thereby offering its technical staff a choice of becoming a "field leader" or a "technical specialist." A technical managing director is a person with leadership and practical skills and plays his/her role as a team leader in the company's production units, presenting technical staff with a vision to be a top leader. A technical specialist is a field expert with professional skills and strong competitiveness, leading the growth of the company. Through this system, technical staff can choose from the two development paths – the "technical specialist track" which enables them to grow into Meisters and the "field leader track" in which they develop into executives in charge of production sites.

In January 2017, in 80 years after the company's founding, the first technical managing director was appointed, which was followed by the selection of a Meister, a top technical expert, in 2019, and there are currently five Meisters. The title of Meister is the highest honor of technical staff that is granted to technicians with the best technical skills and expertise in the respective function. We select a Meister through a process that can be trusted by our employees, including competency evaluation and verification, 360-degree interviews with colleagues, and strict comprehensive evaluation conducted by the Professional Technical Committee. Going forward, Doosan Infracore will continue to foster its technical staff in a systematic way so that they can improve their work engagement with pride, thereby building a virtuous cycle of growth at the corporate level.

Competency-building Programs The technical job training system was established through cooperation between our production executives and on-site VOCs, and 271 courses in total are now being developed, in stages according to priority. In 2020, there were 41 programs for the employees' study clubs, aimed at sharing technologies or passing technical license exams, and 257 persons (including double counting) completed the courses. In 2021, we will continue to support the employees' study clubs, establish a management system for the outcomes of the study clubs using TEAMS, and develop them into knowledge assets of the company, to promote a voluntary, field-oriented learning culture. As a result of these efforts to foster technical experts, 163 Doosan Infracore employees, or 14% of its full-time technical staff, had been nationally certified as master technicians as of December 2020, and 14 of them have obtained their master technician title in more than two areas, meaning that the company has obtained 182 master technician licenses.

Career Development Paths of Technical Staff



In 2021, we plan to run a course designed to nurture knowledge creators in order to create a corporate culture where functional expertise is shared. Those employees who acquire expertise through the company's support system in turn disseminate it throughout the company, creating a virtuous cycle within the organization.

Doosan Infracore runs group coaching programs tailored for field leaders in technical positions. This helps to resolve any on-site issues with the support of professional coaches, and is bringing about practical changes and more advanced leadership through daily learning and coaching. We operated the technical field leader coaching program in accordance with the technical leadership education system that was developed based on the role model for technical field leaders established in 2017. In addition, we have set an education plan to boost organizational vitality to nurture YBs[1] in the technical field, and have been running the "Vision Camp" to enhance their leadership since 2016. In 2020, we improved our existing leadership courses for employees moving to new positions and for those who have recently been promoted as well as field leader group coaching and the Vision Camp. We also launched three new leadership courses, including Vision Camp 1 for YBs in the technical field, "Happy Retirement Preparation Course (for the second year in the three-year program)" for employees soon to be retired, and "New Technical Assistant Manager Course" that reflects the new personnel system for technical staff. In 2020, face-to-face training was restricted due to the spread of COVID-19, and accordingly, we changed three courses, including Vision Camp I, Vision Camp III, and New Technical Manager Course, to non-face-to-face training. To continue to systematically strengthen leadership capabilities of field leaders in technical positions in 2021, we will develop and execute a training program for junior foremen.

Outcomes of Development of Technical Staff

(As of December 2020; Accumulated figure)

Master Technicians	Master Craftsmen
163	3
	1 Master Craftsman of Korea[2], 2 Incheon Metropolitan City Michuhall Master Craftsmen[3]

[1] Young Boy (YB): Technical staff hired in 2004 or after

[2] Master Craftsman of Korea: This refers to those who are designated by Article 11 of the Act on Encouragement of Skilled Crafts among those who have the highest level of skilled crafts, and greatly contributed to the development of skilled crafts and the improvement of the status of skilled craftsmen by having worked in industrial fields for a long period of time.

[3] Incheon Metropolitan City Michuhall Master Craftsmen: This refers to those who are designated by Paragraph 1 of Articles 3 of the Ordinance on the Selection and Support of Incheon Metropolitan City Michuhall Master Craftsmen among those who are equipped with an outstanding spirit of master craftsmen and the highest level of skilled crafts, and greatly contributed to the development of technologies by having worked in industrial fields for a long period of time.

Invigorating Organizational Culture

Improving the Way of Working

Changes Starting from Leaders Doosan Infracore emphasizes the need for its leaders to initiate changes and set a strong example for others to follow. We hold leadership sessions on an annual basis to bring together the CEO and senior executives to share the latest changes in business management environments, figure out the implications of such changes, discuss the directions that our organizational culture must pursue, and find ways to make improvements.

Operating the CA Channel Doosan Infracore makes constant improvements in its way of working through the Change Agent (CA) channel run by each executive organization. Serving as a bridge between executives and staff, a CA has a CORE Time on a monthly basis to identify inefficiencies at work, discuss improvement measurements with leaders, and implement necessary tasks.

Improving Office Work Productivity Since 2018, Doosan Infracore has implemented the company-wide campaign and action plans to boost office work productivity. In 2020, we made a positive impact on productivity by adopting more efficient ways of working, helping our employees strike the right work-life balance, and strengthening our execution capabilities. Meetings and reports have been made more efficient and smarter, with a particular emphasis on eliminating gray zones which can arise from job assignments falling into gaps between departments, new types of work emerging, and ambiguities in roles and responsibilities (R&R) occurring. If issues and problems related to gray zones are solved, the office work productivity can be significantly improved, and we solved 34 gray zone-related issues.

Communication and Consideration

Doosan Infracore operates diverse communication channels, including online and offline grievance mechanisms, the Human Rights Protection Center, the company website, and the in-house portal with the goal of boosting employees' satisfaction at work through genuine communication between the company and its employees. In addition, we have been sharing media coverage about the company and public notices that we have made externally through "D-Briefing" since 2016. Moreover, we share with our employees the corporate vision, including key business strategies, new businesses, and new growth drivers, through "CEO Talks" to ensure transparent communication of corporate activities.

Work-Life Balance

Doosan Infracore complies with the labor regulations of the countries in which it operates. To further improve our employees' quality of life, we offer a wide range of welfare benefits that match each country's unique situation. In particular, we proactively support a sound work-life balance through family-friendly management practices, including the operation of childcare centers and the granting of parental leave, reduced working hours, and family care leave. We also carry out customized activities to improve corporate culture by promoting the use of flextime.

Operation of Flextime In Korea, Doosan Infracore operates a flextime system to support its employees' work-life balance. When working hours need to be altered as a means of improving work productivity and efficiency, employees can freely adjust their work hours by receiving pre-approval from their leaders as long as their regular working time per day is eight hours. In 2020, amid the COVID-19 pandemic, we encouraged our employees to work from home aimed at preventing the spread of the infectious disease.

Support for Building a Stable Life In Korea, Doosan Infracore offers industrial accident insurance, supports medical costs, and carries out regular medical checkups to protect its employees in the events of health emergencies or accidents. We also help our employees financially through loans for their children's tuition fees and housing support measures.

Employee Assistance Program Doosan Infracore runs the Employee Assistance Program (EAP) which offers counseling and education on health, finance, and other matters. In Korea, we have been operating DOOHUG, an in-house psychological counseling center, since 2014. (Please refer to page 89 of this report for further details about DOOHUG.) In China, we offer sand-therapy as a special program for employees and their family members, and operate psychological counseling programs for expatriate employees and their family members.

Moreover, we run a life-cycle design program in cooperation with an external professional organization to help retiring employees with any career shift they may be considering. The life-cycle design program offers one-on-one consulting and open lectures in such areas as career exploration, support for starting a business, life counseling, finance, and liberal arts licenses for up to ten days for around six months depending on the individual lifetime design goals.

Recharging Opportunities In Korea, Doosan Infracore encourages its employees to take a two-week vacation before or after the first week of August when domestic plants halt their operations. We have also implemented the Overseas Advanced Culture Exploration Support System for our full-time staff – office or technical staff who joins the company before January 1st of the previous year – to help them experience foreign culture on the occasion of their annual vacation periods. We offer them round-trip air tickets and Eurail passes so that they can take the opportunity to recharge themselves. This is a differentiated benefit program from other companies offered to Doosan employees, thus boosting their pride in the company.

Family-friendly Management Doosan Infracore allows its employees to choose childcare leave and family care leave or reduced working hours depending on their situations. We also run flextime and leave of absence systems according to the circumstances of the relevant countries. In Korea, we have the Mom's Caring Program in place, a company-wide policy to support pregnant employees. To this end, we publish a "Guidebook on Pregnancy, Childbearing, and Childcare" to offer information about support programs available in and outside the company regarding pregnancy, childbearing, and childcare. Also, we create a "Mom and Pop Guidebook" based on the opinions collected through the Women's Council, share it with all employees, and make constant updates.

For pregnant employees, we grant reduced working hours and prenatal checkup leave, while also offering parental leave. We guarantee a recovery period for female employees who have suffered from miscarriage or abortion comparable to that granted for childbearing. In addition, employees in their childcare period, can chose either childcare leave or reduced working hours, regardless of their gender, and we operate in-house childcare centers in three locations – Incheon, Gunsan, and Bundang. We also allow our employees to use their leave to take care of family members in need, promote personal development, or focus on infertility treatment. In China, we offer a leave of absence or a shorter workday to female employees who have just given birth to a child.

Support Systems for Family-friendly Business Management (Korea)

	System	Details	Eligibility and period
Pregnancy	Pregnant employee caring program	Parking permit for pregnant employees	Pregnant female employees
		Guidebook on pregnancy, childbearing, and childcare	
		Pregnant employee badges, stickers, and parking permit	
		Use of affiliated hospitals, in-house lounges, internal and external psychological counseling centers, if needed	
	Basic support during pregnancy	Compliance with 8-hour workday and prohibition of holiday work	Pregnant female employees (the entire pregnancy period)
		Support for medical bills during pregnancy and childbearing	Pregnant female employees (from pregnancy to childbearing)
	Shortened working hours during pregnancy	Shortened working hours for the health of pregnant employees and their babies	Pregnant female employees (reduce working time up to 2 hours per day until the 12th week and after the 36th week of pregnancy)
	Leave for prenatal checkup	Parental checkup leaves	Pregnant female employees (once per month until the 28th week of pregnancy; once every two weeks from the 29th to the 36th week; and twice per week after the 37th weeks)
Childbearing	Leave before or after childbearing	Childbearing leave	Female employees who give birth to a child (90 days / 120 days for twins)
			Male employees whose wives give birth (10 days)
		Miscarriage/abortion leave	Female employees who have a miscarriage or abortion (Leave duration varies depending on pregnancy period, with a ceiling of 90 days for pregnancy of more than 28 weeks)
	Childbirth cash gift	Cash gift in celebration of childbirth	Employees who have childbirth
Childcare	Leave for childcare	Childcare leave	Employees with children aged less than 8 years or second graders in elementary school (up to 2 years for a total of childcare leave (1 year) and shortened working hours)
	Reduced working hours for childcare	Reduction of working hours for child care (15-30 hours per week)	
	In-house daycare center	Daycare centers in Incheon, Gunsan, and Seoul	Employees with children aged 3-5 years (selected through transparent procedures at a fixed time)
Family	Special leave of absence	Leave of absence to take care of family members suffering from illness or recovering from accidents	Employees (90 days per year)
		Leave of absence intended for family members in need of special care, personal development, and treatment of infertility	Employees (6 months + additional 6 months)

Win-Win Labor-Management Relations

Compliance with Labor Policies

Doosan Infracore complies with the labor standards of the International Labour Organization (ILO). We conduct investigations to detect any child labor or forced labor practices within the company through the annual ESG assessment of all domestic and major overseas business sites. In 2020, the self-assessment proved that none of the company's business sites in Korea and overseas have resorted to child labor or forced labor of any kind. We have also signed the Guidelines on the Protection of the Working Conditions of In-house Subcontractors' Workers with the Korean Ministry of Employment and Labor. Accordingly, the company ensures compliance with relevant regulations through a regular monitoring, and we also comply with the government's guidelines on fair transactions and thus properly operate in-house subcontracting activities.

Labor-Management Relations

Since 2011, Doosan Infracore has maintained and developed labor-management relations based on mutual trust and respect, including the strike-free conclusion of collective bargaining agreement for 10 years in a row. Labor and management continue to communicate through diverse channels, including the Labor-Management Council and the Welfare Subcommittee, and share major issues through the quarterly Business Information Session. In 2020, labor and management announced the joint labor-management declaration for more advanced labor-management relations, and also made joint effort to prepare for improvement activities for quality, safety, and working environment. In addition, each of our business sites in Incheon, Gunsan, and Ansan holds a "Building a Great Workplace Committee" meeting every two months, and thus improves the work environment based on employees' opinions.

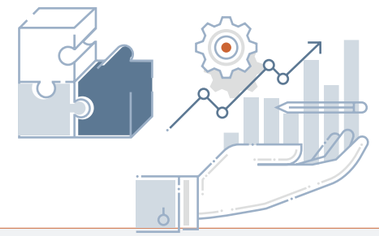
Our Chinese subsidiary has established a special council in accordance with the Trade Union Law of the People's Republic of China which is equivalent to the Labor Standard Act in Korea. The special council's members are elected by vote. It holds a monthly meeting with the special council to discuss major developments and share opinions on various worksite issues, and discusses wage on an annual basis.

Communities

Doosan Infracore will grow into a reliable and reputable company that contributes to the sustainable growth of local communities by generating not only business opportunities but also social values based on its expertise and competencies.

CCI investment (Korea)		(Unit: KRW billion)
8.64	8.91	N/A
2019	2020	Goal for 2025

CCI investment per sales (Korea)		(Unit: %)
0.28	0.33	N/A
2019	2020	Goal for 2025



OUR APPROACH

Infracore has established a global CCI system and guidelines that reflect its corporate capabilities and social demands while carrying out CCI activities worldwide guided by a common set of core values. The CCI Committee ensures that donations are spent in a transparent way. Together with our employees around the globe, we are implementing CCI programs that are instrumental to the development of local communities.

SUSTAINABLE VALUE FRAMEWORK

People | **Corporate citizenship and donations**

Doosan Infracore, as a responsible corporate citizen, aims to contribute to the creation of a sustainable community through constant CCI activities based on partnerships.

CCI Strategies and Directions

CCI System

CCI Strategies Doosan Infracore generates not only business opportunities but also social values by leveraging its expertise and competencies to grow into a trusted and reputable company that contributes to the sustainable growth of its own and local communities as well. To this end, we plan and execute corporate community involvement (CCI) activities that take into account the characteristics of local communities based on our CCI guidelines and continuous communication with local communities. The ESG Team at the head office is taking a central role and works in partnership with staff in charge of our overseas business sites.

CCI Strategies

Mission: To boost local communities' future competitiveness and the company's corporate values through strategic CCI activities

Value: To promote the shared growth of the company and society through CCI activities

3 Strategies: Support for the next generation | Support for local communities | Support based on the company's core competencies

In 2020, we updated our CCI roadmap in consideration of internal and external environment changes based on company-wide CCI strategies, and worked on stabilizing the Dream School program that we reorganized with the goal of voluntary CCI expansion, continually collecting VOC, strengthening community-centered activities, identifying new CCI activities, and developing CCI activities based on employee participation. We carried out online activities in particular, as a way to continue our CCI activities amid the COVID-19 pandemic. In 2021, we will evaluate the performance of the Dream School program and develop new CCI programs according to the relocation of our company building.

Operation of the CCI Committee and the CCI Council Doosan Infracore spends donations after carrying out a comprehensive review of the public interest and appropriateness of programs and institutions, and the relevance of programs to the company's CCI direction. For the more transparent and proper collection of donations and execution thereof, we launched the CCI Committee, an organization that deliberates on and determines all matters related to donation, in 2017 and established relevant regulations. Led by the CEO, who also serves as the chairman of the ESG Committee, the CCI Committee is comprised of the CFO and executives in charge of legal affairs and ESG. The Committee deliberates where to spend donations followed by reviews of how much to spend on each proposed program considering each program's relevance to the company's business and its public nature together with the company's financial situation. Doosan Group's CCI Committee, which is composed of executives from major affiliates of the Group including Doosan Infracore, discusses and makes decisions on policies on donations along with the donation beneficiaries and amounts for each affiliate. In addition, donations worth KRW 500 million or those deemed necessary to be reviewed by the BOD are deliberated and approved by the BOD.

Support for the Next Generation

Dream School Doosan Infracore has been running "Dream School," a dream-finding program for youth based on mentoring, since 2012 together with World Vision, an international NGO devoted to humanitarian aid across the world. As one of our flagship CCI programs, the Dream School helps youth living nearby our business sites in Seoul, Incheon, and Gunsan to nurture their dream for five years from second grade of middle school by offering mentoring programs, education for self-discovery, Dream Project activities, and other experiential programs to help them shape their career path. Middle school mentees take part in a mentoring program provided by Doosan Infracore employees for two years – it also includes education for self-discovery, specialist mentoring sessions, and career experiences. High school mentees engage in self-directed activities, including meeting with professionals through Dream Club activities, in an effort to shape their career paths.

The first year of Dream School mainly consists of "Dream Leaders" activities where a mentor and mentee meet once a month to discover the mentee's area of interest and dream. There are also other activities that form a sense of closeness between mentors and mentees including the "Summer Camp" where mentees meet friends from other regions, "Professional Mentoring" where mentees meet professionals, and "Home Coming Day" where mentees meet Dream School graduates. In the second year, the "Dream Project" is executed to improve youth's problem-solving capabilities with the advent of the Fourth Industrial Revolution era that is changing the world faster than ever. Mentees think about, identify with, and discover solutions for daily life problems that requirement improvement, and challenge themselves to find solutions, thereby enhancing their independent problem-solving skills. The high school program focuses on emotional support and capacity building through coaching programs while also increasing the practical understanding of their dreams and aspired careers through opportunities to meet professionals.

Dream School activities in 2020 were carried out using a video conference platform to prevent the spread of COVID-19, and 22 mentees of the 7th class with 19 mentors of our employees participated in career exploration activities online. We have been making continuous efforts to help the mentees to grow into good members of society by encouraging them to participate in various community activities, such as experiential activities, professional coaching, and peer activities, in addition to mentoring support offered by our employees. From 2012 to 2020, 437 youth and 389 employees shared the journey to nurture dreams of youth, and those who participated in the 1st, 2nd, and 3rd classes of Dream School have grown into respectable members of society. Going forward, Doosan Infracore will continue to develop new programs in consideration of expectations and standards of the participating students so as to make Dream School a more practical and sustainable CCI activity.

Construction Support for Hope Elementary Schools in China Under the slogan of "We will build a beautiful China together," Doosan Infracore China Corporation (DICC) has been participating in "Project Hope," a public service project that involves the provision of educational support for Chinese youth and improvement of the educational environment in underprivileged regions of China. DICC has been supporting the construction of Hope Elementary Schools, thereby providing local youths opportunities for education and contributing to the development of local education and sustainable development of the country. DICC also operates an honorary school principal system together with dealerships in China, and it has been holding the "Doosan Hope Travel Summer Camp" every summer since 2007. Under the honorary principal system, the CEOs of Doosan Infracore dealerships are appointed as principals with the aim of encouraging participation of dealers and ensuring continued support for the schools. Also, teachers and students of Doosan Hope Elementary Schools from all around the country are invited to join the summer camp, which enables students to enjoy cultural experiences while having fun. DICC supported ten schools in 2020, and will continue to provide support in 2021 to share hope with children.

Support for Local Communities

Doosan Infracore carries out corporate community involvement (CCI) activities in consideration of the characteristics and needs of local communities with an aim to grow together with them. We hold workshops with staff in charge of CCI at our business sites, and share the CCI direction and major annual schedule, while collecting their opinions. By doing so, we promote various CCI activities that address the needs of communities based on cooperation with reputable non-profit organizations in local communities.

Doosan Infracore carries out a variety of CCI activities with the participation of not only its employees but also their family members in a way that the activities can bring practical assistance to local communities. In Seoul, we conduct activities aimed at improving the residential environment of the neighborhoods in which our business site is located, while in Incheon and Gunsan, we support local community welfare facilities as part of our efforts to improve the welfare of local residents. We also continue to supply kimchi and briquettes to the underprivileged in local communities, and to offer support to welfare facilities, soup kitchens, and other social welfare organizations. We undertake our CCI activities with funds raised through voluntary financial contributions from our employees in the form of Collecting Small Change from Employee Salary and the Employee Donation Accounts, as well as the company's donation in the form of a matching grant.

In particular, when the number of confirmed COVID-19 cases increased in 2020, we provided around 7,900 masks to prevent the spread of infection in areas located near our business sites (village of tiny one-room housing in Changshin-dong, Seoul; and Hwasu-dong and Manseok-dong in Incheon). To help with building a hospital for emergency accommodation of COVID-19 patients in Wuhan, China, we provided 40 excavators, drivers, and the service team, and also delivered medical supplies and relief donations worth around RMB 1.1 million (around KRW 186 million). Recognized for Doosan Infracore's active participation in responding to COVID-19 and for carrying out diverse socially responsible activities in China, the company was chosen as a social company at the 5th China Corporate Citizen Brand Summit that was held in 2020 and received the Best CSR Brand Award at CSR China Education Awards. Doosan Infracore will carry out CCI activities based on continued interest as a member of the local community.

Support Based on the Company's Core Competencies

Doosan Infracore leverages its business resources to promote its CCI activities, including expertise in construction mechanical engineering and product development.

Support for Natural Disaster Relief In the event of a massive disaster such as an earthquake or a typhoon, Doosan Infracore promptly provides construction equipment, such as excavators, wheel loaders, and compact construction machinery, and funds for relief efforts, thus providing support based on its core competencies – one of the company's core CCI strategies. We have provided construction equipment and donations for rapid relief and recovery from devastating natural disasters around the world, such as Hurricane Katrina in the U.S. in 2005, the Sichuan earthquake in China in 2008, the earthquake in Haiti in 2010, the Tohoku earthquake in Japan in 2011, Typhoon Haiyan in the Philippines in 2013, the devastating earthquake in Nepal in 2015, and the earthquake that hit Indonesia in 2018.

Donation of Equipment and Model Doosan Infracore donated excavators, parts, and engines made for testing during the product development stage to the relevant departments of universities and vocational high schools for the purposed of education. In 2019, we donated prototype engines for educational use to the University of Seoul and Seoul University of Science and Technology, and donated construction equipment, engines, hydraulic pumps, and cylinders, and also ran training programs for the Ajou Motor College. In April 2020, we donated a D34 prototype engine to the Gimje Campus of Korea Polytechnics. By donating equipment, we seek to help foster construction equipment and engine talent, thereby contributing to the development of local communities. In addition, we have donated compact track loaders and the attachments needed to clear snow in winter and control weeds in hazardous conditions to military units stationed along Korea's often snowbound northern border.

The Junior Engineering Class Launched in 2008, the Junior Engineering Class is a talent donation circle mainly consisting of Doosan Infracore's R&D executives and employees. We offer experience-based classes, including science kits, to elementary school students nearby our business sites in Korea to help them learn the basic principles of science in an easy and interesting way, such as steel, solar cars, electrostatic power plants, and glasses which prevent drowsiness. Face-to-face activities were limited in 2020 due to COVID-19, but we held the "online Junior Engineering Class" using a video conference platform. We provided a class on various engineering principles once a quarter based on the concept, "Concept-X," an autonomous solution of Doosan Infracore, to around 30 elementary school students at a local children's center near the Incheon Plant.

Employee Engagement

Doosan Day of Community Service

The Doosan Day of Community Service refers to the CCI activities undertaken by Doosan Group employees. They assess the needs of the local communities in which Doosan Group operates around the world, and then lend a helping hand. Doosan Infracore takes part in making meaningful changes through the Doosan Day of Community Service every year, making the event a festival of sharing. Due to COVID-19, we were not able to carry out the Doosan Day of Community Service, a face-to-face volunteer activity. Instead, we donated around KRW 25 million worth of items, including vehicles to deliver packed lunch and heating devices, to local communities and welfare organizations located near our business sites in Incheon, Gunsan, and Boryeong. As a corporate citizen, Doosan Infracore will continue to take active part in social contribution activities for local communities.

Employee Donations

Approximately 72.3% of Doosan Infracore's employees in Korea, excluding expatriates working overseas, participate in the company's employee donation programs as of the end of 2020. These consist of the "Collecting Small Change from Employee Salary" scheme and the "Employee Donation Accounts," alongside the company's matching grant. The funds raised are donated to the Community Chest to which the company has been making donations since 2011 as part of its efforts to spread a culture of sharing and donation. Information on usage of the funds is transparently disclosed through the CCI information system and internal portal news. We conduct a CCI survey every two years and receive employee recommendations on groups that require support from the company, and then use employee donations to provide items and programs needed by local communities. In 2020, we provided support for facility improvements and counseling programs at six welfare organizations located in areas where our business sites are located, including Incheon and Gunsan. Going forward, we will become a valued corporate citizen that contributes to local communities by continuing our wide-ranging sharing activities.

Building a System for Employee Engagement

Doosan Infracore is operating various systems to establish a corporate culture where employees' participation in CCI is encouraged. The company built a CCI Information System on the company Intranet to increase employees' awareness of the company's voluntary services while keeping track of their participation and managing the employee donation. In addition to company-led CCI programs, we operate a support system for voluntary service clubs run by our employees. In addition, we run diverse support programs, such as the CCI diligence and indolence system and reward system, to encourage the voluntary participation of employees in CCI activities.

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Consolidated Financial Statements

Consolidated Statements of Financial Position

Doosan Infracore Co., Ltd. and Subsidiaries | December 31, 2020 and 2019

(in Korean won)

	December 31, 2020	December 31, 2019
Assets		
Current assets		
Cash and cash equivalents	₩ 1,663,459,039,827	₩ 756,173,371,116
Short-term financial instruments	139,940,131,859	144,970,645,937
Short-term investment securities	111,160,898,007	9,318,795,000
Trade and other receivables	1,358,281,427,677	1,369,116,857,182
Derivative assets	415,822,604	18,988,676,082
Inventories	1,589,908,086,009	1,786,289,860,152
Other current assets	186,449,615,091	220,054,157,373
	5,049,615,021,074	4,304,912,362,842
Non-current assets		
Long-term financial instruments	582,864,908	880,896,511
Long-term investment securities	40,447,591,006	14,272,106,397
Long-term trade and other receivables	4,969,070,586	3,801,609,182
Investments in associates and joint ventures	143,219,994,410	102,979,090,904
Property, plant and equipment	1,851,511,569,146	1,871,456,154,884
Intangible assets	4,480,673,780,764	4,562,367,986,165
Investment properties	135,527,255,910	138,829,679,310
Deferred tax assets	156,818,059,667	174,235,049,341
Right-of-use assets	88,408,864,815	95,677,455,743
Other non-current assets	75,112,121,557	69,180,589,842
	6,977,271,172,769	7,033,680,618,279
Total assets	₩ 12,026,886,193,843	₩ 11,338,592,981,121
Liabilities		
Current liabilities		
Trade and other payables	₩ 1,600,710,190,244	₩ 1,599,449,470,221
Short-term borrowings	930,840,259,045	591,083,320,796
Current portion of bonds	612,592,894,338	1,037,594,646,618
Current portion of long-term borrowings	80,918,529,449	621,375,844,987
Current tax liabilities	32,897,125,091	30,414,605,601
Current derivative liabilities	220,775,235	492,095,603
Provisions	240,699,675,799	236,982,347,908
Current lease liabilities	25,214,690,922	28,225,777,667
Other current liabilities	358,548,574,067	338,801,722,238
	3,882,642,714,190	4,484,419,831,639
Non-current liabilities		
Other non-current payables	5,658,287	1,370,355,771
Bonds	1,795,800,115,056	902,476,286,676
Long-term borrowings	868,988,012,974	751,008,617,154
Net defined benefit liabilities	438,980,831,440	429,338,000,825
Non-current derivative liabilities	43,774,149,009	1,974,340,123
Deferred tax liabilities	272,264,977,225	260,072,401,549
Non-current provisions	62,526,535,945	52,254,778,188
Non-current lease liabilities	52,184,669,864	51,179,799,272
Other non-current liabilities	120,719,925,261	136,946,531,665
	3,655,244,875,061	2,586,621,111,223
Total liabilities	7,537,887,589,251	7,071,040,942,862
Equity		
Share capital	1,079,658,125,000	1,040,806,395,000
Capital surplus	166,597,929,630	154,356,219,760
Other components of equity	(71,162,757,356)	(70,649,474,593)
Accumulated other comprehensive income	(205,475,268,112)	(159,818,151,453)
Retained earnings	1,408,125,824,003	1,257,868,188,737
Equity attributable to owners of the Parent Company	2,377,743,853,165	2,222,563,177,451
Non-controlling interest	2,111,254,751,427	2,044,988,860,808
Total equity	4,488,998,604,592	4,267,552,038,259
Total liabilities and equity	₩ 12,026,886,193,843	₩ 11,338,592,981,121

Consolidated Statements of Profit or Loss

Doosan Infracore Co., Ltd. and Subsidiaries | Years Ended December 31, 2020 and 2019

(in Korean won)

	2020	2019
Revenue	₩ 7,934,104,967,691	₩ 8,185,839,945,377
Cost of sales	(6,205,896,086,155)	(6,273,218,676,924)
Gross profit	1,728,208,881,536	1,912,621,268,453
Selling and administrative expenses	(1,069,610,266,857)	(1,072,224,207,963)
Operating profit	658,598,614,679	840,397,060,490
Finance income	199,535,878,876	150,590,559,071
Finance costs	(385,268,802,984)	(330,376,100,312)
Other non-operating income	26,126,824,534	13,936,345,577
Other non-operating expenses	(47,579,182,011)	(63,836,570,629)
Loss on equity method	(3,158,331,477)	(7,702,168,374)
Profit before income tax	448,255,001,617	603,009,125,823
Income tax expense	(163,181,318,468)	(207,310,954,827)
Profit for the year	₩ 285,073,683,149	₩ 395,698,170,996
Profit is attributable to:		
Owners of the Parent Company	₩ 148,834,138,692	₩ 239,913,446,929
Non-controlling interest	136,239,544,457	155,784,724,067
Earnings per share attributable to the equity holders of the Parent Company		
Basic earnings per share	₩ 707	₩ 1,153
Diluted earnings per share	703	1,139

Consolidated Statements of Comprehensive Income

Doosan Infracore Co., Ltd. and Subsidiaries | Years Ended December 31, 2020 and 2019

(in Korean won)

	2020	2019
Profit for the year	₩ 285,073,683,149	₩ 395,698,170,996
Other comprehensive income		
Items that will not be reclassified to profit or loss :		
Remeasurements of net defined benefit liability	(11,017,849,266)	(41,849,401,252)
Revaluation reserves of property, plant and equipment	-	33,791,953,262
Loss on valuation of equity instruments at fair value through other comprehensive income	-	(2,369,093,630)
Share of other comprehensive income of associates	-	1,737,603,778
Share of retained earnings of associates	43,762,664	(183,785,886)
Items that may be subsequently reclassified to profit or loss :		
Exchange differences	(76,846,084,349)	112,466,225,181
Cash flow hedges	3,056,646,628	1,406,355,621
Other comprehensive income for the year, net of tax	(84,763,524,323)	104,999,857,074
Total comprehensive income for the year	₩ 200,310,158,826	₩ 500,698,028,070
Total comprehensive income for the year is attributable to:		
Owners of the Parent Company	104,600,518,607	305,666,065,211
Non-controlling interest	95,709,640,219	195,031,962,859
	₩ 200,310,158,826	₩ 500,698,028,070

Consolidated Statements of Changes in Equity

Doosan Infracore Co., Ltd. and Subsidiaries | Years Ended December 31, 2020 and 2019

(in Korean won)

	Attributable to owners of the parent company							
	Share capital	Capital surplus	Other components of equity	Accumulated other comprehensive income	Retained earnings	subtotal	Non-controlling interest	Total
Balance at January 1, 2019	₩ 1,040,790,385,000	₩ 213,014,383,085	₩ (129,310,962,134)	₩ (256,805,144,728)	₩ 1,049,189,116,801	₩ 1,916,877,778,024	₩ 1,903,937,105,549	₩ 3,820,814,883,573
Total comprehensive income:								
Profit for the year	-	-	-	-	239,913,446,929	239,913,446,929	155,784,724,067	395,698,170,996
Remeasurement of net defined benefit liabilities	-	-	-	-	(31,295,789,705)	(31,295,789,705)	(10,553,611,547)	(41,849,401,252)
Revaluation reserves of property, plant and equipment	-	-	-	31,876,521,385	60,968,141	31,937,489,526	1,854,463,736	33,791,953,262
Loss(Gain) on valuation of financial assets at fair value through other comprehensive income	-	-	-	(2,540,552,371)	171,458,741	(2,369,093,630)	-	(2,369,093,630)
Share of other comprehensive income of associates	-	-	-	1,614,767,527	-	1,614,767,527	122,836,251	1,737,603,778
Share of retained earnings of associates	-	-	-	-	(171,012,170)	(171,012,170)	(12,773,716)	(183,785,886)
Exchange differences	-	-	-	61,553,072,511	-	61,553,072,511	50,913,152,670	112,466,225,181
Cash flow hedges	-	-	-	4,483,184,223	-	4,483,184,223	(3,076,828,602)	1,406,355,621
Total comprehensive income for the period	-	-	-	96,986,993,275	208,679,071,936	305,666,065,211	195,031,962,859	500,698,028,070
Transactions with owners:								
Cancellation and redemption of share options	-	243,505,810	(243,505,810)	-	-	-	-	-
Exercise of stock warrants	16,010,000	3,324,216	-	-	-	19,334,216	-	19,334,216
Dividend of subsidiary	-	-	-	-	-	-	(53,980,207,600)	(53,980,207,600)
Reclassification of other components of equity	-	(58,904,993,351)	58,904,993,351	-	-	-	-	-
Total transactions with owners	16,010,000	(58,658,163,325)	58,661,487,541	-	-	19,334,216	(53,980,207,600)	(53,960,873,384)
Balance at December 31, 2019	₩ 1,040,806,395,000	₩ 154,356,219,760	₩ (70,649,474,593)	₩ (159,818,151,453)	₩ 1,257,868,188,737	₩ 2,222,563,177,451	₩2,044,988,860,808	₩ 4,267,552,038,259
Balance at January 1, 2020	₩ 1,040,806,395,000	₩ 154,356,219,760	₩ (70,649,474,593)	₩ (159,818,151,453)	₩ 1,257,868,188,737	₩ 2,222,563,177,451	₩2,044,988,860,808	₩ 4,267,552,038,259
Total comprehensive income:								
Profit for the year	-	-	-	-	148,834,138,692	148,834,138,692	136,239,544,457	285,073,683,149
Remeasurement of net defined benefit liabilities	-	-	-	-	(417,257,631)	(417,257,631)	(10,600,591,635)	(11,017,849,266)
Revaluation reserves of property, plant and equipment	-	-	-	(1,799,768,503)	1,799,768,503	-	-	-
Share of retained earnings of associates	-	-	-	-	40,985,702	40,985,702	2,776,962	43,762,664
Exchange differences	-	-	-	(46,801,841,183)	-	(46,801,841,183)	(30,044,243,166)	(76,846,084,349)
Cash flow hedges	-	-	-	2,944,493,027	-	2,944,493,027	112,153,601	3,056,646,628
Total comprehensive income for the period	-	-	-	(45,657,116,659)	150,257,635,266	104,600,518,607	95,709,640,219	200,310,158,826
Transactions with owners:								
Cancellation and redemption of share options	-	513,282,763	(513,282,763)	-	-	-	-	-
Exercise of stock warrants	38,851,730,000	10,892,620,131	-	-	-	49,744,350,131	-	49,744,350,131
Issuance of convertible bonds	-	835,806,976	-	-	-	835,806,976	-	835,806,976
Dividend of subsidiary	-	-	-	-	-	-	(29,443,749,600)	(29,443,749,600)
Total transactions with owners	38,851,730,000	12,241,709,870	(513,282,763)	-	-	50,580,157,107	(29,443,749,600)	21,136,407,507
Balance at December 31, 2020	₩ 1,079,658,125,000	₩ 166,597,929,630	₩ (71,162,757,356)	₩ (205,475,268,112)	₩ 1,408,125,824,003	₩ 2,377,743,853,165	₩ 2,111,254,751,427	₩4,488,998,604,592

Consolidated Statements of Cash Flows

Doosan Infracore Co., Ltd. and Subsidiaries | Years Ended December 31, 2020 and 2019

(in Korean won)

	2020	2019
Cash flows from operating activities		
Cash generated from operations:		
Profit for the year	₩ 285,073,683,149	₩ 395,698,170,996
Adjustments	713,740,733,193	699,544,598,699
Changes in operating assets and liabilities	287,061,060,297	(279,345,395,612)
Interest received	18,463,373,663	15,548,783,391
Interest paid	(143,306,988,879)	(152,315,252,013)
Dividends received	560,000,000	12,982,337,562
Income tax paid	(110,745,091,807)	(124,694,966,717)
Net cash inflow from operating activities	1,050,846,769,616	567,418,276,306
Cash flows from investing activities		
Decrease in short-term financial instruments	5,030,514,078	116,468,540,790
Decrease in long-term financial instruments	240,578,471	-
Disposal of short-term investment securities	-	4,229,388,547
Disposal of long-term investment securities	3,225,381,820	89,098,064,562
Decrease in loans	260,528,473	214,655,657
Disposal of property, plant and equipment and investment properties	8,574,079,178	40,704,138,031
Disposal of intangible assets	5,076,894,597	2,661,894,631
Others	1,382,892,899	-
Acquisition of short-term financial securities	(100,500,186,033)	-
Acquisition of long-term investment securities	(30,599,233,803)	(5,373,856,271)
Increase in loans	(28,321,200,000)	-
Acquisition of property, plant and equipment	(220,138,150,928)	(266,697,358,416)
Acquisition of intangible assets	(95,719,541,929)	(182,781,856,741)
Acquisition of investment properties	(1,436,320,658)	(89,941,811,010)
Acquisition of investment in associates and joint ventures	(46,184,763,344)	(41,386,826,160)
Others	(4,056,208,823)	(6,569,781,464)
Net cash outflow from investing activities	(503,164,736,002)	(339,374,807,844)
Cash flows from financing activities		
Net increase in short-term borrowings	345,268,747,480	-
Proceeds from long-term borrowings	258,849,691,723	11,656,500,000
Proceeds from issuance of bonds	1,447,919,299,190	954,042,108,512
Exercise of stock warrants	49,540,236,110	8,747,760
Net decrease in short-term borrowings	-	(349,801,445,232)
Repayment of long-term borrowings	(646,518,781,751)	(591,644,493,100)
Repayment of bonds	(962,019,463,446)	(498,648,637,732)
Payments for lease liabilities	(34,657,953,968)	(21,423,052,313)
Dividends paid	(29,443,749,600)	(53,980,207,600)
Net cash inflow (outflow) from financing activities	428,938,025,738	(549,790,479,705)
Effects of exchange rate changes on cash and cash equivalents	(69,334,390,641)	24,904,353,149
Net increase (decrease) in cash and cash equivalents	907,285,668,711	(296,842,658,094)
Cash and cash equivalents at the beginning of the year	756,173,371,116	1,053,016,029,210
Cash and cash equivalents at the end of the year	₩ 1,663,459,039,827	₩ 756,173,371,116

ESG Facts & Figures

Economic

Economic Growth: Sales Records

Classification		Unit	2018	2019	2020
Consolidated	Sales	KRW million	7,730,108	8,185,840	7,934,105
	Operating income	KRW million	848,127	840,397	658,599
	Net income	KRW million	394,170	395,698	285,074
Separate	Sales	KRW million	3,058,277	3,102,184	2,712,338
	Operating income	KRW million	181,518	178,187	89,362
	Net income	KRW million	71,748	53,024	(37,858)

Financial Soundness: Financial Status

Classification		Unit	2018	2019	2020
Consolidated	Total assets	KRW million	11,029,167	11,338,593	12,026,887
	Total liabilities	KRW million	7,208,352	7,071,041	7,537,888
	Total equity	KRW million	3,820,815	4,267,552	4,488,999
Separate	Total assets	KRW million	4,923,151	4,965,757	5,180,809
	Total liabilities	KRW million	3,516,787	3,490,347	3,679,161
	Total equity	KRW million	1,406,364	1,475,410	1,501,648

Research & Development

Classification		Unit	2018	2019	2020
R&D investment	Korea	KRW million	135,084	149,291	136,231
R&D investment per sales	Korea	%	4.4	4.8	5.0

* Based on separate financial statements

Intellectual properties	Application[1] (Global[3])	Cases	3,576	3,914	4,285
	Registration[2] (Global[3])	Cases	2,467	2,871	3,224

1) Sum of cases that are in the state of waiting for an evaluation, being under an evaluation, or completed registration, after a patent application on the base date, and includes the number of cases of registration
2) No. of cases that were registered after an evaluation, following a patent application on the base date, and are maintaining registration status
3) Number of intellectual property rights applications and registration made at home and abroad; Based on consolidated financial statements

Transparent Management

Corporate Governance

Classification		Unit	2018	2019	2020
Attendance rate of directors in BOD meetings[1]	Korea	%	85.7	92.9	97.1

1) In 2018, the reporting scope was changed from attendance rate of outside directors (by 2017 Integrated Report) to the attendance rate of all directors. Accordingly, the attendance rate for the past 3 years was revised.

CEO-to-Worker Remuneration Ratio

Classification		Unit	2018	2019	2020[1]
CEO remuneration	Korea	KRW million	1,543	1,443	581
Average remuneration per employee	Korea	KRW million	87	89	86
Ratio[2]	Korea	%	17.74	16.21	6.76

1) Figure reflected a decision to return 30% of executive salaries due to Group business conditions (April 2020)
2) Figure calculated by dividing the total CEO remuneration by the average remuneration per employee

Ethical Management

Classification		Unit	2018	2019	2020
Completion rate of ethical management training[1]	Korea	%	95.3	95.0	99.5
	China	%	95.3	100.0	99.1

1) No. of employees who have completed the ethical management training / No. of total employees (once a year per person)

Collection rate of statement of interests form[1]	%	100	100	100

1) No. of employees who submitted a signed copy of statement of interests form / No. of office worker who has a job title of part leader or higher from among employees in Korea and expatriates working in China

Actions Taken Against Code of Conduct Violations[1]

Classification		Unit	2018	2019	2020
Disciplinary action	Korea	Cases (Percentage)	7 (44%)	5 (71%)	11 (61%)
Warning or lesser measure	Korea	Cases (Percentage)	9 (56%)	2 (29%)	7 (39%)
Total	Korea	Cases (Percentage)	16 (100%)	7 (100%)	18 (100%)

1) Includes violation of "Inhwa" (human rights, workplace harassment, sexual harassment, etc.), honesty and transparency (misconduct, corruption, information security, conflict of interest, etc.), and fair competition (supplier and fair trade, etc.)

Compliance

Classification		Unit	2018	2019	2020
Legal measures on unfair trade conduct	Korea	%	1	0	0
Fine levied due to violation of laws or regulations	Korea	KRW million	382	100	0

Policy-related Expenditures

Classification		Unit	2018	2019	2020
Total political donation	Korea	KRW million	0	0	0
Total contributions to associations	Korea	KRW million	1,502	1,271	2,244

Largest Expenditures to Associations in 2020

Classification		Unit	Amount
Korea Foundation for Cooperation of Large & Small Business, Rural Affairs	Korea	KRW million	1,400
Korea Enterprises Federation	Korea	KRW million	270
Korea Construction Equipment Manufactures Association	Korea	KRW million	257
Incheon Chamber of Commerce & Industry	Korea	KRW million	80
Gunsan Chamber of Commerce & Industry	Korea	KRW million	51

Customers

Protection of Customer Information

Classification		Unit	2018	2019	2020
Customers information leakages	Korea	Cases	0	0	0
	China	Cases	0	0	0

Environment

Environmental Expenditure and Investment

Classification		Unit	2018	2019	2020
Environmental investments and operating costs	Korea	KRW billion	17.6	7.9	13.2

Environmental Management System

Classification		Unit	2018	2019	2020
Worksites with ISO 14001 (EMS[1]) certification	Korea	Sites	3	3	4
	China	Sites	1	1	1

1) EMS: Environmental Management System

Energy Consumption

Classification			Unit	2018	2019	2020
Energy consumption (Including direct and indirect consumption)	Korea	Total[2]	TJ	2,067	2,142	1,730
		LNG	TJ	251	248	213
		Electricity	TJ	1,632	1,701	1,369
		Diesel	TJ	109	122	86
		Others (LPG, kerosene, etc.)	TJ	75	71	62
	China[1]	Total	TJ	254	228	250
		LNG	TJ	69	69	58
		Electricity	TJ	78	75	87
		Steam	TJ	25	16	28
		Diesel	TJ	81	67	76
		Gasoline	TJ	1	1	1

1) China calculates energy consumption based on net calorific value according to the "General Principles for Calculation of Comprehensive Energy Consumption GB/T2589—2008" (for steam, a formula developed by the Yantai municipal government is applied). In 2019, unit of China's energy consumption was changed to TJ, and accordingly, energy consumption data for the past three years was revised.
2) All figures are rounded off to the nearest tenth, and therefore there may be singular number difference in the sum of figures.

Resources Usage

Classification			Unit	2018	2019	2020
Raw material consumption	Incheon[1]	Scrap metal	ton	29,974	34,225	23,560
		Scrap metal intensity	ton/ KRW million	0.010	0.011	0.009
		Sand (molding sand)[2]	ton	17,762	18,406	17,284
		Sand intensity	ton/ KRW million	0.006	0.006	0.006

* Intensity is calculated based on sales of separate financial statements of each year.
1) No usage of steel plate at the Incheon Plant since the excavator plant advancement; and No usage of steel plate, scrap metal, and sand at the Gunsan Plant
2) Molding sands are 100% recycled.

Classification			Unit	2018	2019[4]	2020
Water consumption	Korea	Volume of water consumed	ton	605,326	584,771	478,505
		Water consumption intensity[1]	ton/ KRW million	0.198	0.189	0.176
		Recycled or reused water[2]	ton	67,742	56,771	53,195
	China[3]	Volume of water consumed	ton	67,863	93,289	89,784

1) Intensity is calculated based on sales of separate financial statements of each year.
2) Total volume of reused water, including reused waste water, reclaimed water, and recycled rainwater
3) Data for all business sites in China, including DICI, DICC, and DISD
4) In January 2019, the volume consumed by industrial vehicles was excluded from the volume of water consumed.

Air Emissions

Classification			Unit	2018	2019	2020
Emissions of greenhouse gas (Including direct and indirect emissions)	Korea	Total[1]	$tonCO_2eq$	108,244	112,186	**90,447**
		Scope 1	$tonCO_2eq$	28,951	29,550	**23,961**
		Scope 2	$tonCO_2eq$	79,295	82,639	**66,486**
		Intensity[2]	$tonCO_2eq$/ KRW million	0.035	0.036	**0.033**
	Incheon	Total	$tonCO_2eq$	88,572	93,197	**71,443**
		Scope 1	$tonCO_2eq$	18,102	18,754	**12,779**
		Scope 2	$tonCO_2eq$	70,470	74,443	**58,664**
	Gunsan	Total	$tonCO_2eq$	16,798	16,340	**14,936**
		Scope 1	$tonCO_2eq$	9,636	9,515	**8,525**
		Scope 2	$tonCO_2eq$	7,163	6,825	**6,411**
	Others	Total	$tonCO_2eq$	2,874	2,649	**4,068**
		Scope 1	$tonCO_2eq$	1,214	1,279	**2,657**
		Scope 2	$tonCO_2eq$	1,662	1,370	**1,411**
	China	Total[4]	$tonCO_2eq$	31,867	29,214	**33,442**
		Scope 1	$tonCO_2eq$	10,049	9,012	**9,044**
		Scope 2	$tonCO_2eq$	21,818	20,201	**24,398**
		Intensity[2]	$tonCO_2eq$/ KRW million	0.022	0.021	**0.022**
Emissions of greenhouse gas[3] (Including direct and indirect emissions)	DICC (Yantai)	Total	$tonCO_2eq$	30,843	28,118	**32,454**
		Scope 1	$tonCO_2eq$	10,021	8,964	**9,006**
		Scope 2	$tonCO_2eq$	20,821	19,154	**23,448**
	DISD (Yantai)	Total	$tonCO_2eq$	1,008	965	**881**
		Scope 1	$tonCO_2eq$	11	26	**20**
		Scope 2	$tonCO_2eq$	996	939	**861**
	Others (Including DICI)	Total	$tonCO_2eq$	17	131	**107**
		Scope 1	$tonCO_2eq$	17	22	**18**
		Scope 2	$tonCO_2eq$	0	108	**89**

1) There is a difference between the total emissions volume by GHG type and the total of worksites which sums up rounding off numbers of each worksite's emissions.
2) Intensity is calculated based on sales of separate financial statements of each year. Intensity for the Chinese business sites is calculated after Korean won calculations that are based on the average exchange rate of the respective year (Exchange rate in 2020: KRW 170.88 = RMB 1)
3) Figure was calculated by applying energy usage volume to the "Yantai Energy Reduction Information System," and can be subject to error. Doosan Infracore plans to carry out external verification of GHG emissions to increase reliability.
- Source of Scope 1 emissions includes LNG, diesel fuel, LPG, gasoline, and carbon dioxide (shielding gas for welding)
4) All figures are rounded off to the nearest tenth, and therefore there may be singular number difference in the sum of figures.

Classification			Unit	2018	2019	2020
Emissions of air pollutants	Incheon	NO_x[1]	ppm	20.3	14.2	**18.1**
		SOx	ppm	0.2	1.3	**0.2**
		VOCs (Continuous type/Non-continuous type)[3]	ppm	11.6/11.8	17.1/20.2	**11.9/6.6**
		Dust (Electric induction furnace/ Others)[4]	mg/m^3	5.7/6.8	1.98/1.81	**1.12/1.24**
	Gunsan	NO_x[5]	ppm	1.82	9.96	**4.65**
		SOx[6]	ppm	0.04	0.02	**0.00**
		VOCs[7]	ppm	7.05	5.63	**7.68**
		Dust[8]	mg/m^3	4.13	3.64	**2.93**
	China	VOCs	mg/m^3	3.80	2.82	**5.22**
		Dust	mg/m^3	10.44	2.76	**2.69**

1) Legal limit: 200ppm, company's internal limit: 80ppm
2) Legal limit: 400ppm, company's internal limit: 160ppm
3) Continuous type: Legal limit: 40ppm, company's internal limit: 32ppm / Non-continuous type: Legal limit: 200ppm, company's internal limit: 160ppm
4) Electric induction furnace: Legal limit: 20mg/m^3, company's internal limit: 8mg/m^3 / Others: Legal limit: 50mg/m^3, company's internal limit: 20mg/m^3
5) Legal limit: 200ppm, company's internal limit: 80ppm
6) Legal limit: 400ppm, company's internal limit: 160ppm
7) Legal limit: 40ppm, company's internal limit: 32ppm
8) Legal limit: 50mg/m^3, company's internal limit: 20mg/m^3

Classification			Unit	2018	2019	2020
Emissions of ozone-depleting substances	Incheon	CFC, HCFC, CH_3Br, R-22	ppm	0	0	**0**
	Gunsan	CFC, HCFC, CH_3Br, R-22	ppm	0	0	**0**

* Zero emissions of ozone-depleting substances

Effluents and Waste

Classification			Unit	2018	2019	2020
Emissions of effluents	Korea		ton	81,861	87,137	**82,097**
	Incheon		ton	74,244	80,539	**75,546**
	Gunsan		ton	7,617	6,598	**6,551**
	China		ton	58,037	71,878	**64,588**
Emissions of water pollutants	Incheon	BOD[1]	mg/L	17.1	7.4	**11.0**
		COD[2]	mg/L	18.4	10.6	**18.5**
		Suspended solids[3]	mg/L	3.0	4.0	**1.4**
	Gunsan	BOD[4]	mg/L	144.7	103.2	**76.1**
		COD[5]	mg/L	169.1	143.5	**95.6**
		Suspended solids[6]	mg/L	15.2	8.5	**7.8**
	China	COD	mg/L	20.5	21.5	**24.0**

1) Legal standard 120mg/L, company's internal standard 48mg/L
2) Legal standard 130mg/L, company's internal standard 52mg/L
3) Legal standard 120mg/L, company's internal standard 48mg/L
4) Legal standard 400mg/L, company's internal standard 160mg/L
5) Legal standard 400mg/L, company's internal standard 160mg/L
6) Legal standard 200mg/L, company's internal standard 80mg/L

Classification			Unit	2018	2019	2020
Waste discharge and recycle	Korea	Total waste	ton	32,691	37,655	**27,708**
		Recycled waste	ton	30,881	35,660	**26,349**
		Recycling rate	%	94	95	**95**
	Incheon	General waste	ton	29,309	33,426	**23,656**
		Specified waste	ton	2,349	3,567	**3,399**
		Recycling rate	%	95	96	**96**
	Gunsan	General waste	ton	727	419	**425**
		Specified waste	ton	306	243	**228**
		Recycling rate	%	78	71	**58**
	China	Total waste[1]	ton	6,086	4,878	**5,155**
		Recycled waste[2]	ton	2,801	2,836	**3,080**
		Recycling rate	%	46	58	**60**

1) Includes both hazardous and non-hazardous waste
2) Waste steel, waste wood

Safety and Health

Occupational Safety and Health

Classification		Unit	2018	2019	2020
Occupational accident rate	Korea	%	0.85	1.05[1]	**0.57**
	China	%	0	0	**0.08**

* Based on accidents requiring medical care covered by Industrial Accident Insurance
1) 2019 figure was revised due to data error

LTIR[1]	Korea		0.97	1.17	**0.61**
TRIR[2]			2.45	1.99	**1.15**
LWSR[3]			48.68	70.31	**32.24**
LTIR	China		0	0	**0.08**
TRIR			0	0	**0.08**
LWSR			0	0	**1.99**

* LTIR, TRIR, and LWSR have been managed since 2018
1) LTIR (Lost Time Incidents Rate): Number of incidents involving more than one-day closure of workday per 100 workers, Total number of lost time cases/Total number of hours worked by employees * 200,000 (Number of incidents is based on incidents by employees of Doosan Infracore)
2) TRIR (Total Recordable Incidents Rate): Number of recordable incidents that require treatment for injuries or illness per 100 workers, Total number of injuries and illnesses / Total number of hours worked by employees * 200,000
3) LWSR (Lost Workday Severity Rate): Number of lost work days experienced per 100 workers, Total number of lost work days / Total number of hours worked by employees * 200,000

Occupational Illness Frequency Rate

Classification		Unit	2018	2019	2020
OIFR[1]	Korea	%	0.147	0.315	**0.107**

1) OIFR (Occupational Illness Frequency Rate): Number of workers who have occupational illness and other related illness/Total workers (Number of workers is based on employees of Doosan Infracore; and application of calculation formula of the Korea Occupational Safety and Health Agency)

Health and Safety Management System

Classification		Unit	2018	2019	2020
No. of business sites with ISO 45001(OHSMS[1]) Certification	Korea	Sites	-	-	**4**
	China	Sites	-	-	**-**

1) OHSMS: Occupational Health and Safety Management System

Shared Growth

Support for Suppliers

Classification			Unit	2018	2019	2020
Financial support	Korea	Number of suppliers received financial support	Companies	62	53	56
		Amount of financial support[1]	KRW billion	43.5	43.5	43.5
		Ratio of cash settlement cases	%	0.3	0.2	0.2
		Number of payments	Times	Once a month	Once a month	Once a month

[1] Excluding indirect support

Technical development support	Korea	Support for developing technology	Cases	28	22	22
		Support for protecting technology	Cases	6	6	6
Education support	Korea	Training courses	Courses	14	12	19
		Staff at suppliers who completed trainings	Persons	82	96	37
	China	Training hours	Hours	52	108	127
Competitiveness enhancement support	Korea	Operation days	man-day	196	195	248
	China	Support for enhancing competitiveness	man-day	357	357	357

* Fair Trade Commission standard: 5 days=1 person (1 day=8 hours, Based on the application period of punctuality)

Part development capacity enhancement support	Korea	Provision of casting molds to strengthen suppliers' part development capacity	Companies	99	134	135
			KRW billion	21.9	28.7	20.2
	China		Companies	77	77	77

* Including multiple provision of casting molds to suppliers

EHS support	Korea		Companies	46	55	49
	China		Companies	0	13	14

Employees

Employment

Classification			Unit	2018	2019	2020
Number of employees		Korea	Persons	2,720	2,860	2,791
		China	Persons	1,299	1,255	1,205
		Global	Persons	4,468	4,603	4,467
By job	Korea	Office	Persons	1,505	1,622	1,587
		Technical	Persons	1,215	1,238	1,204
By employment type	Korea	Temporary[1]	Persons	66	96	65
		Ratio of temporary[2]	%	2.4	3.4	2.3
Diversity	Korea	Disabled[3]	Persons	32	35	36
		Veterans[4]	Persons	90	92	92
		Elderly[5]	Persons	224	327	412
		Male	Persons	2,479	2,608	2,551
		Female	Persons	241	252	240
By job	China	Office	Persons	561	562	556
		Technical	Persons	738	693	649
By employment type	China	Temporary	Persons	41	39	45
		Ratio of temporary	%	3.10	3.11	3.73
Diversity	China	Disabled	Persons	0	0	0
		Elderly	Persons	7	9	11
		Male	Persons	1,117	1,071	1,022
		Female	Persons	182	184	183

[1] Contract workers (entrustment, technology entrustment, outside directors, advisory, outside appointment)
[2] Temporary worker / Total staff * 100
[3] Based on MY HR; national disabled classification (levels 1-6)
[4] Based on MY HR; national merit recipients (person with a merit number or someone approved)
[5] Above the age of 55 (Based on total staff in Korea)

Classification		Unit	2018[3]	2019[3]	2020
Turnover rate[1]	Korea	%	1.35	1.10	1.40
Turnover rate by age group[2]	20s	%	2.25	2.26	2.44
	30s	%	1.73	1.19	1.64
	40s	%	0.95	0.75	1.42
	50 and above	%	0.36	0.52	0.32

[1] Based on regular workers. Total number of turnovers in 2020 / Total number of employees as of end of 2019
[2] Based on regular workers. Total number of turnovers in 2020 by age / Total number of employees in 2019 by age
[3] Figures for 2018 and 2019 were revised due to changes in turnover rate calculation method

Classification			Unit	2018	2019	2020
Number of employees on parental leave	Korea	Male[1]	Persons	118	118	117
		Female[2]	Persons	16	11	12
Number of employees eligible for childcare leave[3]	Korea	Male	Persons	884	926	908
		Female	Persons	54	65	68
Number of employees on childcare leave[4]	Korea	Male	Persons	14	19	26
		Female	Persons	10	22	10
Number of employees returning to work after childcare leave[5]	Korea	Male	Persons	15	19	25
		Female	Persons	9	11	16
Continue to work rate for 12 months after childcare leave[6]	Korea	Male	%	100	100	100
		Female	%	100	100	100
Number of employees on parental leave	China	Male	Persons	58	53	41
		Female	Persons	9	17	10
Return to work rate after parental leave	China		%	100	100	100

[1] Employees who began their paternity leave in 2020
[2] Employees who began their maternity leave in 2020
[3] Staff in Korea with children aged eight or under, or second graders in elementary school or below
[4] Number of employees who began childcare leave in the base year
[5] Number of employees who returned from childcare leave in the base year
[6] (12 months after the return to work) Number of current employees in 2020 from among employees who returned in 2019 / Employees who returned in 2019 * 100. Calculation for 2020 is based on figures as of March 31, 2021

Labor Union

Classification		Unit	2018	2019	2020
Union membership rate	Korea	%	93.4	94.4	94.4

* Based on technical staff (1,091 with membership out of 1,156 in total as of December 31, 2020)

Education

Classification		Unit	2018	2019	2020
Average annual training hours per person	Korea	Hours	31.7	40.6	37.6
Average training expenses per person[1]	Korea	KRW 1,000	663	750	400
Average annual training hours per person	China	Hours	17.3	14.9	10.2
Average training expenses per person[2]	China	KRW 1,000	289	352	369

[1] There was a change in the per-capita annual average training expense management standards in 2019. Accordingly training expenses per person for the past three years have been recalculated.
[2] Korean won calculations are based on the average exchange rate of the year (Exchange rate in 2020: KRW 170.88 = RMB 1)

Participation rate in education on human rights protection and sexual harassment prevention[1]	Korea	%	96.0	95.8	97.1

[1] (No. of office workers completed sexual harassment prevention education + No. of technical staff completed sexual harassment prevention education) / No. of total employees based on the data of this report

Community Involvement

Community Involvement Activities

Classification			Unit	2018	2019	2020
Number of employees who participated in CCI activities	Korea	Including double count	Persons	1,046	970	183
		Excluding double count	Persons	385	440	56
	China		Persons	1,696	1,892	588
Total hours of CCI activities	Korea		Hours	4,422	3,902	591

* CCI participation was reduced due to the COVID-19 pandemic in 2020.

Classification			Unit	2018	2019	2020
CCI investment	Korea	CCI investment[1]	KRW billion	7.73	8.64	8.91
		CCI investment per sales[2]	%	0.25	0.28	0.33
	China	CCI investment[3]	KRW billion	0.11	0.15	0.35

[1] Used amount of donation
[2] CCI investment / Sales of each year based on separate financial statements
[3] Korean won calculations are based on the average exchange rate of the year (Exchange rate in 2020: KRW 170.88 = RMB 1)

Classification	Unit	2018	2019	2020
Employee participation rate in the salary fraction donation campaign[1]	%	75	73	72
Annual fund raised by the salary fraction donation campaign[2]	KRW million	123	143	141

[1] Excluding expatriates working overseas
[2] In 2019, a change was made to disclose the fund raised by employee donation (sum of funds from the Collecting Small Change from Employee Salary scheme, Employee Donation Accounts, and the company's matching grant), and accordingly, amount of fund raised for the past three years was revised.

GRI Standards Index

GRI Standards	Disclosure	Title	Page
Universal Standards (GRI 100)			
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GRI 102	102-1	Name of the organization	Company Profile
	102-2	Activities, brands, products, and services	Company Profile
	102-3	Location of headquarters	132
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	102-6	Markets served	30-33, 132
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	102-21	Consulting stakeholders on economic, environmental, and social topics	12
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	102-23	Chair of the highest governance body	70
	102-24	Nominating and selecting the highest governance body	70
	102-25	Conflicts of interest	70
	102-26	Role of highest governance body in setting purpose, values, and strategy	12
	102-28	Evaluating the highest governance body's performance	71
	102-30	Effectiveness of risk management processes	12
	102-31	Review of economic, environmental, and social topics	12
	102-33	Communicating critical concerns	14
	102-34	Nature and total number of critical concerns	71
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	102-37	Stakeholders' involvement in remuneration	71
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	102-39	Percentage increase in annual total compensation ratio	120
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	102-43	Approach to stakeholder engagement	14
	102-44	Key topics and concerns raised	14

GRI Standards	Disclosure	Title	Page
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	102-51	Date of most recent report	May 2020
	102-52	Reporting cycle	1 Year
	102-53	Contact point for questions regarding the report	About This Report
	102-54	Claims of reporting in accordance with the GRI Standards	About This Report
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	102-56	External assurance	130-131
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GRI Standards	Disclosure	Title	Page
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	401-3	Parental leave	125
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GRI 403	403-1	Workers representation in formal joint management–worker health and safety committees	79-80, 85-87
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	403-6	Promotion of worker health	88-89
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GRI 404	404-1	Average hours of training per year per employee	125
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	405-2	Ratio of basic salary and remuneration of women to men	103
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	414-2	Negative social impacts in the supply chain and actions taken	21, 92
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* "Digital transformation and technological innovation" and "Global market strategy and product portfolio enhancement" among our material issues are not applicable to the GRI Standards Topic-specific Standards

SASB Index

Doosan Infracore seeks to provide information that is useful for decision-making to various stakeholders, including investors, by reporting the SASB framework, which is a disclosure standard by industry regarding sustainability issues that was developed by the Sustainability Accounting Standards Boards (SASB). The SASB Index was created in accordance with the Industrial Machinery & Goods industry standard of the Resource Transformation (RT-IG) sector based on the sustainable industry classification system.

Topic	Category	Code	Accounting Metric	Detailed Metric	Page
Energy Management	Quantitative	RT-IG-130A.1	(1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable	Total energy consumed is disclosed in the Giga Jul (GJ) unit	121
				Discloses the ratio of consumption of energy supplied from grid electricity	81, 121
				Discloses the ratio of energy consumption that is renewable energy	Not reported
Employee Health & Safety	Quantitative	RT-IG-320A.1	(1) Total recordable incident rate (TRIR), (2) fatality rate, and (3) near miss frequency rate (NMFR)	Discloses the TRIR	123
				Discloses the fatality rate regarding work fatality	Not reported
				Discloses the work-related NMFR	Not reported
Fuel Economy & Emissions in Use-phase	Quantitative	RT-IG-410A.1	Sales-weighted fleet fuel efficiency for medium- and heavy-duty vehicles	Discloses sales-weighted average fuel efficiency for medium- and heavy-duty vehicles	Not reported
	Quantitative	RT-IG-410A.2	Sales-weighted fuel efficiency for non-road equipment	Discloses the sales-weighted average fuel efficiency for non-road equipment and vehicles	Not reported
	Quantitative	RT-IG-410A.3	Sales-weighted fuel efficiency for stationary generators	Discloses sales-weighted fuel efficiency for stationary generators	Not applicable
	Quantitative	RT-IG-410A.4	Sales-weighted emissions of: (1) nitrogen oxides (NOx) and (2) particulate matter (PM) for: (a) marine diesel engines, (b) locomotive diesel engines, (c) on-road medium- and heavy-duty engines, and (d) other non-road diesel engines	Discloses sales-weighted average emissions of: NOx and PM for: (a) marine diesel engines, (b) locomotive diesel engines, (c) on-road medium- and heavy-duty engines, and (d) other non-road diesel engines	Not reported
Materials Sourcing	Discussion and Analysis	RT-IG-440A.1	Description of the management of risks associated with the use of critical materials	1. Specifies a strategic approach for managing risks related to use of critical materials of our products, including physical limitations to availability and accessibility, price fluctuations, and regulation and reputation risks 2. Identifies the types of critical materials that can cause significant risks to business and strategies that are used to alleviate these risks	96
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	Quantitative	RT-IG-000.B	Number of employees		124

* Indexes on product fuel efficiency and matters requiring improvement in relation to the fuel efficiency and exhaust gas discharge items are internally managed. Product exhaust gas discharge will be included in company-wide management indexes and will be disclosed.

Independent Assurance Report

(English Translation of a Report Originally Issued in Korea)

Independent Assurance Report on the Identified Sustainability Information in Doosan Infracore's Integrated Report

To the management of Doosan Infracore Co., Ltd.

We have undertaken a limited assurance engagement in respect of the selected sustainability information (the 'Identified Sustainability Information') in the Doosan Infracore's Integrated Report for the year ended 31 December 2020('the Integrated Report') listed below.

Identified Sustainability Information

The Identified Sustainability Information included in the Doosan Infracore's Integrated Report for the year ended 31 December 2020 is summarized below:

- 'Global Reporting Initiative (GRI) Standards Index' stated on pages 126~128
- 'ESG Facts & Figures' stated on pages 120~125

Our assurance was with respect to the year ended 31 December 2020 information only and we have not performed any procedures with respect to earlier periods or any other elements included in the Integrated Report and, therefore, do not express any conclusion thereon.

Criteria

The criteria used by Doosan Infracore to prepare the Identified Sustainability Information is 'GRI Standards with Core Option'.

Doosan Infracore's Responsibility for the Identified Sustainability Information

Doosan Infracore is responsible for the preparation of the Identified Sustainability Information in accordance with the Criteria. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation of Identified Sustainability Information that is free from material misstatement, whether due to fraud or error.

Inherent Limitations

The absence of a significant body of established practice on which to draw to evaluate and measure non-financial information allows for different, but acceptable, measures and measurement techniques and can affect comparability between entities.

Our Independence and Quality Control

We have complied with the ethical requirements of the Republic of Korea, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

Our firm applies International Standards on Quality Control 1 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.

Our Responsibility

Our responsibility is to express a limited assurance conclusion on the Identified Sustainability Information based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with International Standard on Assurance Engagements 3000 (Revised), Assurance Engagements other than Audits or Reviews of Historical Financial Information issued by the International Auditing and Assurance Standards Board. These standards require that we plan and perform this engagement to obtain limited assurance about whether the Identified Sustainability Information is free from material misstatement.

A limited assurance engagement involves assessing the suitability in the circumstances of Doosan Infracore's use of the Criteria as the basis for the preparation of the Identified Sustainability Information, assessing the risks of material misstatement of the Identified Sustainability Information whether due to fraud or error, responding to the assessed risks as necessary in the circumstances, and evaluating the overall presentation of the Identified Sustainability Information. A limited assurance engagement is substantially less in scope than a reasonable assurance engagement in relation to both the risk assessment procedures, including an understanding of internal control, and the procedures performed in response to the assessed risks.

The procedures we performed were based on our professional judgment and included inquiries, observation of processes performed, review of documents, analytical procedures, evaluating the appropriateness of quantification methods and reporting policies, and agreeing or reconciling with underlying records.

Given the circumstances of the engagement, in performing the procedures listed above we:

- Interview with the personnel responsible for internal reporting and data collection regarding Doosan Infracore's Identified Sustainability Information to understand their approaches to manage material issues
- Understand the systems and processes in place for managing and reporting the Identified Sustainability Information of Bundang office and factories in Incheon and Gunsan
- Review documents relevant to the risk assessment process, sustainability-related policies and standards, materiality assessment, engagement activities of the stakeholders and others
- Perform limited assurance on the Identified Sustainability Information based on inquiries and analytical reviews

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement. Accordingly, we do not express a reasonable assurance opinion about whether Doosan Infracore's Identified Sustainability Information has been prepared, in all material respects, in accordance with the Criteria.

Limited Assurance Conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that Doosan Infracore's Identified Sustainability Information the year ended December 31, 2020 is not prepared, in all material respects, in accordance with the Criteria.

Restricted Use

This Report is prepared solely for the management of Doosan Infracore to assist in obtaining understanding of Doosan Infracore's sustainable management performance and activities. Accordingly, we accept no liability or responsibility to any third party, other than Doosan Infracore and its management, who gains access to this report.

Samil PricewaterhouseCoopers

Samil Pricewaterhouse Coopers

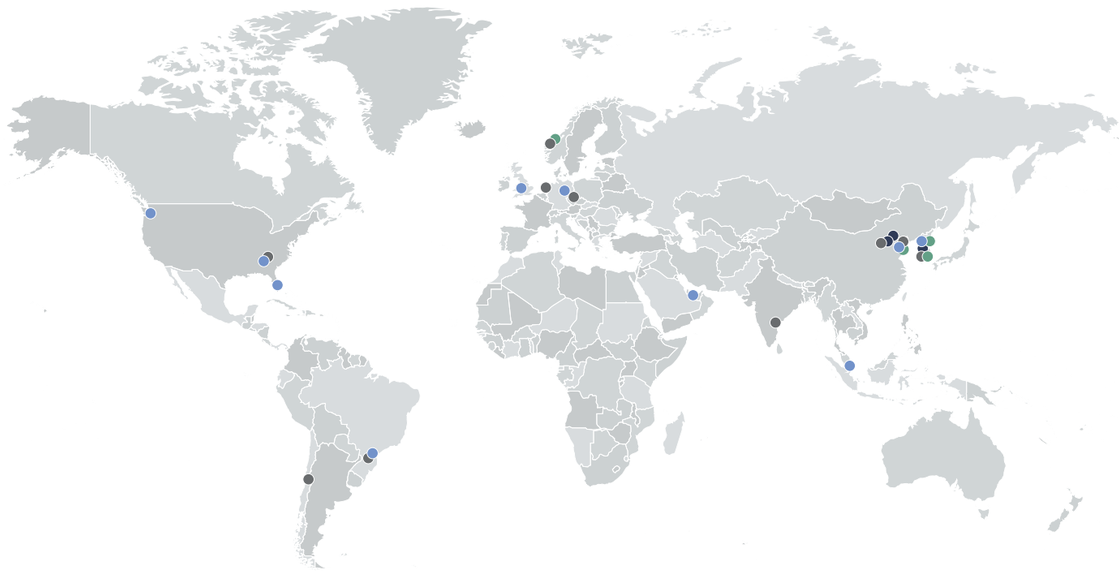
Seoul, Korea

Hoonsoo Yoon, Chief Executive Officer

3 June 2021

Global Network

● Headquarters ● Production Subsidiaries ● Sales Subsidiaries ● Parts Distribution Center



Headquarters

Doosan Infracore Co., Ltd.
489, Injung-ro, Dong-gu, Incheon, Korea

Doosan Infracore(China) Investment Co., Ltd.
19th Fl., Tower B., Gateway, No. 18, Xiaguangli, North Road, East Third Ring, Chaoyang District, Beijing 100027, China

Doosan(China) Financial Leasing Corp.
20th Fl., Tower B., Gateway, No. 18, Xiaguangli, North Road, East Third Ring, Chaoyang District, Beijing 100027, China

Production Subsidiaries

Doosan Infracore Co., Ltd.
489, Injung-ro, Dong-gu, Incheon, Korea

Doosan Infracore Co., Ltd.
185, Dongjangsan-ro, Gunsan-si, Jeollabuk-do, Korea

Doosan Infracore China Co., Ltd.
No. 28, Wuzhishan road, ECO & Tech. Development Zone Yantai, Shandong, China

Doosan Infracore Norway AS.
Varholvegen 149 N-6440 Elnesvågen, Norway

Sales Subsidiaries

Seongnam-si, Gyeonggi-do, Korea | Yantai, China | Beijing, China | Chennai, India | Americana, Brazil | Santiago, Chile | Elnesvågen, Norway | Groot-Ammers, Netherlands | Suwanee, U.S. | Prague, Czech Republic

Parts Distribution Center (PDC)

Ansan, Korea | Yantai, China | Halle, Germany | Dubai, UAE | Singapore | Americana, Brazil | Miami, U.S. | Atlanta, U.S. | Seattle, U.S | Cardiff, U.K.

UN Global Compact – 10 Principles

Human Rights

Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
Principle 2: make sure that they are not complicit in human rights abuses.

Labour

Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
Principle 4: the elimination of all forms of forced and compulsory labour;
Principle 5: the effective abolition of child labour; and
Principle 6: the elimination of discrimination in respect of employment and occupation.

Environment

Principle 7: Businesses should support a precautionary approach to environmental challenges;
Principle 8: undertake initiatives to promote greater environmental responsibility; and
Principle 9: encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption

Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

Doosan Infracore supports the Ten Principles of the UN Global Compact.

The paper used in printing the 2020 Doosan Infracore Integrated Report is certified as an environmental-friendly product by the Forest Stewardship Council®. In addition, the report was printed at an FSC-certified print shop using soy oil ink which drastically reduces the emissions of air pollutants.

Business Locations in Korea

Bundang Office	North 17F, Bundang Doosan Tower, 155 Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do (13557), Korea
Incheon Plant	489, Injung-ro, Dong-gu, Incheon +82-32-211-1114
Gunsan Plant	185, Dongjangsan-ro, Gunsan-si, Jeollabuk-do +82-63-447-3043
Ansan Parts Service Center	48, Yongdam-ro, Sangnok-gu, Ansan-si, Gyeonggi-do +82-31-400-2114
Date Published	July 2021
Publishing Team	Doosan Infracore ESG Team E-mail: di.esg@doosan.com
Planning and Design	Talantone Creative Group

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Innovation