

Integrated solutions for a better life

2017 Integrated Report of Doosan Heavy Industries & Construction



About this Report

Characteristics of the Report

This is an integrated report which introduces the system and activities for the value creation of Doosan Heavy Industries & Construction. This report includes the business strategies and activities of Doosan Heavy Industries & Construction as well as the company's economic, environmental, and social responsibilities and their outcomes. Doosan Heavy Industries & Construction has been publishing this integrated report each year to be utilized as a communications channel with stakeholders.

Criteria for Writing the Report

This report has been written in accordance with the integrated reporting framework of the International Integrated Reporting Council (IIRC) and the G4 Core Option of the Global Reporting Initiative (GRI). The status of the detailed application of GRI G4 can be checked through the GRI Index in the Appendix.

Period and Scope of Reporting

This report was written based on financial and non-financial performance from Jan. 1 to Dec. 31, 2017, and the important items which may influence decision-making by stakeholders include the performance of the first half of 2018. For some of the quantitative outcomes, data collected over 3 years was reported in order to allow the confirmation of trends, while the financial outcome was recorded based on the application of K-IFRS. Furthermore, if any information suggested in previous reports has been revised or re-written, its details were explained in the footnotes. The scope of reporting is 100% of the headquarters, domestic, and international projects, and the activities and performances of subsidiaries located overseas were included as needed.

Verification of the Report

To increase reliability and improve the quality of detail for the report, we received verification of non-financial information from an independent external agency. As for financial information, an accounting audit was performed by an independent audit corporation, and the report was written based on these results. The results regarding the verification can be checked through the verification statement in the Appendix.

Additional Information

This report is to be published and distributed in Korean and English, and may also be downloaded in PDF format from the website of Doosan Heavy Industries & Construction (www.doosanheavy.com). For any inquiries on the report, please contact us through the following.

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 Phone 055-278-3058
 Team in charge CSR Team

Cover Story



It maintained continuity of design using a square, the motif of Doosan's brand identity. As a representative product for the energy conversion era, it expressed the confidence in the transformation of business portfolio using the wind power generator images.

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Doosan Group

Introducing Doosan Group

Korea's Most Long-lived Name Brand Company

As Korea's very first modern corporation, Doosan maintains a length history of 122 years, undergoing several transformations along the way. From its humble beginnings as the Park Seung-Jik Store in 1896 in the neighborhood of Baeogae, currently Jongno 4-ga of Seoul, Doosan has ceaselessly strived to transform and develop itself over the course of the 20th century, up to the present day.

World-recognized ISB Leader

Doosan has become a name brand that is acknowledged throughout the globe within the development industry for its first-class competitiveness, leading today's market. As the premier enterprise in possession of core technology and outstanding performance within the seawater desalination industry, it firmly occupies the predominance of its name brand by living up to its reputation. In addition, it continues to reign at the peak of quality performance within the skid steer loader and attachment sub-industries of the construction machinery industry while boasting of as many as seventeen product lines known for their world-class quality. As a result, Doosan has solidified its status as leader within the infrastructure support business (ISB) industry, comprising that of development, seawater desalination, construction machinery and more, creating a status grounded in its unrivaled, state-of-the-art technology.

Rewriting the History of a World-class Name Brand

Doosan currently operates 25 affiliates and 115 overseas corporate bodies and continues on its journey of ceaseless development despite its remarkable performance record, while the provision of differentiated products and services that enable customers to be instilled with both trust and pride catalyzes Doosan's growth as a global enterprise together with its customers.

Group Vision

We will become a Proud Global Doosan through people-oriented management and the establishment of processes that fulfill world-class standards, which is the source of our global competitiveness.



Overview of Affiliates

ISB (Infrastructure Support Business) Companies

Doosan Heavy Industries & Construction | Doosan Infracore | Doosan Bobcat | Doosan Engineering & Construction | Doosan Mecatec | Doosan Robotics | DMI

Doosan Co., Ltd.

Doosan Corporation Electro-Materials | Doosan Corporation Industrial Vehicle | Doosan Corporation Mottrol | Doosan Retail | Doosan Corporation Fuel Cell | Doosan Corporation Glonet | Doosan Corporation Information & Communications

CSB (Consumer & Service Business) Companies

Oricom | Doosan Bears | Neoplux | Hancorn | Doosan Magazine | Doosan Cuvex

Affiliated Organizations

Doosan Yonkang Foundation | Doosan Art Center | Doosan Leadership Institute (DLI)

Doosan Way

Doosan Way, our belief and philosophy

Doosan Credo

The Doosan Credo is a set of principles stipulated in document and developed from Doosan's philosophy and a unique way of doing business, which have been the foundation of Doosan's success for the past century. The Doosan Credo is integral to every aspect of our business and people, a standard that clearly guides our decisions and the way we conduct business. It is by realizing these values that Doosan accomplishes its ultimate goal. The Doosan Credo consists of Doosan's "Aspiration" and "Core Values."

Aspiration

Doosan's ultimate goal is to create a 'Proud Global Doosan.' It represents our vision that all of our employees and stakeholders will not only benefit from Doosan but also take pride in their association with us. We envision every employee to be proud as a member of Doosan; every customer recognizing and appreciating our high quality goods and services with pride; and every shareholder taking pride in the fair and high levels of profit that we generate.

Core Values

Doosan people practice the nine core values of the Doosan Credo wherever they operate, every day, in order to build a Proud Global Doosan. These values guide our business conduct, the manner in which we treat one another, and the way we work with all of our partners. Doosan's nine core values are as follows.



CSR Value System

Doosan Aspiration	Proud Global Doosan
CSR Goal	To rank among the 100 Global CSR Leading Companies by 2025 <small>*Based on the announcement of the World Economic Forum (Davos Forum)</small>
CSR Mission	Supporting Responsible and Sustainable Growth
CSR Pillars	Respect for People Reliable Operating Responsibility in Engagement CSR Value Creation
CSR Priorities	1. Establishment of a culture that values human rights 2. Fair employment 3. Establishment of a safe work environment 4. Reinforcement of CSR in process operations and the supply network 5. Green management and responsiveness to climate change 6. Reinforcement of responsibilities in products and services 7. Advancement of social contribution activities reflecting the value of work 8. Reinforcement of activities that disclose company information (CSR) 9. Pursuit of businesses that create CSR values 10. Advancement of CSR performance monitoring
Enabler	Powerful CSR Governance <small>(Promotion system / Executives' will of promotion / Employee awareness of social responsibilities)</small>
Doosan Values	9 Core Values <small>(People, Cultivating People, Integrity and Transparency, Inhwa, Customers, World-class Technology and Innovation, Profit, Social Responsibility, Safety and the Environment)</small>
Demand of Society	Global CSR Initiative <small>(UN SDGs · ISO 26000 · UN Global Compact · GRI)</small>

CEO Message



Dear distinguished stakeholders, We truly appreciate the generous encouragement and support you have shown our company, Doosan Heavy Industries & Construction. It gives us great pleasure to be able to share with you again through our Integrated Report the changes and innovation that we have been ceaselessly pursuing over the year, despite being faced with numerous internal and external challenges.

Even in the midst of the rapidly changing business environment, Doosan Heavy Industries & Construction has been investing its best efforts to successfully achieve change and innovation.

While the global economy continues to show sluggish growth, a rapid paradigm shift is occurring in our lives, as well as across the overall industry. In spite of the challenging business environment, Doosan Heavy Industries & Construction has been able to achieve significant accomplishments during the past year alone, such as signing a provisional contract for the Thabametsi project in South Africa and commencing the Nghi Son EPC project in Vietnam which had been delayed for some time. Furthermore, Korea Electric Power Corporation (KEPCO) shows progress in the export of nuclear reactors after being selected as the preferred bidder for the Moorside Nuclear Power Station project in the United Kingdom, while Samcheok POSPower is scheduled to be constructed as a coal-fired thermal power plant as originally planned. By acquiring a gas turbine service company based in the US, we have built a foundation for targeting the gas turbine service market in the Americas, and we have also achieved positive outcomes of varying magnitude in new areas, such as wind power and ESS. And in line with the growing demand and emphasis on companies' roles and responsibilities as a member of society, Doosan Heavy Industries & Construction has constantly sought to practice social responsibility in its business, such as by accelerating efforts for energy and carbon management, jointly advancing into overseas markets with suppliers and contributing to the local communities. As a result, 2017 was a year during which the company was recognized both internally and externally for its performance in sustainable management, such as being bestowed honors such as the Korea Green Climate Award and an ESG rating of 'A' by the Korea Corporate Governance Service. We have also had the honor of being successively listed as a DJSI Korea company.

With a focus on gas turbines and new/renewable energy, we seek to transform our business portfolio now and through this, ultimately achieve continuous business growth.

Doosan Heavy Industries & Construction is striving to build a foundation for continuous growth in various ways, which include pursuing new businesses in line with changes in the business environment. To ensure we can effectively respond to changes in the global power market, the energy sector-related government policies and the reinforced environmental regulations under the new climate regime, we are seeking to convert our business portfolio to one centered on new/ renewable energy, gas turbines, and power plant services. To this end, we plan to widen our business opportunities at both home and abroad in sectors like onshore/offshore wind turbines and renewable energy-linked ESS, while also ensuring the smooth development of large-scale gas turbines, which is currently being pursued as a state project, and will seek early commercialization by utilizing the relevant technology. Moreover, we aim to build up the competitiveness of our services business, which includes performance improvement and maintenance of power plants, a business sector that has contributed to securing a stable business structure for us. In addition, we will apply digital technology to differentiate our engineering and manufacturing from that of others and actively pursue the digital services business, making sure that it fully satisfies customer needs.

We would like to ask for your continued interest and support as we endeavor to uphold social values and raise the value of the Earth.

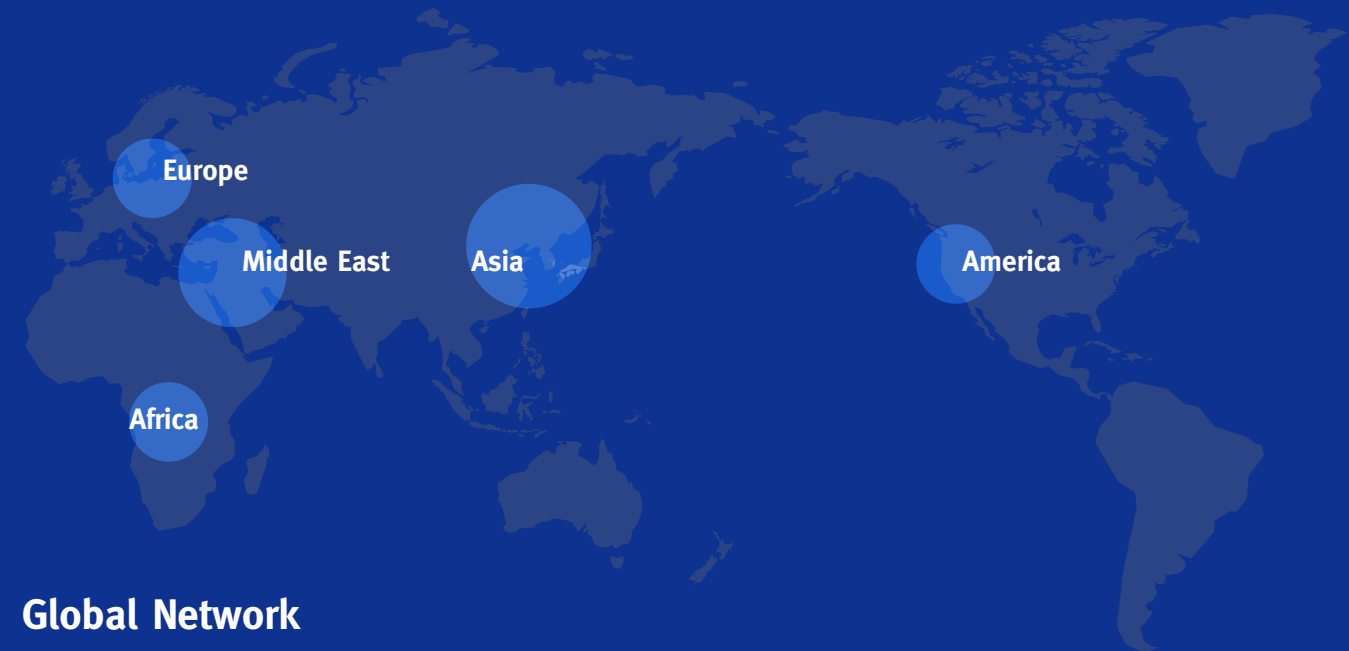
Doosan Heavy Industries & Construction aims to strictly abide by the principles of sustainability in the areas of the environment, human rights, safety, labor, shared growth and business ethics. As a company that hopes to contribute to raising the value of the Earth through its business, Doosan Heavy Industries & Construction also aims to promote social values by actively fulfilling our social responsibilities of "contributing to the local community." We will remain particularly true to the 2030 Sustainable Development Goals (SDGs) commitments, which was established by linking our company's core businesses with the UN SDGs, and will practice active communication with all our stakeholders. Having reached a new turning point, all the employees, management, and union members will be practicing open communication based on the foundation of mutual trust and will focus on effectively implementing bold changes and reform. Your support and interest will be invaluable to us, as we continuously endeavor to establish a sustainable society and a sustainable planet.

Geewon Park
Chairman & CEO

Company Profile

Global Leader in Power & Water

Doosan Heavy Industries & Construction is an expert corporation in plants that has offered integrated solutions in power generation and water industries of 40 countries around the world for the past five decades. Our company serves as a leader in the nation's economic growth by manufacturing casting and forging, which are fundamental materials for industries, nuclear and thermal power generation facilities, seawater desalination and transport facilities, and for supplying them to domestic and overseas plant markets. Recently, we have been actively targeting wind power systems in the eco-friendly green energy market, which is a leader of future growth engines. Doosan Heavy Industries & Construction will continue to strive to create a better future by providing light and water to humankind all over the world and achieving technology which will increase value for the earth.



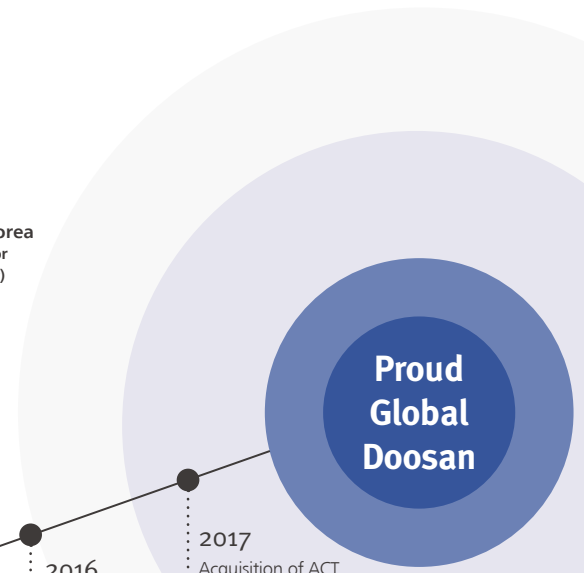
Global Network

Asia	Europe	America	Middle East and Africa
Republic of Korea Headquarters and the Changwon Plant Technology Research Institute Seoul Office Vietnam Doosan Vina / DCS Vina Vietnam Operation Center Hanoi Office India Doosan Power Systems India New Delhi Office / Mumbai Office Kolkata Office / Chennai Office/Shop China Shanghai Office Beijing Office Taiwan Taipei Office Japan Doosan Heavy Industries Japan Philippines Manila Office Thailand Bangkok Office Indonesia Jakarta Office Turkey Istanbul Office	United Kingdom Doosan Power Systems Doosan Babcock Doosan Enpure Boiler R&D Center Czech Republic Doosan Skoda Power Germany Doosan Lentjes Frankfurt Office Poland Katowice Office Romania Doosan IMGB Switzerland Doosan ATS Europe	United States Doosan Heavy Industries America Doosan HF Controls Doosan ATS America Doosan GridTech Doosan Turbomachinery Services Pittsburgh Office Newington Office Chile Santiago Office	Saudi Arabia Doosan Power Systems Arabia Riyadh Office Damman Water R&D Center United Arab Emirates Middle East Operation Center Dubai Office Water Dubai Office Abu Dhabi Office Egypt Cairo Office Kuwait Kuwait Office South Africa Johannesburg Office

(As of December 31, 2017)

- CEO** Geewon Park
- Foundation of the company** September 20, 1962
- Area of Business** Other machinery and equipment manufacturing
- Headquarters** 22, Doosan Volvo-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do
- Seoul Office** 456, Gangnam-daero, Seocho-gu, Seoul

- Revenue** KRW 14,523.6 billion
- Operating Profit** KRW 925.7 billion
- No. of employees** 7,610
- The master hands of Korea** (who are responsible for quality and technology) 31



Doosan History

The Beginning and Challenge 1962~1980

- 1962 Establishment of the Company
- 1982 Groundbreaking of the Changwon Plant (the world's largest)

Growth and Development 1981~2000

- 2001 Privatization and change of the company name to Doosan Heavy Industries & Construction Co., Ltd.
- 2006 Acquisition of Mitsui Babcock Energy
Secured original boiler OEM technology
- 2009 Acquisition of Skoda Power
Secured OEM technology in steam turbines
Completed the Doosan Vina Manufacturing Plant in Vietnam

Growth into a Global Company 2001~

- 2011~2012 Acquisition of AE&E Lentjes
Secured OEM technology in CFB boilers
Acquisition of Chennai Works in India
Acquisition of Enpure
Announced "The Doosan Way"
- 2016 Acquisition of 1 Energy Systems, a US energy storage system firm (currently Doosan GridTech)
- 2017 Acquisition of ACT (currently DTS), a gas turbine service company





Integrated solutions for a better life

We promise a better future through technology that increases the value of the Earth.

Doosan Heavy Industries & Construction is the nation's leading specialized corporation in plants, and for the past 50 years has contributed to the economic growth of the country by providing integrated solutions in the power generation and water industries of 40 nations worldwide. We are equipped with a full line-up of boilers, turbines, and generators in the field of power generation equipment as well as a global production system in countries such as Vietnam and India. In the field of seawater desalination, we take the undisputed rank as No. 1 and have supplied the most numbers of major equipment for nuclear power plants in the world in the past 30 years. Last year, Doosan Heavy Industries & Construction completed the "Vinh Tan 4 Coal-Fired Thermal Power Plant", a project overseen by the Vietnamese Electricity Department, and also received the grand prize in the "Fresh Water Company of the Year Desalination Company of the Year" category at the "Global Water Awards". However, instead of being satisfied with the current performance, we have expanded our company's status by taking orders from new overseas markets such as South Africa and Vietnam to consolidate our position as the leader of the market. The business portfolio created based on accurate insight and detailed strategies in market changes, coupled with a hunger for technology and quality products, is the greatest competitive edge for Doosan Heavy Industries & Construction as well as the reason for our recognition in the global market.

Green Energy Wind Power Solutions

Wind power, one step towards a new future of the power generation industry

For the first time by a Korean company, Doosan Heavy Industries & Construction successfully developed WinDS3000TM, a 3MW-offshore wind power system, resulting in a number of domestic wind power supply contracts signed for Tamra Offshore Wind Farm, Yeongheung Wind Farm, and Southwest Offshore Wind Farm Projects. In November 2017, Tamra Offshore Wind Farm in Jeju-do was constructed as the nation's first-ever commercial offshore wind farm to which Doosan Heavy Industries & Construction had supplied as EPC, making Doosan Heavy Industries & Construction the only company in Korea to have supplied and operated EPC at offshore wind farms. In March 2018, we signed business agreements for the construction of an offshore wind power test site and development of a wind farm in Vietnam, taking the first step into the global wind power generation market.



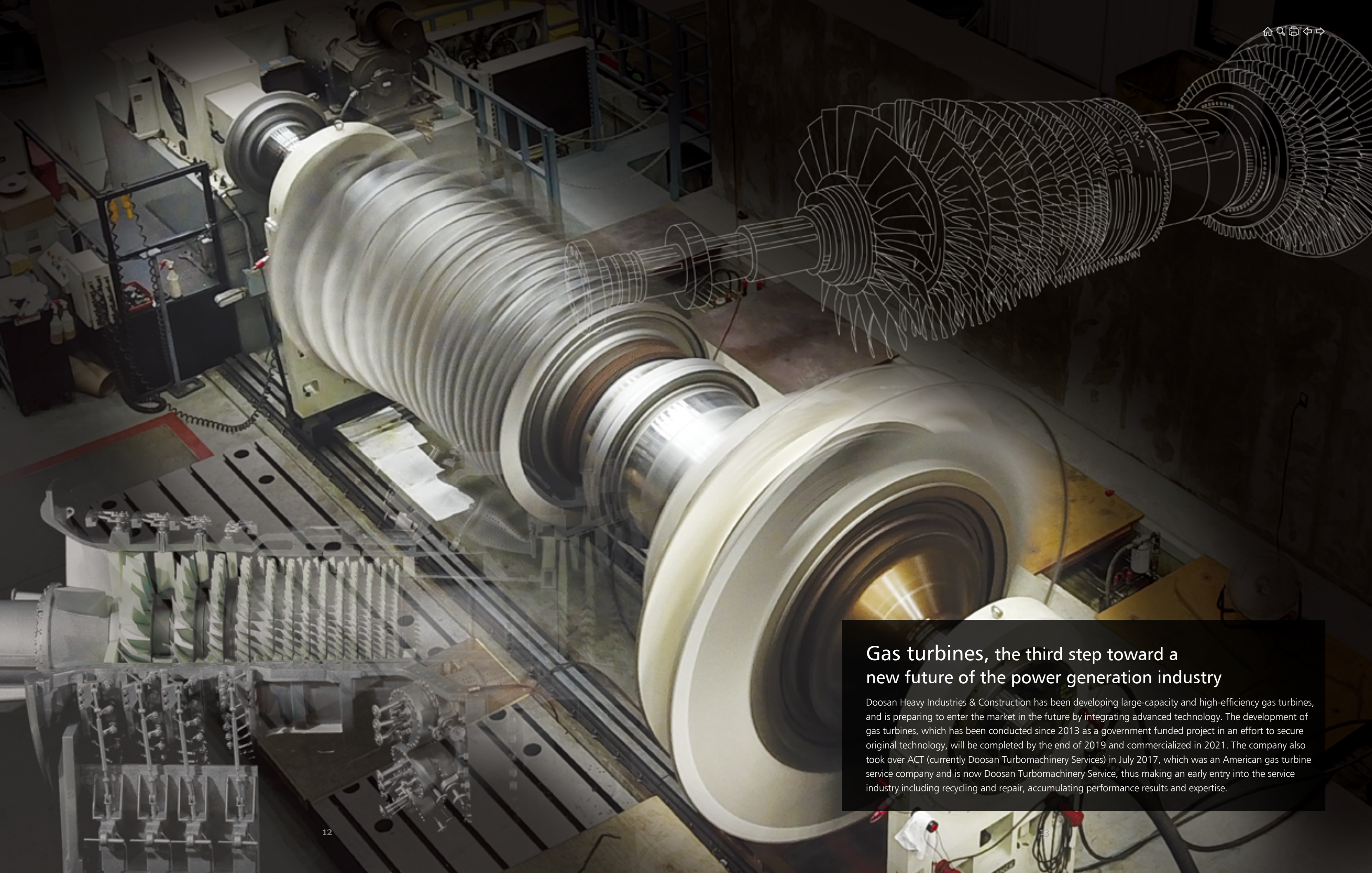
Advance into Vietnamese wind power market (signed an MOU)

ESS and Microgrid, the second step towards a new future of the power generation industry

To empower customers to turn crisis into opportunity and create profits amid the changing energy industry, Doosan Heavy Industries & Construction offers a total technical solution that includes ESS (Energy Storage System) as well as dispersal-type power source and platform-based control system software. The technical solution of Doosan Heavy Industries & Construction enables the integration, management, and control of ESS and various dispersal-type power sources. Doosan Heavy Industries & Construction has been carrying out projects for power generation businesses and energy prosumers in Korea and the American continent. In September 2017, we signed a contract for the supply of 10MWh-ESS to the Beacon Solar Power Station near the Mojave Desert operated by the Los Angeles Department of Water and Power, and in April 2018 we obtained an order with Consumers Energy for ESS to be supplied to a substation located in Kalamazoo, Michigan, proving our competitiveness in the ESS industry once again.

Energy Storage System





Gas turbines, the third step toward a new future of the power generation industry

Doosan Heavy Industries & Construction has been developing large-capacity and high-efficiency gas turbines, and is preparing to enter the market in the future by integrating advanced technology. The development of gas turbines, which has been conducted since 2013 as a government funded project in an effort to secure original technology, will be completed by the end of 2019 and commercialized in 2021. The company also took over ACT (currently Doosan Turbomachinery Services) in July 2017, which was an American gas turbine service company and is now Doosan Turbomachinery Service, thus making an early entry into the service industry including recycling and repair, accumulating performance results and expertise.



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Strategy for Sustainable Growth

Global Leader in Power & Water

Doosan Heavy Industries & Construction offers integrated solutions in the power generation and water enterprises. The phrase "Global Leader in Power & Water" emphasizes the level of determination of Doosan Heavy Industries & Construction in becoming the world's leading player in the global power and desalination market. Based on the Doosan Way, which values technology, talented people, innovation, and transparency, the company is strengthening its foothold as a global leader in all aspects, including world-class technological capabilities, cost competitiveness and quality level, scale of sales and profitability, cultivation of talented individuals, and corporate culture, while at the same time staying at the forefront of technological trends, marketing, and market changes in the world in order to become an advanced global corporation.

Global Trend

- Prolonged period of low growth
- Increased awareness of stronger environmental regulations and eco-friendly products
- Increased water scarcity risks (e.g., water shortage)

Industry Trend

- Prolonged period of low oil prices
- Expanded private investments
- Accelerated application of Industry 4.0
- Expansion of distributed generation
- Expansion of digital-utilizing services

Global Leader in Power & Water

	New business development	Increase in Order Intake	Improvement in profitability
Strategic Direction	"Identifying new growth engines & advancing commercialization"	"Build momentum to increase order intake by implementing strategies by region/product type"	"Improve profitability through strengthened competitiveness"
Promotion activities	<ul style="list-style-type: none"> · Responding to paradigm shifts in the power market · Converting to renewable energy (ESS/ Microgrid, wind power generation) and gas turbine businesses for the portfolio 	<ul style="list-style-type: none"> · Securing the leading position in the market by expanding the scale of the power generation service market · Seeking expansion of the market through strengthened global partnership 	<ul style="list-style-type: none"> · Expanding the business model based on engineering competency and digital solutions · Internalizing the integrated design system based on 3D models and improving competitiveness through implementation of the Digital Factory

Changes in the domestic and global market environments

The world's greatest energy demand and carbon emissions are gradually shifting from advanced economies to emerging economies, and utilization of new and renewable energy continues to expand due to technological growth and environmental issues. Though the recovery of oil prices and the US government's withdrawal from the Paris Agreement in 2017 led to concern over the global trend in fossil fuel reduction, the global energy market is ultimately heading toward the goal of converting to a new direction for an 'Energy Mix' centering on renewable energy. The domestic market also implements energy switching policies, which include the step-by-step reduction of nuclear power plants and expansion of renewable energy through Renewable Energy 3020 and the 8th Basic Plan for Electricity Supply and Demand.

To give a forecast by power source, coal is expected to be in demand in India and Southeast Asia, while gas is estimated to be on the rise consistently as it is advantageous in terms of cost, construction duration, and carbon emission compared to other types of fossil fuels and as a backup power source for new and renewable energy such as wind and solar power.

Though the reduction of new construction projects in the domestic market is expected to decrease the portion of domestic nuclear power plants, the construction of new nuclear power plants is likely to continue in China, India, and the Middle East where demands for energy are expected to rise. Furthermore, the development and construction of small modular reactors (SMR) are likely to take place in many countries. As for renewable energy, the unit cost for power generation is predicted to decrease, while solar power, which is expanding into new markets, is expected to see the greatest increase among all power generation facilities. Moreover, the 8th and RE 3020 proclamations are likely to broaden the domestic wind power market with the increase in acquisition of new 15.7GW orders, etc.

Our strategies for sustainable growth

Doosan Heavy Industries & Construction is seeking to switch its portfolio through the expansion of gas turbines (GT), renewable energy, and service industries. As for gas turbines, a government funded project for the development of large-capacity and high-efficiency gas turbines is in operation in response to reduction of coal-fire thermal power generation and domestication of gas turbine technology, the latter of which has largely been dependent on overseas technology, and the company aims to develop gas turbine technology as a major growth engine of the company in the future. First, its original technology is to be secured by 2019 through infrastructure establishment and development of the 270MW, high-performance gas turbine model, and a full-scale commercialization and performance upgrade will be pursued afterwards. Moreover, the takeover of ACT (currently Doosan Turbomachinery Services) has enabled the securing of competency specialized in gas turbine service, thus allowing us to enter the Global Non-OEM GT Service market in advance. Wind power is expected to grow thanks to the rapid expansion of domestic offshore wind power projects following renewable energy expansion policies, and Doosan Heavy Industries & Construction expects to lead the market based on 3MW and 5.5MW models with outstanding technology as well as the No. 1 share in the domestic public market (42%, 2012-2016). Meanwhile, the field of ESS is broadening its scope of business by awarding a contract for an ESS project at LADWP's Beacon Solar Power Station, and it is also expected to actively operate the Microgrid business through construction of the nation's first-ever microgrid for an industrial complex.

Expected to have a bright forecast in both domestic and international markets following the strengthened environmental regulations, fine dust control, etc., the performance enhancement and environmental facility business will continue to expand through the operation of national projects, securing of standard thermal power performance improvement models (Boryeong #3), and the acquisition of original technology in environmental facilities (Lentjes, Germany).

EPC

Based on a business portfolio that includes power plants and general construction among others, Doosan Heavy Industries & Construction maximizes customer satisfaction and is becoming a leader in Global EPC by providing total solutions.



2017 Highlights

Early completion of the Vinh Tan 4 Coal-fired Thermal Power Plant in Vietnam

Completion of Hwaseong Dongtan 2, Korea's largest cogeneration power plant

2017 Business Performances

Based on our competency in the execution of EPC, Doosan Heavy Industries & Construction continues to preemptively expand areas of business in not only existing markets of emphasis such as the Middle East, India, Vietnam, and the rest of East Asia, but also in new markets. In 2017, we obtained an order for the Thabametsi project of South Africa to enter the new market of Africa. In addition to the acquiring an order for the Grati Combined Cycle Power Plant conversion project in 2016, we obtained an order for the Muara Tawar Combined Cycle Power Plant conversion project in March 2017, solidifying our position in Indonesia. We also continue to acquire orders for construction projects within Korea including for Doosan Alf-heim, currently reinforcing dominance in the domestic market. Meanwhile, construction of large overseas projects including Song Hau 1 in Vietnam and Fadhili of Saudi Arabia are in progress, and we have been recognized for our EPC execution abilities through successful completion of the Vinh Tan 4 Coal-fired Thermal Power Plant and Hwaseong Dongtan 2 Cogeneration Power Plant.

2018 Forecast and Business Strategies

As it is expected that the percentage of coal-fired thermal power generation is likely to decline in the global power generation market, difficulties in the EPC business will tend to increase. In response, we will strengthen preliminary sales activities to maintain our influence in core markets and promote regional diversification strategies, entering and obtaining orders in a greater number of markets. From the standpoint of a business portfolio, the percentage of combined cycle power generation will be increased and the lineup of products will be diversified in order to continue to secure more business opportunities. Through participation in the new and renewable energy business, we will advance into new business areas and maximize our potential for the acquisition of orders by expanding opportunities for domestic construction projects including those related to power generation such as overseas nuclear power plant construction and commissioning, utilizing internal competencies as well as general construction and national policy-based projects. By applying our successful experiences in a number of projects including Rabigh 2 of Saudi Arabia and Mong Duong 2 of Vietnam, we will improve our competitiveness and also converge digital technology with power plant construction upon the arrival of Industry 4.0 to continue to lead the field of power plant EPC execution.



Vinh Tan 4 Coal-fired Thermal Power Plant in Vietnam



Raipur Power Plant in India



Gheco One Thermal Power Plant in Thailand



Mundra Thermal Power Plant in India

Major Performance

Main performance and results in 2017

Entry into new overseas markets for EPC projects

Despite a recession in the thermal power generation market, we obtained meaningful orders in new markets thanks to our efforts to diversify our business regions. As a result of pioneering new markets, a draft contract was signed in November 2017 for the 630MW-level Thabametsi Coal-fired Thermal Power Plant, worth about 1,150 billion KRW in financial scale, in South Africa. In Indonesia, in addition to an order acquisition for the Grati Combined Cycle Power Plant conversion project in 2016, we obtained an order for the Muara Tawar Combined Cycle Power Plant conversion project in March 2017. The project aimed to supply 8 waste heat recovery boilers and 8 steam turbines to a 1,150MW-level gas-fired thermal power plant in order to convert it into a 1,800MW-level combined-cycle power plant.

Early completion of Vinh Tan 4 Coal-fired Thermal Power Plant in Vietnam

The early completion of the Vinh Tan 4 Coal-fired Thermal Power Plant in Vietnam earned Doosan Heavy Industries & Construction a letter of appreciation from EVN (Electricity of Vietnam), the ordering client. Among those ordered by EVN, this was the first ever project to be completed earlier than scheduled. EVN recognized the merit in the successful execution of the project, presenting the letter of appreciation to a foreign company, a first in the history of the company. Through successful construction of the Vinh Tan 4 Coal-fired Thermal Power Plant, we proved once again our abilities as a top tier company in the Vietnamese power generation market and completed a foundation for the acquisition of additional orders in the future.

Construction of Hwaseong Dongtan 2, Korea's largest cogeneration power plant

The Hwaseong Dongtan 2 Power Plant, Korea's largest cogeneration power plant, was completed in December of 2017. As a new type of power generation that has been gaining much attention, a cogeneration power plant may be constructed near a city center, use waste heat for heating, and reduce potential loss in power transmission. The Hwaseong Dongtan 2 Power Plant is the nation's greatest 800MW-level power generation facility among all domestic cogeneration power plants, and Doosan Heavy Industries & Construction was responsible for and oversaw the entire process, from the supply of 2 gas turbines and steam turbines each to construction. This power plant plans to supply heat for 111,639 households in and near the city of Hwaseong.

Reached 1 trillion KRW in orders obtained in the domestic general construction industry

Having been acknowledged for outstanding competency in the execution of general construction projects, we have obtained orders worth more than 1 trillion KRW from both overseas power generation markets and the domestic general construction industry. The list of construction projects obtained includes the "Doosan Alf-heim" new apartment construction in the Baekbong District of Namyangju, worth about 500 billion KRW, along with Yonggang-dong in Gyeongju, Doosan We've Phase 2 in Yangsan, and Godeok Gangil. Private construction projects are significant in that most of their construction expenditure is secured in advance through project financing loans and that the construction company takes full responsibility for the construction, which enables stable operations throughout the entire process. We have also obtained civil engineering projects such as Bongdam-Songsan Expressway and Hamyang-Changnyeong Expressway, and have established a solid business portfolio in the domestic construction industry including plants, architecture, and civil engineering.



Sipat Thermal Power Plant in India

LINK TO CSR

Fadhili construction site achieves 6 million hours accident-free

The Fadhili construction site has reached 6 million hours of accident-free operation. Since the beginning of construction in December 2016, the site has been carrying out an accident-free campaign, and as of April 2018, achieved the record of 6 million hours during which no accident or LTI (Lost Time Incident, an accident that causes more than 1 day of work loss) occurred. This accomplishment is a direct byproduct of consistent implementation of autonomous safety activities in cooperation with the affiliates based on our systematic EHS (Environment Health and Safety) system.

achieves **6 million** hours accident-free

Waste insulation reduction technology certified as green technology

Our waste insulation reduction technology through integral insulation plywood desk plates received certification from the Ministry of Land, Infrastructure and Transport and obtained the green technology certificate No. GT-17-00254 in June 2017. Compared to metal decks that process and attach insulation materials on site, this technology reduces the loss rate of insulation through heat plates, thus enabling a reduction of 73.6% in processing cost compared to existing techniques.

Trimage, an eco-friendly structure

On April 6, 2017, Seoul Forest Trimage acquired the "Green Level 1", the highest distinction for eco-friendly structures in the public housing category. The building was planned and designed for people and nature to coexist and be in harmony together, and has minimized environmental pollution through the conservation of energy and resources, thus achieving a pleasant and healthy residential environment.



View of Seoul Forest Trimage

Introduction of Business

Doosan Heavy Industries & Construction holds competency in EPC (Engineering, Procurement and Construction) with which we can execute the entire process, from power plant design and supply of equipment to construction and commissioning, as well as a number of domestic and overseas project results. Customer satisfaction is achieved by adhering to performance, delivery period, and quality, offering a comprehensive solution through the provision of in-depth services from the initial stage to the completion of a project. We conduct various projects in the domestic and overseas general plant, civil engineering, and construction industries based on a broad spectrum of experience and technology, and continue to lead changes in social infrastructure and residential environments.



Incheon-Gimpo Expressway



Sinboryeong Electric Generation

Major products and services

- Thermal Power Plant Combined Cycle Power Plant
- General plant
- Civil engineering
- Architecture

Major project portfolios

- Rabigh Power Plant No.2 TPP (Saudi Arabia): 700MW x 4
- Mong Duong II TPP (Vietnam): 600MW x 2
- Vinh Tan 4 TPP (Vietnam): 600MW x 2
- Song Hau 1 TPP (Vietnam): 600MW x 2
- Vinh Tan 4 Extension TPP (Vietnam): 600MW x 1
- Sipat TPP (India): 660MW x 3
- Mundra TPP (India): 800MW x 5
- Raipur TPP (India): 685MW x 2
- Obra "C" TPP (India): 660MW x 2
- Jawaharpur TPP (India): 660MW x 2
- Gheco One TPP (Thailand): 700MW x 1
- Saemangeum TPP (Korea): 152MW x 2
- UAE Jebel Ali M CCPP: 2,000MW
- Qurayyah (Add-on) CCPP (Saudi Arabia): 1,330MW
- Fadhili CCPP (Saudi Arabia): 1,519MW
- Karabatan CCPP (Kazakhstan): 310MW
- Grati Add-on (Indonesia)
- Muara Tawar Add-on (Indonesia)
- Hwaseong Dongtan CCPP (Korea): 800MW
- Seoul Combined Cycle Power Plant (CCPP) (Korea): 800MW
- Shin-Kori #3, 4 Nuclear Power Plant construction (Korea)
- Shin-Kori #5, 6 Nuclear Power Plant construction (Korea)
- Samcheok LNG #5, 6, 7 storage facility (Korea)
- Noibai-Laocai Highway (Vietnam)
- Incheon-Gimpo Expressway (Korea)
- Wonju-Gangneung railroad construction (Korea)
- Samcheok Green Power ground work (Korea)
- Suncheon Doosan We've (Korea)
- Trimage (Korea)
- Doosan Alf-heim (Korea)



UAE Jebel Ali M CCPP

Power Plant

Doosan Heavy Industries & Construction is a global corporation that retains original technology and references in boilers, turbines, and generators, all of which are essential equipment in power generation. Based on our outstanding technology, we are successfully carrying out various power plant projects including coal-fired thermal power plants, combined cycle power plants, and nuclear power plants.



2017 Highlights

Construction Start for Biomass, Asnæs Project in Denmark

Conversion of Yeongdong Thermal Unit 1 to a biomass power plant

Ertified for EU-APR EUR (European Utility Requirements)

Establishment of e-Brain Center, a Remote Doctor for Power Plant

Selected as Worldclass Product of Korea in 2017

2017 Business Performances

Boilers

Doosan Heavy Industries & Construction obtained an order for the Shin-Seochon FGD (Flue Gas Desulfurization) project, which utilizes the world's best design for reducing sulfur oxide emission, and by developing the technology for three new types of burners to respond to new environmental regulations, we are now equipped with technologies to minimize environmental pollution, including NOx emissions reduction. Cost competitiveness was also secured via diversification of suppliers and utilization of overseas subsidiaries (DPSI/VINA).

Turbines and generators

In line with the global trend of reduction of coal thermal power, the competition within the market has intensified due to delayed or cancelled orders for new coal-fired thermal power plants. In response, Doosan Heavy Industries & Construction continues to enhance the competitiveness of turbine and generator product groups that are specialized for combined cycle power plants (CCPP). We have secured specialized technology for steam turbines and generators for the CCPP Package project and have succeeded in obtaining orders in Poland, Nigeria, Indonesia, and other countries by offering a complex solution in response to the various gas turbines of other OEMs.

Nuclear power

The design and manufacturing technology for spent nuclear fuel dry transport/storage containers (Casks) have been developed for diversification of the business portfolio, and the company is currently developing technology to dismantle highly activated structures (nuclear reactor pressure vessels and internal structures), which is the most essential piece of technology in nuclear power plant decommissioning. We have also secured the qualifications to participate in general maintenance service in order to expand participation in the operating nuclear power plant service market, and through the experience in start-up maintenance service on the Shin-Hanul Nuclear Power Plant Unit 1 & 2 have prepared the means for advancement into the integrated maintenance service in the future.

Services

By declaring 2017 the first year for digitalization, we have begun development of digital power plant services, building competencies in the digital power generation service industry by operating "e-brain Center" jointly with Korea East-West Power. We have also converted the Yeongdong Thermal Unit 1 into the nation's best and largest eco-friendly biomass power plant, and expanded the business base for service solutions by establishing Middle East Service Center along with organizations for diagnosis/assessment and operation/maintenance of power plants.

New businesses

Doosan Heavy Industries & Construction has promoted technical development, reinforcement of organizational structure, and competency development for expansion of wind power business. In 2017, the 3MW wind power generation system technology was selected as one of the major industrial technologies that made Korea shine in the world, and through construction of the Tamra Offshore Wind Farm in Jeju-do, we became the only Korean company to possess references in large-scale commercial offshore wind farms. As the trend of coal-free and nuclear-free power plants expands faster than expected in both Korea and overseas markets, we have accelerated the plan to growth as a gas turbine OEM provider. For domesticating gas turbines, we have consistently made developments based on national projects, established an R&D Center to secure the driving force for development of large-sized gas turbines, and taken over ACT (currently Doosan Turbomachinery Services), an American gas turbine service company, thus laying the foundation to target the global gas turbine market.

2018 Forecast and Business Strategies

Boilers

As orders for future power plant construction are expected to come mainly from emerging economies in Asia as well as lowdevelopment and energy-deficient countries in Africa, South America, etc., Doosan Heavy Industries & Construction plans to secure cost competitiveness by utilizing its global production bases. In addition, the scale of AQCS (Air Quality Control System) market is expected to expand due to strengthened environmental regulations such as the Paris Agreement, and we will therefore continue to target the eco-friendly power generation facility market through continuous technical developments and sales activities.

Turbines and generators

Though the coal-fired power markets worldwide are being reduced due to domestic policies of anti-coal and anti-nuclear power plants and the Paris Agreement, we plan to reinforce the competitiveness of go-to products, which include steam turbines and generators, together with an overseas subsidiary, SKODA, to secure stable volume of orders and profits. At the same time, based on solid experiences in the past such as various CCPP Package projects both in Korea and overseas, complex solutions which may be applied to different gas turbines will be provided in order to continuously secure orders in the field of gas power generation.

Nuclear power

For participation in the overseas nuclear power plant market as a complementary measure in response to the government's energy conversion policy, the export of new nuclear power plant and Small Modular Reactors are being actively promoted in Kingdom of Saudi Arabia, the United Kingdom, India, the Czech Republic, and other countries. By acquiring orders for spent nuclear fuel dry transport/storage containers (Casks) and expediting development of nuclear power plant decommissioning technology, we plan to secure an advantageous position in the initial stage of the business and continue to expand participation in domestic and overseas service markets.

Services

As rapid growth is expected in business opportunities and the scale of Service market including performance improvement of power plants owing to aging of existing power plants and the reinforcement of regulations, Doosan Heavy Industries & Construction will combine its engineering technology/experiences with digital solutions in order to create more stable and effective Service business. At the same time, we will continue to seek business expansion based on the technology and cost competitiveness of Doosan Babcock and global production bases.

New businesses

As large-scale offshore wind power projects are expected to lead growth, Doosan Heavy Industries & Construction will complete the development of 5.5MW large-capacity offshore wind power models in the future to secure a technical competitive edge, and expand business scale by participating in project development and building maintenance and operation competencies. Based on collaboration with DTS, we will expand gas turbine service business scope and market in order to establish a foundation for gas turbine business and successfully carry out national projects for localizing gas turbines.

Introduction of Business

Boiler

We retain competencies in design, manufacturing, and installation of the core components of boilers, and since the first order intake for power generation equipment in 1976 (Yeongwol Combined Cycle Power), we now have a proud history of orders in thermal power generation that totals approximately 76GW. By acquiring Babcock in 2016, a company that owned the original boiler technology, we were able to obtain the capabilities to design and produce boilers in-house, and a number of our products such as oil-fired boilers and 1000MW USC boilers were selected as World-Class Products of Korea. Moreover, we acquired Lentjes of Germany to secure technical competencies in AQCS plant and CFB boilers, thus reinforcing domestic and overseas capabilities in the power generation product business. In addition, we currently operate design groups and production sites in Changwon, India (Doosan Power Systems India), and Vietnam (Doosan VINA), and through efforts to improve technology and cost competitiveness of subsidiaries led by the headquarters, we continue to maximize the synergy of global operations.



Major products and services

- Pulverized Combustion Boiler (PO boiler)
- Lignite Boiler
- Oil Boiler
- Downshot Boiler
- Circulating fluidized bed boiler (CFB Boiler)
- Oxy-fuel Combustion Boiler
- AQCS (FGD, SCR, ESP, WtE, Bag Filter)

Major project portfolios

- Ain Sokhna (Egypt, 650MW x 2)
- Rabigh PP2/Oil (Saudi, 700MW x 4)
- Mundra (India, 800MW x 5)
- Bulk Order (India, 800MW x 5)
- Gheco-One (Thailand, 700MW x 1)
- Sipat (India, 660MW x 3)
- Sin-Poryong #1,2 (South Korea, 1,000MW x 2)
- Mong Duong II (Vietnam, 600MW x 2)
- Cirebon (Indonesia, 700MW x 2)

Turbine | Generator

Doosan Heavy Industries & Construction is one of the world's best Original Equipment Manufacturers of turbines and generators that can design, produce, and even install the core equipment of power plants such as steam turbines, generators, thermal exchangers, and condensers. By providing optimum Steam Power Solutions for not only new power plants but also improvement construction for aging and deteriorated power plants both in Korea and overseas, it continues to execute technical development and innovation activities to offer its customers affordable and high-quality products.

Turbines are advanced equipment that rotate blades with highly pressurized steam generated by a boiler, a steam generator, or HRSG (Heat Recovery Steam Generator), and use the rotation force to run the generator and produce electricity. Starting with the production of steam turbines at Seocheon Thermal Power (200M) in 1978, steam turbines have been internally designed, manufactured, and supplied to more than 50 countries around the world. We have also successfully developed and produced gas turbines for the first time in Korea, now known as the essence of power generation technology, and are currently working hard on the development of gas turbines.

Turbines

Generators

Major products and services

Steam turbines

- DST-V (for industrial purposes)
- DST-G10 (for industrial/power generation purposes)
- DST-G20 (for industrial/power generation purposes)
- DST-S10 Single/Double casing (for power generation purposes)
- DST-S20 (for power generation purposes)
- DST-S30 (for power generation purposes)
- DST-N (for nuclear power purposes)

Generators

- DGen-A (air cooling)
- Dgen-H (hydrogen cooling)
- Dgen-W (water cooling)
- DGen-N (water cooling, nuclear power)

Thermal exchangers

- Water Cooled Condenser
- District Water Heater
- High & Low Pressure Heater
- MSR (Moisture Separator & Reheater)
- Steam Jet Ejector
- Vent Steam Condenser
- Air Cooled Condenser

Major project portfolios

In progress as of 2017

- Goseong Hai Thermal Power Plant 1, 2 TPP 1,040MW x 2
- Fadhili CHPP 176MW x 2
- Muara Tawar CCPP 150MW x 1, 250MW x 2
- Sinboryeong 1, 2 TPP 1,019MW x 2
- Seoul Combined Cycle Power Plant (CCPP) 400MW x 2
- Hwaseong Dongtan 2 CHP 800MW x 1
- Songhau TPP 600MW x 2
- Assuit & Cairo west 650MW x 2
- Shin-Hanul 1, 2 NPP 1,400MW x 2
- Boryeong 3 R&M 550MW x 1
- Shin-Kori 3, 4 NPP 1,400MW x 2

Nuclear

Starting with Hanbit Nuclear Power Plants (NPP) Unit 1 & 2 in 1986, Doosan Heavy Industries & Construction has been supplying major equipment and machines to all Korean nuclear power plants. We have participated in the development of OPR1000, the first-ever Korean model of nuclear power plants, and have manufactured and supplied 12 units of OPR1000 NPP major equipment thus far. Our technology and quality has also been recognized worldwide through a contract with Qinshan Phase III, NPP 1 & 2 in China, its first-ever major contract to supply steam generators for an overseas power plant, as well as for the supply of replacement steam generators to Sequoyah NPP of the U.S. and AP1000 reactors and steam generators to China and U.S. The Barakah Nuclear Plants Unit 1 through 4 in the Arab Emirates, an order obtained as a part of Team Korea in 2010, were successfully supplied "On Time and Within Budget", and thus acknowledged by international customers as a reliable and economic nuclear power plant model, through the development of Reactor Cooling Pump and digital Instrumentation and Control (I&C) system (MMIS: Man-Machine Interface System) design and manufacturing technology in 2012, the complete domestication of nuclear power plants has now been accomplished. All of the major equipment and machines have been manufactured and supplied beginning with Shin-Hanul Unit 1 & 2, while we continue to expand the areas of participation in domestic and foreign service markets through acceleration of technical development in spent nuclear fuel dry transport/storage containers (Casks) and nuclear power plant decommissioning. We also seek continuous development of technology and diversification of business areas in order to become a global leader in nuclear business market, and actively support the discovery of local companies and technical transfers for reinforced competency in industry of countries aiming to introduce nuclear power plants.

Major products and services

Major component / Auxiliary devices

- Nuclear Reactor Vessel and Reactor Vessel Internals
- Steam generators
- Nuclear reactor coolant pumps and Drives
- Digital instrumentation and control (I&C) system (MMIS: Man-Machine Interface System) for nuclear power plants
- Control Element Assemblies with Drives
- Pressurizer
- Integrated Head Assembly
- Reactor Refueling System
- Primary reactor containment post-tensioning system
- Condenser and thermal exchanger
- Pressure vessels and tanks
- Spent nuclear fuel dry transport/storage containers (Cask)

Service for operating nuclear power plants / Instrumentation and control (I&C) system

- Supply of replacement-type devices
- Maintenance and non-destructive tests
- Upgrades and improvement
- Technical support
- Digital upgrade for Instrumentation and Control (I&C) system in operating nuclear power plants

Major project portfolios

- Wolsong #2, 3, 4 (Korea): 700MW x 3
- Hanbit #1, 2 & Hanul #1, 2 (Korea): 950MW x 4
- Hanbit #3, 4, 5, 6 & Hanul #3, 4, 5, 6 & Shin-Kori #1, 2 & Shin-Wolsong #1, 2 (Korea): 1,000MW x 12
- Shin-Kori #3, 4, 5, 6 & Shin Hanul #1, 2 (Korea): 1,400MW x 6
- Replacement Reactor Vessel Closure Heads for Kori #1, 2 (Korea): 600MW x 2
- Replacement Steam Generators for Kori #1 (Korea): 600MW x 1
- Replacement Steam Generator for Hanul #1, 2 (Korea): 950MW x 2
- Replacement Steam Generator for Hanul #3, 4 (Korea): 1,000MW x 2
- Replacement Steam Generator for Hanbit #3, 4 (Korea): 1,000MW x 2
- Replacement Steam Generator for Sequoyah #1, 2 & Watts Bar #1, 2 (United States): 1,200MW x 4
- Replacement Reactor Vessel Closure Head for Arkansas Nuclear One (ANO) #2 (United States): 890MW x 1
- Replacement Reactor Vessel Closure Heads for Palo Verde #1, 2, 3 (United States): 1,300MW x 3
- Replacement Reactor Vessel Closure Head for Waterford #3 (United States): 1,160MW x 1
- Replacement Reactor Vessel Closure Head for Virgil C. Summer #1 (United States): 971MW x 1
- Vogtle #3, 4 and Virgil C. Summer #2, 3 (United States): 1,250MW x 4
- Barakah Nuclear Power Plants #1, 2, 3, 4 : 1,400MW x 4
- Qinshan Phase III #1, 2 (China): 700MW x 2
- Qinshan Phase II #3 (China): 600MW x 1
- Sanmen #1 & Haiyang #1 (China): 1,250MW x 2
- Lufeng #1 Nuclear Reactor Vessel Internals (China): 1,250MW x 1



Shin-Wolsong #1, 2 (Korea)

Nuclear Reactor Vessel

Nuclear Steam Generator

Power Plant Service

Building on the existing capabilities in New Build sales, design, and project management, we began targeting the power generation service market from 2017 including performance improvement, repair, maintenance and fuel conversion of power plants, and currently boast extensive project references at home and abroad, including biomass fuel conversion of the Yeongdong Thermal Power Plant #1, Eraring Power Station Upgrade Project (Australia), Bandel #5 R&M Project (India), and Morupule A Retrofit (Botswana).

In addition, organic integration with Doosan Babcock, which possesses profound experiences and know-hows in service industry, leads to organizational and personal synergy, and besides Doosan Babcock which is the foothold in Europe, we operate regional hubs in the U.S. (DPSA), Middle East (DPSAr), and India (DPSI) to focus on not only stable operation and support for the power plants in Korea but also on expanding the foundation for overseas businesses. In 2017, we created Solution & Service Team to concentrate our competency on reinforcing efficient and stable operations of power plants, which is expected to contribute to demonstrating the greatest performance during power plant operation. Meanwhile, we have declared 2017 as the first year to accelerate digitalization, and have been actively developing service packages that provide digital-based services to customers. We expect that in the future, through the digital solution, the performance and efficiency of power plants will be maximized to offer customers a significant amount of additional profits.



RMS

Major products and services

- R&M
- O&M
- Fuel conversion
- Diagnoses/Assessment
- Asset Management
- Digital Solution
- RMS (Remote Monitoring Service)

Major project portfolios

- Eraring Power Station Upgrade (Australia, 660MW x 4)
- Bandel #5 Plant R&M (India, 210MW x 1)
- Morupule A Retrofit (Botswana, 30MW x 4)
- Sabarmati E&F (India, 110MW x 2)
- Performance improvement construction for Boryeong Thermal Power Plant Unit 1, 2 (516MW x 2)
- Biomass fuel conversion for Yeongdong Thermal Power Plant Unit 1

Panoramic view of Morupule A site

Panoramic view of Boryeong Thermal Power Plant



Wind Power

The wind power business of Doosan Heavy Industries & Construction spans not only supply of power generation products but also EPC and services. We have been solidifying our status in the domestic wind power market through strengthened competency in development participation or direct development and maintenance operations in addition to installation/supply of equipment. WinDS3000/134, owned by Doosan Heavy Industries & Construction, is an onshore/offshore wind power generation system that shows excellent performance in low wind velocity regions and in maintenance, and that received two Green Certifications from the Ministry of Trade, Industry and Energy in November 2017. WinDS5500/140 is a 5.5MW-level offshore wind power generation system that boasts the highest capacity in the nation. Doosan Heavy Industries & Construction constructed the "Tamra Offshore Wind Farm" in the form of EPC, and also has a history of numerous successful contracts signed including the Yeongheung Wind Farm. Starting with maintenance contracts for wind power generators already supplied to Tamra Offshore Wind Power and Jeonnam Ground Wind Power, we have been actively advancing into the wind power service business and continue to focus on increasing customer satisfaction, from equipment supply to services.



Gas Turbine

Doosan Heavy Industries & Construction aims to set gas turbines as our future business, and through the development of next-generation gas turbine models to continue to expand the line-up of models to solidify our status as a global gas turbine OEM while seeking synergy with existing product groups in order to grow as a Total Power Solution Provider. Since 2013 when we began development of heavy duty gas turbines, Doosan Heavy Industries & Construction has been smoothly carrying out government funded project for the development of gas turbines with scale and efficiency greater than 270MW and 40%, respectively, while at the same time fulfilling the development roadmap via consistent collaboration through the entire value chain from R&D and design to production. We completed the basic design of gas turbines in July 2017 before starting production and plans in order to finish development by the end of 2019 and commercialization by 2021. In May 2017, we established a gas turbine R&D center in the U.S. followed by the ATSE (Advanced Turbomachinery Systems in Europe) to secure a professional workforce and networking for gas turbines in Europe, and in August of the same year completed a takeover of ACT (currently Doosan Turbomachinery Services), also based in the U.S., for the expansion of the service business, thus continuing to establish a broad gas turbine infrastructure.



ESS / Microgrid

Doosan Heavy Industries & Construction offers a total solution that encompasses all areas of the value chain of ESS, Microgrid, and even EPC Turn-key, which includes design services such as system modeling and functional optimization of ESS and Microgrid as well as their installation, trial run, and maintenance. We currently conduct businesses for power generators and energy prosumers based in Korea and the Americas where the market for ESS and Microgrid is growing at a fast pace, and have successfully completed projects of various scales, from 0.5MW to 20MW, utilizing different types of batteries such as Li-ion and Vanadium Redox Flow batteries.



Aerial view of Shin-Seochon Thermal Power Plant



Completion ceremony for the Yeongdong Unit 1 fuel conversion project



Solar ESS business



Panoramic view of Yeongdong Power Plant

Major Performance

Successful conversion of Yeongdong Thermal Power Plant Unit 1 to an eco-friendly biomass power plant

Doosan Heavy Industries & Construction converted the 125MW Yeongdong Thermal Power Plant Unit 1, constructed in 1973, to the nation's best and largest eco-friendly biomass power plant. Though there have been cases in which existing thermal power plants were modified to use both coal and biomass as fuel, this one carries significance in that it was the first ever conversion of a power plant into one that uses biomass exclusively.

Establishment of "e-brain center", a remote power plant doctor

Doosan Heavy Industries & Construction established e-Brain Center by combining East-West Power's Digital Solution technologies with Doosan's competency in digital-based service business. e-Brain Center is a remote doctor for power plants that comprehensively monitors and manages power generation equipment, which detects abnormal symptoms in power plants via an early warning system and analyzes operation and maintenance data in order to propose optimum running conditions and diagnose maintenance strategies. The e-Brain Center is a meaningful example of mutual collaboration, in which a power plant operator and power plant equipment manufacturer join hands to secure differentiated competitiveness in the global market. Based on the collaboration with East-West Power, we will continue to lead the global digital-based service market, leveraging the e-Brain Center.



Opening ceremony of the e-brain center

Order Intake for FGD (Flue Gas Desulfurization) Unit at Shin-Seochon Thermal Power Plant

Doosan Heavy Industries & Construction obtained an order for FGD (Flue Gas Desulfurization) construction at Sinseochon Thermal Power Plant, worth about 124 billion KRW, placed by Korea Midland Power. The flue gas desulfurization technology for which a supply contract has been signed applies the nation's strictest environmental criteria and the world's top-level design standards for the reduction of sulfur oxide emissions.

Construction of the nation's first-ever offshore wind farm for maritime commerce

Doosan Heavy Industries & Construction supplied as EPC the nation's first-ever commercial offshore wind farm, the Jeju "Tamra Offshore Wind Farm", completing the construction in November 2017. The Tamra Offshore Wind Farm is an enormous project with the scale of 30MW, through which ten 3MW-capacity offshore wind power generators, produced by Doosan Heavy Industries & Construction, were installed in the sea by Jeju's Hangyeong-myeon, which will produce 85,000MWh of eco-friendly energy that 24,000 households in Jeju Island can use year-round.

Acceleration of entry into the global ESS market

Doosan GridTech obtained an order from Consumers Energy for ESS (Energy Storage System) to be supplied to a substation located in Kalamazoo, a city in the southwestern part of Michigan, U.S., in April 2018. As the first volume of ESS orders from Consumers Energy, this is a meaningful project with the purpose of demonstration prior to an order for a large-scale ESS project. Doosan GridTech plans to supply ESS by September 2018 through the EPC (Engineering, Procurement & Construction) method, which performs everything from design and supplying of equipment and tools to construction. The batteries of the ESS system are at the scale of 1MWh, capable of supplying electricity to 1,000 households for one hour.



Construction of PKN Orlen S.A.-Plock project

We have supplied power generation equipment for provision of steam and electricity to the largest petrochemical plant in Europe established in the Plock region in Poland. We have successfully completed trial operation of 70MW-level steam turbines and generators in November 2017 and received the certificate of completion.

First entry into the international wind power generation market

On March 22, 2018, Doosan Heavy Industries & Construction signed an agreement with Vietnam Electricity (EVN) for construction of a 3MW offshore wind power generation test site adopting ESS (Energy Storage System). With this agreement, EVN will secure a test site and assist in licensing of the business, while Doosan Heavy Industries & Construction will supply wind power generation equipment including ESS via EPC and perform operation and maintenance (O&M) with Korea South-East Power. We also signed a business agreement for development of a wind farm with CC1, a Vietnamese construction company that owns the business license for 105MW-scale wind power generation. Through this we expect to assume the role of supplying and performing maintenance of major equipment for two wind farms in Binh Thuan province in southern Vietnam, whose business rights are held by CC1.

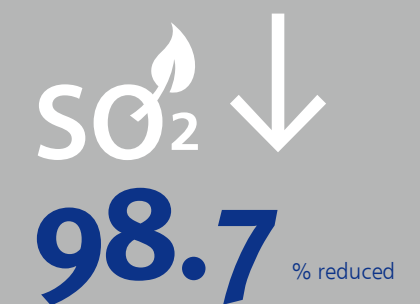
Passing EU-APR certification requiring European business conditions

Through collaboration with Korea Hydro & Nuclear Power, Doosan Heavy Industries & Construction developed the standard design of EU-APR, which is the European export-type nuclear power plant of the Korean model APR1400, and passed the certification review of European business conditions on October 9th, 2017. As the certification review was passed, we have become capable of exporting EU-APR to not only Europe, but also to countries such as South Africa and Egypt that require European business conditions to diversify the market.

LINK TO CSR

Reduction of emission gas through Localization of NL-GGH technology

NL-GGH (Non Leakage Gas Gas Heater) is ecofriendly equipment that fundamentally blocks leakage of sulfur oxides (SOx) through a chimney. For the first time in Korea, Doosan Heavy Industries & Construction became technologically independent by localizing NLGGH technology, and secured technical competitiveness by developing a compact model for retrofit that can reduce installation period and overcome site limitations in the existing power plants. We have decided to apply the nation's first localized model to Shin-Seochon FGD (Flue Gas Desulfurization), and reduce SO₂ emissions by more than 98.7% through the application of this technology.



More than 98.7% of sulfur dioxides reduced compared to before

Water Plant

As a global leader in the water industry, we offer solutions for the full spectrum including seawater desalination and water treatment areas.



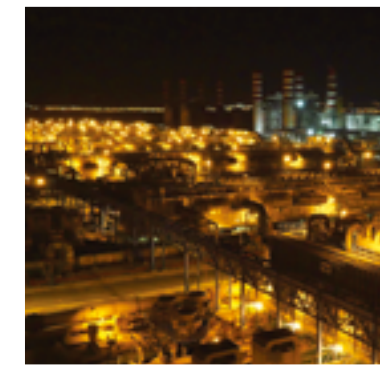
2017 Highlights

Received the grand prize as the "2017 Desalination Company of the Year"

Awarded contracts for ecofriendly water treatment facilities (Zero Liquid Discharge System, Wastewater treatment system which is converting sewage sludge into energy)

2017 Business Performances

Even amidst difficult circumstances in the water market due to the global economic recession and drop in oil prices, Doosan Heavy Industries & Construction has solidified its status as a leading Global Water Solution Provider based on stable technology and a high level of trust from its customers. In the beginning of 2017, it acquired an order for a large-sized desalination project in Saudi Arabia which proves once again its competitiveness in the Middle East desalination market and reaffirms the great level of trust they have gained from their customers through the successful execution and completion of previous desalination plant projects in Saudi Arabia. Meanwhile, in the water treatment area, Doosan signed contracts with a major British water supplier to provide equipment for water treatment plants and sewage sludge energy plants, further establishing the high level of trust Doosan receives from its customers through its supply of cutting edge technology in the field of water treatment.



2018 Forecast and Business Strategies

The seawater desalination market is expected to face a difficult period from 2018 onwards with orders being delayed due to water control policies promoted by Middle Eastern countries, the primary ordering bodies, with an emphasis on demand-centered management and improvement of efficiency of existing plants. Also, as the financial structures of major competitors are being enhanced, they are expected to be more aggressive with their future activities in the market, which is likely to intensify competition. Amidst such a tough market environment, Doosan Heavy Industries & Construction continuously looks to strengthen cost competitiveness and technical capabilities to ensure they remain competitive when acquiring orders, and puts in efforts to further expand the project pipeline by actively participating in private sector projects. In the short-term, it will consistently carry out aggressive activities to obtain orders in countries which plan to place orders of large desalination projects such as Oman, UAE and Saudi Arabia. In the mid-to long-term, it will promote regional diversification with new markets including India, Egypt, and Southeast Asia to establish a new Home Market, and plan to seek diversification of businesses to secure stable sources of income through acquisition of orders for O&M projects based on eco-friendly water treatment facilities and digital transformation.



Saudi Shuaibah



Saudi Yanbu Ph.2



Saudi Jeddah SWRO

Major Performance

Major performance and outcomes in 2017

Acquiring an order of a large-capacity seawater desalination facility in Saudi Arabia

Doosan Heavy Industries & Construction won a bid for "Shuaibah RO Ph.4" large-capacity seawater desalination facility placed by Saudi Arabia's SWCC. Having already successfully supplied "Ras Al Khair" desalination plant, an order placed by SWCC in the past and boasting the world's greatest capacity, and currently performing additional O&M contracts, Doosan Heavy Industries & Construction has recently moved up the water production schedule at "Yanbu Phase 3" Plant by a month, thus securing a solid level of trust from the ordering body and a firm position at the top of the Saudi Arabian market.



Receiving the grand prize as the "2017 Desalination Company of the Year"

At the Global Water Awards 2017, annually hosted by a global water business survey agency called GWI (Global Water Intelligence), Doosan Heavy Industries & Construction won the grand prize of "Desalination Company of the Year" for its efforts and success in the desalination industry. Also, both desalination plants of "Yanbu 3" and "Escondida" respectively won "Municipal and Industrial Desalination Plants of the Year", reaffirming our status of world's No. 1 company in seawater desalination.

Strongford sludge energy plant

Through its U.K. subsidiary, Doosan Enpure, Doosan Heavy Industries & Construction also signed a contract with Severn Trent Water, a British water utility company, to supply a waste-to-energy plant. This project is significant in the sense that Doosan recently entered in the waste-to-energy market, going beyond the existing desalination and water treatment plant business.

Contract to supply desulfurized wastewater ZLD system at Yeongheung Thermal Power Plant

By commercializing its in-house engineered ZLD (Zero Liquid Discharge) system, Doosan Heavy Industries & Construction won a contract for a desulfurized wastewater ZLD facility at the Yeongheung Thermal Power Plant. This system is the most advanced eco-friendly facility that can process not only suspended solids and heavy metal components filtered through existing water treatment facilities but also nitrates and selenium, which have been recently added as regulated elements around the world. Through this project, Yeongheung Thermal Power Plant is now capable of purifying about 1,250 m³ of desulfurized water every day.

Introduction of Business

With a wealth of experiences in supplying and executing seawater desalination and water treatment plants in Korea and overseas, Doosan Heavy Industries & Construction can give maximum satisfaction to its customers through various business models which are not only supplying mere equipment and facilities, but also offering operation and maintenance services of private sector projects including turnkey projects.

Desalination equipment

Doosan Heavy Industries & Construction is one of the world's topclass seawater desalination corporations, owning independent patents related to the reverse osmosis (RO) method, which uses membranes to filter salinity, and thermal type technology, which evaporates then cools the source water, both are key technologies in seawater desalination. Doosan Heavy Industries & Construction has secured large-capacity facility technology of the RO method, which has been applied to various large desalination facilities recently, and also possesses world-class technology and experiences as the leader of thermal type seawater desalination, represented by MSF (Multi-Stage Flash) and MED (Multi-Effect Distillation).

Eco-friendly water treatment facilities

Along with Doosan Enpure, a U.K.-based affiliate and an expert in fresh water and sewage treatment, sludge treatment and converting sewage sludge into energy, Doosan Heavy Industries & Construction possesses engineering competency and experiences that encompass the entire field of water treatment. Through advanced treatment technology utilizing membrane filtration and evaporation technology which has been accumulated from the seawater desalination business, Doosan Heavy Industries & Construction can supply reuse facilities and equipment tailored to different needs including removal of specific industrial harmful substances, maintenance of rivers, landscaping, agricultural and industrial water, etc.

Zero liquid discharge treatment facilities

Based on the know-how of existing desalination facilities, Doosan Heavy Industries & Construction developed a safe water treatment facility (Zero Liquid Discharge, ZLD) that can completely block or minimize waste water discharge while simultaneously producing high purity reuse water, it is supplied to the wastewater treatment system of domestic and foreign power plant desulfurization facilities, it will be expanded to the oil & gas market in the future.

Major products and services

- **Seawater desalination plant**
Reverse Osmosis (RO)
Multi-Effect Distillation (MED)
Multi-Stage Flash (MSF)
- **Water treatment & sewage and wastewater treatment plant**
Drinking water treatment, water treatment for power and industrial plant, sewage treatment and reuse, waste water treatment for power and industrial plant
- **Plant operation and maintenance**
- **Sludge treatment and resource recycling plant**
- **Eco-friendly Zero Liquid Discharge treatment facilities**
- **Pressure flotation equipment (Enflo-DAF™)**
- **Low Energy No Aeration MBR system (LENA MBR)**
- **Large-capacity fiber filter (Doosan Fiber Filter)**

Major project portfolios

- Saudi Arabia Shoaibah Ph.4
- Saudi Arabia Yanbu Ph.3
- Saudi Arabia Yanbu MED
- Saudi Arabia Marafiq MED
- Saudi Arabia Ras Al Khair Ph.1 (Hybrid)
- Saudi Arabia Jeddah SWRO Ph.3
- Saudi Arabia Shuaibah RO Expansion
- Saudi Arabia Shuaibah IWPP
- Saudi Arabia Sohaiba Ph.2
- United Arab Emirates Fujairah Ph.1 (Hybrid)
- United Arab Emirates Jebel Ali 'E'
- Oman Sohar IWPP
- Oman Al Ahnsab STP
- Qatar Ras Laffan B
- Kuwait Doha RO Ph.3
- Kuwait Shuwaikh SWRO
- Kuwait Sabiya Ph.1&2, 3
- Kuwait Az Zour South Ph.2
- Kuwait Shoaibah Pumping Station 'C'
- Libya Benghazi
- United Kingdom Birmingham Resilience
- United Kingdom Strongford THP
- United Kingdom Horsley WTW
- United Kingdom Woodmansterne
- United Kingdom Bellozanne New STW Ph.3
- United Kingdom Northumbrian Water
- United Kingdom Southern and East Water
- Chile Escondida Water Supply
- Republic of Korea Gijang SWRO
- Republic of Korea Yeong-heung ZLD

Casting & Forging

From the material making to machining for essential products in various industries such as power generation, shipbuilding, steel and automotive, a total production facility has been established. Furthermore, castings and forging products of outstanding quality have been supplied all over the world based on our excellent technology and deep experience.



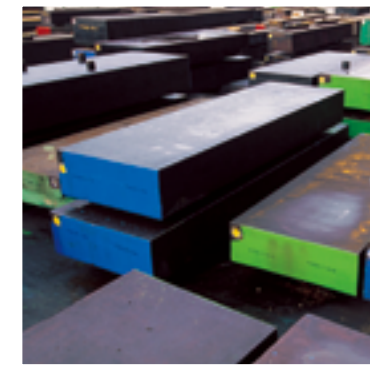
2017 Highlights

Construction of 17,000-ton press, the world's largest

Selected as one of the 9 global top-class products (Ministry of Trade, Industry and Energy)

2017 Business Performances

In order to overcome limitations in growth of existing businesses due to a global economic slump causing a reduction of demands in front industries, Doosan Heavy Industries & Construction has preemptively responded for new product businesses by utilizing existing core competencies to complete the establishment of mass production lines for the marine plant industry, while preparing a foundation to acquire orders for a variety of products by securing partnerships with major customers. Moreover, it has achieved the expansion of new product businesses that meet the diversifying and advancing needs of customers, which includes ultralarge chemical engineering pressure vessels. In addition, strategic partnerships with existing core clients have led to the stable procurement of base volume and, through successful entry into the European market of post-usage nuclear fuel transport and storage products (casks) as well as the first-ever order received on press complex products, its outstanding technical competitiveness on new products has been widely recognized while a firm level of trust has been gained from its customers.



2018 Forecast and Business Strategies

Though the volume of the domestic power generation industry is expected to decrease due to changes in domestic power source policies, major front industries related to casting and forging such as shipbuilding, automotive and steel are forecast to grow thanks to the restoration of the economy. Thus, we aim to continuously maintain close-knit collaboration with major customers in shipbuilding, etc. to keep dominating the existing markets while looking to grow our businesses through market expansion into overseas regions and promotion of new product businesses such as marine plants, which will lead to improved business portfolios. Also, we will continue to strengthen our fundamental competitiveness by securing technology of new materials and processes with high added values including high-efficiency, high-specification, and high-strength materials as well as developing solutions technology optimized in major processes. Meanwhile, we plan to maximize the productivity and business performance of the world's greatest 17,000 ton-level forging press that has been newly activated in order to maintain our rank as the global-leading casting and forging company.



Introduction of Business

The casting and forging business of Doosan Heavy Industries & Construction started in 1973 and, based on technical knowledge and production experience accumulated since the foundation, the company has manufactured and supplied casting and forging products of the highest quality to its customers. Large-scale steel, making, casting, forging, and fabrication factories boast the latest automation facilities, digital-converged process optimization system, and strict quality assurance system based on various quality certifications. The steel mill contains a 100-ton electric ARC furnace, has 250,000 tons of annual production capacity, and can produce a maximum 650 tons of ingot. The forging factory possesses a 17,000-ton press, 140,000 tons of annual production capacity, and can produce more than 350 tons of large-sized forging products. As demand industries continue to become more and more advanced, we aim to continue to secure a competitive edge through consistent investments into the establishment of an optimum infrastructure that can help produce high added-value, highly functional metal materials such as remelting equipment related to high-purity steel production, thus seeking to create the greatest value for the customers. In addition, by discovering new products capable of securing external growth and profitability, we are aggressively enhancing our business portfolio. Based on such abilities, the company consistently exports products to China, Southeast Asia, Japan, Europe, and the U.S. Furthermore, after being acknowledged for our product manufacturing technology and competitiveness in export by the Ministry of Trade, Industry and Energy, nine of our products currently occupy the rank of world's best in categories including mold steel, crankshafts for vessels, work rolls, and low-pressure turbine rotor shafts.

Major products and services

- Shell and head for nuclear power generation
- Runner and crown for hydroelectric power generation
- Turbine rotor and casting for thermal power generation
- Wind power turbine generator materials
- Crankshaft for vessel engines
- Offshore plant materials
- Ship building shaft and rudder horn
- Mold steel and tool steel for cars and electronic products
- Roll for steel industry
- Shell for chemical engineering advancement equipment
- Large sized casting and forging product for industrial use

Major project portfolios

Power generation

- Shin Hanul Unit #3,4 nuclear power
- CASK for nuclear power, Europe
- Anin Thermal Power STG, Gangneung
- Soldier Pond project Hydroelectric Power turbine, Canada
- ZMW wind power turbine, Japan

Shipbuilding/maritime

- 2000TEU ultra-large container ships for Daewoo Shipbuilding & Marine Engineering
- Semi-submersible crane vessel project, Europe

Steel

- POSCO board press roll
- Rolling stand at VOESTALPINE Steel Mill in Australia

Industry

- POCR chemical engineering pressurized vessels for Kazakhstan
- Otto Fuchs die forging press project, USA
- Cement ROTARY KILN
- FLSMIDTH crushing and grinding equipment at Chilean mines
- Mold tool steels for cars and home appliances

Major Performance

17,000 Ton hydraulic forging press

Major performance and outcomes in 2017

Construction of the world's largest, 17,000-ton press

Based on years of experience in manufacturing casting and forging products, installation of the 17,000-ton casting press began in 2014 with the company's own technology, after which a commercial operation in April 2017 was successfully conducted. Featuring four columns and the greatest scale in the world, the 17,000-ton press is 29m-high and 9m-wide, and can produce 80,000 tons of cast products every year. Thanks to the introduction of the 17,000-ton casting press, the company was able to gain a competitive edge over Japanese, Italian, and Chinese competitors and plans to continue to utilize the large-sized press and accelerate penetration into the ultralarge cast product market in the areas of power generation and industry.

First entry into the European nuclear power plant cask market

In Europe, an order for cylindrical body shells and bottom forging products, used in nuclear waste transport and storage containers (casks), was obtained. By winning the bid for nuclear power plant cask prototype #1 in 2016 and successfully supplying in 2017, our manufacturing competency was verified and, based on this, we were able to sign an MOU for long-term cooperation and obtain an order of 2 casks for nuclear power projects. Successful production and delivery of these orders is expected to form a basis for our nuclear power plant cask business, which has become more important due to an increase in aging nuclear power plants, to expand into overseas markets including Europe, the U.S., and Japan.

Successfully supplying complex products to the world's largest semi-submersible crane vessel

After acquiring an order for 82 units of a core part used in the pontoon (floating structure) of the world's largest offshore semi-submersible crane vessel from a client that leads the global offshore structure transport, installation, and decommissioning market, we successfully completed and delivered the final product. Thanks to the successful supply of these products, we have secured an essential reference for major equipment and core parts for marine plants and, thus, expect to field an increased number of additional orders buoyed in the marine plant market, which traditionally has a high barrier to entry.



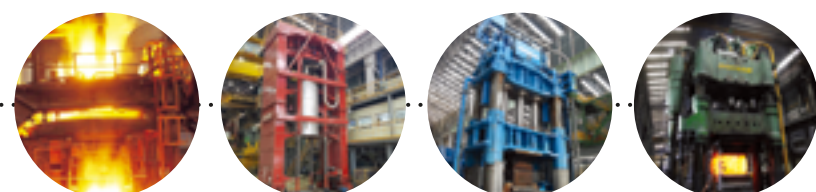
LINK TO CSR

Analyzing big data of the steel mill 100-ton electric furnace to reduce CO₂ through the optimization of work patterns, etc.

The steelmaking shop conducted a big data analysis on the 100-ton electric ARC furnace, which consumes the greatest amount of electricity in the factory, to conduct activities such as optimization of 2nd scrap charging point, optimization of power current/voltage operation of the electric furnace, optimization of oxygen lancing and, thus, the optimization of work patterns. Such activities helped reduce 18,000 tons of CO₂ emission. The company also focuses on reducing greenhouse gas by, for example, using clean forms of fuel such as LNG.



18,000 tons of CO₂ reduced every year



100-ton EAF (max. 650-ton ingot)

150-ton ESR

17,000 Ton hydraulic forging press

4,200-ton PRESS

Major facilities

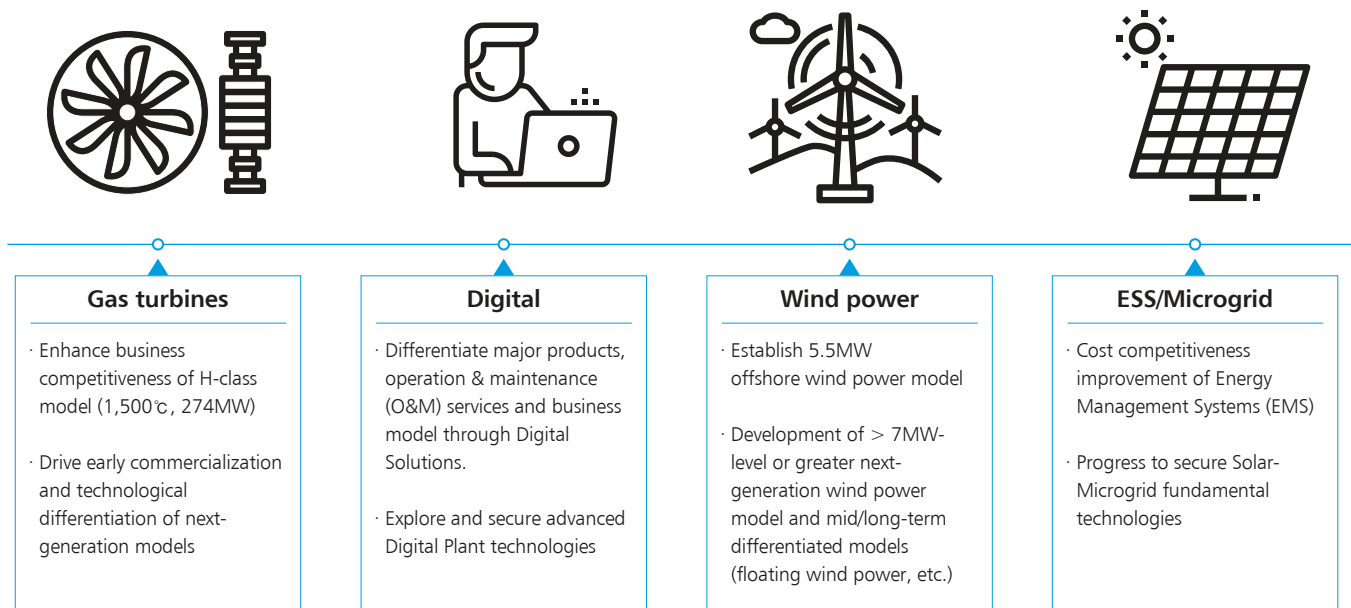
R&D and Digital Solution

R&D leading future growth

Technology development strategies

Global power industry trend continues to accelerate away from new coal and new nuclear power plants and towards digitalization, expansion of distributed power generation and manufacturing innovations. Similarly in Korea, expansion of Renewables (Wind/Solar Power) and tighter demand and supply control management is expected with proclamation of the government's 8th Basic Plan for Electricity Supply and Demand and Renewable Energy 3020 policy. In response, Doosan Heavy Industries & Construction is reinforcing the existing R&D portfolio through prioritized deployment of resources to business areas such as gas turbines, digital solutions, wind power and energy storage systems (ESS). Also by changing our operating R&D system to be agile and performance-orientated, we aim to strengthen linkages between business, product and technology.

Capability focus on major initiatives



R&D portfolio transformation

Going beyond coal or nuclear power R&D, we continue to increase the percentage of innovation and emerging technology by focusing our efforts on discovering innovative technology in the energy industry including : AI, unmanned power generation, blockchain, and 3D printing. Also, for discovery and accelerated deployment of new businesses; we plan to enhance our open innovation by diversifying cooperation channels, develop more demonstration projects linked to policies and actively deliver collaboration projects in response to public energy agency's / client's technological needs.

Technology Research Institute, the engine of Doosan Heavy Industries & Construction

The Corporate Research & Development Institute of Doosan Heavy Industries & Construction proposes and commercializes new products and technologies that spearheads the company's future growth. Also, it offers technical solutions to strengthen business product's core competitiveness and continuously strives to create inter-business synergies by securing capabilities that services their fundamental technological requirements.

Discovering and commercializing new businesses and technologies

With the introduction of new climate change restrictions, the future energy mix is to be restructured around gas and renewables away from coal-fired power. And in anticipation we continue to explore different avenues to secure business development and commercialization opportunities in alternative clean technologies.

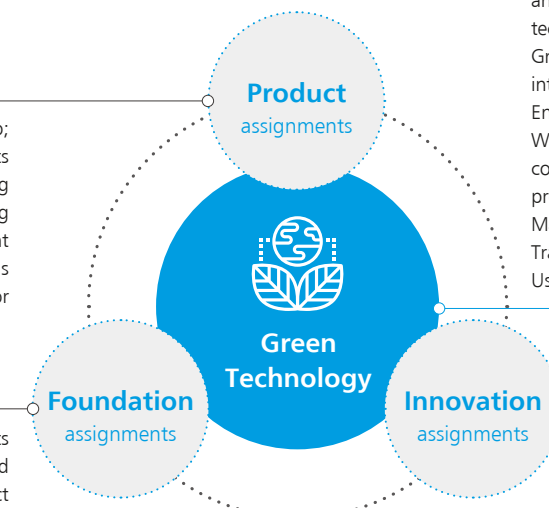
Strengthen business support capability and product's core technological competitiveness

We provide value to the business through on-time delivery of advance technologies, technical sales support and services which enables the business to expand its market share with minimized technical risk. Also, we continue to reinforce competitiveness of our products and business by securing digital technologies such as Smart Power Plant (SPP) technology and extending Digital Factory (Digital Transformation) applications to the Power and Water businesses.

Technology development assignment types

Product R&D assignments are divided into; complete Model Development projects which has a development focus on making performance improvement of new and existing products, and Components Development projects which has a development focus on making component improvements or introduce innovative design changes.

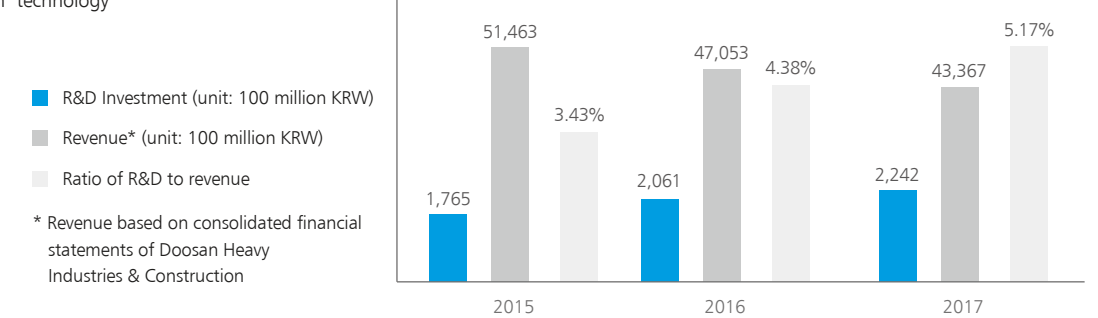
Foundation R&D assignments refer to projects aimed at acquiring engineering data and background knowledge needed for product design or to upgrade and supplement design tool verification and production technology etc.



We are establishing the Green Portfolio management system to proactively respond to Global Green management risks, and continuously inspects and manages the company's green products and technologies.

Green products and technologies are categorized into: Energy Efficiency, New and Renewable Energy, Environmental Pollutant Emissions, and Eco-friendly Water Treatment areas, and in correspondence the company promotes R&D for delivery of eco-friendly products related to: Sustainable Power Generation, Maximized Energy Resources Utilization, Intelligent Transmission & Distribution (T&D) and Efficient Energy Use technology themes.

Innovation R&D assignments refer to projects aimed at delivering feasibility study to develop or discover innovative products that do not exist at present.



Digital Transformation

Doosan Heavy Industries & Construction is preparing for the age of the Fourth Industrial Revolution through digital transformation, which refers to the provision of businesses and services centered on data instead of product sales as in the past, and emphasizes changing ways of working to achieve the transformation. From a business standpoint, Doosan Heavy Industries & Construction began the service offering based on its engineering competence and digital solutions and continues to establish an organizational culture that suits the digital age through an agile methodology.

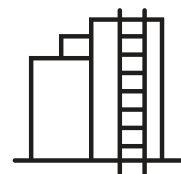
Service Offering

As the age of the Fourth Industrial Revolution, which includes the advancement of data analytics and expansion of the software platform, opens up, new business opportunities continue to be discovered in the power generation industry. A form of business that first improves the performances of a power plant using software and then shares the subsequent value enhancement (Value-up) has appeared and existing recurring O&M businesses become more advanced based on these digital solutions.

In line with the megatrend of digital plants pursued by power plant customers, Doosan Heavy Industries & Construction seeks to strengthen its O&M service business by creating strengths and differences for the future.

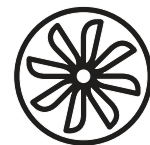
In 2017, Doosan Heavy Industries & Construction signed an MOU with Korea East-West Power on the "power plant monitoring and diagnosis service business" for the development of digital solutions and business models. By applying its internally developed early warning system (PreVision™) and jointly operating the e-brain center based on digital solutions, it continues to secure successful cases of business models that offer power plant monitoring and diagnostic services and, based on this, discover a variety of new services.

Founded upon such technology, it has also established the means to provide a digital solution optimized for the Indian market and to guarantee its performance, as the country owns the world's second largest installed-base and a great need for advanced services. Currently, a solution has been secured and developed specifically for the needs of Indian customers. Moreover, it plans to continuously expand its digital services business by successfully carrying out the pilot project based on the MOU signed with the Indian IPP Reliance.



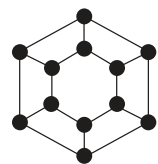
Boiler

- Combustion Optimizer
- Boiler tube management system
- Optimization of ventilation



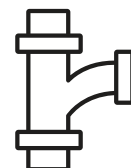
Turbine/Generator

- Turbine vibration diagnoses
- Turbine rotor vibration and rubbing control



Overall/Infrastructure

- Early Defect Warning
- Performance monitoring and diagnoses
- Plant performance diagnoses

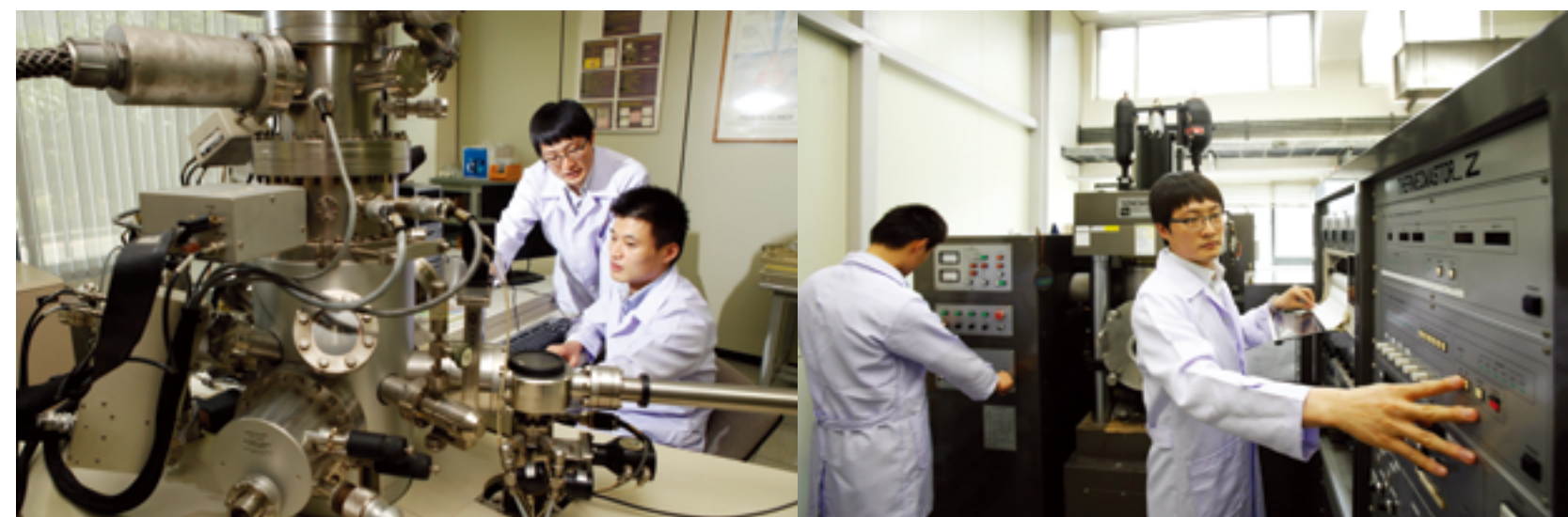
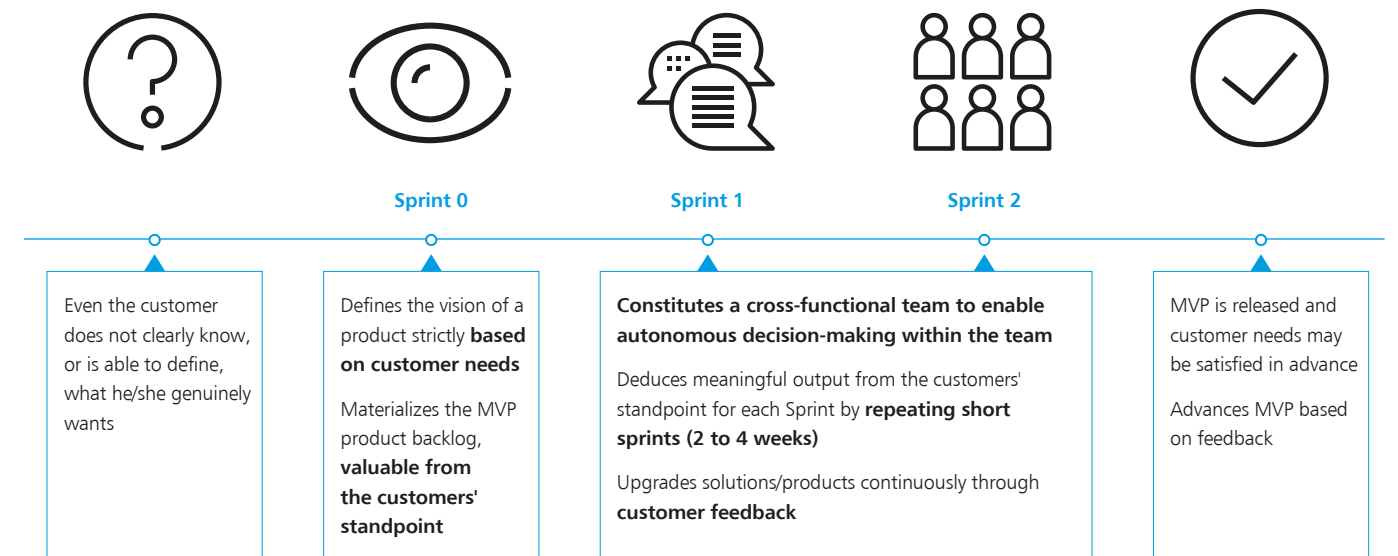


BOP (Balance of Plant)

- BOP vibration diagnoses
- Flexibility solution (automated pump loading distribution)

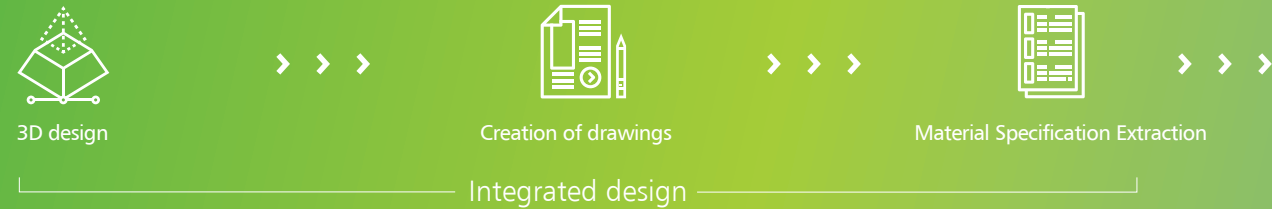
Changes in work styles and methods

As the market environment rapidly changes, "innovativeness" based on disruptive technology innovation has become more important than ever in corporate management. Though the establishment of a business model that does not waver under external changes was a core element for success in the past, the ability to flexibly and rapidly respond to external factors enables existence and growth these days. Thus, Doosan Heavy Industries & Construction applies the "Agile" methodology, which helps respond to the uncertain business environment through "continuous upgrades via customer-oriented and quick iterations". The goal of "Agile" is to quickly launch MVP (Minimum Viable Product) and advance through repeated customer feedback. To effectively implement this, scrum, a cross functional team, is formed to make team-driven decisions, which will lead to fast and powerful execution. Doosan Heavy Industries & Construction applies and extends Agile in development of digital solutions and, through this, enables customer-oriented product development.



Operational Excellence

Industry 4.0 of the heavy industries is being achieved, through applying an integrated design environment based on 3D models and Digital Factory, which combines the digital technology in production sites to improve competitiveness of the manufacturing industry.



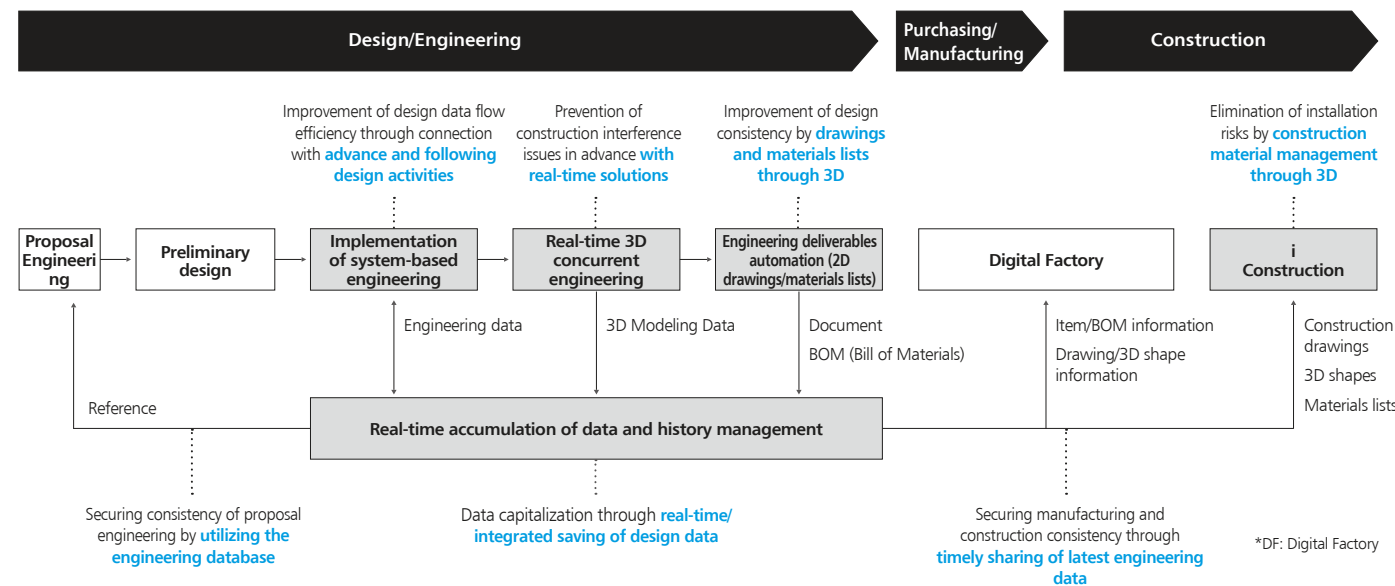
Manufacturing innovation utilizing the digital technology enhances competitiveness in quality, cost and delivery, which will lead to profitability improvement to help secure fundamental competitiveness for Doosan Heavy Industries & Construction.



Integrated design system

The integrated design system provides a design work environment centered on standard design procedures defined among different teams, as well as an environment in which all organizations and subsidiaries can perform concurrent 3D engineering. It also offers an engineering database to systematically manage the design data and for utilization by teams other than design, through which we aim to strengthen the design competitiveness and reduce costs from quality failure occurring due to the design.

Concept of integrated design



Progress and outcomes

After its establishment, the integrated design system has been applied to and is being utilized in a number of EPC projects (6, as of March 2018), and has defined work processes and implemented the enhancement of additional features in order to apply to the proposal engineering as well. It has also improved the work environment in the areas of turbine, generator, and boiler design for association with the Digital Factory.

Future plans

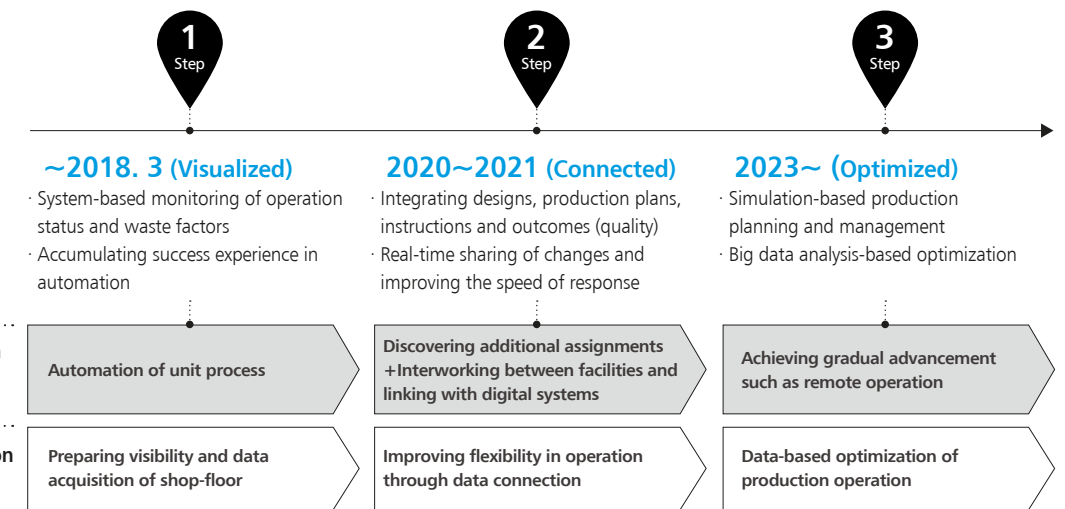
In 2018, we will pursue work improvement activities to internalize the integrated design process and actively use the data, which is managed within the system, in areas other than design. We will continue to produce results through the achievement of expected effects.

Digital Factory

Digital Factory is the unique smart factory of Doosan Heavy Industries & Construction that visualizes, collects, and analyzes all situations in production based on ICT technology, such as sensors and automation equipment, to realize an optimized production process and environment. Since the beginning of implement in June 2016, it has been conducting various assignments in the areas of automation and digitalization and, in the mid-to long-term, the company aims to apply the Digital Factory in three stages throughout the entire production process to reinforce production efficiency and manufacturing competitiveness.

Progress and roadmap of the Digital Factory

"Securing fundamental competitiveness in manufacturing through Industry 4.0 in the production sector"



Progress and outcomes

The automation has completed field application of 32 out of the total 45 tasks focusing on unit process automation (1st stage), and achieved the expected effects (reduction of lead time and man hours, securing of safety, and reduction of outsourcing expenses, etc.). The digitalization is the 1st stage in which the basic system is developing to secure visibility and collecting data in shop-floor. Currently, Doosan Heavy Industries & Construction is building the system that digitalizes manufacturing process design, work instructions, quality information and documents through design information, besides the system to visualize the production execution (production status and materials tracking). Starting in March 2018, 10 systems have been utilized in everyday work.

Future plan

In 2018, we will continuously invest in key tasks of the Digital Factory and internalize an established system, while consistently promoting manufacturing innovation from changes in the way of working through the "Digital Lean," an activity that is utilizing digital technology such as process simulations and AI to eliminate waste and inefficiency.



02

Commitments to Sustainability

2030 SDGs Commitments	48
Communication with Stakeholders	52






2030 SDG Commitments of Doosan Heavy Industries & Construction



2030 SDGs Commitments

Doosan Heavy Industries & Construction has conducted business activities that can increase the value of the earth through technology which increases the amount of water reserves in areas with severe water shortages issues as well as by improving access to sustainable energy in countries with emerging markets.

The Sustainable Development Goals (SDGs) are the greatest common objectives of the UN and international community that deal with humanity's universal issues, the Earth's environmental problems, and socioeconomic issues. As a corporate citizen, Doosan Heavy Industries & Construction establishes and accomplishes goals that contribute to sustainable development worldwide based on its core businesses and social contribution activities.

Link to SDGs	Commitments	Major connected activities
<p>Commitment 1 Increase the amount of water reserves</p> 	<p>SDG 6. Clean Water and Sanitation Ensure the availability and sustainable management of water and sanitation for all 6.1/6.3</p>	<ul style="list-style-type: none"> • Seawater Desalination Plants • Water-Wastewater Treatment Plants • ZLD (Zero Liquid Discharge), MBR (Membrane Bioreactor), etc.
<p>Commitment 2 Ensure access to sustainable energy</p> 	<p>SDG 7. Affordable and Clean Energy Ensure access to affordable, reliable, sustainable and modern energy for all 7.1/7.2/7.3</p>	<ul style="list-style-type: none"> • Improvement in energy efficiency • Renewable energy • Collection and reduction of CO₂ • Reinforcement of the after-market business • Development of green technology products, etc.
<p>Commitment 3 Reduce Greenhouse Gas Emissions</p> 	<p>SDG 13. Climate Change Action Take urgent action to combat climate change and its impacts 13.1</p>	<ul style="list-style-type: none"> • Reduction of greenhouse gas (power plant technology) • Renewable energy • Development of advanced D-NOx burner and eco-friendly combustion technology • Realization of Smart Industry 4.0 by establishing an energy integration system • Step-by-step application of the microgrid system, etc.
<p>Commitment 4 Prevent Diseases and Expand Treatment</p> 	<p>SDG 3. Good Health and Well-Being Ensure healthy lives and promote well-being for all at all ages 3.4</p>	<ul style="list-style-type: none"> • Free local treatment activities by Doosan Vina and Chung-Ang University Hospital (Vietnam) • "Q-Health" medical consulting program (Vietnam) • DPSI "Health Camp" program (India) • Bone-marrow donations by Doosan Skoda Power employees (Czech Republic) • Blood donation of love campaigns and 5 other activities, etc.
<p>Commitment 5 Foster Local Talents</p> 	<p>SDG 4. Quality Education Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all 4.4</p>	<ul style="list-style-type: none"> • Technical training for the unemployed • Operation of industry-academia cooperation, Doosan Class • Themed programs at local children's centers • DPS STEM support (Europe) and 14 others activities, etc.

[Link to SDGs on Business](#)

[Link to SDGs on social contribution activities](#)

Major promoted activities and outcomes of 2017

- Completion of a seawater desalination plant in Yanbu, Saudi Arabia
 - Produced of 550,000 tons/day of water (completion of Yanbu Ph.3)
- Award "Zero liquid discharge waste water system" which is an eco-friendly water treatment technology
- Award seawater desalination plant in Saudi Arabia
- Supplying eco-friendly coal-fired thermal power to new markets: Supply contract for the Thabametsi Coal-fired Power Station (630MW) in South Africa
- Wind power: Construction of Korea's first-ever commercial offshore wind power generation complex (Tamra Offshore Wind Power 30MW) and supplying of wind power (3MW) to Gyewol-ri, Suncheon
- ESS: Pursuit of a Microgrid project in the nation's first profit-sharing industrial complex (Doosan Engine, 4.2MWh ESS+100kw PV) and construction of Doosan Heavy Industries & Construction Learning Center Microgrid (1MWh ESS+300kw PV)
- Establishment of an integrated energy control system (1st stage)
- Execution of energy diagnoses on suppliers
- Installation of solar power generation+ESS at the Learning Center
- Winning the 2018 Korea Green Climate Award
- Reduction of 1,736 tCO₂ in emissions through the establishment of an integrated energy control system (1st stage)
- Reduction of 10,235 tCO₂ through OE and efficiency enhancement activities at the Changwon Plant
- Free local medical treatment activities at Doosan VINA-Chung Ang University Hospital
 - Free health examinations: 3,180 people / free surgeries: 7 people
 - invitation training: 2 people
- "Q-Health" medical consulting program
 - Dispatch consulting: 2 times / invitation training: 6 people
- DPSI "Health Camp" program (India)
 - [Gurgaon region] Eye examinations for 641 people (provided glasses for 49 people)
 - [Lara region] Free health examinations and provision of basic medical supplies for 600 people
 - [Chennai region] Donation of ultrasonic devices to local public hospitals (executed 50 scans on average every week)
- Technical education and training for the unemployed
 - 61 people completed the welding/processing course and 53 people were recruited for employment
- "Doosan Class" technical training collaboration between industry and academia
 - 29 people recruited from 3 specialized high schools and 14 of them employed
- Fostering science talents
 - research expenses and scholarships supported for 80 people
- Youth career exploration group: participation of 100 students from 5 middle schools in Changwon, 25 different career types
- Engineer exploration classes: participation of 54 students from 4 middle schools in Changwon, experiencing design, processing, and welding
- Local children's center themed programs: 9 themed experiences conducted 160 times, 1,500 children from 66 local children's centers participated

Future plan

- Increasing the production volume of fresh water through the additional construction of large-capacity desalination facilities
- Managing eco-friendly water through the additional supply of sewage and waste water treatment facilities
- Continuously developing water reuse technology
- Continuous expansion of the offshore wind power business
- Continuous acquisition of orders for ESS to respond to load variations taking place due to the expansion of new and renewable energy
- Development of gas turbines
- Establishment of an integrated energy control system 2nd stage (water, pressurized air, steam) in 2019
- Establishment of an integrated energy control system 3rd stage (electricity, gas) in 2020
- Installation of solar power generation+ESS in available space such as Changwon factory parking lot
- Review of the designation and operation of the Carbon Reduction Day
- Execution of local medical community services and surgery programs in Vietnam
- Extension of Doosan VINA's Q-Health program operation
- Pursuit of expanding health initiatives in local areas of Jawaharpur and Obra C, India
- Continuous operation of the vocational training consortium business group and Doosan Class technical training
- Addition of vocational content related to the Fourth Industrial Revolution for the youth career exploration group
- Constant operation of engineer exploration classes and execution of special lectures by Master Hands
- Expansion of local children's centers participating in themed programs



Communication with Stakeholders



6 CLEAN WATER AND SANITATION



Based on socially responsible management, Doosan Heavy Industries & Construction recognizes the SDGs as an important strategy that creates new business opportunities according to social and environmental changes, and provides meaningful contributions to society. The core areas and objectives of the SDGs have been selected following the analysis and comprehension of the connection with, and importance of, the business, positive, negative, and potential impacts on Doosan Heavy Industries & Construction. Moreover, it is extremely promising that, going beyond a mere connection between the SDGs and business, detailed target objectives, the specified duration and public commitment are made to share with and encourage cooperation from stakeholders. It is also remarkable to have selected strategic and detailed goals by considering the changes in the system, resolution of social issues and contribution to the local communities through not only business opportunities but also connection with management and operational issues, as well as existing social contribution activities. The synergy between Doosan Heavy Industries & Construction and various stakeholders, which are related to the objectives it established to successfully carry out the 2030 Commitments, is increased through mutual collaboration and participation in platforms for each issue, and it is hoped that the company serves a more leading role in Korea as well as overseas. We also hope to collect various opinions and specify better policies and directions by consistently sharing strategies and cases related to the SDGs with stakeholders and other companies.

Seawater desalination projects are spotlighted as a way to solve the global environment pollution and water scarcity. Doosan Heavy Industries & Construction has supplied approximately 3.9 million tons/day such as Saudi Arabia's Shuaibah RO Seawater Desalination Project, Yanbu-Phase 2 MED Seawater Desalination Project and Marafiq MED Seawater Desalination Project. These projects have supplied fresh water to many people in the Kingdom and helped solve their water shortage problem. Doosan is the world major total water solution provider and contributes to sustainable water use through securing water resources. I hope that Doosan will keep a remarkable progress in expanding water business, based on the competitiveness and knowhow of seawater desalination technology and continue to play a positive role in raising the value of the earth by contributing to clean water supply and improving sanitation for all.

7 AFFORDABLE AND CLEAN ENERGY



Vinh Tan 4 Coal-fired Thermal Power Plant in Vietnam is the nation's core project in the scale of 1200MW (600MW x 2 plants) and is located in Binh Thuan region, 230km east from Ho Chi Minh City. Doosan Heavy Industries & Construction participated in the EPC method (Engineering, Procurement, and Construction) through which it carried out the entire process from the design and manufacturing of equipment to installation and trial operation. As the project was completed three months earlier than scheduled, electricity was also supplied in a stable manner earlier than expected. Vinh Tan 4 Power Plant currently uses the most advanced technology available in Vietnam and is designed for maximum efficiency. In addition, the eco-friendliness of the power plant has been improved through technology that minimizes the environmental load. EVN highly values Doosan Heavy Industries & Construction's experience in equipment manufacturing as well as its abilities in operation and management. In particular, the level of satisfaction in the personnel training is high, as the needs of Industry 4.0 have been applied. We hope that Doosan Heavy Industries & Construction may supply stable energy services in Vietnam based on the partnerships and reliability it has established over a long period of time.

13 CLIMATE ACTION



HK Metal Co., Ltd. participated in the 2016 affiliate green partnership project through which energy efficiency diagnoses are offered for the suppliers of Doosan Heavy Industries & Construction. Through this program, consulting on carbon emission and control at workplaces and during processes, as well as assistance for efficient use of energy, were received. Through this, they learned that electricity cost may be reduced by understanding the current status of greenhouse gas emission and carrying out energy efficiency policies at production sites. We have devoted internal efforts, including the replacement of all halogen lights with LED and installation of motion sensor lights in seldom-used spaces. As a result, 16% of our annual power cost was reduced and the efficiency in production tasks was also improved, as it became less necessary to replace lights that reach the end of their lifecycle, and as the brightness in workspaces could be maintained at an optimal level. This project has enabled us to participate in the global climate change actions and draw positive outcomes of, for example, improving the energy efficiency of the company. Active support from Doosan Heavy Industries & Construction is expected to enable more suppliers to participate in the green partnerships.

3 GOOD HEALTH AND WELL-BEING



The Quang Ngai Department of Health is extremely grateful for the medical service activities conducted by Doosan Vina and Chung-Ang University Hospital. Free surgeries and medical exams, which first began in 2009, have benefited more than 25,000 local residents thus far, and such medical community service activities that have lasted a decade bring about positive feedback and a great level of faith from the locals. In addition, they conduct medical technology education programs for the medical staff at local hospitals and also provide necessary medical equipment, all of which are absolutely necessary in the Quang Ngai region. A few surgeries conducted last year by the medical staff of Chung-Ang University who showed great heart and care as they checked the progress of patients in the post-surgery recovery processes. I know that programs have been prepared and are scheduled this year as well. We extend our deepest gratitude for their services, and hope that we continue to maintain a good relationship with Doosan Vina and Chung-Ang University Hospital.

4 QUALITY EDUCATION



Doosan Heavy Industries & Construction and the Changwon Office of Education have been serving as mentors who support the youth to experience the entire process including the exploration, experience and design of careers through the Doosan M.Y. Dream Youth Career Exploration Program. The process of trial-and-error that our youth encounter as they enter society and find appealing jobs are intense. Though these may sometimes be meaningful experiences, they also can have an unnecessarily high social cost. Thus, effective career and vocational education in middle and high schools may not only prevent the waste of time and finances, but also efficiently lead these youth into future society. In the actual education sites, however, vitalization of vocational education is pursued through the introduction and attempt of new policies, which have not yet been settled in the field due to the lack of infrastructure, society-wide awareness, systems and manuals. From this standpoint, the youth career program of Doosan Heavy Industries & Construction provides young people with the opportunity to think deeply about their future and careers while helping reduce the time consumption of trial-and-error, which carries social significance. Therefore, we hope that Doosan Heavy Industries & Construction continues to be interested in, and offer assistance for, the upright development and fostering of local youth.



UN Global Compact Network Korea
Lee Eun Kyung, Senior Researcher



Saline Water Conversion Corporation, Saudi Arabia
Sharekh Ibrahim Al Sharekh, Deputy Governor for Project & Technical Affairs



Vietnam Electricity (EVN)
Duong Quang Thanh Chairman



HK Metal Co., Ltd.
Kim Deuk-yeon, CEO



Quang Ngai Health Department
Nguyen Tan Duc, Director



Changwon Office of Education
Song Seung-hwan, Superintendent of Education



03 Sustainable Management

Governance Performance	56
Environmental Performance	62
Social Performance	72

Result of Sustainable Management for 2017

Listed for Four consecutive years in DJSI Korea

Grade A rated for Six consecutive years in the evaluation performed by the Korea Corporate Governance Service

Participation in declaration of support for the 'UN Sustainable Development Goals (SDGs)'

Release of 2017 Casebook for Outstanding Fulfillment of Sustainable Development Goals (issued by UNGC Korea)



**Governance
Performance**



2017 Performance at a Glance

Introduction of an electronic voting system to promote the exercise of shareholder rights

By the introduction of the electronic voting system, the ways to exercise the voting rights of shareholders who are not able to attend general shareholders' meetings are strengthened. In 2017, About 260,000 voting rights were exercised via the electronic voting system.

Participation in the UNGC "Fair Player Club"

The "Fair Player Club" is a local, anti-corruption public-private cooperation forum to create a fair and transparent corporate environment. Having signed up as a member of "Fair Player Club" overseen by the UN Global Compact Network Korea, Doosan Heavy Industries & Construction has publicly demonstrated its strong commitment towards ethics management and strengthened the sense of ethics in its employees.

Corruption risk diagnosis

Types of anti-corruption risks internalized in each business area, the degree of exposure as well as the regulations, systems, organizations, etc. for the prevention of corruption were inspected. Based on the results of analyses, anti-corruption activities to prevent items with a high degree of risk for corruption and items requiring special improvement will be carried out.

Anti-corruption improvement activities

In all contracts signed with suppliers, items were added to conform to the regulations of ethics principles. Moreover, compliance regulations were specified in contracts signed with representatives who perform local tasks in the process of overseas projects in order to prohibit illegal and manipulative activities.

Governance

Our Approach The Board of Directors is the highest-level decision-making entity of Doosan Heavy Industries & Construction, reviewing and deciding mid-to long-term business plans and other major agenda. When electing independent directors, Doosan Heavy Industries & Construction meets the conditions of independence according to the Commercial Act, and there is no discrimination based on gender, race and ethnicity.

2018 Goals In the appointment and operation of the Board of Directors, institutional impartiality will be strengthened consistently to prepare the foundation of transparent corporate management. In addition, independence of the Board and its efficient operation will be secured for the maximization of shareholders' interest.

Composition of the Board

The Board of Directors is the highest decision-making body that makes decisions on matters specified by legislation, articles of association, items consigned from general shareholders' meetings, basic policies of the company's management and all other important matters concerning the execution of business. As of April 30, 2018, Doosan Heavy Industries & Construction's Board of Directors is comprised of a total of seven directors; 3 executive directors and 4 independent directors. To improve efficiency in managerial judgments and realize responsible management, The CEO is in charge of the chairperson of the Board. When electing a director, there are no restrictions on or discrimination against a specific gender, religion, academic background, race, ethnicity, disability, origin, etc.

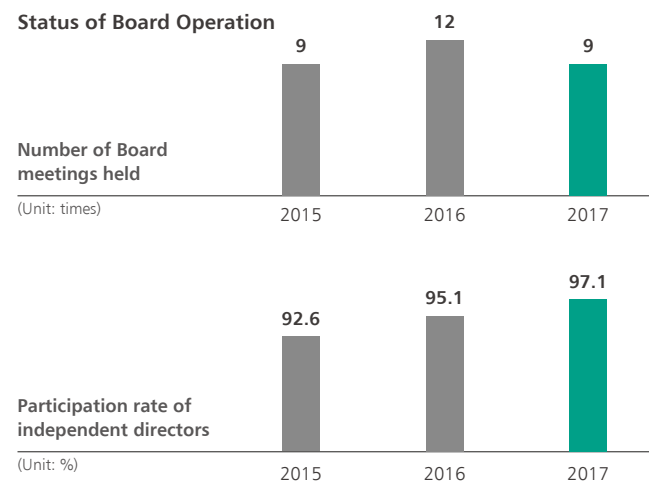
Composition of the Board of Directors (as of April 30, 2018)

Position	Name	Gender	Position/experiences
Executive directors	Geewon Park	Male	(Current) Chairman and Representative Director of Doosan Heavy Industries & Construction (Current) CEO (chairman of the Board)
	Myungwoo Kim	Male	(Current) President and Management Division Head of Doosan Heavy Industries & Construction (Former) Executive Vice President of Doosan Heavy Industries & Construction
	Hyounghee Choi	Male	(Current) Executive Vice President and Finance Management Division Head of Doosan Heavy Industries & Construction (Former) Executive Vice President of Doosan Infracore
Independent directors	Dongsoo Kim ¹⁾	Male	(Current) Chair professor, Korea University (Current) Head of Institute for Future Growth (Current) Elected as independent director of Doosan Heavy Industries & Construction
	Youngrok Lim	Male	(Former) Chairman and Representative Director of KB Financial Group
	Dongmin Cha	Male	(Current) Lawyer, Kim & Chang Law Firm
	Ickhyun Nam	Male	(Current) Professor, Dept. of Business Administration at SNU Business School

1) Lead Independent Directors

Operation of the Board

The meeting of the Board of Directors is convened and held by the Representative Director or a director appointed by the Board. It may also be held when more than one-third of the registered directors jointly ask for a meeting's purpose, date, etc. and request an assembly. Decisions of the Board are reached by the attendance of the majority of the registered directors and consent from the majority of the directors in attendance. Also, directors with special interests with regard to decisions made by the Board will be restricted from their right to vote. For important issues regarding corporate management including economic, environmental and social aspects, the Board shares details and opinions and posts information related to the composition and operation of the Board of Directors on the company website, thus protecting the rights and interests of shareholders and any stakeholders.



Committees under the Board

For fast and efficient decision-making, committees were established internally by the Board of Directors as specified by the articles of association. The committees include the Independent Director Candidate Recommendation Committee that performs the function of making recommendations for candidates of independent directors to be elected at the general shareholders' meeting, Audit Committee that conducts audits on the company's accounting, and Internal Transaction Committee in charge of approvals of internal transactions worth more than 5,000,000,000 KRW among affiliates. Each committee is constituted of four independent directors and performs the function of managerial control and supervision based on professionalism and independence.

Direction of Board Operation

Leadership & Accountability

For mutual monitoring between internal and independent directors, 4 independent directors, accounting for 57% of the entire Board, are appointed. Impartiality and transparency in electing independent directors at the general shareholders' meeting are reinforced through recommendations made by the Independent Director Candidate Recommendation Committee.

Effectiveness

To help increase the independent directors' level of understanding of the company and professionalism, shop tours at headquarters and the Changwon Plant are held for the appointed independent directors to brief them on the overview of the company. From June 23 to June 26, 2017, all independent directors visited Doosan VINA, local office in Vietnam, and Vinh Tan4, construction site for a power plant, to not only understand the local power market, the construction status and encourage workers, but also have the opportunity to improve their understanding of overseas projects.

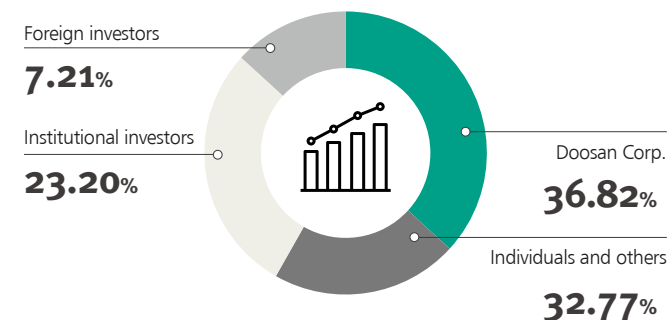
Remuneration

Remunerations of independent directors and internal directors are made within the limits of directors' salaries approved by the general shareholders' meeting. Information on salaries of individual executives including independent directors and the CEO is made public through business reports and audit reports.

Relationship with Shareholders

To protect the rights of minority shareholders, independent shareholders' rights and minority shareholders' rights acknowledged by relevant laws including the Commercial Act are recognized. General shareholders' meetings are held each year to report on the management status and hear the opinions of minority shareholders. The electronic voting system was introduced in 2017 to safeguard the voting rights of minority shareholders. In addition, major information about management issues is made public transparently through various communication channels including the corporate disclosure system and company website.

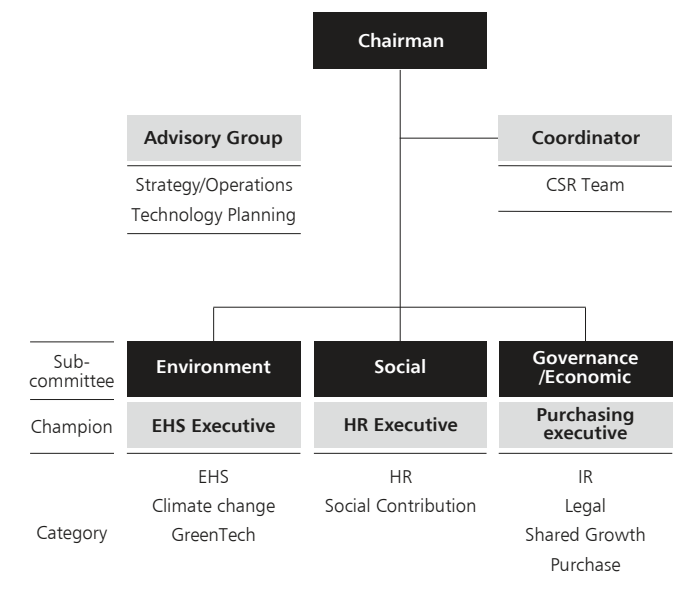
Current Status of Holding of Stocks (as of December 31, 2017)



CSR Committee

The CSR Committee is chaired by the CEO and has been restructured centering on the three main areas of the environment, society and governance for efficient operation, including comprehensive response and risk resolution in response to increased demands from interested parties and stakeholders, and changes in the governance structure arising from changes in the management environment.

Composition of the CSR Committee



Introduction of Electronic Voting System

The electronic voting system allows a shareholder to exercise his/her right to vote via a computer or a smartphone with online access without having to physically attend a general shareholders' meeting. Beginning with the "2016 final regular shareholders' meeting" held in March 2017, Doosan Heavy Industries & Construction introduced and implemented the electronic voting system to ensure the voting rights of minority shareholders. As a result of the electronic voting conducted in 2017, about 260,000 voting rights were exercised by participating in the general shareholders' meeting via electronic voting, and this accounted for 0.33% of the entire shareholders' voting rights in attendance. Electronic voting was also implemented at the general shareholders' meeting held in March 2018 to strengthen shareholders' opportunity to exercise their voting rights and, as a result, 0.38% of the total number of shareholders' voting rights (454,061 shares owned by 277 shareholders), a slight increase from the previous year, utilized electronic voting to exercise their right to vote at the meeting.

Ethics Management

Our Approach Doosan Heavy Industries & Construction Co., Ltd. establishes a healthy corporate culture based on ethical responsibility including honesty, transparency and impartiality throughout its corporate activities. Founded upon ethical principles and standards, it unites the ethics of the organization and its individual employees to help with decision-making that conforms to social and ethical standards, and such internalization of ethics influences the fundamental knowledge and attitude of internal members, thus ultimately acting as an element that elicits increased productivity and value of the company.

2018 Goals In accordance with the global trend that seeks law-abiding and ethical management as well as the government's direction to realize a righteous society, we will further invigorate the compliance officer system, which has been operated since 2012, and strengthen activities to prevent any illegal activities in the management of the company. Further, we will prepare institutional measures to eradicate bribery among domestic and international counter parties, thus establishing a foundation to obtain ISO 37001, an anti-bribery management system certification.

Ethics Management System

Through conformance to laws and principles as well as fair business operation, the ethics management of Doosan Heavy Industries & Construction aims to become an ethically leading corporation that can gain the respect from the outside and at the same time instill a sense of pride into its members. Based on a firm will of the executives on ethics management, it builds the infrastructure including ethical principles, cyber reporting system and operational organization and, based on this system, executes planning, inspection and countermeasure activities to improve the sense of ethics and prevent the non-ethical behavior of employees.

Ethics Management Pursuing Strategies



Ethics Management Execution Activities

Domestic and foreign promotion activities for anti-corruption management

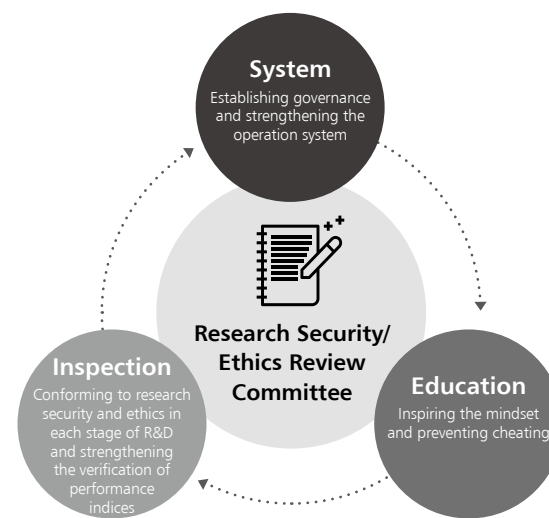
As reorganization of domestic and international systems and punishment for violation of laws are reinforced for anti-corruption issues due to the enactment of the "Improper Solicitation and Graft Act" in Korea and the FCPA (Foreign Corrupt Practices Act) of the United States, active attention and efforts are being demanded for the anti-corruption activities of companies. In order to respond to the risks of corruption in a more proactive and preemptive manner, Doosan Heavy Industries & Construction held a company-wide meeting for the introduction of ISO 37001, the anti-bribery management system and an international standard, before the attendance of executives and employees from the relevant teams and departments. Doosan Heavy

Industries & Construction received an anti-corruption risk assessment and diagnosis by the Korean Foundation for Quality, the domestic certification agency for the particular system, and Deloitte Anjin LLC, a consulting agency, and, among the areas for improvement derived from the results of the diagnoses, conducted activities for anti-corruption management by, for example, stipulating prohibition of receipt of bribery and conformance to ethical principles in contracts with domestic and international trading partners. Meanwhile, Doosan Heavy Industries & Construction is also actively engaged in activities of UNGC Fair Player for which it signed up in 2017.

Research Security/Ethics Review Committee

As social and legal risks increase due to illegal activities in R&D such as unjust technical development or plagiarism of research papers, Doosan Heavy Industries & Construction has formed the research security and ethics review committee chaired by the CTO in order to strengthen its research ethics. Founded upon the corporation's research security and ethics principles, this committee seeks to establish its own unique research ethics governance, arouse the mindset of R&D manpower and perform research security and ethics inspection activities, thus setting up an honest and transparent R&D atmosphere and preventing any illegal activities in research.

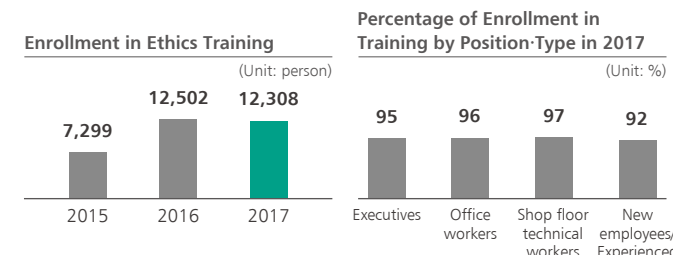
Direction of the promotion of research security and ethics



Expansion of the Ethical Culture

Specialized law-abiding and ethics education

To encourage members to increase their sense of ethics, the company requires all of its employees including new recruits and experienced recruits as well as those in overseas offices and suppliers in India, Vietnam, Europe and other countries to take training courses in principles in ethics each year. Doosan Heavy Industries & Construction also conducts ethics education reflecting the timeliness; for example, when the "Improper Solicitation and Graft Act" was enacted in 2016, it immediately hosted educational courses for all employees on prohibition of graft and bribery and, furthermore, it aims to preemptively deal with unfair transactions, for which regulations have continued to become strengthened, by conducting education for its sales employees on the prevention of any unjust agreements, thus constantly reinforcing ethics education in pursuit of sound corporate management.



Compliance management at global worksites

Over the course of conducting an overseas business, compliance regulations have been set up within contracts signed with agents who deals with local tasks in order to prohibit any illegal and/or manipulative actions. For risk management in ethics at global workplaces, a regular cooperation system is in operation with the compliance organizations at international suppliers and, also, sharing of knowledge is carried out to reinforce their competency in compliance.

Unity of interests written description management system

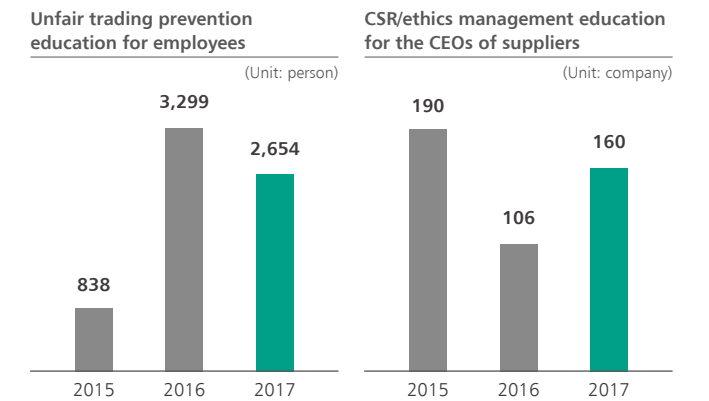
According to Article 5 Paragraph 3 of the "Guidelines for honest and transparent implementation of tasks," a detailed regulation of its ethics principles, Doosan Heavy Industries & Construction requires all executives and all employees who assume positions above Team Manager to submit 'the persons concerned reports' each year, in order to secure impartiality in performing tasks and to take proper measures if tasks entrusted to an individual within the company are financially and directly related to him/herself, his/her direct ascendants or descendants, spouse or spouse's direct ascendants, immediate relatives, or a company or an organization in which he/she was previously employed, or if he/she is placed under circumstances that would cause him/her difficulty in carrying out the tasks in an unbiased manner.

In the past, however, there existed a few issues with the 'the persons concerned report' such as the fact that it takes a long period of time to request the reports offline and that it is often difficult to request such reports from employees working in the field both in Korea and overseas. To solve these issues, Doosan Heavy Industries & Construction has developed the "the persons concerned report management system" through which details of the reports are written and submitted for the efficient management of the reports that should be requested each year, and began asking for the submission of details of the persons concerned online since 2016. Through this system, which allows simple writing and convenient management, all executives and team managers were able to submit 'the persons concerned reports' of theirs in 2017.

Prevent Unfair Trading and Support the Ethics Management of Suppliers

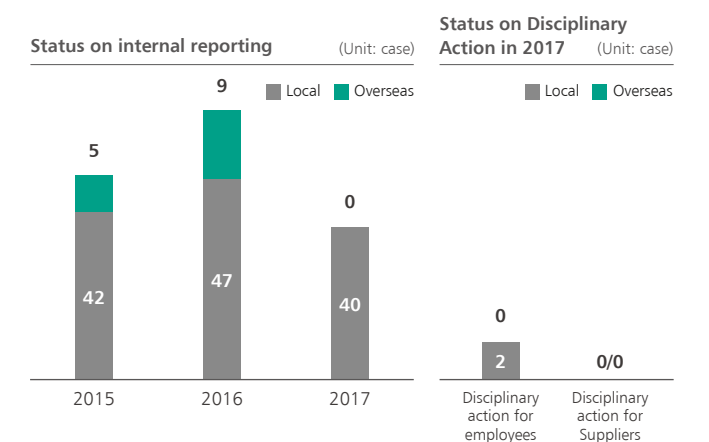
Doosan Heavy Industries & Construction implements ethical standards and regulations to strictly prohibit the acceptance of bribes from suppliers with whom it conducts any form of transactions. As an institutional measure to achieve this, it has added clauses requiring conformity to the ethical standards and regulations in all contracts signed with suppliers. Moreover, Doosan Heavy Industries & Construction plans to prepare measures to inspect the risk of corruption of new suppliers it deals with in order to actively support their anti-corruption activities.

Meanwhile, it consistently performs education on fair trade and subcontracting law for its employees to prevent any unfair transactions with suppliers and, also, supports them to spread and help them conform to the ethical standards of Doosan Heavy Industries & Construction.



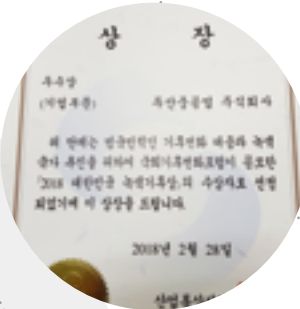
Reporting and monitoring

To easily report ethics violations from both inside and outside, a cyber reporting center and internal report box are in operation. For overseas subsidiaries, a third party-run internal report system has been introduced to actively field reports of violations in matters regarding ethics.





Environmental Performance



2017 Performance at a Glance

Received the "2018 Korea Green Climate Award"

At the "2018 Korea Green Climate Awards" overseen by the National Assembly Forum on Climate Change, Doosan Heavy Industries & Construction received the Minister of Trade, Industry and Energy Award as it was selected No. 1 in the company category for the establishment of its energy efficiency roadmap and contribution to the spread of a low-carbon corporate culture through continuous facility efficiency improvement activities and smart energy management.

First sales of certified Carbon Emission Reduction secured through greenhouse gas reduction

Doosan Heavy Industries & Construction has reserved 104,000 tons of certified Carbon Emission Reduction through energy-saving activities in the past three years and sold the credits to Korea South-East Power in December 2017, creating a profit worth around 2.5 billion KRW.

Completion of Stage 1 of the integrated energy control system

In an attempt to reduce greenhouse gas emissions, we are establishing an integrated energy control system constituted of three stages, to be completed by 2020. In 2017, the comprehensive heating-cooling supply control system (the first stage) was completed through which 740 million KRW of energy costs was saved and 1,736 tons of CO₂ emissions were reduced.

Acquisition of ISO14001[2015] certification change

We have set up the EHS management system, which can help satisfy the demands of ISO14001's revision certification, at the Changwon Plant, domestic and overseas construction sites and all business management teams, and ultimately acquired the final certification in November 2017 after a recertification audit.

Acquisition of an "A" grade in safety health coexistence and collaboration program for suppliers

By improving autonomous safety management capabilities through assistance in establishing the safety health management system for suppliers, we have carried out the safety health coexistence and collaboration program for 51 suppliers (47 internal, 4 outside) to prevent industrial accidents, which led to the acquisition of an "A" grade for the coexistence and collaboration program in 2018.

Safety experience training held for the safety of regional society (talent donation activities)

The "safety sharing community service group" was launched in July 2017 as a special talent-sharing community service group that works to spread the culture of safety-first throughout local communities. Consisted of executives and employees with expertise in the fields of disaster response, firefighting safety, health and sanitation, the community service group conducted safety training for about 200 teachers and children of local children's centers in Changwon.

Environmental Performance

Green Management

Our Approach As the level of interest in the environmental management of companies, including responses to climate change, minimization of environmental impacts, etc., increases throughout the globe, demands by stakeholders such as clients and investors continue and legislation of related activities also progress in a swift manner. Doosan Heavy Industries & Construction has established a green management system in advance to comply and manage environmental issues through active execution of reducing environmental impacts among production processes and the development of green technologies.

2018 Goals Doosan Heavy Industries & Construction plans to establish and promote step-by-step measures to closely control processes that emit fine dust particles and fix any inadequacies stepwise to comply fine dust regulations. Also, we seek to enhance internal competency and upgrade the response process to be able to adapt to the comprehensive management act, which began to be implemented in 2018.

Green Management System

Doosan Heavy Industries & Construction establishes green management strategies to identify environmental issues generated throughout the duration of business activities, from usage to disposal of resources, and devise fundamental solutions.

Green management strategies

Proud Global Doosan

MISSION	<p>Reduce 20% of GHGs by 2030</p> <p>Reduce 25% of energy usage by 2020 <small>(as of 2017)</small></p>
GOAL	Support responsible and sustainable growth
Strategic assignment	
Response to emission trading	<ul style="list-style-type: none"> Improve energy efficiency Reduce greenhouse gas emissions
Efficient use of resources	<ul style="list-style-type: none"> Resources recycling Sewage recycling Water risk management
Operation	<ul style="list-style-type: none"> Reduce the emission of pollutants (air and water pollutants, wastes, harmful chemical substances, etc.) Reduce energy usage
Green product technology	<ul style="list-style-type: none"> Establish a management structure for green products and technology Link to business commercialization and strengthen performance management
Environmental responsibility	<ul style="list-style-type: none"> Procure green products from suppliers Protect the ecosystem

Response to Climate Change

Responding to the emissions trading system (ETS)

By obtaining various information on climate change in advance, Doosan Heavy Industries & Construction aims to minimize impact on the company and carry out systematic responsive activities. A committee constituted of experts in energy and greenhouse gases as well as executives monitor risks related to climate changes on a regular annual basis and also pursue improvement in operational efficiency and development of reduction technology. Predominantly due to the greenhouse gas emissions trading system introduced in 2015, the government has faced a significant, direct financial burden as it has been required to purchase certified Carbon Emission Reductions for the amount of greenhouse gas it discharges in excess of the allocated amount. Thus, based on detailed analyses of climate change risk factors and potential scenarios, the amount of potential greenhouse gas emissions is estimated, along with the degree of financial burden which would accompany the measures to resolve the issue. Also, by considering the cost and convenience that entailed the introduction of the emissions trading system, lists of priorities are deduced for each response plan and applied to decision making at the management level while objective management for each BG is being implemented to meet its quota of carbon emissions. In addition, we strive to reinforce internal competency by conducting training on energy management and certified Carbon Emission Reductions at each BG plant.

BEST PRACTICE

Integrated Energy Control System - construction of level one heating and cooling supply integrated control system

In an attempt to save energy costs and reduce greenhouse gas emissions, we have started the establishment of an integrated energy control system, constituted of three stages. In 2017, the establishment of the first stage, the integrated heating-cooling supply control system, was completed through which 740 million KRW of energy costs was saved and 1,736 tons of CO₂ emissions were reduced. The second stage, the comprehensive steam, compressed air and water control system, and the third stage, the integrated electricity and gas control system, are scheduled to be established by 2020 with a total investment of 10 billion KRW. Once the energy management system, which enables real-time remote control by sensors and control devices connected to each energy source and also maximizes efficiency by being automatic linked with production, is established, 6.7 billion KRW in annual energy cost savings and greenhouse gas reduction of 20,000 tons of CO₂ are expected.

Reduction of greenhouse gases

In an attempt to preemptively respond to the government's policies on greenhouse gas reduction, including the demonstration project for the target management system and emission trading system, Doosan Heavy Industries & Construction has been performing TFT activities for the reduction of greenhouse gases with the formation of an exclusive team. The carbon emission rights secured through the efforts of improving facilities at plants and performing OE activities have been sold through the Korea Exchange to create profits. We also plan to reduce carbon emissions by 20% in comparison with BAU by 2030.

Improvement in energy efficiency

Through the efficient usage of energy, we simultaneously seek economic feasibility and consideration of the environment as well as to strengthen our fundamental competitiveness. To this end, a variety of energy saving activities are being carried out, including waste heat recovery, standby power shut-off, enhanced facility efficiency, and replacement of LED lights, and, upon the advent of the era of the fourth industrial revolution, the energy integration system, which fuses big data and ICT technology, is in progress via three stages to be completed by 2020. In 2017, the first stage work of heating-cooling facility integration was completed, which led to energy cost savings of 740 million KRW, reduction of greenhouse gases and innovative enhancement of the system.

Efficient use of resources

Water risk management

Doosan Heavy Industries & Construction receives all of the operational and everyday water for its plants from the city's water supply system and, in an effort to reduce operational water at plants, it utilizes a monitoring system, which uniformly supplies water at a proper pressure, for constant management. Starting in 2018, an inspection is performed daily on multi-use facilities while, at company dormitories, cafeteria, restrooms and shower rooms where water is used every day, a proper temperature of warm water is maintained and equipment such as decompression devices are installed in order to reduce 10% of the total usage. In addition, we will apply IoT technology to the water supply system, in which water is constantly stored through an internal storage tank, by 2020 to enhance the system into one that directly supplies water to locations of use, and also plan to establish a system that can take necessary measures in advance for accidents occurred and waste of water through reduction of electricity costs consumed for the water supply as well as immediate response to leaks or any abnormal phenomena.

Rainwater Non-Discharge (Reusing)

Doosan Heavy Industries & Construction has combined its own water treatment technology to establish a rainwater nondischarge (reusing) system for fundamentally solving hazardous substance leaks by collecting and re-treating substances in emergency, while recycles rainwater on daily basis. The rainwater non-discharge (reusing) system was built completely in December 2017, and rainwater will be recycled in the company's large cooling tower after a pilot test until March 2018.

BEST PRACTICE

Received the "2018 Korea Green Climate Award" – No. 1 in the company category, Minister of Trade, Industry and Energy Award

Doosan Heavy Industries & Construction received the Minister of Trade, Industry and Energy Award as it was selected No. 1 in the company category of the "2018 Korea Green Climate Awards" hosted by the National Assembly Forum on Climate Change. We not only focus on new and renewable energy projects, which include a land and sea wind power generation system and energy storage system, in order to preemptively respond to climate change but also contribute to the reduction of the country's greenhouse gas emissions through the technology of reducing the generation of NO_x, a kind of environmental pollutant, and eco-friendly power plant combustion technology. Since the establishment of the energy efficiency roadmap in 2013, we have conducted activities to improve facility efficiency and manage smart energy, receiving broad recognition for our contribution to the spread of low-carbon corporate culture. Doosan Heavy Industries & Construction promises that we will continue to actively pursue future eco-friendly energy projects and, at the same time, reinforce our efforts to deal with climate change.



First sales of certified Carbon Emission Reductions secured through the reduction of greenhouse gases

In line with the rapidly changing climate and subsequently implemented policies and regulations, Doosan Heavy Industries & Construction has been diligently dealing with the certified carbon emission reduction trading system. It was allocated with certified Carbon Emission Reductions from the government, which is about 2% reduced from the usage of energy in the past. Considering the characteristics of the business in which electricity and heat used in the production process lead to the emission of carbon, Doosan Heavy Industries & Construction has performed activities to reduce greenhouse gases by improving the efficiency of equipment within plants and eliminating elements where energy is being wasted. 104,000 tons of certified Carbon Emission Reductions saved from such efforts were sold to Korea South-East Power in December 2017 through which a profit of about 2.5 billion KRW was produced. We will continue to take one step further into the green future by preparing a step-by-step carbon emission reduction plan.

Waste Management

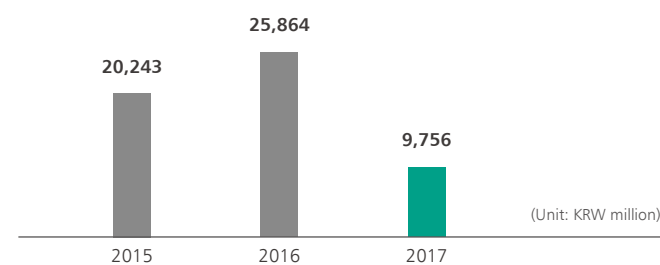
To establish a culture of separate garbage collection among employees, we currently carry out the collection in accordance with the separate garbage collection criteria at plants or teams where wastes are generated, and separated wastes are processed by certified permitted waste treatment companies after being transferred to storage sites through exclusive equipment (dump trucks and rotating forklifts). For all waste contracts, only companies that have been verified as suitable through early legal conformance assessments may participate in the bidding process, an attempt to prevent in advance any issues regarding illegal processing wastes. Also, contracts are signed only with waste companies that can satisfy the waste transfer regulations, which were strengthened and implemented in 2017 to ensure no violations of the law take place. In 2017, we accomplished a waste recycling rate of 89% and will continue to discover and expand recycling that suits green resources in 2018 through the professional recycling of waste refractories.

Environmental Responsibility

Green purchase

To fulfill our social responsibilities in the production and consumption of green products, we have voluntarily signed a green purchase contract with the government to expand the purchase of eco-friendly products. In 2011, we implemented the green purchase guideline for the establishment of a systematic foundation and have operated in connection with the ERP system and green energy monitoring system (GEMS) in order to select eco-friendly products from the beginning stage of purchase. In addition, we have set up and operate a process for automatic monitoring of results of improvement.

Outcome of green purchases



Improved awareness of green management on the part of suppliers

In March 2017, Doosan Heavy Industries & Construction performed an energy efficiency diagnosis on production facilities at Judan BG's suppliers. This diagnosis on suppliers was requested directly by the suppliers to Doosan Heavy Industries & Construction for precise diagnosis tailored to specific facilities and equipment. Suppliers conducted energy efficient diagnoses on absolutely necessary parts including the approach towards energy efficiency in the operation of thermal processing facilities and support policies by the government, and also had time to discuss the competency to deal with the increase in facility operations and potential malfunctions of equipment in the future. With suppliers sharing their needs and unknowns, it proved to be a livelier diagnosis on suppliers.

Environmental Management at Construction Sites

Management of chemicals at construction sites

Since the development and consistent operation of the chemicals management program in 2015, Doosan Heavy Industries & Construction has grasped the information and levels of hazard chemicals arriving in the sites and if any identified hazardous chemical substances such as toxic chemicals and substances requiring preparation for accidents, are placed on site its computer program helps to help replace them with non-hazardous chemicals in advance. Doosan Heavy Industries & Construction has established standards in dealing with sulfuric acid at waste treatment facilities and managing chemicals at construction sites. Through this, we comply with the Chemical Control Act by use of own chemicals management system and apply chemical management standards.

Meanwhile, for the safe management of chemicals at construction sites, we conduct training for construction team leaders and environment and health administrators on hazardous chemicals facilities and management standards. In addition, we have implemented training for employees and their safety in the field in an attempt to spread the importance of the safe control of chemicals.



Preservation of Biodiversity in Local and Overseas Construction Sites

Overseas construction sites have the responsibility to categorize and manage the flora, fauna, etc. to be preserved and protected in local communities. By conducting local surveys prior to the start of projects, Doosan Heavy Industries & Construction notifies the details of the living species to be protected in environmental effect assessment reports and fulfills its duty to execute measures to safeguard local ecosystems. To preserve the ecosystem and minimize changes of the environment from the construction phase, we perform periodic monitoring of the atmosphere, water quality, noise and vibration, and share the results with ordering bodies for systematic management. As of 2017, the living organisms controlled at three sites consist of a total of 11 species, three of which are flora and eight are fauna. In Korea, we systematically control environmental elements such as noise, vibration, atmosphere and water quality at seven project sites (1 project was completed in middle of 2017) in an attempt to minimize the impact on the ecosystem.

Minimizing Environmental Effects

Air pollutants

Total about 400 air pollutant emission and prevention facilities are thoroughly controlled to meet our stronger internal standards (40% of the legal permitted emission standards). Periodic pollution inspections are performed to check if additional pollutants are generated during production processes and, for 1, 3-Butadiene, which was designated as a new pollutant in December 2017, we plan to revise the permit, if needed, after investigating if it is discharged from environmental facilities. Also, we will set up a process to automatically create legal daily logs from manually written records on the operation of environmental facilities by utilizing sensors. The process conducted a pilot test in 2016 to complete internal verification and, by 2020, will be applied extensively to all facilities. Moreover, we install facility recognition sensors (beacons) in order to inspect operation of environmental facilities in a more reliable manner, and also implement inspection on the environmental facilities by utilizing mobile devices and applications. In addition, general air quality and noise level measurements are conducted in nearby worksites every quarter to continuously monitor the changes of the impact on environments near our worksites. Meanwhile, we have acquired an environmental liability insurance with a guaranteed limit of 30 billion KRW that assures compensation for damages in case physical and/or property damages occur to a third party due to the installation and operation of environmental facilities such as air and water facilities quality discharge facilities, thus minimizing the effect of environmental accidents on surrounding areas.

Hazardous Chemical Substances

Doosan Heavy Industries & Construction operates a monitoring system in order to manage all chemicals that are used in the Changwon Plant and have trained and appointed 16 hazardous chemical supervisors in all factories. To fundamentally eliminate risks from the use of hazardous chemicals, we have replaced 9 out of 14 hazardous chemical substances in 2016 and three more in 2017, and continuously working on to replace the two remaining hazardous chemical substances to non-hazardous chemicals.

Water Pollutants

An average of 400 tons/day of waste water that comes into the wastewater treatment facility is being processed with various physical and chemical treatment methods including condensation, precipitation and filtration (maximum processing capacity of 1,590 tons/day). The final treated water is controlled in 17 items to discharge less than 30% of the limit stated in the legally permitted emission standards. Also, as a means to fundamentally solve potential leakage accidents of hazardous substances, we have installed a discharge route shutoff system and rainwater zero-discharge system, which can collect and process all of the hazardous chemicals under emergency situations. The sewage generated is flowed into and additionally processed at comprehensive sewage treatment facilities run by Changwon, the local government, through sewage pipes.

Responding to Fine Dust Regulations at the Changwon Plant

It has been reported that the production processes of the manufacturing industry have an immense effect on the generation of fine dust and, therefore, relevant regulations are expected to be strengthened. Doosan Heavy Industries & Construction has put forth efforts to minimize the amount of fine dust emissions that can be generated among businesses. We control the amount of emissions to be below 30% of the limit as stated in the legally permitted emission criteria, and volatile organic compound (VOC) removal facilities have been installed for operation in all large painting booths since 2015. We continuously pay attention to the trends in the government's detailed guidelines for preparation in advance, and when replacing aging facilities, long-term countermeasures on fine dust are established to reflect environment-friendly conditions.

Environmental Clean-Up in Masan Bay

As a local community-focused corporate social contribution activity, Doosan Heavy Industries & Construction has commemorated the annual Ocean Day and performed environment cleaning underwater and by the shores of Masan Bay for 11 consecutive years. More than 90 people from the Seongsan-gu Office and private organizations in Changwon as well as 20 divers from the in-house scuba diving club, participated to process 20 tons of waste nets, buoys and ropes, which were collected. We aim to continuously nurture the event into an environment cleaning activity that represents the local community in the future.

BEST PRACTICE

Acquisition of ISO14001[2015] certification change

For strengthened competitiveness in sales, acquisition of orders and execution of business in Korea as well as overseas, Doosan Heavy Industries & Construction has obtained and currently maintains an integrated certification of the EHS management system, which encompasses the environment, safety and health, from the International Organization for Standardization (ISO). We implemented the EHS management system, which can satisfy the demands of a certification revised in July 2017, in the Changwon Plant, domestic and overseas construction sites and all business management teams, and through review of the certification change, obtained the final certification from DNV.GL, the certifying body, on November 26, 2017. In the future, we will continue to strive for efficient execution of the EHS management system to contribute to activities which help to obtain orders in both local and overseas sites.



ISO14001 [2015] certificate

Health & Safety

Our Approach As the EPC power plant business has recently been carried out in the form of private development, requirements from ordering bodies and all stakeholders are becoming more detailed in regards to the issues of safety and health. Thus, Doosan Heavy Industries & Construction applies an advanced, scientific safety and health management system in local and overseas worksites and consistently discover potential hazard and risks, which are thoroughly and preemptively handled. Also, all sectors, inside and outside, of our company including the headquarters, worksites and suppliers currently strive to strengthen competency and awareness in safety and health management.

2018 Goals To reinforce EHS prevention activities, we plan to promote the strengthening of EHS inspection and participation of site managers and supervisors in EHS prevention activities. While continuing to report preemptive safety measures for high-risk tasks such as working at height and heavy load lifting, we aim to select three critical risks each month to manage them with a focus and emphasis in an attempt to prevent potential accidents and disasters in advance. Meanwhile, we will stress strict conformance to and implementation of EPC BG 10 Golden Safety Rules at all domestic and overseas construction sites to enable all of our employees to recognize the dangers on their own and perform the basics and principles without exception. In addition, we will support EHS to allow not only the employees but also their families and suppliers to enjoy a pleasant environment and healthy lives, thus preparing an environment in which everyone can secure safety and protect their health on their own.

Safety Management System and Inspection

High-risk process management

When handling heavy-load items, a work plan is asked to be written in advance in order to eliminate major risks of falling or jamming, and a safety work procedure enacted for easy utilization of heavy-load items is provided. Moreover, a monthly special training is given to secure professional skills and enhance the competency of workers. For work at high locations, a tag system is introduced at safety facilities, and workers who have completed fall experience falling are also cared for and managed through identification of the graduates. Regarding hazard risk facilities (cranes, etc.) at which major disasters may occur, special precision diagnoses such as non-destructive inspection of parts with stress concentration are performed to secure the safety of the facilities and, by reporting the high-risk work plans and outcome of safety activities at 65 local and overseas worksites weekly to executives, elements of potential danger are controlled with emphasis.

Reinforcement of safety and health inspections during vulnerable periods

First, internal inspections were conducted through a checklist on urgent tasks and high-risk worksites as well as during holidays including New Year's Day, Chuseok, and summer and winter vacations. Then, improvement measures and 37 special safety inspections were carried out to promote the level of safety awareness at sites that may have been overlooked.

Safety Training

EHS Leadership Training for executives and plant directors

As a means to establish the culture of safety, education programs are provided periodically for 45 production executives and plant directors on EHS participation, communication, risk management capabilities, etc. to foster their EHS Leadership.

Fostering Training at safety experience facilities

The company has made it obligatory to install safety experience facilities at all local and overseas construction sites, conducting education for all employees since 2016. In addition, we have developed a pool of professional trainers at the safety experience facilities to accurately inform workers of the purpose of facilities, training methods, etc.

Expansion of safety and health training for enhancement of work competency

Training for improving competency in safety and health work was continuously and sequentially implemented for all employees working at or related to construction sites, including the Construction Team Manager at the headquarters, construction site director, managers and supervisors, and directors and supervisors of suppliers. The training was conducted for 236 local managers and supervisors, 25 site directors and construction team managers, and 86 cooperating companies, while a special curriculum was implemented to foster experts in safety and health managers at domestic construction sites. Also, training sessions were conducted for employees at overseas sites who have a relatively difficult time to receive such training, seeking enhancement of EHS Mindset and Leadership for 197 employees in eight projects.

Establishing a safety culture

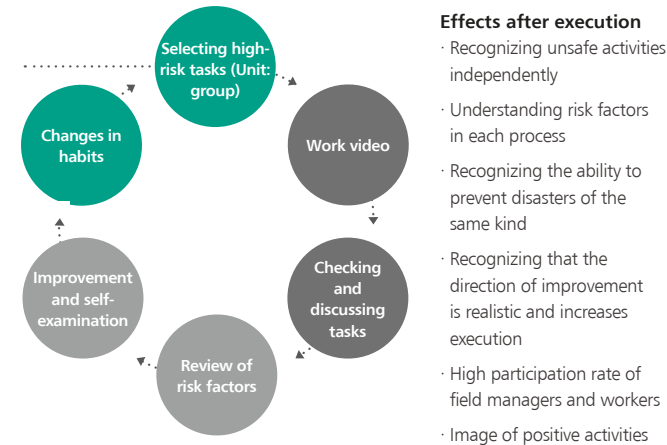
Strengthening of autonomous execution of safety and health by suppliers

We have pursued the safety and health coexistence cooperation program for 51 suppliers (47 internal, 4 outside) to prevent potential industrial disasters, leading to the acquisition of "A" grade in the 2017 coexistence cooperation program. 43 suppliers conducted autonomous risk assessment activities to discover and fix risk factors at worksites, and received benefits of industrial accident insurance fee exemption through certifications of risk assessment, along with the acquisition of KOSHA 18001 certification for 25 companies. In addition, targeting presidents of cooperating companies and supervisors of domestic and overseas suppliers, mind improvement training was provided in order to establish an autonomous safety management system and strengthen voluntary improvement and execution of EHS activities. In conclusion, the hazard rate of suppliers was significantly reduced from 0.03 in 2016 to 0.02 in 2017.

Self-safety and Health Activities by Workers

Going from safety and health activities mainly performed by managers and supervisors, we now allow the workers themselves to take the leading role in participating in and implementing such activities.

Category	Description	2017 results
Video risk assessment	Activity of making a video of the progress of work and discovering and improving risk factors during each process by the workers themselves	Performing risk assessment in which actual workers participate by utilizing the videotaped work situations: 92%



Crane and forklift driving license system

At the Changwon Plant, strict limitations are placed on the driving of crane and forklift vehicles that are used to perform loading and unloading which may pose potentially grave dangers, and it is mandatory for drivers in charge of transporting heavy items using those vehicles to pass the qualifications programs operated by the company before they can actually operate the machinery on site. The qualifications program consists of professional theory and practical training, and drivers must pass the final driving test in order to gain qualification. Applicants who failed the program can retake the program and apply for the test again.

Emergency Response System

Operating the BCM (Business Continuity Management) system

Doosan Heavy Industries & Construction has established the BCM system to secure the safety of its employees and their families under various disaster situations. With consideration of characteristics at different worksites, a response manual and processes are secured and training sessions in which all of its employees participate are held twice a year.



Performing emergency response training

We have organized detailed response measures under emergency situations such as unexpected accidents or disasters in scenarios based on which emergency drills (60 times/year) are performed on site. Considering the risk characteristics at different sites, the training is carried out not only with a

purpose to secure competency in initial response for the protection of human lives and property but also in the form of field exercises for potential earthquakes, fires and explosions, environmental accidents, utility shutoff response, evacuation from office buildings, etc.



Operating Safety Talks

We internally produce videos specialized for the company including evacuation measures for emergency situations, response methods in the case of earthquakes, introduction of and how to utilize firefighting facilities, and play them before any meeting or event, just like in a movie theater. Also, all relevant information is provided via the smartphone application.

Operation of an in-company fire department

In order to quickly respond to fire or emergency patients inside the company within the golden time, an internal fire department is in operation and a system capable of emergency mobilization 24 hours a day and 365 days a year is in place by possessing 10 professionals from firefighting or emergency-related departments with relevant licenses, two fire trucks and one ambulance.

Safety Management at Construction Sites

Enactment of EPC BG '10 Golden Safety Rules'

To encourage active participation in EHS activities by all persons related to construction as well as to reduce the occurrence of accidents, 10 core safety rules, proclaimed by the head of EPC BG and that all EPC BG employees must abide by, are enacted and declared to strengthen EHS activities on site and prevent potential accidents.

[10 Golden Safety Rules]

Five acts to essentially comply with	Five essentially prohibited acts
<ol style="list-style-type: none"> 1 Providing core safety rules training for all field entrants and visitors, and participating in TBM by everyone 2 Wearing proper protective gear and cross-hooking safety belts at locations of high work platforms 3 Maintaining cleanliness at worksites and securing transfer paths for workers 4 Conforming to the 3.3.3 rule for transport work of heavy goods (maintaining 30 seconds after transporting 30cm from the ground, controlled within 3m of the operating radius) 5 Use after fetch inspection of tools, machines and devices, and checking the attachment of the safety certificate 	<ol style="list-style-type: none"> 1 Running inside work sites and walking around in the water are prohibited 2 Smoking or the use of unauthorized fire equipment inside the worksites prohibited 3 Simultaneous work at upper and lower locations prohibited 4 Arbitrary control of mechanical and electrical equipment prohibited 5 Entry or access to restricted/dangerous areas prohibited

Achievement of zero-accidents at domestic and overseas construction sites

In addition to maintaining the systematic safety health management system, we have installed safety experience facilities and fostered professional lecturers to perform education for increased awareness in high-risk factors such as falling at domestic and overseas construction sites. We increase the execution of field safety and health activities as site directors monitor and report ways to control high-risk tasks directly to executives and, in particular, seven of our domestic and overseas construction sites have been recognized for achieving zero-accidents by various local and overseas ordering bodies as well as the Korean government.



UAE Barakah nuclear power plant's construction site MSLT

2017 zero-accident certified construction sites

Overseas	Local
<ul style="list-style-type: none"> · Lara site in India · Kudgi site in India · Fadhili site in Saudi Arabia · Doha site in Kuwait 	<ul style="list-style-type: none"> · Hwaseong Dongtan 2 construction office site · Jeju LNG combined cycle construction office site · The on-site main facility constructions scene of Shin Kori Nuclear Power Plants 5 and 6

EHS performance assessment at domestic and overseas construction sites

We have prepared operation assessment and improvement of the on-site EHS management system as well as a program in which all of our field employees participate, particularly the site directors, in order to enhance the level of EHS on site. These are reflected in the performance assessments and it accounts for 10% of the KPI. Based on this, Doosan Heavy Industries & Construction improves execution of the EHS management system and establishes an autonomous EHS activity system through preemptive risk management.

Overseas Site Security

Crisis management plan and emergency care plans are in operation to protect the personal safety and local properties for sojourning employees who are dispatched to overseas sites and their family members in case of war, terrorism, riots, epidemics, or natural disasters. The headquarters monitors the current status of overseas sites, and any issues in relevant countries are constantly communicated for taking necessary actions.

Workers at overseas sites	Workers in dangerous countries	Those on short-term business trips
<ul style="list-style-type: none"> · International SOS · Monitoring the status of overseas sites, etc. 	<ul style="list-style-type: none"> · Understanding and applying issues in advance · Forming a plan to establish measures through collaboration with relevant teams 	<ul style="list-style-type: none"> · Travel Tracker · Securing safety by checking real-time transportation routes

Health Management

Health Management Program

We operate a "Total Health Care Program" for all of our employees, their families as well as subsidiaries' employees. A variety of healthcare programs that takes care of physical and mental health are being conducted in diet improvement activities, aquarobics class, anti-smoking class and medical counseling. In addition, medical support is also provided to employees of Doosan, ordering bodies and subsidiaries who currently work at overseas sites with a relatively poor level of medical facilities.

On-the-job training for new health administrators and education to improve competency in health work

As the appointment of health administrators in the construction industry has become mandatory since January 2015, we have been electing health administrators at the construction sites, and starting in 2017, on-the-job training program has been conducted for the soft landing of newly recruited health administrators as they perform initial health work. A total of three curricula (first and second: field OJT, third: headquarters OJT) were conducted for the three new health administrators to study benchmarking and best practices of health management at other sites and establish the health management system, which includes yearly health management plans at each site, while forming a personal network with health administrators at other sites to enable the continuous sharing of information in health work and work assistance.

Also, health work competency advancement education was conducted for seven health administrators at domestic construction sites to discuss together, for example, the roles and responsibilities of health administrators, overall trends in health management of the construction industry, and recent cases of inspection by the Ministry of Employment and Labor.

Smoking cessation program

To promote the health of its employees and their families, Doosan Heavy Industries & Construction has operated a smoking cessation program through which 231 people successfully stopped smoking over the past three years. The program was implemented on 35 employees at the Changwon Plant in 2017 and expanded to 34 in the Seoul Office. The training in Seoul was carried out along with Seocho-gu Community Health Center in five sessions including a training on how to quit smoking, individual counseling, and provision of supplements, and we plan to run the smoking cessation program every year to continue our efforts in promoting the health of our employees.

Management of muscular skeletal disease patients

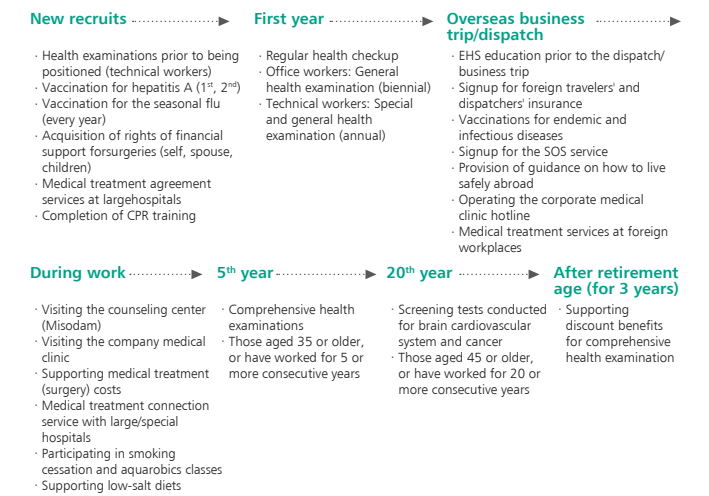
We have hosted aquarobics classes every year since 2011 as a means to alleviate symptoms in muscular skeletal disease patients, and 57 people participated in 2017. Even for those who have difficulty walking or moving on the ground, aquarobics enables balanced exercise for all parts of the body, which has led to much positive feedback. Moreover, results from analysis of effectivity through VAS (Visual Analogue Scale) and isokinetic devices showed that more than 54% of the participants experienced alleviation of pain.

Status of management of muscular skeletal diseases



Healthcare Program Cycle for years of service

From the entry of employees to their retirement, we offer a health management program tailored to different age groups. Upon joining the company and prior to being stationed for specific work, newly recruited employees are subject to not only a basic health examination but also medical treatment at large hospitals, and all employees have access to a mental health program that offers counseling with professional counselors on stress and problems they face in their everyday lives.



Sanitary Control

We conduct a sanitary diagnosis on the nine canteens within Changwon through a professional sanitary diagnosis company three times per year in addition to more than six internal inspections. Also, a total epidemic prevention system has been established to assure that our employees can be free of infectious diseases.

Prevention of infectious diseases and operation of in-company affiliated clinics

We offer regular flu vaccinations for not only employees but also their families and members of suppliers. While conducting safety education for employees dispatched or on business trips to worksites overseas, we support vaccinations for hepatitis A, typhoid fever, malaria and yellow fever prior to their departure in order to prevent endemic diseases prevalent in local regions. Also, our medical staff including professional doctors visit overseas worksites, which lack proper medical infrastructure, on a regular basis to assist in health management through counseling and on-site treatment, and an in-company clinic is established where doctors, nurses, physical therapists and sports physicians are stationed to offer a one-stop treatment service, prescription of medicine, physical treatment and sports treatment.

Status of vaccination and usage of affiliated clinics

Category	Unit	2015	2016	2017
Vaccination for seasonal flu (including family)	people	12,950	15,420	13,749
Vaccination against endemic diseases/Type A influenza	people	119	238	118
Persons treated at affiliated clinics	people	19,265	19,520	13,415

BUSINESS CASE

The implementation of safety experience training tailored to child welfare facilities

Doosan Heavy Industries & Construction's "Safety Sharing Community Service Group," launched in July 2017 as a special talent sharing community service group to spread the culture of safety in local communities, is constituted of employees with expertise in disaster response, firefighting safety, health and sanitation, conducting safety education for 200 teachers and children of local children's centers in Changwon during the second half of 2017. Safety experience education constitutes of not only the training of theory but also hands-on training to practice the basics of CPR in case of fire, as well as experiential training where evacuation procedures and use of fire extinguishers and fire hydrants are practiced at the in-company fire department. A teacher at the local children's center who participated in the education stated, "Direct experience of fire extinguishers and fire hydrants, coupled with theoretical teaching, will help children significantly in case an actual disaster occurs" and showed gratitude in saying, "firefighting and disaster safety education is legally required for all who work at child welfare facilities to complete a certain number of hours each year but, knowing that most of them are not able to receive proper training, Doosan Heavy Industries & Construction has set up this special opportunity." Based on positive feedback from local children's centers last year, the "Safety Sharing Community Service Group" of Doosan Heavy Industries & Construction expanded the number of subjects for training in 2018 to about 300 people and will continue to fulfill its role as a protector of safety of children in local communities through experiential training on action guidelines in the case of earthquakes in addition to methods of initial response to fire.





Social Performance

2017 Performance at a Glance

A supplier of Doosan Heavy Industries & Construction signing an MOU for investment collaboration with Quảng Ngãi Province, Vietnam

To help outstanding supplier' overseas advancement, Doosan Heavy Industries & Construction set up an MOU signing ceremony for 6 suppliers with the Quảng Ngãi Province of Vietnam on November 14th, 2017.

Hosting the first "Shared Growth Academy"

Doosan Heavy Industries & Construction's "Shared Growth Academy," hosted by Large & Small Business Agriculture-Fisheries Cooperation Foundation was held on September 20th, 2017. More than 150 people from about 60 suppliers participated in the event, which conducted education directly related to reinforcement of business competitiveness with suppliers, such as education involving the Smart Factory, fair trade, and performance sharing system.

Selection as an outstanding shared growth site (Changnyeong-Miryang Highway)

Doosan Heavy Industries & Construction's Changnyeong-Miryang Highway construction project was selected as an outstanding site in the shared growth evaluation program of construction sites hosted by Korea Expressway Corporation.

Hosting shared growth meetings with Tier 2 suppliers

To vitalize communication with Tier 2 suppliers, the CEOs of 31 Tier 2 suppliers were invited for a shared growth meeting. Through this meeting, various shared growth programs of Doosan Heavy Industries & Construction were introduced, and many proposals and recommendations from the suppliers were heard, with time for open communication through a Q&A and encouragement.

Received the gold medal in national quality award competition for the 8th consecutive year

In the field improvement category of 2017 national quality award competition, the "Taepyeongyang" quality circle of the Production Equipment Engineering Team participated with the goal to "improve productivity by enhancing the boiler header manufacturing process" and won the gold medal. Doosan Heavy Industries & Construction has now won gold medals in the national quality circles contest for 8 consecutive years from 2010 to 2017.

Re-establishment of customer management procedures

In order to systematically management deal with the needs of customers and stakeholders, customer management procedure, customer inquiry and complaint procedure, and customer satisfaction survey procedure documents were re-established. These enable systematic and standardized customer response and are expected to create a greater business value for Doosan Heavy Industries & Construction.

Acquisition of the rural society contribution certificate

To help rural regions that are facing various issues such as shortage of hands and the wealth gap between rural and urban areas, "1 company, 7 farms" sisterhood relations were formed with 7 farm villages in Changwon, Goseong, and Haman in 2011, and Doosan Heavy Industries & Construction has been performing community service in the areas for over 7 years. For its efforts, Doosan Heavy Industries & Construction has received a "rural society contribution certificate" from the Ministry of Agriculture, Food, and Rural Affairs, recognizing its contributions.

Talent Management

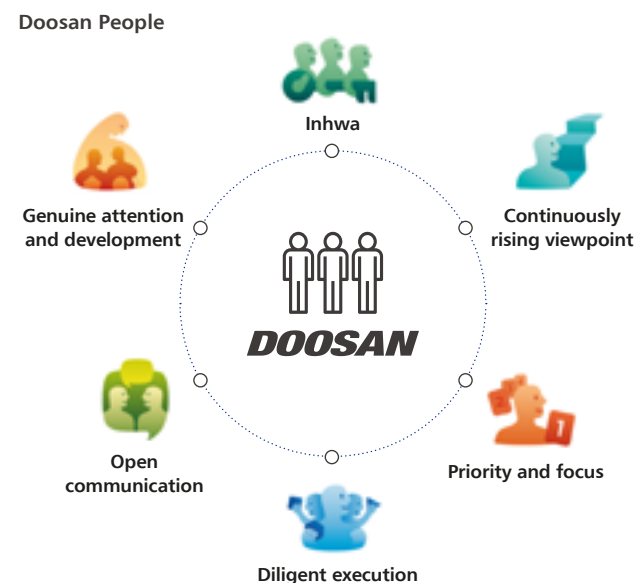
Our Approach Doosan Heavy Industries & Construction recognizes human resources as an important source of revenue for the growth and development of the company. We discover talented individuals and establish a corporate culture in which they can unleash their utmost capabilities while offering timely opportunities for suitable education and subsequently securing a competitive edge. Meanwhile, Doosan Heavy Industries & Construction continues to establish a labor-management culture based on solid mutual trust and maintain an advanced, coexisting labor-management relation that seeks the benefit of both parties.

2018 Goals Through improvement of the labor environment, Doosan Heavy Industries & Construction aims to strengthen employees' work and life balance and maximize the production efficiency in 2018. Thus, it plans to carry out a reduction of work hours and encourage the use of vacations with greater emphasis. Also, by strengthening promotion for an in-company education curriculum and vitalization of in-company lecturers, we aim to improve the level of utilization of existing education programs while continuously promoting employee fostering activities.

Talent management principle

"Doosan People", the talent sought by Doosan

"Doosan People" are Doosan talents that represent all members who continuously strive to improve their own competence with skills and have a willingness to contribute to the organization regardless of current level or level of capabilities. Moreover, Doosan People are those who regard our fundamental values and desired talents with utmost importance and contain them in their everyday actions.



Fair selection of talents

To recruit individuals that coincide with its desired talents, Doosan Heavy Industries & Construction handpicks competent personnel every year through strict screening for selection of new recruits and experienced workers. It also seeks open recruitment and conducts fair assessments without prejudice regarding academic background, age, gender, ethnicity, and/or region.

Respecting the Human Rights of Employees

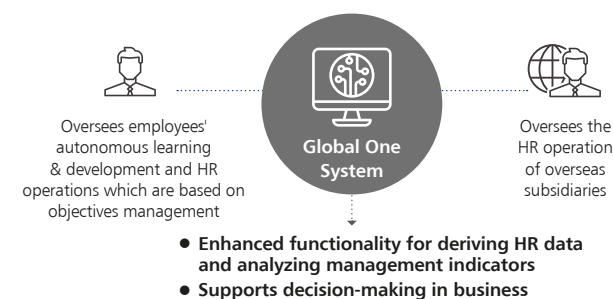
All local and global worksites of Doosan Heavy Industries & Construction regard an employee's human rights as an essential value. We strictly prohibit the employment or forced labor of children and youth under the age of 18 and, in case a violation occurs, we immediately investigate to take necessary measures. We also operate a human rights management program in an attempt to resolve human rights blind spots and work to gradually expand it to all of our global worksites. In addition, we plan to develop and utilize a human rights investigation and self-diagnosis tool to advance human rights management.

Evaluation based on fostering

Instead of an assessment for short-term compensation, we run an evaluation system focused on the long-term development of each employee. We understand the characteristic strengths and elements to develop for each individual worker and perform fact-based assessments for the employees to satisfy the character desired by Doosan Heavy Industries & Construction. Through this, we assist in establishment of a detailed fostering plan and Career Development Plan (CDP).

Doosan Heavy Industries & Construction has improved the HR information system to set up HRIS (Human Resource Information System) that seeks the standardization of human resources data, simplification of the HR process, and a user-focused concept. Competency evaluations of about 6,800 and 8,500 employees in Korea and overseas, respectively, have been completed through HRIS whose utilization value as the Global One System is to be increased in connection among performance assessment, growth management, education, and recruitment.

Human Resource Information System



Fostering talents

Strategy for Fostering Talents

We believe that the greatest asset in a company's growth and development is "people." Based on a balanced growth of talents instead of a selected few, the value of "people" has been instilled throughout the development system and, with the goal of "fostering proud Doosan People," a talent fostering system centered on the "Leadership College" and "Professional College" has been established. The educational curriculum within each growth structure is differentiated by position and level according to individual growth roadmaps and, thus, every employee can select and enroll in classes tailored to his or her level of competency. Also, we actively encourage various learning activities in workplaces to establish a self-directed learning culture that enables voluntary improvement of competency. As a result, employees performed self-competency development through more than 53 hours of education in 2017.

Advancement of the vocational training system and encouragement of in-company lecture activities

As a means to strengthen the work competency of all our employees, we have developed and implement Work Academies based on the value chain. Each academy is constituted of a three-stage learning structure, including Basic > Advanced > Expert, based on the capabilities required for each position and year of service, and the employees may select and enroll in work training that suits their needs and levels of competency accordingly. To provide practical educational content that is closely related to everyday tasks, a handful of employees participate as lecturers to teach and reproduce their professional knowledge and experiences, thus reinforcing competitiveness of the organization as a whole. We aim to improve the level of quality and pride of in-company lecturers by providing opportunities to develop delivery skills or paying lecture fees, and run various programs such as an annual Faculty Day event, which will continue to be held in 2018 as well.

Strategy for Fostering Talents

<p>01 Expanding opportunities to foster employees</p> <ul style="list-style-type: none"> Rejecting the development of only a few leaders, instead providing opportunities for equal growth to all employees Reinforcing the 'Doosan Way' implementation leadership training Expanding management education to all employees Establishing a 3-stage learning structure consisting of basic, advanced, and expert courses for improved vocational competency 	<p>02 Providing educational opportunities customized for each stage of growth</p> <ul style="list-style-type: none"> Providing systematic educational opportunities considering individual abilities by position and years of service Tiered educational content according to various levels of competency of those subject to education Supporting advance learning of vocational training in connection with rotated placement 	<p>03 Expanding development opportunities to all employees</p> <ul style="list-style-type: none"> Providing EDU (HRD portal) and the Solution Book for efficient and systematic self-learning management Implementing the Learning Credit system, an annual compulsory credit system Supporting various self-directed learning such as learning clubs and courses created by employees
<p>Education system</p>		
<p>Doosan Leadership College "Fostering leaders who have internalized the Doosan Way"</p>	<p>Doosan Professional College "Fostering experts equipped with a fundamental competitive edge"</p>	

Establishing good workplaces

Retirement Assistance Program

Customized retirement support programs are provided for employees whose retirement is imminent, as well as their spouses, to guide them in the post-retirement phase. It is comprised of basic and intensive curriculums. Information on individual circumstances of concern is provided, and discussions and consulting are supported to offer more practical assistance, especially near the time of retirement.

Education Process

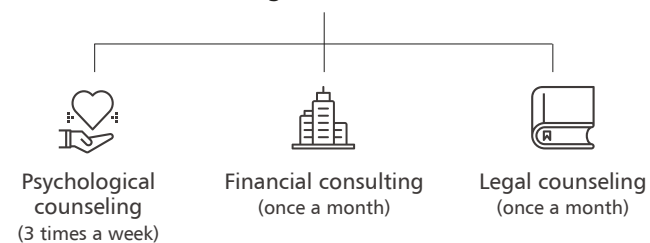
Basic curriculum	Intensive curriculum	Individual consulting
Change in understanding of life after retirement	Establishment of action plan	Actualization and post-assistance
<ul style="list-style-type: none"> · Education on utilizing working hours on weekdays · Education in which married couples may participate · Importance of life design · Change management · Family relations 	<ul style="list-style-type: none"> · Basic grounding · Provision of information · Future design · Special lectures by topic 	<ul style="list-style-type: none"> · Individual consulting · 1:1 consulting with experts

Misodam

We have opened and been operating a general counseling center, Misodam, an integrated center of mental, legal, and real estate counseling for our employees. For mental counseling services, in particular, we conduct counseling on psychological conflicts related to self, family, and children's education to seek mental stability and maximize work efficiency.



Counseling Center (Misodam)



Number of psychology counseling center in 2017 **618** times

Smart Office

The Smart Office system is in operation to encourage members to enjoy work-life balance by improving productivity through the efficient operation of work hours and, subsequently, completing given tasks within the work hours (8 hours).

This program includes a concentration work system in which employees focus on their tasks during the hours of concentration work (10:00-12:00), an overtime agreement system that eliminates unnecessary and conventional overtime work through an agreement of reasons for overtime work, and a flexible work system that adjusts commuting hours and offers replacement vacations according to work situations. Through the simplification in writing and submission of reports, minimization of meeting hours, etc., inefficient elements are removed and work productivity is enhanced.

Meister system

The company selects and nurtures in-company 'meisters' to pass down intricate techniques accumulated through decades of experience in production sites and to foster technical talents. 19 meisters have been raised since 2014 and serve the role of improving productivity through technical training and process standardization. We run a systematic curriculum on technical competency enhancement for our employees to grow as meisters.



Technology Management School (technical management curriculum)

We operate the Technology Management School, a technical management curriculum, for improvement in competency of technical staff. We establish a culture of communication by delivering a value-creating business cycle and accounting knowledge through leadership education. Since 2014, education has been conducted with 1,575 people (76%) over 58 cumulative sessions.



In-company university

In collaboration with Changwon National University, we are currently running the Department of Energy Fusion Engineering for self-development and growth of the technical staff. Employees apply for undergraduate and transfer courses and use weekdays and weekends to study, before obtaining a degree in engineering upon graduation. 69 employees have graduated thus far and, currently, 20 employees are enrolled in the transfer curriculum.



Consortium education

We execute national human resources development consortium education to enhance the technical competency of power generation customers, suppliers, and employees. Through this, we lead shared growth among the company, customers, and suppliers, and accomplish improved productivity through an increase in the level of technical skills of the employees.

Category	National human resources development consortium education	Consigned education at power generation clients	Technical training for current employees
Purpose	Seeking shared growth of large corporations and SMEs through support in personnel development	Achieving satisfaction of power generation clients	Seeking improvement in the technical and work competency of current employees
Subject for education	Current employees and new recruits at suppliers	Current employees at power generation clients	Company's current employees
Education outcomes in 2017	694 people (633 current employees, 61 new recruits)	224 people	1,148 people

Build Advanced Labor-Management Relations

Open Communication with Employees

Doosan Heavy Industries & Construction values internal communication and always strives for better communication. Starting in 2018, we listen to our employees' opinions and comments through regular surveys. The survey system, which aims for open communication among the employees, is designed to ensure strict confidentiality and operated in the form of direct communication by the highest executives on inquiries and recommendations from the employees.



Negotiations Settled without Complications for 12 Consecutive Years

We have established a stable and rational labor-management relation based on strong mutual trust and, as a result, a peaceful collective bargaining process led to settlement of negotiations without any complications for 12th consecutive year.

Labor-Management Communication and Participation

Opportunities for employees to freely participate in the decision-making process are offered through companywide labor-management meetings such as collective bargaining, the labor-management council and system improvement committees. Also, we have prepared communication windows for individuals such as difficulty counseling by BG in order to actively reflect our employees' opinions in corporate management.

Support of Club Activities

We support club activities for our employees' work and life balance. More than 2,100 employees are currently signed up in 52 clubs in Changwon, Seoul and Yongin and enjoy leisure activities in various areas including sports, hobbies and self-development.

Social Performance

Shared Growth

Our Approach A company may coexist with its suppliers through synergetic partnerships. Doosan Heavy Industries & Construction guarantees the fair selection of and compensation for suppliers, and gives support to strengthen their competency. This enables stable transactions with solid suppliers and, as a result, strengthens the competitiveness of Doosan Heavy Industries & Construction.

2018 Goals Doosan Heavy Industries & Construction will foster shared growth suppliers as elites to establish a long-term cooperative system, and will improve effectiveness through advanced development programs that reinforce competitiveness and assists overseas entry. We will also minimize the risk of legal violations and prevent conflicts in advance by strengthening subcontract risk management and education as well as improvement of the relevant procedures and systems.

Shared Growth Promotion System

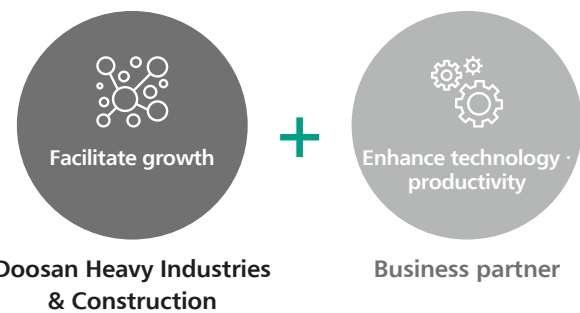
Shared Growth Strategy

The synergetic partnership is a mutual win in the global market, as Doosan Heavy Industries & Construction's own management, quality, and technology systems, such as technical capabilities and business system, are shared with the suppliers to further increase their competitiveness. By establishing synergetic partnerships with its suppliers, Doosan Heavy Industries & Construction has been serving a positive role in local and national economy. It also shares the outcomes with the suppliers to reinforce their competitiveness, which in turn leads to stronger partnerships.

Shared growth promotion strategies

Foster 200 or so strong global companies by 2020

Develop a "mutually-beneficial partnership" system through which we can grow together with suppliers



Building suppliers' Competency

Shared Growth Academy

The "Shared Growth Academy" is a program aimed to introduce the shared growth project, run by the government and Large & Small Business Agriculture & Fisheries Cooperation Foundation, to large corporations as well as small and medium-sized suppliers to energize cooperation networks between large and small businesses and to expand the culture of shared growth even to secondary and tertiary suppliers. Doosan Heavy Industries & Construction held

its first "Shared Growth Academy" in 2017. 150 employees from 60 suppliers participated in the event, which featured special lectures on smart factory promotion strategies, case studies and relevant laws of fair trading, as well as education on various support systems directly related to reinforcement of business competitiveness for the suppliers, including cases involving the utilization of performance sharing systems and SME technology protection assistance systems.

Consulting to Reinforce Competitiveness

Doosan Heavy Industries & Construction offers consulting for its suppliers to reinforce their competitiveness. Professional consultants from an external consulting firm visit the Doosan Heavy Industries & Construction suppliers to help deduce and execute assignments for improvement. 26 suppliers have received such assistance since 2014; through this consulting, they experienced the effects of improved purchasing, productivity, design, etc. and also achieved 10.4% average cost reduction. In addition to the ongoing program, the company conducted professional consulting for 11 suppliers in 2017 regarding entry into the Vietnamese and Indian markets, which has resulted in 5 of them currently working to establish local offices.

Capacity-Building Training

By providing opportunities to develop work competencies for those employees under employment at our suppliers including those who are expected to be recruited. Education and training expenses are fully supported by Doosan Heavy Industries & Construction to our suppliers that and additional training allowances is provided to encourage participation in the education and training. 633 employees from 95 affiliate companies participated in and trained through the competency improvement education in 2017.

Management Consulting and Support suppliers' Quality Improvement Activities

Customized consulting is implemented by matching a business partner in need of effective consulting and donation of talents by a retired Doosan Heavy Industries & Construction executive. In 2017, 12 companies benefited from counseling in the areas of design, quality, business management, and technical management. Meanwhile, for enhancement of quality control by the suppliers, quality Master Hands of Doosan Heavy Industries & Construction are utilized to support establishment of a quality system. In 2017, 13 Master Hands provided assistance for 2 suppliers to contribute to their quality improvement.

Establish a Culture of Shared Growth Communication

Doosan Heavy Industries & Construction Cooperative Association is a consultative group launched for the fulfillment of shared growth and communication between Doosan Heavy Industries & Construction and its suppliers, thus aiming to establish a long-term, productive cooperative relation based on mutual trust. With the Cooperative Association, Doosan Heavy Industries & Construction implements various shared growth programs including competitiveness reinforcement support, financial assistance, joint advancement overseas, and strengthened communication.

To discuss major issues generated between Doosan Heavy Industries & Construction and its suppliers, regular meetings are held as well as executive visits to the suppliers. The Win-Win Call Center is also operated to consult and receive feedback regarding difficulties, complaints, and recommendations from suppliers, while cultural events such as family culture festivals and family music concerts, hosted by Doosan Heavy Industries & Construction, are held for affiliate employees and their families, one of many ways the company communicates with its suppliers.

Fair Trading Compliance Program

As a fair trade compliance organization, Doosan Heavy Industries & Construction has designated compliance administrators, compliance managers by BG, and a team responsible for fair trade compliance. To prevent any legal violations in advance, work processes and computer systems have been improved, while education on fair trading and the shared growth mindset is carried out for employees who work directly with the suppliers. Furthermore, any cases of unfair trading are investigated from the suppliers' standpoint. Education on subcontract law is especially being implemented throughout the company and, efforts to prevent legal violations are being put forth by enacting executing regulations of personnel transfer for law violators.

BUSINESS CASE

A business partner of Doosan Heavy Industries & Construction signs an MOU for investment collaboration with Quảng Ngãi Province, Vietnam

To assist the overseas advancement of outstanding suppliers, Doosan Heavy Industries & Construction prepared an MOU signing ceremony between Quang Ngãi Province of Vietnam and 6 of its suppliers in November 2017. According to this MOU, Doosan Heavy Industries & Construction is to utilize a part of the plant site owned by Doosan Vina for the suppliers to build offices and factories and, thus, provide consulting on administration, finance, management, and HR, while Quang Ngãi Province will provide administrative support and share a sufficient amount of relevant information, such as corporate tax and income tax exemption incentives in order for the suppliers to smoothly establish local offices. Through this, a foundation has been prepared for SMEs to resolve difficulties in overseas expansion and reinforce competitiveness through dynamic business activities, and Doosan Heavy Industries & Construction is now able to improve its competitive edge in acquiring international orders with its suppliers.



Hosting a meeting for shared growth among secondary suppliers

In July 2017, Doosan Heavy Industries & Construction hosted a shared growth meeting for secondary suppliers to promote vitalization of communication. In front of 40 attendees, including the executives of Doosan Heavy Industries & Construction and CEOs of 31 secondary suppliers, the shared growth assistance program of Doosan Heavy Industries & Construction was introduced and a time for open communication was held to hear various comments and recommendations of the suppliers. Meanwhile, Doosan Heavy Industries & Construction supports secondary suppliers to utilize the shared growth fund and coexistence payment system, and continues to strengthen its assistance for the secondary suppliers through, for example, operation of national human resources development consortium project, industrial innovation movement 3.0, field improvement activities by quality Master Hands, and operation of a management consulting group consisting of retired executives.



Supply Network Management suppliers' CSR Guideline

Doosan Heavy Industries & Construction has enacted and enforces the "Doosan Heavy Industries & Construction suppliers' CSR guidelines," the fundamental criteria with which all of its suppliers must comply. These guidelines were written based on the 10 principles of the United Nations Global Compact, which includes human rights, labor, environment, and anti-corruption, and Doosan Heavy Industries & Construction encourages all suppliers to follow such criteria.

Major contents of business partners' CSR guideline

- **Human rights** (health and safety, working conditions and wages, etc.)
- **Labor** (freedom of association, child labor, forced labor, etc.)
- **Environment** (environmental protection and pollution control)
- **Anti-corruption** (prevention of corruption, compliance with the law)
- **Conflict minerals** (conflict minerals, response status, etc.)

Suppliers of Doosan Heavy Industries & Construction

Doosan Heavy Industries & Construction has selected strategic items and cooperation items by considering price, quality, delivery time, entry barriers, etc. and defines suppliers who maintain long-term supply relationships as suppliers.

When selecting a new business partner, Doosan Heavy Industries & Construction performs an assessment of its financial and governance structure through a credit evaluation, and the selection criteria include items of environment, safety, and fair trade. Also, a company that has caused social or moral disturbance is strictly prohibited from applying as a new affiliate, and the entire selection process is carried out in an unbiased and transparent manner.

Purchase Status of Local and Overseas Supply Chains (2017)

Region	Country	Percentage
Asia	Korea	73.92%
	Japan	4.26%
	China	1.26%
Middle East	Saudi Arabia	2.03%
North America	United States	2.00%
Europe	Italy	4.04%
	Czech	3.39%
	Germany	2.32%
	Romania	1.02%
Others		5.77%

Risk Management of suppliers

We conduct a business partner registration assessment through which cost, delivery, quality, collaboration, CSR, environmental safety, etc. are evaluated based on annual transaction results, thus managing the risks of our suppliers on a regular basis. Other items evaluated include credit rating, reputation and sales volume. Companies exhibiting high risks as indicated by the evaluation results are excluded from the pool of potential suppliers, and the assessment grades are applied as points, when allocating incentives or penalties to suppliers. An assessment is conducted by a representative or an auditor designated by Doosan Heavy Industries & Construction who visits the workplaces of suppliers to inspect the state of compliance with the CSR guideline. Suppliers maintain all documents and data needed to prove their conformance to the guideline within all workplaces related to Doosan Heavy Industries & Construction. In 2017, we conducted CSR assessments on 603 of our suppliers and allocated 253 incentives and 5 penalties on companies respectively. Furthermore, we have empowered the suppliers to self-diagnose their CSR levels to understand their own strengths and weaknesses, and offer practical support in weaker areas by supervisory visits and sharing of exemplary cases.

Policies for conflict minerals

Doosan Heavy Industries & Construction announces its policies to eliminate the use of conflict minerals (tin, tantalum, tungsten, gold) when manufacturing its products, and to resolve any related risks of human rights violation or delivery practices. Though the act of extracting or mining minerals is not directly related to its areas of business, Doosan Heavy Industries & Construction still implements this system to fulfill its social responsibilities and to protect human rights throughout the value chain. The system related to conflict minerals is being executed by applying the company's regulations related to its suppliers' CSR guidelines, and diverse efforts are undertaken to listen to the opinions of stakeholders.

Response to conflict minerals

Since 2012, Doosan Heavy Industries & Construction has determined a process to determine country-of-origin and established a system to support it. To verify the country of origin for each project, item categorization of original materials is requested to an external professional agency (customs firms, etc.) to secure reliability and, through a simulation feature of the system, necessary materials (companies) to satisfy the country of origin are selected, while requiring relevant suppliers to submit country-of-origin verification documents. For instance, 7 country-of-origin determinations are made on average every month on scrap iron, a primary raw material for mold tool steel manufactured by Doosan Heavy Industries & Construction, and the usage of conflict minerals is confirmed, by mill makers purchasing raw minerals for the manufacture and supply of products. Doosan Heavy Industries & Construction will revise the content of subcontract purchasing contracts signed with the suppliers to include the prohibition of using conflict minerals, and have all of its suppliers conform to the regulations.

Social Performance

Customer Satisfaction

Our Approach Customer satisfaction management at Doosan Heavy Industries & Construction goes beyond the one-dimensional meaning of merely processing customer complaints, rather assigning innovative momentum involving the improvement of customer relations by "respecting and listening carefully to customers' voices [VOC]", "fulfilling the customers' expectations [Wants]", and "providing superior value for the customers [Value]" while, at the same time, creating new aftermarket business and opportunities to contribute to increased number of orders obtained by the company. This aims to improve the quality of Doosan Heavy Industries & Construction products and services to enhance the company's competitive edge through customer satisfaction management based on a customer-oriented mindset.

2018 Goals Based on the model upgrade of the customer satisfaction survey conducted last year, we will deduce improvement assignments through execution and analysis of the customer satisfaction surveys to meet the needs of customers as much as possible. We will regularly advertise the details and results of customer management improvement activities and receive feedback to strengthen customer interaction activities and approach them as a first mover, swiftly responding to customers' requests. By exchanging technology and information that enable clients and us to grow together, we will meet the various expectations of customers better than our competitors. We will also reinforce customer technical support activities by operating an emergency customer support measures group in case of electricity peaks during summer and winter and power supply/demand crises, and through the power generation company technical support center on the company website. Meanwhile, we have developed, and currently operate, a non-destructive information management system to increase the level of customer satisfaction and reliability in quality, aiming to implement an advanced testing management.

Activities to Improve Customer Satisfaction

With customers as the priority of our corporate management, we promote service innovation to enhance customer values. Through diverse and systematic activities to satisfy customers, including periodic customer satisfaction surveys, lifecycle management of supplied equipment, and operation of technical support centers at power generation companies, we seek to continue positive partnerships.

Activities to improve customer satisfaction

Customer Satisfaction Survey	<ul style="list-style-type: none"> · Long-term customer satisfaction surveys · Yearly (constant) satisfaction surveys · Continuous collection of VOC
Lifecycle management of supplied equipment	<ul style="list-style-type: none"> · Operation of rapid support team for power generation shut down · Lifecycle management of supplied equipment · Power plant remote control system
Technical support centers at power generation companies	<ul style="list-style-type: none"> · Online technical support · Call center · Trend analyses requested as technical support for each client company and provision of proper feedback
Technical cooperation with client companies	<ul style="list-style-type: none"> · Visiting technical exchange meetings · Technical cooperation agreements with power generation companies · Inviting client companies for field trips to the plant
Establishing customer management procedures	<ul style="list-style-type: none"> · Customer management procedures · Customer inquiry and complaint processing procedures · Customer satisfaction survey procedures

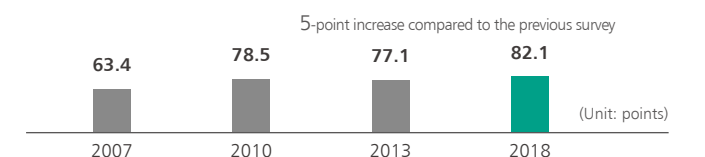
Customer Satisfaction Survey

To provide better services for its customers, Doosan Heavy Industries & Construction requests an external professional agency to conduct periodic customer satisfaction surveys to measure the level of customer satisfaction on quality of its products and services. Through the surveys, we listen to the customers' opinions and speedily reflect them in improvement of products and services. In the future, Doosan Heavy Industries & Construction will continue to actively deal with field issues, enhance our attitude in customer correspondence and increase the level of reliability with the customers, all of which are measures to improve customer satisfaction.

Category	Direction of customer satisfaction survey
Previous (1 st to 3 rd)	<ul style="list-style-type: none"> 1st (2007) Reinforcing the rapid response system 2nd (2010) Strengthening technical capabilities 3rd (2013) Reinforcing mutual exchanges and relations
2017	Model upgrade conducted
2018	<ul style="list-style-type: none"> · Conducting the Annual Online Survey · Continuously understanding trends in customer satisfaction · Securing talking points with customers

* Although surveys were conducted once in 3 years, a model upgrade was implemented in 2017 considering the purpose and effectiveness and, starting in 2018, customer satisfaction surveys are conducted in the form of an 'Annual Online Survey'.

Progress of customer satisfaction surveys



* To be surveyed: Korea Hydro & Nuclear Power, 5 power generation suppliers and a number of independent power generators

Outstanding cases of customer satisfaction

Additional acquisition of domestic construction projects by understanding customer needs and close-contact sales

We preemptively grasped the difficulties in the procurement of resources that our customers face and, subsequently, proposed a solution, which ultimately led to acquisition of an order. Through successful execution of the Yangsan 1st Project, an order for which was obtained in 2016, we have achieved a great level of customer satisfaction, and our close-contact sales with CEOs of client companies, whom we invited to events for other current projects to exhibit our performance and business status, were the driving force behind the additional acquisition of the Yangsan 2nd Project. By providing excellent value for customers, forming a relationship of trust, and raising customer needs to establish "Yangsan Deokgye Doosan We've Brand Town", we have secured an advantageous position in the cultivation sales of the Yangsan Project, which is scheduled to the 5th stage, which is expected to result in additional orders.

Received the outstanding repair group award in RCP complete disassembly and assembly of Hanul No. 3

The complete disassembly and assembly service of RCP (Reactor Coolant Pump) at Hanul No. 3 Power Plant had been carried out independently by a competitor in the past. We established a trust relationship with customers through continuous technical information sessions, and finally succeeded in acquiring an order via a competitive bid. Upon receiving a request from a customer to complete site repair work in a short period of time, we performed various improvement activities to finish the job successfully within the given time, which satisfied the expectations of the customer and ultimately led to the outstanding repair group honor awarded by the customer.

Establishment of customer management procedures

Customer satisfaction management of Doosan Heavy Industries & Construction aims to assign innovative momentum in customer relations improvement by "respecting and listening carefully to customers' voices [VOC]", "fulfilling customers' expectations [Wants]", and "providing superior value to customers [Value]". In pursuit of customer satisfaction, we establish various lower-level documents such as "customer satisfaction survey procedures", which aim to apply customer requests for improvement discovered through the surveys, and "customer inquiry and complaint processing procedures" for efficient processing of customer inquiries, requests, and complaints regarding the products and services provided.

Lifecycle Management of the Supplied Equipment

Power Plant Remote-Control Service

Based on ICT, a remote-control system has been established to monitor operation data of the power plant in real-time. Doosan Heavy Industries & Construction has opened the RMSC (Remote Monitoring Service Center) and, through the constant support operating system, consistently enhances the operational capabilities of power plants, including real-time surveillance of operation data, monitoring of abnormal symptoms, and analysis of malfunction predictions.

Category	Details
Generation stoppage special response team	Operating a special response team during peak power usage periods and generation emergencies to offer expedient customer support
Lifecycle management of supplied equipment	Providing services on supplied generation equipment before the closing of the plant, and continuously offering lifecycle support on equipment whose assurance periods have elapsed.

Technical cooperation with client companies

Visiting Technical Exchange Meetings

"Visiting technical exchange meetings" are carried out by visiting client companies to provide information on the latest technology and trends, and share the data on the client's facility enhancement and operation. A form of proactive participation from the client companies has been encouraged with a combination of seminars and discussions.

Status of Technical Exchange Meetings by Year (Unit: times)

2015	2016	2017
11	23	14

The Changwon Plant Field Trip Program Inviting Client Companies

We conduct field trips to Doosan Heavy Industries & Construction's Changwon Plant by inviting newly recruited and experienced employees of client companies. In 2017, there were 2 field trip programs.

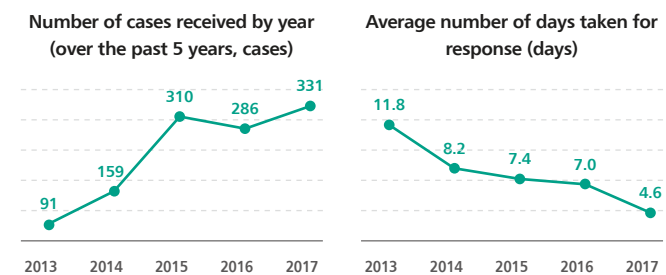
Customer Communication Channels

Doosan Heavy Industries & Construction carefully listens to the voices of customers and reflects these ideas into its products and services to generate more value for the customers. Their various opinions are collected through online and offline channels.

Technical support center at power generation companies

Online Customer Technical Support

We strive to provide more accurate and faster replies to the technical support requests of our customers, which are received online. The time it takes to reply has been reduced from 12 days in 2013 to 4.6 days as of 2017.



Call Center

We operate a place to which urgent support can be requested via phone when an emergency occurs inside the power plant. Along with online technical support, faster replies and assistance are offered.

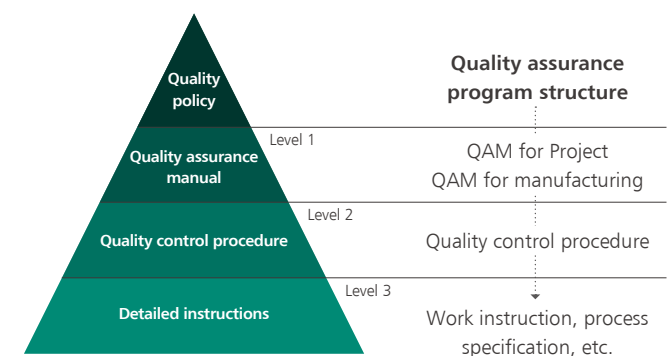
Quality Management Strategy

Doosan Heavy Industries & Construction regards the provision of comprehensive customer satisfaction and contribution to the creation of customer values through the greatest competitiveness in quality as the top priority for quality management. To ensure the performance and quality desired by customers and to guarantee no defects, we maintain a quality assurance system of the highest level that is organized, systematic, and meets the global standards. Also, all organizations and employees within the company strictly comply with the base conditions required by the quality policies.

System of the Quality Assurance Program

Doosan Heavy Industries & Construction has established a systematic foundation of the quality assurance program that fulfills various laws, regulations, codes and standards, and helps secure a sufficient level of quality. Using the quality assurance information portal, the contents may be browsed in any environment with Internet access.

Quality Assurance Program



Establishment of Inspection Automation and the Non-destructive Information Management System

Non-destructive examination is a method that inspects interior defects, etc. from the outside, without deforming the shape or functions of the product. Through this inspection, Doosan Heavy Industries & Construction prevents and fixes the defects of products, while systematically controlling quality. For more advanced testing and management, a new kind of non-destructive information management system is under development and will be operated. Through this, we expect non-destructive testing to not only contribute to improved customer satisfaction and reliability in this type of testing, but also achieve significant cost reduction. Meanwhile, we also have established and currently operate an inspection automation system to help strengthen productivity and competitiveness of the BG.

Quality Management Performance

The Highest Number of Master Hands* in the Industry

Doosan Heavy Industries & Construction has 31 Master Hands, the most among any in the industry. The council formed by these Master Hands conduct various activities such as talent development and support to strengthen the competitiveness of suppliers among others.

* Master Hands: Human Resources Development Service of Korea and Korean Standards Association select technicians and engineers who own the highest level of experience and skills in industries as Master Hands, of Korea and National Quality. This contributes to the foundation of a quality innovation climate and activities.

"The Gold Prize" at National Quality Award Competition

The "Taepyeongyang" circle from the Production Facility Technology Team competed in the field improvement category and received the gold medal. The "Taepyeongyang" circle presented on how to "improve productivity by enhancing the boiler header manufacturing process" and was honored with the award for analyzing and fixing the issue of excessive time loss generated in certain processes and, subsequently, maximizing tangible and intangible effects of time and cost. Doosan Heavy Industries & Construction has now won gold medals in the National Quality Circle Team contest for 8 consecutive years from 2010 to 2017.

Gold prize at National Quality Award Competition



Status on external certificates acquired

(Unit: number of times)

Category	Types of certifications	2017
Nuclear power project	ASME N type, KEPIC	16
Thermal power/desalination/wind power businesses	ASME U type, ISO	13
Others	PED, KR, NK, BV, etc.	29
Total		58

Social Contribution

Our Approach Doosan Heavy Industries & Construction strives to become a company respected by communities through a blueprint that can enhance community competitiveness while establishing Doosan's social contribution identity that instills pride in Doosan people.

2018 Goals Restructuring of the social volunteer group and adjustment of social contribution programs, we aim to increase operational efficiency and focus our competency on more effective programs. Moreover, we will continue to discover and promote policies centered on local communities, such as career path education and urban regeneration, and social contribution programs that meet the social needs, thus maintaining our network and contributions to the local community.

Social Contribution Strategy

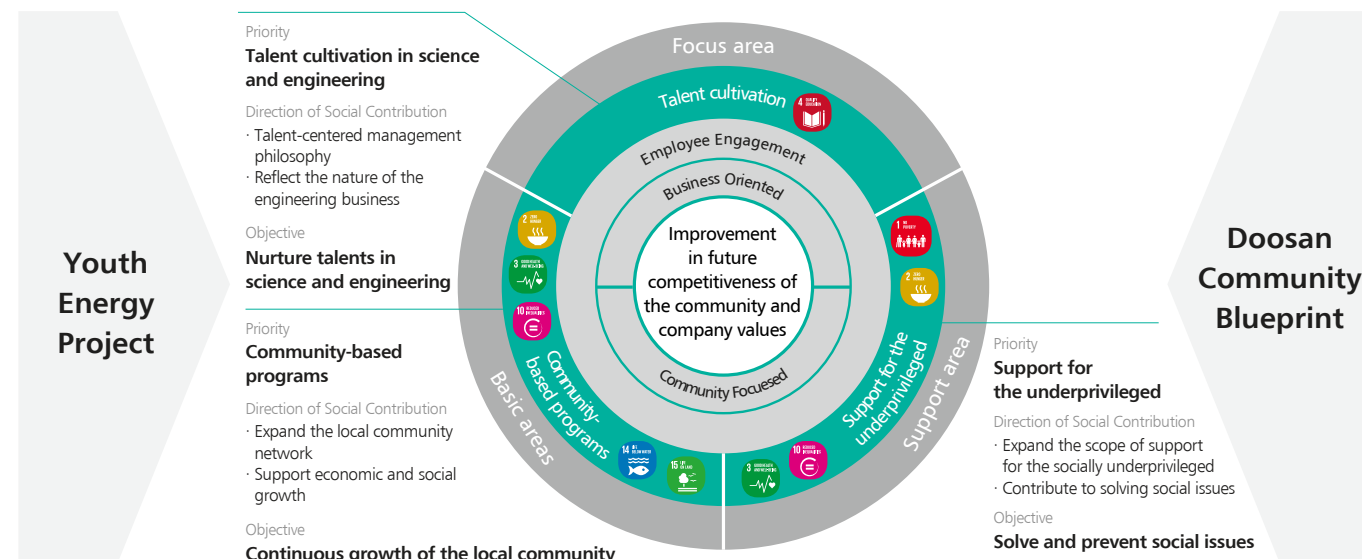
Direction of Social contribution

Guided by the mission of improving future competitiveness of communities and corporate value through strategic social contribution activities and the business-oriented and community-focused principles, Doosan Heavy Industries & Construction maintains programs aimed at fostering talent, helping the underprivileged and serving local communities.

Social Volunteer Groups

As of December 2017, 91% of all employees were signed up in Doosan Heavy Industries & Construction Social Volunteer Groups to participate in periodic social contribution activities, and we have also set up a social contribution fund collected by portions of monthly salaries and Wish accounts to fulfill the art of sharing for marginalized neighbors in our local communities. In addition, the company has introduced various programs for vitalization of social contribution, including a matching grant, weekday community service, social contribution portal, and prizes for outstanding volunteers, to support employee social contribution activities.

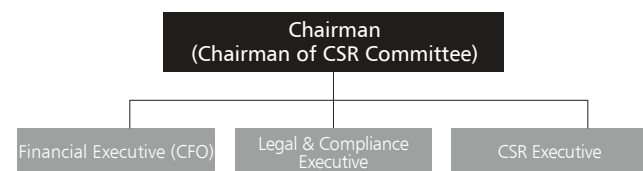
Social contribution system



Social Contribution Committee

Doosan Heavy Industries & Construction has established the social contribution committee, which serves as the C-level decision-making group, to reinforce the transparency of the social contribution provided to local communities. The social contribution committee is chaired by the head of the CSR Committee and joined by the CFO, executives of legal and CSR as members who come together to review the public interest aspect and suitability of social contribution to local communities. Each review comprehensively determines not only transparency and propriety of the supported agencies but also whether or not the purpose and details of the donations comply with the company's social contribution strategy and seek public interest before a final decision is made. In 2017, more than 9.1 billion KRW contributed through the local community donation program.

Organizational Structure of the Social Contribution Committee



Talent Cultivation

Based on Doosan Group's talent-centered management philosophy, social contribution to nurture the outstanding talents of the future is specified as an area of focus. Considering the nature of the engineering industry, we have a high proportion of individuals from the fields of science and engineering. Therefore, we feel the importance of nurturing talents in engineering and also concentrate on related social contribution activities. As a major result in 2017, we provided theme programs for 1,500 children in the local children's center, 14 students from Doosan Class were recruited, and 53 technical trainees were hired by suppliers.

Youth Energy Project

The Youth Energy Project aims to support future talents to grow and be independent as well-rounded individuals with diverse capabilities. All programs included in this project are offered in a personalized fashion depending on the growth stage of the individual.

Major programs of the Youth Energy Project

- Elementary School Students**
 - Theme programs for local children's center
 - Supporting "love-sharing" reference books
 - Matching the tuition fees for children from low-income families
 - Sponsorship for the Kumkum-Dda Orchestra
- Middle School Students**
 - M.Y. Dream Career Exploration Group for Youngsters
 - Sharing the love through school uniforms
 - Scholarships for outstanding students from low-income families
 - Matching the tuition fees for children from low-income families
 - Supporting "love-sharing" reference books
- High School Students**
 - Supporting science high schools to nurture science and engineering talents
 - Scholarships for outstanding students from low-income families
 - Operating the "Doosan Class" at Meister high schools and specialized high schools
- University Students**
 - Operating the "Doosan Class" at industry-academia cooperative colleges
 - Technical dissertation contests and visits to advanced countries overseas

Local Children's Center Theme Programs

Since 2014, we have been operating 10 theme programs including history exploration, ecological experience, woodworking, practical crafts, cooking class,



social studies, science education for 75 local children's centers in Seoul and Changwon with whom we have sisterhood relations. We conducted 160 activities for each social volunteer group to contribute to social development and emotional cultivation of 1,500 marginalized children.

M.Y. Dream (Make Your Dream) Career Exploration Group for Youngsters

The Career Exploration Group for Youngsters is a program that comprises of 3-stage activities of career path exploration, experience and design through which teenagers are encouraged to develop interest in different professions, and ultimately determine their own career paths in advance. In line with the implementation of the free semester system in middle schools, a career education MOU was signed with Changwon Office of Education to install the program in middle schools in the city of Changwon and, in 2017, the program was operated for about 100 students in 5 middle schools. Also, by utilizing the engineering competency that the company possesses, an engineer experience class was run additionally to enable youth to have first-hand experience in engineering tasks.



Operate the "Doosan Class" as Part of Industry-Academia Cooperation

To support the nurturing of engineering talents, Doosan Heavy Industries & Construction has signed industry-academia cooperative agreements with Changwon Machine Technical High School, Busan Automobile High School and Sudo Electric Technical High School at which the "Doosan Class" curriculum is established and is in operation for technical and competency education tailored to Doosan Heavy Industries & Construction. In 2017, 14 students from Doosan Class were recruited as a part of the plan to acquire competent engineering talents.

Provision of Reference Books for Children's Welfare Facilities

Every semester, we provide reference books to 81 children's welfare facilities with whom we maintain sisterhood relations for the purpose of improving the practical learning abilities of marginalized children. In 2017, we provided 11,452 reference books in two semesters for 1,840 beneficiaries, and the total number of books that have been offered since 2011 is about 60,000.

Youth Dream Up Project

For teenagers who have outstanding gifts and talents but cannot dream big due to financial difficulties, we provide support through the "Youth Dream Up Project" hosted by ChildFund Korea to help 5 students in 3 sports-1 in archery, 2 in shooting and 2 in Taekwondo-to enable them to pursue their dreams.

Support for the Underprivileged

We take the lead in social contribution to support better lives for underprivileged neighbors in our society, including children, youth, senior citizens, and the disabled. We continue to expand the scope of targets to include more people from marginalized classes, placed in blind spots of welfare policies, and understand and support to resolve the social issues. As part of major projects carried out in 2017, 12 social welfare center programs targeted for the elderly, children, and youth were implemented in which the measurement of effect of the normal range increased from 56% to 82% after the program in terms of psychological and mental health.

Programs Associated with Community Welfare Centers

With an aim to reflect the needs of the local community, programs are planned with community welfare centers, which are in direct contact with socially marginalized groups of our society, to carry out volunteers in which our employees participate. Together with 6 and 4 community welfare centers in Changwon and Seoul, respectively, emotional support and sociality development programs are in operation for teenagers, senior citizens, the disabled and multicultural families.



Clean House

Through a technical volunteer group consisting of employees' talent sharing, house repair programs are implemented on a regular basis to check electric equipment and perform papering and painting for the underprivileged, farming villages and child welfare centers.



Dasarang Dream

Dasarang Dream Program started in 2011 with Korea National Red Cross Gyeongnam Branch to support underprivileged youth in the region. In 2017, we conducted community service in which we purchased daily necessities from a social company to package and deliver them to 300 underprivileged households in the region. Also, we regularly donate and serve bread and noodles to children at welfare facilities that are in sisterhood relations with the company.

BEST PRACTICE

55th anniversary community service

In September 2017, Doosan Heavy Industries & Construction conducted a special community service activity in the city of Changwon, as 800 of its employees participated to return the favor received from the local residents and for coexistence with the local community in commemoration of the company's 55th anniversary. In particular, our employees gave a helping hand at a chrysanthemum nursery in preparation of Gagopa Chrysanthemum Festival, one of the region's representative fall festivals, and performed a cosmos mural painting in Mujeom Village in Dongeup where the Cosmos Festival was held, receiving positive feedback from the local community. Also, through various community service activities, including marine environmental cleaning in Sogo-do, Jinhae-gu, street environment improvement for crime prevention in Masanhoewon-gu, and traffic safety mural painting at Hoewon Elementary School and Masan Dong Middle School, we had worthwhile time to ruminate the company's social responsibilities and the meaning of its anniversary.



2017 volunteer mileage compensation with Korean Federation of Community Credit Cooperatives

The volunteer community service mileage compensation, which has been conducted every year since 2007, when a sponsorship agreement was signed with the in-company Korean Federation of Community Credit Cooperatives (KFCC), is a system that aims to vitalize participation of Doosan Heavy Industries & Construction employees in voluntary community service and compensate their results of activities with KFCC gift certificates. In 2017, 364 employees who participated in community service for 13 hours or longer were compensated for a total of 8,970 hours. The KFCC gift certificates were issued to those who performed active voluntary services including Social Volunteer Group, professional volunteer groups, and club community service groups. Thus, under this agreement, Doosan Heavy Industries & Construction has been sponsored by the in-company KFCC for about 60,000,000 KRW over the course of 10 years to deliver compensation for 2,000 employees.



Community-based Program

We seek community-based social contribution through which various stakeholders join in and grow together with the local community. We continue to expand the cooperation network for the growth of local communities with various stakeholders, such as local governments, NGOs, social welfare agencies, and farm villages. Through the growth of local communities, we improve their economic and social conditions and broaden the foundation for companies to coexist. As for major performance in 2017, activities for the 29th Talent Sharing took place with the participation of 325 employees in affiliation with regional stakeholders in Changwon City and other areas, and through farming exchange contributed to a farming household income increase for 150 households totaling 84 million KRW.

Kimchi Sharing Event

Doosan Heavy Industries & Construction conducts the 'Kimchi Sharing Event' activity with the local community to share the love with neighbors every year. In 2017, about 400 people from the civil servant family social volunteer groups, voluntary service organization associations, Danuri Social Volunteer Groups consisting of multicultural families as well as suppliers of Doosan Heavy Industries & Construction prepared 5,000 heads of kimchi at the Changwon headquarters, which were delivered to nearly 3,000 people at Changwon child welfare centers, the underprivileged groups, social welfare centers and multicultural households.



Offering Helping Hands to Seven Farming Villages

Doosan Heavy Industries & Construction has formed sisterhood relationships with 7 farming villages (Gwisan in Changwon, Janggi in Goseong, Misan in Haman and others), which enables employees to participate during farming and harvesting seasons to lend a helping hand. In every harvesting period during the fall, 450 Doosan employees, as well as members of the Changwon Volunteer Service Organization Association, visit the sister farm villages to assist with the kiwi and sweet persimmon harvest.



Environmental Improvement Mural Painting

Doosan Heavy Industries & Construction has been operating a mural painting program in deteriorated residential areas and crime-prone districts to ensure safe paths for women, children and teenagers as well as to prevent various forms of crimes. This has been operational with the help of the police department and the city of Changwon. In 2017, we transformed the underground and above-ground pedestrian paths near Gijang Station, where Gijang RO Office is located, into a mural street.



Environmental Clean-Up

To prepare a clean environment in the local community and environmental protection for the future generation, we perform environmental cleaning activities on a regular basis over a broad region including coasts, islands, rivers and mountains. Particularly on the annual World Oceans Day, large-scale coastal and underground cleaning is performed in Masan Bay near the Changwon headquarters, and nearly 100 people including members of the in-house scuba diving club, employee volunteers and Changwon's private-public joint social volunteer groups participate every year.



Doosan Day of Community Service

10 countries, 31 business sites, 2,642 employees participated in 94 programs



To fulfill the corporate social responsibilities and the local community's sustainable growth,

Doosan Heavy Industries & Construction has been hosting

'Doosan Day of community Service'

since 2014, an event that draws the voluntary participation of all employees from all worksites. In 2017, we conducted various community service activities in Korea as well as overseas such as "Clean Changwon with Doosan," a representative program jointly performed with the alliance of stakeholders in private and government sectors, and "dream furniture making". In 2018, we will maintain it as a social contribution festival that represents Doosan to continue our warmhearted sharing of Doosan People.



Germany Doosan Lentjes
Local environmental cleaning, support of clothing and food for the low-income class



Vietnam Doosan Vina
Clean houses for low-income families, House Building of Love



United Kingdom Doosan Babcock-Enpure
Improving the environment such as children's centers and local schools, and providing food supplies to the underprivileged groups through a food bank



Korea (Seoul, Changwon) Doosan Heavy Industries & Construction
37 programs including "Clean Changwon (Seocho), with Doosan", dream furniture making, clean house, farm village cultivation, traffic safety mural painting, and environment cleaning.



Czech Republic Doosan Skoda Power
Facility reinforcement of local animal shelters, nursery facilities, elementary schools, etc. and environmental improvement



India Doosan Power Systems India
School Day at sister elementary schools, environmental improvement of public facilities



United States Doosan HF Controls, GridTech, DHT
Local welfare facilities, support of living supplies to children's centers, etc., support of food for the Food Bank



Saudi Arabia Doosan Power Systems Arabia
Cleaning the environment in local streets, parks, etc.

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Performance of Overseas Subsidiaries

Doosan Babcock

Doosan Babcock is a professional power generation equipment manufacturer that possesses original and advanced technology in boilers and oxy-fuel combustion. Based on expertise and abundant experience in thermal/nuclear power plant design and performance improvement services, oil & gas, petrochemical, and process business areas, provides power generation facilities to 30 countries in the world including the U.S. and Europe.



Business Performance and Strategies

Based on proprietary technology accumulated over more than 125 years, Doosan Babcock provides an integrated solution for carbon emission reduction through energy innovation, and conducts its business with an emphasis on maximization of long-term, stable service activities with its major customers. It offers an integrated solution for the oil and petrochemical industries in order to respond to continuous movements in oil prices and changes in industrial investments. The company plans to establish a strategic partnership model through successful execution of contracts signed with new customers in the Middle East. As the energy market is converting to low-carbon power generation thanks to worldwide efforts to reduce greenhouse gas emissions, demand in the fuel cell market is on a consistent rise, and Doosan Babcock supplies suitable energy to local environments in a stable manner through its innovative fuel cell solution. It strives to expand the business to the global market based on its core competencies, as the energy market gradually evolves into that of low-carbon energy.

Accomplished 12 Million Accident-Free Man Hours

Further success was seen at the Grangemouth Oil Refinery and chemicals complex where our team surpassed a staggering 12,000,000 man hours since their last lost time incident (LTI) in 2001. This equates to almost 6,000 days of continuous, safe working across a highly safety-sensitive working environment, incorporating year-round maintenance, turnarounds, construction, EPC projects and specialist technology services.

One Way Campaign

In 2017, Doosan Babcock launched the One Way Campaign to reinforce safety as our number one value and encourage the mindset that the 'safest way' is the 'only way.' As part of this awareness and our commitment to continual improvement, Doosan Babcock developed a range of materials to support the campaign. Senior management has also committed to a range of new safety focused initiatives including face to face briefings with each and every colleague to get the campaign off the ground. This will be supplemented through 2018 with a new Working at Height campaign to raise awareness of the particular hazards of these activities.

Project Carbon

We have set a goal for 20% carbon reduction by 2020, and introduced "Project Carbon" to achieve it. Together with an organization formed by administrators from each business area, a variety of strategies and activities will be carried out to reduce carbon in different sectors, including product performance, supply network, and infrastructure.

CIPS Accreditation

Doosan Babcock achieved record scores in our annual accreditation assessment to be part of the Chartered Institute of Procurement and Supply (CIPS) Sustainability Index. Covering all aspects of legal, financial, ethical and CSR activities, the assessment provides a rigorous benchmark to be assessed against and we are delighted to have achieved record ratings against the three pillars – Social, Economic and Environmental.

Charity Fundraising

Colleagues throughout the Doosan Babcock business combined for a day of fundraising activities to raise £5000 to be split between two cancer charities – Breast Cancer Awareness and Prostate Cancer Awareness. From bake sales to dressing down, quizzes and competitions, the fun activities helped to raise money for two wonderful charitable causes.

Dream Placement

Doosan Babcock continues to support the government's Dream Placement scheme, a leadership program in Cumbria, as part of our commitment to the promotion of STEM and skills development. Students spent time on-site at our Westlakes and Renfrew offices and were given exposure to various areas of the business including project management, quality control, HR, commercial, health and safety and engineering. This gives them the opportunity to acquire knowledge on project management and leadership skills.

Doosan Skoda Power

Doosan Skoda Power is a world-renowned power generation equipment manufacturer that owns OEM technology in steam turbines and, ever since it produced and supplied its first turbines in 1904, has been providing total services from design and production, to supply, installation, and test operation of 3 to 1,200MW steam turbines.



Business Performance and Strategies

By winning bids for steam turbine supply projects in Indonesia and Nigeria, as well as a biomass project in Denmark in 2017, Doosan Skoda Power (DSPW) not only pioneered new emerging markets, but also solidified its status in the Europe region. At the same time, it signed new service contracts in the Central and South Americas to enter another new market in a stable fashion. It also conducts monitoring and analyses of the power generation market and environment to actively respond to any changes taking place in the market and environment. In particular, according to the global trend of reduction in coal-fired thermal power, it has been focusing on combined cycle power plants, biomass, WtE (Waste to Energy) and other forms of new and renewable energy power plants to discover a project pool and seek acquisition of orders through aggressive sales activities. Moreover, it reinforces its competitiveness in the existing business areas and product groups while, simultaneously, preparing to enter new domains of business such as turbines for geothermal power generation, turbines for drivers to operate equipment, and field services. By region, it continues to strive to reinforce its market presence in areas such as Southeast Asia, Central and South Americas, Africa, and India, in addition to the existing European and Middle East regions.

Environmental Management

Various environment indices, including electricity and water consumption and waste emission, are periodically measured. The measured values are checked throughout the product manufacturing process at DSPW and resulting trends are tracked and managed. In 2017, in particular, company-wide improvement activities were performed with a focus on reduction of compressed air consumption and, as a result, the total consumption of compressed air significantly decreased.

Safety & Health

The ultimate goal of safety and health is to reduce the accident rate and improve the labor environment. DSPW has continuously worked to eliminate elements that hinder a healthy working environment, including noise, vibration, and dust. In particular, it conducted activities to decrease vibration at the Locksmith-Pipe Fitter in 2017, which resulted in the reduction of the accident rate.

Continuous Product Improvement

Through improvement of turbine efficiency and design, we contribute to the reduction of customers' fuel usage (coal, gas, etc.) and air pollutant emissions.

Customer Relationship

DPSW proposes quick and improved measures on issues generated in the field, and conducts annual surveys to check customer satisfaction, in an attempt to establish a positive relations with customers. It also has enhanced the customer satisfaction survey method to be able to understand and focus on the customers' requests and desired values. Through this, it provides services tailored to each customer with whom it has been building a great amount of trust.

Doosan Day of Community Service

To fulfill social responsibilities as a company and seek continuous growth of the local community, employees voluntarily participate in the Doosan Day of Community Service (DDCS). Notable activities include caring for senior citizens by reading books and going on walks at hospitals, establishment of shelters, furniture bazaars, environment cleaning at elementary schools, cleaning and painting fences at shelters for abandoned dogs, and cleaning at Plzen Zoo.

Donations and Support

Continuous support is being provided to allow children at orphanages located in Rokycany to enjoy summer camps. We also take part in DEJME DĚTEM ŠA NCI o.p.s. (Let's Give Children a Chance) to help children and youth to successfully adapt to society even after they leave the orphanages where they are raised. Moreover, a contract to sponsor FC Victoria Plzen has been renewed to provide constant assistance for children's sports. Such activities have been receiving positive feedback from the local community.

Performance of Overseas Subsidiaries

Doosan Lentjes

Doosan Lentjes is a global provider of processes and technologies for energy generation from both renewable and fossil fuels. The company's specific areas of expertise include circulating fluidized bed boilers, key technologies for the generation of energy from waste and flue gas cleaning systems.



Business Performance and Strategies

As a company that provides technology and EPC, Doosan Lentjes concentrates on providing innovative solutions that encompass all areas including CFB, APC, and WtE, and establishes strategic relationships with potential for advancement into new emerging markets such as the Middle East, India, Eastern Europe, Central and South America, and Southeast Asia. It also utilizes extensive in-company service and manufacturing capabilities to make positive contributions to the provision of cost-optimized solutions. Doosan Lentjes promotes the "2G" strategy throughout the company to establish an interactive, virtuous cycle structure based on the belief that growth of a business is the growth of people, from which it re-emphasizes that people are the greatest asset of a company. This is why Doosan Lentjes strives in multiple aspects to recruit, educate, and develop talents with the most promising future. Thus, it conducts concentrated R&D at the in-company research center, and combines the effort and knowledge of many to develop innovative energy technology that can meet even the most challenging customer demands, in both the core and emerging markets of the present and future.

Environmental Management

An environment management system was introduced in 2013 to minimize the negative impact business activities have on the environment, even when considering the economic and technical opportunities, and the prerequisite conditions for ISO 14001:2015 have been maintained. Doosan Lentjes continuously strives to process environmental and energy resources with a sense of responsibility and encourage ecological awareness, while constantly ruminating on its business activities, reviewing its technology and the means of production used, and complying with all legal standards. Through this, Doosan Lentjes avoids any unnecessary environmental pollution generated due to its business activities, products and services, and also minimizes the risks on people's health as well as the environment.

Safety & Health

Doosan Lentjes regards its employees' vocational safety and health, as well as protection of the environment, as its No. 1 priority. By preparing a safety and health management system in accordance with OHSAS 18001:2007, it prevents and minimizes the top risks determined during work, and strives to eliminate the effect on the environment due to accidents, diseases, and operation. Also, it actively studies any dangerous activities and situations performed by or taking place by not only its employees but also anyone in cooperation with Doosan Lentjes. These include customers, contractors, subcontractors, and suppliers before actively encouraging everyone to participate in solving the issues, achieving common objectives, and proposing measures for improvement. Thanks to such efforts for establishment of a safety culture, a 0% injury rate was accomplished in the year of 2017.

Shared Growth

Doosan Lentjes has established a Suppliers Code of Conduct, founded upon corporate values. The Suppliers Code of Conduct defines the basic items to be followed in areas of human rights, work environment, the environment, and business integrity. Doosan Lentjes strives to value suppliers as suppliers and establish a trustworthy relationship for mutual growth, while simultaneously demanding suppliers to conform to, and operate by, the principles of the Suppliers Code of Conduct, as well as all relevant laws and regulations.

Make-a-Wish Christmas Tree Campaign & Nikolaus party

We offer Christmas events for youth in need, including children in refugee families and low-income households. Through the "Make-a-Wish Christmas Tree" campaign, children write their Christmas wishes on paper and hang them up on the tree, then employees of Doosan Lentjes respond to their wishes and welcome the refugee children and their families to their homes during the Nikolaus party.

"Médecins Sans Frontières" (Doctors without Borders) Support

Doosan Lentjes supports social organizations through profits from book sales. Employees bring books they do not need and place them on the bookshelf in the company cafeteria before taking home other books for a certain fee. The profits collected are delivered to "Médecins Sans Frontières" (Doctors without Borders), an international organization that offers emergency aid to those damaged by armed conflicts, infectious diseases, marginalization from medical treatment, and natural and manmade disasters.

Doosan Power Systems India

Doosan Power Systems India (DPSI) is growing into a comprehensive power plant solutions company based on the OEM Boiler Technology owned by Doosan Heavy Industries & Construction, world-class manufacturing facilities at Chennai and end-to-end EPC solutions capabilities.



Business Performance and Strategies

Even amidst uncertainties prevailing throughout the world, India is one of the up-and-coming countries, and is still growing at an extremely fast pace. The power consumption per person in India is only 1/3 of the current global average, and about 240 million Indians still do not have access to electricity. Thus, once the mid-term plan of "Make in India" leads to an increase in industrial demands and the emerging middle class requesting quality electricity, the individual power consumption is also expected to significantly increase. At the same time, the importance of renewable energy sources is expected to become greater in the field of power generation and, thus, existing power generation facility and service providers recognize it as both a potential crisis and a promising opportunity. DPSI not only provides eco-friendly power generation technology to India, but also actively seeks to become an essential partner of the Indian government in its carbon reduction activities.

Environmental Management

Factors with the greatest impact on manufacturing of facilities are the production process and energy and water consumption. We continuously work to optimize the production process and preserve energy and water resources and, simultaneously, develop a comprehensive approach toward green management. In particular, the DPSI Chennai Plant succeeded in innovation focused on the reduction of energy usage through optimization of its production processes. Harmonic filters were installed at major substations and reduced the harmonic wave level by 8% below the allowable limit, which has led to a maximum 15% savings on electricity bills. DPSI continues to increase the percentage of environment-friendly technology and, through an energy audit, actively finds new opportunities to save, such as the conversion of existing lights to LED and stoppage of power usage during idle time.

Safety & Health

DPSI strives to achieve safety and health by providing a safe and healthy labor environment to all of its employees and stakeholders in its workplaces. Also, the executives take the lead in increasing awareness on safety and extending the systematic safety regulations and processes throughout the company. Accidents are tracked, measured, and monitored through risk assessments, and proper corrective measures are taken. DPSI instills the importance of safety in its employees through collaboration and participation activities, and maintains accident-free operation through safety education, regular inspections, tool box and safety meetings, and awareness-improving communication. In 2017, the number of accidents occurred at the DPSI Chennai Plant was zero, a feat achieved for the third consecutive year.

Respect for Employees' Rights

We strive to respect the dignity of human rights and understand, evaluate, and manage the impact on human rights within the scope of our activities. DPSI regards the rights of employees as fundamental freedoms and extends them to all DPSI employees. By especially focusing on human rights, DPSI offers training on the rights of employees against discrimination, bullying, and unfair treatment through "Human Rights Weekly," a policy and program workshop. Moreover, it conducts periodic meetings and fields feedback on a regular basis to check if the regulations are followed and, subsequently, establishes clear implementation plans to review whether or not existing policies are able to protect the rights of the employees.

Social Contribution Activities

DPSI nurtures its business by focusing on its CSR strategic goals of "talent-oriented," "reliable operation," and "responsible participation" and, at the same time, responds to the global trends and demands of stakeholders in society. As a part of the effort to develop talents, it performed infrastructure repairs for several schools in 2017 and also provided facilities and equipment, such as computer centers, furniture, and hygiene products, in an attempt to improve the overall educational environment for underprivileged students. Moreover, we hosted Health Camp and Eye Camp to provide glasses and medical supplies, which are two necessities of the students. We also began supporting technical development of youth through highly-skilled workshops for Chennai government's ITI and donation of modern tools and lab equipment. Meanwhile, the safety of Chennai highways was improved through safety barricades and, furthermore, monthly financial assistance, as well as donations of home supplies and grain, were donated to orphanages and those in the underprivileged class. In addition to the "Swachh Bharat (Clean India)" campaign implemented in each region, DPSI regularly organizes health camps and traffic safety guidance activities, thus minimizing safety and health risks in the local communities.

Performance of Overseas Subsidiaries

Doosan Vina

Doosan Vina is Vietnam's only power generation equipment manufacturer and deals with boilers, port facilities, and seawater desalination equipment as its primary areas of business. Based on its experience implementing around 200 projects, it currently exports products to 28 countries worldwide, including Vietnam.



Business Performance and Strategies

Even amidst difficulties in the power generation business worldwide, collaboration with Doosan Heavy Industries & Construction, coupled with internal activities to acquire orders, has led to a third consecutive profitable year. In the power generation business, we plan to continuously expand the spectrum of our supplies by participating in the Obra-C project in India and signing boiler equipment delivery contracts with global corporations, such as IHI of Japan. Regarding port facilities, we aim to successfully complete the production of port cranes to be supplied to India and make the first shipment of cranes at Mumbai Port. In the area of desalination facilities, we will manufacture the Shoaiba RO facility in Saudi Arabia to continue to expand production of desalination facilities in the Middle East. Meanwhile, we are the first company to acquire ASME certification in Southeast Asia and are a high-quality fabricator, capable of everything from design to production in the field of steel structures. Since the acquisition of the first order of steel structure products for power plants in Japan in 2017, we have been obtaining repeat orders.

Energy Usage Reduction Activities

Through regular inspections on the state of energy usage, energy loss due to waste is being minimized. Also, by implementing the movement of turning off air conditioners 15 minutes before the end of daily work, energy usage is being reduced throughout typical daily tasks and, when an air conditioner is running, we advise the closing all doors and windows. When certain employees work late, we ask them to always turn off all lights and electronic devices when they leave.

Environmental Pollutant Control

Waste water generated within the company is less than roughly 45% of the Vietnamese legal standard on pollutant emissions, and is being released after undergoing internal processing. For facilities that generate air pollutants, air control equipment such as bag filters and wet scrubbers is installed to allow for the release of air pollutants equivalent to less than 45% of the Vietnamese legal standard. We will continue to make efforts to reduce environmental pollutants in the future.

Employee Education

Doosan Vina offers a diverse range of training for each level to help cultivate job and leadership competency in employees. For office workers a focus is placed on reinforcing leadership, work and global business competency to develop the next-generation of leaders and, for technical staff, training for the improvement of specialized skills and leadership is conducted on a regular basis. Also, training on Code of Conduct compliance and foreign languages are carried out to internalize the Doosan Way.

Establishing a Positive Workplace

We abide by Vietnam's Labour Standards Act and human rights principles as specified by the International Labour Organization and, provide sufficient opportunities for rest and welfare programs to improve the quality of life of workers. Also, a variety of services such as congratulatory





and condolence expenses, dormitory, shuttle service, corporate housing and regular health exams at the company hospital, is being provided for the convenience and health of the employees. In particular, education on human rights is being conducted on a regular basis in order to realize the value of Doosan Way that prevents various instances of human rights violations and is focused on unity.




Social Contribution Activities to Improve Local Residents' Quality of Life

Doosan Vina has selected three primary social contribution activity themes of medical services, educational activity support and residential environment improvement to conduct social contribution activities and, thus, invested more than USD 550,000 up to 2017. For medical service activities, Doosan Vina has performed medical treatments on about 24,780 patients in association with Chung-Ang University Hospital. In addition, we have invited patients to Korea every year to conduct surgeries (85 child patients, 19 cataract patients, 2 heart surgery patients). In addition, we have provided more than 30 physical treatment devices worth about USD 153,000 to four hospitals in the Quang Ngai region, and have conducted medical technique instruction activities through collaboration between Quang Nam General Hospital and Chung-Ang University Hospital since 2012. In the education area, we have presented 1,077 scholarships to students of 12 Vietnamese universities and signed partnership agreements on education and recruitment with 17 colleges as well as conducted counseling activities every year. Also, we have provided school supplies to local elementary schools and currently conduct various education and community service programs in association with Chung-Ang University students. In the housing area, we have either constructed or performed renovation activities on 31 houses for the needy.

Stakeholder Engagement

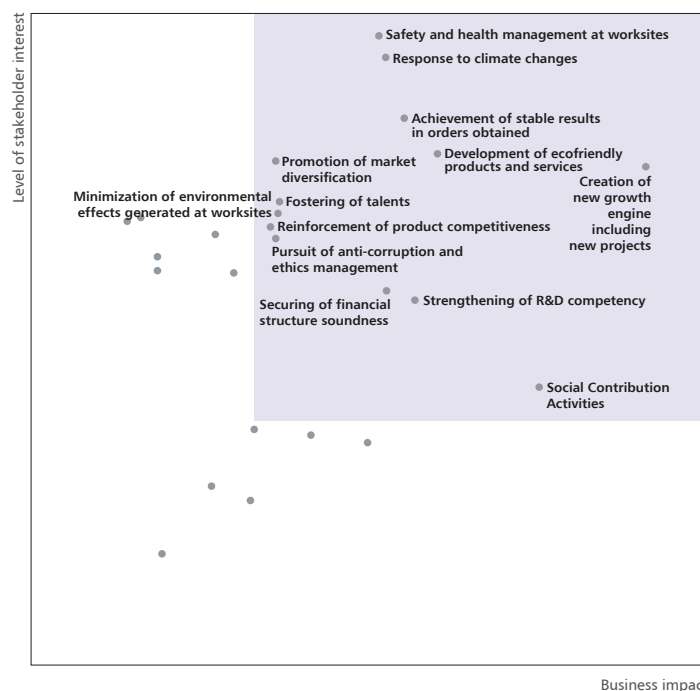
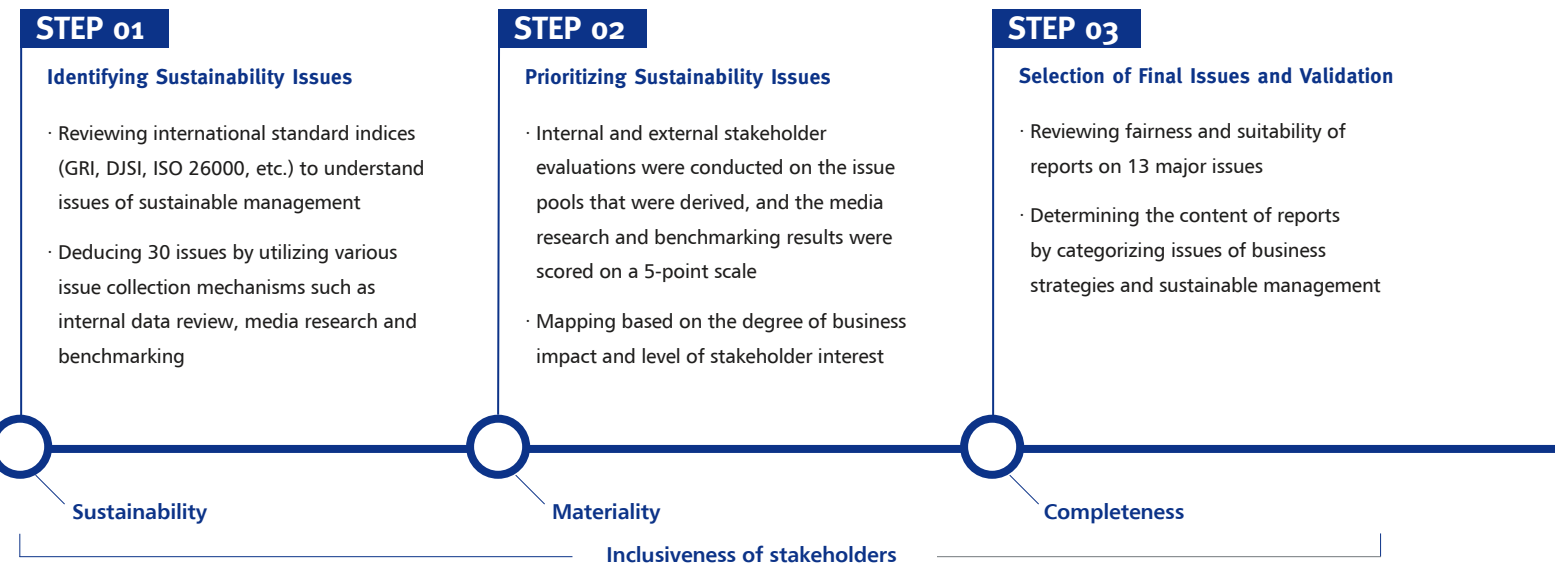
Doosan Heavy Industries & Construction defines shareholders, customers, employees, suppliers, local community, government, and competitors as primary stakeholder groups. For active communication with them, various communication channels are in place and valuable opinions are well considered for corporate management.

Group	Definition	Communication channel	Number of operations
 Shareholders	Doosan Corporation, Foreign investors, Institutional investors, Minority shareholders	Investment relations (IR) events	Regularly
		Conferences	When needed
		Overseas NDRs (Non-Deal Roadshow)	When needed
 Customers	Local public power generators, Local private power generators, Overseas clients	Roadshows	When needed
		Technology briefings	When needed
		VOC (Voice of Customer)	Always
		Participation in safety education for local private power generators	When occurred
		Technical exchange meetings and seminars	At anytime
		Technical support center (online)	Always
		Power generation interruption special response team and call center	Always
Customer satisfaction surveys	Once a year		
 Employees	Headquarter employees, Overseas branch offices' employees, Overseas subsidiaries' employees	Industrial Safety and Health Committee	4 times a year, at anytime
		Labor-Management Council	Once a quarter
		Education for employees dispatched to overseas worksites	Once a week
		Safety and health practical training	Once a year
		Management status information session	Every quarter
		CTO discussion meeting	At anytime
		Communication with employees related to certified emissions reduction	More than 10 times a year
		Consultative groups of Social Volunteer Group	Once a month
		 Local Community	Local residents, Academia, research institutes, NGOs
Doosan Day of Community Service	Once a year		
Consultative groups of Social Volunteer Group of Doosan Heavy Industries & Construction	Once a month, at anytime		
Community Communications Council (Woongnam-dong)	Twice a year, at anytime		
Relevant agencies for social contribution activities (Gyeongsangnam-do, Changwon, beneficiary agencies)	At anytime, when needed		
Gyeongnam corporate social contribution representatives workshop	Once a year		
Local social contribution council	At anytime, when needed		
Offshore factory design research society	Twice a year		

Group	Definition	Communication channel	Number of operations
 Suppliers	Tier 1 suppliers, Tier 2 suppliers	Representative consultative groups	Once a month
		Shared growth conference	Once a year
		Tier 1 suppliers meeting on shared growth	Every quarter
		Tier 2 suppliers meeting on shared growth	Once a year
		Cooperation Council of Doosan Heavy Industries & Construction	When needed
 Government	Central/local governments, Related organizations	Cooperation Council of Operations Committee	Once a half-year
		Shared growth committee	At anytime
		Large & Small Business Agriculture & Fisheries Cooperation Foundation	At anytime
		Fair Trade Commission	When needed
		Center for Large and Small Business Cooperation	When needed
		Korea Environmental Industry & Technology Institute	When needed
		Health and Innovation Leader Forum	16 times a year
		PSM Council	Once a quarter
		Voluntary agreement on fine dust reduction	4 times a year
		Changwon City Sustainable Development Council	Once a year
 Competitors	Power generation facility manufacturers, Desalination and water treatment plant companies	Gyeongnam Climate Environment Network	Once a half-year
		Maritime Policy Advisory Committee	Once a month
		Firefighting Power Development Council	Once a month
		Gyeongsangnam-do & Changwon City	Once a year, at anytime
		Council of Construction Safety Division	Every quarter
		Construction Safety Workers' Council	Every quarter
		Health Council	Every quarter
Construction company CEO safety and health leader meeting	Once a year		
Construction Safety and Health Officer / Department Head Meeting	Every quarter		
International Construction Association of Korea Counter-Terrorism Council	Twice a year		
Technology exchange meeting	Once a year		

Materiality Assessment

Doosan Heavy Industries & Construction has conducted a Materiality assessment so that its performance can be disclosed through an integrated report and reflected in decisions for sustainable management, focusing on issues of high interest from stakeholders and business impact. The Materiality assessment refers to the method for obtaining important issues presented by GRI G4, and then results to deduce 13 core issues.



Results of major issues deduced

Core issues	GRI	Report boundary	
		Internal	External
Creation of new growth engines such as new businesses	-		Shareholders
Safety and health management at worksites	Industrial safety and health	-	
Response to climate changes	Energy, Discharge		Local community
Achievement of stable results in orders obtained	-		Shareholders
Development of ecofriendly products and services	Product and service		Customers
Social Contribution Activities	Indirect economic effect		Local community
Strengthening of R&D competency	-	Employees	Customers
Securing of financial structure soundness	-		Shareholders
Promotion of market diversification	-		Shareholders
Fostering of talents	Training and education		-
Minimization of environmental effects generated at worksites	Wastewater and waste		Local community
Reinforcement of product competitiveness	-		Customers
Pursuit of anti-corruption and ethics management	Anti-corruption		Shareholders

Risk Management

Our Approach

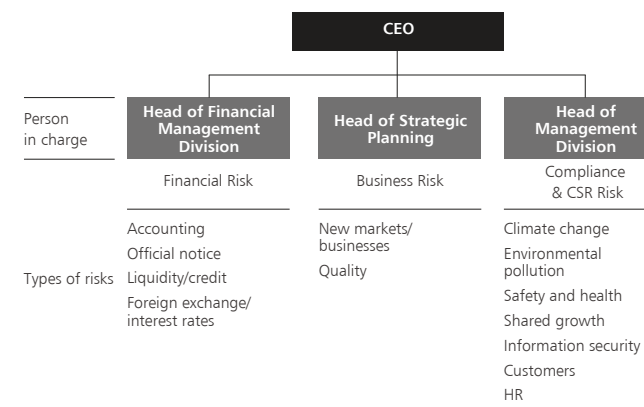
Doosan Heavy Industries & Construction operates an integrated risk management system to effectively manage risk factors which may potentially be generated in the midst of business operations. Risk factors are categorized into financial, business, compliance and CSR risk and are being properly managed by teams with expertise.

2018 Goals

We plan to continue to strengthen our comprehensive risk management and detect variabilities in the global economy in advance to avoid potential risk factors while actively taking advantage of opportunities. Through company-wide education on risks not only for employees in charge of different risk types but all employees, we aim to improve our level of risk management.

Comprehensive Risk Management System

The types of risks at Doosan Heavy Industries & Construction are controlled and categorized into Financial Risk, Business Risk, and Compliance and CSR Risk, and executives and teams responsible for each risk factor are assigned for constant monitoring. It has set up a management system in which any issue generated is directly reported to the CEO, and for risks with significant impact on the company, the Board of Directors makes the final decisions. Four of the independent directors are experts on risk in different areas, and once elected, implement relevant education to help make optimal decisions based on their understanding and expertise on laws, internal transactions, etc. related to the economy, environment and society.



response system that encompasses risk factors in all stages of business from the procurement of raw materials to the provision and follow-up management of products and services in pursuit of business stability, and by recognizing business risks in domestic and international market environments in advance, manage the risks based on clear response criteria and procedures.

Compliance & CSR Risk

We recognize and manage various legal and non-financial risks related to the environment, safety, human rights, information security, local community, etc. as Compliance and CSR Risks. An immediate response and management system has been set up centered on teams in charge of each risk, and a sufficient amount of discussions are conducted through the CSR Committee to make proper decisions.

Risk Analysis

The company checks both business opportunities and risks through step-by-step operating profit simulation over the course of a project. Standardized checklists are used to analyze the impact on business and response measures, and the results of such analyses are reported to the CEO every month.

Finance	Sensitivity analysis by scenario including cost, cash flow, taxes, etc.
Environment	Establishing mid-to long-term reduction plans such as discharge of greenhouse gas emissions, water scarcity, etc. as well as an emergency response system
Others	Utilization of a quality gate system on risks, human rights, transparent management, etc., which influence the performance of a project (clarifying major risk factors in each stage and establishing appropriate response measures)

Financial Risk

We aim to minimize the financial risks as associated with accounting, finance, banking, public announcements, etc. As a global corporation, we have established the "exchange risk management guideline" in order to avoid currency risks caused by exchange rate fluctuations while analyzing financial risks anticipated in the course of business and also actively managing them in accordance with response strategies. Such details are officially and publicly disclosed to stakeholders in a transparent manner to improve the company's credibility

Business Risk

Any risks related to new markets and businesses, quality and intellectual property rights are recognized as business risks. We establish a preemptive

Companywide Risk Management Culture

Internal education is implemented for all employees on management principles, processes, recurrence prevention, etc. for each risk type in an effort to propagate a risk management culture throughout the company. Also, financial compensation is provided to all employees under the CEO based on their performance evaluated on the improvement of risks.

Performance Summary

Economy

Largest contributions and expenditures

(Unit: KRW million)

2015		2016		2017	
Donated to	Amount	Donated to	Amount	Donated to	Amount
Large and Small Business Cooperation Foundation	500	Gyeongnam Center for Creative Economy and Innovation	2,239	Large and Small agricultural and fishery Business Cooperation Foundation	500
Korea Foundation	205	Large and Small Business Cooperation Foundation	500	Korea Technology Finance Corporation	208
2013, 2014 Association of the Electricity Supply Industry of East Asia and the Western Pacific	100	Korea Nuclear Association for International Cooperation	367	Gyeongnam Center for Social Economy and Entrepreneurs	58
Korean Nuclear Society	30	Korea Credit Guarantee Fund	312	Korea Nuclear Society	30
Korea Accounting Institute	25	2015 World Water Forum Organizing Committee	250	Korean Society of Pressure Vessels and Piping	3

* DHIC is not engaged in donation or supportive activities to political campaigns, political organizations, lobbyists or lobbyist organizations according to legal regulations in Korea and the Code of Conduct.

Total contributions

Category	Unit	2015	2016	2017
Industry association, tax-exempted group, etc.	KRW million	12,166	8,962	8,699

* There is no donation record on lobby/interest group, election, legislation, and voting.

R&D spending¹⁾

Category	Unit	2015	2016	2017
R&D expenses	KRW 100 million	1,665	1,932	2,242
Sales	KRW 100 million	51,463	47,053	43,367
R&D spending as % of sales ²⁾	%	3.24	4.11	5.17

1) Calculated based on Doosan Heavy Industries & Construction Headquarters
2) 2015 data was revised due to internal reasons

Environment

Usage and recycling of raw materials

Category	Unit	2015	2016	2017	Remarks	
Non-renewable raw materials	Scrap iron	tonnes	143,694	134,461	114,308	External purchase
	Recovered iron	tonnes	78,214	77,908	70,527	Internal recycling
	Chip	tonnes	14,616	12,363	11,471	Internal recycling
	Ferro alloy	tonnes	7,586	7,318	6,369	External purchase
	Quicklime	tonnes	9,483	8,934	7,412	External purchase
	Fluorspar*	tonnes	870	950	949	External purchase
	Lump coal**	tonnes	6,169	5,788	4,601	External purchase
Total	tonnes	260,632	247,722	215,637		
Recycled raw materials	Recovered iron	tonnes	78,214	77,908	70,527	
	Chip	tonnes	14,616	12,363	11,471	
Percentage***	%	36	36	38		

* There is a discrepancy between the data in this report and that from 2015 or 2016 due to an error in classification entry.
** There is a discrepancy between the data in this report and that from 2015 or 2016 due to an error in classification entry.
*** There is a discrepancy between the data in this report and that from 2015 or 2016 due to an error in unit.

Energy

Energy usage and purchase

Category	Unit	2015	2016	2017	
LNG	Nm ³	41,231,486	39,648,695	39,438,558	
LPG	Nm ³	160,512	196,049	171,407	
Gasoline (car)	L	2,297,619	587,932	1,496,439	
Diesel (car)	L	1,769,380	1,186,886	1,401,781	
LPG (car)	L	6,700	12,582	0	
Gasoline (generator)	L	365,688	6,119	4,237	
Diesel (generator)	L	656,548	1,206,014	1,427,849	
Kerosene (Heating)	L	38,089	16,750	304	
Hi-sene	L	4,946,804	4,825,713	4,540,953	
Other (anthracite)	kg	0	21,600	617	
Total		51,472,826	47,708,340	48,482,145	
Purchased energy	Electricity	Kwh	325,257,573	315,946,555	297,688,042

Amount of energy reduction

Category	Unit	2015	2016	2017
Heating equipment improvement	tCO ₂	1,803	0	0
Operation method improvement	tCO ₂	5,152	737	0
Introduction of high efficiency equipment	tCO ₂	2,318	3,730	1,872
Minimization of combustion	tCO ₂	7,727	0	0
Total	tCO ₂	17,000	4,467	1,872

Cost and reduction of energy consumption

Category	Unit	2015	2016	2017
Fossil fuel	mwh	293,536	283,690	278,129
Electricity	mwh	325,256	315,945	297,688
Total	mwh	618,792	599,635	575,817
Amount of energy usage	TJ	5,395	5,158	5,026
Energy cost	KRW million	80,283	73,400	72,800
Amount of cost reduction	KRW million	19,660	26,600	27,200

Water

Total water intake by source

Category	Unit	2015	2016	2017
Surface water	tonnes	75,619	25,907	0
Underground water	tonnes	74,507	110,251	98,509
Rainwater repository within organization	tonnes	50,200	40,000	40,000
Wastewater from another organization	tonnes	28,614	4,860	0
Water supply system	tonnes	1,844,467	1,928,555	1,580,307
Total	tonnes	2,073,407	2,109,573	1,718,816

Recycled and reused water

Category	Unit	2015	2016	2017
Recycled and reused water	tonnes	31,716	40,060	25,900

Atmospheric emissions

Greenhouse gas emissions

Category	Unit	2015	2016	2017
Direct greenhouse gas emissions	tonnes	136,861	127,608	126,586
Indirect greenhouse gas emissions	tonnes	155,820	150,881	142,060
Total	tonnes	292,681	278,489	268,646

Performance Summary

Amount of air pollutant emissions

Category	Unit	2015	2016	2017
Amount of emission by type				
VOC (volatile organic compounds)	tonnes	10.50	10.20	9.4
PM (particulate matter)	tonnes	37.0	36.7	30.1

Amount of hazardous chemical substances consumption

Category	Unit	2015	2016	2017
No. substances	type	14	5	2
Amount of usage	tonnes	620	405	195

* Goal for replacement of hazardous chemical substances: 6 types (2016), 2 types (2017), 1 type (2018)

Wastewater and waste

Amounts of treated wastewater discharged

Category	Unit	2015	2016	2017
Final wastewater discharge site name				
Final rainwater discharge site name				
Treatment method				
Rainwater discharge amount (B)	tonnes	2,150,444	3,473,779	1,283,258
Total amount of wastewater/ rainwater (A+B)	tonnes	2,440,937	3,757,568	1,475,243

Quality of treated wastewater

Category	Unit	2015	2016	2017
COD	mg/l	15.76	10.07	12.38
SS	mg/l	1.89	2.79	5.67
N-H	mg/l	0.13	0.10	1.2
Cr	mg/l	0.001	0.001	0
Zn	mg/l	0.08	0.02	0.027
Pb	mg/l	0.002	0	0
Fe	mg/l	0.096	0.031	0.211
T-N	mg/l	4.095	4.115	3.87
T-P	mg/l	0.022	0.081	0.15

Rainwater discharge quality

Category	Unit	2015	2016	2017
COD	mg/l	3.3	3.5	3.4
SS	mg/l	1.4	1.3	1.3
N-H	mg/l	0	0	0
Cr	mg/l	0	0	0
Zn	mg/l	0	0	0
Pb	mg/l	0	0	0
Fe	mg/l	0.02	0.01	0.02
T-N	mg/l	2.21	2.18	2.24
T-P	mg/l	0.06	0.06	0.05

Amount of waste disposal

Category	Unit	2015	2016	2017	
Hazardous waste	Recycled	tonnes	679	524	719
	Incinerated	tonnes	677	422	373
	Landfill	tonnes	9,562	3,974	2,944
	Others	tonnes	11	3,052	9
	Reused	tonnes	308	269	0
Non-hazardous waste	Recycled	tonnes	78,647	68,711	52,923
	Incinerated	tonnes	314	1,442	1
	Landfill	tonnes	11,242	4,747	11,401
	Others	tonnes	13,280	49,978	19,839

Biodiversity management at Doosan Heavy Industries & Construction construction sites

Region	Project list	Areas of primary control	Number of managed species	Details of managed species
Saudi Arabia	Fadhili Combined Heat and Power Plant	Soil: Sand Sea Swamp	1	amphibia : Spiny-tailed Lizard - classified as VU
Asia/Pacific Philippines	Redondo Peninsula Energy CFPP - Phase 1 (300MW)	Soil: Mountain Soil Water: Subic Bay, Creeks, River	3	Flora1) Katmom : classified as VU2) Tanglin: classified as VU3) Molave: classified as VU
Oman	Al ansab STP	Soil: Lagoon	7	Fauna Bird - EX (1), VU (3), NT (3) 1) Egyptian Vulture: Classified as Endangered 2) Greater Spotted Eagle: Classified as VU. 3) Eastern Imperial Eagle: Classified as VU. 4) Lesser Kestrel: Classified as VU. 5) Ferruginous Duck: Classified as NT. 6) Pallid Harrier: Classified as NT. 7) European Roller: Classified as NT.
Vietnam, Binh Thuan Province	Vinh Tan 4	Soil: Grass/ forestland, coastal sandy plain Water: Sea (Cost of Cana)	x	The ecosystem types identified in the EIA are as follows, but there is no mention of management targets in the EIA Report. Plants 56, animals 53, fish species 76,
Vietnam	Song Hau 1 TPP	Soil: Agricultural land (farm land) Water: River, canal	x	The following EIA types are identified in the EIA, but there are no types of plants to be managed under the EIA Report. No mention of controls on animals and species. Plants (154 species): No precious plants species in the Red Book of Vietnam and the IUCN (See Resources) Animals (53), fish species (35)
India	Lara	Soil: Agricultural land (farm land), Manmade Forest/Green cover (gardened forest) Water: Mahanadi and Kelo River	x	The ecosystem types identified in the EIA are as follows: the EIA Report mentions that there are currently no management targets (see Resources). - No mention of the IUCN Risk of Extinction. Plants (43), animals (28), fish species (64)
India	Obra C	Soil: Soil, Forest, Jungle Water: Rihand River, Son River	x	The ecosystem types identified in EIA are as follows: the EIA Report mentions that there are no categories of controls (see Resources). - The IUCN Risk of Extinction states that there are no flora and fauna. Plants (255), animals (287), fish species (21)
Korea	Changwon-Donggeup-Gimhae-Hallim Route		5	Korean buzzard, kestrel, Asiatic sparrow hawk, Grey Frog Hawk, Mandarin Duck
	Samcheok Green Power #1, 2	Swamps	4	Otter, kestrel, Mandarin Duck, whooper swan
	Jeju LNG Combined Cycle	Soil	1	Yellow rosemallow
	Changnyeong-Miryang Highway	Soil, sky	6	Leopard cat, Mandarin Duck, Asiatic sparrow hawk, eagle, kestrel
	Shin Kori Nuclear Power #5, 6	Water	55	Conger eel, horse mackerel, Korean rockfish, thornback ray
	Bibong-Maesong Highway (completed in middle of 2017)	Soil	4	Pine, white oak, saw-tooth oak, Mongolians oak

Performance Summary

Total environmental protection expenditures and investments

Total environment-related expenditures

Category	Unit	2015	2016	2017
Investment	KRW million	12,000	3,000	1,900
Waste disposal cost	KRW million	1,986	1,293	1,092
Waste Test & Analysis cost	KRW million	5	5	5
Waste recycling profit	KRW million	818	425	649
Other costs	KRW million	1,480	1,480	1,254
Total	KRW million	16,289	6,203	4,900

Eco-friendly purchasing

Category	Unit	2015	2016	2017
Amount of products purchased	KRW million	20,243	25,864	9,756

Overview of environmental regulation violations

Regarding environmental regulations, there have not been any violations, penalties and environment-related liabilities for the past 3 years.

Society

Employees

Overview of employees

Category	Unit	2015	2016	2017	
Total no. of employees	person	7,779	7,728	7,610	
Per employment contract	Permanent position	Male	6,753	6,770	6,630
		Female	284	287	271
	Contract position	Male	651	591	624
		Female	91	80	85
Minority group	Disabled	Male	174	167	134
		Female	3	3	3
	Men of national merit	Sum	177	170	137
		Male	176	173	159
	Female	6	6	5	
	Sum	182	179	164	

New employment and turnover rate

Category	Unit	2015	2016	2017	
New recruitment	Employees	person	442	488	70
	Percentage	%	5.68	6.31	1

Category	Unit	2014	2015	2016	2017	
Resignees	Male	person	65	83	86	43
	- Male (retired, voluntarily resigned)	person	333	4	128	134
	Female	person	16	16	14	7
	Total	person	414	103	228	184
Job turnover	Turnover rate	%	4.94	1.32	2.95	2.74
	Voluntary turnover (net turnover)	person	81	99	100	50
	Voluntary turnover rate	%	0.97	1.27	1.29	0.75

Employee education

Category	Unit	2015	2016	2017	
Total no. of training hours	hours	562,253	633,835	401,986	
No. of training hours per person	Male	hours	97.6	86.4	58
	Female	hours	101.6	87.2	128
	Total	hours	78	82	53

Overview of labor union membership

Category	Unit	2015	2016	2017
Total number of workers (subject to membership)	person	4,287	3,878	4,004
Number of people who signed up for labor unions and the labor management council	person	2,268*	2,172	2,166
Percentage of people who signed up for labor unions and the labor management council	%	52.9	56.0	54.1

* Revised due to entry error in this report

Parental leave

Category	Unit	2015	2016	2017	
Employees on parental leave	Male	person	2	8	15
	Female	person	38	44	33
Employees who return to work after parental leave	Male	person	-	2	7
	Female	person	36	38	22
Return rate	Male	%	-	100	47
	Female	%	97	100	67
Employees who work continuously for 12 months after parental leave and return to work	Male	person	-	-	7
	Female	person	36	35	21
Retention rate after return	%	73	97	97	

Performance evaluation and compensation

All employees are assessed according to fair, transparent performance evaluation. The criteria for evaluation and compensation are differentiated based on individual work performance and competency, and there is no discrimination based on personal differences in gender, religion, education level, etc.

Compliance with laws and regulations

Legal actions for unfair trade practices

Category	Unit	2015	2016	2017
Legal actions for unfair trade practices	case	1	2	2

* Regarding the bid rigging of Wonju-Gangneung High Speed Rail (2013), an order placed by Korea Rail Network Authority, corrective measures and a fine of 10,060,000,000 KRW were imposed by the Fair Trade Commission for the violation of the Monopoly Regulation and Fair Trade Act, of which the fine has been paid in full. Regarding this case, Doosan Heavy Industries & Construction is currently in a lawsuit against the Fair Trade Commission to cancel the of imposition of penalties (filed July 2017).

** Regarding the case of bid rigging of LNG tanks in 2017, 1 current employee of the company was fined (5,000,000 KRW, verdict made on November 14th, 2017) and a second trial is underway.

Penalties and sanctions for violations of laws and regulations

Category	Unit	2015	2016	2017
Total amount of imposed fines	KRW 100 million	45	3.6	100.6
Number of non-monetary sanctions	case	-	-	-
Number of lawsuits	case	-	1	0

* Regarding the bid rigging of Wonju-Gangneung High Speed Rail (2013), an order placed by Korea Rail Network Authority, corrective measures and a fine of 10,060,000,000 KRW were imposed by the Fair Trade Commission for the violation of the Monopoly Regulation and Fair Trade Act, of which the fine has been paid in full. Regarding this case, Doosan Heavy Industries & Construction is currently taking legal action against the Fair Trade Commission to cancel the of imposition of penalties (filed July 2017).

Health & Safety

Lost time incident rate (LTIR¹⁾)

Category	2015	2016	2017
All	0.028	0.035	0.040
Employees	0.044	0.044	0.071
Local	0.066	0.107	0.177
Overseas	0.000	0.000	0.000
Suppliers	0.021	0.030	0.020
Local	0.067	0.159	0.086
Overseas	0.005	0.005	0.006

1) LTIR: Lost Time Incident Rate, U.S. OSHA Total No. of Lost Time Accidents X 200,000 / [Total Man-hours worked]

2) The Standard for Lost Time Incident applies the standard of one or more days of work loss accident, which is based on OSHA LTIR calculation

3) The calculated accident rate has been subdivided into employees, suppliers, domestic, and overseas, and the latest three years of the disaster rate has been re-established based on OSHA LTIR, which is the most widely used international standard

Number of incidents

Category	2015	2016	2017
All	11	16	19
Employees	5	7	13
Local	5	7	13
Overseas	-	-	-
Suppliers	6	9	6
Local	5	8	5
Overseas	1	1	1

Zero accident hours achieved in construction projects

	Site	Unit	2017
Local	Hwaseong Dongtan2 Group Energy Facility	hours	1,820,000
	Jeju LNG Combined-cycle Power Plant	hours	910,000
Overseas	Lara, India	hours	17,000,000
	Yanbu Ph.3, Saudi Arabia	hours	16,000,000
	Fadhili, Saudi Arabia	hours	6,000,000
	Kudgi, India	hours	32,000,000
	Doha RO, Kuwait	hours	1,500,000

Human rights and anti-corruption

Human rights and corruption risk assessment¹⁾

Category	Unit	2015	2016	2017
Total no. of workplaces	ea	101	104	93
No. of workplaces that have been evaluated	ea	84	86	93
Percentage of workplaces	%	83	83	100

1) The number of workplaces is calculated including local and overseas workplaces, subsidiaries, and construction sites.

Performance Summary

Official reporting of complaints related to human rights¹⁾

Category	Unit	2015	2016	2017
No. of complaints officially reported	cases	47	56	40

1) Including the number of reports from suppliers

Identified cases of corruption and mitigation measures

Category	Unit	2015	2016	2017
No. of identified cases ¹⁾	cases	2	5	4
No. of employee disciplinary action case	cases	2	3	2
No. of supplier disciplinary action case	cases	2	4	0

1) The data that includes corruption cases of supplier

Training on anti-corruption policies and procedures

Category	Unit	2015	2016	2017	
Employees	No. of people subject to education	persons	7,779	7,728	6,968
	No. of people who completed education	persons	7,242	7,550	6,701
	Percentage of education completion	%	93.10	97.70	96.17
Suppliers	Total no. of suppliers	companies	194	170	160
	No. of suppliers that completed education	companies	194	170	160
	Percentage of suppliers having completed education	%	100	100	100
	No. of education held	time	4	4	0
	No. of people who have received education	persons	776	680	0

Major negative impact on society and measures implemented within the supply chain

Category	Unit	2015	2016	2017
No. of suppliers that have been evaluated on social impact	companies	852	743	324
No. of suppliers that have been verified to actually or potentially have a negative social effect	companies	2	2	0
Percentage of suppliers that have discussed the evaluation results for improvement	%	100	100	100
No. of corruption cases in which penalties have been imposed on suppliers	case	2	4	2

Social contribution

Participation in community service activities

Category	Unit	2015	2016	2017	
No. of activities	cases	412	621	501	
Employee participation	Participants	persons	3,853	4,201	3,633
	Participation rate	%	58	60	53
Amount of community service hours	Total	hours	31,816	35,490	29,250
	Per person	hours	5.19	5.93	5.13

Expenses in the local community

Category	Unit	2015	2016	2017	
Expenses	Cash	100 mil. KRW	123.7	91.3	88.9
	Existing goods	100 mil. KRW	1.5	0.4	0.8
	Operation expense	100 mil. KRW	2.2	2.0	1.2
	Total	100 mil. KRW	127.4	93.7	90.9
Expense details	Charitable donations	100 mil. KRW	14.0	19.2	16.2
	Investment into local community	100 mil. KRW	106.1	62.2	67.5
Activity boundary	Others	100 mil. KRW	7.3	12.3	7.2
	Fostering of talent	100 mil. KRW	65.3	52.7	35.9
	Supporting minority groups	100 mil. KRW	13.1	14.2	21.4
Community-based	100 mil. KRW	49.0	26.8	33.6	

Participation in the local community, impact assessment

Category	Unit	2015	2016	2017
Regions in which local community growth programs are run	%	37	29	30
Local development program operation region considering stakeholder needs	%	37	29	30
Operation of local community-wide consulting committees and processes, which includes minority groups	%	37	29	30
Official community grievance handling process workplace	%	100	100	100

Financial Performance

Our Approach

Doosan Heavy Industries & Construction aims to proactively and speedily deal with changes in the global power generation market to create business outcomes and seek sustainable growth. In addition to the reinforced acquisition of orders in the existing go-to market, we are expanding into new business areas such as wind power, ESS, gas turbines, and services to maximize economic outcomes.

2018 Goals

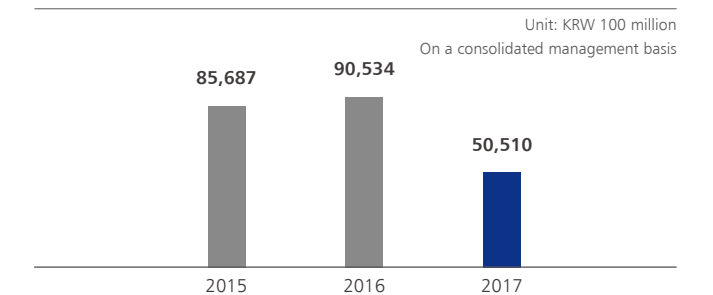
The company plans to shift its business portfolio centered on new businesses including renewable energy, gas turbines, power generation services, etc. and prepare a turning point by achieving its target of orders through new large EPC projects obtained in existing markets such as the Middle East, Vietnam and Philippines, and also advance into new markets such as Africa and Eastern Europe.

The amount of orders received on a consolidated management basis in 2017 recorded 5,051 billion KRW, a reduced figure from 9,053.4 billion KRW recorded in 2016. Such a slump was affected by the cancellation of the originally planned Sinhanwool 3 and 4 Nuclear Power Plants of Korea and postponing of orders for a domestic coal-fire power generation project. Revenue based on consolidated financial statements in 2017 totaled 14,523.6 billion KRW, an increase of 571.3 billion KRW from 2016, by applying innovative performance improvement of Doosan Infracore, one of its affiliates. Operating profits also came to 925.7 billion KRW, an increase of 127.5 billion KRW from 2016, thanks to the balanced enhancement of subsidiaries. Doosan Infracore maintained high growth from sales of large excavators and stable flow of performance of Doosan Bobcat while Doosan Engineering & Construction began to improve its sales and operating profits as orders continued to come from various housing projects, etc. since 2015.

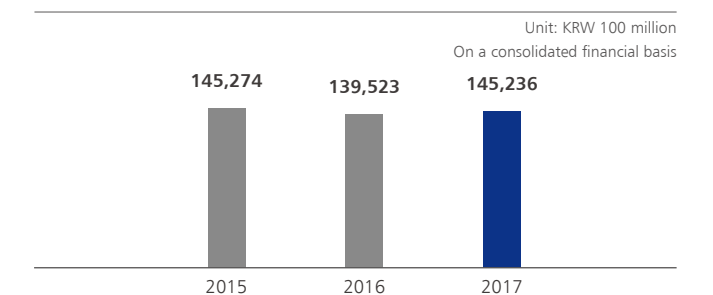
On a consolidated management basis in 2017, Doosan Heavy Industries & Construction recorded sales of 5,744.2 billion KRW, a 457.1 billion KRW reduction from 2016, in the aftermath of the halted construction of Shin Kori Nuclear Power Plants 5 and 6. Affected by the reduced sales, it recorded operating profits of 190.3 billion KRW, a 97.1 billion KRW reduction from 2016, and converted to a net loss during the term due to the application of certain losses related to foreign exchange.

In 2018, Doosan Heavy Industries & Construction is forecasting 6.9 trillion KRW in orders obtained, 6 trillion KRW in sales and 303 billion KRW in operating profits on a consolidated management basis. We expect orders to be achieved by obtaining large domestic projects, which had been postponed from 2017, and will activate marketing for new businesses. Sales and operating profits are expected to show enhanced outcomes from 2017 through the normalization of the processes of local and overseas projects and construction of new projects.

Orders obtained

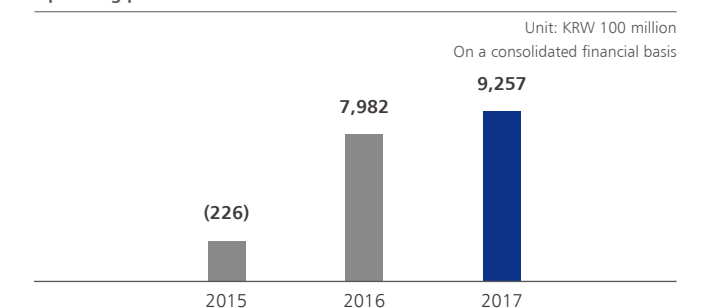


Revenue*



* This data has newly calculated and reflected the omitted portion in the performance of Doosan Engineering & Construction's Vietnam Office and the performance data of 2015 and 2016 may slightly vary from the figures made public through the 2016 comprehensive report.

Operating profit*



* This data has newly calculated and reflected the omitted portion in the performance of Doosan Engineering & Construction's Vietnam Office and the performance data of 2015 and 2016 may vary slightly from the figures made public through the 2016 comprehensive report.

Performance Summary

Consolidated Statements of Financial Position

As at December 31, 2017

As at December 31, 2016

Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries

(Unit: Korean won in units)

Items	December 31, 2017	December 31, 2016
Assets		
I. Current assets	9,229,887,491,691	9,028,233,955,280
1. Cash and cash equivalents	1,970,147,004,768	1,372,545,180,357
2. Short-term financial instruments	237,662,748,168	213,506,823,569
3. Short-term investments in securities	133,975,273,587	141,391,168,087
4. Trade receivables	1,959,806,124,716	2,102,275,430,087
5. Due from customers for contract work	1,969,815,782,428	1,941,105,761,635
6. Other receivables	257,069,973,971	313,076,585,681
7. Prepayments	416,258,993,540	510,139,286,591
8. Prepaid expenses	124,074,003,045	101,614,362,261
9. Short-term loans	62,146,236,742	114,094,313,691
10. Derivative financial assets	72,312,481,305	24,494,373,789
11. Firm commitment assets	6,166,652,593	108,462,686,041
12. Inventories	1,737,966,743,195	1,738,986,481,566
13. Non-current assets classified as held-for-sale	-	108,722,003,724
14. Other current assets	282,485,473,633	237,819,498,201
II. Non-current assets	15,732,430,635,496	15,804,334,235,075
1. Long-term financial instruments	31,136,772,418	31,395,752,125
2. Long-term investments in securities	199,055,580,136	286,332,778,653
3. Share of investments in associates and joint ventures	78,667,176,602	80,681,100,934
4. Long-term loans	1,021,175,375,224	910,287,291,842
5. Property, plant and equipment	6,904,855,603,272	6,387,955,013,095
6. Intangible assets	6,475,671,479,962	6,646,354,106,313
7. Investment property	20,787,447,372	270,299,018,663
8. Derivative financial assets	56,693,678,457	80,958,564,225
9. Firm commitment assets	2,716,940,181	80,039,145,810
10. Guarantee deposits	363,203,456,821	320,258,434,073
11. Deferred tax assets	518,511,358,722	641,043,930,920
12. Other non-current assets	59,955,766,329	68,729,098,422
Total assets	24,962,318,127,187	24,832,568,190,355
Liabilities and equity		
I. Current liabilities:	11,746,546,311,844	11,580,255,571,756
1. Trade payables	2,827,162,503,355	2,454,857,937,156
2. Short-term borrowings	3,765,146,758,496	2,907,282,486,322
3. Asset-backed loan	597,624,558,295	432,987,691,317

4. Other payables	601,142,200,157	854,364,633,040
5. Advanced receipts	180,452,579,927	358,843,891,391
6. Due to customers for contract work	833,253,858,439	906,281,202,465
7. Withholdings	72,662,589,044	71,983,025,287
8. Accrued expenses	437,855,294,885	493,320,336,312
9. Current tax liabilities	32,583,825,150	48,233,038,854
10. Current portion of long-term debt	1,867,839,620,799	2,531,345,860,669
11. Derivative financial liabilities	89,201,468,110	174,733,740,322
12. Firm commitment liabilities	66,217,473,811	11,617,547,945
13. Estimated liabilities	167,447,557,810	118,561,044,391
14. Non-floating liabilities to be sold	-	1,675,220,150
15. Other current liabilities	207,956,023,566	214,167,916,135
II. Non-current liabilities	6,649,823,755,291	6,429,481,702,563
1. Debentures	2,600,066,685,462	1,753,691,202,152
2. Long-term borrowings	2,062,073,719,593	2,534,990,813,266
3. Long-term asset-backed loan	197,479,161,174	246,974,997,243
4. Long-term other payables	31,625,142,612	35,611,850,491
5. Defined benefit liabilities	678,559,199,568	866,404,829,367
6. Deposits received	177,151,025,578	189,263,467,929
7. Derivative financial liabilities	107,297,507,265	128,882,334,708
8. Firm commitment liabilities	49,450,153,167	18,966,908,638
9. Deferred tax liabilities	302,709,107,586	183,364,761,950
10. Estimated liabilities	236,907,011,231	234,378,483,813
11. Other non-current liabilities	206,505,042,055	236,952,053,006
Total liabilities	18,396,370,067,135	18,009,737,274,319
Equity		
I. Equity attributable to owners of parent	3,386,808,328,894	3,475,660,913,667
1. Issued capital	596,836,515,000	596,808,980,000
2. Capital surplus	1,703,499,795,417	1,652,835,160,666
3. Other components of equity	(44,828,871,791)	(17,273,121,037)
4. Accumulated other comprehensive income (loss)	728,803,238,711	538,782,208,792
5. Retained earnings	402,497,651,557	704,507,685,246
II. Equity attributable to equity holders of the parent	3,179,139,731,158	3,347,170,002,369
1. Hybrid equity instruments	333,286,268,697	841,535,153,252
2. Other non-controlling interests	2,845,853,462,461	2,505,634,849,117
Total equity	6,565,948,060,052	6,822,830,916,036
Total liabilities and equity	24,962,318,127,187	24,832,568,190,355

* Details regarding items such as footnotes may be checked through audit reports posted on the website.

Performance Summary

Consolidated Statements of Profit or Loss

As at December 31, 2017

As at December 31, 2016

Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries

(Unit: Korean won in units)

Items	December 31, 2017	December 31, 2016
I. Revenue	14,523,554,475,823	13,952,279,021,391
II. Cost of sales	12,018,510,226,445	11,526,074,486,466
III. Gross profit	2,505,044,249,378	2,426,204,534,925
IV. Selling and administrative expenses	1,579,305,139,271	1,628,019,593,291
V. Operating profit	925,739,110,107	798,184,941,634
VI. Financial profit and loss	(519,283,915,136)	(547,609,805,091)
Finance income	1,133,179,237,233	1,018,064,911,277
Finance costs	1,652,463,152,369	1,565,674,716,368
VII. Other non-operating profit and loss	(271,793,241,941)	(480,265,888,933)
Other non-operating income	128,726,618,314	108,833,503,615
Other non-operating expense	400,519,860,255	589,099,392,548
VIII. Share of loss in associates and joint ventures	(16,742,096,549)	(14,607,721,727)
IX. Profit for the year before tax	117,919,856,481	(244,298,474,117)
X. Income tax expense (benefit)	201,936,460,630	133,105,172,253
XI. Loss from continuing operations	(84,016,604,149)	(377,403,646,370)
XII. Profit (loss) from discontinued operations	(25,671,406,613)	161,878,860,423
XIII. Net loss during the term	(109,688,010,762)	(215,524,785,947)
XIV. Reversion of net loss during the term		
Equity holders of the parent	(292,038,065,484)	(170,750,790,211)
Non-controlling interests	182,350,054,722	(44,773,995,736)
XV. Earnings per share:		
1. Basic loss per share	(2,908)	(1,777)
Loss for the year from continuing operations	(2,715)	(2,609)
Profit (loss) for the year from discontinued operations	(193)	832
2. Diluted loss per share	(2,908)	(1,777)
Loss for the year from continuing operations	(2,715)	(2,609)
Profit (loss) for the year from discontinued operations	(193)	832

* Details regarding items such as footnotes may be checked through audit reports posted on the website.

Consolidated Statements of Comprehensive Income or Loss

As at December 31, 2017

As at December 31, 2016

Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries

(Unit: Korean won in units)

Items	December 31, 2017	December 31, 2016
I. Net loss during the term	(109,688,010,762)	(215,524,785,947)
II. Other comprehensive income	160,739,225,976	(28,495,650,754)
1. Items not subsequently reclassified to profit or loss:		
Remeasurement of the net defined benefit liabilities	54,742,976,025	(68,268,654,681)
Asset revaluation profit and loss	268,539,355,389	(27,848,133,467)
2. Items that are subsequently reclassified to profit or loss:		
Net change in unrealized fair value of available-for-sale financial assets	7,298,423,839	19,919,849,838
Effective portion of changes in fair value of cash flow hedges	(42,267,513,322)	20,130,625,897
Equity adjustments in equity method	3,471,444,554	(108,837,338)
Net gain (loss) on translation of overseas operations	(131,045,460,509)	27,679,498,997
III. Total comprehensive income (loss), net of tax	51,051,215,214	(244,020,436,701)
IV. Attributable to:		
Equity holders of the parent	(47,042,955,493)	(191,711,547,908)
Non-controlling interests	98,094,170,707	(52,308,888,793)

* Details regarding items such as footnotes may be checked through audit reports posted on the website.

Performance Summary

Consolidated Statements of Changes in Equity

As at December 31, 2017

As at December 31, 2016

(Unit: Korean won in units)

	Capital						Total equity
	Issued capital	Capital surplus	Other components of equity	Accumulated other comprehensive income (loss)	Retained earnings	Non-controlling interest	
2016.1.1 (beginning of previous term)	596,808,980,000	1,563,917,672,526	(105,157,160,978)	512,011,506,902	1,013,088,220,397	3,445,438,453,285	7,026,107,672,132
Total comprehensive profit and loss:							
Net loss during the term	-	-	-	-	(170,750,790,211)	(44,773,995,736)	(215,524,785,947)
Remeasurement of the net defined benefit liabilities, net of tax	-	-	-	-	(69,873,976,427)	1,605,321,746	(68,268,654,681)
Net change in unrealized fair value of available-for-sale financial assets	-	-	-	15,157,202,176	-	4,762,647,662	19,919,849,838
Effective portion of changes in fair value of cash flow hedges	-	-	-	8,543,444,308	-	11,587,181,589	20,130,625,897
Equity adjustments in equity method (debit)	-	-	-	(52,099,346)	-	(56,737,992)	(108,837,338)
Net loss on translation of foreign operations	-	-	-	35,097,951,303	-	(7,418,452,306)	27,679,498,997
Asset revaluation profit and loss	-	-	-	(36,361,223,176)	26,527,942,918	(18,014,853,209)	(27,848,133,467)
Subtotal	-	-	-	22,385,275,265	(214,096,823,720)	(52,308,888,246)	(244,020,436,701)
Dividends	-	-	-	-	(94,483,711,431)	-	(94,483,711,431)
Stock option	-	2,015,482,504	(1,690,789,528)	-	-	-	324,692,976
Treasury share transactions	-	53,023,096,674	90,260,916,283	-	-	-	143,284,012,957
Acquisition of subsidiaries	-	(9,541,315,814)	(59,899,143)	-	-	(448,432,336,102)	(458,033,551,059)
Capital increase by issuing new shares of subsidiaries	-	584,932,605	8,050,624,034	-	-	(7,961,277,354)	674,279,285
Acquisition of investments in subsidiaries	-	860,011,026	-	-	-	(862,871,474)	(2,860,448)
Dividends of the subsidiaries	-	-	-	-	-	(53,324,066,352)	(53,324,066,352)
Share option of subsidiaries	-	1,524,014,014	(1,912,830,727)	-	-	(21,735,404)	(410,552,117)
Transactions of treasury shares by subsidiaries	-	6,256,086,126	(739,097)	-	-	(18,581,712,073)	(12,326,365,044)
Issuance of convertible bonds by subsidiaries	-	(4,791,047,084)	-	-	-	7,112,878,144	2,321,831,060
Partial disposal of subsidiaries	-	35,715,299,969	(6,763,241,881)	4,385,426,625	-	468,281,455,861	501,618,940,574
Issuance and exertion of preemptive rights of subsidiaries	-	4,453,082,166	-	-	-	7,638,266,627	12,091,348,793
Adjustments of scope of connection	-	-	-	-	-	12,906,000	12,906,000
Others	-	(1,182,154,046)	-	-	-	178,929,457	(1,003,224,589)
2016.12.31 (end of previous term)	596,808,980,000	1,652,835,160,666	(17,273,121,037)	538,782,208,792	704,507,685,246	3,347,170,002,369	6,822,830,916,036
2017.1.1 (beginning of current term)	596,808,980,000	1,652,835,160,666	(17,273,121,037)	538,782,208,792	704,507,685,246	3,347,170,002,369	6,822,830,916,036

(Unit: Korean won in units)

	Capital						Total equity
	Issued capital	Capital surplus	Other components of equity	Accumulated other comprehensive income (loss)	Retained earnings	Non-controlling interest	
Total comprehensive profit and loss:							
Net profit during the term (loss)	-	-	-	-	(292,038,065,484)	182,350,054,722	(109,688,010,762)
Remeasurement of the net defined benefit liabilities, net of tax	-	-	-	-	56,964,808,378	(2,221,832,353)	54,742,976,025
Net change in unrealized fair value of available-for-sale financial assets	-	-	-	7,384,376,734	-	(85,952,895)	7,298,423,839
Effective portion of changes in fair value of cash flow hedges	-	-	-	(38,535,122,794)	-	(3,732,390,528)	(42,267,513,322)
Equity adjustments in equity method (debit)	-	-	-	3,194,208,671	-	277,235,883	3,471,444,554
Net loss on translation of foreign operations	-	-	-	(7,623,006,506)	-	(123,422,454,003)	(131,045,460,509)
Asset revaluation profit and loss	-	-	-	222,671,132,901	938,712,607	44,929,509,881	268,539,355,389
Subtotal	-	-	-	187,091,589,006	(234,134,544,499)	98,094,170,707	51,051,215,214
Dividends	-	-	-	-	(67,875,489,190)	-	(67,875,489,190)
Stock option	-	3,292,022,379	(3,292,022,379)	-	-	-	-
Issuance of bonds with warrant	-	49,492,056,640	-	-	-	-	49,492,056,640
Exertion of preemptive rights	27,535,000	74,159,618	-	-	-	-	101,694,618
Partial disposal of subsidiaries	-	-	(2,199,240,446)	2,929,440,913	-	135,054,468,139	135,784,668,606
Capital increase by issuing new shares of subsidiaries	-	(7,649,371,531)	-	-	-	8,221,609,462	572,237,931
Acquisition of investments in subsidiaries	-	4,811,760,426	(726,269)	-	-	(20,208,499,637)	(15,397,465,480)
Dividends of the subsidiaries	-	-	-	-	-	(47,792,407,120)	(47,792,407,120)
Share option of subsidiaries	-	627,562,392	(627,562,392)	-	-	-	-
Issuance of convertible bonds by subsidiaries	-	(22,506,401)	-	-	-	33,249,710	10,743,309
Issuance of bonds with warrant of subsidiaries	-	19,520,648,285	-	-	-	25,088,768,344	44,609,416,629
Exertion of preemptive rights of subsidiaries	-	(9,876,787,673)	-	-	-	14,283,874,945	4,407,087,272
Issuance of convertible shares of subsidiaries	-	-	-	-	-	94,718,408,838	94,718,408,838
Repayment of hybrid equity instruments of subsidiaries	-	-	(21,436,199,268)	-	-	(545,728,397,732)	(567,164,597,000)
Adjustments of scope of connection	-	(9,604,909,384)	-	-	-	70,204,483,133	60,599,573,749
2017.12.31 (end of current term)	596,836,515,000	1,703,499,795,417	(44,828,871,791)	728,803,238,711	402,497,651,557	3,179,139,731,158	6,565,948,060,052

* Details regarding items such as footnotes may be checked through audit reports posted on the website.

Performance Summary

Consolidated Statements of Cash Flows

As at December 31, 2017

As at December 31, 2016

Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries

(Unit: Korean won in units)

Items	December 31, 2017	December 31, 2016
I. Net cash flows provided by operating activities	429,324,784,710	967,566,785,961
1. cash provided from operations	915,211,992,032	1,491,876,388,986
(1) Net loss during the term	(109,688,010,762)	(215,524,785,947)
(2) Adjustments	1,927,880,888,075	1,667,514,803,768
(3) Working capital adjustments	(902,980,885,281)	39,886,371,165
2. Interest received	48,819,579,898	39,862,994,719
3. Interest paid	(450,278,642,618)	(495,762,417,342)
4. Dividends received	2,418,130,866	303,597,150
5. Income taxes paid	(86,846,275,468)	(68,713,777,552)
II. Net cash flow used in investing activities	(457,137,175,002)	804,766,783,274
1. aggregate cash inflows from investing activities	529,247,917,065	1,970,231,156,575
(1) Proceeds from disposal of short-term financial instruments	62,613,996,581	297,898,738,398
(2) Proceeds from disposal of short-term investments in securities	1,032,750,000	-
(3) Collection of short-term loans	22,682,497,753	65,275,787,851
(4) Proceeds from disposal of long-term financial instruments	3,815,552,944	63,611,006,170
(5) Proceeds from disposal of long-term investment in securities	86,107,848,209	2,435,824,713
(6) Collection of long-term loans	171,467,917,148	229,701,707,401
(7) Proceeds from disposal of investments in Subsidiaries	7,681,720,761	-
(8) Proceeds from disposal of property, plant and equipment	65,618,637,439	69,257,010,540
(9) Proceeds from disposal of intangible assets	5,065,871,259	1,636,717,701
(10) Proceeds from disposal of investment property	13,088,324,900	1,173,000,000
(11) Proceeds from disposal of non-current assets classified as held-for-sale	29,078,999,531	84,419,819,225
(12) Business transfer	1,029,800,540	1,154,821,544,576
(13) Net cash flow from adjustments of consolidated entities	59,964,000,000	-
2. aggregate cash outflows from investing activities	(986,385,092,067)	(1,165,464,373,301)
(1) Acquisition of short-term financial instruments	(74,714,189,155)	(95,091,693,985)
(2) Acquisition of short-term investments in securities	(146,271,516)	(127,937,629,145)
(3) Increase in short-term loans	(22,831,467,294)	(27,800,272,132)
(4) Acquisition of long-term financial instruments	(10,157,643,555)	(16,895,446,044)
(5) Acquisition of long-term investment in securities	(20,531,110,565)	(131,466,690,976)
(6) Increase in long-term loans	(265,483,561,847)	(179,347,198,041)
(7) Acquisition of associates and joint ventures	(2,013,022,000)	(9,791,807,060)
(8) Acquisition of investments in subsidiaries	(33,901,864,924)	(31,841,144,402)
(9) Acquisition of property, plant and equipment	(277,268,881,055)	(290,902,622,062)

(10) Acquisition of intangible assets	(277,895,048,431)	(248,694,126,605)
(11) Acquisition of investment property	-	(1,122,000,000)
(12) Acquisition of non-current assets classified as held-for-sale	(1,442,031,725)	(4,573,742,849)
III. Cash flows from financing activities	703,612,291,698	(2,251,618,951,835)
1. aggregate cash inflows from financing activities	6,141,673,819,344	3,041,909,023,273
(1) Net increase in short-term borrowings	941,739,587,791	-
(2) Proceeds from short-term bonds	-	180,000,000,000
(3) Proceeds from asset backed loans	1,492,932,369,119	714,113,619,260
(4) Issuance of debentures	2,128,041,350,520	735,050,064,828
(5) Proceeds from long-term borrowings	1,350,379,324,151	886,199,800,000
(6) Proceeds from disposal of treasury shares	-	160,218,812,676
(7) Partial disposal of investments in subsidiaries	133,721,600,000	365,449,720,215
(8) Capital increase by issuing new shares of subsidiaries	-	694,701,094
(9) Exertion of preemptive rights	4,651,450	-
(10) Exertion of preemptive rights of subsidiaries	108,178,950	182,305,200
(11) Issuance of convertible shares of subsidiaries	94,746,757,363	-
2. aggregate cash outflows from financing activities	(5,438,061,527,646)	(5,293,527,975,108)
(1) Net decrease in short-term borrowings	-	(865,054,268,013)
(2) Repayment of current portion of long-term debt	(2,713,376,372,308)	(2,189,786,666,558)
(3) Repayment of assets backed loans	(1,386,950,000,000)	(682,900,000,000)
(4) Repayment of debentures	-	(300,602,677,526)
(5) Repayment of long-term borrowings	(636,148,293,548)	(636,852,572,778)
(6) Extinguishment of debt for financial lease	-	(149,982,177)
(7) Partial acquisition of investments in subsidiaries	-	(458,033,551,059)
(8) Capital increase by issuing new shares of subsidiaries	(15,397,465,480)	-
(9) Dividends paid	(67,875,489,190)	(94,483,711,431)
(10) Dividends paid by the subsidiaries	(47,792,407,120)	(53,324,066,352)
(11) Acquisition of treasury shares by subsidiaries	-	(12,326,365,036)
(12) Cost of issuing shares of subsidiary	-	(11,253,730)
(13) Free charge of subsidiary	-	(2,860,448)
(14) Repayment of hybrid equity instruments	(570,521,500,000)	-
IV. Net foreign exchange difference	(78,198,076,995)	(41,177,184,921)
V. Net increase (decrease) in cash and cash equivalents (I + II + III + IV)	597,601,824,411	(520,462,567,521)
VI. Cash and cash equivalents as at January 1	1,372,545,180,357	1,893,007,747,878
VII. Cash and cash equivalents as at December 31	1,970,147,004,768	1,372,545,180,357

* Details regarding items such as footnotes may be checked through audit reports posted on the website.

Independent Auditors' Report

To the Board of Directors and Stockholders
Doosan Heavy Industries & Construction Co., Ltd.

March 16, 2018

We have audited the accompanying consolidated financial statements of Doosan Heavy Industries & Construction Co., Ltd. (the "Company") and its subsidiaries (collectively, the "Group"), which comprise the consolidated statements of financial position as of December 31, 2017 and the consolidated statements of profit or loss, consolidated statements of comprehensive income or loss, consolidated statements of changes in equity and consolidated statements of cash flows for the years then ended, and a summary of significant accounting policies and other explanatory information.

Management's responsibility for the consolidated interim financial statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with Korean International Financial Reporting Standards ("KIFRS"), and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the Republic of Korea. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement. An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

Opinion

In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries as of December 31, 2017 and their consolidated financial performance and cash flows for the years then ended in accordance with Korean International Financial Reporting Standards.

Points of emphasis

Users of this audit report shall pay attention to the following items, which do not have any influence on the audit opinion. The core audit items in a made-to-order production industry including the auditor's points of emphasis have been selected from significant matters in the consolidated financial statement audit in the term through the auditor's expert judgment and communication with governing organizations in accordance with the "Accounting Audit Guideline 2016-1." The specific matters are discussed in the context of an audit on the entire consolidated financial statement, and we do not provide separate audit opinions on these matters. We have reflected the results of the audit procedure conducted on the core audit items as follows in forming our audit opinions on the consolidated financial statement of Doosan Heavy Industries & Construction Co., Ltd. and its subsidiaries.

A. General items

The details commonly applicable to the core audit items of the made-to-order production industry described in this audit report are as follows.
If the results of a construction contract can be estimated with reliability as shown in Footnote 2 regarding the consolidated financial statement, the company can reliably estimate the contract profits and production costs as profits and costs based on the progress rate of current contract activities as of the year ended of the reporting period. The rate of progress of the contract activities is measured as a rate of the cumulative incidence contract production cost divided by the total estimated contract production cost incurred on the work performed excluding the contract production cost that cannot reflect the stage of progress. The amount that is added to the profit (or deducted from the loss) is recognized on the cumulative incidence contract production cost and exceeds the progress amount claimed is expressed as uncharged construction while the cost exceeding the amount that is added to the profit (or deducted from the loss) recognized on the cumulative incidence contract production cost is expressed as overcharged construction.

B. Company's accounting policies including revenue recognition based on investment method

If the company applies progress criteria on a contract whose results cannot be predicted with reliability to recognize contract profits and contract production costs, risks exist for the potential distortion of contract profits and contract production costs. In addition, even for construction contracts whose results can be predicted with reliability, risks exist for the potential distortion of contract profits and contract production costs if the progress rate measurement method, which can measure executed construction works with reliability, is not used. Therefore, we have considered such risks to identify revenue recognition based on investment methods as a significant risk.

We have executed the following audit procedure on the company's accounting policies including the revenue recognition on the investment method of the company during the term.

- Review of the company's internal control related to the decision on revenue recognition accounting policies
- Questions and analytical review of the progress and significant changes of major projects
- Questions on whether all reliable and estimated conditions of the results of the construction contract are satisfied with major projects and review of the contract conditions

C. Uncertainty in prediction on total contract production cost

As mentioned in Footnote 26 regarding the consolidated financial statement, the impact on profits and losses of this term and a future period due to fluctuations in the total predicted contract amount and total predicted contract production cost amount to KRW 11,363,000,000 and KRW 125,235,000,000, respectively, while the amount affecting uncharged construction totals KRW 11,363,000,000. Thus, if the prediction of a company's total predicted contract production cost changes, the progress rate for the measurement of contract profits and contract production costs also changes and, as a result, the profits and losses of this term and the future as well as uncharged or overcharged construction costs of the end of this term change. Therefore, we have identified the uncertainty in prediction on the total contract production cost as a significant risk.

We have executed the following audit procedure on the impact that uncertainty in the prediction of the company's total contract production cost as of the end of the current term has on its consolidated financial statement.

- Review of the company's internal control related to the decision on the total predicted contract production cost
- Questions and analytical review of major items constituting the total contract production cost during the reporting period

- Retroactive review of a project in which significant fluctuations occurred in the total predicted contract production cost
- Understanding of the causes for differences in a project with significant fluctuations in the total predicted contract production cost and verification of relevant evidence, if needed
- Verification of documents regarding the total contract production cost approved by an appropriate approval authority
- Confirmation of summing-up and distribution of overhead costs for each project by the computing audit team

D. Appropriateness of calculated construction progress rate

Revenue recognition based on the progress rate retains a significant risk of potentially affecting important arbitration of capital values of assets and liabilities after the end of the current term. In addition, if the progress rate is measured based on the cumulative incidence production cost in comparison to the total predicted contract production cost as the company applies, the amount of contract production costs, which cannot reflect the construction conducted, is included in the cumulative incidence production cost and, subsequently, the progress rate may be distorted, leading to a risk of inappropriate recognition of contract profits and contract production costs. Therefore, we have identified the appropriateness of the calculated construction progress rate as a significant risk.

We have executed the following audit procedure on the amount of cumulative incidence contract production cost that affects the calculation of the company's construction progress rate as of the term then ended.

- Questions and analytical review of causes for increase or decrease of the construction progress rate during the reporting period
- Questions and analytical review of the items that constitute the cumulative incidence contract production cost during the reporting period
- Comparison review for a major project of the progress rate for each process (monthly progress reports) and the progress rate based on production costs
- Verification of sample evidence to confirm the substantiality of investment of materials cost and other expenses
- Appropriateness test of summing-up and distribution of overhead costs for each project by the computing audit team
- Survey of equipment currently being manufactured as well as sites in progress
- Questions and analytical review of significant increase or decrease of the cumulative incidence production cost for a major project
- Re-calculation of the construction progress rate for each project

E. Assessment on recoverability of unclaimed construction expenses

If the allowance for bad debts on uncharged construction is not properly specified due to failure to appropriately perform a recoverability assessment on the uncharged construction, there exists not only a risk of the uncharged construction becoming overly appropriated but also uncertainties in prediction on recoverability of the uncharged construction. Therefore, we have identified the assessment on recoverability of uncharged construction as a significant risk.

We have performed the following audit procedure on the assessment of recoverability of the company's uncharged construction expenses as of the end of the current term.

- Questions on payment conditions, overdue compensation, delivery timing and other requirements specified in the contract and verification of the contract document for projects whose uncharged construction expenses have significantly increased
- Execution of questioning and analytical procedures on prolonged uncharged construction and verification of relevant evidence, if needed
- Questions and analytical procedure on recoverability of uncharged construction in case uncharged construction exists in regard to a contract that has specified the allowance for bad debts on accounts receivable
- Execution of an external inquiry on major ordering bodies

F. Appropriateness of accounting due to construction changes

The company includes construction changes in contract profits if the ordering body is highly likely to approve construction changes and subsequent changes in the total contract profits, and also if the amount of profits can be measured with reliability. Moreover, the total contract profits may increase depending on the amount of production costs, which is not included in the contract amount that a constructor receives as compensation from the ordering body or a third party. At this time, the company includes the compensation in the contract profits if it is highly likely that the ordering body will approve the compensation charged as negotiations have been substantially progressed, and also if the amount highly likely to be approved by the ordering body can be measured with reliability. In addition, in case the total contract profits decrease due to a penalty charged for delay in completion of construction caused by the company, the company deducts the penalty from the contract profits if it is highly likely that a penalty will occur and also if the amount of the penalty can be measured with reliability.

Therefore, since the contract profits may be distorted if construction changes or compensations and penalties are not properly reflected in the total contract profits, we have identified accounting on construction changes as a significant risk.

We have performed the following audit procedure on accounting and official notice of the company's construction changes as of the end of the current term.

- Effectiveness test of the company's internal control operations in regards to changes in the contract conditions
- Questions and analytical procedure on projects with significant fluctuations in the contract amount
- Verification of relevant evidence (change orders, etc.) to confirm the appropriateness of fluctuations in the contract amount
- Comparison analysis of the delivery date specified in the contract and the scheduled delivery date as of the end of the current reporting period to perform questioning and analytical procedures on contracts that have passed the delivery dates as specified in the contract and, if needed, verify relevant evidence
- Appropriateness review of prediction on the predicted liquidated damages

Other items

The compared consolidated statement of financial position as of December 31, 2016, consolidated statement of profits and losses of the fiscal year then ended, consolidated inclusive statement of profits and losses, consolidated statement of changes in equity, and consolidated statement of cash flows were audited by another auditor in accordance with auditing standards generally accepted in the Republic of Korea, and proper opinions were expressed in the audit report dated March 23, 2017.



152 Teheran-ro (Yeoksam-dong), Gangnam-gu,
Seoul (27th floor, Gangnam Finance Center)

Kim Kyo Tae, CEO of Samjong KPMG Accounting Corp.

This auditors' report is effective as of the audit report date (March 16, 2018). Therefore, an event or a situation, which may have a significant impact on the attached consolidated financial statement of the company, may occur from the date of the audit report until the report is accessed, and this may lead to a revision of this report.

Independent Assurance Statement

Independent Assurance Statement on the '2017 Integrated Report of Doosan Heavy Industries & Construction'

Preface

KFQ was engaged by Doosan Heavy Industries & Construction (further 'DHIC') to provide limited assurance on the '2017 Integrated Report of Doosan Heavy Industries & Construction' (further 'the Report'). Our responsibility is to perform a limited assurance engagement and to express a conclusion based on the work performed. We conducted its assurance based on completeness of the data and information provided by DHIC. DHIC is responsible for all contents within the Report including the reporting principles and standards.

Independence

KFQ is not involved in the preparation of any part of the Report, other than providing an assurance opinion, and there has been no interest between DHIC and us. We have no biased opinion on stakeholders of DHIC.

Assurance Standards

KFQ has designed and implemented assurance according to the following standards.

- AA1000 Assurance Standard (2008)
- AA1000 Accountability Principles Standard (2008)
- GRI G4.0
- UN SDGs (Sustainable Development Goals)

Assurance Scope

KFQ identified the followings as its scope:

- DHIC's sustainable management activities and performances of the headquarter and all business establishment (domestic and overseas) described in the Report
- Compliance with the guidelines according to GRI Standards Core Option
- GRI Standards compliance assessment regarding contents of the Report and assurance principles of reporting quality
- Application of Type 1 assurance approach according to AA 1000 APS 2008 and AA 1000 AS 2008 to assess compliance with inclusiveness, materiality and responsiveness principles and reliability of sustainability performance information. The term 'Moderate Assurance' used in AA 1000 AS is designed to be consistent with 'Limited Assurance' as articulated in ISAE 3000
- Core subjects and linkages with UN SDGs

Assurance Procedures

KFQ designed procedures to have reasonable assurance of the Report's critical errors or inappropriate information. We verified the reliability of the contents, processes and systems of data generation and report preparation.

Document Review

We reviewed the reliability of non-financial data in respect of the 'Sustainability' by cross-checking the Report with GRI Standards, quantitative data of DHIC, and internet & media research information. We also confirmed that the financial information has been appropriately extracted from the internal documents and the financial statements of the business report of the following system (<http://dart.fss.or.kr>).

On-site Verification

We visited DHIC headquarter and conducted on-site verification to confirm reliability of the sustainability activities and performance data contained in the Report and to evaluate the effectiveness of the reporting process. We performed verification in the accuracy topic of the aggregated data from DHIC. These procedures included the following:

- Materiality assessment process, stakeholders inclusiveness, key issues, internal response procedures, and etc.
- Assessment of data analysis and descriptions and sustainable management performance in the Report
- Consistency between the financial data contained in the Report and the audited financial statements 2017
- Interviews with relevant staff responsible for providing information in the Report

Resolution of Findings

We confirmed that some errors, inappropriate information, and ambiguous expressions found during on-site visit were properly reflected in the final Report.

Limitations

The Report has been prepared solely for DHIC in accordance with the terms of our engagement. We do not accept or assume responsibility to anyone other than DHIC for our conclusions we have reached in the statement. Completeness and responsiveness of sustainability performance information presented in the Report have inherent limitation due to their nature and the methodology used for determining, calculating and estimating such data.

Opinion

Based on the verification activity stated herein, KFQ confirmed that the Report meets the GRI Standards 'Core Option'. According to the principles of AA 1000 APS 2008 and AA 1000 AS 2008, inclusiveness, materiality and responsiveness, sustainability performance information were assessed and we could secure reasonable grounds to provide Type 1 level of assurance with the following confirmation:

1. **(Stakeholders Inclusiveness)** DHIC subdivided eight stakeholders into seven groups related to the major issues of sustainable management. To hear any concerns and opinions from them, DHIC had a customized communication strategy for each stakeholder group and reflected their responses and opinions to its sustainable management activities.
2. **(Sustainability Context)** In terms of sustainability, DHIC has achieved both economic and environmental performance through continuous monitoring of its domestic and overseas sites and building an energy efficiency system in the face of tight environmental regulatory challenges. In addition, DHIC is faithfully fulfilling its international principles by linking its major activities and achievements in 2017 and future plans with the UN SDGs.
3. **(Materiality)** DHIC established issue pools and reviewed by internal guidelines and external assessment criteria (GRI guidelines, DJSI, UN SDGs, media coverage, benchmark, and issue analysis) incompliance with the materiality assessment process. As a result, DHIC appropriately reflected that thirteen key topics derived from the process along with key performance in 2017.
4. **(Completeness)** DHIC applied reporting scope, boundary and temporal criteria. We confirm that the Report is suitable for stakeholders to assess sustainability performance.



June 2018
Seoul, Korea

CEO Nam Dae Hyun
Korean Foundation for Quality (KFQ)

Environmental Guidelines

Based on its people-centered management philosophy and technology that enhances the value of the earth, Doosan Heavy Industries & Construction has established environmental guidelines in accordance with the Doosan Credo, internal environmental management rules and regulations for the protection of the environment together with employees, suppliers, customers and the local community.

Thus, we are promoting the following activities to reduce environmental impact generated during the course of business, and continue to expand the scope to supply networks and suppliers.

1. Production and workplace environment management

For efficient environmental management of production and business facilities, 10 procedures including objective management, educational training, document and records management and internal audit as well as 9 directives on, for example, environmental impact assessment, air environment control and waste control, are used for management.

2. Selection of supplier, contractor and service provider and continuous assessment

Doosan Heavy Industries & Construction performs regular environment control assessments on subsidiaries within the company twice a year, and the results are utilized as the basis for incentives or penalties to be levied on the subsidiaries and as reference data for their development planning. Also, areas related to the environment are assessed when evaluating suppliers and supplier CSR guidelines including environmental control are distributed as a part of an effort to reduce environmental risks throughout the supply network.

3. Development of products and services

By recognizing the fact that various environmental issues related to climate changes pose both risks and opportunities for Doosan Heavy Industries & Construction, we have been conducting research and development that can minimize environmental impact when developing products or services.

4. Logistics

To minimize environmental pollution that may occur during transport, Doosan Heavy Industries & Construction manages it through a guide, etc. Work standards are made and managed based on the best cases for each step, which includes transport quotes, preliminary surveys, transport company selection, contract signing, local transport (inland, barge, air, etc.) and cargo insurance.

5. Waste management

Doosan Heavy Industries & Construction specifies the entire work process from waste generation to final disposal and operates and manages it through a waste management order, which helps control the scope of application, definitions of terms, responsibilities and authorities, waste recycling and storage facilities, generation, collection, storage and disposal of waste, inspection, consignment contracts and monitoring.

6. Engineering and maintenance

To minimize environmental pollution generated during operation and maintenance of power plants, Doosan Heavy Industries & Construction provides an environmental guide to fundamentally prevent environmental pollution that would occur from irregular operations. By offering operation and maintenance manuals based on the characteristics of each power plant, a guide is provided to minimize the environmental impact generated during operations.

7. New projects

Prior to the start of a new project, Doosan Heavy Industries & Construction utilizes its Project Environment Plan, to which detailed means of environmental control are applied, to ensure environmental control in project sites. Primary items of the Project Environment Plan include Project Policy, water supply and waste discharge requirements, hazard substance management, air pollution control, etc.

8. Due Diligence of mergers and acquisitions

Doosan Heavy Industries & Construction conducts due diligence assessment on companies prior to mergers and acquisitions in order to examine environmental risks and respond in advance, if needed. Major aspects evaluated include soil and underground water contamination, asbestos, hazardous chemical substances, environmental pollution prevention facilities and greenhouse gas emission management, and the assessment results are utilized and managed as important factors to consider during acquisitions or mergers.

GRI Content Index

GENERAL STANDARD DISCLOSURE

Classification	G4	Indicators	Report rate	Pages/Remarks
Strategy and Analysis	G4-1	Statement from the most senior decision-maker	●	2-3
	G4-2	Provides a description of Key impacts, risks, and opportunities	●	2-3, 97
Organizational Profile	G4-3	Report the name of the organization	●	4
	G4-4	The primary brands, products, and services	●	6-13, 18-39
	G4-5	The location of the organization's headquarters	●	4
	G4-6	The number of countries where the organization operates, and names of countries where either the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report	●	5
	G4-7	The nature of ownership and legal form	●	4, 58-59
	G4-8	The markets served (including geographic breakdown, sectors served, and types of customers and beneficiaries)	●	4-5
	G4-9	Scale of the organization	●	4-5, 102, 105-113
	G4-10	Total workforce	●	4, 102
	G4-11	The percentage of total employees covered by collective bargaining agreements	●	102
	G4-12	The organization's supply chain	●	80
	G4-13	Any significant changes during the reporting period regarding the organization's size, structure, ownership, or its supply chain	●	No significant changes
	G4-14	Whether and how the precautionary approach or principle is addressed by the organization	●	97
	G4-15	List Externally developed economic, environmental, and social charters, principles, or other initiatives to which the organization subscribes or endorses	●	48-51, 122
	G4-16	Memberships in associations (such as industry associations) and/or national/international advocacy organizations in which the organization	●	122
	Identified Material Aspects and Boundaries	G4-17	List all entities included in the organization's consolidated financial statements or equivalent documents	●
G4-18		The process for defining the report content and the Aspect Boundaries	●	96
G4-19		List all the material Aspects identified in the process for defining report content	●	96
G4-20		For each material Aspect, report Aspect Boundary within the organization	●	96
G4-21		For each material Aspect, report the Aspect Boundary outside the organization	●	96
G4-22		The effect of any restatements of information provided in previous reports, and the reasons for such restatements	●	About this Report
G4-23		Significant changes from previous reporting periods in the Scope and Aspect Boundaries	●	No significant changes
Stakeholder Engagement	G4-24	List of stakeholder groups engaged by the organization	●	95
	G4-25	Basis for identification and selection of stakeholders with whom to engage	●	95
	G4-26	Organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group	●	52-53, 95
	G4-27	Key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting	●	52-53
Report Profile	G4-28	Reporting period such as fiscal or calendar year) for information provided	●	About this Report
	G4-29	Date of most recent previous report (if any)	●	About this Report
	G4-30	Reporting cycle such as annual, biennial	●	About this Report
	G4-31	Provide the contact point for questions regarding the report or its contents	●	About this Report
	G4-32	Report the 'in accordance' option the organization has chosen	●	About this Report
	G4-33	Report the organization's policy and current practice with regard to seeking external assurance for the report	●	About this Report
Governance	G4-34	Report the governance structure of the organization, including committees of the highest governance body	●	58-59
Ethics and Integrity	G4-56	Describe the organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics	●	60-61, Homepage*

* <http://www.doosanheavy.com/kr/csr/ethics/creed/>

GRI Content Index

SPECIFIC STANDARD DISCLOSURE

Classification	G4	Indicators	Report rate	Pages/Remarks
Economic Performance	EC1	Direct economic value generated and distributed	●	106-113
	EC2	Financial implications and other risks and opportunities for the organization's activities due to climate change	●	50-51
Indirect Economic Impacts	DMA	Disclosures on Management Approach		84
	EC7	Development and impact of infrastructure investments and services supported	●	104
	EC8	Significant indirect economic impacts, including the extent of impacts	●	104
Procurement Practices	EC9	Proportion of spending on local suppliers at significant locations of operation	●	80
Materials	EN1	Materials used by weight or volume	●	99
	EN2	Percentage of materials used that are recycled input materials	●	99
Energy	DMA	Disclosures on Management Approach	●	64
	EN3	Energy consumption within the organization	●	99
	EN6	Reduction of energy consumption	●	99
	EN7	Reductions in energy requirements of products and services	●	48-51
Water	EN8	Total water withdrawal by source	●	99
	EN10	Percentage and total volume of water recycled and reused	●	99
Biodiversity	EN11	Operational sites owned, leased, managed in, or adjacent to, protected areas	●	66, 101
	EN12	Description of significant impacts of activities, products, and services on Biodiversity	●	66, 101
	EN13	Habitats protected or restored	●	66, 101
	EN14	Total number of IUCN red list species and national conservation list species with habitats in areas affected by operations, by level of extinction risk	●	66, 101
Emissions	DMA	Disclosures on Management Approach		64
	EN15	Direct greenhouse gas (GHG) emissions (scope 1)	●	99
	EN16	Energy indirect greenhouse gas (GHG) emissions (scope 2)	●	99
	EN19	Reduction of greenhouse gas (GHG) emissions	●	64-65
Effluents and Waste	DMA	Disclosures on Management Approach	●	64
	EN22	Total water discharge by quality and destination	●	100
	EN23	Total weight of waste by type and disposal method	●	100
	EN24	Total number and volume of significant spills	●	100
Products and Services	DMA	Disclosures on Management Approach		41, 64
	EN27	Extent of impact mitigation of environmental impacts of products and services	●	64-65
Compliance	EN29	Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with environmental laws and regulations	●	102
Overall	EN31	Total environmental protection expenditures and investments by type	●	102
Supplier Environmental Assessment	EN32	Percentage of new suppliers that were screened using environmental criteria	●	80
	EN33	Significant actual and potential negative environmental impacts in the supply chain and actions taken	●	80

SPECIFIC STANDARD DISCLOSURE

Classification	G4	Indicators	Report rate	Pages/Remarks
Employment	LA1	Total number and rates of new employee hires and employee turnover by age group, gender, and region	●	102
	LA2	Benefits provided to full-time employees that are not provided to temporary or part-time employees, by significant locations of operation	●	76-77
	LA3	Return to work and retention rates after parental leave, by gender	●	103
Labor/Management Relations	LA4	Minimum notice periods regarding operational changes, including whether these are specified in collective agreements	●	In the event there are any significant changes in management, employees shall be notified in a timely manner.
	DMA	Disclosures on Management Approach		68
Occupational Health and Safety	LA6	Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender	●	101
	LA7	Workers with high incidence or high risk of diseases related to their occupation	●	68-71
	LA8	Health and safety topics covered in formal agreements with trade unions	●	68-71
Training and Education	DMA	Disclosures on Management Approach		74-75
	LA9	Average hours of training per year per employee, by gender, and by employee category	●	102
	LA10	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings	●	76
Diversity and Equal Opportunity	LA12	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity	●	102
Equal Remuneration for Women and Men	LA13	Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation	●	103
Supplier Assessment for Labor Practices	LA14	Percentage of new suppliers that were screened using labor practice criteria	●	80, 104
	LA15	Significant actual and potential negative impacts for labor practices in the supply chain and actions taken	●	80
Investment	HR1	Total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	●	80, 104
	HR2	Total hours of employee training on human rights policies or procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained	●	80, 104
Freedom of Association and Collective Bargaining	HR4	Operations and suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and measures taken to support these rights	●	77
Child Labor	HR5	Operations and suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor	●	74
Forced or Compulsory Labor	HR6	Operations and suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures taken to contribute to the elimination of all forms of forced or compulsory labor	●	74
Assessment	HR9	Total number and percentage of operations that have been subject to human rights reviews or impact assessments	●	104
Supplier Human Rights Assessment	HR10	Percentage of new suppliers that were screened using human rights criteria	●	80, 104
	HR11	Significant actual and potential negative human rights impacts in the supply chain and actions taken	●	80, 104
Local Communities	SO1	Percentage of operations with implemented local community engagement, impact assessments, and development programs	●	104
	SO2	Operations with significant actual and potential negative impacts on local communities	●	104
Anti-corruption	DMA	Disclosures on Management Approach		60-61
	SO3	Total number and percentage of operations assessed for risks related to corruption and the significant risks identified	●	103-104
	SO4	Communication and training on anti-corruption policies and procedures	●	61
	SO5	Confirmed incidents of corruption and actions taken	●	103-104
Public Policy	SO6	Total value of political contributions by country and recipient/beneficiary	●	98
Anti-competitive Behavior	SO7	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes	●	103
Compliance	SO8	Monetary value of significant fines and total number of non-monetary sanctions for noncompliance with laws and regulations	●	103
Supplier Assessment for Impacts on Society	SO9	Percentage of new suppliers that were screened using criteria for impacts on society	●	104
	SO10	Significant actual and potential negative impacts on society in the supply chain and actions taken	●	80, 104
Product and Service Labeling	PR5	Results of surveys measuring customer satisfaction	●	81

UN Global Compact

Doosan Heavy Industries & Construction has joined the UN Global Compact since 2004 and has complied with the ten principles of human rights, labor, the environment and anti-corruption. We are committed to fulfilling our social responsibilities and role as a global leader in sustainable management that represents Korea by reflecting international standards for social responsibility management and by solidifying our commitment to social responsibility management.

Ten principles		page
Human Rights		
Principle 1	Businesses should support and respect the protection of internationally proclaimed human rights	48-51, 74, 80
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	74, 77, 80, 102
Principle 4	the elimination of all forms of forced and compulsory labor	
Principle 5	the effective abolition of child labor	
Principle 6	the elimination of discrimination in respect of employment and occupation.	
Environment		
Principle 7	Businesses should support a precautionary approach to environmental challenges	64-67, 98-102
Principle 8	undertake initiatives to promote greater environmental responsibility	
Principle 9	encourage the development and diffusion of environmentally-friendly technologies.	41
Anti-Corruption		
Principle 10	Businesses should work against corruption in all its forms, including extortion and bribery.	60-61, 80, 103-104

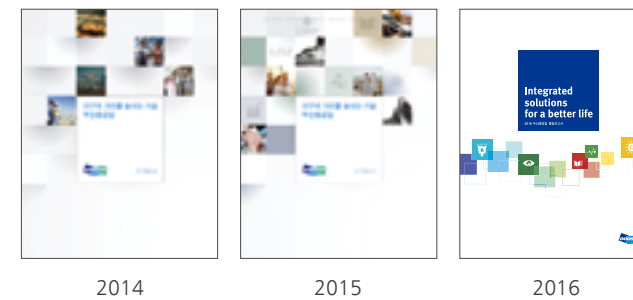
Overview of Association Memberships

Category	Associations for which memberships have been signed up	Category	Associations for which memberships have been signed up	Category	Associations for which memberships have been signed up
Common	Large & Small Business Agriculture & Fisheries Cooperation Foundation	Common	Korea Employer's Federation	Nuclear power	Korea Nuclear Society
	Korea Technology Finance Corporation		World Energy Council		Korea Nuclear Association for International Cooperation
	Korea Credit Guarantee Fund		WEC Korea		World Nuclear Association
	Gyeongnam Center for Social Economy and Entrepreneurs		Korea-Arab Society	Women Interested in Nuclear	
	Gyeongnam Center for Creative Economy and Innovation		Korea Chamber of Commerce and Industry	Korean Welding & Joining Society	
	Korea New & Renewable Energy Association		Fair Competition Federation	Construction Association of Korea	
	National Academy of Engineering of Korea		UNGC (UN Global Compact) Korea	Korea Housing Builders Association	
	Korean Federation of Science & Technology Societies		Marine Rescue & Salvage Association	Korea Federation of Construction Contractors	
	Korea Management Association		Korean Institute of Electrical Engineers	Korea Electrical Contractors Association	
	Korea International Trade Association		Korean Society of Mechanical Engineers	Korea Information Certificate Authority	
	Korea Industrial Technology Association	Korea Electric Association	International Contractors Association of Korea		
	Korea Engineering & Consulting Association	Korea Association of Machinery Industry	Korea Mech. Const. Contractors Association		
	Korean Society of Combustion	Korea Wind Energy Industry Association	PEA (Plant Eng. Association)		
	Korea Plant Industries Association	Korea Wind Energy Association	Korean Institute of Metals & Materials		
	Machinery Financial Cooperative	EPRI (Electric Power Research Institute) - WRTC	Korea Foundry Society		
	Korea Radioactive Waste Society	Korea Iron & Steel Association			
	Korea Nuclear Equipment Advancement Association	Korean Standards Association			
	Korea Atomic Industrial Forum	Korean Foundation for Quality (KFQ)			



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DHIC Integrated Report by Year



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