

2019 KHNP Sustainability Report



About This Report

102-50, 102-51, 102-52, 102-53, 102-54, 102-56

In order to advance to a reliable global energy leader through economic, environmental, and social value creation, Korea Hydro & Nuclear Power Co., Ltd. (KHNP) discloses its sustainable management goals and performance, and shares the future values and promises it aims to achieve with its stakeholders by publishing the sustainability report every year. This is KHNP's tenth sustainability report, focuses on how the company's management has changed and performed since 2018.

Reporting Principles

GRI(Global Reporting Initiative) Standards

Reporting Boundary

Head office and all domestic and overseas offices of KHNP

Reporting Period

January 1 - December 31, 2018
(performance in the first half of 2019 partially included)

Reporting Cycle

Annual (previous report published in November 2018)

Assurance

Independent third-party assurance

Inquiry

Department in Charge: Planning Team, Corporate Planning

Department, Korea Hydro & Nuclear Power Co., Ltd.

Tel: +82-54-704-4124

Fax: +82-54-704-4198

Website: www.khnp.co.kr

Email: zeon.kim@khnp.co.kr



KHNP Sustainability Report is published in Interactive PDF.



Related Websites



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ABOUT KHNP

In order to advance to a trusted global energy leader, KHNP is focusing all our capacities on securing improved technological power and realizing social values.

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An energy leader making life prosperous with eco-friendly energy

CEO's Message



KHNP is focusing all its capabilities on securing advanced technological power and realizing social values in order to be reborn as a general energy company. We ask for your continued support and interest so that KHNP can become a reliable global energy leader.

Dear Stakeholders,

We sincerely appreciate your continuous support to and interest in Korea Hydro & Nuclear Power Co., Ltd.

KHNP is Korea's largest power generation company that contributes to the national economic development by stably supplying electricity through nuclear, hydro, and new and renewable energy power generation. We are putting forth the utmost effort in fulfilling our economic, social, and environmental responsibilities in order to play an important role for the national economy and as a pillar for the national energy security in ten and a hundred years from now. Since joining the UNGC in 2007, we have been faithfully implementing the Ten Principles for human rights, labor, environment, and anti-corruption. Through this tenth sustainability report, we would like to share our management performance and renew our promise to achieve greater growth.

First, we focus all our capabilities on achieving safe nuclear power plant operation.

With safety as the highest priority, all employees of KHNP have concentrated on the safety operation of nuclear power plants and have conducted thorough safety checks on all nuclear power plants. KHNP received the WANO safety performance assessment, which comprehensively examines safety capacity and operating ability of nuclear power plant operators around the world. During the assessment, KHNP recorded the second highest result, and thus won global recognition for our safe nuclear power plant operating ability. Using the Fourth Industrial Revolution technologies, we are enhancing the safety and efficiency of our nuclear power plants and strengthening seismic performance of key facilities, and thus improving our capabilities for response to earthquakes. We will continue dedicating efforts to establishing a safety culture in all power plants.

Second, we realize social value through communication and win-win cooperation.

With a goal to fulfill social responsibilities, KHNP is performing customized social contribution activities not only for the residents of local communities around the power plants, but also all citizens. Rather than dispensation-type one-off activities, we intend to promote projects that provide practical assistance for local economic development. In addition, for win-win growth with small and medium businesses, we have been striving to create an energetic NPP industry ecosystem by providing mutually beneficial and effective support, including assistance in domestic and overseas market development. KHNP will advance into the future with stakeholders by communicating and attentively listening to their voices through various channels.

Third, we are striving to secure the world's highest technological power and competitiveness.

Under the goal to become a global top company in nuclear power plant operating capacity, KHNP is endeavoring to advance to a global energy company equipped with the highest technological power through continuous technological development. We are also securing the necessary technologies and foundations for preemptively responding to the nuclear decommissioning market in the future. At the same time, based on our business in the UAE, we plan to expand entry to overseas hydro power generation markets and promote additional nuclear power plant export.

In line with the energy paradigm that is shifting across the world, KHNP will pursue the creation of new added value and improve its constitution. We ask for your continued interest and support so that we can be reborn as a general energy company that is capable of safely operating nuclear power plants as "One Team" with "One Mind" and providing consulting services in all areas of energy business through hydro power and new and renewable energy.

Thank you.

October 2019

Korea Hydro & Nuclear Power Co., Ltd. President & CEO **Chung Jae-hoon**

KHNP in Numbers



Sales from New and Renewable Energy Business

KRW 107.1 billion

More information on page 29

Green Product Purchase Amount

KRW 20.7 billion

More information on page 62



Green Bond

USD 600 million

More information on page 63

Accumulated Sales from Barakah Nuclear Power Plant in the UAE

KRW 1.8 trillion

More information on page 35

Percent of Male Employees on Childcare Leave

26.7%

More information on page 40



Amount of Purchase of Products from SMEs

KRW 1.03 trillion

More information on page 45



Number of Serious Occupational Accidents

0

More information on page 52

Number of People to Complete Human Rights Training

1,319

More information on page 75



Started commercial operation of

Shin-Kori 4

More information on page 8



Number of Employment-related Corruption Cases Pointed out by External Institutions

0

More information on page 72

Number of Jobs Created in the Private Sector

19,944

More information on page 58

KHNP Introduction

Korea Hydro & Nuclear Power Co., Ltd. (KHNP) is Korea's largest electric power company and generates approximately 24% of the nation's domestic electricity through its mission of, and pride in, "stable supply of electric power to enrich the lives of the people and to contribute to the growth of the national economy" as a driving force. Since KHNP first began commercial operation of Kori 1 in April 1978, it has been generating and stably supplying electricity using nuclear power for approximately 40 years. In particular, KHNP is dedicating efforts to expanding new and renewable energy sources, such as hydro power, photovoltaic power, and supplying national energy from a variety of energy sources.

Company Overview 102-1, 102-3, 102-4, 102-5, 102-6, 102-7 102-8, 201-1 [As of the end of Dec. 2018]

Company Name	Korea Hydro & Nuclear Power Co., Ltd.
Governing Organization	Ministry of Trade, Industry and Energy
CEO	Chung Jae-hoon
Institution Type	Public enterprise
Headquarters	1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do, Korea
Date of Establishment	April 2, 2001
Capital	KRW 1.212 trillion [As of Dec. 31, 2018]
No. of Employees	12,307 [As of Dec. 31, 2018]
Major Functions	Development of electric power resources, power generation, R&D and affiliated businesses, overseas business
Organization	[Headquarters] 8 divisions and 31 departments(offices) [Branches] 6 nuclear power sites, 7 pumped-storage power plants and 9 other branches

The largest facility capacity in Korea

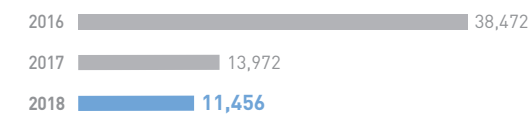
[As of the end of Dec. 2018]

Total facility capacity	27,183MW
Nuclear power facility capacity	21,850MW
Hydro power/new and renewable energy facility capacity	5,333MW

Sales (Unit: KRW 100 million)



Operating Income (Unit: KRW 100 million)



Debt to Equity Ratio (Unit: %)



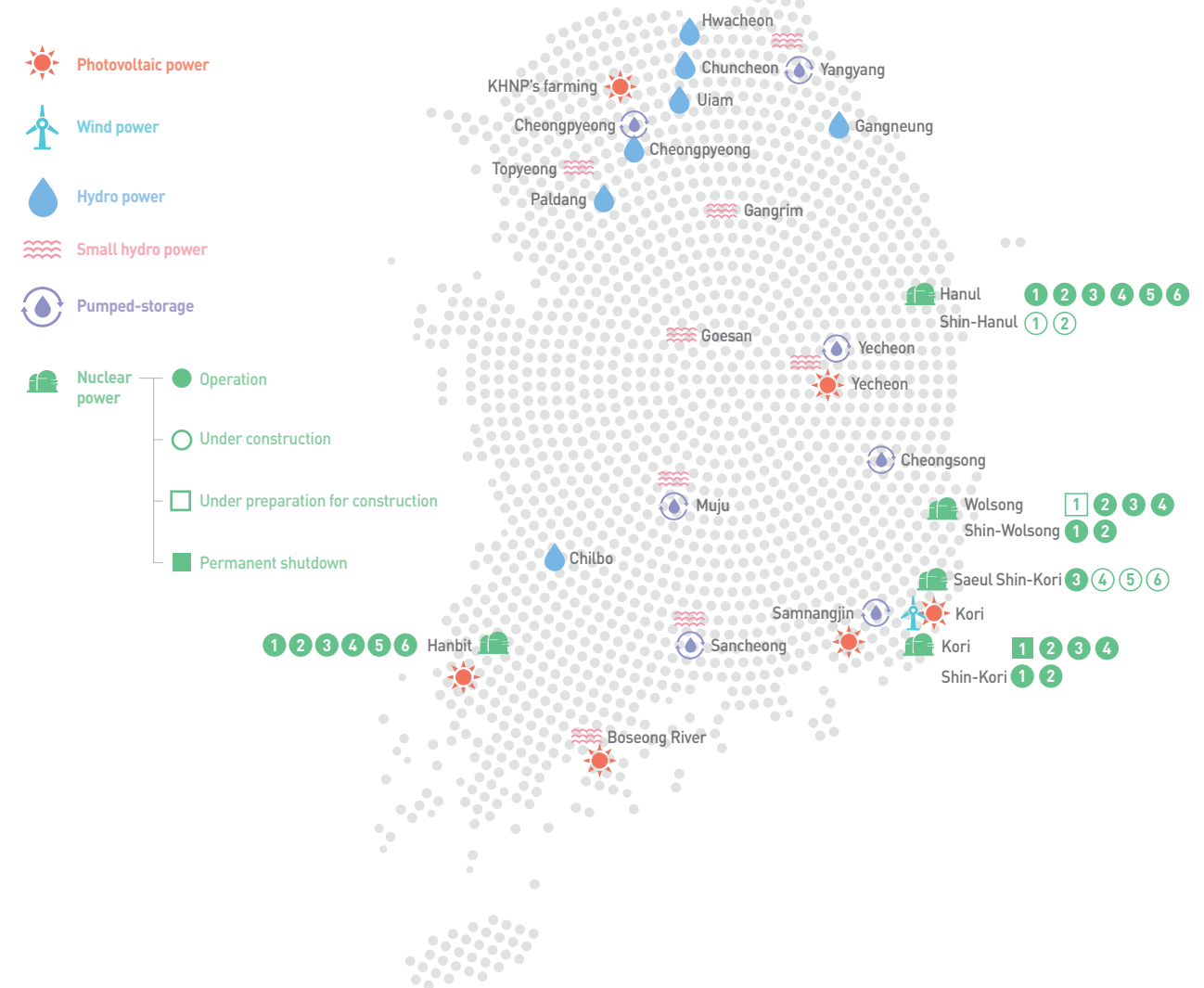
The largest generation capacity in Korea

[As of the end of Dec. 2018]

Total generation capacity	138,585GWh
Nuclear power generation capacity	133,505GWh
Hydro power/new and renewable energy generation capacity	5,080GWh

Main Businesses 102-2

The main business domain of KHNP covers nuclear power, hydro power, new and renewable energy, construction, and overseas businesses. As of December 2018, KHNP is operating 23 nuclear power plants, 35 hydro power/small hydro power plants, 16 pumped-storage power plants, 14 photovoltaic power plants, and one wind power plant.



History 1980's

- 1978** Started commercial operation of Kori 1 [the world's 21st nuclear-powered country]
- 1983** Started commercial operation of Wolsong 1 and Kori 2
- 1985** Started commercial operation of Kori 3
- 1986** Started commercial operation of Kori 4 and Hanbit 1
- 1987** Started commercial operation of Hanbit 2
- 1988** Started commercial operation of Hanul 1
- 1989** Started commercial operation of Hanul 2

1990's~2000's

- 1995** Started commercial operation of Hanbit 3
- 1996** Started commercial operation of Hanbit 4
- 1997** Started commercial operation of Wolsong 2
- 1998** Started commercial operation of Wolsong 3
Korea's first standard nuclear power plant (OPR1000)
Started commercial operation of Hanul 3
- 1999** Started commercial operation of Hanul 4 and Wolsong 4

2000's~2011's

- 2001** Launched Korea Hydro & Nuclear Power Co., Ltd. [separated from KEPCO]
- 2002** Started commercial operation of Hanbit 5 and 6
Developed next-generation reactor (APR1400)
- 2004** Completed ERP system / Founded KHNP Regional Volunteer Group
- 2005** Completed new and renewable energy power plants (Kori Wind Power Plant and Yeonggwang Solar Park) / Completed Hanul 5 and 6
- 2007** Obtained approval for continued operation of Kori 1
- 2010** Installed Shin-Kori 3 reactor (first APR1400 application)
- 2011** Started commercial operation of Shin-Kori 1 reactor (first OPR1000 application)
Officially launched Nuclear Safety & Security Commission

2012's~2019's

- 2012** Started commercial operation of Shin-Kori 2 and Shin-Wolsong 1
- 2013** Obtained license for safety analysis with Korean technology for the first time in heavy water reactor
- 2014** Obtained approval for Korean APR+ nuclear power plant standard design
- 2015** Obtained approval for continued operation of Wolsong 1
Started commercial operation of Shin-Wolsong 2
- 2016** Relocated head office to Gyeongju
- 2017** Completed Noeul Fuel Cell Power Plant/ Permanently suspended operation of Kori 1, Korea's first nuclear power plant/ Completed Kori Photovoltaic Power Plant
- 2018** Completed Chameliya Hydro Power Plant in Nepal
- 2019** Completed Photovoltaic Power Plant at Samnangjin Pumped-storage Power Plant
Started commercial operation of Shin-Kori 4

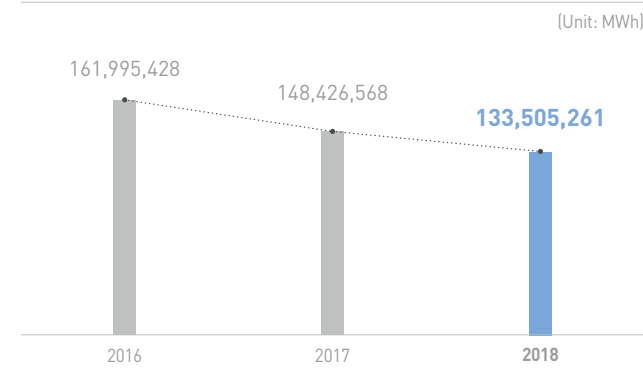
KHNP Business Model ¹⁰²⁻²

More than 40 years after commercial operation of Kori 1 began in April 1978, nuclear power has become a main source of electricity in Korea, as three out of ten households now use electricity produced from nuclear power. KHNP generates and supplies approximately 24% of the nation's power, for stable supply of electricity, using hydro power and new and renewable energy, as well as nuclear power.

Nuclear Power Generation Business

Nuclear power plants generate steam using the enormous amount of heat released from the nuclear fission of uranium in reactors and produce electricity by operating turbines using this energy. In 2018, the total energy production through nuclear power was 133,505GWh, accounting for approximately 24% of the nation's power generation.

■ Electricity Production through Nuclear Power Generation

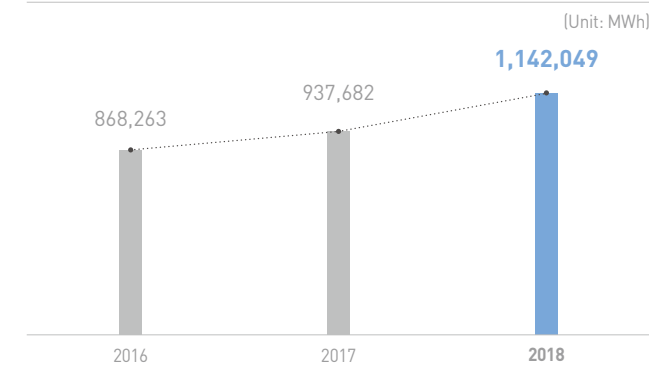


Operation of Nuclear Power Generation Facilities			
[As of Dec. 2018]			
Facility	No. of Facilities Operated	Facility Capacity (MW)	Share of total power generation facilities of KHNP (MW)
Kori	3	2,550	
Shin-Kori	3	3,400	
Hanbit	6	5,900	
Hanul	6	5,900	21,850 (80.39%)
Wolsong	3	2,100	
Shin-Wolsong	2	2,000	
Total	23	21,850	

General Hydro Power Business

General hydro power generation is the production of electricity by converting hydrokinetic energy into mechanical energy, and then into electrical energy. In particular, general hydro power is clean and pollution-free energy to generate electricity using the nation's natural water resources. It produces an effect to substitute the import of fuels for power generation. As of December 2018, KHNP is operating 25 hydro power plants and 10 small hydro power plants with a total facility capacity of 606.8MW.

■ Electricity Production through General Hydro Power Generation



Operation of General Hydro Power Generation Facilities		
[As of Dec. 2018]		
Division	No. of Facilities Operated	Facility Capacity (MW)
Hwacheon	4	108
Chuncheon	2	62.2
Uiam	2	48
Cheongpyeong	4	140.1
Paldang	4	120
Chilbo	3	35.4
Gangneung	2	82
Boseong	2	4.5
Goesan	2	2.8



▲ Shin-Kori 3, 4

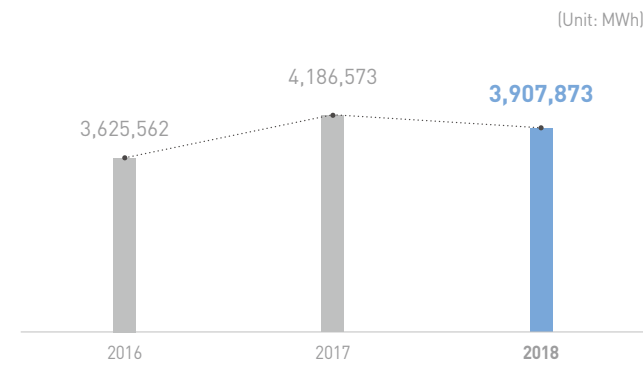


▲ Hwacheon Hydro Power Plant

Pumped-Storage Business

A pumped-storage plant pumps water from a lower-elevation reservoir to a higher-elevation reservoir using power during nighttime hours when the demand for electricity is relatively lower. Then, it drops water from the higher-elevation reservoir to generate electricity during high-demand hours. As of 2018, KHNP is operating 16 pumped-storage power plants in Cheongpyeong, Samnangjin, Muju, Sancheong, Yangyang, Cheongsong, and Yecheon, with a total facility capacity of 4,700MW. Through its pumped-storage business, KHNP stably supplies electricity during peak seasons while also continuing with the modernization of power plant facilities in order to improve reliability and ensure stable operation of the facilities.

Electricity Production through Pumped-Storage Power Generation



Operation of Pumped-Storage Facilities		
[As of Dec. 2018]		
Division	No. of Facilities Operated	Facility Capacity (MW)
Cheongpyeong	2	400
Samnangjin	2	600
Cheongsong	2	600
Sancheong	2	700
Yangyang	4	1,000
Muju	2	600
Yecheon	2	800

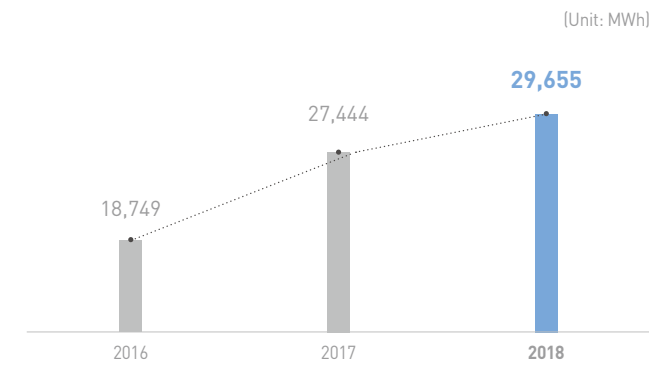


▲ the higher-elevation reservoir of Cheongpyeong Pumped-Storage Power Plant

New and Renewable Energy Business

In order to comply with the government's policy of "20% of electricity generation through new and renewable energy by 2030," KHNP is actively promoting its new and renewable energy business as Korea's largest electric power company subject to the Renewable Portfolio Standard (RPS). KHNP will grow as an energy leader by supplying 7.6GW of new and renewable energy facilities with an investment of KRW 7.3 trillion by 2030.

Electricity Production Using New and Renewable Energy



Operation of New and Renewable Energy Facilities		
[As of Dec. 2018]		
Division	Project	Facility Capacity (MW)
Solar Power	Hanbit Solar Park #1, 2	3
	Hanbit Solar Park #3	11
	Yecheon Solar Power Plant #1, 2	2
	Kori Solar Power Plant	5
	Farming Solar Power Generation	0.07
	Hydro, Pumped-Storage, Company Building Solar Power Generation (4plants)	0.48
Wind Power	Samnangjin Pumped-Storage Power Plant	2.2
	Boseong River #1, 2	1.99
	Kori Wind Power Plant	0.75



▲ Grid-connected solar photovoltaic power generating system in agricultural management



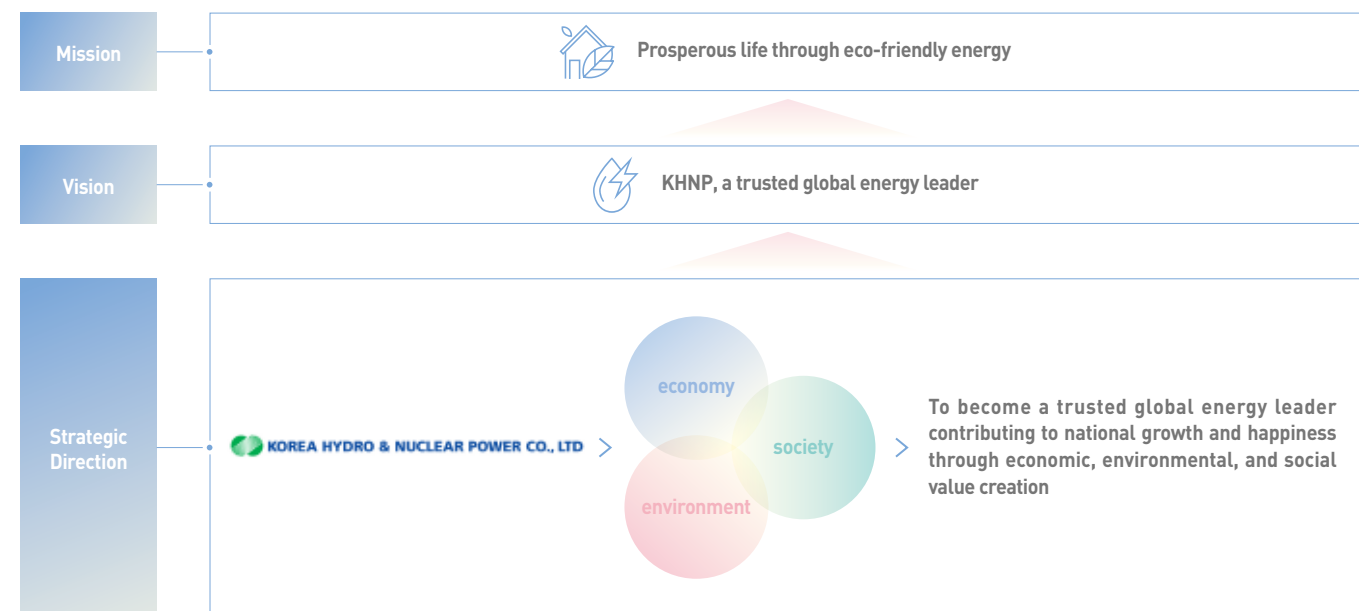
THE START OF KHNP'S SUSTAINABLE MANAGEMENT

For sustainable growth through economic, environmental, and social value creation, KHNP is establishing a desirable management environment by operating sound corporate governance and successfully communicating with our stakeholders.

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Sustainable Management Strategies

KHNP has reestablished the sustainable management strategy system based on its core value, "T.R.U.S.T," so as to become a trusted global energy leader through economic, environmental and social value creation. In order to enhance the execution of sustainable management, KHNP derived tasks and performance indicators in connection with its management strategies. Substantial measures are also taken to strengthen the degree of monitoring through active cooperation with working-level staff.



TRUST		Tasks
Technology	Technology	Converting to Clean Energy
		Securing Global Technological Competitiveness
		Creating Outcomes from Overseas Business
Respect	Respect	Creating Good Workplaces
		Fostering Professional Talents
		Win-win Growth with Partners
Ultimate Safety	Ultimate Safety	Risk management for National safety
		Nuclear Plant Operation with Top Priority on Safety
		Cyber Security Management
Social Value	Social Value	Creating Social Value
		Minimizing Environmental Impact
		Win-win Growth with Local Communities
Timeless Integrity	Timeless Integrity	Establishing Culture of Integrity and Ethics
		Spreading Corporate Culture of Respect for Human Rights

United Nations Sustainable Development Goals (UN SDGs)

The United Nations Sustainable Development Goals (UN SDGs), which were announced in 2016 in response to global economic, environmental, and social issues, are goals of which the global society must work together to achieve by 2030. KHNP is actively participating in fulfilling ten goals by implementing its sustainable management strategies based on the core values of TRUST.

	Indicator	Unit	2016	2017	2018	2019 (T)
Technology	Capacity of new and renewable energy facilities	MW	652	666	672	694
	R&D investment	KRW 100 million	3,984	4,604	4,543	4,800
	Overseas sales	KRW 100 million	3,822	2,967	3,454	3,459
Respect	Labor-management partnership index	Points	61	64	57	64
	Percentage of female managers	%	2.9	3.3	3.7	4.1
	HR support (including Atom Mentor system)	Persons	51	156	241	261
	Amount of purchase of products from SMEs	KRW 100 million	7,829	8,325	10,278	11,305
	Financial support for SMEs	KRW 100 million	1,099	1,181	1,139	1,230
	Win-win growth index	Points	91.2	92.2	93.9	94
Ultimate Safety	KHNP Occupational Accident Rate*	%	1.38	0.92	0.88	Under 0.8
	Unplanned auto-stops	Cases/unit	0.16	0.04	0.13	Under 0.3
	Radioactive dose of workers	Man-Sv/unit	0.44	0.3	0.36	Under 0.42
	Comprehensive NPP safety performance index	Points	99.924	99.936	99.962	100
	Operating NPP safety management index	%	4.3	3.524	2.196	3.34
Social Value	Seismic performance improvement index	Cases	New	7	5	4
	Sharing Fund (Dandelion Spore Fund)	KRW 100 million	142	208.5	64	126.5
	Environmental performance index	Points	285.9	314.8	373.8	411.2
Timeless Integrity	Local community receptivity	Points	56	56.3	69.2	56.8
	Integrity index	Grade	1	2	1	1
	Assessment of anti-corruption plans	Grade	1	1	1	1

* Occupational accident rate of KHNP and partners

Supreme Decision-making Body

Corporate governance must incorporate stakeholder expectations into management based on sustainable decision-making. With the Board of Directors, the supreme decision-making body, at the center, KHNP is establishing sound governance to help reflect stakeholder opinions regarding management.

Composition of the Board of Directors 102-18, 102-22, 102-23, 102-24

The Board of Directors is KHNP's supreme decision-making body with voting rights and authority regarding supervision of the company's basic management policies and business operations. As of July 2019, the KHNP Board of Directors consists of a total of 13 members, of which are six standing directors and seven are non-standing directors. Among them, one standing auditor and two non-standing auditors work in the Audit Committee. The KHNP Executive Recommendation Committee is composed of non-standing directors and external members to ensure transparency. The Committee selects professionals from relevant fields who have no conflicts of interest with KHNP and recommends them as candidates for the positions of CEO, standing auditor, and non-standing directors. The CEO is appointed by the President of the Republic of Korea upon resolution at the General Shareholders Meeting and request of the Trade, Industry and Energy Minister. The standing auditor is also appointed by the President of the Republic of Korea upon resolution at the General Shareholders Meeting and request of the Economy and Finance Minister. The BOD guarantees a three-year term for the CEO and a two-year term for other directors, while allowing them to serve consecutive terms on a yearly basis to encourage responsible decision-making. KHNP ensures the independence of the BOD by electing a chairperson among the non-standing directors. The non-standing directors, which are appointed by the Economy and Finance Minister, make up a majority of the BOD in accordance with pertinent regulations.

Board of Directors (As of August 2019)			
Division	Name	Position and Post	Term
Standing directors	Chung Jae-hoon	Standing head of organization (president & CEO)	~ Apr. 4, 2021
	Park Seok-jin	Standing auditor	~ May 14, 2021
	Kim Hyeong-seop	Director of Administration Division/Executive Vice President of Business	~ Aug. 6, 2020
	Jun Hwee-soo	Director of Power Generation Division/Executive Vice President of Technology	~ Apr. 3, 2020
	Lee Jae-dong	Director of Quality and Safety Division	~ Jun. 5, 2020
	Kim Sang-don	Director of Global Business Division	~ Aug. 13, 2021
Non-standing directors	Klm Kyu-ho	Chairperson/President of Gyeongju University Graduate School	~ May 9, 2020
	Kim Hae-chang	Professor at School of Environmental Engineering, Kyungsoong University	~ May 9, 2020
	Kang Rae-gu	President of the Conference of Regional Chairpersons Outside the Assembly, Democratic Party of Korea	~ May 9, 2020
	Lee Gwang-hui	Non-standing director, Korea Institute for Advancement of Technology (KIAT)	~ Aug. 11, 2021
	Lee Chang-ho	President of Korea National University of Welfare	~ Aug. 11, 2021
	Kim Yun-seok	President of Future Value Strategy Research Institute	~ Aug. 11, 2021
	Lee Ju-shik	Director of the Sunil Accounting Firm	~ Aug. 11, 2021

Composition and Key Activities of Subcommittees 102-22

KHNP operates five subcommittees dedicated to the implementation of government policies and social value realization. The subcommittees deliberate on agendas in the respective areas of expertise, centering on the major fields and social experience of their standing and non-standing directors. Each subcommittee contributes to activation of the BOD by expanding the roles of the non-standing directors to propose policies and provide management consulting.

Division	Composition	Role/Field	Major Activities in 2018
Audit Committee	1 standing member 2 non-standing members	Accounting and business audit	<ul style="list-style-type: none"> Requested inspection on employee discipline, concurrently with special inspection on safety management (6 cases) Strengthened criteria for disciplinary actions for cases of gross sexual misconduct
Executive Recommendation Committee	4 non-standing members 3 external members	Recommendation of executive candidates	<ul style="list-style-type: none"> Recommended candidates for the head of organization and non-standing directors
Energy Conversion Committee	1 standing member 2 non-standing members	Energy conversion New and renewable energy	<ul style="list-style-type: none"> Deliberated on early shutdown of Wolsong 1, and on closing projects of new NPP Deliberated on Saemangeum and Hyundai Motor Company photovoltaic power generation projects
Social Value Committee	1 standing member 2 non-standing members	Win-win cooperation NPP safety	<ul style="list-style-type: none"> Deliberated on investment of KRW 14.8 billion in small and large enterprise win-win cooperation fund Deliberated on additional installation of compulsory response facilities for implementation of accident management strategies
Financial Management Committee	1 standing member 2 non-standing members	Management goals Financial management	<ul style="list-style-type: none"> Deliberated on mid to long-term financial management plans and mid-term management goals Deliberated on budget, budget operation plan, and income and expenditure plan for 2019

BOD Performance			
Division	2016	2017	2018
No. of Meetings Held	11	13	12
Agendas Resolved	48	53	50
Agendas Reported	14	17	23
Amendment Agendas Resolved	1	0	0
Preliminary Deliberation Rate	100%	100%	100%
Non-standing Directors Participation Rate	90.9%	96%	85%

Strengthening Expertise of and Communication with Non-standing Directors

KHNP receives monitoring and consultation on major policies relating to corporate operation from seven non-standing directors, who possess seasoned experience in the fields of, academic circles and press. KHNP has established an extensive support system to hold regular capacity-building workshops and provide online/offline management information on a real-time basis for non-standing directors.

System to Improve Expertise of Non-standing Directors			
<p>Support for job performance</p> <ul style="list-style-type: none"> Regular workshops for nonstanding directors Job performance manual 	<p>Improvement of preliminary agenda explanation process</p> <ul style="list-style-type: none"> 100% customized preliminary deliberation system Agendas explained by experts, such as accountants and lawyers 	<p>Online/offline real-time management information supply</p> <ul style="list-style-type: none"> Follow-up on management proposals, executive conference data Information on latest technological trend abroad, such as from EPRI (Electric Power Research Institute) of the U.S. 	<p>SNS communication channels</p> <ul style="list-style-type: none"> Press releases and contributions relating to company issues Schedules of government/ National Assembly energy policy forums notified

Decision-making Process Considering Sustainability 102-33, 102-34

The BOD prioritizes sustainability issues as its agendas and makes decisions considering sustainability. In 2018, KHNP resolved major issues relating to energy, local communities and win-win cooperation.

Date	Sustainability Issue	Description	Performance
Mar. 2018	Master plan for construction of three pumped-storage plants and photovoltaic power plant at Wolsong Power Site (draft)	Total Facility Capacity: 17.7MW (Onshore photovoltaic 6.7MW, offshore photovoltaic 11MW)	Stably secured new and renewable energy supply certificate (REC)
Jun. 2018	Plan for execution of key social contribution projects in 2018 (draft)	Happiness Plus Hope Wings project for 2018 (Donated 84 vans to local children's centers and supported 30 library facilities)	Established KHNP social contribution brand and enhanced corporate's positive image
Nov. 2018	Plan for contribution to small and large enterprise win-win cooperation fund (draft)	Contributed KRW 14.812 billion for win-win cooperation fund to Foundation for SMEs, Large Enterprises and Agricultural and Fisheries Industries Cooperation	Promoted win-win growth and maintained industrial competitiveness

Remuneration and Compensation for Directors 102-35, 102-36

The BOD remuneration limit complies with the Executive Wage Guideline of the Ministry of Economy and Finance through resolution by the General Shareholders' Meeting. The total remuneration of the directors in 2018 was approximately KRW 1.284 billion and the remuneration for each director is dependent on the regular executive performance evaluation. For standing directors who receive remuneration above the standard level, the type, basis, and total amount of remuneration are disclosed separately to ensure transparency.

Division	No. of People	Total Remuneration	Average Remuneration per Person	Remarks
Standing head of organization	1	22,662	22,662	Including bonus
Standing directors	5	84,738	16,948	Including bonus
Non-standing directors	7	21,000	3,000	KRW 2.5 million per month as service allowance

(Unit: KRW 10,000)

Communication with Stakeholders


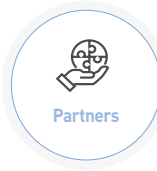



Communication with Stakeholders

KHNP has divided its stakeholders into five categories, based on global guidelines, and identified the needs and key issues of each stakeholder group by communicating with these stakeholders through various channels and conducting media analysis. With the stakeholder needs and issues identified, KHNP has established sustainable management strategies, considering all stakeholders.

Stakeholders and Communication Strategies

Division	Values Pursued	Stakeholders	Role
Key Stakeholders	Empathy and understanding	Employees, labor union, and non-regular workers	Corporate operation entities
	Win-win growth	Partners	Partners for value creation
Strategic Stakeholders	Open communication	Local residents/Public	Local development, consent for projects
	Coexistence and cooperation	Government/National Assembly	Policy decision/permits and authorization
Other Stakeholders	Principle and transparency	Press/NGO	Safety monitoring, leading public opinion

Communication with Stakeholders in 2018

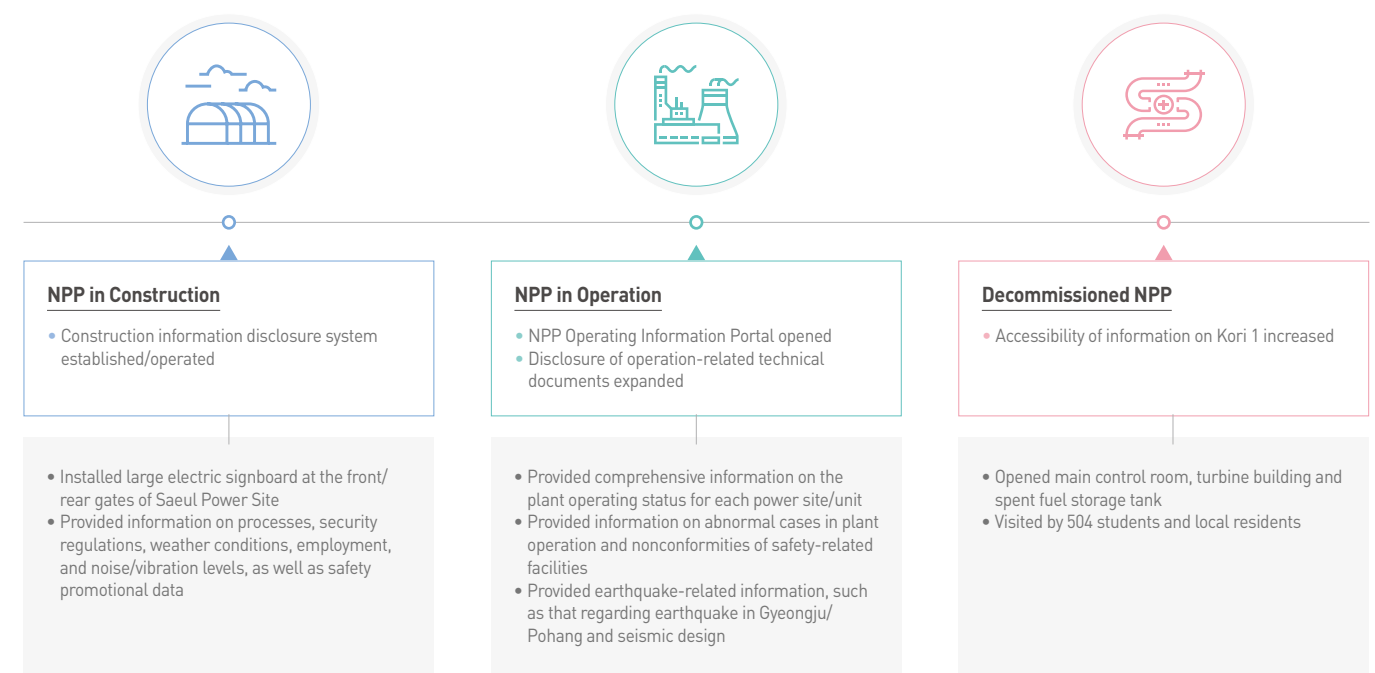
Stakeholders	Communication Channels	Areas of Interest	Communication Performance
 Employees, labor union, and non-regular workers	<ul style="list-style-type: none"> Labor-management- corporate council Future Policy Group Dangchan Dudeurim CEO field management 	<ul style="list-style-type: none"> Suggest future strategy and vision in line with the nuclear power phase-out trend Alleviate burden of childcare and promote work-life balance Improve treatment of non-regular workers and convert them to regular positions 	<ul style="list-style-type: none"> Reflected some effective suggestion policies out of 91 suggestions in total (introduction of childcare leave and part-time work for childcare systems) Regular position conversion goal achieved by 138% (2,097 workers) Operated company-wide gender equality committee
 Partners	<ul style="list-style-type: none"> Win-win growth committee Talk with partners 	<ul style="list-style-type: none"> Provide compensation for damages suffered by partners due to suspension of nuclear power plant construction Plans to maintain required personnel and construction sites Technical support to strengthen competitive power 	<ul style="list-style-type: none"> Improved partner satisfaction Increased number of qualified suppliers (1,397 companies in 2017 → 1,465 companies in 2018)
 Local residents / Public	<ul style="list-style-type: none"> Support project committee Local community groups and residents' groups 	<ul style="list-style-type: none"> Create quality jobs and revitalize local economy Strengthen nuclear power plant safety Transparently disclose nuclear power plant information 	<ul style="list-style-type: none"> Improved sense of cooperation with local communities (55.6 points in 2017 → 71.5 in 2018) Improved nuclear power plant safety awareness (84 points in first survey → 91 in second survey → 97 in third and fourth surveys)
 Government / National Assembly	<ul style="list-style-type: none"> Distribution of explanatory data, presentations Workshops of public institutions, conference with heads of relevant organizations Parliamentary inspection 	<ul style="list-style-type: none"> Expand management - National Assembly communication on key issues Expand information disclosure 	<ul style="list-style-type: none"> Activated two-way online communication channels Established close cooperative relationships
 Press / NGO	<ul style="list-style-type: none"> Press release Nuclear Power Academy 	<ul style="list-style-type: none"> Increase level of understanding of nuclear power plants and provide related information Organize presentations on pending issues targeting the public 	<ul style="list-style-type: none"> Rate of negative press coverage decreased (9.3% in 2017 → 8.0% in 2018)

Guaranteeing the Right to Know

Full Cycle Disclosure

KHNP strives to swiftly and transparently disclose nuclear power plant information in order to relieve public anxiety regarding nuclear safety. KHNP opened the "NPP Operating Information Portal" in 2018 to help the public easily access information on the full cycle of a nuclear power plant, from construction to operation and decommissioning. Information regarding the decommissioning of Kori 1 has also been disclosed. As such, KHNP has dedicated efforts to improving transparency and accessibility of nuclear power plant information.

Information Disclosure for each NPP Cycle



Reliable NPP Information Center

In December 2018, KHNP officially opened the "Reliable NPP Information Center," an independent organization, with the goal of improving reliability of nuclear power plant information provided to the public. With seven experts in the fields of nuclear power, machinery, electricity, geology, engineering, structure, and administration, Reliable NPP Information Center aims at transparently disclosing technical information related to nuclear safety and data on safe operation of nuclear power plants. At the first meeting, outcomes and issues in the areas of nuclear safety, communication, and information disclosure as well as the direction of future activities were discussed. Reliable NPP Information Center will share NPP information through online and offline channels with an objective viewpoint.



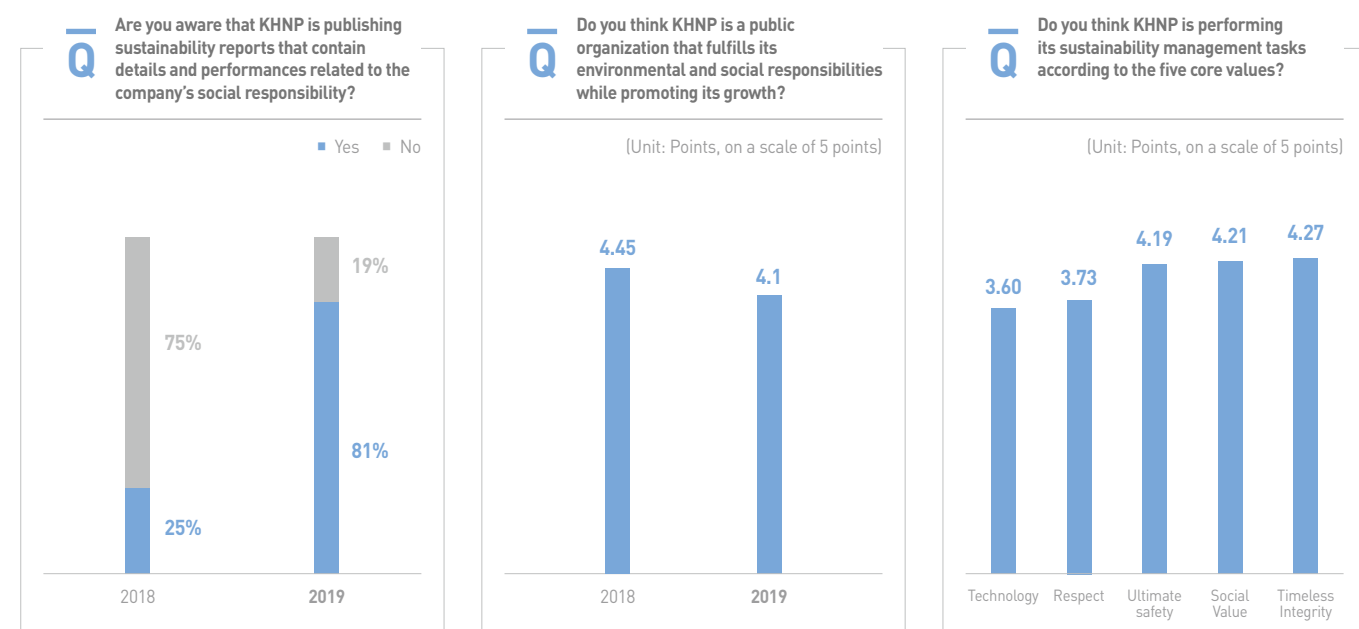
▲ Reliable NPP Information Center founding ceremony

Sustainability Material Topics

KHNP is practicing sustainable management by collecting the stakeholder expectations and adjusting management activities to reflect that. In the course of publishing this report, KHNP conducted a materiality assessment in order to focus on the issues in which stakeholders' level of interest is high and which are connected to the development of the power generation industry. In August 2018, KHNP conducted a survey on awareness of sustainable management targeted at 431 employees. Through the survey, KHNP collected stakeholders' opinions about its social responsibilities, sustainability goals, and social value creation.

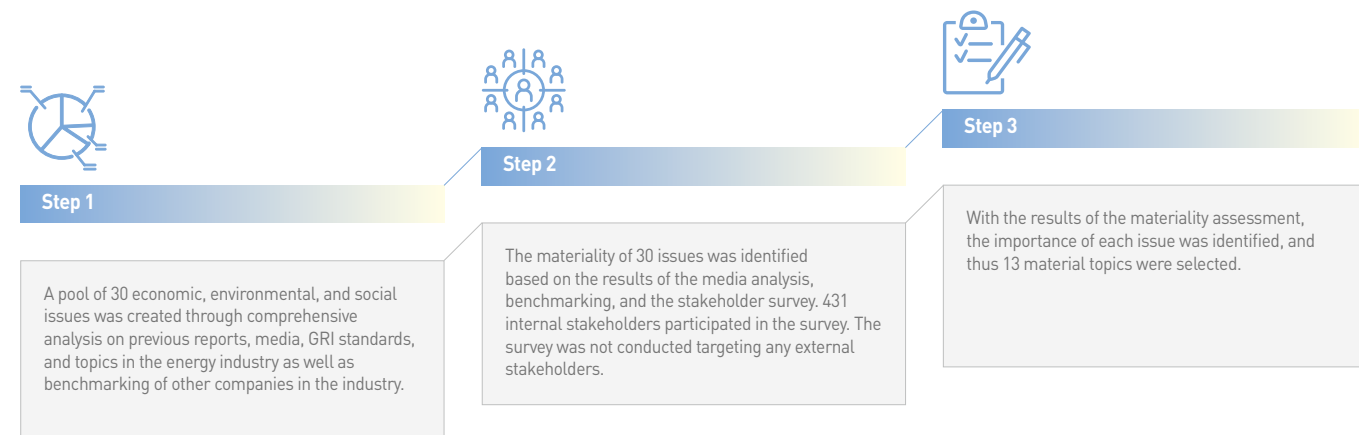
Survey on Awareness of Sustainable Management

KHNP surveyed employee awareness regarding sustainable management in order to assess the internal and external awareness of its efforts for sustainable management. The survey focused on employees' awareness of sustainability reporting, KHNP's CSR and five sustainability tasks.

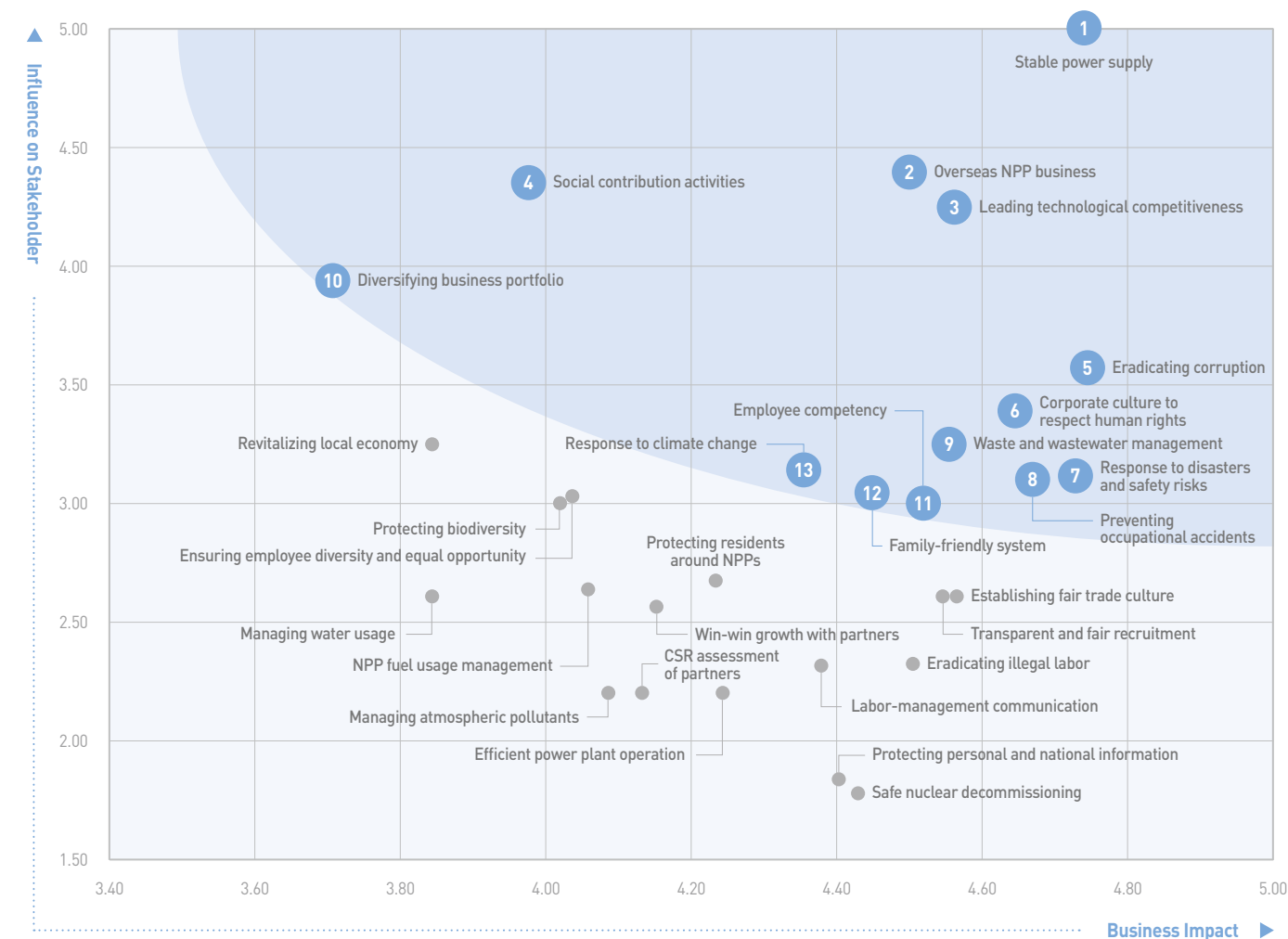


Materiality Assessment

KHNP conducted an internal materiality assessment in order to identify major issues by reflecting characteristics of the energy industry and stakeholders' interests. The materiality assessment process is comprised of three steps, the formation of a pool of issues, the stakeholder survey, benchmarking, and media analysis and then the selection of core issues. The scope of reporting on the selected issues varies depending on the impact to each stakeholder.



Materiality Assessment Result








Division	Material Topic	Reporting Scope				
		Employees	Partners	Government/ National Assembly	Press/NGO	Local residents/ Public
Technology	1 Stable power supply	●	●	●		●
	2 Overseas NPP business	●	●	●		
	3 Leading technological competitiveness	●	●	●		
	10 Diversifying business portfolio	●	●	●		
Respect	11 Employee competency	●				
	12 Family-friendly system	●		●		
Ultimate Safety	7 Response to disasters and safety risks	●	●	●		●
	8 Preventing occupational accidents	●	●	●		
Social Value	4 Social contribution activities	●		●	●	●
	9 Waste and wastewater management	●		●	●	●
	13 Response to climate change	●		●	●	●
Timeless Integrity	5 Eradicating corruption	●	●	●		
	6 Corporate culture to respect human rights	●	●	●		




Sustainability Material Topics





Approaches to Material Topics




KHNP divided the 13 material topics derived through the materiality assessment process into 5 categories (technology, respect, ultimate safety, social value, and timeless integrity). KHNP identified the materiality of each topic in terms of its corporate management sustainability and reported company-wide response to the topic.

Division	Topic	Importance	Response
 Technology	 Stable power supply	Accurate power demand prediction and the stable supply of power are prerequisites for maintaining the key industries and guaranteeing basic living conditions for people. In particular, as power demand is soaring during the summer and winter due to climate change, the establishment of a stable power supply system is required.	29-30p
	 Overseas NPP business	In line with economic growth in the Middle East and Africa, the competition for winning NPP contracts in these areas is intensifying. NPP operations, in particular, are not only a long-term income source, but can create the additional benefits of job creation and win-win growth with partners.	34-35p
	 Leading technological competitiveness	Advanced NPP companies across the world are fiercely competing to secure key NPP technologies of the future. In addition, as the proportion of power generation using new and renewable energies is expected exceed 60% in the EU by 2020 and the Renewable Energy 3020 policy has been announced in Korea together with the energy conversion road map, the importance of securing new and renewable energy technologies is growing. Amid the nuclear power phase-out trend, investment in cultivating the nuclear decommissioning industry is necessary.	32-33p
	 Diversifying business portfolio	The rate of nuclear power generation in Korea is decreasing according to the government's energy conversion policy and the worsening of mid to long-term financial projections has led to the deterioration of competitiveness and growth. Accordingly, it is necessary to continuously expand new and renewable energy facilities, such as photovoltaic and wind and fuel cell power plants, and actively promote the winning of NPP contracts abroad.	29-30p 34-35p

 Respect	 Employee competency	There is a demand to develop employees' competency and foster key human resources in order to respond to changes in the management environment and strengthen core business areas in line with the Fourth Industrial Revolution. It is necessary to provide professional and practical training and foster a competent workforce.	42p
	 Family-friendly system	As the level of social interest in maintaining a work-life balance and the burden of childcare increases, an emphasis has been placed on creating a family-friendly culture within the company in order to prevent career disruption due to childcare and to guarantee a work-life balance.	40p

Division	Topic	Importance	Response
 Ultimate Safety	 Response to disasters and safety risks	Since the Fukushima nuclear disaster in 2011 and the Gyeongju earthquake in 2016, the concern regarding nuclear safety has increased across the country. The establishment of a system that ensures safe NPP operations even during disasters, such as earthquakes, and which provides transparent information disclosures to help people feel confident about nuclear safety has become important.	49-50p
	 Preventing occupational accidents	Occupational safety in the course of NPP construction and operation is a vital issue for the employees of KHNP and its partners. Occupational accidents can increase national concerns and anxieties regarding nuclear power plants. Therefore, efforts to prevent such accidents are important.	51-52p

 Social Value	 Social contribution activities	As a result of the characteristics of the NPP business, it is important to secure national support as well as support from local residents. In addition, KHNP, as a public organization, is responsible for putting the public interests of the local community first by maximizing benefits for local communities and residents. Accordingly, KHNP must seek ways to increase local residents' trust and achieve win-win growth with them through continuous social contribution activities to which the social values the organization pursues are reflected.	64-67p
	 Response to climate change	Since the Paris Climate Change Accord, U.N. Member states and global enterprises have been reducing GHG emissions in stages and strengthening efforts for climate change response. With eco-friendly management performance utilized as an external assessment indicator, climate change response activities are being managed as an essential part of a company's sustainable growth.	62-63p
	 Waste and wastewater management	According to the characteristic of the NPP business, using a large volume of seawater, thorough management of spent fuel and radioactive waste as well as protections for the marine environment around NPPs are important social responsibilities of nuclear power companies.	60-61p

 Timeless Integrity	 Eradicating corruption	Following a series of recruitment scandals, the level of national interest in the culture of integrity and ethics of businesses has been heightened. The NPP industry is directly related to the lives of the people. To this end, the establishment of a transparent corporate culture is a necessity.	71-73p
	 Corporate culture to respect human rights	In line with an increase in the social influence of KHNP, the issue of respect for human rights concerning employees has emerged as a major management risk. In particular, as the act to ban bullying in the workplace has passed the National Assembly, compliance with the law is expected to an important issue.	74-75p



OUTCOME OF KHNP'S SUSTAINABLE MANAGEMENT

An energy leader making life prosperous with eco-friendly energy

KHNP's effort for sustainable management to set and implement promotional tasks based on our core values, "T.R.U.S.T.," is bearing fruit.

Technology	27
Respect	37
Ultimate Safety	47
Social Value	55
Timeless Integrity	69

Technology



Overview

KHNP intends to develop various business items in order to secure future growth engines, such as new and renewable energy and nuclear decommissioning. In addition, KHNP has enhanced technological competitiveness in the global market through technological development for optimization of safe NPP operation and export. Having successfully promoted a nuclear power plant construction project in the UAE and hydro power projects in Nepal and Pakistan, KHNP is dedicating efforts to entering overseas niche markets.

Social value	Job creation	Equal Opportunity	Safety	Environment
Win-Win Cooperation	Local community	Ethical Management	Quality of life	Cooperation & Participation

Task	Activities	Key Performance in 2018	UN SDGs & GRI Standards
Converting to Clean Energy 	<ol style="list-style-type: none"> New and renewable energy business Hydro power business Fuel cell business Fulfillment of RPS for seven consecutive years Nuclear decommissioning business 	Established Renewable Energy 3020 Strategy Completed fuel cell power generation facility to a scale of 31MW, the largest in the world Sales from new and renewable energy business: KRW 107.1 billion	Goal 7 : Ensure access to affordable, reliable, sustainable and modern energy for all 201-1 : Direct economic value generated and distributed
Securing Global Technological Competitiveness 	<ol style="list-style-type: none"> Strengthening Mid to Long-term R&D Optimizing Safe NPP Operation through Technologies of the Fourth Industrial Revolution Securing Technological Competency for New and Renewable Energy Business Strengthening Technological Development for NPP Export Nu-Tech 2030 Establishment Development of Nuclear Decommissioning Technologies 	R&D investment: KRW 454.3 billion Developed the world's first automatic prediction and diagnosis system	Goal 9 : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation 203-1 : Infrastructure investments and services supported
Creating Outcomes from Overseas Business 	<ol style="list-style-type: none"> Diversifying NPP export Entering Overseas Nuclear Decommissioning Market Successful execution of the UAE project Operating overseas hydro power business 	Accumulated sales from Barakah Plant in the UAE: KRW 1.8 trillion Overseas hydro power business: 5 locations in 4 countries Concluding contract for NPP maintenance project in the UAE	Goal 8 : Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all Goal 9 : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation 203-1 : Infrastructure investments and services supported

Interview



Securing Future Growth Engine through Independent Nuclear Decommissioning Technology Development

Director
Nuclear Decommissioning Team
Chu Seong-Jib

As it has been over 30 years since nuclear power plant operation began across the world, the number of nuclear power plants being prepared for decommission is increasing rapidly, as their design lifetimes are soon to expire. At the same time, the nuclear decommissioning market is quickly growing, and 12 nuclear power plants in Korea are scheduled for permanent shut-down within the next ten years. Given these trends, KHNP is actively preparing for nuclear decommissioning business as a future growth engine.

In the course of permanent shutdown of Kori 1, the level of Korea's nuclear decommissioning technological power was evaluated and, as a result, 17 out of 58 technologies necessary for nuclear decommissioning business were identified not secured. KHNP aims to develop these technologies by 2021. While it is important to benchmark overseas technologies, KHNP plans to internally develop these technologies in order to activate the domestic nuclear decommissioning industry. As of the end of 2018, KHNP secured approximately 80% of the nuclear decommissioning technologies required. We intend to promote nuclear decommissioning business with these domestically developed technologies so as to encourage participation by local NPP operators and revitalize the nuclear industry. In fact, KHNP is moving forward with installation of a nuclear decommissioning research center in Gijang and Ulju region, which is near Kori 1, and companies verifying nuclear decommissioning technologies will be able to produce results by directly participating in KHNP's nuclear decommissioning business with their own technologies.

For the decommissioning of Kori 1, a permit from the regulatory authority must be obtained. KHNP has set out a goal to prepare a decommissioning plan and submit it to the Nuclear Safety and Security Commission for approval by June 2020, and to obtain approval by June 2022. As this is KHNP's first attempt at the nuclear decommissioning business, it is important for the company to secure a foundation for the business and establish the necessary systems. In line with a decrease in the demand for nuclear power plant construction, KHNP is making numerous preparations to achieve both corporate and national sustainability, such as to ensure efficient execution of the nuclear decommissioning business.

* Nuclear decommissioning is an operation to decontaminate radiation-contaminated zones of a permanently closed nuclear power plant, dismantle the contaminated devices and wastes and treat the remaining building so as to return the plant site to the nature.

Converting to Clean Energy ! Material Topic

New and Renewable Energy Business

Renewable Energy 3020 Strategy

KHNP has established the system of "Renewable Energy 3020 Strategy" by reflecting the government's eighth Basic Plan for Power Supply and Demand and "Renewable Energy 3020 policy". This system, which was established by modifying the existing renewable energy implementation plan, focuses on the development of large-scale projects with a capacity of at least 100MW centering on photovoltaic power generation, expansion of the percentage of wind power generation up to 23%, and development of win-win business models with participation of local residents.

Customized Renewable Energy Projects

In 2018, KHNP obtained a patent on the grid-connected photovoltaic power generating system in agricultural management for win-win growth with local communities. In addition, it has entered into business agreements with local governments, such as Jeollabuk-do Provincial Government and Saemangeum Development and Investment Agency. As for the offshore photovoltaic power generation project, which is implemented with a capacity of 300MW, the world's largest scale, within the Saemangeum Seawall area, KHNP plans to share the proceeds with the local government and residents. In particular, KHNP will create an opportunity to share its proceeds with a large number of residents through cloud funding and preferentially select local businesses as its partners for module/equipment supply and construction works.

Promoting Renewable Energy Business through SPC

By establishing a special purpose company (SPC), KHNP secures the funds and site necessary for photovoltaic power plant construction and operation and is also expanding cooperation with the private sector. It signed a memorandum of understanding (MOU) in 2018 for the construction and operation of a photovoltaic power generation facility using an idle site of Hyundai Motor Company and has since been building the facility with a goal to complete the stage 1 project (27MW) by 2020. In addition, KHNP agreed with Gyeongsangnam-do Provincial Government on the joint development of new and renewable energy business and construction of photovoltaic power generation facilities in the Korea's largest cooperative union-type industrial complex. This project will be carried out through an SPC with the

industrial complex cooperative union using roofs of the factories of tenant companies in the complex. KHNP strives to find opportunities for large-scale photovoltaic power generation through cooperation with private companies.



▲ Samnangjin Pumped-storage and Photovoltaic Power Plant

Simultaneously Promoting Onshore and Offshore Wind Power Business

KHNP focuses all its capabilities on the offshore wind power business centering on the development of a large-scale offshore wind power generation complex near a nuclear plant along with onshore wind power business. As for the project to build a wind power plant in Cheongsong, KHNP is currently installing the generators with a goal to complete pilot operation by December 2019. In addition, for the government's R&D project to "develop design and assessment technologies for offshore wind power generation complexes with a capacity of 100MW or larger," KHNP has been selected for, and is thus implementing the project of offshore wind power plants in both Anmado and Yeongdeok. Prior to this, KHNP completed an R&D project for Kori offshore wind power plant to a scale of 150MW in the foreshore of Kori Nuclear Power Site in preparation for the closing of Kori 1. By 2030, KHNP will develop wind power generation business to a scale of approximately 1.7GW with an investment of KRW 3.1 trillion.

Hydro Power Business

Hydro Power Plant Operation Using Technology of the Fourth Industrial Revolution

For stable operation and maintenance of hydro power plants, KHNP is using technology of the Fourth Industrial Revolution, such as drones and ICT. In 2018, KHNP carried out a pilot project at Muju Pumped-Storage Power Plant to use drones for inspecting the dam during the flooding season, to cover the wide basin area and blind spots. In addition, for efficient plant management, KHNP established an integrated remote operating system by building big data regarding precipitation, water level, and flow, and also built a new hydro power monitoring center to operate the system.

Promoting New Pumped-Storage Plant Construction

KHNP aims to stabilize power systems using energy the storage and supply functions of pumped-storage power plants. In addition, to comply with the schedule for completion of three new pumped-storage plants specified in the eighth Basic Plan for Power Supply and Demand (by 2029, 2030 and 2031), KHNP invited seven local governments to recommend candidate sites for the plant construction projects. To collect opinions from each local government and residents, KHNP organized teams in charge of improving the level of acceptance by region and strengthened promotional activities for the new pumped-storage plant construction. In addition, for objective and fair site selection, it operated the Site Selection Committee with external experts and secured candidate sites from three local governments (Yeongdong-gun, Hongcheon-gun, Pocheon-si).

Modernizing Old Hydro Power Plants

For Hwacheon Hydro Power Plant, Samnangjin Pumped-Storage Power Plant and Cheongpyeong Pumped-Storage Power Plant, which have reached the limit in hydro power plant lifespan (40 years for hydro power, 30 years for pumped-storage), KHNP is executing a power plant modernizing project so as to improve performance of facilities in the plants and apply advanced digital control functions.

Fuel Cell Business

As a key task for "K-Cloud," an open R&D project, KHNP has selected a business model to connect renewable energy power generation, hydrogen generation, and fuel cell power generation, and thus has been developing the related technologies. KHNP is also expanding the "dispersed power generation system," which enables fuel cell business in urban areas. Following the completion of a fuel cell power generation facility with the capacity of 31MW, the largest in the world, in Haeundae, KHNP has signed MOUs for Godeok Fuel Cell Power Plant and KOGAS Fuel Cell Power Plant.

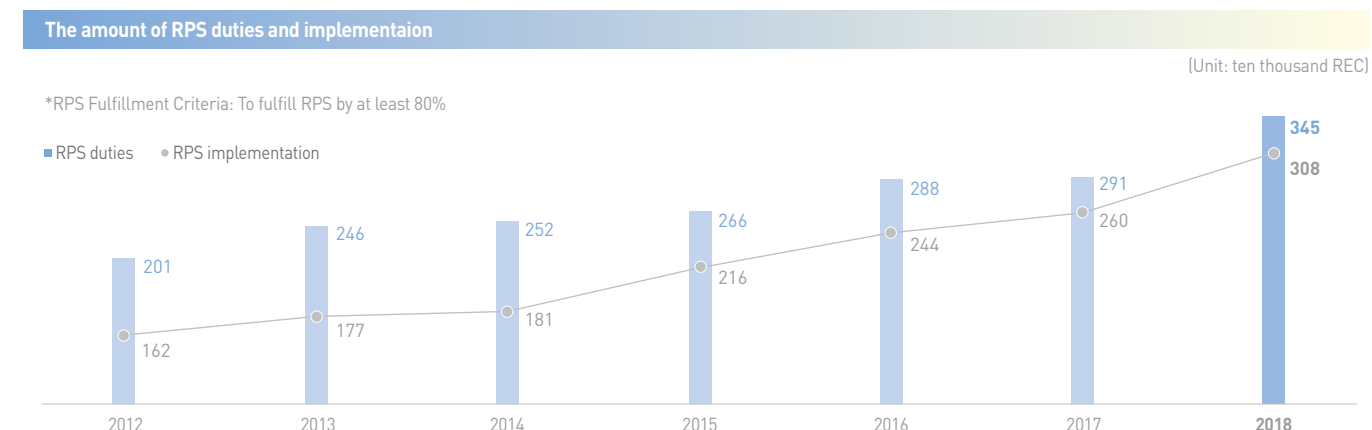


▲ Noeul Fuel Cell Power Generation Plant

Fulfillment of RPS for Seven Consecutive Years

KHNP is actively implementing the Renewable Portfolio Standard (RPS) prescribed by the government. By using its internal facilities and through spot market trade, KHNP is securing a Renewable Energy Certificate (REC) and has fulfilled its RPS duties for seven years in a row. Expecting an increase in the amount of RPS duties in the future, KHNP plans to strengthen its portfolio for RPS implementation, such as to spread the use of energy storage systems (ESS) and small photovoltaic power systems.

KHNP 3020 Renewable Energy Strategy								
Goal	To advance to Korea's largest new and renewable energy business operator by 2031 (Domestic Market Share: 13%, Facility Capacity: 8.4GW, Sales: KRW 1.1 trillion)							
Promotion Plan by Year	'18	'19	'20	'21	'22	'30	Total	Grand Total
Facility Capacity (MW)	Solar Power	7	74	520	350	725	3,749	5,425
	Wind Power	-	120	100	100	205	1,200	1,725
	Fuel Cell	-	110	20	-	100	-	230
	Bio	-	220	-	-	-	-	220
Investment (KRW 100 million)	374	971	1,247	3,570	5,575	61,293	73,030	KRW 7.3 trillion



Nuclear Decommissioning Business

Establishing Road Map for Nuclear Decommissioning Business

KHNP has established a decommissioning business execution plan for "safe and economic decommissioning" of Kori 1, which is Korea's first nuclear power plant of permanent operation suspension, and the "nuclear decommissioning technology development road map" in order to develop the commercial-level nuclear decommissioning technologies. KHNP will develop the technologies by 2021 according to the technology development road map and successfully implement the decommissioning process of Kori 1 according to the decommissioning business execution plan.

Decommissioning of Kori 1

Following technological and legal preparations, KHNP will submit the final decommissioning plan of Kori 1 in 2020. It will then start the removal and decontamination of radioactive facilities in 2026 and finish up the decommissioning process by 2032. For this, KHNP established the reference process for decommissioning business management in 2018 together with the strategies for execution of facility dismantling, decontamination, and removal operations. In addition, it prepared a draft of the final decommissioning plan by referring to decommissioning plans abroad established according to the IAEA standards. As a result, 4.9% of preparation for the promotion of Kori 1 decommissioning has been executed as of the end of 2018, which exceeded the goal by 0.1%p.

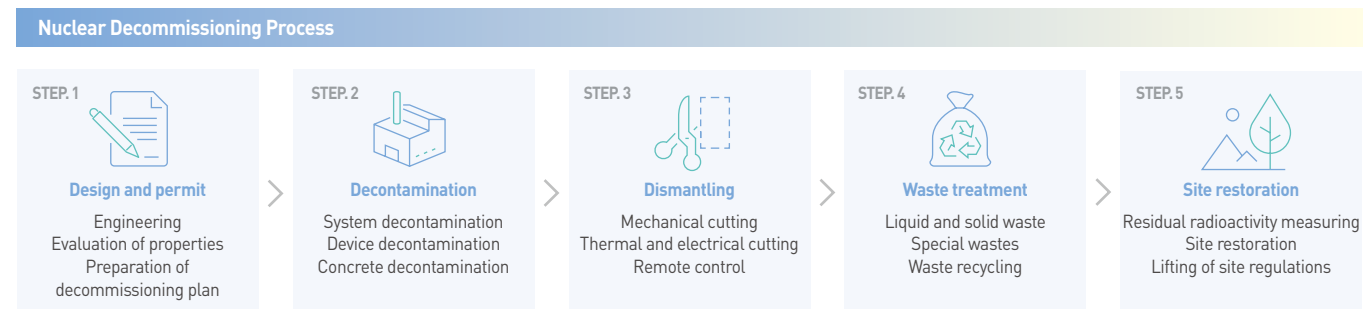
Decommissioning of Wolsong 1

In June 2018, the Board of Directors of KHNP resolved on early shutdown of Wolsong 1, which began commercial operation in 1983. Since the

earthquake in Gyeongju, the operating rate of Wolsong 1 has fallen to approximately 40%. As for the power generation capacity, it is only 3% of the total capacity of nuclear plants, which is 22.5GW. Accordingly, Wolsong 1 shutdown is not expected to exert impact on the overall power supply plan. For safe decommissioning of Wolsong 1, KHNP operated the "Wolsong 1 Safety Management TF" at the head office in 2018 through which key operations necessary for safety management following permanent suspension of the plant and preparation for decommissioning were identified. In the field, it also improved the relevant organizations, such as by installing Permanent Suspension Preparation Team. In 2019, KHNP established the "Wolsong 1 Decommissioning Master Plan (draft)" and submitted an application for permit on operation change to execute permanent suspension of the plant to Nuclear Safety and Security Commission according to the Nuclear Safety Act.

Establishing Nuclear Decommissioning Industry Ecosystem Centering on KHNP

KHNP is strengthening the domestic network by holding the Nuclear Decommissioning Business Forum each year. In 2019, it started establishing an industrial ecosystem based on the creation of demand for nuclear decommissioning business through order placement for decommissioning projects at an earlier phase. In addition, it is operating eight decommissioning expert training courses internally and externally in order to foster the necessary human resources and strengthen industrial competency. In 2018, KHNP developed 47 internal experts and provided training to 53 people at 22 companies. Moreover, KHNP established a system of international cooperation with eight institutions in six countries and two international organizations and thus has been sharing technological information with them.



Nuclear Decommissioning Business Road Map				
Division	2017 - 2021	2022 - 2030	2031 - 2034	
Domestic nuclear decommissioning	Kori 1	Preparation for decommissioning / management of spent fuel	Establishment of waste treatment facility, decontamination/removal	Site restoration
	Wolsong 1	Preparation for decommissioning/management of spent fuel Decontamination, removal, waste treatment		
Ecosystem establishment	Development of professional human resources / gradual allocation of existing personnel to decommissioning operation Equipment development, competency improvement, establishment of domestic and international cooperative system, development of business items		Promotion to win overseas contracts	

Securing Global Technological Competitiveness ! Material Topic

Strengthening Mid to Long-term R&D

Under the vision to develop the "global top energy technologies," KHNP has been pushing to strengthen R&D in the four strategic directions with a goal to secure global technological competitiveness in various industrial fields, ranging from NPP operation to new and renewable energy and technologies of the Fourth Industrial Revolution. Through Radiation Health Institute and Central Research Institute with approximately 400 researchers, KHNP strives to secure technological competitiveness in response to the improvement of NPP safety and facility reliability as well as the trend of energy conversion.

Performance Related to Industrial Properties			
(Unit: Cases)			
Division	2016	2017	2018
Application	138	92	205
Registration	103	89	105
Utility Model	0	0	1
Design/Trademark	0	0	53
Program	41	49	101
Total	282	230	465

Optimizing Safe NPP Operation through Technologies of the Fourth Industrial Revolution

E-Tower, General NPP Operation Center

Since 2016, KHNP has been operating the General NPP Operation Center (E-Tower) that supports 24-hour remote monitoring and early warning functions of all nuclear power plants. In 2018, the monitoring function, which was activated only when the plant was in normal operating state, was improved for activation during a phase of emergency plant operation with the reactor operation stopped. KHNP has also promoted safe operation of the APR plant by developing an exclusive early warning model. Using this model, signs of facility failure were detected 390 times, and thus preemptive actions were taken. This resulted in the prevention of power generation suspension to a scale of approximately KRW 196.5 billion.

Early Detection Cases			
(Unit: Cases)			
Division	2016	2017	2018
Big	0	3	0
Medium	14	32	35
Small	268	417	355

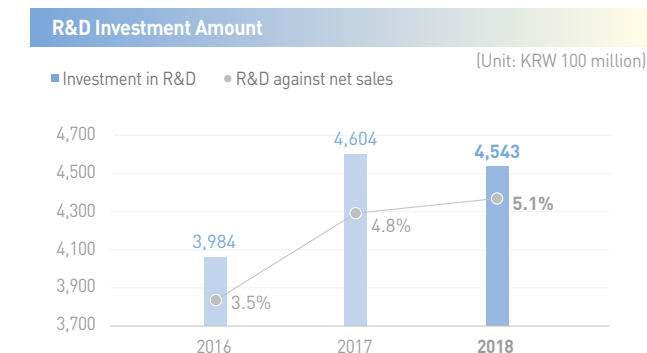
R&D Vision System					
Vision					
Development of global top energy technologies					
Strategic Direction		Advancing NPP operation technology	Securing new and renewable energy technology	Bolstering technological development for new growth engine creation	Intensively fostering Fourth Industrial Revolution technologies
Tasks		Strengthen NPP stability System safety Radiation safety management Response to natural disasters	Improve reliability of facilities Improved equipment reliability Improved material integrity Intelligent facilities	Secure new and renewable energy technologies Secure new NPP technologies for export	Secure nuclear decommissioning/spent fuel technologies Nuclear decommissioning technology Spent fuel treatment technology

Automatic Facility Failure Prediction and Diagnosis System

KHNP, as the first in the world, developed an automatic failure prediction and diagnosis system based on big data and artificial intelligence technologies. This system, which was established with big data for facility monitoring nuclear power plants, monitors facilities 24 hours a day and predicts failure through artificial intelligence. For this, KHNP standardized the facility monitoring data of all nuclear power plants and internally developed a diagnosis algorithm for 300 key facilities of five types. In addition, it organized a prediction and diagnosis technology group with 12 members, of whom six had acquired internationally accredited facility diagnosis qualifications. In 2018, through prior detection of facility defects, five cases of power generation suspension were prevented, including two for Kori 3, one for Wolsong 1, and one each for Hanul 1 and 2. This resulted in a cost reduction of KRW 144.3 billion. KHNP executed a trial installation of wireless sensors and plans to expand the target of diagnosis to 15,000 facilities of 300 types.



▲ Automatic facility failure prediction and diagnosis system



Cyber Power Plant Construction

KHNP is developing cyber power plant technology to create an environment and situations similar to those of an actual power plant, by establishing a 3D model using virtual/augmented reality technologies. This technology supports power generating facility location tracking, design error and construction interference identification, and operating variable monitoring functions. KHNP anticipates that this technology will strengthen NPP construction and operation safety and decrease the work hours spent in radiation areas. KHNP commenced this internal virtual/augmented reality technology development in 2018 and plans to develop the technologies for high-risk/high-hazard operation and construction work simulation by 2021.



▲ Project kick-off meeting

Securing Technological Competency for New and Renewable Energy Business

KHNP is pushing to develop a range of new and renewable energy-related. It focuses its capabilities on securing key technologies for hydro power generation, for which a modernization project is currently in progress. In the fields of tidal and fuel cell power generation, KHNP is also striving to contribute to Korea's energy conversion in the mid-to long-term by participating in government-led R&D projects.

Key R&D Projects in New and Renewable Energy Fields	
Division	Key Projects
Expansion of new and renewable energy related technology development	<ul style="list-style-type: none"> Technology for performance test of pump turbine model for pumped-storage power generation Key hydro power design technology for 30MW Francis/Kaplan turbine Technique for allocation of multiple tidal turbines and power generation complex performance analysis Survey on the foundation of combined power generation through link between NPP and new and renewable energy related technology and complex design

Strengthening Technological Development for NPP Export

In addition to nuclear decommissioning, KHNP has selected NPP export as its future growth engine, and thus has been performing R&D activities to secure the necessary technological competitiveness. With ARP1400, a strategic nuclear reactor model for export, and SMART, a new small to medium-scale reactor model, KHNP is actively promoting NPP export business. It is also accelerating the related design and operating technology development.

Key Projects for Technological Advancement for NPP Export

- Develop virtual/augmented reality (VR/AR) systems for NPP
- Design and develop reactor building passive cooling system concept
- Assess limit strength and structural integrity of working NPP containment
- Develop technology for HDPE greased strand posttensioning application to reactor building

Nu-Tech 2030 Establishment

Together with the government, KHNP is establishing Nu-Tech 2030, an NPP industry R&D road map, with the goal of maintaining key technological competitiveness for the NPP field and fostering new industries, such as nuclear decommissioning and spent fuel management. Based on the accomplishment to develop ARP1400, a light water reactor model, KHNP has successfully implemented "Nu-Tech 2012" for the development of NPP operating technologies in the level of the advanced countries. With Nu-Tech 2030, KHNP will promote R&D in the four fields of nuclear safety, decommissioning, disposal and export/international cooperation so as to strengthen its competitive power for safe NPP operation and export.

Development of Nuclear Decommissioning Technologies

KHNP intends to improve its technological competitiveness by securing nuclear decommissioning technologies before commencing decommissioning of Kori 1. In 2018, KHNP developed "organic compound chemical decontamination technology" to reduce workers' exposure to radiation, and "contaminated resin treatment technology" for radioactive waste treatment. It also established the guidelines for contaminated site restoration. As a result, KHNP has secured a total of 45 technologies out of 58 commercialized nuclear decommissioning technologies. In 2019, it is developing six new technologies.

Projects in Decommissioning/Spent Fuel Technologies

Key Projects
Development of safety assessment technology in relation to contamination and deregulation of decommissioned NPP sites
Development of technology for verification testing on decommissioning of activated pressure vessels and internal structures
Commercial technology for coolant supply system and device decontamination for nuclear decommissioning design
Initial property assessment of spent fuel with a low degree of burn-up

Creating Outcomes from Overseas Business ! Material Topic

Diversifying NPP Export

Acquiring International Certification on Korean NPP Model and Performing Activities to Acquire NPP Contracts

KHNP acquired standard design approval and permit for APR1400, the third-generation Korean NPP model, from Nuclear Regulatory Commission (NRC) of the U.S. This is the first case in the world for a reactor outside of the U.S. to obtain design approval and permit. KHNP achieved this result by receiving 19 inspections and 2,315 questions for review over a period of 42 months. APR1400 has not only obtained approval in the U.S., but also acquired the EUR certification, a requirement for NPP operators in Europe. As such, it has enhanced competitive power for entry into the global NPP market including the U.S. and Eastern Europe. Based on its internationally recognized technological power, KHNP is performing various activities to win contracts from the Czech Republic, Poland, promoting nuclear power plant construction. KHNP is also promoting to participate in the projects to build a small modular reactor (SMR) in Saudi Arabia.



▲ NRC Design Certification

Discovering Niche Markets Abroad

In addition to NPP construction, KHNP is continuously promoting entry to the overseas niche markets, such as in Romania, Taiwan, Brazil, and the U.S., by diversifying its export models to NPP operation and maintenance (O&M) and technological support. KHNP is currently participating in the facility improvement project and in service test projects in Romania and Taiwan. In China, it is operating a benchmarking education business through continuous technological exchange. In addition, KHNP is securing a foundation for export by hosting road shows to demonstrate its excellent technologies targeting NPP operators in the U.S. KHNP will develop new markets and secure the bases for order reception throughout the world, including the Philippines, Finland, and Slovenia, by strengthening cooperation with NPP operators in the local areas and will actively support joint overseas market entry with the NPP-related companies in Korea.

NPP Consulting

As a key business for developing niche markets abroad, KHNP is promoting NPP consulting and technological service business. NPP consulting is a service to provide consultation and education on the operation and safety of nuclear power plants. It is to turn KHNP's internal capabilities and expertise into an asset. KHNP has established a goal to record sales of at least KRW 10 billion by 2031. For this, KHNP plans to actively make use of its overseas partnerships.

Entering Overseas Nuclear Decommissioning Market

It is identified that 64% of nuclear power plants in operation across the world have been operated for over 30 years. In line with the aging of nuclear power plants, the global nuclear decommissioning market is forecast to display a trend of continuous growth. Accordingly, KHNP plans to establish a system to promote overseas nuclear decommissioning business, such as by organizing a consortium with domestic and international industries, for entry into the global nuclear decommissioning market and promote the overseas business in stages by preferentially selecting the areas where it can start single-unit business items by 2030. At the same time, KHNP has set a goal for Korea to enter the global market by itself in the 2030s with KHNP at the lead through the development of database for and securing of the experience of Kori 1 decommissioning.

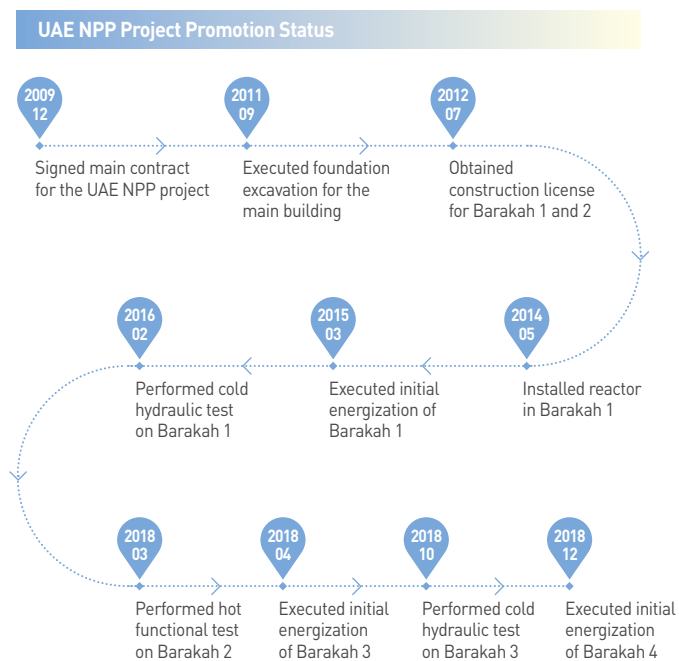
Successful Execution of the UAE Project

Maximizing Sales by Focusing Competencies in Each Phase of Project

In 2009, South Korea won a \$18.6 billion contract to build a nuclear power plant comprised of four units of APR1400 with the power generation capacity of 5,600MW in Barakah, UAE. This is the first case of NPP export in Korea. It also made Korea the sixth NPP exporting country in the world. Currently, construction and test-drive of Barakah 1 is completed and the operating permit is expected to be issued in 2020. The overall progress rate of Barakah 2, 3 and 4 is at least 93% as of June 2019. In 2018, especially, KHNP completed the planned process by concurrently pilot-operating Barakah 2, 3, and 4. KHNP also provided intensive English education to the employees scheduled for dispatch to the UAE for operating support according to the language proficiency requirement specified by the client. With the Barakah NPP construction project, KHNP has recorded KRW 1.8 trillion in accumulated sales so far and also created 1,342 new jobs including 939 in Korea.

Cooperation throughout NPP Life Cycle

NPP export provides an opportunity for overseas market entry for the full life cycle of a nuclear power plant, such as not only plant construction, but also operation and maintenance. KHNP signed an operation support contract in 2016 and won a maintenance contract for the Barakah nuclear plant in 2019. With this contract, KHNP will perform a leading role throughout the life cycle of the plant from design and construction to operation and maintenance. KHNP will also participate in key decision-making processes, such as for the plant maintenance plan, and will maintain a close cooperative relationship with Nawah, the local plant operator.



Operating Overseas Hydro Power Business

KHNP's First Overseas Hydro Power Plant Completed

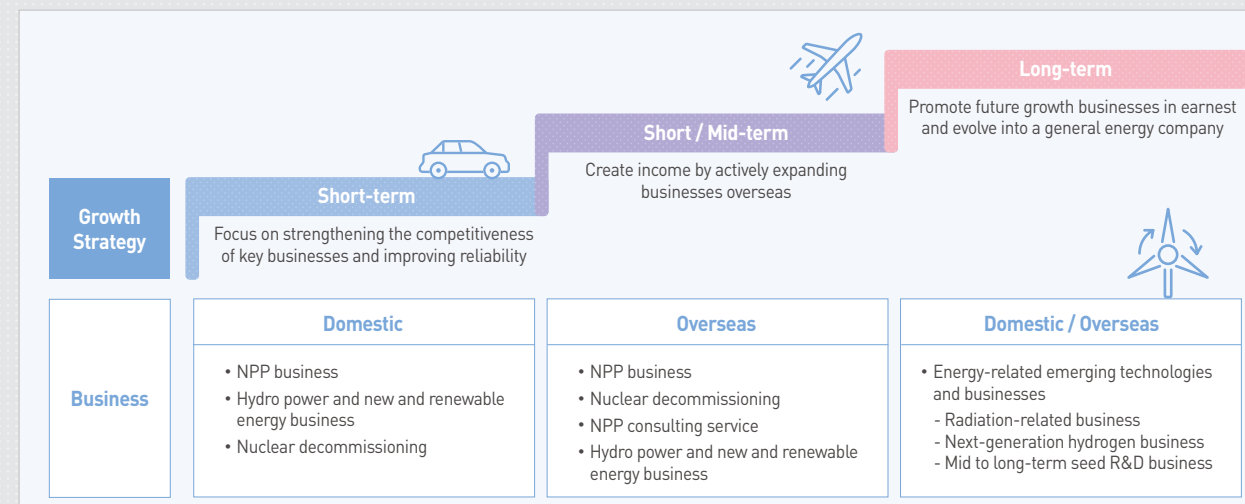
In August 2018, KHNP successfully completed the \$48 million project from Nepal Electricity Authority (NEA) to build the Chameliya Hydro Power Plant. This is KHNP's first hydro power project and also an example of win-win growth where KHNP entered the overseas market jointly with Korea's small and medium businesses in the form of a consortium. With its hydro power plant operating technologies accumulated over a period of 70 years and the experience of winning the hydro power plant construction project in Nepal, KHNP is actively promoting overseas business in Pakistan, Indonesia, and countries of the CIS (Commonwealth of Independent States). In the course of this, KHNP added a hydro power business in Pakistan to its performance.

Successful Promotion of Hydro Power Business in Pakistan

KHNP obtained the exclusive development rights for the Lower Spat Gah hydro power business in Pakistan. This project is to construct and begin operation of a 470MW hydro power plant by 2026. Through power sales over 30 years, KHNP is expected to make stable profits. It is promoted as a public - private project (PPP) with the KP state government of Pakistan and, as Asia Development Bank participates in the capital investment, the financial risks are kept to a minimum. Currently, KHNP is working on five hydro power projects to a total scale of 1,290MW, including two in Pakistan, one of which is the Athmaquam Hydro Power Plant with a capacity of 450MW, and one each in Georgia, Indonesia, and Nicaragua. In the long term, KHNP aims to achieve KRW 930 billion in sales by winning 12 overseas hydro power projects.

Status of Overseas Hydro Power Business		
Region	Facility Capacity (MW)	Project Cost (USD 100 million)
Lower Spat Gah, Pakistan	496	10
Athmaquam, Pakistan	450	13
Lentekhi, Georgia	192	3.8
Tripa-1, Indonesia	48	2
Mojolka, Nicaragua	104	3

Plotting the Course of the Future with the 2031 Mid to Long-term Strategy



▲ KHNP's blueprint for the future

1 2031 Mid to Long-term Strategy Rolling according to Changes in Management Environment

In line with changes in the management environment, such as those regarding the government's energy conversion policy and the global trend to increase new and renewable energy use, KHNP has decided to roll out the existing strategies in order to diversify our mid-to long-term business portfolio, such as to expand our new and renewable energy and overseas businesses. KHNP has added innovative growth to the existing strategic direction with a goal to secure the seeds for new businesses by reflecting the government's innovative growth policy and promoting businesses using technologies of the Fourth Industrial Revolution. With the strategy, KHNP set out five new strategic directions, which will help to strengthen the competitiveness of key businesses, generate revenue thanks to new growth driving businesses, secure the seeds for innovative growth, actively create social value, and improve the sustainability of the system of operations. Under this strategic direction, KHNP has drafted detailed projects that will expand its growth businesses in key areas based on a balance between business and social value and improved execution thanks to the establishment of detailed roadmaps that will guide each business and its functions.

2 Advancing to become a Global Energy Leader through Systematic Strategy Design

Based on our systematic strategies, KHNP is creating a range of outcomes from our overseas NPP and hydro power businesses. In August 2018, we completed the construction of our first overseas hydro power generation plant in Nepal, and we are continuing our efforts to enter other countries, including Pakistan and Georgia. In 2019, KHNP plans to secure a future growth engine by promoting a number of new projects abroad including the conclusion of a contract for the NPP improvement project in the UAE.

3 Growing into a global energy generation and consulting specialist



By implementing the 2031 mid to long-term strategy management plans, KHNP will gradually expand its key businesses overseas based on the NPP business in Korea, and change the business structure in stages by starting new future energies businesses, and through this, growing into a global energy and power generation consulting specialist.

Respect

Overview

Based on the spirit of respect for its employees, KHNP supports employee achievement of work and life balance in order to create a happy corporate culture, and is creating equal opportunities for all by fostering female talent and executing fair recruitment. It is also improving educational infrastructure to strengthen employee abilities and supporting partners to alleviate their financial burden and help them develop new markets. As such, KHNP is dedicating efforts to win-win growth with its stakeholders.

Social value	Job creation	Equal Opportunity	Safety	Environment
Win-Win Cooperation	Local community	Ethical Management	Quality of life	Cooperation & Participation

Task	Activities	Key Performance in 2018	UN SDGs & GRI Standards
Creating Good Workplaces 	<ol style="list-style-type: none"> 1 Activating labor- management communication 2 Promoting work-life balance 3 Supporting work-life balance 4 Encouraging self-enrichment using spare time 5 Providing equal opportunity 	Increased fair recruitment Percentage of new employees: 20% No. of female managers increased: 145	 Goal 5 : Achieve gender equality and empower all women and girls  401-3 : Parental leave 405-1 : Diversity of governance bodies and employees
Fostering Professional Talents 	<ol style="list-style-type: none"> 1 HRD for competency improvement 2 Preemptively securing necessary human resources 3 Continuous HRD infrastructure improvement 	No. of employees receiving HRD training increased: 135,012 Average training budget per person: KRW 4.04 million	 Goal 8 : Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all  404-2 : Programs for improving employee skills
Win-win Growth with Partners 	<ol style="list-style-type: none"> 1 Establishing fair trade culture 2 Maintaining competitive power of NPP supply network 3 Alleviating gap between small and large enterprises 	Satisfaction of partners: 90.2 points Amount of Purchase of Products from SMEs KRW 1,027.8 billion	 Goal 8 : Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all  Goal 9 : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation  203-1 : Infrastructure investments and services supported

Interview



A Future in which Women Can Work with Enthusiasm

Director
 Job Creation & Government Policy Implementation Office
Jun Hye-soo

Currently, I manage the company's job creation policy and help the business department actively pursue the tasks of national affairs.

Although our company has a somewhat rigid organizational culture, with many male employees, it has changed a lot recently. Flexible work hours and half-days, which I believed to be absolutely necessary while raising children, have been introduced. I think it much easier to balance work and family now than in the past, not only for women in regards to the organizational culture, but also on the institutional level.

Particularly helpful in the process of developing as a female manager was a program that encouraged women to share our experiences and help each other overcome difficult times in our work lives, through networking opportunities with external women leaders and trainings provided by the company.

We understand that KHNP has also introduced a women's mentoring system, to enable female employees to network and share their concerns. First of all, I think it is necessary to have institutional support at the company level, so that experienced employees can help mentor newer staff.

The nuclear industry has also been changing a lot, recently.

With regards to technology, the way of working during the Fourth Industrial Revolution is changing. Coinciding with government policy that emphasizes communication with the public, communication and empathy are required, more than ever before. I think this change is a good opportunity for women to play a larger role in the nuclear industry.

Creating Good Workplaces

Activating Labor - Management Communication

KHNP operates a number of communication channels with a goal to form a bond between laborers and management. The CEO spreads the company's management policy by holding talks with employees. In addition, the company promotes organizational stabilization through direct communication with employees, to listen to their difficulties and resolve labor issues. Moreover, through "Dangchan Dudeurim," a system where employees can freely make suggestions about operation improvement, KHNP collects employee suggestions and gives answers regarding these issues. In 2018, KHNP activated participation of, and communication with, employees by establishing a system to give official answers to effective suggestions, such as those regarding childcare leave and improvement of the company's internal assessment system, through the competent departments.

Promoting Work-Life Balance

KHNP encourages employees to leave work at the regular time by organizing the Working Culture TF, to eliminate unnecessary tasks and promote smart working to enhance work efficiency. It also reduced overtime hours by operating a flexible work-hour system, targeting employees on shift work at the hydro power and nuclear power plants. In addition, KHNP has made efforts to establish a culture for employees to take leave freely, such as by deleting the "reason for leave" section in the leave application form and downwardly shifting authority for leave approval from team leaders to part leaders. In 2019, with the goal of promoting the use of long-term leave, KHNP started linking the employee use of long-term leave by at least five days to their internal assessment. As a result, the annual leave usage increased up to 93.8% and the usage of long-term leave increased by 12%p from the previous year. As such, KHNP's efforts contributed to guaranteeing workers' right to taking leave from work.

Supporting work-life balance ! Material Topic

Activating Flexible Hours System

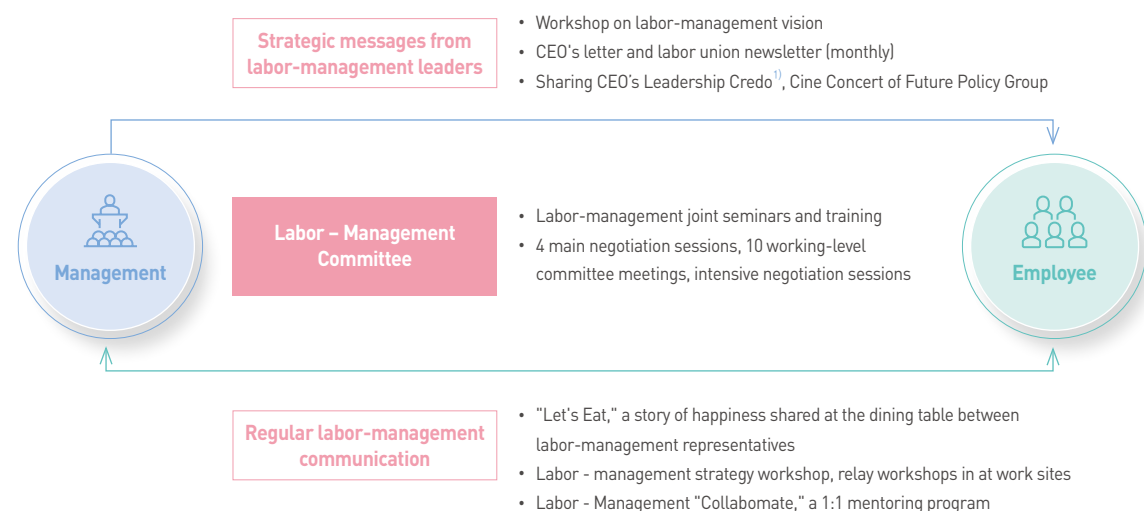
KHNP strives to activate a flexible hours system in which workers can adjust the form of work and working hours according to their lifestyles. The authority for approving a flexible hours system has been assigned to the head of each section, rather than the head of a department, and the minimum working hours under the flexible hours system has been adjusted to at least three hours. In addition, by implementing a system to reduce the working hours during childcare periods, KHNP helps its employees decide working hours by each day of the week so as to work for less than five days a week. At the same time, KHNP alleviated limitations of the flexible hours system, such as by changing the minimum application unit for intensive work from one month to one week, and thus increased the rate of employees using the flexible hours system where they can select their working hours by 44.8% from the previous year. As such, KHNP has been supporting employee work and life balance and contributing to improving productivity by activating the flexible hours system. In October 2019, it plans to distribute a manual on how to effectively use the flexible hours system.

such as from before marriage to childbirth and childcare, in order to provide employees with an environment where they can enjoy life at home and also work. KHNP extended the maternity protection period so that pregnant employees can work for up to two hours a day throughout their pregnancy. In addition, for employees who have children under the age of five, it improved the childcare working hours system where employees can adjust the time for arriving at and leaving the office by up to two hours a day, and also started the childcare leave system. Moreover, as a result of the campaign to encourage male employees to take childcare leave, the number of male employees on childcare leave has increased by 7%p from the previous year.

Encouraging Self-enrichment Using Spare Time

KHNP operates a wide range of work - study programs, which employees can take in their spare time for self- enrichment. From job-related degree courses to language education and programs for qualification license examinations, KHNP unsparingly provides support for employee individual competence improvement. As a result of the efforts to support employee work and life balance, KHNP won the "Leisure Friendly Company" certification from the Ministry of Culture, Sports and Tourism in 2018.

Labor - Management Communication Channel based on Empathy and Participation

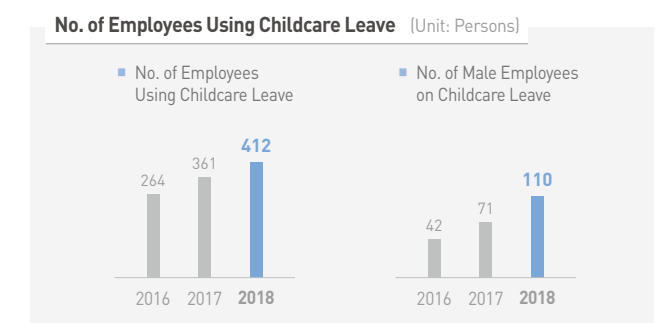
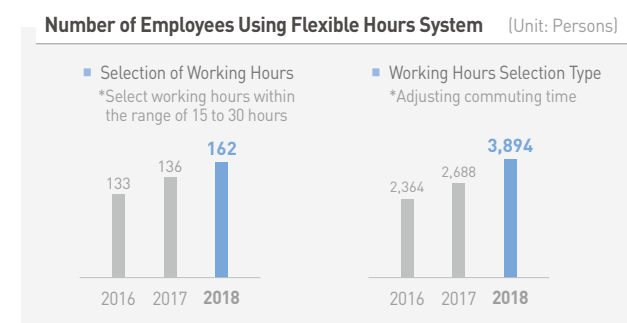
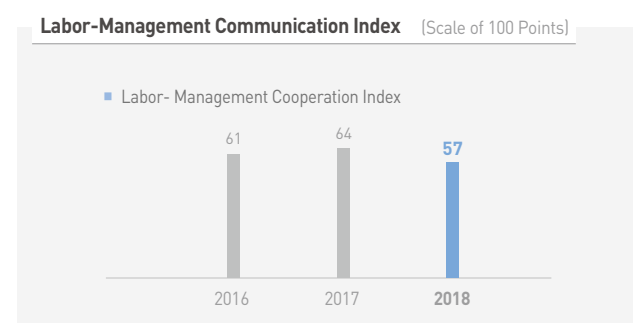
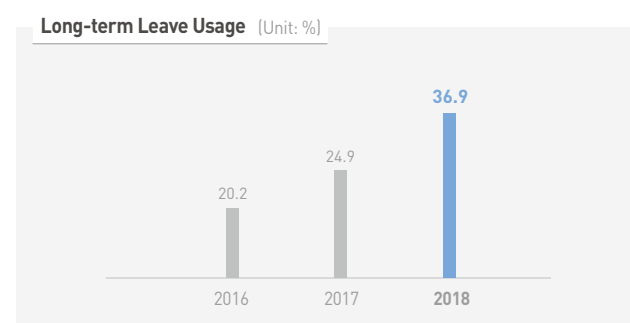
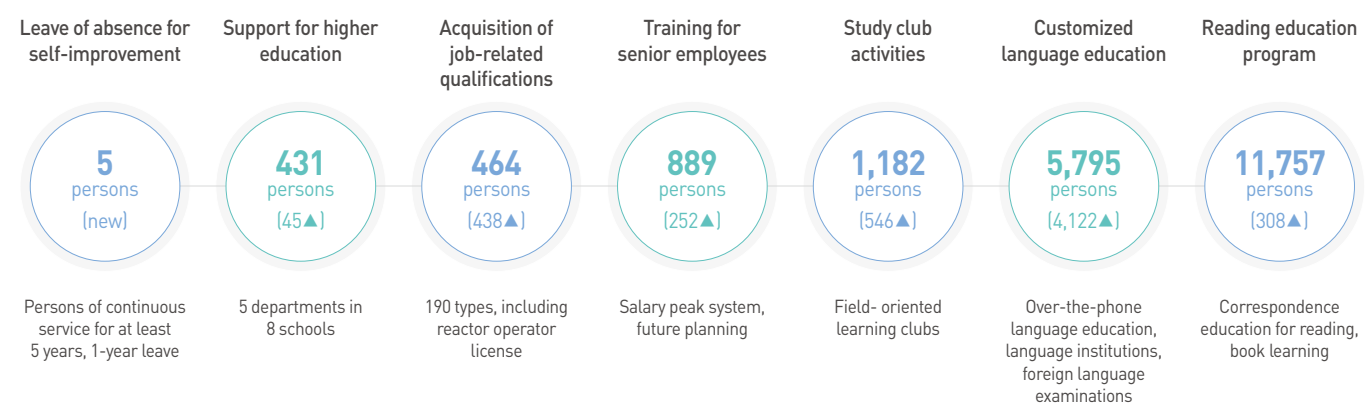


¹⁾ Leadership Credo: Practical and detailed action guide, instructed by the CEO, that all KHNP members must follow for the creation of core values and implementation of the company's management policy

Customized Support to All Employees

With the importance of work and life balance increasing, KHNP is operating various systems covering the entire life cycle of employees,

Work - Study Program Outcomes



Providing Equal Opportunity

Blind Recruitment and Process Improvement

Since 2014, KHNP has been operating a blind recruitment system in order to select competent human resources in a fair and unbiased manner. In 2015, it also introduced the NCS¹⁾ process for recruitment based on the employee performance. KHNP has expanded job-oriented recruitment so that applicants can prepare their majors, qualifications, and capabilities in conjunction with the tasks to be performed after joining the company. In addition, we conduct in-depth observation interviews to screen applicants' potentials, such as personality and values, rather than specifications.

¹⁾ National Competency Standards (NCS): A system established by the state for assessment on the knowledge, skills and attitudes necessary for job performance in the industrial sites

Employing Human Resources in the Relocated Region

In 2019, KHNP set the goal of employment in the relocated region as 21% in order to achieve regionally balanced development and create quality jobs in the relocated region. For the recruitment through principal's recommendation of high school graduates, KHNP raised the goal for employment in the relocated region as 24% and the schools to be included in the recommended recruitment have been expanded from the existing Meister High School to specialized high schools in areas surrounding nuclear power plants, including the relocation of headquarters.

Support to Female Human Resources by Career Cycle

KHNP dedicated efforts to strengthening competitive power by improving representativeness for female workers, and thus securing diversity in its human resources. However, as a characteristic of its business that centers on technical jobs, KHNP was lacking specialized programs and talent pool necessary for expanding female managers. KHNP recognized the situation and started implementing HR management centering on female human resources from the stage of employment to fostering, appointment/promotion and prevention of career disruption.

Management of Female Human Resources by Career Cycle

Item	Employment	Fostering	Appointment/Promotion	Prevention of Career Disruption
Management Details	<ul style="list-style-type: none"> Expand employment opportunities by operating new employment target system for technological fields Eliminate discrimination by practicing blind recruitment 	<ul style="list-style-type: none"> Execute female employee mentoring system as a pilot project in the headquarters Provide education for female employees jointly with specialized institutions and organize special lectures by role models 	<ul style="list-style-type: none"> Assign female managers to key positions in each business/function Double the rate of female employee participation in promotion review committee 	<ul style="list-style-type: none"> Operate educational programs customized to pregnant employees and employees on childcare leave Provide information on the company's status and changed systems on a quarterly basis to employees on leave through management information system
Performance	<ul style="list-style-type: none"> Employed 34 new female employees in technological fields (4%pt from previous year) Rate of female employees who have passed written test to pass interview screening: 28% (5%pt from previous year) 	<ul style="list-style-type: none"> 39 female employees received leadership training at Female Talents Academy 	<ul style="list-style-type: none"> Rate of female executives in technical positions increased by 12.7%pt from previous year KHNP's first class 1 female manager 	<ul style="list-style-type: none"> 81 female employees and families received pregnancy/childbirth/reinstatement educational programs

Increase in the Number of Female Managers (Unit: Persons)



Increased fair recruitment

20%

of new employees as people with disabilities and distinguished service to the nation

Fostering Professional Talents ! Material Topic

HRD for Competency Improvement

KHNP derived key HRD²⁾ tasks by reflecting its management strategies and changes in the external environment. KHNP is striving to foster professional global talents by operating programs for job competency improvement in relation to the company's growth businesses, such as new and renewable energy, along with the programs for general and leadership competencies based on the company's core values.

²⁾ HRD: Human Resource Development

Preemptively Securing Necessary Human Resources

KHNP strives to preemptively foster human resources that are necessary for its growth business areas. KHNP provided immersive English education to employees scheduled for dispatch to the UAE, in order to help them overcome the language barrier in executing operations abroad. It also provided commissioned educational programs in Korea and abroad, as well as within the company, targeting 47 people in time for the nuclear decommissioning service. KHNP also prepared an online training program to assist in employees' understanding of new and renewable energy, and provided 60 employees with customized training abroad, and thus fostered professional human resources for its growth business.



▲ Education In HRD Institute

Continuous HRD Infrastructure Improvement

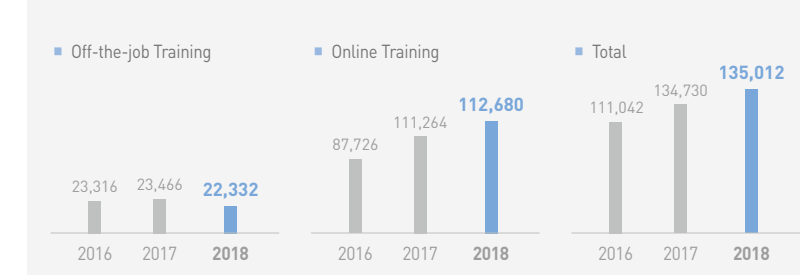
KHNP has established a mobile learning environment where employees can take high-quality lectures on 196 projects anytime, anywhere. In addition, as a result of introducing the smart learning system, which is for the learners to directly take part in developing educational content, KHNP won a prize as an excellent HRD institution from Korea Association of Cyber Education. At the same time, by improving the K-TD³⁾ learning support system, KHNP scored 3.49 points in the HRD level diagnosis infrastructure satisfaction survey, which is higher than that of large enterprises and other public institutions.

³⁾ K-TD (KHNP Talent Development): KHNP's self-initiative learning program (language, license/diploma/degree acquisition, study club)

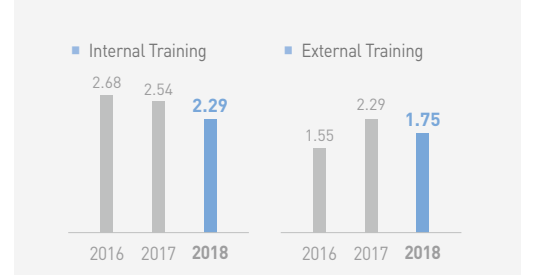
Key HRD Tasks

Division	Strengthen "general competency" based on core values	Improve "job competency" for key and growth businesses	Enhance customized "leadership competency"
Key HRD Tasks	<ul style="list-style-type: none"> Establish safety culture at work sites Create organizational culture of human rights management Strengthen competency of partners Strengthen ethics and integrity education 	<ul style="list-style-type: none"> Improve job competency in key business areas Preemptively foster human resources for growth businesses Expand creative education in the era of the Fourth Industrial Revolution 	<ul style="list-style-type: none"> Provide leadership training for each class areas Spread KHNP Leadership Credo Strengthen leadership training in work sites at power plants Expand leadership training for female workers
No. of Courses	58	1,368	62
No. of Employees to Complete Program	3,327	17,298	1,707

No. of Employees to Receive HRD Training (Unit: Persons)



Average Training Budget per Person (Unit: KRW million)



Win-win Growth with Partners

Establishing Fair Trade Culture

Establishing a culture of fair trade with partners and promoting collaboration by paying fair remuneration is an important element for the healthy growth of a business and the nation. In order to eliminate elements what are unfair for partners and subcontractors and create an environment for fair competition, KHNP has created and implemented three tasks through a status analysis on the environment for fair competition.

Improving System and Employees' Awareness

With the goal of creating an environment for fair competition through improvement of the related systems and employees' awareness, KHNP has attentively listed to business partners' complaints through the "Power Overuse Ombudsman" system in order to monitor and receive reports on unfair practices. In addition, KHNP has strengthened its integrity and ethics standards by amending the Code of Ethics so the organization can eradicate unfair contract-related practices and also provide customized integrity education internally and also to its partners. At the integrity survey conducted by the Anti-Corruption & Civil Rights Commission, KHNP scored 9.65 points in the category of customary practice of power overuse, which is higher than the average score of 8.94 points of all institutions surveyed.

Preventing Bid Rigging and Strengthening Punishments

In order to prevent bid rigging, which is an unfair trade, KHNP improved the bid rigging sign detection system by expanding analysis targets and monitoring frequency. As a result of expanding analysis targets from auxiliary devices to all bidding cases, the number of bidding cases analyzed increased by 11 times from the previous year to 1,553 and four suspected bid rigging cases were detected and reported to the Fair Trade Commission. KHNP contributed to promoting fair competition by strengthening punishments and applying additional penalties to violations of integrity in contracts like bid rigging during the bidding participation restriction period.

Tasks for Fair Competition

Fair competition environment status analysis

- **Power Overuse and Corruption** Staying vigilant to employee power overuse and corruption
- **Fair Competition** Continuation of unfair practices, such as bid rigging
- **Fair Remuneration** Continuation of delay in wage payment and financial difficulties of small and medium-scale suppliers

Tasks derived

- Establish environment for fair competition by improving systems and employees' awareness
- Strengthen efforts to prevent unfair practices, such as bid rigging
- Ensure fair remuneration to small and medium-scale suppliers and laborers

Alleviating Financial Burdens

For win-win growth with partners and subcontractors, it is essential to guarantee reasonable delivery cost estimations and fair remuneration. KHNP reduced the financial burden of its partners by setting the amount for compensation of deferment that occurs in case a partner fails to fulfill their contractual obligations as 30% of the contract amount. In addition, in July 2018, KHNP completed delivery cost adjustments by a total of KRW 23.2 billion considering increases in raw materials and labor cost, and thus led the way in ensuring reasonable contractual amount adjustment and fair remuneration.

Maintaining Competitive Power of NPP Supply Network

In line with the government's energy conversion policy, new nuclear power plant construction has been put to a stop and extension of lifespan of old nuclear power plants is prohibited. As a result, Korea's nuclear power plant market is forecast to be reduced in phases. In a status survey of partners conducted in July 2018, 21% of respondents answered that they are considering reduction of or withdrawal from nuclear power business. At this, KHNP, with the CEO at the lead, identified the needs and difficulties of its partners through direct communication and strengthened support to provide substantial assistance.

Support to Prevent Supplier Separation

As nuclear power plants in Korea are forecast to decrease in the mid to long term, KHNP promoted preemptive support to prevent supplier separation and maintain a healthy supply network. KHNP provided 1:1 expert mentoring service and basic and practical education on quality in the nuclear fields to suppliers. In addition, it alleviated the entry barrier by simplifying the supplier registration review process through

reestablishment of the non-safety level supplier quality criteria. In addition, KHNP improved contract system including the execution of price adjustment for factors causing an increase in delivery cost. As a result, the number of qualified suppliers increased by 5% from the previous year.

Supplier Relationship Management (SRM) System

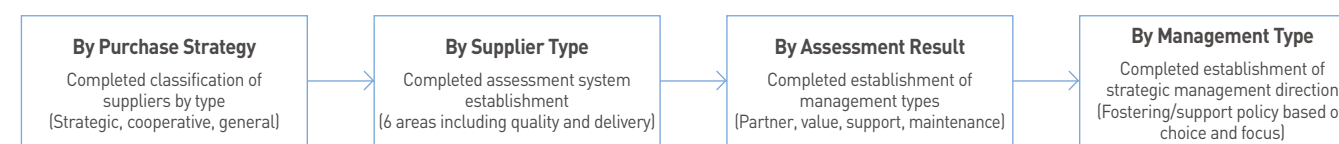
To strategically manage key suppliers according to their level of importance and strengthen customized fostering and support system for partners by management type, KHNP introduced the SRM (supplier relationship management)¹⁾ system in 2018 and is currently promoting the SRM system establishment. KHNP plans to complete the establishment and pilot operation of the SRM system in 2019 and start full-scale system operation in 2020. In addition, by 2023, it plans to improve supply network through optimized and strategic supplier management and strengthen competitive power together with its partners.

¹⁾ SRM (Supplier Relationship Management): A strategy to optimize the supply network and strengthen competitive power by establishing strategic cooperative relationships with partners

Tasks for Competitive Power of NPP Supply Network



SRM System



Number of bid rigging cases analyzed

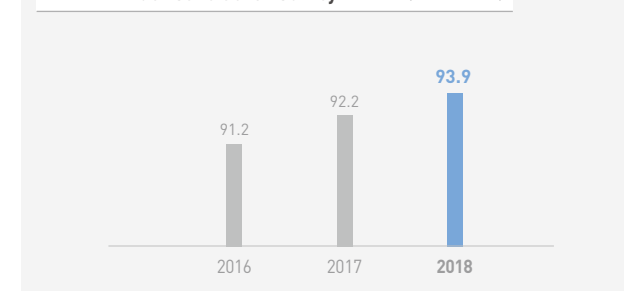
1,533

(increased by 11 times from previous year)

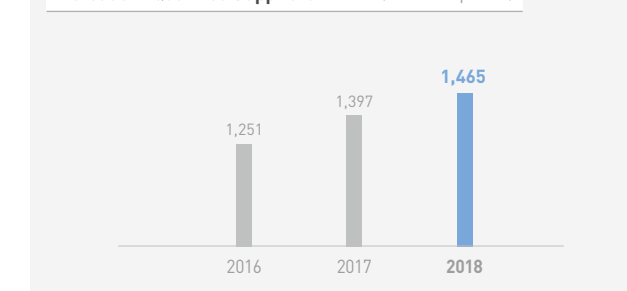
Delivery cost amount with the cost increasing factors recognized

Adjustments completed for a total amount of
KRW 23.2 billion

Win-Win Index Satisfaction Survey (Unit: Points)



Increase in Qualified Suppliers (Unit: Companies)



Alleviating Gap between Small and Large Enterprises

Discovering New Growth Engine for SMEs

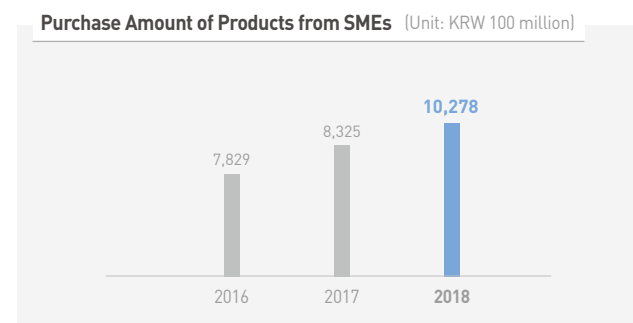
With a goal to support overseas market entry by small and medium businesses, KHNP organized a joint market development team with 56 partners. The team visited the UAE and Russia, KHNP's NPP export targets, and held consulting sessions with major buyers in the countries. The export amount recorded by companies that participated in KHNP's various export support programs including overseas supplier registration support was KRW 67.5 billion, which increased by 20% from the previous year. In addition, to resolve difficulties experienced by its partners, diversify business items including new businesses, such as nuclear decommissioning, and play a pivotal role, KHNP opened the SME Support Center and expanded support to its partners by raising an energy fund to a scale of KRW 50 billion to support the growth of the NPP ecosystem.



▲ Joint market development team sent to the UAE

Creating Stable Growth Environment by Life Cycle

KHNP has been supporting the establishment of a stable environment for the growth of its partners according to their life cycle, such as from entry to the industry to development to maturity. It provides support in terms of qualified partner registration, acquisition of domestic and international certifications and loans for win-win growth to the companies that have just entered the NPP ecosystem. For those in the phase of development, KHNP supports them by organizing buyer consulting sessions, helping them participate in exhibitions held in Korea and abroad, and offering educational programs. Lastly, to the companies in the phase of maturity, KHNP provides process innovation and facility improvement consulting support. As a result, the purchase amount of products from small and medium businesses has increased by 23% to KRW 1,027.8 billion. In addition, companies receiving support for productivity improvement achieved a financial outcome to a scale of approximately KRW 5 billion.



Promoting Inclusive Win-wind Growth

In an effort to create a happy workplace by helping partners improve their working conditions, KHNP supported the total cost of general health examination for 2,000 employees of its partners. In addition, KHNP held the "Partner's Day" event with its partners in December 2018 and presented scholarship certificates to 23 children of employees to strengthen welfare for partners. Moreover, KHNP has contributed to improving working conditions of its partners by establishing the "Naeilchaeum Mutual Aid" support system in order to narrow the pay gap.



▲ Partner's Day event

Creating Innovation-friendly Environment

With a goal to strengthen competitiveness by fostering innovative small and medium businesses, KHNP has been actively supporting quality and technological competency improvement in the nuclear fields. KHNP has selected 43 projects through internal and external proposal system and supported R&D cost for the projects. It has also shared its technological power through 169 cases of technology sharing and eight cases of technology transfer. In addition, KHNP dedicated efforts to protecting technologies developed by small and medium businesses, such as through seven cases of technology data transaction record registration and three cases of technological protection consulting. Moreover, KHNP introduced technological products developed by small and medium businesses through the pilot procurement system and, as a result, the amount of KHNP's purchase from venture businesses increased by 12% from the previous year and the amount of purchase of the products selected for development increased by 62%.

For 2,000 employees of partners,
Total cost of general health examination supported

KHNP opened the first "Happy Energy Store" for socioeconomic revitalization



▲ The first "Happy Energy Store" opened

1 Secured a market for socioeconomic enterprises

In September 2018, KHNP opened the first "Happy Energy Store," a marketplace for social enterprises, at its head office building in Gyeongju with a sense of responsibility that public enterprises must lead the way in realizing a "human-centered economy" and an "inclusive Korea," which are pursued by the government, through providing support to socioeconomic enterprises experiencing difficulties in finding markets and achieving self-reliance by themselves on their own, and supplementation of the profit-centered market economy.

2 Promoting happy purchase with employees' participation

In the store, a wide range of products from local specialties to safety items were displayed according to the employees' demand. The Social Value Support Center was also opened to provide various communication services including consultation for public procurement. On the day of the store opening, "Labor - Management Joint Market for Chuseok Gifts" was opened to contribute to local economy revitalization. Around 40 socioeconomic enterprises in Gyeongsangbuk-do region sold agricultural and food products as well as gift sets. KHNP employees visited the booths to purchase Chuseok gifts and promised to fulfill their social responsibility for the local communities.

3 Won Presidential Commendation at Public Procurement Promotion Contest

Through the "Happy Energy Store," KHNP strengthened the capacity of 112 participating companies to stand on their feet by providing them with support in product display and sale. With its efforts to play a key role in public procurement activation recognized, KHNP was selected as an excellent public institution for public procurement and won the Presidential Commendation at the Public Procurement Promotion Contest in November 2018. By supporting socioeconomic enterprises, KHNP will improve public awareness about them, lead win-win growth in local communities, and cooperate with them in various fields.

Ultimate Safety



Overview

KHNP is continuously improving its serious accident prevention and response system in order to secure safety for the people including local residents and workers. KHNP is improving the disaster response capacity of the people by organizing exercises with residents' participation. The company is also creating a safe workplace by expanding management and inspection of work sites through the application of innovative technologies. In addition, for reinforced cyber security, KHNP is advancing its artificial intelligence security system. As such, KHNP is making efforts to increase the information security level of not only itself, but also its partners.

Social value	Job creation	Equal Opportunity	Safety	Environment
Win-Win Cooperation	Local community	Ethical Management	Quality of life	Cooperation & Participation

Task	Activities	Key Performance in 2018	UN SDGs & GRI Standards
Risk management for National safety 	<ol style="list-style-type: none"> Establishing KHNP disaster management system Prevention of natural disasters Prevention of chemical accidents Participation by residents near nuclear plants 	No. of chemical accidents 0 accidents for four consecutive years "Safe Korea Exercise for Disaster Response" Selected as outstanding institution for disaster response	 Goal 3 : Ensure healthy lives and promote wellbeing for all Goal 11 : Make cities and human settlements inclusive, safe, resilient and sustainable 416-1 : Health and Safety Impact Assessment
Nuclear Plant Operation with Top Priority on Safety 	<ol style="list-style-type: none"> Prevention of occupational accidents Management of high-risk work sites 	No. of serious occupational accidents 0 incidents Exposure dose of radiation workers 1% of legal standard Ensuring zero-accident operation of Wolsong 2 for 8 cycles	 Goal 8 : Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all 403-2 : Serious occupational accidents
Cyber security management 	<ol style="list-style-type: none"> Establishing cyber risk response system Artificial Intelligence Security System Personal Information Protection Management System 	No. of personal information leakage incidents 0 incidents MoTIE information security inspection Excellent level	 Goal 9 : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation 418-1 : Customer's Personal Information Protection

Interview



Creating safe NPP construction sites through strict safety management

Safety Supervision Division, Samsung C&T Corporation
Park Seung-ju

Samsung C&T Corporation is currently participating in KHNP's construction project for the main facilities of Shin-Kori 5 and 6. The Safety Supervision Division handles safety-related operations in the facility construction project sites. As all elements, including working environment improvement, health management, and safety education are important in ensuring worker safety, Samsung C&T Corporation, together with KHNP, is promoting four activities to achieve advanced safety management. These are safety culture establishment, safety management in line with the Fourth Industrial Revolution, standardization of NPP construction safety management, and emotional safety management.

A program that particularly influences education for safety is the activity to experience elements of hazards in worksites and learn the methods of safe response at the safety experience and education center of KHNP. This program has been made compulsory for new workers and managers in order to enhance the safety awareness level of worker. In the past, the level of awareness on the importance of using protective equipment or safety belts was low. However, as a result of the efforts to arrange for safety inspections conducted by the representatives and managers of construction companies, and introduce various safety standards from the U.S. and the U.K., the level of safety culture in Korea's construction companies has improved enough that these companies are even handling safety management operations in overseas locations.

One of the most important elements for building the world's best nuclear power plants is safety. However, the elementary, middle, and high school education systems of Korea include almost no curriculum on safety. So, in most cases, the level of workers' safety awareness during the initial phase of an operation is low. To improve this situation, intensive development of, and investment in, safety education programs are necessary, and it is also important for workers to develop interest and practice safety in their routine operations. Samsung C&T Corporation will continue dedicating the utmost efforts to establishing a safety culture that is practiced by all and creating safe NPP construction sites.

Risk management for National safety ! Material Topic

Establishing KHNP Disaster Management System

KHNP has specialized its disaster management system for natural, social, or radioactive disasters in order to protect the public and workers from these various disasters. Notably, KHNP established the business continuity management system (BCMS), which enables continuation of key projects even during times of disaster, and obtained the ISO 22301 certificate. As such, KHNP has established a top-level disaster management system among public enterprises.

Prevention of Natural Disasters

Reinforcing Seismic Performance in Key Facilities

KHNP applied reinforcement materials to structures and equipment of all 24 operating nuclear power plants and strengthened and replaced devices with performance that was falling short of standards in order to ensure the safety of the public and employees from natural disasters, such as earthquakes. As a result, it improved seismic safety up to 63 times the intensity of the magnitude 5.8 earthquake that occurred in Gyeongju in September 2016. In addition, through maintenance on earthquake monitoring facilities, it optimized the locations and types of the facilities that had been different by nuclear power plant. Moreover, KHNP checked the structural soundness and safety of containment buildings for reactors, and thus strengthened its earthquake response capacities. KHNP will continue striving to procure technologies in preparation for major earthquakes and ensure safety even in the case of large-scale disasters.

Strengthening Water Management Competency

KHNP conducted a study to verify and improve the discharge capacity of Paldang Dam in order to bolster its role for flood response including prevention of damage caused by inundation of areas surrounding the dam. In addition, it improved water management capacities by establishing a remote integrated management system and real-time dam image and information disclosure system so as to ensure a systematic dam management function. KHNP also installed an integrated water resources management center, with the goal of enhancing the ability to respond to floods, targeting dams on the Han River. As a result, its power plants did not suffer flood damage despite several typhoons over the summer.

Prevention of Chemical Accidents

To prevent chemical accidents that can lead to a serious damage, KHNP derived 75 insufficiencies in the facilities and their operating systems by conducting safety inspections and detecting inappropriate locations of devices, such as emergency showers, targeting facilities in the nuclear power sites where harmful chemicals are handled. Through an assessment of risk levels by item on the insufficiencies derived, preferential actions were taken on 13 items requiring intensive management. As a result, KHNP recorded 0 chemical accident in 2018. In addition, KHNP transparently disclosed information on chemical accidents for response to such accidents, improved the handling manual, such as by establishing an automatic notification procedure, and held statutory training sessions and accident response drills. Moreover, KHNP reinforced accident prevention items, such as personal protective equipment, and devices including detection monitors in all nuclear plants, and thus improved the chemical accident recovery system.

Exercise with Residents' Participation

KHNP has been leading the way in improving the national emergency response capacity by strengthening exercise programs with residents' participation so that all people can protect themselves from radiation accidents. KHNP held radiation accident prevention exercises by a total of 53 times including the national joint exercises and exercises in each power plant. It also encouraged residents' participation through the respective local governments. As a result, in 2018, 4,705 residents participated in the exercises, which increased by 38% from the previous year. With its efforts for disaster and accident response recognized, KHNP was selected as an outstanding institution for disaster response at the "Safe Korea Exercise for Disaster Response 2018" led by the Ministry of the Interior and Safety.



▲ Website informing locations of assembly points and shelters

Participation by Residents Near Nuclear Plants

Development of Website for Disaster Action Plan

KHNP developed "Compass for Disaster Escape" website by collecting opinions suggested by Open Citizens' Group in order to provide action plans and guidelines to residents living near nuclear power plants in case of an emergency. When resident enter their current locations in the web, the nearest assembly points or shelter are informed based on the residents' traveling time. With an intuitive animation technique, this website provides action plans residents can easily follow in different situations. KHNP is also providing directions for emergency response by the level of emergency alert or warning issued so as to improve the residents' capability for response to radiation accidents.



▲ Disaster response exercise

Type	General Disasters		Radioactive Disasters
	Natural Disasters (Earthquake, tidal wave, typhoon, heavy rain)	Social Disasters (Fire, explosion, strike)	
Management / System	National safety management detailed execution plan, disaster management guidelines, business continuity management system (BCMS)		Disaster prevention measures
Prevention Manual	Disaster response manual, for incidents such as earthquake or flood	Threat response manual, such as terrorism	Radiation emergency plan
Key Tasks of 2018	<ul style="list-style-type: none"> Reinforce seismic performance for operating nuclear plants Establish an integrated water management system 	<ul style="list-style-type: none"> Improve chemical facilities and management Improve the chemical accident response manual 	<ul style="list-style-type: none"> Internalize disaster prevention training and exercises Develop "Compass for Disaster Evacuation"

Business continuity management system
Re-obtained
ISO 22031
certificate

Installed Integrated Water Resource Management Center

0 chemical accidents
(for four years in a row)

"Safe Korea Exercise for Disaster Response"
selected as
Outstanding Institution for Disaster Response

Nuclear Plant Operation with Top Priority on Safety ! Material Topic

Prevention of Occupational Accidents

Expanding Management and Inspection

The results of accident status analysis for each division, conducted since 2010, indicates that 93% of accidents occur in KHNP's partners. KHNP distributed 20,000 copies of an industrial safety guidebook. In addition, it increased the cost funding for safety management of partners by approximately KRW 650 million. At the same time, KHNP expanded the application of internal assessment safety indicators, which had been limited to its nuclear and hydro power branches, to all branches including the head office, and thus enhanced safety awareness of its members. Moreover, KHNP improved safety-related expertise by commissioning safety management operations to external agencies specializing in the field.

Internalizing Safety Awareness

KHNP executed special safety management, such as customized safety inspection and training, in order to internalize safety awareness, centering on its partners and temporary visitors. The company is dedicating the utmost effort to creating a workplace that is free from the risk of accidents.

Smart Field Safety Management

KHNP uses innovative technologies and equipment in order to fundamentally improve high-risk working environments where it is difficult for people to work. The company expanded the installation of the intelligent CCTV system, which automatically detects fire outbreaks and collapse of workers, with the goal of minimizing safety blind spots in construction sites where the risk of accident occurrence is high. In addition, it developed a robot for inspection of high-radiation zones and completed pilot application to Shin-Kori 3. KHNP eliminated the risk of falling by conducting a safety inspection on the slopes of a dam for Muju Pumped-storage Power Plant using drones. It also provided training on drone programming and use. In 2019, KHNP plans to expand smart safety management by conducting safety inspections using drones in other hydro and pumped-storage power plants.

Management of High-risk Work Sites

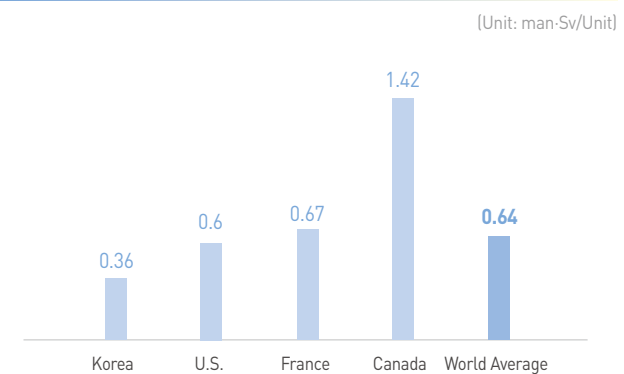
Radiation Dose Management

Continuous exposure to high-dose radiation is harmful to human body. Therefore, radiation dose management is a must for people working in high-risk work sites. To reduce radiation dose of the employees of its partners and subcontractors, KHNP drastically lowered the ALARA¹⁾ committee standard dose from 200man-mSv²⁾ to less than 50man-mSv. In addition, considering the radiation work hours and rate of radiation dose, KHNP strengthened the radiation dose management for radiation workers by applying a standard for suspension of high-dose operations. KHNP is keeping the rate of occupational dose by facility to the global low. It will dedicate the utmost effort to radiation dose management for safety of workers.

¹⁾ ALARA (As Low As Reasonably Achievable): Concept of reasonably reducing exposure by taking into account the costs of the International Commission on Radiological Protection.

²⁾ Collective Dose (man-Sv): When a multiple number of people are exposed to radiation, this refers to the total amount of radiation dose.

Radiation Dosage by Country [Unit: man-Sv/Unit]



Minimizing Occupational Dose through Facility Improvement

To lower occupational dose of radiation workers, KHNP has installed three additional portable tritium removers to reduce the concentration of tritium, a major cause of radiation dose in heavy water reactors. KHNP is also promoting facility improvement by changing the radiation shield material in the reactor buildings from lead to tungsten. In addition, it injected zinc to the reactor coolant, and thus reduced radiation dose by more than 44%. Through facility improvement for radiation dose reduction, the dose of radiation workers in 2018 was recorded as 0.57mSv/person, which is only 1% of the permissible dose of 50mSv/person prescribed by the law.

Health Management of Radiation Workers

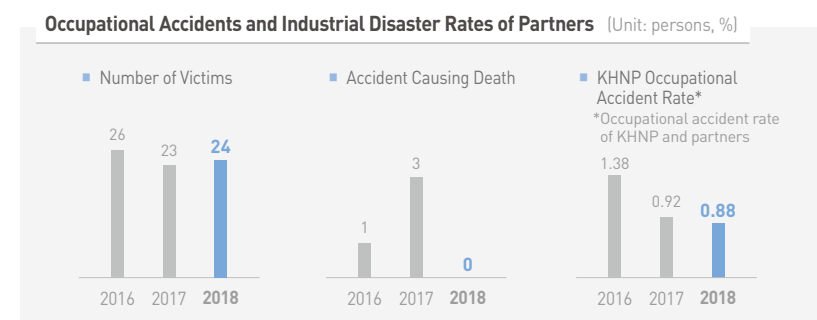
KHNP supported general health examination for the employees of its partners working in controlled areas in order to provide a safe working environment. Considering characteristics of the jobs performed, KHNP helped these workers receive detailed health examinations on 47 items by adding examination items other than those specified by the law, such as gastric endoscopy, abdominal ultrasonography and tumor market test. With the effort, KHNP contributed to improving working welfare for radiation workers.

Workplace without Safety or Health Risk

With a goal to create a safe working environment from various industrial accidents, KHNP organized the safety and health management system improvement TFT dedicated to creating a "workplace without safety or health risks" for its partners, and thus amended 23 regulations including the management guidelines. It collected "safety pledges" in the field so as to improve the workers' safety awareness and also guaranteed to support safety management cost by 100% upon contract signing. In 2018, KHNP recorded "zero" for the number of serious occupational accidents. KHNP will continue on its efforts to create a safe workplace, such as by expanding support on safety and health management system certification cost of its partners.

Safety Awareness Internalization Activities

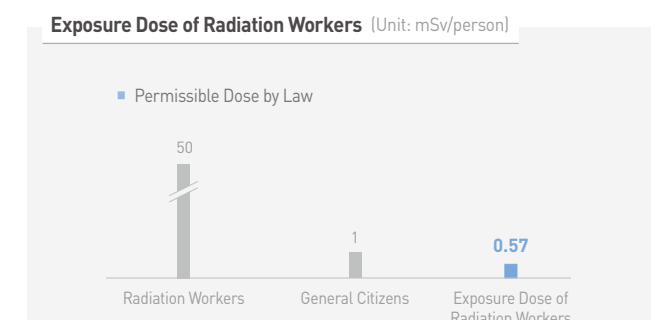
<p>Execute special management of temporary Intensively visitors</p>	<ul style="list-style-type: none"> Implement safety pledge system and provide customized training Make it compulsory for visitors to wear a safety pledge card Provide occupational safety field training to field partners 	<p>Strengthen participatory/pre-operation safety training</p>	<ul style="list-style-type: none"> Provide training led by supervisors using industrial safety guidebook Operate experience-type occupational safety training center at Saeul Nuclear Power Site
<p>Execute safety inspection in vulnerable areas</p>	<ul style="list-style-type: none"> Conduct intensive joint inspection of construction sites by head office and experts <ul style="list-style-type: none"> Field inspection of major accidents in construction sites, led by the head office Execute intensive safety inspection at work sites, jointly with external experts in preparation for the thawing season 	<p>Arouse attention to occupational accidents</p>	<ul style="list-style-type: none"> Install signboards showing accident cases in areas where accidents have occurred and are likely to occur (approx. 120 areas) Expand distribution of monthly "Safety Magazine" to employees of resident suppliers



Funding for safety management of partners

Increased by approx.

KRW 650 million



Cyber Security Management

Establishing Cyber Risk Response System

Establishment of Security System for Nuclear Power Plants

With cyber threats on nuclear power plants continuously increasing, reinforcement of cyber security system for safe nuclear power plant operation is being required. KHNP divided the NPP control system facilities into seven levels, applied plans to prevent unauthorized information change by each facility, and thus met the cyber security technological requirements for nuclear power plants in the U.S., the strictest standard in the world. In addition, KHNP fundamentally blocked the cyber infringement routes by applying 101 security measures to each of approximately 10,000 control system facilities in nuclear power plants, drastically strengthened security in comparison to national facilities of other institutions in Korea, and thus established an NPP security system of the highest standard in the world.

Improving Information Security Competency of Partners

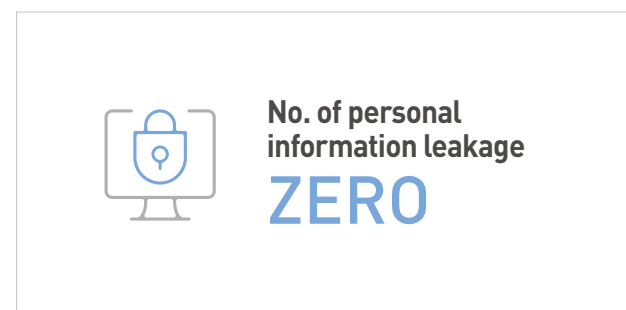
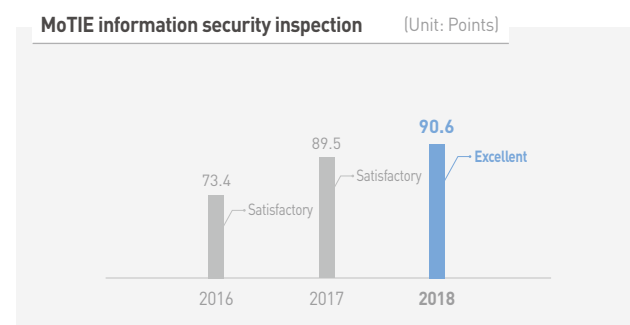
In order to prevent the risk of data leakage and security infringement that can occur in its partners without an internal security system, KHNP expanded the application of integrated information protection system to all partners and established the Anti-APT system for defense against continuous threats to specific targets. As a result, the routes of security accident occurrence in the course of document distribution were fundamentally blocked and KHNP recorded "zero" for the number of document leakage accidents.

Artificial Intelligence Security System

KHNP has established an artificial intelligence system to strengthen its cyber infringement prevention and response capacity. This system innovated the threat information analysis process as it recognizes threat information on the Internet across the world and can analyze 730 million cases of threat on a daily basis through the artificial intelligence technology. As information analysis previously conducted by monitoring staff is executed using artificial intelligence technology, the length of time required in analysis has been reduced drastically and the accuracy and quality of analysis have been advanced.

Personal Information Protection Management System

KHNP enhanced security for the entire life cycle of personal information collection, use, provision and destruction in order to secure reliability for information security. It obtained a certificate for personal information management system (PIMS) targeting its website, bidding system and access control system, operates a system to monitor personal information access records and abnormal activities on a real-time basis and improved the level of its personal information management system. As the importance of personal information protection has been increasing following the effectuation of the General Data Protection Regulation (GDPR) in Europe in May 2018, KHNP's effort for security improvement, such as by establishing a response system, was recognized. At the diagnosis of personal information protection level conducted by the Ministry of the Interior and Safety, KHNP won "excellence" level for four years in a row.



Conducted nuclear plant stress testing to prepare for extreme conditions



▲ Independent verification by IAEA on the results of stress testing on working nuclear plant



What is Stress Testing?

Since the Fukushima nuclear accident in Japan, the level of public concern and interest in safety of nuclear power plants under extreme conditions exceeding the design criteria has been heightening. KHNP conducts stress testing to evaluate the safety and response capacity of nuclear power plants by assuming an extreme situation of serious natural disaster where most of a nuclear power plant's safety facilities lose their functions.



Responding to Extreme Conditions through Stress Testing

As a measure for response to extreme conditions, KHNP conducted stress testing on Kori 1 and Wolsong 1, the plants for continued operation, in 2013. Through the stress testing, the company derived 71 safety improvement items and has since been implementing them. The Nuclear Safety and Security Commission (NSSC) resolved in September 2015 to expand the application of stress testing to all working nuclear plants in Korea. NSSC proposed assessment guidelines based on the stress testing method of the EU and, in June 2019, KHNP completed stress testing on all of 22 working nuclear plants according to the guidelines.



Securing Reliability through Verification by IAEA

For international verification on the reliability and validity of stress testing conducted in Korea, KHNP promoted an independent verification by International Atomic Energy Agency (IAEA) on the stress testing results of Hanul 3, its representative nuclear plant, in 2018. The verification results indicated that the stress testing conducted in Korea conforms to the IAEA safety standards and is equipped with a very sound system. The four stress testing cases were selected as "Good Practice". KHNP will reinforce safety of nuclear power plants by systematically implementing safety improvements found to be necessary as a result of the stress testing on nuclear plants in Korea and also of verification by NSSC.

Social Value

Overview

KHNP is striving to create new jobs and convert non-regular workers to regular. In addition, it is reducing the usage of harmful substances and the amount of waste discharge in order to minimize environmental impacts in all processes of its business and is also leading climate change response by managing the greenhouse gas emissions. At the same time, KHNP is performing resident-friendly activities, such as to foster local talents and establish photovoltaic power generating system in agricultural management, along with a variety of other social contribution activities targeting the vulnerable class.

Social value	Job creation	Equal Opportunity	Safety	Environment
Win-Win Cooperation	Local community	Ethical Management	Quality of life	Cooperation & Participation

Task	Activities	Key Performance in 2018	UN SDGs & GRI Standards
Creating Social Value 	<ol style="list-style-type: none"> Leading social value creation Creating quality jobs 	Agreement for conversion to regular positions achieved with 2,097 workers subject to conversion Number of jobs created in the private sector: 19,944 Opening and operating an onsite NPP workers training center	Goal 8 : Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all 401-1 : New employment
Minimizing Environmental Impact 	<ol style="list-style-type: none"> Establishing environmental preservation promotion system Waste management Environmental pollutant discharge management Biodiversity conservation Response to climate change 	Green product purchase amount: KRW 20.7 billion Climate change adaptation assessment result: Excellent	Goal 13 : Take urgent action to combat climate change and its impacts Goal 14 : Conserve and sustainably use the oceans, seas and marine resources for sustainable development 305-1,2 : GHG emissions 306-1,2,3 : Waste water and waste
Win-win Growth with Local Communities 	<ol style="list-style-type: none"> Establishing local development and social contribution promotion system Industry-linked shared value creation Local economy revitalization Contribution activities for the socially vulnerable UN SDGs Best Practices 	Supported cost of surgery to prevent blindness by KRW 55,126,000 Supported health examination for local residents to a scale of KRW 1.8 billion	Goal 11 : Make cities and human settlements inclusive, safe, resilient and sustainable 413-1 : Operations with local community engagement, impact assessments and development programs

Interview



Realizing social value by installing solar-powered streetlights

Road Division, Gyeongju City Government
Lee Jeong-hwan

The Road Division of Gyeongju City Government is in charge of operations for road management, including the opening and extension of roads and the installation and maintenance of streetlights and safety lighting. In order to contribute to the establishment of a social safety network by creating a safe environment for pedestrians at night, Gyeongju City Government has been working on the Safety Streetlight project together with KHNP. Starting with the installation of 66 solar-powered streetlights in 2015, Gyeongju City Government had installed more than 280 solar-powered streetlights by 2018. The solar-powered streetlights produce a positive ripple effect to contribute to improving the village environment and safety of pedestrians at night.

In 2019, we have been implementing a plan to improve the residential environment for citizens living in Buji-ri, Naenam-myeon, the epicenter of the earthquake that hit Gyeongju in 2016, by installing 30 solar-powered streetlights in the area. In addition, we plan to guarantee safe fishing activities of local fishermen by installing hybrid wind and solar-powered streetlights at Daebon Port and Gagok Port in Gampo where successful wind power generation is possible, and also to provide a new attraction to tourists visiting the ports.

Being in charge of streetlight-related operations for Gyeongju City, I hope the Safety Streetlights will evolve into "smart streetlights" that will also function as a guide and protector for citizens. Gyeongju City Government, through cooperation with KHNP, will serve as a backbone for the local communities, by contributing to reducing the daytime and nighttime crime rates in vulnerable areas through installation of CCTVs and electronic signboards, and assisting in handling emergency situations occurring in rural regions that have entered the phase of an aging society.

Creating Social Value

Leading Social Value Creation

Mid to Long-term Strategy for Social Value Creation

With the government's policy to encourage social value creation by public institutions increasing and the industry's pursuit of social values expanding, KHNP established the mid to long-term strategies for social value creation. With job creation, safety, local communities and win-win cooperation as key values, KHNP will derive social values based on its businesses, and thus advance to a general energy company that leads social value creation.



▲ Social value creation policy forum

Social Value Creation Policy Forum

KHNP held the "social value creation policy forum". At the forum, CEO Chung Jae-hoon, the co-chairperson of the Social Value Committee, and the Committee members shared various opinions about the social value creation activities currently promoted by KHNP, plans to objectively measure social value creation performances and methods to maximize the effect of social value creation in the local communities. KHNP reestablished the direction for operation promotion in the second half of 2019 by reflecting the opinions and will execute operations centering on social value creation by sharing the direction with all branches.

Strategies for Social Value Creation			
Vision	General energy company that leads social value creation based on trust and communication		
Strategic Direction	To establish foundation for creation of substantial outcomes	To maximize link with the company's growth engines and synergy between social values	To operate feedback system based on engagement/communication in all business processes
Road Map	Establish foundation for social value creation (~ 2019)	Establish differentiation by social value (~ 2021)	Spread values throughout the industrial Ecosystem(~ 2023)
2018	To establish 129 action plans, 43 tasks and 24 detailed strategies for social value creation in 9 fields		
Detailed Strategies for Social Value	<p>Job creation</p> <ul style="list-style-type: none"> Establish comprehensive job creation management model Promote company-wide job creation project planning Strengthen communication and feedback system in all business areas <p>Equal opportunity and social integration</p> <ul style="list-style-type: none"> Link equal opportunity to development of qualified human resources Guarantee sustainability of the provision of equal opportunities within the organization Realize expansion of social integration through a link between job creation and win-win growth <p>Safety</p> <ul style="list-style-type: none"> Execute safety management by business type with characteristics of each business reflected Actively spread safety management expertise to partners 	<p>Environment</p> <ul style="list-style-type: none"> Establish safety and environmental management plan by reflecting new/overseas businesses <p>Win-win cooperation</p> <ul style="list-style-type: none"> Support partners through a link to business conversion Design services customized to the level of maturity of partners Establish win-win cooperation system based on the strengthened role of partners <p>Local community</p> <ul style="list-style-type: none"> Strengthen local community development with a focus on win-win growth Promote projects to support economic independence of local communities by strengthening capacities of local residents Support maintenance and strengthening of healthy communities 	<p>Ethical management</p> <ul style="list-style-type: none"> Establish human rights management assessment and operating system Establish an ethical management organization with integrated function of strategy development and operation Establish ethics risk assessment and prevention system <p>Quality of life</p> <ul style="list-style-type: none"> Eliminate safety blind spots for the vulnerable class Advance family-friendly system based on productivity improvement Establish integrated quality of life assessment and feedback system <p>Cooperation and engagement</p> <ul style="list-style-type: none"> Specify social values through public engagement Promote company-wide integrated management of national engagement and communication Operate customized communication channels by stakeholder

* The social value area that can be effectively created by KHNP selected through internal and external stakeholder surveys

Creating Quality Jobs

Strategy to Promote Job Creation

KHNP actively reflects the trend of the government's employment policy, such as conversion of non-regular workers to regular positions and job creation in the private sector. It has also established, and thus is implementing a job creation strategy system in preparation for the mid to long-term changes in its management environment including the implementation of energy conversion policy. Under the goal to "lead social value creation with the efforts to create sustainable and innovative quality jobs," KHNP has set the increase of jobs, improvement of the quality of jobs and job creation in the private sector based on its business as the three promotional directions. As a leading public institution in the field of energy, KHNP is dedicating the utmost efforts to providing quality jobs to the people.

Increasing Jobs

For implementation of the government's energy conversion policy in phases, efficient HR management is required more than ever. For this, KHNP is making various efforts. First, it created sustainable jobs to prepare for the future business environment, such as to additionally secure 198 persons for the new business areas including new and renewable energy and nuclear decommissioning, through consultation with the government. In addition, through voluntary efforts and cooperation between labor and management, KHNP reduced annual labor cost by approximately KRW 2.5 billion from the allowance for overtime work and substitute work. KHNP has also introduced the flexible enrollment system within the scope of its budget for labor cost for the first time since the company's split-off, and thus created 41 new jobs for young people.

Improving Quality of Jobs

By promoting agreement on conversion through organization and operation of the six labor - management - corporate councils, forming an internal consensus through communication led by the CEO and overcoming

differences in opinions by continuously holding working-level meetings and interviews with the labor union and workers' representatives by job type, KHNP reached an agreement on conversion of 2,097 dispatched and contracted workers to regular positions, and thus achieved the goal by 138%. In addition, KHNP created an optimal working environment for the converted workers by designing financial measures to apply the same remuneration system as that for the regular workers.

Creating Jobs in the Private Sector Based on Its Business

KHNP is contributing to creating a variety of jobs in the private sector through a link with its businesses by successfully promoting the key businesses, such as nuclear power and hydro power generation, promoting win-win growth with SMEs as its partners for nuclear power business and providing support to areas near its workplaces. In particular, through a connection with Shin-Kori 5 and 6, for which recommencement of construction had been decided based on the public opinion, KHNP provided approximately 460 new jobs to the local residents and those who had unemployed or retired from shipbuilding industry as part of its efforts to resolve employment issues in the local area. KHNP has also discovered new growth business models in relation to its new and renewable energy business including the Saemangeum project to build the world's largest offshore photovoltaic power plant and the photovoltaic power project for Hyundai Motor Company in Ulsan, and thus secured a foundation for creating approximately 3,300 jobs in the future. KHNP strengthened the basis of sustainable employment for SMEs as its partners for nuclear power business by promoting a range of customized support projects including financial and management innovation support. In addition, KHNP has been continuously striving for stable income creation and sustainable job creation at the same time as strengthening employment competency of local residents by promoting the establishment of a facility to foster technical human resources to work at the nuclear power plants and activating socioeconomic organizations in areas around the nuclear power plants.

Job Creation Strategy			
Goal	To lead social value creation with the efforts to create sustainable and innovative quality jobs [To create 100,000 jobs by 2023]		
Promotional Directions	Increase jobs	Improving Quality of Jobs	Create jobs in the private sector based on its business
Tasks for 2018	<ul style="list-style-type: none"> Continuously secure a room for new employment through optimal HR management Create jobs for young people by improving work patterns 	<ul style="list-style-type: none"> Promote legitimate and reasonable conversion by phase Achieve optimal agreement considering conversion conditions Systematically prepare financial resources and improve employees' treatment 	<ul style="list-style-type: none"> Internalize key business items Secure future growth engines Strengthen support for win-win growth Create community-friendly and win-win cooperation jobs

Agreement for conversion to regular positions achieved with **2,097** workers subject to conversion





Number of jobs created in the private sector **19,944**

Minimizing Environmental Impact

Establishing Environmental Preservation Promotion System

Environmental Preservation Strategy

In order to advance to a cleaner and safer energy company, KHNP analyzed the environmental issues concerning its nuclear power, hydro power and new and renewable energy businesses and the needs of each stakeholder, such as the people, local residents and the government. Through the analysis, it derived environmental implications by business area and established the environmental preservation promotion system to prevent environmental pollution and damage.

KHNP Environmental Preservation Promotion System				
	Environmental Vision	To become a trusted environmentally friendly company by preventing environmental pollution and damage occurring in the course of energy business and minimizing the impacts		
	Strategies	Establish strict safety network for sustainable development	Improve dam management competency and secure stakeholders' trust	Apply eco-friendly design and secure environmental value
	Tasks	Four tasks including pollution monitoring and optimal discharge management	Four tasks including dam water pollution prevention management	Four tasks including securing of optimal sites for photovoltaic power generation
	Assessment/Monitoring	Green company designation rate	Environmental management system audit	Waste recycling rate

Environmental Management System Advancement

KHNP has advanced its eco-friendly management system in order to promote environmentally sound and sustainable development. Internally, it established internal assessment indicators for green management activities, such as green purchase and climate adaptation, with a goal to strengthen environmental performance monitoring. KHNP also conducted a joint inspection of its facilities by receiving consultation service from experts to obtain certification as a green company in line with the government's environmental policy. As a result of the effort, it won the green company certificate for Cheongsong Pumped-Storage Power Plant. In addition, KHNP organized training sessions with experts on purchase promotion in order to actively implement the government's green product purchase policy, and thus achieved the green purchase rate of 94%. On an international scale, KHNP continuously improved its system by analyzing the gap from the latest environmental management standards and fully amending its environmental management manual. As a result, it obtained ISO 14001 certificate of the latest environmental management standard.

Waste Management

Industrial Waste Management

KHNP has categorized wastes into general waste, designated waste, and construction waste and thoroughly manages the entire waste treatment process from generation to final treatment. In accordance with the Wastes Control Act, the organization strictly manages waste sorting, storage, treatment, treatment support, and landfill management operations through a service supporting industrial waste storage site operations and the consignment of treatment of most generated waste to qualified service providers. In addition, KHNP reduces the amount of waste generated by categorizing wastes by type, property, and treatment method for thorough management.

Waste Generation and Recycling				
(Unit: Tons)				
Division	2016	2017	2018	
Nuclear Power Site	General Waste	10,817	9,821	10,324
	Designated Waste	1,037	1,238	1,849
	Total Amount of Waste	11,854	11,059	12,173
	Recycling Rate (%)*	61.4	63.7	62.5

* The ratio of waste recycling to general and designated waste generation

Low and Intermediate-level Radioactive Waste Management

Low and intermediate-level radioactive waste is generated from the operation of NPPs. KHNP is minimizing low and intermediate-level radioactive waste generation by applying available technologies, such as compression and cutting, and the sealing radioactive waste in containers after treatment for safe management. In 2010, KHNP began transferring radioactive wastes kept in NPPs to a radioactive waste treatment facility located in Gyeongju. Through the continuous transfer of radioactive waste for treatment, the radioactive waste stored at the nuclear power sites has been gradually reducing since 2015. KHNP will increase the amount and types of radioactive waste transferred for treatment in order to ensure the safe management of radioactive wastes that are expected to be generated during mid to long-term facility replacement and nuclear decommissioning.

Real-time Radiation Monitoring

KHNP strictly manages radioactive substances in order to mitigate the

impact of environmentally harmful elements generated in the course of nuclear power plant operation. It operated real-time radiation monitoring devices in 92 locations around nuclear power plants and disclosed the results. As for the result of the onshore/offshore environmental radioactivity investigation in which local residents participated, KHNP disclosed that on the Internet following a review by a private environmental monitoring organization and verification from the Nuclear Safety Committee. In addition, it shared information on radiation status by holding presentations targeting local residents. Through strict management, the annual radiation dosage in areas around nuclear power plants was kept at 0.01mSv, which is only 1/100 of the annual allowable radiation dosage to the public.

Environmental Pollutant Discharge Management

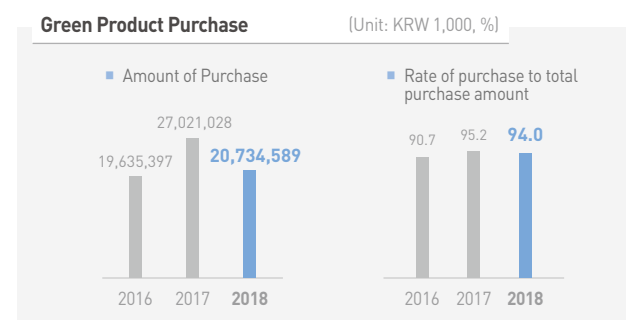
Optimal Wastewater Discharge


KHNP strengthened the consigned treatment of wastewater with a high-concentration of organic nitrogen in order to minimize the environmental impact of wastewater generated in the course of the nuclear power plant operations. As a result, total nitrogen discharge was decreased by 14% from the previous year and the concentration was kept at 12.1ppm, which is approximately 20% of the legal standard of 60ppm.

Water Pollutant Discharge				
(Unit: kg*)				
Division	2016	2017	2018	
Nuclear Power Site	Chemical Oxygen Demand (COD)	20,987	17,340	22,215
	Suspended Solids (SS)	3,276	2,326	3,869
	Total Nitrogen (T-N)	41,704	45,929	39,488

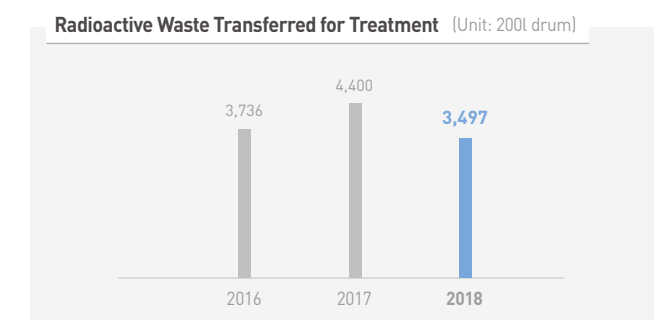
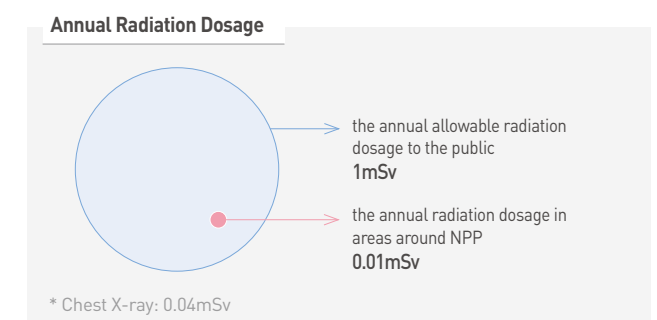
* Discharge concentration×and amount of discharge

Wastewater Discharge and Recycling				
(Unit: 1,000 m³)				
Division	2016	2017	2018	
Nuclear Power Site	Wastewater Discharge	4,051	3,673	3,612
	Recycled Amount	496	389	582
	Recycling Rate (%)	12.3	10.6	16.1





Obtained
ISO 14001
of the latest environmental management standard



Reduction in the Usage of Harmful Substances

As a result of changing the previous method to inject aqueous ammonia and ethanolamine in the course of water treatment to the method of injecting ethanolamine only, the use of chemicals has been reduced. In addition, through reduction of the use of condensate polishing regeneration chemicals according to the suspension of aqueous ammonia injection and conversion of the concentration of harmful chemicals to that of non-harmful chemicals (hydrazine hydrate 55%→24%, hydrochloric acid 35%→9%), the amount of harmful substances used in 2018 was reduced by 11.7% from the previous year.

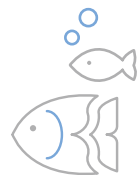
Emission of Harmful Chemicals			
	[Unit:Tons, cases]		
Preliminary Action	2016	2017	2018
Chemical Usage by Nuclear Power Site	7,391	6,667	5,883
No. of Harmful Chemical Discharges*	0	0	0

* Source: Chemical Safety Information Sharing System, National Institute of Chemical Safety

Improving Dam Management Capabilities

KHNP succeeded in water quality management at the dam for its hydro power plant on the Han River where an issue of oil leakage had occurred, by fundamentally preventing the use of 13,200L of lubricant oil through development and application of a patented technology to remove pollution sources of a water turbine. In addition, for the water of Doam Dam located in Gangneung, KHNP improved the water quality to level 2 - 3 by conducting a test for turbidity improvement and cleaning 1,660 tons of floating debris. As for the dam level management, KHNP applied the water level limit flexibly in preparation for floods, and thus contributed to the prevention of flooding and environmental damage in the downstream area.

Average Standing Crop of Macroalgal Community near NPPs						
	[Unit: g-dry-wt/m²]					
Item	2016		2017		2018	
	No. of Species	Average Standing Crop	No. of Species	Average Standing Crop	No. of Species	Average Standing Crop
Kori	58	201	58	194	56	192
Wolsong	60	181	68	176	64	142
Hanbit	26	3	27	2	26	3
Hanul	87	88	86	84	87	79
Saeul	-	-	-	-	-	-




Areas affected by heated effluents
6 million
fish and shellfish released

Biodiversity Conservation

Minimizing Impact of Heated Effluents

KHNP applied an underwater seawater intake and discharge system to its new power plants in order to minimize the damage caused by heated effluents. This is an environmentally friendly system to reduce the range of heated effluent diffusion by approximately 10 - 19% in comparison to existing surface intake and discharge systems. To monitor the impact of heated effluents on the environment, KHNP has been conducting an annual environmental survey since 1986. The result of the long-term survey indicates no special signs of environmental impact or changes in the ecosystem caused by plant operation. For environmental preservation in the areas affected by heated effluents and win-win cooperation with local residents, KHNP released approximately six million fish and shellfish (10 species) over 16 times in 2018 into the sea near its nuclear power plants, and thus contributed to substantially preventing reduction of fish stocks and increasing the regional income.

Seawater Quality near NPPs				
	[Unit: mg/l]			
Item	Plant	2016	2017	2018
Dissolved Oxygen (DO)	Kori	7.6	7.9	7.7
	Wolsong	8.2	8.0	7.9
	Hanbit	8.1	8.0	8.3
	Hanul	8.4	8.2	8.1
	Saeul	-	-	-
Chemical Oxygen Demand (COD)	Kori	1.8	1.8	0.8
	Wolsong	1.8	1.5	1.0
	Hanbit	1.8	2.1	2.1
	Hanul	1.3	1.1	0.8
	Saeul	-	-	-
Phosphate (PO ₄ -P)	Kori	0.01	0.01	0.01
	Wolsong	0.01	0.01	0.01
	Hanbit	0.02	0.02	0.01
	Hanul	0.01	0.01	0.01
	Saeul	-	-	-



Amount of lubricant used on water turbine:
ZERO
(13,200L previously used)

Response to Climate Change ! Material Topic

Establishing Climate Change Response System

Under the philosophy of "prosperous life through eco-friendly energy," KHNP established an internal climate change response road map, and thus has been implementing it by stage in order to achieve the national GHG reduction goal. KHNP is actively responding to climate change issues by selecting 17 tasks of four areas.

Greenhouse Gas Reduction

The world is facing serious climate change issues, such as global warming as a result of greenhouse gas (GHG) emissions. In order to reduce its GHG emissions, KHNP expanded the capacity of new and renewable energy business, such as photovoltaic, fuel cell, wind and biomass power generation that have emerged as energy sources of the future, to 844MW. In addition, KHNP obtained green building certificate for the new buildings at Wolsong and Saeul Nuclear Power Site and led green purchase for the environment by purchasing eco-friendly green products to a scale of KRW 20.7 billion.

Active Contribution to National GHG Reduction

KHNP contributes to achieving the national GHG reduction goal by generating energy using nuclear power, hydro power and new and renewable energy, which emit very minimal amounts of GHGs. It is also actively responding to the carbon emissions trading scheme, which was introduced to fulfill the national goal of efficient GHG emission reduction. As its ability to reduce GHG emissions developed, KHNP sold and carried forward the additionally secured emission allowances. Furthermore, KHNP has established its own GHG inventory management system amid continuous improvements.

System for Response to GHG Emissions Trading Scheme

The GHG emissions trading scheme, which was introduced in 2015, is the government's efficient policy to reduce GHG emissions based on the market economy principles where companies sell or buy emission allowances with other companies according to their ability to reduce GHG emissions. In order to actively respond to the GHG emissions trading scheme, KHNP established a company-wide response system, such as by securing a skilled workforce and developing a trading procedure. It has also established a joint response system with other power companies and is co-developing GHG emissions reduction projects and technologies.

GHG Inventory Management System

KHNP is operating a GHG inventory management system in order to respond to the GHG emissions trading scheme by quantifying GHG emissions. With this system, KHNP is establishing an optimized GHG emissions trading plan by monitoring its GHG emissions in real time and calculating expected annual GHG emissions. GHG emissions can be directly measured and entered into the GHG inventory management system or the amount is automatically calculated according to the emission factor. As the tasks of emission amount measuring and registration are tracked down and managed, systematic GHG emission control is enabled.

Four Areas of Climate Change Response and the Detailed Tasks



- Implementing government policies**
 - Responding to GHG emissions trading scheme
 - Continuously expanding new and renewable energy business
 - Introducing eco-friendly and high-efficiency buildings
 - Establishing climate change adaptation plans
- Securing carbon sinks**
 - Building green parks on idle corporate land and expanding open spaces
 - Establishing water resource management system (e.g. rainwater)
- Reducing GHGs**
 - Maintaining an appropriate percentage of NPPs
 - Improving nuclear power usage rate
 - Promoting use and supply of hydro power facilities
 - Introducing eco-friendly vehicles, such as electric vehicles
- Building infrastructure and promoting cooperation**
 - Strengthening branch organizations and fostering professional human resources
 - Strengthening PR to improve the company's image of clean energy
 - Pursuing global certification for carbon management
 - Supporting photovoltaic power business near NPPs
 - Supporting GHG reduction of SMEs in Gyeongju
 - Participating in COP as an industrial representative
 - Promoting industry - academia - research sector cooperation for climate change response

Adaptations to Extreme Climate Change


In order to adapt to rapid climate change across the globe, KHNP has developed and applied a climate change adaptation risk assessment methodology for its partners which is the first of its kind in Korea. It assessed the prevention management levels of its partners in relation to five climate elements, such as heat waves, and provided consulting related to climate change. As a result, KHNP achieved "Excellent" level in the climate change adaptation assessment. In addition, KHNP executed a national climate adaptation service project to improve old asbestos slate roofs and replace insulating materials for 143 households vulnerable to climate change. Through these efforts, KHNP lowered the risk of climate change, such as strong winds and heat waves, on vulnerable classes while simultaneously creating the social value of GHG reduction by 11,838tCO₂ and energy cost reductions of KRW 550 million.

Excellent Organization for Climate Change Adaptation

In 2017, KHNP assessed the magnitude of the climate impact elements of heat waves, cold snaps, heavy rains, heavy snows, and strong winds, and the degree of risk on 21 nuclear power plants and hydro power plants. Based on the results of this assessment, it established a climate change adaptation plan in order to ensure the safety of its facilities and workers as well as vulnerable classes. To establish an inspection system for the detailed implementation of the plan, KHNP developed the "climate change adaptation implementation inspection guidelines" and organized 14 implementation teams led by the headquarters. It also strengthened monitoring by introducing the "implementation inspection data processing system." As a result, KHNP was selected as an excellent organization



▲ Won the Environmental Minister's award for climate change adaptation



Climate change adaptation assessment results:
Excellent level


for climate change adaption, and thus won the Environmental Minister's award. KHNP will continue its active response to climate change by discovering and implementing new business items, such as developing e-Learning content related to climate change adaptation for the purpose of improving the awareness of internal and external employees.

Green Bond

With social interest in the environment and the scale of eco-friendly businesses increasing, KHNP issued the green bond of \$600 million in July 2018. Green bond, which is issued to invest in eco-friendly businesses including new and renewable energies, electric vehicles, and energy-efficient products, is a popular form of bond in the environmental fields. Being the first public enterprise to issue a green bond, KHNP is evaluated to have successfully raised investment demand even when the bond market in emerging countries has been frozen due to the trade war between the U.S. and China. Based on this accomplishment, KHNP will further accelerate its progress towards becoming a general energy company.

Energy Consumption by Business Site			
(Unit: 10TJ)			
Division	2016	2017	2018
Nuclear Power Sites	1,611	1,710	1,785
Pumped-Storage Plants	4,534	5,268	4,911
General Hydro Power Plants	6	7	5
Other Special Business Units	23	23	23
Total	6,174	7,008	6,724

GHG Emission by Business Sites			
(Unit: 1,000tCO ₂ eq)			
Division	2016	2017	2018
Nuclear Power Sites	839	872	931
Pumped-Storage Plants	2,203	2,560	2,387
General Hydro Power Plants	3	3	3
Other Special Business Units	12	10	12
Total	3,057	3,445	3,333



Green Bond issued
\$600 million

Win-win Growth with Local Communities ! Material Topic

Establishing Local Development and Social Contribution Promotion System

As the government has designated social values as core values of its operations, it has been encouraging public institutions to perform activities that contribute to public interests and community development. In addition, according to an expansion in the needs of local communities for support projects that are closely related to the community, KHNP has established a social contribution promotion system with the goal of "contributing to the spread of social values through local economy revitalization and improved convenience in local communities." In 2018, KHNP promoted local development and social contribution activities in three areas, "industry-linked shared value creation," "the needs of local communities," and "the socially disadvantaged."

Industry-linked Shared Value Creation

One Village - One Photovoltaic Power Generating System Pilot Project

In line with the government's energy conversion policy, the amount of local support funds for residents living in areas near nuclear power plants decreased and, accordingly, local residents' demands for long-term and stable revenue-making businesses has heightened. While keeping pace



▲ Supported photovoltaic power generating facilities at a social welfare center in Gyeongju

with the government's energy conversion policy by expanding its new and renewable energies business, KHNP promoted the One Village - One Photovoltaic Power Generating System Pilot Project for agricultural management in order to meet the demands of local residents. On a farmland site at Huimangchang Sandeok Village in Hongnong-eup, Jeollanam-do, which had been selected through a resident contest, a 100kW level photovoltaic module was installed to enable photovoltaic power generation concurrently with farming. This project is expected to produce an annual income of approximately KRW 26.56 million. KHNP will actively publicize the project, and thus expand the grid-connected photovoltaic power generating systems in areas near nuclear power plants.

Support Projects Based on New and Renewable Energy Business Capacity

KHNP has started contribution projects based on its new and renewable energy business capacity in order to improve the living environments of the neglected as well as the safety susceptible regions. KHNP installed the wind or photovoltaic-powered streetlights that are turned on at night with power charged during the day in order to prevent crimes and protect the citizens' safety. It also installed photovoltaic power generating facilities to a scale of 51kW at six social welfare centers, and thus contributed to reducing power charges by a total of KRW 6.51 million.



▲ Grid-connected solar photovoltaic power generating system in agricultural management. No.1

KHNP Local Development and Social Contribution Promotion System

Goal	To contribute to spreading social value through local economic revitalization and improvement of convenience in local communities		
Strategies	Expand industry-linked shared value creation (CSV) projects and support activities	Improving living conditions based on regional needs and promoting economic revitalization projects	Development of Community Consciousness and Contribution Activities for the socially disadvantaged
Key Tasks of 2018	<ul style="list-style-type: none"> Promote the One Village - One Photovoltaic Power Generating System Pilot Project Develop projects using new and renewable energy business capacities Prepare for the opening of human resource development centers to foster human resources for NPP sites Alleviate energy policy-related conflicts 	<ul style="list-style-type: none"> Support tourism projects considering regional characteristics Implementation of a support project based on the participation of residents Expansion of the residential life-saving project for residents Efforts to attract nuclear power plant suppliers to Gyeongju 	<ul style="list-style-type: none"> Implementation of contribution projects for vulnerable people Opening of facilities for the community Preferred purchases of and local products Support various international and regional events
Monitoring	Workshop for persons in charge of collaboration with local communities + questionnaire surveys regarding the level of local community acceptance (through an external agency, at year's end) + Local Committee		





Local Economy Revitalization

Support Projects Based on the Needs of Local Residents

In accordance with the Act on Assistance to Electric Power Plants-Neighboring Areas, KHNP has improved the living conditions in local areas in order to support the lives of local residents by implementing projects selected through a review process. In particular, the Einstein Class, which is aimed at fostering local talent through mentoring service provided by university students, has been developing into KHNP's representative educational project for local communities over the last nine years. The stakeholders' satisfaction with this project is as high as 86.5%. In addition, with the goal of eliminating blind spots in the medical welfare systems of areas around nuclear power plants, KHNP provided health examination services on a scale of KRW 1.8 billion, and thus prevented diseases and enhanced the quality of life of local residents.

Resident-friendly Projects by Life Stage

KHNP expanded the scale of its support projects that are closely related to the lives of people living near nuclear power plants and improved support systems by grouping recipients according to their life stages, such as from birth to school age, adolescence, middle age, and the elderly. In addition to supplying baby products worth approximately KRW 4.6 billion to families with newborn babies in the East Gyeongju area, KHNP unsparingly provided various support including scholarships to college and university students and recuperation and nursing care to senior citizens. KHNP has been expanding its resident-friendly support amounts through invitation and review of proposals for support projects targeting areas around nuclear power plants. In 2019, KHNP will continue to implement these resident-friendly projects.

Projects to Support Business in 2018			
(Unit: Cases, KRW 100 million)			
Area	Support Projects	No. of Projects	Support Amount
 Education and Scholarship	<ul style="list-style-type: none"> Education by native speakers Support students in the fields of art, music, and sports 	<ul style="list-style-type: none"> Einstein Class (mentoring) Scholarship center for students in Seoul 	59 / 89.6
 Local Economy	<ul style="list-style-type: none"> Support by supplying fishing equipment Support by supplying farming equipment 	<ul style="list-style-type: none"> Support for qualifications acquisition Support given to socioeconomic enterprises 	63 / 196.3
 Surrounding Environment and Cultural Promotion	<ul style="list-style-type: none"> Disinfection of sewage systems for individual households CCTV installation for crime prevention 	<ul style="list-style-type: none"> Support for art and cultural events Ecological parks 	108 / 119.7
 Welfare and Other Projects	<ul style="list-style-type: none"> Events for senior citizens Construction of Village rest areas 	<ul style="list-style-type: none"> Support provided to multicultural families and families of the disabled Health examinations for local residents 	146 / 140.3



▲ Einstein Class launching ceremony

Contribution Activities for the Socially Vulnerable

Project to Prevent Disappearances

KHNP conducted a project to prevent the disappearances of residents in order to strengthen its contribution to the vulnerable class. Through cooperation with Community Chest of Korea and Gyeongju Police Station, it distributed wander detectors to 136 senior citizens suffering from dementia and the intellectually disabled living in Gyeongju area and contributed to preventing the disappearance of residents by enabling detection of relevant persons through GPS attached to the detectors.

Project to Prevent Blindness and Promote Eyesight Recovery

KHNP has been implementing a project to prevent blindness targeting residents in areas around nuclear power plants with the goal of realizing mutually-beneficial collaboration with local communities and improving medical welfare for the low-income class. Since 2016, it has been providing financial support for the cost of surgery to low-income people facing the risk of blindness at the same time as promoting the early detection of cataracts, glaucoma, and retinal diseases through ophthalmologic diagnosis using advanced equipment. In 2018, 2,033 people in 11 areas received examinations and 153 of them were provided with financial support of KRW 56,029,000 for the cost of surgeries. In 2019, KHNP will continue supporting free ophthalmologic examinations and surgeries for eyesight recovery while putting forth its most earnest effort in order to ensure that all people, including local residents, enjoy healthy lives by operating the "healthy eye class" targeted towards the medically neglected classes, such as children and senior citizens.



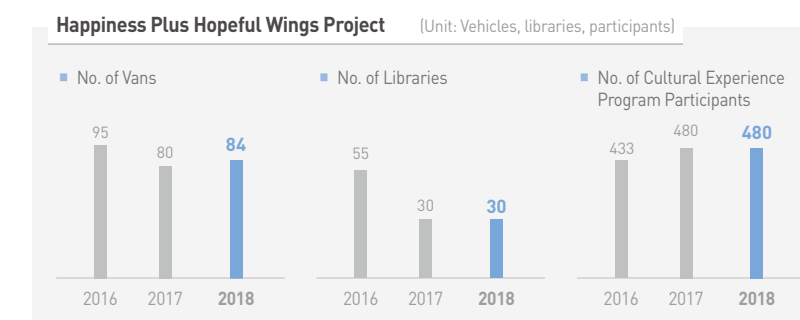
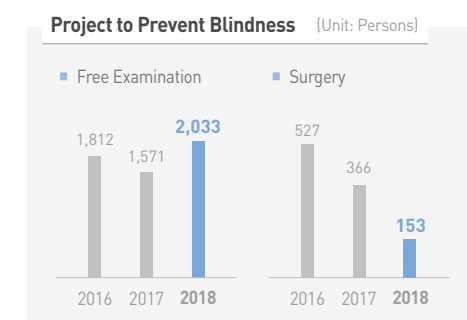
▲ Free ophthalmologic examinations to prevent blindness

Happiness Plus Hopeful Wings Project

The Happiness Plus Hopeful Wings project is one of KHNP's exemplary social contribution projects that has been conducted for seven years. This project focuses on providing vehicles, supporting cultural events, and installing libraries in order to improve the learning environments in local children's centers, the institutions that care for children and adolescents from low-income families. In 2018, KHNP provided 84 vehicles to local children's centers, assisted in providing cultural experiences to 480 children, and installed 30 libraries. In particular, KHNP provided an online English learning program and held a language learning camp for 27 children's centers in Gyeongju where its head office is located. Through these efforts, it motivated local children who do not have as many opportunities for learning as those in Seoul and the capital region. KHNP will perform various support activities to help children nurture their dreams and hopes for the future.



▲ Happiness Plus Hopeful Wings Library opening ceremony



UN SDGs Best Practices

KHNP is implementing the UN SDGs (Sustainable Development Goals) in order to create a sustainable society. The CEO attended the General Assembly of the UNGC (United Nations Global Compact) Korea held in March 2019 in order to reaffirm KHNP's commitment to fulfilling the SDGs and internationally pledged KHNP's support to the SDGs based on its management strategies and business activities. On the same day, a ceremony for the publication of the "UN SDGs Best Practices 2019," a casebook introducing the management visions, key strategies, and activities of companies in relation to the SDGs, was held. KHNP was listed in the casebook as a best case scenario for the implementation of SDGs. With the CEO attending the General Assembly, KHNP formed a consensus with other UNGC members by sharing with them its business plans for 2019 and its mid to long-term goals, and thus took a step towards fulfilling the common goals of the world.

A voluntary initiative of corporate citizens for proposing substantial methods for internalizing the ten principles--the core values--recognized in the fields of human rights, labor, the environment, and anti-corruption in corporate operations and management strategies



General Assembly of the UNGC Korea

지속가능발전목표 달성을 위한 CEO 지지 서약

친환경 에너지 기업
한국수력원자력

[지지하는 SDG 및 이행을 위한 Action Plan]

SDG	Action Plan
7. Affordable and Clean Energy	청정에너지인 원자력, 수력·양수 및 신재생에너지를 통해 전력을 생산·공급하여 국가에너지 수급안정에 이바지
8. Decent Work and Economic Growth	국내 최대 발전회사로서 협력사의 성장을 지원하는 등 건전한 상생 생태계를 조성하고 사회 형평적 채용, 정규직 전환 등으로 양질의 일자리 창출
9. Industry, Innovation and Infrastructure	안전 최우선 원전건설과 운영을 위한 재난대응체계 고도화, 설비품질 제고 및 산업안전사고 예방 강화 등 지속가능한 산업화 증진 노력 전개
11. Sustainable Cities and Communities	지속가능한 도시와 공동체 구축을 위해 원전 사업장 주변 지역에 사회공헌 활동 및 협력 사업을 시행하여 지역민의 삶의 질 향상에 기여
13. Climate Action	기후변화 대응 로드맵(16~25)에 따라 온실가스 감축, 탄소 흡수원 확보, 인프라 구축 및 대외협력 등 기후 변화 이슈에 대한 세부과제 지속 이행
16. Peace, Justice and Strong Institutions	책임 있고 공정한 제도 구축을 위해 인권경영과 윤리 경영을 선도적으로 실천하고 반부패 경영기반을 구축하여 부패 위험요소를 사전에 예방

2019년 2월 11일

[서명]

[성함] 정재훈

[직함] 사장

Support Commitment of CEO

KHNP Sustainability Report - SPECIAL ISSUE

KHNP Global Volunteer Group performed volunteer work in the Czech Republic



Volunteer work in the Czech Republic

1 Held Global Volunteer Group Kick-off Ceremony for Volunteer Service in the Czech Republic

KHNP has been performing volunteer work for three years in the Czech Republic, including educational services and mural painting, in order to realize the value of global sharing and practice love for humanity. The Global Volunteer Group, comprised of 45 members, including students of Haeoreum Alliance Colleges, an industry-academia-government cooperative group in Gyeongju, Ulsan, and Pohang regions, along with employees of KHNP and its partners, attended the kick-off ceremony held in May 2019 and strengthened their will for overseas volunteer work.

2 Performing Labor Service and Cultural Exchange Activities

The KHNP Global Volunteer Group, which left for the Czech Republic on June 17, 2019, performed volunteer work until the 30th to improve facilities and assemble educational science kits at schools and welfare centers in Trebic, Okrisky, and Ivancice. In Moravsky Krumlov, an event of cultural exchange was held where the Global Volunteer Group members introduced Korean culture to local residents by performing Taekwondo, K-pop dance, and Korean traditional dance performances, and the local students presented a traditional Czech performance in return.

3 Promoting cooperation and forming friendly relationships between Korea and the Czech Republic

Performed for the third time this year, KHNP's global volunteer work in the Czech Republic contributed to improving KHNP's image as a general energy company, helping to solidify friendship and cooperative relationships between Korea and the Czech Republic. KHNP will continuously dedicate efforts to enhancing its global reputation and forming friendly relationships with countries around the world.

UN SDGs Best Practices

<p>Demonstrated technological excellence of APR1400, the Korean NPP model</p> <ul style="list-style-type: none"> Obtained EUR certification for EU-APR, an NPP model for exports to Europe Obtained standard design approval on APR1400 from the Nuclear Regulatory Commission of the U.S. 	<p>Provided composite disaster response exercises and training</p> <ul style="list-style-type: none"> Held disaster response exercises for things such as radiation exposure and fire by simulating an earthquake situation Reinspected command and report system between work sites in preparation for disaster occurrence 	<p>Installed photovoltaic-powered streetlights</p> <ul style="list-style-type: none"> Installed photovoltaic-powered streetlights in dark alleyways and vulnerable residential areas Support for living and medical expenses for low-income families in areas where photovoltaic-powered streetlights are installed 	<p>Staged a play on the theme of ethics for employees and partners</p> <ul style="list-style-type: none"> Conducts an ethics play for all employees, including business partners
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Timeless Integrity



Overview

KHNP has expanded integrity education targeting high-ranking officials in order to create a corporate culture of integrity through eradication of corruption and is dedicating efforts to preventing irrational and unfair practices by establishing a system to ban unfair work instructions and operating transparent employment system. In addition, KHNP has established the Human Rights Management Committee for the purpose of preparing plans for substantial relief to the victims of human rights infringement. It is also increasing activities to improve human rights of its stakeholders, such as by starting the "Human Rights Week" program.

Social value	Job creation	Equal Opportunity	Safety	Environment
Win-Win Cooperation	Local community	Ethical Management	Quality of life	Cooperation & Participation

Task	Activities	Key Performance in 2018	UN SDGs & GRI Standards
Establishing Culture of Integrity and Ethics 	<ol style="list-style-type: none"> Establishing ethical management promotion system Expanding preventative integrity promotion activities Eradicating irrational and unfair practices Spreading integrity culture internally and externally 	Integrity survey by Anti-Corruption & Civil Rights Commission Won Best grade in overall integrity level Number of employment-related corruption cases pointed out by external institutions: 0	Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels 205-2: Communication and training about anti-corruption policies and procedures
Spreading Corporate Culture of Respect for Human Rights 	<ol style="list-style-type: none"> Establishing human rights management promotion system Strengthening basis for human rights management promotion Improve employee awareness of human rights Spreading culture to respect human rights 	Number of people to complete human rights training: 1,319 Human Rights Movie Festival Participated by 100 people including people with disabilities	Goal 10: Reduce inequality within and among countries 412-2: Employee training on human rights policies or procedures

Interview



Establishing Company-wide Ethics Culture through Anti-Corruption Activities

Associate Senior Manager
Integrity Policy Team,
Audit Office
Kim Byung-hoon

Last year, KHNP dedicated much effort to preventing violation of the Improper Solicitation and Graft Act by focusing on employee training regarding the law. With abuse of power raised as a social issue, even resulting in a movement for legislation, since the end of last year, we have been striving to come up with an appropriate plan for response. For internal system improvement to prevent abuse of power, we recently held a contest and collected approximately 80 ideas from employees. Based on the suggested ideas, we are reviewing amendment of the company regulations in the necessary areas. Our Audit Office is currently promoting the use of honorific terms as part of our efforts to change the corporate culture regarding abuse of power. We are committed to continuing with efforts to eradicate abuse of power across the company.

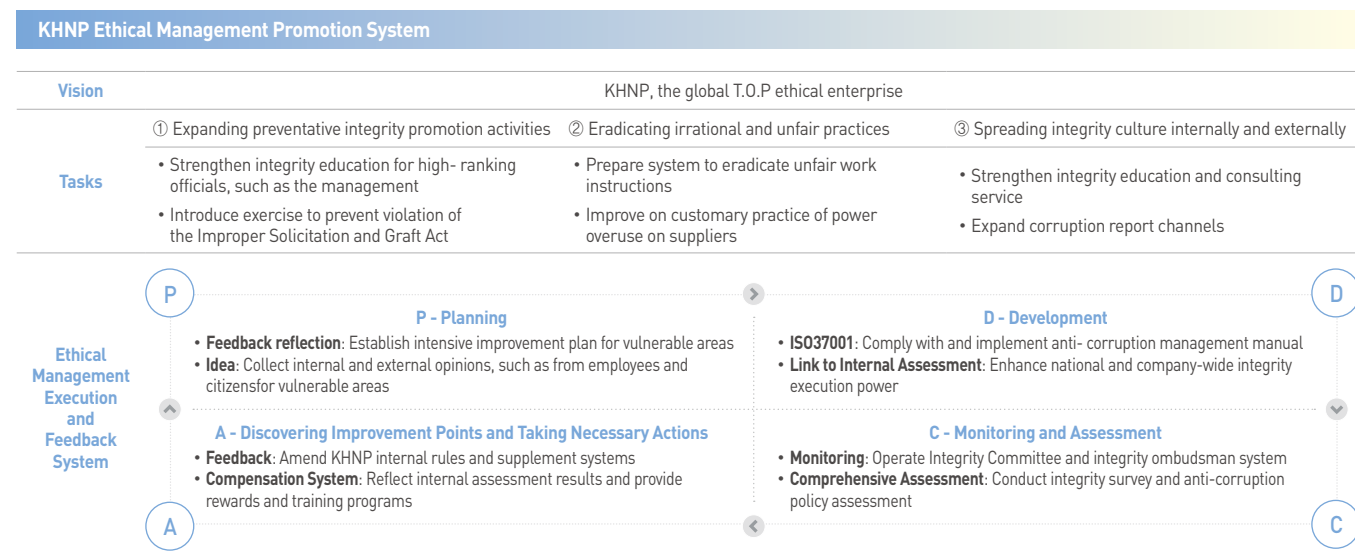
We are striving to prevent the occurrence of corruption cases, not only internally, but also within our partners. We provide training to our partners and also thoroughly check for irrationalities in the contracting process by making service calls to our business sites on a regular basis. Our Audit Office plays a role to receive and handle reports on such irrationalities. As a result of making these service calls over several years, the awareness of our partners regarding ethical management has improved considerably.

Last year, KHNP organized a short example of integrity, producing and sharing a promotional video featuring employees, to raise awareness and understanding regarding integrity. Additionally, we are solidifying our status as a leader in integrity through various ethical management activities. With the efforts of all employees, we maintain the highest rating in the Integrity Assessment and Anti-Corruption Policy Evaluation conducted by the National Civil Rights Commission. Particularly, we have received the highest rating in the Anti-Corruption Policy Evaluation for four consecutive years, establishing the company as an institution of integrity. In the future, KHNP will strengthen employee awareness of integrity through various integrity ethics policies, and we will continue striving to spread an integrity culture through the nuclear power industry.

Establishing Culture of Integrity and Ethics ! Material Topic

Establishing Ethical Management Promotion System 102-16

As the social demand for the fulfillment of ethical responsibilities in corporate management activities is heightening, ethical management has become a compulsory requirement for the existence of a company and its competitiveness improvement. KHNP has strengthened ethical management activities by establishing an ethical management promotion system centering on the tasks to expand preventative integrity promotion activities for corruption prevention, eradicate unfair practices and spread an integrity culture. Through the ethical management activities, KHNP intends to advance to the best institution of integrity and ethics.



Expanding Preventing Integrity Promotion Activities

Introducing Integrity Education Program for High- ranking Officials

KHNP's leap towards becoming a trusted energy company starts with the employees' integrity. In an effort to prevent corruption cases of high-ranking officials, which was relatively weak in the previous year as found through the integrity survey of the Anti-Corruption & Civil Rights Commission (ACRC), KHNP provided integrity education in September 2018 to high-ranking officials by inviting a spokesman for the ACRC to be an instructor of integrity. KHNP also provided all employees with integrity education twice a year with the department head as a lecturer in order to strengthen its corruption prevention system.



Integrity survey by Anti-Corruption & Civil Rights Commission

Won **Best** grade in overall integrity level

Exercise to Prevent Violation of the Improper Solicitation and Graft Act

KHNP held a simulation exercise targeting 288 employees of the headquarters and branches in order to prevent the violation of the Improper Solicitation and Graft Act. The employees who participated in the exercise received messages about the cases of violation of the Act and education on how to handle such cases. The scenarios of which the employees' level of understanding was low were reflected in the company- wide integrity education so as to enhance the employees' understanding about the Act. In the integrity survey conducted by ACRC, KHNP recorded ten points, a perfect score, in the categories of experience of special treats and monetary gifts.



▲ Integrity education for high-ranking officials

Eradicating Irrational and Unfair Practices

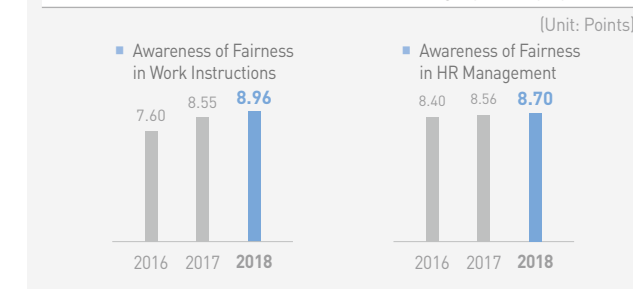
Preparing a System to Eradicate Unfair Work Demands

Through analysis on the results of an integrity investigation conducted in 2017, KHNP recognized issues in work demands, such as the shifting of responsibilities by superiors. Accordingly, with the goal of setting up a detailed guideline for the eradication of unfair work demands, KHNP established the "code of conduct for leaders" based on the situation and type of work in connection with personnel evaluations in August 2018. This was intended to heighten employee awareness regarding the eradication of unfair work demands by holding ten performances under the theme of corruptions in the NPP industry across the company and sending e-mails in addition to in-house broadcasting. KHNP subsequently conducted a questionnaire survey for subordinate employees in order to inspect the status of compliance with the code of conduct and increase the validity of the code of conduct by reflecting the survey results in personnel evaluations of their leaders. The results of an integrity survey conducted by the Anti-Corruption & Civil Rights Commission indicated an increase in the scores of fairness at work instructions in comparison to the previous year.

Improving System to Eradicate Power Overuse

KHNP operates the "integrated complaint management system" for receiving and handling complaints from its partners and subcontractors in order to secure transparency in regards to contracted operations and prevent the overuse of power on suppliers. Having recognized the difficulties in complaint reception and handling operations due to the complex process and the principle of identity disclosure, KHNP improved the procedure by integrating complaint reception routes and guaranteeing anonymity for whistle blowers. It also expanded communication channels through the establishment of a complaint processing status notification system and a full- time communication route with the Administrator of Public Procurement Service. Through protections for whistle blowers and the transparent disclosure of the complaint handling status, KHNP has achieved its goal of creating a corruption control system for issues such as power overuse and also received 9.65 points in the integrity survey conducted by the Anti-Corruption & Civil Rights Commission in the category of power overuse prevention.

Increased Awareness of Fairness with the Integrity Survey by ACRC



Transparent Recruiting System


In order to restore the decreased reliability of the recruitment process, which was caused by employment-related corruption cases of public enterprises, and meet the demand for supplementation of qualified human resources based on its fair recruiting system. KHNP fully complied with the government's plan to reduce employment-related corruption and promoted the improvement of recruiting systems through an internal status diagnosis, and disclosed detailed procedures for each recruitment area transparently. KHNP conducted inspections on each stage of recruitment process and applied the human error prevention manual.

Preparing Priority Hiring Eradication Standard and Establishing Verification System

With the CEO's determination to eradicate priority hiring, KHNP prepared a strict eradication standard and introduced a system for verification of cases which violate this. It specified the prohibited acts in detail in the priority hiring standard, such as the exercising of pressure and solicitation through SMS, and prepared plans for the imposition of countermeasures including registration of the violation in the respective employee's HR records. In addition, for verification of the status of violation, KHNP evaluated the ethics of superiors through an external agency. It also received reports on the promotion and appointment-related irregularities by operating the "HR Ombudsman" system under the direct management of the CEO. In 2018, KHNP led the way in priority hiring eradication by receiving a total of ten reports and taking swift follow-up action including on the recommendation of improvements for the process of selecting overseas workers.



▲ Declaration to eradicate power overuse



Number of employment-related corruption cases as indicated by external institutions:

0

Spreading Integrity Culture

Strengthening Integrity Education and Consulting Service

KHNP provided integrity education and consulting service internally and externally in order to spread the culture of integrity and ethics. It shared the integrity survey and anti-corruption policy assessment results with all employees and explained the necessity of improvement. As for the partners, it organized 12 sessions of a special lecture on integrity. Through the efforts, KHNP has contributed to improving integrity of not only itself, but also the nation as a whole.

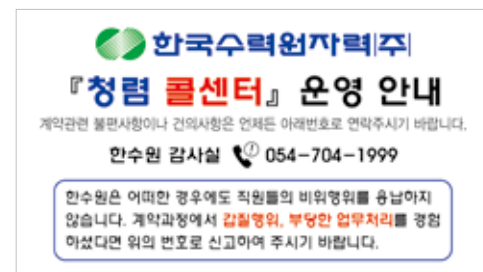


▲ Play on integrity and ethics targeting partners and their employees

Integrity Culture Development Programs		
Division	Description and Performance	
Integrity Education	Employees	Company-wide integrity education Provided feedback on the results of integrity survey/anti-corruption policy assessment, explained areas where improvement is necessary (all employees)
		Special education for vulnerable areas Provided special education to employees in charge of vulnerable areas, such as HR and contract management (5 sessions, 300 employees)
	Partners	Special lecture on integrity Provided special lectures on integrity to partners including Act co., ltd. (12 sessions, 375 employees of partners)
	All	Production and performance of play on integrity and ethics Produced and staged a play under the theme of corruptions in the NPP industry (10 times, 2,000 employees)
Ethical Education Consulting	Private companies, public institutions	Provided integrity consulting service to other institutions, such as POSCO M-TECH and Korea East-West Power (11 institutions)
	Local communities and consultative bodies	Operated Gyeongsangbuk-do Integrity Cluster (Gyeongsangbuk-do Office) and regional consultative body in Gyeongju area (11 times)

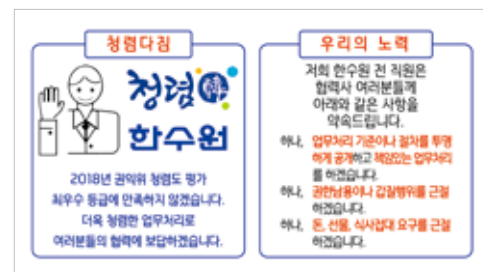
Publicizing and Activating Corruption Report Channels

To prevent the occurrence of non-ethical and corruptive practices at the same time as imposing appropriate punishment, an effective corruption report system must be established. In order to expand corruption report channels, KHNP installed the Power Overuse Report Center, an independent organization in the Audit Office, in addition to the existing channels, such as the KHNP website and the 24-hour direct report channel to the Audit Office. It notified the opening of this organization by internally sending e-mails and holding a presentation. KHNP strengthened the foundation for eradication of corruptive practices by actively protecting whistleblowers in accordance with the Public Service and Corruption Report Protection Act, establishing the criteria for and procedures of protecting confidentiality. It also recommended report of corruption cases by delivering integrity business card to the partners.



▲ Integrity business card

Integrity Survey and Anti-corruption Policy Assessment						
Division	2016	2017	2018	Performance		
Result of Integrity Survey by Anti-Corruption & Civil Rights Commission	Overall Integrity Level	Level 1 (8.77)	Level 2 (8.61)	Level 1 (8.90)	"Best" level in overall integrity level (the only public enterprise of the Ministry of Trade, Industry and Energy)	
		Level 1	Level 1	Level 1	"Best" level (4 years in a row)	
Internal Integrity Survey Result	9.87	9.77	9.79	Increased from previous year		



Spreading Corporate Culture of Respect for Human Rights ! Material Topic

Establishing Human Rights Management Promotion System

KHNP has established a system to promote human rights management by reflecting the government's policies, including the third National Action Plan for the Promotion and Protection of Human Rights following internal and external environmental analysis. KHNP is striving to establish a culture to respect human rights.

Strengthen basis for human rights management promotion

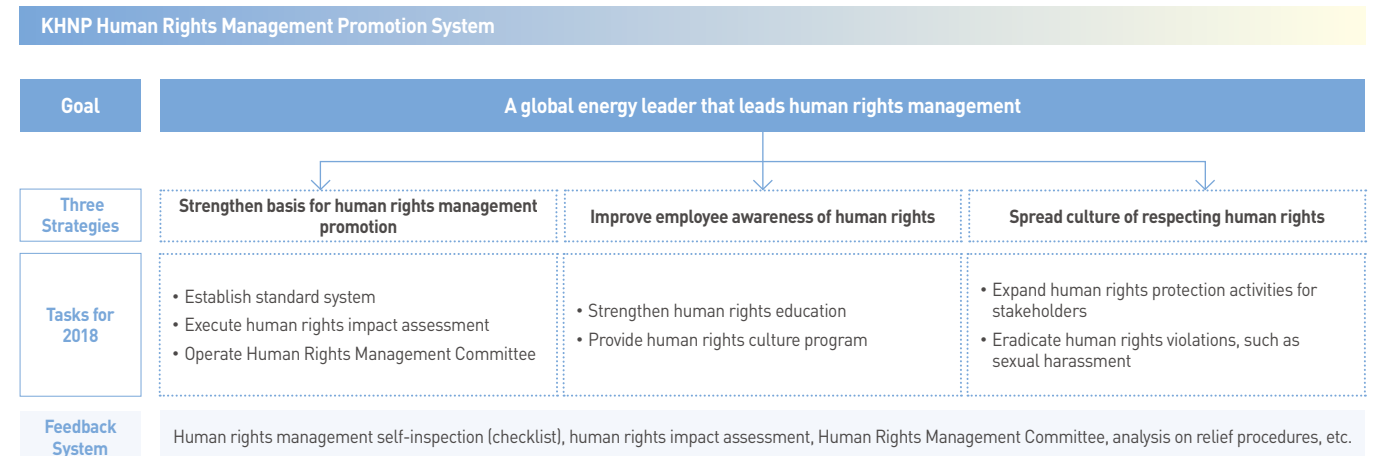
Human Rights Management Standard System

KHNP established principles for practicing human rights management by reflecting the characteristics of its businesses and also in compliance with the ten principles of the UNGC¹⁾. The principles for practicing human rights define obligation for compliance with the human rights rules as well as action guidelines for operation handling and activities to protect human rights for stakeholders. The principles were spread through the human rights management practice declaration ceremony led by the CEO in June 2018.

¹⁾ The ten principles of the United Nations Global Compact (UNGC) on human rights, labor environment, and anti-corruption



▲ Human Rights Management Committee appointment ceremony



Human Rights Impact Assessment

KHNP conducted a human rights impact assessment in order to prevent the factors causing conflicts, such as human rights violations, by analyzing the impact exerted by corporate activities on human rights and to enhance the stakeholders' satisfaction through promotion of human rights. The result of an internal inspection conducted in October 2018 based on the "human rights impact assessment checklist" of the National Human Rights Commission of Korea was found to be positive in terms of employment non-discrimination, prohibition of forced labor and guarantee of occupational safety. On the other hand, supplementation was necessary in relation to the establishment of a human rights management system and supply network management. Therefore, KHNP dedicated efforts to expanding external communication channels through the Human Rights Management Committee operation. KHNP will lead human rights management by practicing responsible supply network management and establishing a system to monitor the partners' compliance with human rights protection.

Human Rights Management Committee

In November 2018, KHNP launched the Human Rights Management Committee in order to protect human rights and increase interests of its stakeholders. With four of the seven internal and external members representing various stakeholders, such as research agencies, partners, and female employees, the Human Rights Management Committee establishes effective relief plans in relation to human rights violation cases. The Committee deliberates on and resolves issues on all areas of human rights management, and thus will further improve the level of KHNP's human rights management.

Improve employee awareness of human rights

Strengthen Human Rights Education

The human rights education, which had been provided mainly in the head office, was expanded to the branches, such as nuclear power sites. The number of employees to complete human rights education has also increased by as many as 101 from 2018 to 1,319. In addition, KHNP provided online and offline educational programs about human rights regarding people with disabilities to all employees.

Human Rights Week

KHNP designated the period of June 25-29, 2018 as Human Rights Week and held a human rights concert, photo exhibition, special lectures, and movie festival targeting employees, partners, and local residents. From 2018, the 70th anniversary of the Universal Declaration of Human Rights, KHNP actively fulfilled its responsibilities in order to advance to become a leading company of human rights management.

Human Rights Week Programs	
Concert	<ul style="list-style-type: none"> Concert by PyeongChang Winter Paralympics performance team at the lobby Attendance by the management including the CEO
Photo Exhibition	<ul style="list-style-type: none"> Exhibition of human rights photos, such as of women and the disabled, at the lobby P.R. and posting in CEO's SNS
Special Lectures	<ul style="list-style-type: none"> Special lectures, such as Story of Human Rights in Historical Paintings Attendance by 120 persons including key executives
Movie Festival	<ul style="list-style-type: none"> Watching barrier-free movies with people with disabilities from local areas Attendance by approx. 100 people with disabilities



▲ KHNP Human Rights Week poster

Spread culture of respecting human rights

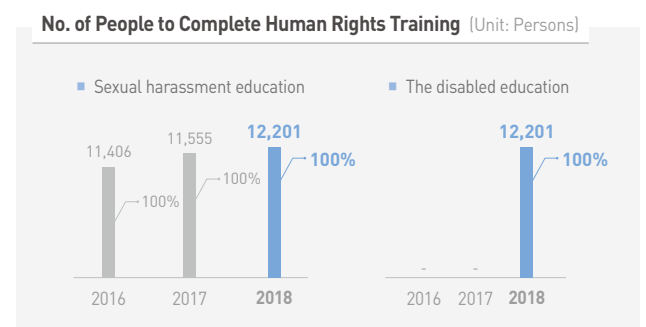
Expanding Human Rights Activities for Stakeholders

KHNP has dedicated the utmost efforts to expanding human rights activities for various stakeholders and also to securing their rights to equality, safety, and labor.

Human Rights Activities for Stakeholders	
Division	Description
Non-regular Workers	<ul style="list-style-type: none"> Give welfare points to workers who have served for at least one year, implement project to create a workplace without discrimination Achieve labor-management agreement on early introduction of performance-based annual salary system and use of returned bonus in improving treatment of non-regular workers
Partners	<ul style="list-style-type: none"> Expand safety management funding (12%), distribute safety guidebook (20,000 copies), provide mobile occupational safety training at work sites (May - June) Strengthen subcontracting payment at the right time (number of contracted banks doubled, help desk operation), win-win growth talks (3 times)
Local Residents	<ul style="list-style-type: none"> Expand employment of local talents ('17: 17.5% → '18: 23.1%), projects to help the vulnerable class Expand disclosure of environmental information in areas around nuclear plants, movie screening event for people with disabilities in local areas
Employees (permanent contract/female employees)	<ul style="list-style-type: none"> Change title of permanent contract employees, resolve welfare discrimination, hold event to pledge for practicing gender equality Foster female managers, programs for employees returning to work after childcare leave, establish maternity protection period system

Strengthening Training for Sexual Harassment and Sexual Violence Prevention

KHNP has included a violence prevention course in the educational curriculum for employees subject to promotion by one-three position levels. A it is also added to the compulsory curriculum for the heads of departments and preventative training is provided to the vulnerable class, such as new employees, foreign workers, and temporary workers. KHNP organized off- the-job training programs in various formats, such as plays and musicals, in addition to lectures by professional lecturers.



Established sexual harassment prevention system and strengthened punishment



▲ Oath to practicing gender equality

1 Efforts to eradicate sexual harassment and violence

The "Me Too" campaign is spreading across the world and the government is continuing with efforts to eradicate sexual harassment and violence. In line with this trend, KHNP established a sound organizational culture to prevent the occurrence of sexual harassment by strengthening punishment for offenders and protection for whistle blowers.

2 Established System to Prevent Sexual Misconduct and Culture of Gender Equality

At a talk for gender equality promotion held in July 2018, KHNP established the ground rules for a sound get-together culture to prevent the risk of sexual harassment at corporate get-together events and promised to practice gender equality with the CEO at the lead. In addition to the efforts to prevent internal sexual harassment and violence, KHNP developed a manual on how to handle sexual misconduct regarding external stakeholders, and thus established a system to prevent damage. KHNP also appointed grievance handling consultants in all branches and opened the independent report centers to enable counseling and report service through external agencies.

3 Strengthened Punishment for Offenders and Safe Protection for Whistle Blowers

KHNP strengthened the criteria for punishment of offenders of intentionality and gross negligence, and thus immediately eliminates offenders through the one-strike-out system. In addition, to improve protection of whistle blowers, the company supports the costs required for counseling and treatment of victims. At the same time, it started operating a system for the heads of respective departments to assume full responsibility so as to prevent secondary damages. KHNP will continue striving to create a healthy working environment by imposing strict punishments on offenders and actively performing sexual harassment and violence prevention activities.



APPENDIX

KHNP is advancing to achieve greater growth by transparently disclosing our sustainable management performances according to the international reporting standard.

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Sustainability Performance Data

Economy

Environment

Financial Performances (Year on year) ²⁰¹⁻¹

Division	2016	2017	2018
Sales	112,771	95,109	89,552
Operating income	38,472	13,972	11,456
Net income	24,721	8,618	-1,020
Overseas sales	3,822	2,967	3,822

Division	2016	2017	2018
Assets			
Current assets	60,632	57,693	66,377
Non-current assets	469,593	494,634	493,978
Total assets	530,225	552,327	560,355
Liabilities			
Current liabilities	31,882	27,339	25,397
Non-current liabilities	243,897	267,116	281,134
Total liabilities	275,779	294,455	306,530
Equity			
Paid-in capital	107,045	107,045	107,045
Surplus	147,401	150,844	146,637
Other equity	-367	-396	-426
Total equity	254,446	257,872	253,824

Investment in R&D

Division	Unit	2016	2017	2018
Investment in R&D	KRW 100 million	3,984	4,604	4,543
R&D against net sales	%	3.5	4.8	5.1

Distribution of Economic Value ²⁰¹⁻¹

Division	Unit	2016	2017	2018
Government - Corporate tax payment (government subsidy)	KRW 100 million	7,155	2,798	1,888
Employees - Avg. compensation per employee	KRW 1 thousand	88,920	88,849	89,055
Local communities - Social contribution expenses: Dandelion Spore Fund	KRW 100 million	142.1	208.5	64
Suppliers - Subsidies for small and medium-sized enterprises	KRW 10 million	512	547	682

Financial Stability

Division	Unit	2016	2017	2018
Interest coverage rate	Multiples	7.94	2.82	2.24
Reliance on borrowings	%	16.49	15.93	17.27
Financial information	%	108.4	114.2	120.8
Total assets turnover rate	%	21.63	17.57	16.10

Credit Rating

Division		2016	2017	2018
International credit rating	Moody's	Aa2	Aa2	Aa2
	S&P	AA	AA	AA
	Fitch	AA+	AA-	AA-
Domestic credit rating	Korea Ratings Korea Investors Service NICE Investors Service	AAA	AAA	AAA

Major Operating Performances

Division	Unit	2016	2017	2018
NPP usage	%	79.7	71.2	65.9
No. of unplanned auto-stops	Cases (cases/unit)	4(0.16)	1(0.04)	3(0.13)
Power sales	100 million kWh	1,588.10	1,464.09	1,321.35
Investment in NPP construction	KRW 100 million	21,897	16,342	17,722

Major Environmental Performances

Division	2016	2017	2018
Nuclear power sites	1,611	1,710	1,785
Pumped-storage plants	4,534	5,268	4,911
Hydropower plants	6	7	5
Other special business units	23	23	23
Total	6,174	7,008	6,724

Division	2016	2017	2018
Fuel	72	26	64
Electricity	6,102	6,982	6,660
Steam	0	0	0
Total	6,174	7,008	6,724

Division	2016	2017	2018
Underground water	40	75	11
Industrial water	1,877	1,893	3,735
Water supply	819	330	409
Surface water	4,977	4,512	4,236
Total water consumption	7,713	6,810	8,391

Division	2016	2017	2018
Nuclear power sites	839	872	931
Pumped-storage plants	2,203	2,560	2,387
Hydropower plants	3	3	3
Other special business units	12	10	12
Total	3,057	3,445	3,333

Division	2016	2017	2018
Scope 1	94	54	97
Scope 2	2,963	3,391	3,236
Total emissions	3,057	3,445	3,333

Division	2016	2017	2018	
Nuclear power sites	Wastewater discharge	4,051	3,673	3,612
	Recycling amount	496	389	582
	Recycling rate (%)	12.3	10.6	16.1

Division	2018
Recycling	6,345
Incineration	768
Landfill	3,199
Others	12
Total waste amount	10,324

Division	2018
Recycling	1,261
Incineration	265
Landfill	0
Others	323
Total waste amount	1,849

Division	2016	2017	2018	
Nuclear power sites	Chemical Oxygen Demand (COD)	20,987	17,340	22,215
	Suspended Solids (SS)	3,276	2,326	3,869
	Total Nitrogen (T-N)	41,704	45,929	39,488

*Discharge concentration x Amount of discharge

Division	2016	2017	2018	
Mandatory supply [A]	2,882	2,915	3,448	
Carry-over [B]	560	450	444	
Implementation performance	Photovoltaic	16	22	25
	Hydro	819	909	941
	Fuel cell	668	950	884
	Wind	-	-	-
Implementation performance	Geothermal	-	-	-
	Biomass	-	-	-
	External purchase	1,497	1,164	1,671
Total [C]	3,000	3,045	3,521	
Implementation performance for the year [D=C-B]	2,440	2,595	3,077	
Implementation rate [E=D/A](%)	84.7	89.0	89.2	

Division	2016	2017	2018
Total purchase	21,652,902	28,394,883	22,057,152
Purchase of green products	19,635,397	27,021,028	20,734,589
Green product purchase ratio(%)	90.7	95.2	94.0

Society

Employee

Human Resources and Recruitment ^{102-8, 401-1, 405-1} (Unit: Persons)

Division	2016	2017	2018	
Total*	11,507	11,870	12,068	
Gender				
Male	10,218	10,474	10,600	
Female	1,289	1,396	1,468	
Female employee ratio [%]	13	12	14	
Age group				
20s	2,047	2,109	2,033	
30s	3,805	3,857	4,034	
40s	3,220	3,335	3,368	
50s & older	2,435	2,569	2,633	
Region				
Korea	10,806	10,927	11,021	
Overseas	701	943	1,047	
Business site				
Headquarters	1,363	1,357	1,370	
Nuclear power sites	7,884	7,965	8,009	
Hydropower & Pumped-storage	809	803	784	
Other sites	1,451	1,745	1,905	
By rank				
Executive	Total	6	6	6
	Male	6	6	6
	Female	-	-	-
1st level position	Total	182	181	196
	Male	182	181	194
	Female	-	-	2
2nd level position	Total	756	771	781
	Male	747	758	765
	Female	9	13	16
3rd level position	Total	2,723	2,795	2,850
	Male	2,639	2,701	2,736
	Female	84	94	114
4th level position	Total	6,439	6,563	6,751
	Male	5,548	5,600	5,745
	Female	891	963	1,006
Others	Total	1,401	1,554	1,484
	Male	1,096	1,228	1,154
	Female	305	326	330

*The No. of regular employment (excluding permanent contract employment)

(Unit: Persons)

Division	2016	2017	2018	
Employment type				
Regular employment**	Total	11,501	11,864	12,062
Permanent contract employment	Total	44	49	77
Non-regular employment	Total	217	234	162
Disabled employees***				
No. of disabled employees		1,289	399	417
Rate of disabled employees [%]		3.1	3.27	3.31
Employment and retirement				
New employees	Total	821.5	602.5	427
	Male	682	469	337
	Female	139	133.5	90
Regular retirement	Total	0	60	213
Voluntary retirement	Total	30	32	22
Turnover and retirement	Total	12	7	2
	Male	11	5	2
	Female	1	2	-

**The No. of executives is excluded.

***Based on the data of Ministry of Employment and Labor

Flexible Work Hours (Unit: Persons)

Division	2016	2017	2018	
Alternative work schedule system	133	136	162	
Flex time type	6,116	3,770	3,147	
Flexible working system	Flexible working time	2,364	2,688	3,894
	Compressed work time	52	82	83
Total number of employees	8,665	6,676	7,286	

Parental leave (Unit: Persons)

Division	2016	2017	2018	
Employees entitled to parental leave	Male	3,129	3,136	3,202
	Female	232	244	400
Employees that took parental leave	Male	42	71	110
	Female	222	290	302
Employees that returned to work after parental leave ended	Male	24	36	63
	Female	71	95	99
Employees that returned to work after parental leave ended that were still employed 12 months after their return to work	Male	23	35	63
	Female	71	95	97

Employee Training ^{404-1, 412-2}

Division	Unit	2016	2017	2018	
Total No. of trainees	Total	Persons	23,316	23,466	22,332
	Male	Persons	21,200	21,152	20,136
	Female	Persons	2,116	2,314	2,196
Total education hours	Total	Hours	2,201,458	1,709,771	1,272,186
	Male	Hours	2,001,668	1,541,169	1,154,604
	Female	Hours	199,789	168,602	117,582
Total training expenditure (distribution based upon proportions of male and female employees)	Total	KRW 100 million	422	584	564
	Male	KRW 100 million	383.7	526	509
	Female	KRW 100 million	38.3	58	55
Average education expense per person	Internal Training	KRW 1 million	2.68	2.54	2.29
	External Training	KRW 1 million	1.55	2.29	1.75
	Male	Hours	94	167	57
Training hours per person	Female	Hours	94	167	54
	Executive	Hours	72	68	43
	1st level position	Hours	121	65	69
No. of People to Complete Integrity Training	2st level position	Hours	105	161	107
	3st level position	Hours	78	126	98
	4st level position	Hours	211	228	129
No. of People to Complete Human Rights Training	Executive	Persons(%)	6 (100%)	6 (100%)	6 (100%)
	Employee	Persons(%)	11,182 (97.54%)	10,821 (91.7%)	10,393 (95.2%)
	Partners	Persons(%)	-	-	-
No. of People to Complete Sexual harassment education	Sexual harassment education	Persons(%)	11,406 (100%)	11,555 (100%)	12,201 (100%)
	The disabled education	Persons(%)	-	-	12,201 (100%)

Current Status of Labor Union Registration ¹⁰²⁻⁴¹

Division	Unit	2016	2017	2018
No. of employees who have joined the labor union	Persons	6,911	7,397	7,386
Ratio of employees who have joined the labor union	%	60	63	61

*Any changes in collective agreements are announced within 14 days from the date on which the grounds occur.

Partners

Support for SMEs and Social Enterprises (Unit: KRW 100 million)

Division	2016	2017	2018
Purchase of Products from SMEs	7,823	8,325	10,278
Purchase of Products from socioeconomic enterprises	165	173	241
Financial Support for SMEs	1,099	1,181	1,139

Win-win Growth (Unit: Points)

Division	2016	2017	2018
K-PGI	91.2	92.2	93.9

Occupational Accidents and Industrial Disaster Rates of Partners (Unit: Persons, %)

Division	2016	2017	2018
Number of Victims	26	23	24
Accident Causing Death	1	3	0
KHNP Occupational Accident Rate*	1.38	0.92	0.88

*Occupational accident rate of KHNP and partners

Local Community

Sharing Fund Use (Unit: KRW 100 million)

Division	2016	2017	2018
Love Fund	10.9	10.7	10.8
Matching Grant	131.2	197.75	64.0
Total	142.1	208.5	74.8

Blindness Prevention Project (Unit: Persons)




Division	2016	2017	2018
Free eye exam	1,812	1,571	2,033
No. of patients receiving operation	527	366	153

Happiness Plus, Hopeful Wings Project (Unit: Persons)

Division	2016	2017	2018
No. of vans	95	80	84
No. of libraries	55	30	30
Cultural experience	433	480	480















GRI Content Index

Universal Standards

GRI Standard	Disclosure	ISO 26000	SDGs	Page	Assurance		
Universal Standards							
GRI 102 : General Disclosure							
Organizational profile	102-1	Name of the organization	Korea Hydro & Nuclear Power Co., Ltd.	7p	○		
	102-2	Activities, brands, products, and services	Development of electric power resources/ Power generation, R&D, Affiliated businesses/Overseas businesses	7p	○		
	102-3	Location of headquarters	1655, Bulguk-ro, Yangbukmyeon, Gyeongju-si, Gyeongsangbuk-do, Korea	7p	○		
	102-4	Location of operations	[Headquarters] 8 Divisions, 31 Departments (offices) [Branches] 6 Nuclear power sites, 7 Pumped-storage plants, and 8 other branches	7p	○		
	102-5	Ownership and legal form	A public enterprise under the Ministry of Trade, Industry and Energy	7p	○		
	102-6	Markets served	Power generation and electricity business (nuclear power, pumped-storage power, and new and renewable energy)	6.3.10/6.4.1	8p	○	
	102-7	Scale of the organization	· No. of employees: 12,307 · Sales: KRW 8,955.2 billion	6.4.2/6.4.3/6.4.4/6.4.5/7.8	7p	○	
	102-8	Information on employees and other workers	Refer to Sustainable Performance. Society, Human Resources and Recruitment.		81p	○	
	102-9	Supply chain	Conduct mutual growth projects to establish a healthy nuclear supply chain		43-45p	○	
	102-10	Significant changes to the organization and its supply chain	No significant change		43-45p, 81p	○	
	102-11	Precautionary Principle or approach	Determine projects for response to climate change in preparation for extreme disasters resulting from climate change		62p	○	
	102-12	External initiatives	Support UN Global Compact and UN SDGs		16p, 67p, 86p	○	
	102-13	Membership of associations	Refer to Memberships		89p	○	
Strategy	102-14	Statement from senior decisionmaker	Refer to CEO Message	4.7/6.2/7.4.2	3-4p	○	
Ethics and integrity	102-16	Values, principles, standards, and norms of behavior	Refer to Ethical Management System	4.4/6.6.3		71p	○
Governance	102-18	Governance structure	Operate the Board of Directors, the supreme decision making body	6.2/7.4.3/7.7.5	17-18p	○	
Stakeholder engagement	102-40	List of stakeholder groups	Employees, labor union, nonregular workers, Partners, Local residents/ Public, Government / National Assembly, Press/ NGO		19p	○	
	102-41	Collective bargaining agreements	Collective agreements apply to 61% of the total employees	5.3	82p	○	
	102-42	Identifying and selecting stakeholders	Refer to Communication with Stakeholders		19p	○	
	102-43	Approach to stakeholder engagement	Refer to Communication with Stakeholders		19p, 21p	○	
	102-44	Key topics and concerns raised	Refer to Sustainability Material Topics		21-22p	○	
	102-45	Entities included in the consolidated financial statements	Refer to Pages 48-51 of 2018 KHNP Business Report	5.2/7.3.2/7.3.3/7.3.4	79p	○	
Reporting practice	102-46	Defining report content and topic Boundaries	Refer to Sustainability Material Topics		21-22p	○	
	102-47	List of material topics	Refer to Sustainability Material Topics		22p	○	
	102-48	Restatements of information	Not applicable		-	○	
	102-49	Changes in reporting	Refer to Sustainability Material Topics	5.2/7.3.2/7.3.3/7.3.4	21-22p	○	
	102-50	Reporting period	From January 1, 2018 to December 31, 2018 (Major performances are included in 2019.)		1p	○	
	102-51	Date of most recent report	Date of most recent report		1p	○	
	102-52	Reporting cycle	October 2019, 10th report		1p, 4p	○	
	102-53	Contact point for questions regarding the report	Planning Team, Planning Dept., Korea Hydro & Nuclear Power Co., Ltd. (Tel. +82-54-704-4133)		1p	○	
	102-54	Claims of reporting in accordance with the GRI Standards	Complying with GRI Standards Core option	7.5.3/7.6.2	83-85p	○	
	102-55	GRI Context Index	Core indicator of general disclosures and topic-specific disclosures of material topics		83-85p	○	
	102-56	External assurance	A third-party assurance was conducted by Lloyd's Register		87-88p	○	

Topic-specific Standards

GRI Standard	Disclosure	ISO 26000	SDGs	Page	Assurance
Topic 1: Stable power supply					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary			
	103-2	The management approach and its components		22-23p, 29-30p	○
	103-3	Evaluation of the management approach			
-	-	No. of unplanned auto-stops		79p	○
Topic 2: Overseas NPP business					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary			
	103-2	The management approach and its components		22-23p, 34-35p	○
	103-3	Evaluation of the management approach			
-	-	Overseas Sales		79p	○
Topic 3: Leading technological competitiveness					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary			
	103-2	The management approach and its components		22-23p, 32-33p	○
	103-3	Evaluation of the management approach			
-	-	Performance in Industrial Properties		32p	○
-	-	Investment in R&D		32p	○
Topic 4: Social contribution activities					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary			
	103-2	The management approach and its components		22p, 24p, 64-66p	○
	103-3	Evaluation of the management approach	6.3.9/6.5.1-6.5.2/6.5.3/6.8		
GRI 413: Local Communities 2016	413-1	Operations with local community engagement, impact assessments, and development programs		82p	○
Topic 5: Eradicating corruption					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary			
	103-2	The management approach and its components		22p, 24p, 71-73p	○
	103-3	Evaluation of the management approach	6.6.1-6.6.2/6.6.3		
GRI 205: Anticorruption 2016	205-2	Communication and training about anti-corruption policies and procedures		82p	○
Topic 6: Corporate culture to respect human rights					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary			
	103-2	The management approach and its components		22p, 24p, 74-75p	○
	103-3	Evaluation of the management approach	6.3.5		
GRI 412: Human Rights Assessment 2016	412-2	Employee training on human rights policies or procedures		82p	○
Topic 7: Response to disasters and safety risks					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary			
	103-2	The management approach and its components		22p, 24p, 49-50p	○
	103-3	Evaluation of the management approach			
-	-	Comprehensive NPP Safety Performance Index		16p	○
-	-	Operating NPP Safety Management Index		16p	○
-	-	Seismic Performance		16p	○

GRI Standard	Disclosure	ISO 26000	SDGs	Page	Assurance
Topic 8: Preventing occupational accidents					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary		22p, 24p, 51-52p	○
	103-2	The management approach and its components			
	103-3	Evaluation of the management approach			
		6.4.6/6.8.8	 	82p	○
GRI 403: Occupational Health and Safety 2016	403-2	Hazard identification, risk assessment, and incident investigation		82p	○
Topic 9: Waste and wastewater management					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary		22p, 24p, 60-61p	○
	103-2	The management approach and its components			
	103-3	Evaluation of the management approach			
		6.5.3/6.5.4	   	80p	○
GRI 306: Effluents and Waste 2016	306-1	Emission of Water Pollutants		80p	○
		Wastewater Discharge and Recycling		80p	○
	306-2	Waste by type and disposal method		80p	○
	306-3	Significant spills		80p	○
Topic 10: Diversifying business portfolio					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary		22-23p, 29-30p	○
	103-2	The management approach and its components			
	103-3	Evaluation of the management approach			
		-		12p	○
		-		12p	○
Topic 11: Employee competency					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary		22-23p, 42p	○
	103-2	The management approach and its components			
	103-3	Evaluation of the management approach			
		6.4.7	 	82p	○
GRI 404: Training and Education 2016	404-1	Average hours of training per year per employee		82p	○
Topic 12: Family-friendly system					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary		22-23p, 40p	○
	103-2	The management approach and its components			
	103-3	Evaluation of the management approach			
		6.4.4	 	81p	○
GRI 401: Employment 2016	401-3	Parental leave		81p	○
Topic 13: Response to climate change					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary		22p, 24p, 62-63p	○
	103-2	The management approach and its components			
	103-3	Evaluation of the management approach			
		6.5.4/6.5.5	  	80p	○
GRI 302: Energy 2016	302-1	Energy consumption within the organization		80p	○
GRI 305: Emissions 2016	305-1	Direct (Scope 1) GHG emissions		80p	○
	305-2	Energy indirect (Scope 2) GHG emissions		80p	○

UNGC Advanced Level



In March 2007, KHNP joined the UN Global Compact (UNGC), an initiative to encourage voluntary fulfillment of corporate social responsibilities, and declared to comply with the ten principles in the four areas of human rights, labor, environment, and anti-corruption. KHNP's performance regarding social responsibility fulfillment through implementation of the ten principles are transparently disclosed each year to the UNGC.

Division	Principle	Page	GRI Standards
	This integrated report (IR) describes the discussions at the level of the CEO and the BOD regarding the strategic aspects of the implementation of the UNGC.	3-4	102-14
Governance	This IR explains the company's decision-making processes and corporate governance to achieve its sustainability.	17-18	102-18, 21
	This IR describes the engagement of all of the company's major stakeholders.	19, 21	102-43
UN Goals and Issues	This IR describes activities designed to support comprehensive goals and issue of the United Nations.	16	102-12
	This IR describes the company's strong commitment, strategies and policies in the area of human rights	69, 74-75	103-1
Human Rights	This IR describes an effective management system designed to integrate its human rights principles.	74	103-2
	This IR describes effective monitoring and evaluation mechanisms about human rights principles.	74-75	103-3
	This IR applies standardized performance indices (including GRI) about human rights.	84	412-2
	This IR describes the company's strong commitment, strategies and policies in the area of labor.	37	103-1
Labor	This IR describes an effective management system designed to integrate its labor principles.	39	103-2
	This IR describes effective monitoring and evaluation mechanisms about labor principles.	39	103-3
	This IR applies standardized performance indices (including GRI) about labor.	81-82	402-1 403-2 405-1
	This IR describes the company's strong commitment, strategies and policies in the area of environmental management.	55	103-1
Environment	This IR describes an effective management system designed to integrate its environmental principles.	59	103-2
	This IR describes effective monitoring and evaluation mechanisms about environmental management.	59-63	103-3
	This IR applies standardized performance indices about environmental management.	80	302-1, 303-1 305-1, 2 306-1, 2, 3
	This IR describes the company's strong commitment, strategies and policies in the area of anti-corruption efforts.	69	103-1
Anti - Corruption	This IR describes an effective management system designed to integrate its anti-corruption principles.	71	103-2
	This IR describes effective monitoring and evaluation mechanisms in the area of anti-corruption efforts.	71-73	103-3
	This IR applies standardized performance indices about anti- corruption efforts.	82, 84	205-2
Strategies, Governance and Engagement	This IR explains about the implementation of Global Compact Principles within the company's value chain.	67	-
Assurance and Transparency	This IR offers information on the corporate profile and operational environments.	4, 7-12, 81, 83	102-1~13
	This IR includes a high level of transparency and disclosure.	About this report, 83-89	102-50~56

Third-party Assurance Statement

LRQA Independent Assurance Statement

Relating to Korea Hydro & Nuclear Power Co.,Ltd.'s 2019 Sustainability Report for the 2018 calendar year

This Assurance Statement has been prepared for Korea Hydro & Nuclear Power Co.,Ltd. in accordance with our contract but is intended for the readers of this Report.

Terms of engagement

Lloyd's Register Quality Assurance (LRQA) was commissioned by Korea Hydro & Nuclear Power Co.,Ltd.(KHNP) to provide independent assurance on its 'Korea Hydro & Nuclear Power Co.,Ltd. 2019 Sustainability Report' ("the report") against the assurance criteria below to a moderate level of assurance using AA1000AS (2008), where the scope was a Type 2 engagement.

Our assurance engagement covered KHNP's operations and activities in Korea specifically the following requirements:

- Evaluating adherence to AA1000 AccountAbility Principles of Inclusivity, Materiality and Responsiveness
- Confirming that the report is in accordance with:
 - GRI Standards: Core option
- Evaluating the accuracy and reliability of data and information for only the selected indicators listed below:
 - GRI 200 (Economic): GRI 205-2
 - GRI 300 (Environmental): GRI 302-1, GRI 305-1, GRI 305-2, GRI 306-1, GRI 306-2, GRI 306-3
 - GRI 400 (Social): GRI 401-3, GRI 403-2, GRI 404-1, GRI 412-2, GRI 413-1

Our assurance engagement excluded the data and information of KHNP's suppliers, contractors and any third-parties mentioned in the report. LRQA's responsibility is only to KHNP. LRQA disclaims any liability or responsibility to others as explained in the end footnote. KHNP's responsibility is for collecting, aggregating, analysing and presenting all the data and information within the report and for maintaining effective internal controls over the systems from which the report is derived. Ultimately, the report has been approved by, and remains the responsibility of KHNP.

LRQA's Opinion

Based on LRQA's approach nothing has come to our attention that would cause us to believe that KHNP has not, in all material respects:

- Met the requirements above
- Disclosed accurate and reliable performance data and information as all errors or omissions identified during the assurance engagement were corrected
- Covered all the issues that are important to the stakeholders and readers of this report.

The opinion expressed is formed on the basis of a moderate level of assurance and at the materiality of the professional judgement of the verifier.

Note: The extent of evidence-gathering for a moderate assurance engagement is less than for a high assurance engagement. Moderate assurance engagements focus on aggregated data rather than physically checking source data at sites. Consequently, the level of assurance obtained in a moderate assurance engagement is substantially lower than the assurance that would have been obtained had a high assurance engagement been performed.

LRQA's approach

LRQA's assurance engagements are carried out in accordance with our verification procedure. The following tasks though were undertaken as part of the evidence gathering process for this assurance engagement:

- Assessing KHNP's approach to stakeholder engagement to confirm that issues raised by stakeholders were captured correctly. We did this through reviewing documents and associated records.
- Reviewing KHNP's process for identifying and determining material issues to confirm that the right issues were included in their report. We did this by benchmarking reports written by KHNP and its peers to ensure that sector specific issues were included for comparability. We also tested the filters used in determining material issues to evaluate whether KHNP makes informed business decisions that may create opportunities that contribute towards sustainable development.
- Auditing KHNP's data management systems to confirm that there were no significant errors, omissions or mis-statements in the report. We did this by reviewing the effectiveness of data handling procedures, instructions and systems, including those for internal verification. We also spoke with those key people responsible for compiling the data and drafting the report.
- Reviewing supporting evidence made available by KHNP at their head office at 1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do in Korea.
- Checking that the GRI Content Index allows stakeholders to access sustainability indicators.

Observations

Further observations and findings, made during the assurance engagement, are:

- **Stakeholder inclusivity**

We are not aware of any key stakeholder groups that have been excluded from KHNP's stakeholder engagement process.
- **Materiality**

We are not aware of any material issues concerning KHNP's sustainability performance that have been excluded from the report. It should be noted that KHNP has established extensive criteria for determining which issue/topic is material and that these criteria are not biased to the company's management. However, the media analysis for identifying external stakeholders' material issues needs to be more inclusive with nuclear safety issue.
- **Responsiveness**

KHNP reported various activities for safer workplace as a material topic. KHNP enhanced its responsiveness by reporting UN Sustainable Development Goals. However, KHNP needs to reflect positive and negative aspects of the performance more balanced in the report.
- **Reliability**

KHNP has reliable data management systems for the indicators in the report.

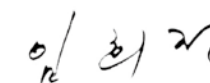
LRQA's standards, competence and independence

LRQA implements and maintains a comprehensive management system that meets accreditation requirements for ISO/IEC 17021 Conformity assessment – Requirements for bodies providing audit and certification of management systems that are at least as demanding as the requirements of the International Standard on Quality Control 1 and comply with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants.

LRQA ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

This verification engagement is the only work undertaken by LRQA for KHNP and as such does not compromise our independence or impartiality.

Dated: 22nd Sep. 2019
Hee-Jeong Yim | LRQA Lead Verifier



On behalf of Lloyd's Register Quality Assurance Limited
 17th Floor, Sinsong Building, 67 Yeouinaru-ro, Yeongdeungpo-gu, Seoul, Korea



LRQA reference : SE00000531



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Awards and Memberships

Award Details

Date	Award Name	Host Organization
2018-02-28	2018 Vision Awards Grand Prize	LACP (USA)
2018-11-13	2018 Excellent e-Learning Organization Award	Korea Association of Consilience Education (KAOCE)
2018-11-20	2018 Gyeongsangbuk-do Volunteer Competition Merit Group Commendation	Gyeongbuk Volunteer Center
2018-11-22	Korea Social Media Award	Korea Internet Communication Association
2018-11-22	Korea Communication CEO Award	Korea Internet Communication Association
2018-12-05	Grand Prize in Digital Division, JoongAng Advertising Awards	JoongAng Ilbo
2018-12-11	2018 Gyeongju Volunteer Competition, Minister of Public Administration and Security Award	Gyeongju Volunteer Center

Memberships

Domestic				Overseas
Gyeongju Chamber of Commerce & Industry	Korea Asset Management Association	Korea Power Exchange	Korea SMEs Trade Association	CANDU Procurement Audit Committee (CANPAC)
Climate Change Center	Korea Society of Energy & Climate Change	Korea Standards Association	The Korean Welding and Joining Society	CANDU Owners Group (COG)
Public Institution Audit Committee	The Korean Women's Nuclear Expert Association	Korea Society for Quality Management	Korean Society of Pressure Vessels and Piping	Framatome Owners Group (FROG)
The Korean Society of Mechanical Engineers	The Institute of Internal Auditors	Institute of Nuclear Materials Management - Korea Chapter	Korea Coating Experts Society	International Hydropower Association (IHA)
Future Energy Policy Institute	Korea Radioactive Waste Society	The Korean Society for New and Renewable Energy	Korea Engineering & Consulting Association	Nuclear Energy Institute (NEI)
Korea Fisheries Resources Agency	Korea Industrial Technology Association	Korea Photovoltaic Industry Association	Fuel Cell Industry Development Council	Nuclear Procurement Issues Committee (NUPIC)
Korea Business Council for Sustainable Development	Korea Smart Grid Association	The Korean Association for Radiation Protection	Korea Wind Energy Industry Association	Pressurized Water Reactor Owners Group (PWROG)
Korea Association for Radiation Application	Korea Energy Foundation	Korea Personnel Improvement Association	UN Global Compact Network Korea	World Association of Nuclear Operators (WANO)
Korea New & Renewable Energy	Korea Atomic Energy Agency	The Korean Society for Energy	Korean Tunneling and Underground Space Association	World Nuclear Association (WNA)
Korea Atomic Industrial Forum	Korean Nuclear Society	The Korean Association for Policy Studies	Korea Plant Industries Association	World Nuclear Fuel Market (WNFM)
Korea Academy of Nuclear Safety	Korea Electrical Manufacturers Association	Korea Exchange	Korea International Trade Association	International System on Occupational Exposure (ISOE)
-	-	-	-	OECD/NEA (Nuclear Energy Agency)

RELIABLE GLOBAL ENERGY LEADER, KHNP

Department, Korea Hydro & Nuclear Power Co., Ltd.

Planning Team, Corporate Planning
1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si,
Gyeongsangbuk-do, Korea

Tel. +82-54-704-4124

Fax. +82-54-704-4198

Homepage. www.khnp.co.kr

E-mail. zeon.kim@khnp.co.kr

