KOREA HYDRO & NUCLEAR POWER CO., LTD

KHNP Sustainability Report 2018

RELIABLE
GLOBAL
ENERGY
LEADER,
KHNP

ABOUT THIS REPORT

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

Korea Hydro & Nuclear Power Co., Ltd. (KHNP) has been publishing its sustainability report every year with the aim of releasing its sustainability management goals and performance to share its commitment to creating future value with the public. This is KHNP's ninth sustainability report, which focuses on how its management has changed and performed since 2017.

Reporting Scope and Period

This report includes major financial and non-financial performance over the 2017 fiscal year from January 1, 2017 to December 31, 2017. Quantitative data of the three most recent fiscal years from 2015 through 2017 were utilized to provide time-series trends, while some qualitative data included its performance in 2018. The scope of this report covers the head office and all domestic and overseas offices.

Reporting and Verification Guidelines

This report was compiled in accordance with the Global Reporting Initiative (GRI) Standards Core option. The reliability of the content was verified by a third-party assurance institute, and the detailed results can be found in the independent assurance statement (pages 100 to 101).

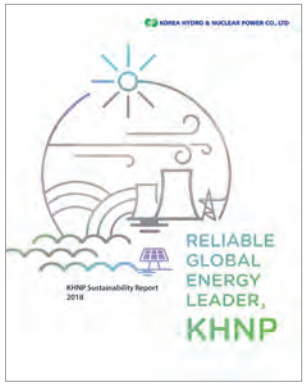
Additional Report Information

Korean and English versions of this report are available on the KHNP website (www.khnp.co.kr) and can be downloaded in PDF format. For further inquiries or information related to this report, please reach us by referring to the contact information provided below.

Planning Team, Corporate Planning Department.,
Korea Hydro & Nuclear Power Co., Ltd.

Address: 1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do, Korea
Tel. +82-54-704-4133 **Fax.** +82-54-704-4198
Website: www.khnp.co.kr
Email: sooho.jung@khnp.co.kr

COVER STORY



Graphical representation of the energy source of Korea Hydro Nuclear Power generating environment-friendly energy from the sun, wind and nature

RELIABLE GLOBAL ENERGY LEADER, KHNP

CEO MESSAGE

102-14

"

KHNP is striving to secure future growth engines and lead the way in realizing social values, in order to grow into an integrated energy company. We ask for your continuous support and interest so that KHNP can become a trustworthy global energy leader.

"

Dear Stakeholders,

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

KHNP is Korea's largest electric power company, contributing to national economic development by generating eco-friendly energy, including nuclear energy, hydro power, pumped-storage power, and new and renewable energy. We, as a public enterprise producing energy that enriches the lives of so many people, have been continuing to put forth our utmost in carrying out our economic, social and environmental responsibilities. Since we joined the UN Global Compact in 2007, we have been complying with the four sectors of the Ten Principles that include human rights, labor, environment, and anti-corruption. Through this ninth sustainability report, we would like to showcase our endeavors and achievements in our social responsibility activities with our stakeholders.

First, we secure future growth engines to become an integrated global energy leader.

As the business environment of the energy industry rapidly changes, KHNP is creating opportunities for growth by diversifying its business structure based on One-Mind, One-Team, and One-Voice. We are expanding investment in new and renewable energy by applying for a patent on the grid-connected solar photovoltaic power generating system with agriculture and constructing the system, itself, for the first time ever in Korea. We obtained the European Utility Requirements for EU-APR and successfully completed the standard design assessment of the U.S. Nuclear Regulatory Commission (USNRC) in September 2017 while also accelerating our overseas business expansion. In addition, we are developing commercialized technology for the decommissioning of Kori 1 and promoting the nuclear decommissioning business in order to establish a foundation for overseas business expansion.

Second, we consider safety as a top priority in operating and constructing nuclear power plants.

KHNP places the highest priority on safety with the goal of becoming the world's leading brand name in nuclear safety. We strengthened seismic performance and established accident management strategies against extreme disasters for numerous plants in order to ensure the safety of operating nuclear power plants in preparation for earthquakes. In particular, we operated a civic inspection group in the design stage of Shin-Kori 5 and 6 so as to collect public opinion on nuclear safety. In addition, we strive to enhance safety in all spheres from nuclear plant construction to operation by utilizing state-of-the-art technology featured in the Fourth Industrial Revolution, including big data, AI, and IoT.

Third, we are creating social values by creating jobs and pursuing win-win growth with local communities.

KHNP is conducting a wide range of practical support projects and social contribution activities for the growth of the Nuclear Power Plant(NPP) ecosystem and local communities. Since relocating our headquarters to Gyeongju, we have been contributing to stimulating the regional economy of the area by attracting 63 NPP business partners. In addition, we are going to create about 70,000 jobs in the private sector by 2022, pursuing a variety of new businesses. Furthermore, we illuminated communities during night time hours by installing a total of 1,008 photovoltaic-powered streetlights in safety-susceptible regions until 2017.

In the face of the rapidly shifting energy business environment, we are doing our best to become an integrated global energy leader. In addition, we endeavor to strengthen our primary businesses by placing safety as a top priority and taking initiative in creating social value. We ask for your continuous support and interest so that KHNP can become a trustworthy global energy leader. Thank you.

December 1, 2018

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

KHNP Evolves into an Integrated Energy Leader

As the energy climate changes, KHNP is creating new business opportunities through new and renewable energy, NPP exportation, the securing of nuclear decommissioning technology, and the digital transformation of the Fourth Industrial Revolution, in order to evolve into an integrated energy leader providing general energy consulting.

Increase in New and Renewable Energy

KHNP will supply 7.6GW new and renewable energy facilities with an investment of KRW 7.3 trillion by 2030. In order to achieve this goal, KHNP will increase its capacity of new and renewable energy facilities from 2.8% (777MW) in 2017 to 24% (8,377MW) by 2030, and the power generation of new and renewable energy from 1.1% (1,663GWh) in 2017 to 9.1% (15,681GWh) by 2030.

Enhancement of Overseas Business Competitiveness

Based on its outstanding export competence and project financing (PF), KHNP will lead NPP exportation. KHNP will expand NPP exportation to the Czech Republic, Slovakia, Poland, the Philippines, etc., and will become a software-based energy company, making profits by providing NPP consulting with its 35-year experience and expertise in the NPP business.

Securing of Nuclear Decommissioning Technology

As the global energy market is entering the "energy conversion period" where eco-friendly energy is increasing, the nuclear decommissioning market is expected to expand in suit. Based on its experience in the successful decommissioning of Kori 1, KHNP will lead the nuclear decommissioning market by fostering a skilled workforce in nuclear decommissioning and focusing on technology development.

Development of New Businesses based on Fourth Industrial Revolution

KHNP will develop business utilizing Fourth Industrial Revolution technology, overseas hydro power and new and renewable energy package businesses, and businesses using hydrogen and other future energy resources. KHNP will develop new businesses, focusing on smart NPP business based on its strengths and other businesses utilizing corporate assets and power generation by-products.

KHNP News at a Glance

FUTURE VALUES

Pursued construction of world's largest 300MW offshore photovoltaic power plant in Saemangeum

KHNP seeks to make the sea to the southwest, centered around the Saemangeum area, an advanced base for new and renewable energy by dispatching a skilled workforce in order to successfully construct the world's largest offshore photovoltaic power plants.

Acquired exclusive right to conduct hydro power project in Pakistan

KHNP acquired exclusive rights to conduct the hydropower plant construction project in Lower Spat Gah, Pakistan. KHNP will generate a stable income by constructing 496MW hydro power plants by 2026 and operate them for 30 years.

Working to acquire NPP contracts from Czech Republic and Poland

KHNP held a NPP forum and a B2B meeting with the Ministry of Energy of Poland and concluded "an agreement for an NPP business partnership with the Czech Republic and Poland" while working to acquire additional NPP contracts.

SAFETY VALUES

Obtained NRC Standard Design Approval for APR1400

KHNP obtained a standard design approval for the design of the next-generation reactor for "APR1400" from the U.S. Nuclear Regulatory Commission (NRC) in recognition of the safety of the NPP designs. KHNP will work on the legal procedure required for design certification.

Completed year-long continuous operation of the exported Shin-Kori 3 NPP during the first year

The third generation NPP APR1400 certified for European Utility Requirements (EUR) completed its 389-day continuous operation since its construction in December 2016, resulting in Korea, once again, proving its excellence in NPP construction and safe operations.

Visitation of civic inspection group to observe main equipment manufacturing site of Shin-Kori 5 and 6

40 members of the civic inspection group visited the main equipment manufacturing site of Shin-Kori 5 and 6 and checked the safety and excellent quality of NPPs on site.

SOCIAL VALUES

Contributes to local community safety and energy saving by installing photovoltaic-powered streetlights

KHNP installed a total of 1,008 photovoltaic-powered streetlights from 2014 to 2017. In 2018, KHNP will contribute to the safety of local residents and energy saving by installing an additional 363 streetlights in eight regions.

Improves the learning environment of local children's centers through Happiness Plus, Hopeful Wings Project

In 2018, KHNP concluded an agreement for the Happiness Plus, Hopeful Wings Project reaching heights of KRW 4 billion in scale. Through this project, KHNP donated 325 vans, installed 173 Hopeful Wings Libraries, and provided multicultural workshops for about 1,000 children over the past six years.

Overseas Market Development Group supports SME exportation

In order to help SMEs in the NPP equipment manufacturing industry export their products, KHNP organized the Overseas Market Development Group with about 30 suppliers and held a purchasing consultation in the UAE where SMEs provided export consultations around the equivalent of USD 35 million.

KHNP Profile

Korea Hydro & Nuclear Power Co., Ltd. is Korea's largest electric power company and generates approximately 31.5% of the nation's domestic electricity through its mission and pride of "supplying stable electric power to enrich the lives of the people and to contribute to the growth of the national economy" as its driving force. Since we first started the commercial operation of Kori 1 in April 1978, we have been generating and providing a stable supply of electricity using nuclear power for 40 years. In addition, we are making strides to expand new and renewable energy sources, such as hydro power, pumped-storage power and photovoltaic power, and to supply national energy through a variety of energy sources.

Overview

102-1, 102-3, 102-4, 102-5, 102-6, 102-7 102-8, 201-1

Company name	Korea Hydro & Nuclear Power Co., Ltd.	Date of establishment	April 2, 2001
Governing organization	Ministry of Trade, Industry and Energy	Paid-in capital	KRW 1.212 trillion (As of Dec. 31, 2017)
President & CEO	Chung Jae-hoon	Employees	11,559 people (As of Dec. 31, 2017)
Institution type	Public enterprise	Major function	Development of electric power resources / Power generation businesses, R&D, affiliated businesses/ Overseas businesses
Head office	1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do, Korea	Organization	[Headquarter] 8 Divisions, 28 Departments (offices) [Branches] 6 Nuclear power sites, 7 Pumped-storage power plants, and 8 other branches

Main Financial performance

(Unit: KRW 100 millions)

	Sales
2015	107,470
2016	112,771
2017	95,109

(Unit: KRW 100 millions)

	Operating income
2015	37,917
2016	38,472
2017	13,972

(Unit: %)

	Debt to equity ratio
2015	116.9
2016	108.4
2017	114.2

1980's

1978 ·Initiated commercial operation of Kori 1 (the world's 21st nuclear-powered country)
1983 ·Initiated commercial operation of Wolsong 1 and Kori 2
1984 ·Established the NPP construction technology independence plan
1985 ·Initiated commercial operation of Kori 3
1986 ·Initiated commercial operation of Kori 4 and Hanbit 1
1987 ·Initiated commercial operation of Hanbit 2
·Pursued NPP construction technology independence
·Surpassed 100 billion kWh in accumulated nuclear power generation
1988 ·Initiated commercial operation of Hanul 1
1989 ·Initiated commercial operation of Hanul 2

1990~2002

1995 ·Initiated commercial operation of Hanbit 3
1996 ·Initiated commercial operation of Hanbit 4
1997 ·Initiated commercial operation of Wolsong 2
1998 ·Initiated commercial operation of Wolsong 3
·The first Korea Standard Nuclear Power Plant (OPR1000)
·Initiated commercial operation of Hanul 3
·Selected as the first order for NPP from overseas (technical advisory for Gwangdong Nuclear Power)
1999 ·Initiated commercial operation of Hanul 4 and Wolsong 4
2000 ·Surpassed 1 trillion kWh in accumulated nuclear power generation
2001 ·Launched Korea Hydro & Nuclear Power Co., Ltd. (Separated from KEPCO)
2002 ·Initiated commercial operation of Hanbit 5 and 6
·World's 6th largest facility capacity
·Developed next-generation reactor (APR1400)

Main Businesses 102-2

Our business domain covers nuclear power, hydro power, new and renewable energy, construction, and overseas business. As of December 2017, KHNP has been operating 24 nuclear power plants, 35 hydro power/small hydro power plants, 16 pumped-storage power plants, eight photovoltaic power plants and one wind power plant.

Korea's largest facility capacity

Total facility capacity 27,857MW

Nuclear power facility capacity 22,529MW

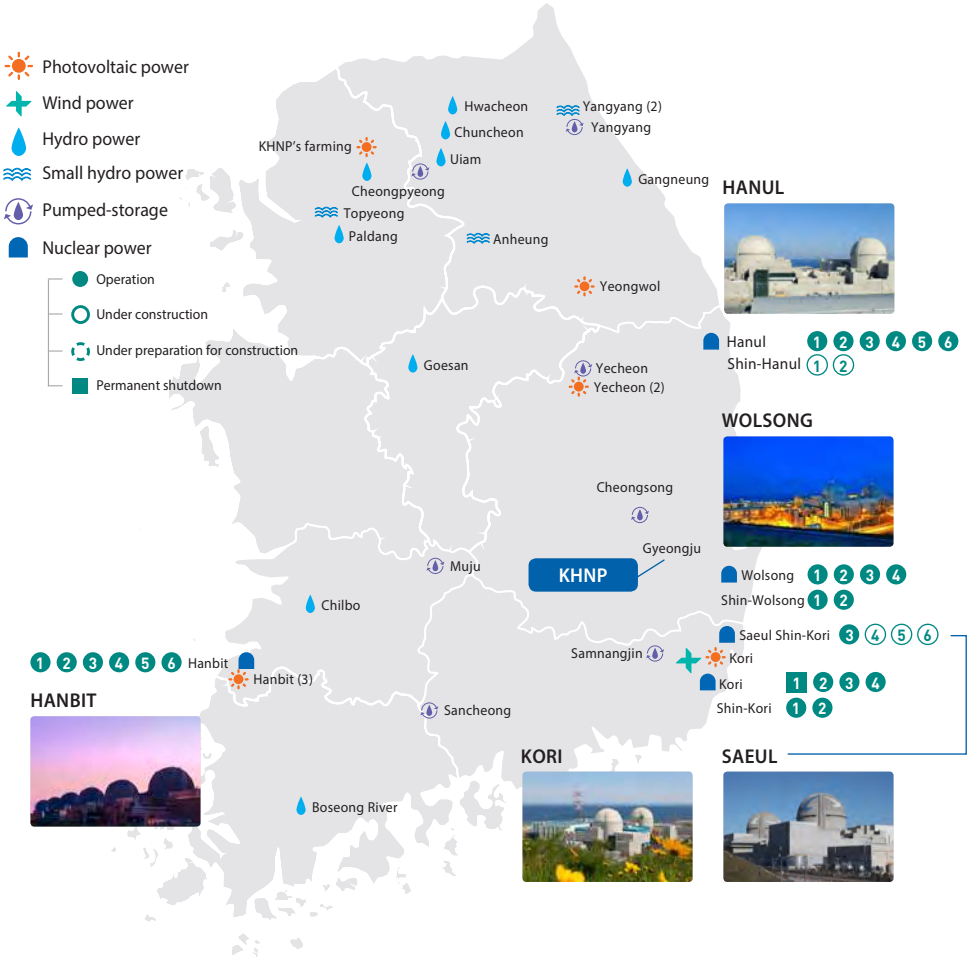
Hydro power/Pumped-storage/New and renewable energy facility capacity 5,328MW

Korea's largest generation capacity

Total generation capacity 153,578GWh

Nuclear power generation capacity 148,427GWh

Hydro power/Pumped-storage/New and renewable energy generation capacity 5,151GWh



2004~2011

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) & Hanul 5 and 6

2007 ·Obtained approval for continued operation of Kori 1

2008 ·Surpassed 2 trillion kWh in accumulated nuclear power generation

2009 ·Selected as contractor for the UAE nuclear power plant project (USD 18.6 billion)

2010 ·Installed the Shin-Kori 3 reactor (first APR1400 application)

2011 ·Initiated commercial operation of Shin-Kori 1 (first OPR1000 application)
·Acquired pumped-storage power plants from a thermal power generation company (4,700MW)
·Recognized as a family-friendly company displaying excellence
·Recognized as a Korean quality competitiveness enterprise displaying excellence
·Officially launched Nuclear Safety & Security Commission

2012~2018

2012 ·Initiated commercial operation of Shin-Kori 2 and Shin-Wolsong 1

2013 ·Concluded a business agreement for the integrity project with the Anti-corruption & Civil Rights Commission
·Obtained licensure for safety analysis with Korean technology for the first time in heavy water reactor NPPS

2014 ·Obtained approval for Korean APR+ nuclear power plant standard design
·Conducted groundbreaking ceremony for Gyeongju head office

2015 ·Surpassed 3 trillion kWh in accumulated nuclear power generation
·Obtained approval for continued operation of Wolsong 1
·Initiated commercial operation of Shin-Wolsong 2
·Halted Kori 1 operation permanently and established a bridgehead for the nuclear decommissioning business
·Finalized construction of Cheonji NPP (Yeongdeok) based on the 7th general plan for electricity demand and supply

2016 ·Relocated head office to Gyeongju
·Obtained approval for construction of Shin-Kori 5 and 6

2017 ·Completed Noeul fuel cell power plant
·Halted Korea's first NPP Kori 1 operation permanently
·Completed Kori Photovoltaic Power Plant

2018 ·Completed 365-day continuous operation of Shin-Kori 3 during first year
·Completed Chameliya Hydropower Plant in Nepal

KHNP Business Model

102-2

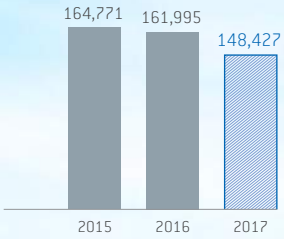
Since KHNP first started the commercial operation of Kori 1 about 40 years ago in April of 1978, the nuclear power generation-based power supply has been steadily increasing to the point where three out of 10 households in Korea are now using electricity generated by nuclear power. KHNP is generating and supplying approximately 31.5% of the nation's power for a stable supply of electricity using hydro power, pumped-storage power, and new and renewable energy, as well as nuclear power.

NPP Business

Nuclear power plants generate steam using an enormous amount of heat released from the nuclear fission of uranium in reactors and produce electricity by operating turbines using this energy. In 2017, the total energy production of nuclear power generation was 148,427GWh, accounting for over 26.8% of the nation's power generation.

Electricity Generation through Nuclear Power

(Unit: GWh)



*1GWh = 1,000MWh

Nuclear Power Plants

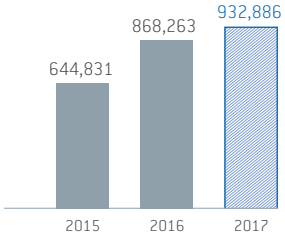
(As of Dec. 2017)

Classification	Units in operation	Capacity (MW)
Kori	5	4,550
Hanbit	6	5,900
Wolsong	6	4,779
Hanul	6	5,900
Saeul	1	1,400
Total	24	22,529

Hydro Power Business

Hydro power plants generate electricity by converting kinetic hydraulic energy into mechanical energy and then converting it to electrical energy. Hydro power is a pollution-free and clean energy source that produces electricity using the nation's natural water resources. KHNP is currently operating 21 hydro power plants and 14 small hydro power plants, with a total facility capacity of 606.73MW.

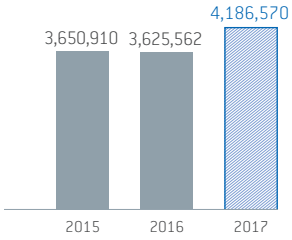
Electricity Generation through Hydro Power (Unit: MWh)



Pumped-Storage Business

Pumped-storage plants pump water from a lower elevation reservoir to a higher elevation reservoir using cost effective power during the low-demand nighttime hours. Then, these plants drop water from the higher elevation reservoir downstream to generate electricity during the high-demand hours. As of 2017, KHNP has been 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 plays an important role in providing a stable supply of electricity during peak seasons while also continuing with the modernization of power plant facilities for increased reliability and long-term, sustained operation.

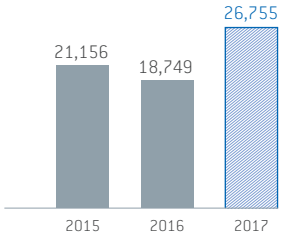
Electricity Generation through Pumped-Storage (Unit: MWh)



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 taking the initiative in 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 new and renewable energy facilities with an investment of KRW 7.3 trillion by 2030.

Electricity Generation through Renewable Energy (Unit: MWh)



KHNP Sustainability Management

2031 Mid- to Long-term Management Strategy

In response to the rapidly-changing energy market, KHNP has re-established its 2031 mid- to long-term management strategy in order to promote public confidence in nuclear safety. Under its new vision of becoming a global energy leader creating a sustainable future, KHNP has established new strategic targets and five new strategies. Based on its two strategic targets to enhance business value and lead social value, KHNP will create a balance of business and social values by proactively pursuing its overseas and new business models with the competitiveness of hydro power and new and renewable energy business.

Mission — "Prosperous life through eco-friendly energy"

Vision — KHNP-a trusted global energy leader

Core values — Technology•Respect•Ultimate Safety•Social Responsibility•Timeless Integrity

Strategic targets

Enhance business values	Lead social values
• Sales of KRW 16.2 trillion in 2031 (overseas business: 28%)	• World's No.1 nuclear safety
• World's No.1 NPP operation competence	• Public trust in NPPs: 50%
• Korea's No.1 new and renewable power generation	• Local receptivity: 70 points
	• Creation of jobs in private sector: 190,000 (from 2018 to 2031)

Strategic direction

Short-term	Mid-term	Long-term
Internalize core businesses	Enter overseas promising business	Enter overseas promising business
Enhance competitiveness of core business	**Make new profits through promising businesses**	**Secure innovative growth engine**
•Domestic NPP business •Domestic hydro and pumped-storage power •Domestic new and renewable energy business •Domestic nuclear decommissioning	•Overseas NPPs + Consulting + Nuclear decommissioning •Overseas hydro power •Overseas new and renewable energy	• Future Smart Plant • Radiation business • Next-generation hydrogen business • New business and business utilizing new technology • Mid- to long-term future seed R&D business

Create social values proactively	Improve operation systems
• Utilize NPP assets for social value creation • Cooperation in the industrial ecosystem for social value creation • Establish KHNP model for new and renewable energy business (in association with local communities) • Development of collaboration blueprint between industry, academia, & research communities in preparation for Fourth Industrial Revolution • Lead hydrogen-verification programs connected with the new and renewable energy industry • Development of activities to bolster mutual growth between local communities & businesses, etc.	• Incorporation of business portfolio management paradigm & strengthening of business risk management • Strategic management of shareholders • Improvement of business support infrastructure • Establishment of sweeping R&D strategy, inclusive of new business sectors • Innovation of management infrastructure & enhancement of corporate culture

TRUST-based Sustainable Management Strategies 102-16

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

Strategic Directions

Grow into a global energy leader contributing to national growth and public happiness by generating economic, environmental and social values

Tasks

Technology	Respect	Ultimate Safety	Social Responsibility	Timeless Integrity
• Secure world-class NPP technology • Expand overseas NPP projects • Diversify business portfolio	**Employees** • Improve the organizational culture and create a GWP • Cultivate professional manpower Suppliers **Suppliers** • Support shared growth	• Prioritize safe NPP operation first • Improve the reliability of NPP facilities • Enhance risk management capabilities to reassure the	**Environment** • Strengthen the environmental management system • Minimize environmental impacts • Respond to climate change Society **Society** • Implement social contributionactivities	• Enhance the ethical management system • Establish a culture of ethics and integrity

Sustainability Management Performance

Core Values	Indicator	Unit	2016 Results	2017 Results	2018 Targets
Technology	R&D Investment	Billion KRW	4,185	4,604	4,750
	Overseas Sales	Billion KRW	3,822	2,968	3,876
	RPS Execution	GWh	2,440	2,595	2,945
Respect	Labor-Management Partnership Index	Points	3.45	3.51	3.61
	Percentage of Female Managers	%	2.93	3.32	3.54
	HR Support (Including Atom Mentor)	Persons	51	156	150
	Overseas/Domestic Marketing Support	Cases	534	1,090	1,090
	Financial Support for SMEs	Billion KRW	1,099	1,181	1,181
	Performance Sharing Tasks	Cases	103	99	88.6
Ultimate Safety	Industrial Disaster Rate	%	1.38	0.79	0.97
	Unplanned Auto-Stop	Cases/Unit	0.16	0.04	0.04
	Radioactive Dose	Man-Sv/Unit	0.44	0.3	0.57
	Comprehensive NPP Safety Performance Index	Points	99.924	99.936	100
	Operating NPP Safety Management Index	%	4.3	3.524	7.21
	Seismic Performance	Cases	New	40	196
Social Responsibility	Sharing Fund (Dandelion Spore Fund)	Billion KRW	142	208.5	146.7
	Local community's receptivity	Points	56	56.3	56
	Environmental performance index	Points	285.9	286	315
Timeless Integrity	Integrity index	Grade	1	2	1
	Assessment of Anti-Corruption Plans	Grade	1	1	1

SECTION 01

KHNP, SOCIAL VALUE CREATOR

SOCIAL VALUE HIGHLIGHTS 1

Sustainable Job Creation

203-2, 401-1

KHNP, as a responsible public enterprise, is focusing on creating sustainable jobs in light of the challenge the nation faces in creating sustainable job opportunities. KHNP founded the Job Creation Commission with the CEO as the chairperson under the Social Value Committee and newly formed a department for job creation. It has been creating quality jobs in a variety of ways, including the creation of private sector jobs, job sharing, and converting contracted positions into salaried ones.

Plan to convert 32 contracted positions into salaried positions

100% achieved

17,153

Create private sector jobs

Gyeongju Naa Cooperative Union Selected in public job creation contest for

corporate excellence

Cultivating a community cooperative where local residents are executives and employees

KHNP pursued the Gyeongju Naa Cooperative Union for mutual growth with local communities to stimulate the local economies of the NPPs. In the Naa Cooperative Union, local residents, including the underprivileged, improve their quality of life by running ancillary facilities in the NPP vicinity as a main agent. KHNP established the autonomous rules (articles of association) so that members share common goals based on their bond and voluntary participation. In addition, we supported the union's democratic operation, in terms of members' participation and profit distribution. KHNP also systematically supports the union from operating independently to grow in association with its new businesses. Through the mid- to long-term roadmap for the development of cooperative unions (2017-2022) based on the Naa Cooperative Union model, KHNP will expand the union model nationwide across the board and establish a platform where local residents develop public services on their own.

Supporting the Gyeongju Naa Cooperative Union

Supporting the establishment of common goals of union

Establishing the autonomous rules (articles of associa-tion) through coaching for union foundation in order to determine target facilities and sizes having taken local residents' needs and regional traits into account

Establishing a democratic management system

Operating a flexible work program to en-sure member job participation in the union whenever desired and preventing the monopolization of business profits by sharing the union's income with local communities

Supporting systematic growth

Supporting the union's self-reliance so that it can grow as a NPP-customized job creation model and provide opportunities to participate in the agriculture business, utilizing thermal drainage from Wolsong, a business division for the KHNP

Participation of **45%** of total households

7% of profits **Income redistribution**

59 jobs created for the elderly in the community

Standardized as a **social economic model** in the NPP vicinity

INTERVIEW 1

Fulfilling our social responsibility as a leading public energy company requires us take that initial step forward in practical job creation policy by establishing a job creation platform for the private sector

"We essentially formed the Job Creation Commission to create sustainable jobs."

The recent economic recession is worsening the employment climate and the polarization of social classes. This has led us to seek out ways to create more jobs in order to carry out our responsibility and duty to the fullest as a public organization. As a result, we have formed the Job Creation Commission consisting of the Quality Job Creation Sub-commission and the Quality Job Conversion Sub-commission to promote sustainable job creation. Following the establishment of our job creation system, we have been continuing with its implementation and a variety of strategies, such as the mid- to long-term business strategy for job creation, employment impact assessment, and innovative project development process.

"We are focusing on job creation within the public and private sectors through conversion policy to salary employment and new business areas."

KHNP came up with a variety of ways to create jobs in both the public and private sectors. We are operating the Labor, Management and Specialist Council to improve the working conditions of non-regular workers and pursue conversion policy to salaried employment, to where we are systematically funneling our efforts. In addition, we created jobs in the private sector, as well as through the safety and eco-friendly energy business and there are currently new business areas we are exploring. Lastly, we are going to expand local community job creation with the Gyeongju Naa Cooperative to all NPP areas.

"Pursuing job creation policy that's actually helpful for the public."

Under the vision of 'realizing social values by creating sustainable jobs', KHNP established a network to create quality jobs in cooperation with stakeholders from local governments, academic circles and other related organizations, amid a variety of different fields. Fulfilling our social responsibility as a leading public energy company requires us take that initial step forward in practical job creation policy by creating jobs for the youth and establishing a job creation platform for the private sector.

Lee Seong-beom, Head of Job Creation Team

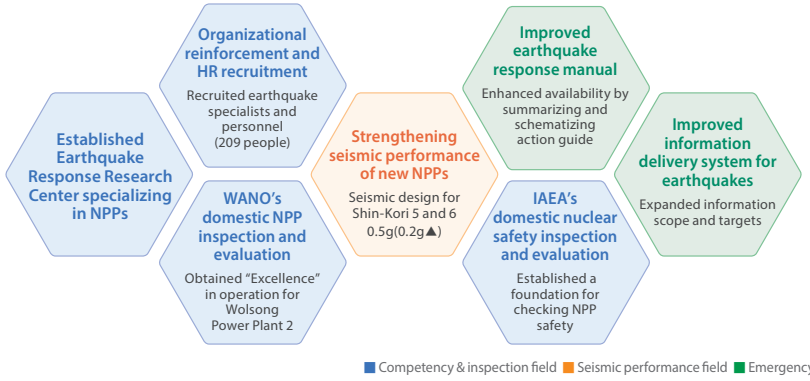
SOCIAL VALUE HIGHLIGHTS 2

Establishment of Comprehensive Seismic Safety Action Plan

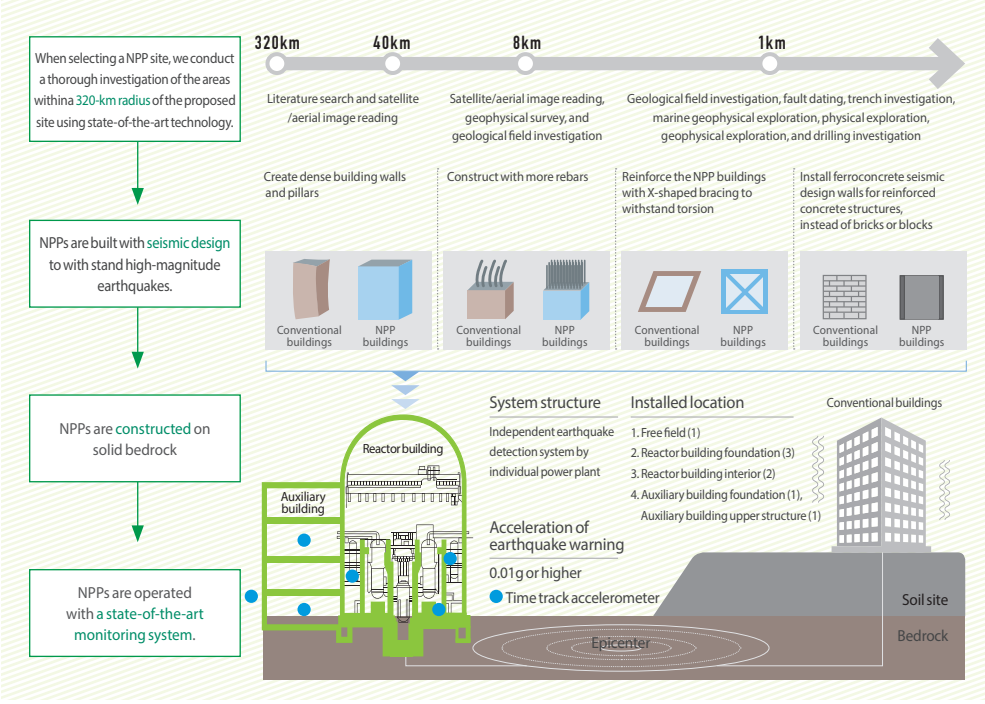
416-1

On September 12, 2016, the 5.8 magnitude earthquake that hit Gyeongju was the strongest earthquake in the country in Korea's meteorological survey history. Following the earthquake, the Korean government announced the Comprehensive Measures for Earthquake Prevention and the Ministry of Trade, Industry and Energy issued the Comprehensive Measures for Seismic Safety of Energy Facilities. In line with the government's measures, KHNP established the Comprehensive Seismic Safety Action Plan, consisting of 20 tasks in the four areas of earthquake/geology, seismic performance, emergency response, and others, in order to secure public trust and bolster the safety of its NPPs. KHNP has completed seven tasks in 2017 and will successfully carry out all of 20 tasks by 2021 to set a new global standard in earthquake response.

Performance of 2017 Comprehensive Seismic Safety Action Plan



Are our power plants safe from earthquakes?



INTERVIEW 2

The 2016 Gyeongju earthquake completely evaluate nuclear safety basics from the ground up. To address this, we established the Comprehensive Seismic Safety Action Plan and greatly enhanced the seismic performance of NPPs.

"We determined whether to maintain operation of NPPs by measuring accurate PGA (peak ground acceleration) when the 2016 Gyeongju earthquake hit."

When the 5.8 earthquake struck Gyeongju on September 12, 2016, the PGA was 0.0981g at the Wolsong site, which was the closest NPPs to the epicenter. Although it was only half the NPP design earthquake standard, we manually stopped Wolsong 1-4 in line with procedure as the measured response spectrum exceeded the OBE design response spectrum standard. Later, a nuclear regulatory organization approved a restart after checking that KHNP had checked Wolsong NPPs precisely and had properly responded to the earthquake according to procedure. When the 5.4 earthquake hit Pohang in 2017, we kept operating the NPPs after inspecting the site in line with procedure as the 0.0134g PGA did not exceed the OBE standard.

*OBE: Operating Basis Earthquake

"Following the 2016 Gyeongju earthquake, we greatly enhanced the seismic performance of operating NPPs and Shin-Kori 5 and 6."

The 2016 Gyeongju earthquake pushed us to reinspect nuclear safety from the very basics. Based on the results of inspection, we were able to establish and conduct earthquake measures in seismic performance, emergency response, competency reinforcement, and inspection. In particular, we enhanced the seismic performance of core NPP facilities so that they could withstand 7.0 magnitude earthquakes, which are 64 times stronger than the 5.8 Gyeongju earthquake in 2016. When we constructed Shin-Kori 5 and 6, we analyzed Shin-Kori 3 and 4 and strengthened seismic performance so that new NPPs could withstand up to 7.4 magnitude earthquakes.

"We are conducting a variety of R&D projects to evaluate and improve seismic design standards."

As the Korean Peninsula is approximately 600km away from the boundary of the Eurasian Plate, it is very unlikely that a huge earthquake will hit Korea. However, KHNP will evaluate the seismic design standards of NPPs according to the government's fault investigation. In order to prepare for earthquakes exceeding design standards, we are looking into formulating an upgraded methodology that is appropriate for domestic situations, by referring to overseas cases of earthquakes exceeding the design standards. We will establish the optimized safety reinforcement plan in preparation for earthquakes exceeding the design standards by conducting a probabilistic earthquake risk assessment and developing the GMRS (ground motion response spectra) that incorporates seismic characteristics in accordance with the methodology, for the first time in Korea.

Im Jeong-muk, Head of Seismic Design Team , Seismic Engineering Office

SOCIAL VALUE HIGHLIGHTS 3

Innovation in Paradigms of Industrial Safety & Health

403-3

Although the number of accidents decreased as a result of establishing and conducting a variety of safety measures, the number of severe disasters have ceased to lessen, increasing the necessity to discover fundamental solutions. KHNP has innovatively changed its industrial safety paradigms so as to protect the lives of employees and reduce potential management risks. It is trying to shift from "conscious safety hazard resolutions" for removing evident risks to "subconscious prioritization of safety" to create a world-class safety culture.

2017 industrial safety disaster rate 0.92%
(0.46%▼)

Mandated suppliers with over 20 employees to establish an
occupational health and safety management

Won the Global Standard Management Award in
safety management

Establishment of Safety Culture by Improving Three Elements for Prevention of Industrial Accidents

Reinforcing safety system

Helping suppliers develop their safety management competence

KHNP is proactive in the prevention of industrial accidents through the support for and restriction on suppliers' safety management. Through the use of a reward system, KHNP sets goal disaster rates by supplier size and evaluates supplier safety activities. As part of restriction measures, it raises supplier safety awareness by establishing a corporate expulsion system and access/work suspension standards.

Establishing safety infrastructure

Constructing a hands-on safety education center in each nuclear power site

KHNP is constructing hands-on safety education centers to provide on-site safety education, involving safety measures for harmful and dangerous apparatus use, wearing proper safety gear, and more. On a trial basis, KHNP is constructing a hands-on safety education center with about 60 major facilities, such as a 4D Zone, lecture rooms, and industrial safety workshop facilities, near the Public Relations Center of the Hanul site.

Strengthening safety awareness

Safety Cards to prevent industrial accidents

KHNP did not have proper safety education for visitors even though visitors assisting power plant operation and taking care of landscaping, facility maintenance, etc., showed high accident rates. In order to resolve this issue, a Two-minute Safety Card was created and mandated for visitors to always have the card in hand for reference purposes.

Roadmap for Industrial Paradigm Innovation

Vision	Risk-free workplace
Goal	Employees pay attention to the safety of co-workers and the risk factors even when without supervision

2018	2019	2020
Conscious safety hazard resolutions	**Conscious prioritization of safety**	**Subconscious prioritization of safety**
Management emphasis of safety management and goals followed by conducting safety education. ▼ Zero recorded severe accidents Accidents: 20cases/year or less	Employee voluntary action for safety, sufficient knowledge of safety, continuous training ▼ Zero recorded severe accidents Accidents: 15cases/year or less	Employees pay attention to co-workers' safety, safety embedded in daily life ▼ Zero recorded severe accidents Accidents: 10cases/year or less

INTERVIEW 3

With a vision for achieving zero fatality, zero injury and zero accident, we endeavor to continuously reduce fatality and injury rates.

"We are establishing an optimized safety management system to help prevent accidents and innovate industrial safety and health paradigms."

KHNP is pursuing a flawless safety management system for the safety of its employees and suppliers. We are conducting safety inspection constantly by maintaining the Occupational Health & Safety Management System KOSHA and OHSAS 18001 for our head office and all power plants. Based on our belief that the three factors of system, infrastructure, and employee awareness, are required to prevent industrial accidents, we continue to improve our safety management system. We are innovating our industrial safety paradigms to catalyze a shift from performing "conscious safety hazard resolutions" to "subconscious prioritization of safety".

"We are working to raise KHNP and supplier safety awareness."

Among the three factors for preventing industrial accidents (system, infrastructure, and employee awareness), we should improve employee awareness of safety first in order to conduct a system and utilize infrastructure properly. There are still those isolated case of improper job performance on the part of our employees and on occasion, we discover some cases where safety awareness is lacking, leading to negligence on the job and other issues. We consider such cases to be risk factors, which has been prompting us to make the required improvements. The increased safety awareness of employees of KHNP, suppliers, and temporary staff calls for a dynamic approach involving safety inspections in cooperation with external agencies and suppliers.

"We insist on reducing disaster rates by achieving a status of zero-recorded accidents."

With the vision of a "risk-free workplace", we are creating a safety-centered culture so that employees pay attention to the safety of their fellow coworkers, as well as their own safety, even when no one is supervising. We will share the corporate industrial safety guidebook with all employees and request a diagnosis on our safety and health system from domestic and overseas agencies. By 2020 with the goal of achieving zero-recorded accidents, fatalities and injuries while reducing the count to under 10 accidents on a yearly basis, we continue our endeavor to progressively reduce disaster rates.

Lee Jung-gi, Head of Emergency Management Office

SOCIAL VALUE HIGHLIGHTS 4

Fostering a Culture of Human Rights

412-1, 412-2

As KHNP's social influence grows, the issues of human rights are emerging as a management risk. KHNP has set the "Respect for Human Rights" as one of its goals and has been conducting human rights management in all business areas. By conducting a wide range of human rights management activities, including the establishment of the Charter of Human Rights Management and Practical Principle, self-inspection on human rights management, and the Week of Human Rights, KHNP pursues the strengthening of its culture for respecting human rights. KHNP will become a company leading human rights management so as to grow as a trusted global energy leader.

Establishing and declaring
the Charter of Human Rights Management and the Practical Principle for Human Rights Management

Conducting self-inspection
on 10 fields relating to human rights management

Operation
Week of Human Rights

Operation Week of Human Rights

KHNP held the Week of Human Rights over the course of five days starting from June 25, 2018, at its head office in Gyeongju, where employees of KHNP and suppliers, together with local residents, participated in unison. KHNP provided a variety of cultural and art programs under the theme of human rights, including a photo exhibition, lecture, and concert, in order to create an organizational culture of harmony and passion by raising employee awareness of respecting human rights and eliminating discrimination.

Human Rights Photo Exhibition, 「Hidden Pictures」

KHNP exhibited 30 press photographs that touched on the themes of sorrow, aspirations, and hope among minorities, which included the disabled, the elderly, and women. KHNP designed the exhibition so that visitors could gain insight from the subtle messages within the stories of human rights while observing the photos.

Human Rights Lecture, 「Unmasked Gallery」

The instructor gave a lecture on discrimination against minorities, the recent issue of hate crimes, and human rights of the elderly, depicted within different artworks so as to provide a sense of the hidden issues of human rights.

Human Rights Concert, 「Hand in Hand」

For the harmony of employees and disabled and non-disabled relations, KHNP held a concert by inviting the performance team of the disabled, who performed at the 2018 Winter Paralympics.

Human Rights Media, 「Pit-a-pat」

KHNP raised employee awareness of human rights by utilizing media contents of human rights, including video clips, email webtoons, and corporate portal login quiz.

INTERVIEW 4

Advocating human rights management is no longer an option; it is a requirement. It pushes us to build trusting relationships with stakeholders by improving our human rights management and establishing a system to prevent related violations.

"We will gain stakeholder trust by taking the initiative in human rights management."

The trust-based relationship with numerous stakeholders is very important in NPP business, a main business facet of KHNP. If we violate stakeholder human rights or fail to protect such rights, we will not be able to establish a trusting relationship nor continue on with our business. Therefore, our human rights management is no longer an option; it is a requirement. We use global company violations as examples to improve our human rights management. We will build trust with stakeholders in our overseas markets, as well as the domestic market, by taking the initiative in human rights management.

"We conduct self-inspection on human rights management and remedy the shortcomings based on the results."

Starting with the declaration of the Charter of Human Rights Management in 2017, KHNP is conducting a wide range of human rights management activities, such as the declaration of the Practical Principle for Human Rights Management and the operation of the Week of Human Rights. In addition, we distributed the Human Rights Checklist and the departments of the head office conducted self-inspection on 10 fields of human rights management. As a result, we discovered that we need to establish a human rights management system and find a way to responsibly manage the supply chain. And to remedy its shortcomings, we are scheduled to install a Human Rights Management Committee and establish strategies to protect human rights in the supply chain.

"We will integrate a human rights management system to prevent human rights violations."

Of course, it is important to respond to a human rights violation properly and swiftly when such a violation occurs. Paramount to this, however it the prevention of such incidents from occurring in the first place through the establishment of an appropriate response system. In order to prevent human rights violations, we are seeking to plan human rights programs for both employees and stakeholders. By developing and utilizing key indicators we will record and trace the 'do's and don'ts' of human rights management. Furthermore, we will upgrade our human rights management system to meet global standards by analyzing overseas cases of human rights violations and participating in a variety of human rights activities.

Yun Seung-ho, Head of Planning Team, Corporate Planning Department

SOCIAL VALUE HIGHLIGHTS 5

Win-win Growth with Local Communities

203-1, 413-1

Since the head office of KHNP moved to Gyeongju, KHNP has been utilizing its competencies as much as possible for the development of local communities. KHNP revitalized local economy by developing local businesses and creating jobs, as well as putting forth the effort in various fields through the recruitment and development of local talent and various social contribution activities for local communities. In particular, KHNP announced the Gyeongju Win-win Growth Plan as part of local economic revitalization of Gyeongju while focusing on encouraging NPP business partners to visit Gyeongju and establish the On-site NPP Workers Training Center.

461.25 people
employed from local communities

Inviting
nuclear power business partners to **Gyeongju**

Development of local talent by establishing the **On-site NPP Workers Training Center.**

Revitalizing the Local Economy through Business Partner Invitation

Considering the Gyeongju mutual growth plan as a top priority, KHNP set a goal of inviting nuclear power business partners to Gyeongju. As the shipbuilding and automobile industries declined, the Gyeongju's economy worsened, which is where several second and third-tier suppliers were based. In this situation, KHNP established a support system to invite its business partners to Gyeongju and strived for mutual growth with local communities.

Establishing a support system for business partners that are willing to move to Gyeongju

Rent subsidies	Cooperation for technology development	Preferential contract
Up to KRW 200 million for five years	Funding KRW 20 million for industrial innovations and KRW 80 million for process innovations	Qualifying local business for limited competitive bidding Up to KRW 3 billion for construction works, KRW 300 million for specialized construction works, and KRW 200 million for services
Techno doctors (technical personnel who retired from KHNP) and quality mentoring (KHNP quality personnel)	Automatic loan interest discount by 2.7%p up to KRW 1 billion	Operating Nuclear Training & Education Center Win-win Growth Academy and supporting occupational training programs
Provision of skilled workforce	**Financial support**	**Support for development of job competence**

88 companies and 1,295 employees moved to Gyeongju

Invited KEPCO KPS ENG Center and Soosan Industries HRD Institute

KEPCO KPS ENG Center

Panoramic view of On-site NPP Workers Training Center

Cultivating a functional workforce through the establishment of On-site NPP Workers Training Center

In August 2017, KHNP started the construction of On-site NPP Workers Training Center, in cooperation with Gyeongsangbuk-do Province and Gyeongju, to provide on-site occupational education for local residents and NPP workers. Once the construction of On-site NPP Workers Training Center is completed in 2019, KHNP will promote employment, providing occupational education, such as plumbing, specialized welding, and electric control for unemployed local residents.

INTERVIEW 5

We have been making various efforts for Gyeongju's local economic revitalization by bringing in businesses, prioritizing the purchasing local products, employing local talented individuals as well as conducting social contribution activities. Together with Gyeongju, we are building a familial type, tightly-knit relationship.

"We have invited nuclear power business partners to stimulate the Gyeongju's local economy."

Since we moved our head office to Gyeongju, we have established the Gyeongju Win-win Growth Plan and have been inviting nuclear power business partners for mutual growth with Gyeongju. We have established a variety of support systems, including rent subsidies, finance, contracts, education, and technical support. In addition, we invited suppliers specializing in NPP maintenance, radiation control, information and communications, nuclear fuel, facility management, and other various fields, including leading nuclear power businesses, such as KEPCO KPS, KEPCO KDN, and Soosan Industries.

"We are constructing the On-site NPP Workers Training Center to foster a skilled workforce and create jobs."

In cooperation with Gyeongju-si and Gyeongsangbuk-do, KHNP is constructing the On-site NPP Workers Training Center to promote a functional workforce with an enhanced skil lset who can then be dispatched to the site immediately. Once the Training Center opens, it will provide technical education, such as plumbing, welding, and electric control, for unemployed local residents. Trainees completing the training program will have access to job opportunities at NPP business partners. We anticipate this to increase local resident income and consequently contribute to stabilizing the economy and enhancing the quality of life.

"As one of the leading companies of Gyeongju, developing a mutual-growth relationship with local communities is our priority."

As a representative public enterprise of Gyeongju, KHNP has been actively moving forward in the development of local communities by optimizing its utilization of its competencies. We have been steadily making various efforts for local economic revitalization and win-win growth by bringing in businesses, prioritizing the purchasing of local products, employing talented individuals in local communities, as well as conducting social contribution activities for those same communities. Together with Gyeongju, we are building a tightly-knit familial type of relationship. We anticipate the future contribution to a variety of Gyeongju's fields; including the economy, society, education, culture, and history, which will thereby enable us to be better received by the people of Gyeongju.

Yun Sang-jo, Chef of Community Support Department

Social Value Creation Forum

Considering social values as future values, KHNP held the Social Value Creation Forum to diagnose its current social value level and seek out a strategic direction. About 30 stakeholders, including eight social value members who represent various interests in profits and losses from the academic circles, research institutes, civic groups, and private specialists attended the forum and shared various opinions about KHNP's efforts to realize social values. In particular, attendees agreed that social values should be linked to KHNP's status, as a public energy company, and its corporate value chain. In addition, many attendees said that they consider the opinions of local communities which conducted social value activities and internal working-level staff, who were in fact the main agents of such activities. As a responsible public organization, KHNP is striving to become a company leading social values by remaining open to the opinions of various stakeholders and establishing realistic and achievable social value strategies.

- Date: 1pm - 4pm, November 2, 2018 (Friday)
- Venue: Oakwood Premier Coex Center (Samseong-dong)
- Sponsor: Job Creation & Government Task Force, Korea Hydro & Nuclear Power

Attendees for Social Value Creation Forum

Kwak Chae-ki	Professor at Dongguk University	**Hong Kil-pyo**	Professor at Baekseok University
Yun Tae-beom	Chairman of Korea Research Institute for Local Administration	**Bae Seong-gi**	Director of Social Value Institute
Park Seong-hun	Senior Researcher of SK Center for Social Entrepreneurship Studies	**Jeon Yeon-su**	Executive Secretary of Social Welfare Foundation Haesong
Jeong Ji-yeon	Senior Consultant of MYSC	**An Geun-hong**	Senior Consultant of Korea Management Association Consulting

Kwak Chae-ki, Professor at Dongguk University

I believe that a company can innovatingly grow by linking its business to social values. In order to achieve this, KHNP must be able to set strategies to realize social values by its foundation purpose and business, and establish a social value vision that can be linked to its corporate vision.

Park Seong-hun, Senior Researcher of SK Center for Social Entrepreneurship Studies

The public's first impression of KHNP may include safety, environmental, and NPP issues. KHNP should strive to realize social values while focusing on such issues. In particular, it should develop significant social values and estimate their impact. I recommend that KHNP devise a way to generate effective synergy.

Jeon Yeon-su, Executive Secretary of Social Welfare Foundation Haesong

I have been working with KHNP for a long time as a business partner, as well as a local resident living near its power plant. I think that one of the biggest social values of KHNP is the stable supply of electricity. As KHNP is greatly contributing to the national and local economy, it must exhibit the effort in helping realize such social values.

Bae Seong-gi, Director of Social Value Institute

I have been working with KHNP for a long time as a business partner, as The government emphasizes that all the public organizations should be grounded in social values, leaving KHNP the obligation of reviewing overseas success cases. In the United Kingdom, public organizations define and create their own social values according to their organizational characteristics. KHNP should set detailed social values considering its characteristics and make efforts to lead them to social innovations.

Hong Kil-pyo, Professor at Baekseok University

KHNP should think about how it could incorporate social values into its major businesses. KHNP should find out a correlation between its activities and social values by analyzing the value chain and develop social value tasks based on analysis results.

Jeong Ji-yeon, Senior Consultant of MYSC

I believe that KHNP should pay attention to its working-level staff who directly communicate with local communities and reflect their opinions into its business in order to realize social values. KHNP should interview working-level staff to find out what kinds of difficulties they face in creating social values while helping their social value creation activities in association with its business.

An Geun-hong, Senior Consultant of Korea Management Association Consulting

The pursuit of social values must enable KHNP to transform crisis into opportunity. As we saw from the case of Shin-Kori 5 and 6, public opinion about nuclear power plants are gradually changing in a positive way. Gaining public trust, KHNP needs to suggest a correlation between social values and its establishment and set it as a strategic direction for social values.

Yun Tae-beom, Chairman of Korea Research Institute for Local Administration

KHNP is a public entity that is required to operate its business for a long period of time due to the characteristics of its business and should be able to generate quality energy. Therefore, I believe that its entire energy generation processes should be integrated with that of social values.

Yi In-sik, Director of Planning Division, KHNP

With internal and external changes in the energy market, KHNP is now in a transitional period to grow as an energy leader. The keyword of our sustainable growth is public acceptability, which provides the driving dynamic to essentially incorporate social values into our business and do our utmost to see them through.

SECTION 02

KHNP, SUSTAINABILITY ISSUES

TECHNOLOGY

Securing of Future Growth Engines

KHNP PERFORMANCE

Fulfilled its **RPS** duties for **6** consecutive years

Obtained European Utility Requirements (EUR) for **EU-APR**

Successfully passed the main assessment of U.S. Nuclear Regulatory Commission Design Certification **(NRC DC)**

Completed construction of **Chameliya** Hydro Power Plant in Nepal

RELEVANT SDGs

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

SUSTAINABILITY CONTEXT

Leading countries are promoting low-carbon energy policies in order to fulfill their duty to reduce greenhouse gas emissions voluntarily in accordance to the Paris Agreement. As part of national energy policy, the Korean government is also in pursuit of new and renewable energy generation. Although the global nuclear power market somewhat reduced following the Fukushima nuclear disaster, nuclear power plants are actively being constructed in newly-emerging developing countries. As numerous power plants of the world are entering a phase of long-term operation, the nuclear decommissioning market is anticipated to take root. The Republic of Korea, however, has already secured its own nuclear decommissioning technology during the process of permanently shutting down operations of Kori 1. In response to shifting domestic and overseas NPP business environments, KHNP is working to strengthen its future growth engines in new and renewable energy business, NPP export, and nuclear decommissioning.

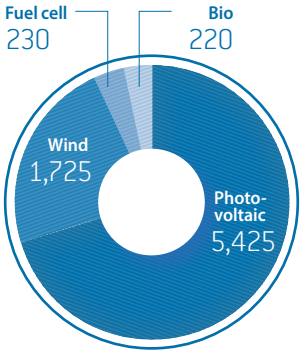
KHNP APPROACH

In order to create future growth engines in the energy business, KHNP is diversifying its business portfolios while receiving overseas NPP construction orders. In addition, KHNP is pushing forth to increase low-carbon power plants, part of the national policy to reduce greenhouse gas emissions. KHNP is increasing its facilities of new and renewable energy, including photovoltaic power and hydro power, while also conducting the Renewable Portfolio Standard (RPS). Based on its technology and experience accumulated during the domestic NPP and hydro power plant projects, it is successfully conducting an NPP project in the UAE. KHNP is contributing to enhancing the nation's status by expanding its overseas hydro power business. Furthermore, KHNP secured commercial nuclear decommissioning technology during the dismantling of Kori 1 and is currently establishing a foundation for the overseas expansion of the nuclear decommissioning business through the bolstering of its competencies of nuclear decommissioning companies.

Development of Eco-friendly Energy 201-2

Facility capacity of new and renewable energy in 2030

(Unit: MW)



Securing of New and Renewable Energy Roadmap

KHNP established strategies to diversify businesses by introducing new businesses while bolstering business competencies so as to become Korea's largest new and renewable energy business in 2031 in line with the government's eco-friendly future energy development policy. KHNP introduced various new types of its own projects, such as the purchasing of sites, the acquisition of development projects, and mutual growth with local communities, instead of focusing on the preexisting SPC-centered development. In addition, KHNP expanded its new and renewable energy group, cultivated field specialists, and optimized its business implementation system and facility management system in order to further improve upon business competencies.

2030 Mid to Long-term Roadmap for Renewable Energy Business Development

Classification	Unit	Photovoltaic	Wind	Fuel cell	Bio	Total
Capacity	MW	5,425	1,725	230	220	7,600
Direct investment	KRW 100 million	41,180	31,079	499	272	73,030
Total project costs	KRW 100 million	93,538	82,645	13,274	6,820	196,277
Power generation	GWh	6,538	4,148	1,713	1,638	14,037

Photovoltaic Power Business

The Two-track Approach

KHNP's photovoltaic power business conducting self-driven projects using corporate idle land and large-scale SPC projects in cooperation with the private sector. In 2017, KHNP completed the installation of a 5MW Kori photovoltaic power plant and a 100KW rooftop photovoltaic power facility for the Hydro Power Training Center. In addition, KHNP introduced a fund investment business model and set the conditions for expanding its photovoltaic business by participating in government-initiated, large-scale projects, including the 100MW photovoltaic power plant projects for the Hyundai Motor Company and the 150MW Seoul Capital Area.

Applied for a patent on Korea's first grid-connected solar photovoltaic power generating system in agricultural management

Photovoltaic Power Business based on Win-win Growth with Local Communities

KHNP developed a photovoltaic power business platform for win-win growth with local communities by applying a patent on the grid-connected solar photovoltaic power generating system in agricultural management. Under the implementation of this system, farmers can grow rice using the preexisting agricultural methods while KHNP can simultaneously conduct its photovoltaic power business. KHNP installed three-meter high photovoltaic solar panels on agricultural land in order to conduct power generation and grow agricultural products. As a result, KHNP is contributing to generating additional agricultural income and distributing renewable energy. 73KW photovoltaic power facilities installed in Gapyeong, Gyeonggi-do in 2017 produced 86% of the yield of neighboring agricultural land, proving that the photovoltaic power business' viability with agricultural industry.

Solar photovoltaic power generating system in agricultural management.

Reach wind power facility capacity of **1.7GW** by 2030

Wind Power Business

In line with the government's wind power business promotion policy, KHNP is simultaneously conducting onshore and offshore wind power businesses; in particular, it is developing offshore wind power facilities. It was initially difficult to conduct the wind power business in Goheung, Cheongsong, and Anmado Island due to wind power development expenditures and resident compensation for noise, fishery rights, and other issues. However, KHNP reached an agreement with stakeholders, facilitating its acceleration of wind power businesses by absolving of business obstacles. With the aim of reaching wind power facility capacity of 1.7GW by 2030, KHNP is developing a large-scale, 100MW and above-scale offshore wind power facilities on land adjacent to the NPP site.

2030 Wind Power Business Development Goals

Classification	Unit	Onshore Wind Power	Offshore Wind Power	Total
Facility Capacity	MW	190	1,535	1,725
Power Generation	GWh	383	3,765	4,148

Completed the construction of the Busan Green Energy world's largest **31MW** fuel cell

Fuel Cell Business

Recently, fuel cells are emerging as an alternative that can simultaneously resolve future energy issues and pollution. In order to maximize the capacity of fuel cells in a limited urban site, KHNP installed multi-stage fuel cells in Haeundae, Busan, using a newly-developed form of construction. 31MW Green Energy, which is the world's largest multi-stage fuel cell model, is an exemplary case of dispersed generation that helps alleviate civil complaints regarding large-scale power line construction.

Onshore Wind Power

Fuel cell facilities

Fulfilled its **RPS** duties for **six consecutive years** for the first time among electric power companies

Fulfillment of its RPS duties for six consecutive years

KHNP pushes to meet its mandatory supply through the active implementation of the Renewable Portfolio Standard (RPS). This has propelled KHNP to construct facilities while conducting some projects in cooperation with private businesses. In addition, it obtains new and renewable energy supply certificates through autonomous contracts, (including selected contracts), spot markets, and other means. Essentially, these efforts provided the dynamic for KHNP to meet the RPS target for six consecutive years. In order to minimize external purchase costs based on RPS implementation, is minimizing spot purchases while expanding upon the number of selected contracts by the Korean Energy Agency in its external purchase portfolios, long-term fixed price autonomous contracts, and Korea FIT-enforced contracts from 2018.

RPS Targets and Implementation

(Unit: 10,000 REC)

Year	2012	2013	2014	2015	2016	2017	2018
RPS Duties (Targets)	201	246	252	266	288	291	345
RPS Implementation (performance)	162	177	181	216	244	260	In progress

*RPS goal achievement criteria: Achieving over 80% of RPS duties

Expansion of Overseas Business 201-1

EU-APR
certified for European Utility Requirements (EUR)

Passed NRC DC
main assessment

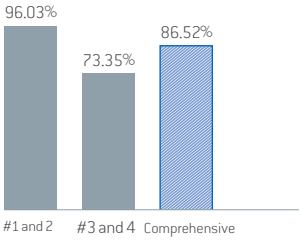
Establishing a Foundation for NPP Export by Obtaining Overseas Certificates for Third Generation NPPs

KHNP is working to obtain certificates for third generation NPP APR1400 from Europe and the US, resulting in the foothold needed for successful plant exportation. The APR1400 is certified for European Utility Requirements (EUR), which can be used as a technology requirement for NPP project bidding in Europe, leading to KHNP establishing a bridgehead for NPP exports to Europe, including the Czech Republic and the UK. In addition, KHNP is working on the main assessment of NRC DC*, which is issued for safe NPPs by the Nuclear Regulatory Commission (US), and successfully passed three out of among the six stages of the NRC DC primary assessment, laying the groundwork for the advantageous position in entering the US market.

* NRC DC (Nuclear Regulatory Commission Design Certification): The NRC DC (US) certifies the safety of standard NPP designs

UAE NPP Construction Completion Rate

(As of the end of 2017)



Barakah NPP construction completion ceremony

Successful Implementation of UAE Project

Successful NPP Construction and Trial Operation

In 2009, KHNP won the bidding for the construction of NPPs in Barakah and the UAE, triumphing over the world's most advanced nuclear competitors, including the US, France, and Japan, thanks to KHNP's competitive edge in its APR1400 nuclear reactors. This enabled the KHNP to contribute to Korea's first export of NPPs, making Korea the sixth nation in the world to export NPPs overseas. Since commencing construction in 2010, 90% of the required construction has been completed as of September 2018. Operation preparation for the first NPP will be completed by Nawah, the NPP operator of the UAE. Around 2020, when operational permission is scheduled to be obtained from a regulatory agency, the conducting of fuel cell installation and power ascension testing are in the works.

UAE NPP Construction Status

Major Events	Date
Signed the main contract for the UAE NPP project	December 2009
Undertook foundation excavation for the main building	September 2011
Obtained a construction license for #1 and 2	July 2012
Undertook the first concrete casting for reactor #1	July 2012
Installed reactor #1	May 2014
Undertook initial energization for reactor #1	March 2015
Performed cold hydraulic test for reactor #1	February 2016
Loaded nuclear fuel in reactor #1	Late 2019 to early 2020
Completed construction of reactor #1	2021

OSSA, Operating Support Services Agreement

By signing a USD 600 million (excluding indirect expenses) OSSA with Emirates Nuclear Energy Corporation (ENEC) in July 2016, KHNP accomplished the unprecedented feat of the largest exportation of operation services in the history of NPPs. After completing the construction of the UAE NPP #4, KHNP is planned to dispatch an average of 200 qualified NPP operators and other operating personnel annually for the next 10 years. Furthermore, KHNP will explore new areas of long-term cooperation with the UAE, such as operation-related purchasing, quality management, and technical assistance, to generate additional profits.

Contracting UAE NPP OSSA

Sustained profit creation	USD 600 million for 10 years
No. of dispatched personnel until 2030 (Total of 3,000)	Operators: 1,123
	Support Personnel: 2,152

Expansion of Overseas Hydro Power Business

Completed construction of Chameliya Hydro Power Plant

30MW in Nepal

Successfully Completed the First Ever Overseas Hydro Power Project in Korea

Nepal Chameliya Hydro Power Plant

The global hydro power market, including preexisting facility operation, maintenance and management, as well as new businesses, is experiencing a growth in demand, catalyzing the KHNP to expand upon its overseas hydro power business, currently functioning as a new growth engine. As a public enterprise that has the greatest number of hydro power facilities and professional workforce employees in Korea, KHNP successfully completed the construction of its first overseas business, the Chameliya Hydro Power Plant, in Nepal of February 2018. As a result, KHNP acquired a successful overseas business performance and development expertise in overseas hydro power business development, rewarding it with its current state of professional manpower.

Constructing and operating of hydro power plants

450MW in Athmuqam, Pakistan

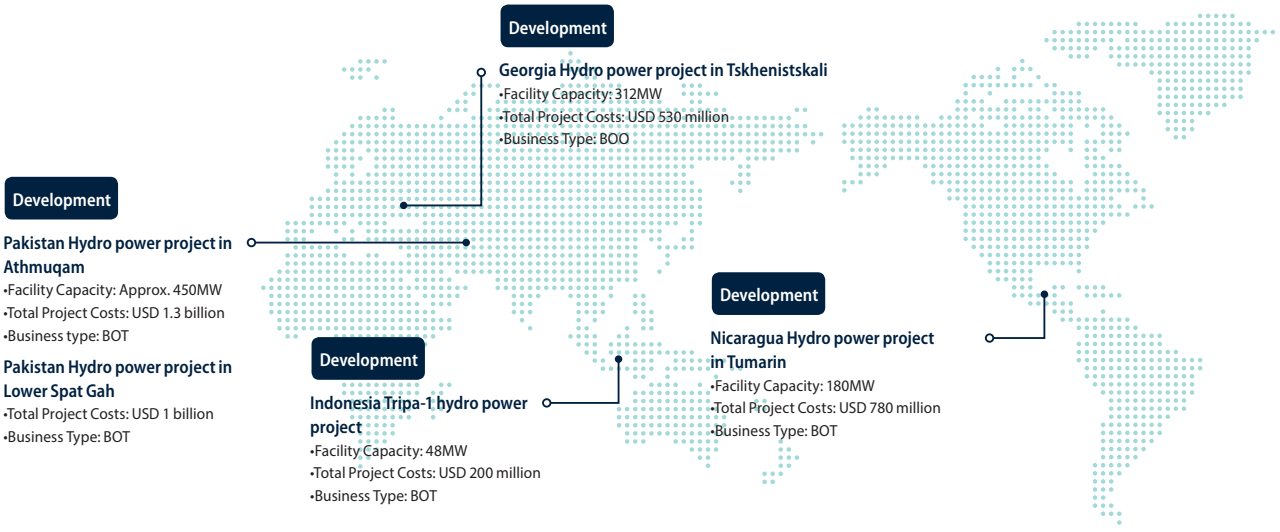
Timely Implementation of Follow-up Work of New and Current Projects

Based on its successful experience in the construction of Chameliya Hydro Power Plant in Nepal, KHNP is currently conducting the hydro power plant (450MW) construction and operation project in Athmuqam, Pakistan, of which the contract was acquired in March 2017. The client power company, based in Pakistan, asked that the KHNP take an active part in additional hydro power construction following the high rating of its project management capacity and quality, as well as its proactive development. The aim of commercial operation of the Athmuqam project in 2025 has propelled the conducting of follow-up operations, including the Risk Inspection Committee and project feasibility study.

Sustained Expansion of Overseas Hydro Power Business

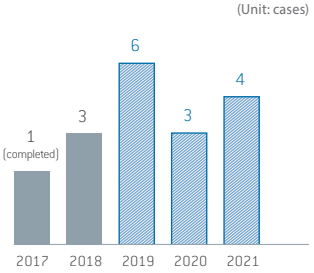
KHNP is carrying out additional hydro power construction in Asian nations with a high potential in the hydro power business. In 2019, tangible results from various nations, including Pakistan, Indonesia, and Georgia, has provided the driving force in the progressive development of new markets by expanding its the scope of development to Nicaragua and other Latin American countries. In addition, efforts are being made to enhance its role and status in the global market by strengthening a cooperative relationship with international organizations, including the International Financial Institutions (IFI) and the International Hydropower Association (IHA).

Current Overseas Hydro Power Business

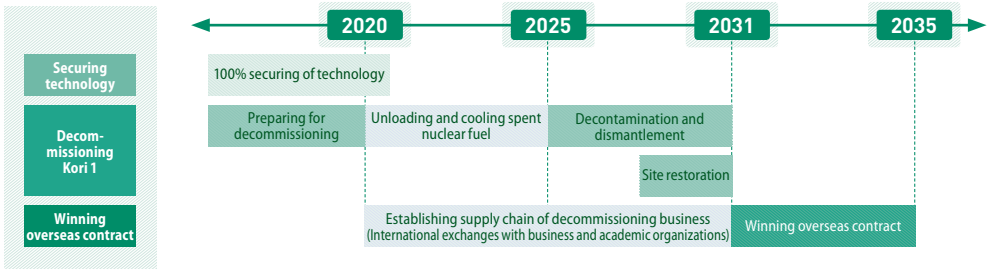


Nuclear Decommissioning Business

Reinforcement of Competencies in Nuclear Decommissioning Business



Roadmap for Nuclear Decommissioning Business



Establishment of Groundwork Decommissioning Technology

Establishment of Roadmap for Development of Unsecured Commercial Technology

KHNP established the "roadmap for development of nuclear decommissioning technology" in line with the goal of self-reliance of nuclear decommissioning technology. KHNP has secured 42 out of 58 commercial technologies required for nuclear decommissioning and looks to achieve 100% by securing the remaining 16 technologies until 2021. In 2017, KHNP developed 'technology for decommissioning facility design change and isolation' among the 17 unsecured technologies. As staged design changes are required for NPP decontamination and decommissioning, decommissioning facility design changes and isolation technology is part of the preparation for removing unnecessary facilities or recalculating the design capacity for permanent shutdown or decommissioning.

Strengthening of Competencies in Nuclear Decommissioning Business

Establishment of Industrial Network

KHNP has created a platform for exchanging information through workshops and forums so as to strengthen its competencies in the nuclear decommissioning business. In hopes of sharing information on regulations, technologies, and roles with domestic and overseas decommissioning companies, KHNP held the Specialists Workshop and International Nuclear Decommissioning Workshop. In addition, KHNP hosted the Nuclear Decommissioning Business Forum to build industrial-academic-research the decommissioning industrial network within the domestic spheres of industry, academia, and research.

Decommissioning Industrial Events

Classification	Participating agencies	Summary
Specialists Workshop (April)	NDA(UK)*, IAEA, and Hanyang University	• Exchanging information about the composition of organizations and roles by sharing cases regarding overseas nuclear decommissioning • Sharing information on technology and regulations toward domestic and overseas decommissioning businesses
International Nuclear Decommissioning Workshop (September)		
Nuclear Decommissioning Business Forum (December)	Ministry of Trade, Industry and Energy, KHNP, businesses, etc.	Building decommissioning industrial network within Korean industry, academia, and research fields

* NDA: Nuclear Decommissioning Authority (UK)

11 nuclear decommissioning equipment development plans

Development of Nuclear Decommissioning Equipment

According to the government's nuclear decommissioning promotion policy, the KHNP is trying to develop the competencies of Korean companies by developing decommissioning equipment in cooperation with SMEs. KHNP established 11 nuclear decommissioning equipment development plans and encouraged suppliers to participate in development of general-purpose equipment as main agents for the Kori 1 decommissioning. Preparations are underway for the nuclear decommissioning industrial climate and the development of technical competencies of suppliers by co-developing decommissioning equipment.

Decommissioning Equipment Development Plans

Equipment	Exclusive equipment	General-purpose equipment
Description	Exclusive application for Kori 1 tailored to its design traits	Equipment that can be applied to the decommissioning of other units
Type	Four pieces of equipment enabling system decontamination, radioactivation concrete cutting, etc.	Seven pieces of equipment enabling mobile work facilities, on-site decontamination of soil, etc.
Main agent	KHNP & Businesses	SMEs & Research Institutes

TECHNOLOGY

Development of Top Global Energy Technology

KHNP PERFORMANCE

R&D budget:
KRW **494.5** billion

No. of industrial properties:
230

No. of research projects:
154

No. of on-site technology tasks:
1,546

RELEVANT SDGs

SUSTAINABILITY CONTEXT

The world's leading nuclear power companies are under fierce competition to develop safer and more efficient nuclear power technology and acquire future growth engines. New and renewable energy is projected to increase to over 60% in the EU by 2020 while the Korean government has announced an energy conversion roadmap and the Renewable Energy 3020 implementation plan, emphasizing the growing importance of developing technology required for expanding the new and renewable energy business. KHNP now needs to focus on developing decommissioning technology so as to facilitate its decommissioning business to evolve into that of a new growth engine while also dismantling Kori 1 after its permanent shutdown in 2017.

KHNP APPROACH

In line with the vision of 'developing global top energy technology', KHNP is focusing on developing NPP operation technology, and new and renewable energy technology, new growth engine creation technology, as well as technology befitting of the Fourth Industrial Revolution. KHNP is studying system and radiation technology to improve upon nuclear safety in preparation for disasters, including natural disasters. In addition, it is enhancing nuclear power equipment reliability, securing sound materials, and developing intelligent facility technology based on Fourth Industrial Revolution technology. Lastly, KHNP is trying to secure technology for new growth engines, including NPP technology for exportation, nuclear decommissioning technology, and new and renewable energy technology, such as hydro power, solar power, wind power, and tidal power.

Mid- to Long-term R&D Direction

R&D Vision System

With the aim to develop global top energy technology, KHNP has set four strategic paths ahead for its R&D activity: the advancement of NPP operation technology, the securing of new and renewable energy technology, the bolstered development of new growth engine creation technology, and the intensive fostering of Fourth Industrial Revolution technology. KHNP seeks to enhance global competitiveness by developing core technologies to improve nuclear power safety and facility reliability, resolve issues while pushing forward new energy businesses based on technology development customized to the market.

R&D budget in 2017:
KRW 494.5 billion
(4.71% of net sales)

Vision	Development of global top energy technology				
Strategic direction	Advancement of NPP operation technology	Securing of new and renewable energy technology	Bolstered development of new growth engine creation technology	Intensive fostering of Fourth Industrial Revolution technology	
Tasks of implementation	Reinforced nuclear safety technology	Facility reliability-boosting technology	New and renewable energy technology	New NPP technology for export	Decommissioning/ Spent nuclear fuel technology
	• System safety technology • Radiation safety operations technology • Natural disaster response technology	• Improved equipment reliability technology • Improved material soundness technology • Intelligent facility technology	• Hydro power/Pumped-storage technology • Photovoltaic power technology • Wind power technology • Tidal power technology • New energy technology	• NPP development technology for export • Core competitiveness enhancement technology	• Nuclear decommissioning technology • Spent nuclear fuel technology

Performance in Industrial Properties

Classification	2013	2014	2015	2016	2017
Application	111	124	148	138	92
Registration	49	98	87	103	89
Utility model	0	0	1	0	0
Design/Trademark	1	2	1	0	0
Program	48	122	104	41	49
Total	209	346	341	282	230

Advancement of NPP operation technology

In order to enhance nuclear safety, KHNP is developing safety-centered technology that immediately impacts public awareness. It is developing innovative countermeasure facilities based on the severe accident management strategy so as to ease public anxiety about the operation of multiple units on the same site. KHNP is improving nuclear safety and maximizing utilization rates by preventing forced outage through reinforced performance evaluations and the monitoring of NPP facilities and equipment. In addition, KHNP is striving to minimize the negative impact of radiation on the surroundings, local residents, and employees through optimized radiation waste management and rapid monitoring/evaluation technology on leaked radiation.

Major Research Projects in NPP Operation Technology

Reinforcing Nuclear Safety

- Development of technology on nuclear safety evaluation methodology on multiple NPPs
- Fault inquiry and probabilistic seismic risk evaluation near the Wolsong site
- Development of design automation technology for AI-based, multi-period optimized reactor core loading pattern
- Development of assessment technology on NPP radiation's marine diffusion and marine environment operations, etc.

Advocating Facility Reliability

- Development of soundness assessment technology on the temperature aging safety of internal reactor structures
- Development of technology integrated (online) prediction and diagnosis on reactor coolant pumps
- Development of assessment technology of NPP operation instrumentation and controls of a cyber security response system
- Development of steam deposit removal technology and inspection robots, etc.

Securing of New and Renewable Energy Technological Capacity

KHNP is developing its competencies in new and renewable energy technology in order to foster the future energy industry that will lead its sustainable growth. KHNP is responding to the government's Renewable Energy 3020 implementation plan and focusing on complex development and verification/commercialization technology as an electric power company. In the field of hydro power business, KHNP is developing the technology required for the modernization and reinforcement of its core technology of hydro power/pumped-storage power so as to succeed in its overseas hydro power business. Within the new and renewable energy sector, KHNP is focusing on the R&D of photovoltaic power and wind power, currently the most promising resources to date. Since its participation in government-initiated projects, it has been approaching fuel cell and tidal power businesses from a long-term perspective.

Major Research Projects in New and Renewable Energy

Classification	Major projects
Diversifying new and renewable energy technology	• Development of technology of performance testing on pump turbine models for pumped-storage power • Development of hydro power design technology for 30MW Francis and Kaplan turbines • Development of positioning technology of multiple tidal turbines and power generation complex performance analysis techniques • Survey and facility complex design based on NPP-new and renewable energy joint power generation

Bolstered development of new growth engine creation technology

KHNP is trying to develop technology for creating new growth engines, focusing on improving its competitiveness of NPP exports and developing nuclear decommissioning technology. Efforts are also being actively made to enter overseas markets by developing market-customized, core technologies for the exportation of nuclear reactor models, such as the APR1400 and SMART while seeking to maintain the world-class competitiveness of construction technology, through the merging with new construction technology and techniques. In preparation for entering the nuclear decommissioning market, KHNP is conducting some R&D projects in line with the goal of securing 100% decommissioning technologies prior to the dismantlement of Kori 1. Furthermore, KHNP is upgrading its spent nuclear fuel management, transportation, and storage technology to enhance the sustainability of NPP operation.

Major Research Projects for New Growth Engine Creation

Classification	Major projects
Enhancement of New NPP Technology for Exportation	• Development of VR/AR systems for NPPs • Development of conceptual design of passive cooling systems for reactor structures • Assessment on extreme pressure capacity and structural integrity on containment buildings of operating NPPs • Development of post-tensioning technology for reactor structures, etc.
Timely Development of Decommissioning/ Spent Fuel Technology	• Development of safety assessment technology on decommissioned NPP site pollution and the termination of regulations • Development of verification testing technology on the decommissioning of activation pressure vessels and infrastructure • Development of commercial technology of coolant systems and equipment decontamination for nuclear decommissioning design • Initial property assessment on spent nuclear fuel with a low degree of burnup

Concentrated Technology Development in Preparation for Fourth Industrial Revolution

The Fourth Industrial Revolution is giving notice to the noticeable transformations in the ecosystem of the power industry. In order to become a global energy leader, KHNP has established mid- to long-term countermeasures by applying Fourth Industrial Revolution technology, including big data, AI, VR, and wireless communications to nuclear power and new and renewable energy. It will promote the innovative improvement of safety of NPP operations utilizing big data and AI technologies, which can optimize reactor core design, radiation level prediction, and nuclear power equipment performance evaluation and prediction diagnosis. In addition, KHNP developed safety training facilities and emergency medicine education/training scenarios utilizing VR and AR, which greatly enhanced the safety of workers.

SPECIAL SECTION 1

KHNP on the World Stage

KHNP proved the excellence of Korean NPP Model APR1400

Entering the European Market

In October 2017, EU-APR Standard Design, which is Korean NPP Model APR1400 for exports to Europe, passed the main assessment of European Utility Requirements. As a result, KHNP obtained EUR certification, enabling the use as technology requirement for NPP project bidding in Europe. EU-APR Standard Design is the European version of APR1400, which is under construction in Korea and the UAE, meeting European safety standards, which has led to the KHNP achieving recognition for the safety and economic feasibility of new NPPs that are to be constructed in Europe. With such an achievement, KHNP is now able to export NPPs to nations requiring EUR, including South Africa and Egypt, as well as the European continent, which enables NPP export market diversification.

Promoting the Excellence of Korean NPP Technology Worldwide

In May 2018, KHNP co-hosted the "2018 KHNP-IAEA HRD (Human Resources Development) Conference" with the International Atomic Energy Agency (IAEA). About 500 Korean and foreign people engaged in NPP business from 60 countries attended the conference and discussed plans to cultivate human resources for the NPP industry. Especially, during the conference opening ceremony, KHNP donated its exported Korean NPP model APR1400 miniature to Barakah nuclear power plant in the UAE and it served as a great opportunity to promote the excellence of new the Korean NPP model APR1400 worldwide. The donated miniature is permanently exhibited at the IAEA Headquarters in Austria and is expected to contribute to raising Korean NPPs global awareness.

Achieving Recognition for NPP Design Safety in U.S.

In September 2018, KHNP obtained a standard design approval for the design of the next-generation reactor design for APR1400 from the U.S. Nuclear Regulatory Commission (NRC). The NRC certifies the safety of standard NPP designs and issues a standard design approval once all the safety regulations are met. This means that the safety of Korean NPP model APR1400 was proven by a regulatory commission of the U.S. Under this approval, KHNP achieved recognition for its global-class NPP design competence and secured a solid foothold for NPP exportation to U.S.

RESPECT

Win-win Cooperation with Suppliers

KHNP PERFORMANCE

Earned Grand Prize for National Sustainable Management
Shared Growth

Awarded Citation of
Excellence in Performance Sharing
from the Ministry of SMEs and Startups

Earned Minister's Award for Contributor to
Productivity Innovation Partnership

KHNP's K-PGI:
92.2 points

RELEVANT SDGs

SUSTAINABILITY CONTEXT

The times call for the establishment of win-win growth climate with suppliers to serve as a backbone for the healthy growth of the nation. As the recently-established Korean government policies have created an environment for the growth of SMEs and the revitalization of the social economy, there is a growing need for public organizations to lead the way for mutual growth, hand in hand with SMEs. Since the global network environment is increasingly being applied to the industrial community, this kind of mutual growth with suppliers has become a key point of opportunity. KHNP continuously builds an environment for fair competition among suppliers while promoting a positive cycle mutual growth through a variety of support programs.

KHNP APPROACH

As a leader in the NPP industry, KHNP has its sights set on creating a healthy and vigorous nuclear power climate, while improving the contract system and preventing big rigging to enable SMEs to compete with one another in a fair environment. In addition, it works to provide customized support over the course of the corporate lifecycle from market entrance to maturity in areas including education, market development, finances, and cooperative R&D, exportation. KHNP has expanded performance sharing of its partner businesses and formed the Win-win Growth Council so as to tune into suppliers' needs more carefully, and is focused on enhancing the soundness of the nuclear power climate in preparation for energy conversion.

KHNP's K-PGI:
92.2 points

Win-win Growth System

With the recent changes in the government's energy policy, mutual growth with suppliers is gaining importance for industrial competitiveness. This pushed KHNP to establish a win-win growth system in line with the vision of 'leading a healthy and competitive nuclear power climate through mutual growth with suppliers.' As a result, KHNP aims to create a healthy nuclear power climate by guaranteeing a climate for fair competition between suppliers, as well as supporting mutual growth that reflects their corporate lifecycle.

Win-win Growth System

Vision	Leading a healthy and competitive nuclear power climate through mutual growth with suppliers			
Strategic direction	"KHNP devotes itself to enabling the realization of SME aspirations."			
	World-Class Leading win-win growth	Innovation Differentiation through innovation	Transparency Transparent win-win growth culture	Harmony Creating nuclear power climate based on win-win growth
Strategy	Creating an environment for fair competition through the elimination of unfair elements		Establishing a healthy supply chain based on mutual growth that reflects the corporate lifecycle	
Tasks	• System improvement and prevention of bid rigging • Protection of subcontractors	• Development of new companies • Development of business partners	• Expansion of financial support and markets • Revitalization of cooperative R&D	• Support for business innovation • Export promotion

Creation of Fair Competition Culture

Improvement in Contract System for Fair Competition

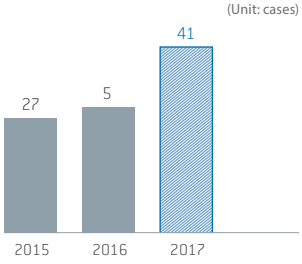
In order to create a fair competition culture, KHNP made improvement upon the contracting system having identified irregular procedural risks. It, therefore, systemized the susceptible specifications within new technology fields during the order preparation stages, and clarified the ambiguous pricing criteria of the NPP business during budget calculation to establish an objective purchasing criterion. The process of formation of a majority comprised of outside members within the contract committee followed by deliberations and assessment were recorded, while during the monitoring stages, the establishment of guidelines for the handling of objections preceded the creation of an integrated management system for enhanced contract transparency.

Prevention of Bid Rigging for Equal Opportunity

206-1

KHNP improved and reinforced its bid rigging sign detection system in order to prevent bid rigging among suppliers. Bid rigging analysis was conducted having expanded the analysis fields to construction, services, and purchasing, in addition to the diversification of analysis standards according to the bidding features. In addition, KHNP imposed sanctions on 41 cases, including bid rigging in 2017, resulting in improvements being made upon unfair business restrictions. A compensation claim was also lodged against forged quality documentation and bid rigging businesses.

Sanctions against Unfair Suppliers

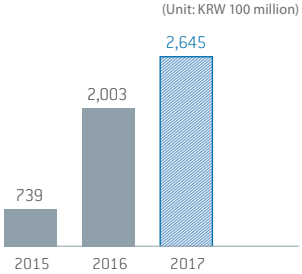


Protection of Labor Workers and Second/Third-tier Suppliers

KHNP is supervising subcontractor payment through its direct payment confirmation system so as to enhance the transparency of wage payment to labor workers. There were improvements made toward wage payment rates to labor workers by awarding a penalty to businesses that delayed wage payment for supplier qualification screening. KHNP also strengthened its supervision on the guidelines for protection of working conditions and provided certification and insurances for preventing industrial disasters in order to enhance the work safety of labor workers.

Furthermore, KHNP introduced a win-win settlement system, making the issuance of win-win bonds compulsory while expanding the system so as to fortify the competitiveness of the second and third-tier suppliers. KHNP obligated the first-tier suppliers to issue win-win bonds to reissue the bonds for the second-tier suppliers upon win-win bond issuance for first-tier suppliers. Lastly, conditions were set to allow suppliers to collect stable payment by increasing the number of payment banks to five.

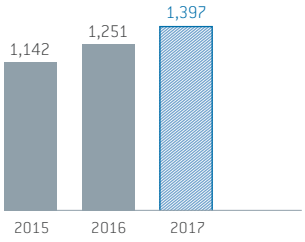
Amount of direct payment confirmed



Support for Win-win Growth Reflecting Corporate Lifecycle

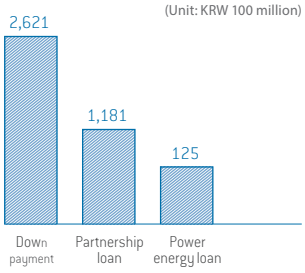
No. of qualified suppliers

(Unit: Number)



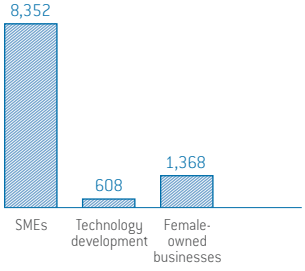
Financial Support Performance for suppliers in 2017

(Unit: KRW 100 million)



Public purchasing in 2017

(Unit: KRW 100 million)



Lowering the Entry Barrier for New Companies

KHNP continues its efforts to invite new business partners by lowering the entry barrier to NPP businesses. Partnerships have ensued with as many as 15 companies by holding win-win growth business orientations 18 times and providing door-to-door supplier registration service. In addition, KHNP operated the Shared Growth Academy to provide basic training for NPP business, with 1,530 trainees completing the program. These efforts to enhance the quality of the NPP industry, such as providing quality education for 63 companies and helping 23 companies establish their own quality systems. This resulted in a 10.4% year on year increase of qualified suppliers, promoting the KHNP's strengthening of its foundation for NPP business.

Strengthening Supplier Growth Foundation

Financial Support and Improvement in Supplier Payment Conditions

KHNP is providing a variety of financial support programs that guarantee liquidity in order to prevent a shortage of funds in supplier businesses. KHNP also reduced the number of days required for the administrative process from 14 days to five days and increased down payment rates from 70% to 80% to optimize the down payment system. This enabled suppliers to receive larger down payments within in a shorter period of time. In addition, KHNP is providing suppliers with customized financial services, such as down payment settlements, mutual growth loans* and power energy loans**.

* Mutual Growth Loans: Raising funds and lending SME-based suppliers money at low interests

** Power Energy Loans: Lending SME-based suppliers operation funding up to 80% of the contracted price

Support for Domestic Market Development 204-1

Many SMEs have difficulty developing markets even with quality products due to an insufficient workforce and capital. KHNP provided assistance to SMEs in order to help expand the versatility of their markets, including exhibitions, purchasing consultations, and public purchasing so that they could establish a foundation for growth. 273 enterprises attended the Global Electric Power Tech along with six other exhibitions held by KHNP. At this exhibition, as much as KRW 5,870 million in purchasing agreement were concluded through the provision of purchasing consultations. In addition, KHNP contributed to socioeconomic revitalization by holding the first purchasing consultation of 34 social enterprises and was thus able to boost its purchases from SMEs and social enterprises

Revitalization of cooperative R&D

SME R&D support projects provide SMEs with the opportunity to enhance their technology competitiveness while facilitating a new growth engine in the future energy industry. In 2017, KHNP improved its pre-existing systems relating to research participation qualifications and research development to enable active SME participation in its R&D support projects. Efforts to revitalize creative project development also led to KHNP's development of 156 R&D projects using K-CLOUD (R&D innovation merging the three spheres of industry, academia, and research). Moreover, KHNP enhanced supplier technology through the passing down of its patents, development technology, and other key assets.

Performance index	Unit	Target	Performance	Achievement
No. of joint R&D agreements concluded	Cases	27	30	111%
Amount of joint R&D investment executed	KRW 100 million	47	57.5	122%
Purchase amount of technology development goods	KRW 100 million	542	608	112%

Executing Business to Boost Suppliers' Growth

Productivity of suppliers increased by 56%

Support for Supplier Management Innovation

SMEs are in urgent need of management innovation amid the potential business crises that may be in store due to the poor economic conditions. In order to break this vicious circle of low productivity-induced supplier management, KHNP provided expert consultation and financial support for their business innovation. As a result of introducing new facilities, standard management and quality management practices, increased efficiency of processes, and the provision of financial support for management and manufacturing innovations, the productivity of suppliers increased by 56%, catalyzing efforts for the increased efficacy of supplier management.

KHNP-based supplier export reached KRW 29 billion (150% increase year on year)

Promotion of exportation among supplier

A number of SMEs have difficulty in entering overseas markets due to a lack of global market information and marketing skills. In order to appease this situation, KHNP strengthened their export competence through the implementation of Korea Nuclear Partners (KNP). Consulting services pertaining to identifying potential items of export and selecting target countries were provided to suppliers yearning to expand business globally while support was also given for marketing through overseas exhibitions and the KHNP UAE Branch. It also promoted supplier exportation by helping in bid contracts and conducting post-contract management. The result of providing this kind of one-stop service that encompassed the entire export process for suppliers was the year on year increase of 150% among supplier exports.

No. of performance sharing cases with suppliers 103 cases

Establishment of Soundness of Nuclear Power Ecosystem in Preparation for Energy Conversion

Expansion of Performance Sharing System

Since the performance sharing system was introduced, leading companies and SMEs have been conducting improvement activities together that allowed SMEs to enhance productivity and major companies to reduce costs while making quality improvements. KHNP is establishing a healthy supply chain and a mutual growth climate through the sharing of performance with business partners. It shared 103 performance cases, including financial performances by purchasing products selected for development, increasing business partner sales by dispatching retired KHNP personnel, and providing technology and management consulting. Part of performance distributions is provided for 36 children of SME employees as scholarships to improve the labor welfare of suppliers. In addition, KHNP operated a KHNP-KNP (Korea Nuclear Partners)-SME export performance sharing model to develop overseas markets, resulting in SME export competences to be greatly improved.

Reinforcement of Communication with Suppliers

Maintain a relationship for sustainable win-win growth with suppliers requires KHNP to preserve its healthy supply chain by staying on top of supplier needs and improving upon such issues. KHNP continues to conduct improvement activities based on suppliers' recommendations collected through meetings and questionnaire surveys. Through a supplier CEO meeting, KHNP collected 68 recommendations which included quality costs and completed 48 of them. After a subcontractor meeting, it supported the emergency liquidity of NPP suspension for 57 suppliers. As a result of a questionnaire on supply chain, it was found that 90% of the suppliers planned to reduce their NPP business, which enabled KHNP to maintain cooperative relations with the pre-existing qualified suppliers by improving the support system.

Win-win Growth Council

The Win-win Growth Council was formed to build strategic partnership with SMEs and promote mutual growth through smooth exchanges. A total of 75 suppliers from four fields (machine technology, relaying technology, general technology, and overseas market development) merged together with the council. According to the operational plan of each field, the council will exchange and cooperate with the members through general assemblies, meetings, and benchmarking. KHNP is giving its full support to the council and members by providing activity expenses and selecting the members for mutual growth projects.

RESPECT

People-centered Corporate Culture

KHNP PERFORMANCE

Awarded a Presidential Commendation at the **Gender Equality Week Ceremony**

Earned a prize at **the 100 Best Companies to Work For**

Produced **130** female managers

Male employees on parental leave **19.66%**

RELEVANT SDGs

SUSTAINABILITY CONTEXT

Recently, utilization of manpower in terms of social equality is of growing importance. It is significant to prevent employment inequality by creating jobs for local communities, recruiting the underprivileged, and minimizing non-regular employees. As the balance between work and family and the extension of women's rights are emerging as social issues, there is growing emphasis on family-friendly management and activities to create a gender equality culture. In order to increase employee satisfaction with the company that determines the competitiveness of future growth, KHNP is creating a positive corporate culture through open recruitment and family-friendly management.

KHNP APPROACH

KHNP is realizing social values through organizational and HR management, including fair and equal recruitment, family-friendly corporate policy, and gender equality. It employed more women and disabled persons for regular employment to increase the recruitment from the underprivileged while creating quality jobs for local communities. In addition, KHNP is operating family-friendly programs, such as a flexible work program and work-family balance program, to enhance work productivity by improving upon the employee quality of life. KHNP is also increasing the number of female managers and the frequency of employing talented individuals among females, such as women on career breaks, in order to realize gender equality.

Expansion of Open Recruitment and Social Equality Employment 401-1

In order to respond to the governmental policy to realize social values, KHNP is greatly contributing to creating quality jobs for the underprivileged by expanding social equality recruitment to include a greater number of women and disabled persons. It recruited women on career breaks separately and the rate of new female employees to the total number of new employees increased by 5.2% year on year. In addition, KHNP employed 27 disabled persons through the additional point system for disabled persons and ranked No.1 in related employment the among public enterprises. The creation of local jobs for regional balance also required KHNP to set the target number of people to be employed from the regional divisions and non-metropolitan areas and proactively employed talented individuals from the local community.

Social Equality Employment Performance

(Unit: No. of people)

Classification Percentage		2015		2016		2017	
		Employment	Percentage	Employment	Percentage	Employment	Percentage
Female		19.0%	260	17.0%	139.5	22.2%	133.5
Disabled Persons		0.7%	9	1.2%	9.5	4.5%	27
Local Talent	Local Region	60.2%	824.25	65.6%	538.5	59.1%	356
	Relocated Region	15.4%	211	18.8%	154.5	17.5%	105.25

Realization of Gender Equality

Increase in female managers

(Unit: No. of people)

years	female managers
2015	99
2016	111
2017	130

Fostering Talent among Female Staff

It is essential to improve the competitiveness of the female workforce so as to create a discriminatory-free workplace. KHNP is providing female employees with the opportunity for career management and competency development through the women's leadership programs to enable female employee growth into company leaders. Results of selecting female employees displaying excellence, preferentially as middle managers showed that the number of female managers increased to 130 in 2017. Furthermore, KHNP reduced the time required for female employees to become managers.

Gender Equality Committee's Activities

KHNP must keep analyzing and evaluating on-site gender equality to guarantee the settling of a corporate gender equality culture. The Gender Equality Committee consists of 34 corporate members and 101 business site members and provides on-site feedback while proposing policy for the improvement of the working environment for female employees and their utilization as valued team members. According to the suggestions of the Gender Equality Committee, KHNP deleted the 'reason for leave' from their vacation request form, conducted gender equality campaigns, and purchased safety gear for female employees in 2017.

Creating a Harassment-free Company Culture

KHNP strives to create a better corporate culture free from sexual harassment and sexual violence by raising employee awareness regarding gender equality. In order to improve the efficiency of the prevention of sexual harassment and violence within the company, KHNP incorporated gender-sensitivity training within leadership programs and made sexual harassment and violence prevention training compulsory across the board. In addition, KHNP strengthened the disciplinary action standards for sexual harassment and violence and established guidelines for handling sexual harassment and violence cases, including the application of a minimized rate of commission for violators.

Development of Customized Talent 404-2

On-site Capacity-building for Overseas and New Businesses

In order to evolve into an energy leader in the domestic and overseas market, KHNP is expanding its new businesses, such as NPP exportation, post-management of NPPs, and new and renewable energy, and training the workforce needed for such businesses. According to the NPP export plan, KHNP established the HR development system and provided education and training to develop employee competency required in the global market. In addition, it provided language education, education expenses and books for dispatched personnel. Lastly, KHNP will secure internal experts with expertise in new businesses and improve its professional competencies utilizing external infrastructure, such as the advanced professional courses in association with college.

24 education Programs for suppliers

1,530 trainees

Development of Talent among Suppliers

KHNP assisted partnered SMEs with poor educational infrastructure in establishing a systematic HR development system while promoting mutual growth. It opened 24 training curricula of nuclear power expertise required for supplier work, transferring field knowledge to as many as 1,530 trainees. In addition, KHNP held meetings to identify required training curricula for suppliers and developed its very own comprehensive education website.

Cooperative Labor-management Relations

New Labor-Management Relations

As the external NPP environment has changed, including the operation of the Commission for Deliberative Opinions on Shin-Kori 5 and 6, KHNP has been discussing labor-management issues in accordance with the 2017 government's energy conversion policy. It inspired empathy for collective action within the range of laws and principles for the labor union's understanding and cooperation while also serving to prevent volatile strikes through continuous communication and persuasion. As a result, KHNP resolved labor-management conflicts and agreed to create a future-oriented labor-management culture by striking up a labor-management resolution for the safe and transparent construction of Shin-Kori 5 and 6.

Countermeasure Strategy	STEP 1	STEP 2	STEP 3
	Initial response through systematic labor-management trend management	Intensive efforts for stabilizing on-site labor-management relations	Crisis response through emergency system
	• Permanent operation of full-time labor online and offline • Holding a management-employee discussion & team exchange meeting to discuss management issues	• Inspection of on-site labor-management relations • Providing advanced labor education for team leaders, or those equivalent, that are responsible for on-site operations	• Operating a crisis response strategy system by scenario • Enforcing strict labor management based on laws and principles

Revitalization of Labor-management Communication 402-1

As internal integration and energy conversion policy are of growing importance due to a changing external environment, including, KHNP stimulated labor-management communication. Based on the result of an analysis on employee communication, communication methods were improved to optimize communication between different ranks while enhancing new employee satisfaction. In order to improve upon communication, KHNP prevented conflicts in advance through bottom-up, on-site open communication, while the CEO took the initiative in resolving labor issues. Closer in-person communication developed sympathetic bonds and strategic communication to aid in the overcoming of management issues and internal conflicts.

Labor-Management Communications

	2015	2016	2017
Labor-management cooperation index	3.31	3.45	3.51
Open management index	3.34	3.4	3.58
Open management index	3.20	3.38	3.38

Status of Labor Union Employees

	Unit	2015	2016	2017
No. of labor union employees	Cases	6,812	6,911	7,397
Ratio of labor union employees	%	64	60	63

SPECIAL SECTION 2

Joyful Workplace, Happy Family

Operation of Family-friendly Systems for the Balance between Work and Family

KHNP is developing and operating the highest level of family-friendly systems among public enterprises so that employees can balance work and family. Work-family balance and the enhancement of work productivity and efficiency is also carried out by strengthening its infrastructure to support employees' childbirth and parenting while preventing career breaks among female employees. KHNP will strive to enhance the employees' quality of life by developing various family-friendly programs for their work-life balance.

Supporting Good Parents and Happy Families 401-3

KHNP expanded parental diagnosis leave for pregnant employees. Expecting employees can receive paid leave every four weeks until the 28th week of pregnancy, every two weeks from the 29th to 36th week, and every week following the 37th week. KHNP is funneling its efforts into reducing the burden of childbirth and childcare by operating in-house daycare centers at seven business operation sites and at the headquarters. In promotional parental leave, KHNP now includes parental leave during the employment period of the second child. In particular, it encourages male employees to take parental leave so that they take an active part in parenting. Male employees account for 19.66% of the total employees taking parental leave.

Helping Employees on Parental Leave Restart Their Careers

KHNP helps employees on parental leave return and adapt to work successfully. In June 2018, KHNP launched "Information provision service for employees on leave". Employees who are on parental leave can receive information regarding major management and returning to work by text message during the period of leave. It provides customized training for employees who are scheduled to restart their jobs or for employees who have returned from parental leave to work for under six months to create a smoother transition back into to work while enabling them to adapt at a faster rate. KHNP supports employees on leave with various systems, enabling them to sustain their career-building paths without requiring a career break.

ULTIMATE SAFETY

Safety-centered NPP Operation

KHNP PERFORMANCE

Industrial disaster rate
0.92%

Forced outage per unit
0.13 case

Voluntarily disclosed
20 NPP documents
(**5** types)

Founding of
Nuclear Safety Information Reliability Center

RELEVANT SDGs

3 GOOD HEALTH AND WELL-BEING

11 SUSTAINABLE CITIES AND COMMUNITIES

SUSTAINABILITY CONTEXT

After the 2011 earthquake off the Pacific coast of Tohoku and the Fukushima Daiichi nuclear disaster, ensuring the safety of nuclear power plant operations became a pressing global issue. In Korea, public concern over the safety of nuclear power plants have been on the rise following the earthquake that struck Gyeongju in 2016. In response, KHNP fortified its disaster response capabilities and established a new safety management system so as to enable the currently operating NPPs a more comprehensive response to earthquakes. KHNP created a response system with the goal of safety-centered NPP operation and actively communicates about safety in order to ease the distrust of nuclear safety and win public trust.

KHNP APPROACH

With the aim of ensuring national safety, KHNP established a safety-centered NPP management system by enhancing its safety culture and securing facility quality. It conducted a safety evaluation on multiple units and strengthened seismic safety so as to enhance its preemptive response capability to extreme disasters and accidents, while improving its management system according to each type of disaster, including societal and radiation disasters, as well as cyber terrors. In order to prevent supplier accidents, which account for a majority of industrial accidents, KHNP strengthened its industrial safety system. It is also utilizing Fourth Industrial Revolution technology to promote the innovative improvement of safety of NPP operations. KHNP founded the KHNP Information Reliability Center as a nuclear power information verification agency and disclosed NPP operation information for communication regarding safety issues with the public.

Safety Management Strategy System

416-1

KOSHA 18001

OHSAS 18001

Certified

Gaining full public trust in the safety of nuclear power plants through communicating about the prioritization of NPP operations safety and decommissioning, KHNP established and continues to implement systematic safety management strategies. Notably, KHNP is upgrading its safety management system to meet that of global standards by obtaining and maintaining KOSHA 18001 and OHSAS 18001 certification standards for safety and health management.

Project goals	Securing public trust in the entire NPP value chain, including NPP operation and decommissioning, through safety-centered operation and communication		
Target	Operational safety	Nuclear decommissioning	Safety communications
Performance goal	Ensuring national safety through safety-centered NPP operation	Dismantling NPPs successfully and safely	Building public trust in nuclear safety
Strategic tasks	• Developing capacity to respond to a variety of disasters, including extreme disasters on multiple units, and natural disasters, such as earthquakes • Improving management system to reduce industrial accidents, etc.	• Dismantling NPPs successfully and establishing a foundation for export by securing nuclear decommissioning technology	• Providing objective information, satisfying public demand and expanding direct communication channels

Enhancing Capability to Respond to Severe Accidents at Multiple Units

Having learnt from the Fukushima Daiichi nuclear disaster, KHNP is working on the establishment of an accident management system that can be applicable to accidents exceeding design standards. KHNP improved the safety performance of NPP facilities by upgrading the seismic performance of safety halting equipment in order to protect facilities from natural disasters, such as earthquakes and tidal waves. In addition, KHNP is securing movable facilities for each unit so that it can respond to accidents exceeding the design standards and prevent severe accidents even when occurring on multiple units. KHNP is ensuring the safety of NPPs based on its systematic accident management system that takes facilities, procedures, and organization into account to prevent soil contamination and protect local residents from radiation exposure for increased soundness of primary reactors in the event of severe accidents due to reasons not immediately identifiable.

Expansion of Emergency Response Team (SAFE-T):

20 members ⟶ 30 members

Establishment of Multi-barrier Accident Coping Strategy (MACST)

Phase	Facilities and safety measure	Power
[Phase 1] • Time: 0~8hr • Initial accident response to fixed facilities	• [Facility] Fixed facilities (turbine-driven auxiliary feedwater pumps, main steam release valves, etc.) • [Countermeasure] Removing the remaining heat from the reactors and replenishing coolants using fixed facilities • [Organization] Radiation Emergency Organization by Division	Storage battery
[Phase 2] • Time: 8~72hr • Responding to an accident with movable facilities	• [Facility] Phase 1 facilities + MACST facilities* • [Measure] Continuing Phase 1 strategy and replenishing water from outside using movable facilities (Rx, SG, SFP)** • [Organization] Radiation Emergency Organization by Site and Severe Accident & Emergency Response Team (SAFE-T, 30 members)	Movable generator car
[Phase 3] • Time: 72hr~ • Accident response using all facilities in the NPP	• [Facility] Phase 2 facilities + All available facilities inside and outside NPPs • [Countermeasure] Restoring the safety facilities of NPPs • [Organization] Radiation Emergency Organization by Division, SAFE-T, and external organizations	Movable generator car + External power

* MACST (Multi-barrier Accident Copping Strategy) facilities: Large/Small capacity movable generator cars, water transfer pumps for Rx/SG/SFP, heavy equipment (tractors, etc.), communication facilities (MCR-site), fuel oil supply facilities, movable air compressors, (thermal) ventilators, etc.

** Rx: Reactor, SG: Steam generators, SFP: Spent fuel pool

Enhancement of Disaster Management System by Type 416-1

KHNP enhanced its disaster management system by disaster type, including general and radiation disasters, and cyber terrors, and raised its on-site response capability by improving the disaster prevention-response-restoration systems. In particular, it expanded the Business Continuity Management System (BCMS) that enables the company to continue its core work even during the occurrence of a disaster which provides the infrastructure for KHNP's global No. 1 disaster management system.

Disaster Management System by Type

Type	General disasters		Radiation disasters	Cyber terrors
	Natural disasters (earthquakes, tidal waves, typhoons, heavy rain, etc.)	Social disaster (fire, explosions, strikes, etc.)		
Management system	Business Continuity Management System (BCMS)		Radiation disaster prevention measure	Cyber security plan
Preventive system	On-site response manual, etc.		Radiation emergency plan	Cyber terror response manual
Primary Tasks	• Establishing a cooperative system with public organizations responding to natural disasters in preparation for climate change	• Establishing a fire protection system • Developing a checklist for compliance with environmental laws	• Setting up a disaster response center	• Bolstering security of the cyber security system and control system • Helping suppliers bolster their security

Establishment and Implementation of Natural Disaster Response Strategies in Preparation for Climate Change

As disasters resulting from climate change occur more frequently, KHNP is conducting a climate change risk assessment based on its cooperative system with the government and research institutes which has resulted in the current implementation of developed natural disaster response strategies. KHNP set the reinforcement of infrastructure for adaptation to climate change, crisis management, and response capability building as its strategic directions, leading to the creation of eight strategies and 13 tasks. KHNP submitted a self-evaluation report on task implementation to the Ministry of Environment and receives regular check-ups regarding budget execution rates and degrees of implementation.

Establishment of World-class Fire Protection System

KHNP established a world-class fire protection system by improving its systems, organization, and infrastructure. Fire safety indexes were developed at a global level to diagnose fire safety management standardized for NPPs, along with a newly-formed Fire Survey Team consisting of internal and external fire analysis experts, who can identify the causes of fire swiftly and accurately. In addition, KHNP established a chemical safety management system for systematic management and developed a checklist for compliance with environmental laws which could be applied to all NPPs.

Construction of Disaster Response Center in Preparation for Radiation Accidents

KHNP is pursuing the establishment of a comprehensive disaster response center following the necessity for emergency response facilities for the protection of employees and operations command and control during radiation leakage accidents. The Disaster Response Center located inside the NPP site is designed to withstand earthquakes of a horizontal acceleration of 0.5g and a vertical acceleration of 0.3g. The center can supply emergency power for up to 72 hours. KHNP created a rapid response control tower within the NPP site area to enable accident response during radiation leakage accidents and other disasters.

Advancement of Cyber Terror Response System

KHNP, as a large organization, has difficulty managing its complex security system. In order to resolve this issue, it introduced a threat analysis system based on the Fourth Industrial Revolution technology of big data and AI, and analyzed security equipment, such as firewalls and vaccines, for an improved 9,420 security vulnerabilities. KHNP also improved supplier information security by providing the integrated information protection system for all 293 suppliers working at the NPPs full-time with vulnerable information security.

Earned Record Score in Evaluation on Public Organizations' Information Security Management

	Score	Grade
2015	81.60	Good
2016	83.64	Good
2017	91.00	Excellent

Reinforcement of Industrial Accident Prevention 403-2

Continuous Decrease in Suppliers' Industrial Accidents and Disaster Rates

Classification	Accident	Disaster Rate (%)
2015	29	3.97
2016	26	3.04
2017	23	1.54

Reduction in Supplier Accidents

As supplier accidents account for a majority of the total accidents, efforts are required to aid in the reduction of supplier accidents. KHNP produced Safety Sitcom with supplier employees in order to raise their awareness of industrial safety and expand the Industrial Safety Center where employees can experience risk factors according to each process. In addition, it strengthened supplier responsibility for supervision, prompting suppliers to replace safety managers when they exceed a certain level of penalty points in violation of the safety regulations. KHNP promoted industrial disaster preventions among suppliers, as well, by mandating suppliers with over 20 full-time employees to establish an occupational health and safety management system.

Nuclear Safety Management Based on Fourth Industrial Revolution Technology

Development of Automatic Prediction & Diagnosis System Using Big Data

KHNP utilized big data to predict failure by analyzing facility conditions. All the NPP monitoring systems of 24 units were connected online and established big data for prediction and diagnosis using information collected through the sensors installed at the core NPP facilities. If any abnormal sign is detected from a facility, KHNP can prevent failure by maintaining the facility preemptively using systematically-managed big data. KHNP seeks to achieve zero recorded failures of core facilities through improvements made to the automatic prediction system while expanding upon the diagnosis targets.

No. of Early-response Countermeasures through Early Warning System

Increased by 60% year on year

Expansion of AI-based E-Tower Functionality

E-Tower is a control tower that provides swift response to a variety of emergencies by monitoring all NPPs 24 hours a day and implementing response to the situation preemptively upon the detection of any abnormal signs. Such expansion of the prediction and diagnosis range of the early warning system detecting abnormal signs in advance required KHNP to strengthen its risk monitoring and early-response countermeasure system that utilizes AI technology. KHNP recategorized operational variables so that the E-Tower could monitor abnormal signs during inoperational or low-power states, as well as a 100% normal state of operation with the help of AI, conclusively aiding in the prevention of three forced outage cases in 2017.

No. of Early-response Countermeasures Using an Early Warning System

(Unit: Cases)

Type of Early-response countermeasure	2016	2017
Big (forced outage if action is delayed)	0	3
Medium (failure diagnosed from major facilities)	14	32
Small (failure signs detected from other facilities)	268	417

Creation of Smart Plant

In order to improve the efficiency and safety of the NPP operation processes, KHNP is working on Smart Plant by applying IoT technology and a cloud system based on wired and wireless communication environments. In 2017, radio repeaters (AP) were installed in Hanbit 6. The NPP will expand target facilities for prediction and diagnosis using IoT and introduce a real-time communication system enabling an on-site operation status check and real-time operational status image sharing.

Development of AI Robots for Hazardous Work Sites

KHNP is funneling energy into the development AI robots that can work at high-risk sites with high temperatures, high radiation levels, or underwater conditions in order to contribute to improving the safety of on-site workers. KHNP is researching technology applicable to NPP accident sites and looks to develop variable 2,4 pedal robots and other technology functional within high-temperature, high-humidity, and high-radiation conditions by 2019, in addition to general industrial AI robot features.

Improvement in Safety Culture

Earned an "Excellent" rating during **WANO** safety inspections

Working to Strengthen Safety Inspection to Meet International Standards

416-1

KHNP is enhancing the safety of NPPs, NPP sites, and facilities through safety inspections of international organizations. Following the 2016 Gyeongju earthquake, IAEA SEED was additionally conducted on the KHNP's seismic verification system and emergency response procedures so as to verify the safety of sites and facilities. In 2018, the inspection group consisting of experts from WANO and member companies completed two-week inspections on Hanbit Power Plant 3 and Wolsong Power Plant 1. The safety of the power plants was successfully verified through the WANO safety inspections.

Safety Inspection of International Standards

Classification	Inspection intervals	Inspection goals	Inspection performance
WANO	Every four years	Promoting NPP safety and operational performance by analyzing the differences between domestic NPPs and the highest global standards	Earned an "Excellent" rating for Wolsong Power Plant 2 during main inspection
IAEA SEED	When required	Globally reputable inspection service that verifies the safety and soundness of NPP sites and facilities against earthquakes and other natural disasters	Earned an "Excellent" rating at WANO Safety Inspection for Hanbit Power Plant 3 and Wolsong Power Plant 1

Safety Communications

Participatory Communication Program

KHNP expanded on-site participatory programs, from NPP operation to nuclear decommissioning, in order to promote public understanding of nuclear safety. In operating participatory NPP programs differentiated from the pre-existing visiting program to the public relations center, efforts are being made for positive changes in visitor awareness concerning NPP operations. In order to provide more opportunity to experience the complicated notion of NPPs due to a strict approval procedure, KHNP developed a virtual power plant without spatio-temporal constraints. This enables a user experience that allows a virtual visit to the power plant through mobile devices and PCs. In addition, KHNP opened the major facilities of inoperational Kori 1 to the public and created a visiting program to raise public awareness of NPP safety and nuclear decommissioning.

Voluntarily disclosed **20** NPP documents of **five** types

Expansion of NPP Information Disclosure

Amid public growing interest in nuclear safety, KHNP is voluntarily increasing the level of disclosure regarding its NPP information, such information pertaining to power plant licensing documentation. After analyzing the public and NGOs' request for information, it established document disclosure standards and procedure. As a result, it disclosed 20 documents of five types online for the first time. These pertained to power plant licensing documents, such as safety analysis reports of Kori 2, Hanul 3 and 4, and Shin-Kori 5 and 6. Disclosing power plant information in real time propelled KHNP to make improvements to the accessibility of information by opening the NPP Operation Information Disclosure Website.

Foundation of Nuclear Safety Information Reliability Center

Safety information is verified and disclosed, not by KHNP, but by an independent group of experts to ensure the reliability of NPP safety information, which is a national concern. With external experts* as a main agent for verification, KHNP newly established the Nuclear Safety Information Reliability Center verifying NPP information disclosure and analyzed stakeholder needs for NPP information. KHNP will provide transparent information through reliable information disclosure and continuous monitoring based on two-way communication with stakeholders.

* Consists of a panel of seven specialists within the industries of nuclear power, machinery, electricity, structure, civil engineering, geology, administration, etc.

SPECIAL SECTION 3

Safe Nuclear Power Plants and Happy People

Combined Disaster Drill and Education

In accordance with Article 35 of the Framework Act on the Management of Disasters and Safety, KHNP conducted 32 drills, including earthquake drills and radiation emergency drills at all business operations and NPP sites from May 14 to 18, 2018, under the supervision of the Ministry of Public Administration and Security. In order to strengthen practical disaster response and protect people's lives in a timely manner, real-life complex disaster drills were conducted, mimicking all types of possible disasters.

Preparing for Disasters through Realistic Drills

On May 15, 2018, KHNP conducted the drill at the Wolsong Nuclear Power Site. About 500 people including officials from 10 organizations participated in the drill in preparation for complex disasters that arise from a major quake. Participants discussed disaster responses under the chairmanship of the CEO from 10:30am to 12pm, while from 1:30pm to 3:30pm, an on-site drill was conducted. These drills were in preparation for the leakage of harmful matter and radiation, fire breakouts, and other disasters, following the aftermath of the 5.4 and 7.2 magnitude earthquakes that hit the region near the Wolsong Site.

The purpose of this company-wide drill was to protect people's lives with the utmost of priority and strengthen competence when it comes to practical disaster response. In preparation for a real situation, KHNP, rechecked its command structure and reporting system between the command and the site in cooperation with the Central Disaster Control Tower, Integrated Support Center, and Emergency Rescue Team during the Wolsong Site Drill. Through the drill, KHNP identified the need for the swift reporting, distribution, and cooperation between disaster response groups, propelling the company forward in moving to improve the disaster response system through continuous drill exercises.

Time of Incident	Situation	Countermeasure
2pm	5.4 magnitude earthquake hits Gyeongju	Issued Emergency Grade B response and evacuated the Wolsong Site
2:10pm	7.2 magnitude earthquake hits Gyeongju	Issued Emergency Grade A response and Green Warning
2:15pm-2:22pm	Internal and external power failed with the collapse of the transmission towers.	Dispatched movable generator cars, pump trucks, and firefighting pump trucks and installed the alternative cables of the movable generator cars
2:45pm-2:53pm	Sulfuric acid was leaked.	Sulfuric acid decontaminated and collected by Hazardous Chemical Substances Response Team and 119 Special Rescue Service
2:53pm-3:00pm	Radiation was leaked when the reactor buildings lost the isolation function.	Issued Red Warning, requested the evacuation of local residents, and supplied emergency power using movable generator cars
3:00pm	A fire broke out.	Fire extinguished by Wolsong Site's fire department and Gyeongju's fire department

ULTIMATE SAFETY

Construction of Safe NPPs

KHNP PERFORMANCE

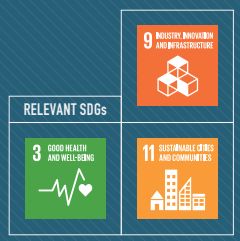
No. of NPP design improvement cases:
46

Strengthened the seismic design standards of Shin-Kori 5 and 6
0.5g
(magnitude: 7.4)

12%
increased reactor wall thickness of Shin-Kori 5 and 6

Exceeded the target rate of NPP construction progress by
100%

RELEVANT SDGs



SUSTAINABILITY CONTEXT

Considering the government's energy conversion policy and the public concern for nuclear safety, KHNP gathered public opinion on the construction of Shin-Kori 5 and 6 in July 2017. Feedback from a public participatory group of 471 people showed that it was decided to resume construction, however, KHNP realized that many people were still expressing concern over nuclear safety. KHNP is preparing for resuming the construction of Shin-Kori 5 and 6 and doing its utmost to restore public trust by strengthening the nuclear safety of multiple NPPs against earthquakes and pursuing construction based on public participation.

KHNP APPROACH

Based on public opinion, KHNP will construct world-class NPPs by ensuring the safety of NPPs under construction. In order to innovate the operational safety process of Shin-Kori 5 and 6, KHNP is enhancing construction quality by building Cyber Power Plant using 3D VR technology at the design stage and preventing accidents with AI CCTVs installed at the construction site. KHNP also formed a civic inspection group that will monitor all the construction processes of Shin-Kori 5 and 6, while also incorporating the improvement requests of the civic inspection group into the construction processes so as to realize public-participatory NPP construction procedure.

Timely Construction of Safety-centered NPP

Exceeded the target rate of NPP construction progress by 100%

Achieving Construction Progress Goal by Building NPP Construction Capability

Although public concerns about nuclear safety increased and NPP construction experienced a number of difficulties along the way due to the government's energy conversion policy, KHNP successfully conducted the construction processes of third generation APR1400 (Shin-Kori 3 and 4, Shin-Hanul 1 and 2, and Shin-Kori 5 and 6) by resolving major safety issues. KHNP was also able to exceed the target rate of NPP construction progress for safe NPP construction by resolving NPP quality issues, such as delays in facility trial operation and concerns regarding equipment damage, in a timely manner.

Performance in Resolving Domestic NPP Construction Safety Issues

Classification	Shin-Kori 3 and 4	Shin-Hanul 1 and 2	Shin-Kori 5 and 6
Pending Issues	• Need to inspect for forgery and falsification of foreign quality verification documents (QVD) • Reevaluated the safety of NPP sites after the Gyeongju earthquake	• Delay in delivery of tools and materials of major auxiliary equipment, including main stream discharging valves, etc. • Delay in trial operation, including verification test on pressurizer safety discharge valves, etc.	• Concerns about on-site equipment damage during the suspension of construction following related discussion • Need to minimize delay of procedure at the time of resuming construction
Current Solutions	• Utilized Electric Power Research Institute (US)'s guidelines for QVD verification and conducted verification testing • Conducted a site safety evaluation and verification in time and held meetings with regulatory agencies	• Completed a verification testing on the first domestically-produced reactor coolant pump (RCP) • Operated a practical consultative group resolving major trial operation risks	• Conducted on-site response to prevent structure damage, rust, etc. • Developed maintenance procedures • Conducted inspection by KHNP's regulatory agency
Performance Track Record	• Completed regulatory agency inspection and follow-up measures • Checked the suitability of the site safety evaluation with regulatory agencies	• Commenced regular high-temperature functional testing on Shin-Hanul 1 • Conducted cold-hydrostatic testing on Shin-Hanul 2 successfully	• Conducted initial pouring of concrete • Resumed testing before use after on-site inspection by Nuclear Safety & Security Commission
Process achievement rate (%)	Plan: 99.57 Performances: 99.58 Achievement rate: 100.00	Plan: 96.38 Performances: 96.79 Achievement rate: 100.43	Plan: 30.71 Performances: 30.93 Achievement rate: 100.72

Strengthening Site Safety to Increase Reliability in NPP

GRI 461-1

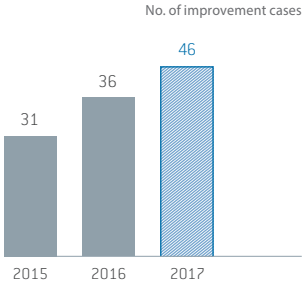
With a growing need to enhance the safety against earthquakes after the 2016 Gyeongju earthquake, KHNP checked the safety of NPP sites and multiple units situated on faults susceptible to earthquakes and performed safety reinforcement countermeasures. As a result of evaluating the safety on Shin-Kori 3 and 4 and Shin-Hanul 1 and 2, currently under construction and located on the faults susceptible to earthquakes, it respectively secured a safety level of 0.06g and 0.01g, based on a design standard of 0.3g. In addition, KHNP conducted a probabilistic safety assessment (PSA) to quantify all types of potential accidents and their possibilities in a probabilistic manner and achieved recognition for the safety of multiple units. KHNP is preemptively conducting R&D activities to fortify safety of developing PSA methodologies and participating in joint research with IAEA.

Performance in Strengthening Site Safety in Preparation for Natural Disasters

Evaluation method	Performance Track Record
Conducted safety evaluation on Shin-Kori 3 and 4 and Shin-Hanul 1 and 2, located on the faults susceptible to earthquakes	Secured safety based on design standards of 0.3g - (Shin-Kori 3 & 4) 0.06g - (Shin-Hanul 1 & 2) 0.01g
Conducted probabilistic safety assessment (PSA) on multiple units and technology development	Developed the methodologies of a preliminary probabilistic safety assessment on multiple units and conducted a preliminary assessment on Kori and Saeul sites

People-centered Construction for Safer Shin-Kori 5 and 6

Increase in NPP Design Improvement



Following the decision to resume construction as a result of multilateral discussions on Shin-Kori 5 and 6, safety reinforcement was determined to be handled as a top priority. Accordingly, KHNP greatly enhanced the design safety of Shin-Kori 5 and 6, in comparison to Shin-Kori 3 and 4, which constitute identical models (APR1400). KHNP extended the storage battery capacity to 24 hours and upgraded the emergency power generators to Seismic Grade I in order to improve the design of the safety system. In preparation for flooding resulting from tidal waves, emergency power generators were installed three meters above land level. In addition, KHNP installed additional devices for the protection of reactor coolant systems and reactor buildings in case of severe accidents. Lastly, the wall thickness of the reactors was increased by 12% to provide protection against terror acts and accidents involving aircrafts.

Fields	Shin-Kori 3 and 4		Shin-Kori 5 and 6
Safety system design	Storage battery capacity: 8 hours		Capacity: 24 hours
	1 unit of AAC DG[1](Seismic Grade Ⅲ)		2 units (Seismic Grade Ⅰ)
Natural disaster response design	Earthquakes	Seismic design: 0.3g (magnitude: 7.0)	Seismic performance 0.5g (magnitude: 7.4)
	Tidal waves	Installed AAC DG at level with the land	Installed three meters higher than the level of the land
Severe accident response design	Installed POSRV for protection against overpressure, as well as safety depressurization, facilities for reactor coolant systems		POSRV[2] + ERDV[3] for severe accidents
	Installed reactor building depressurization facilities ECSBS		ECSBS[4]+ CFVS[5]
Terror response design	Reactor wall thickness: 122cm		Wall thickness: 137cm(12%↑)

1) AAC DG (Alternate AC Diesel Generator): Emergency power supply in case of power failure of internal and external NPPs
2) POSRV (Pilot Operated Safety Relief Valve): Protection against overpressure of reactor coolant systems
3) ERDV (Emergency Rapid Depressurization Valve): Preventing reactor damage by relieving the overpressure of reactor coolant systems during severe accidents
4) ECSBS (Emergency Containment Spray Backup System): Lowering temperature and pressure by spraying water onto reactor buildings during severe accidents
5) CFVS (Containment Filtered Venting System): Dropping the pressure of reactor structures during severe accidents

Civic Inspection Group

No. of Members of Civic Inspection Group

40

Since the construction of Shin-Kori 5 and 6 was resumed, KHNP has been operating the Civic Inspection Group to disclose the NPP construction process and relieve public anxiety regarding nuclear safety. KHNP selected 40 people from representative backgrounds, regions, and future generations to become members of the civic inspection group. KHNP then supported their activities, such as construction monitoring, identifying issues requiring improvement, and provided them with suggestions. The civic inspection group participated in on-site construction inspections after completing safety training during the opening ceremony and first on-site safety inspection. During the second visit, they went on to observe the seismic verification test on core NPP equipment and participated in training in seismic design. KHNP will incorporate the suggestions of the civic inspection group into the construction process as much as possible so as to ensure nuclear safety.

Conducted on-site safety inspection

Participated in seismic verification test on core NPP equipment

Establishment of NPP Construction System using Fourth Industrial Revolution Technology

Installation of AI CCTVs

KHNP has installed AI CCTVs to monitor and analyze risks and vulnerabilities in real time and are now able to prevent accidents in advance while enabling expedient response in such situations. AI CCTVs identify abnormal situations, including enclosed zones, fire, signals for help, and trespassing, by comparing the images with the pre-set patterns, and deliver related information to the E-Tower for on-site measurement. KHNP has installed intelligent CCTVs at 16 areas near the construction site of Shin-Kori 5 and 6 and has been enforcing smart safety management. KHNP will test-operate AI CCTVs and an image analysis system and install more CCTVs in all enclosed zones and areas that pose a hazardous risk.

Major Functions of AI CCTVs

Monitoring enclosed zones	Preventing a trespass on a protected district	Detecting fire	Detecting worker's signal for help
			
Detecting workers not moving	Setting virtual boundaries near major facilities	Detecting fire by analyzing smoke colors	Early warning in case of emergency

Effects of Cyber Power Plant

Productivity of construction design improved

by 30%

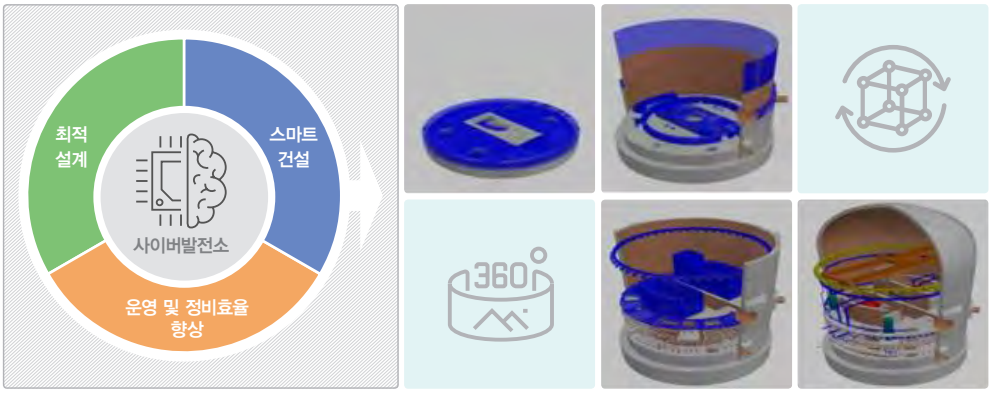
Construction period reduced

by 4%

Cyber Power Plant using 3D and VR Technology

The Cyber Power Plant applied with 3D and VR technology has the same design as an actual power plant with improved construction quality by providing advanced prevention for various issues, including design error and construction interference. Linking construction information to the 3D design model, KHNP will develop a VR system and utilize the system during the design, construction, and operational stages for optimized design, smart construction, and efficient and safe operation. KHNP is developing a Cyber Power Plant for Shin-Kori 5 and 6. The Cyber Power Plant, scheduled to be utilized for NPP construction and operation, is expected to increase construction design productivity by 30% and reduce the construction period by 4%.

Virtual Construction Simulation



SOCIAL RESPONSIBILITY

Minimization of Environmental Impacts

KHNP PERFORMANCE

No. of business sitesdesignated as green companies
8

Purchasing of eco-friendly products
95.16%

Environmental performance index 315 points
(**10%▲** year on year)

Amount of radiation employees are exposed to prediction
(**32%▼** year on year)

RELEVANT SDGs

SUSTAINABILITY CONTEXT

At the 21st Paris Climate Conference (COP21) in 2015, member states agreed on adopting the Paris Agreement to reduce greenhouse gas emissions on a step-by-step basis in order to prevent the average temperature of the earth from increasing by over 2℃ to that of the average temperature pre-industrialization era. All UN member states, which have signed the Paris Agreement, promised to reduce GHGs, resulting in KHNP taking strides in responding to climate change. KHNP, as an eco-friendly energy leader supplying green energy, such as nuclear power and hydro power, is both thoroughly managing pollutants and responding to climate change.

KHNP APPROACH

KHNP is establishing an advanced environmental management system based on International Standard for Environment Management System ISO 14001, and conducting continuous environmental management and strict internal and external environmental assessments having expanded its operations sites, designated as green companies. KHNP is ensuring the safety of the regions near NPPs by managing sewage, wastewater, harmful waste, and radioactive waste, while also establishing a climate change response system and conducting the tasks according to the four strategic directions. In addition, KHNP is preparing for Post 2020 Climate Change Regime, conducting demonstration projects for a climate change supply chain management and developing the guard lines to adapt to climate change.

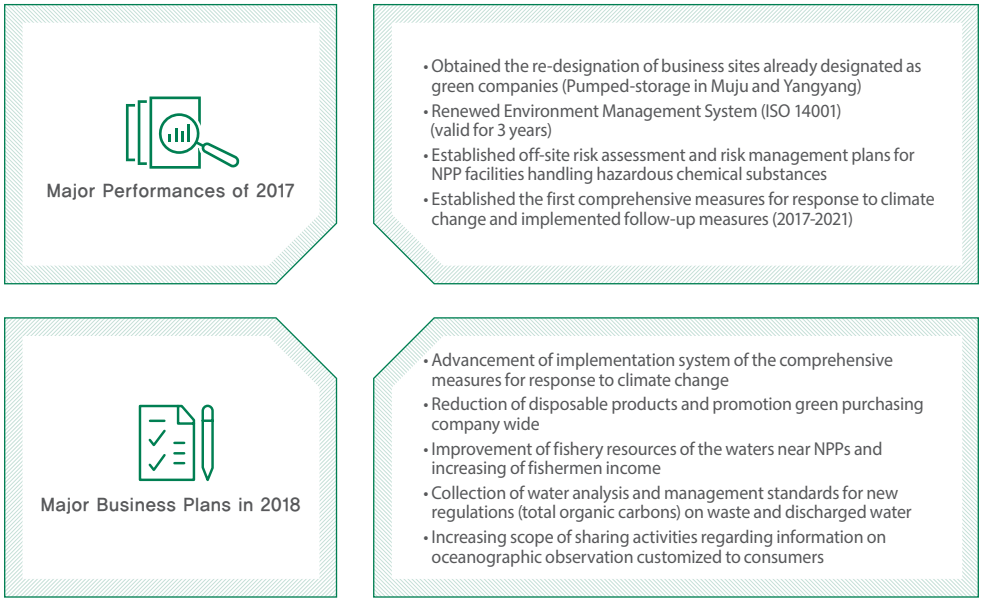
Establishment of Eco-friendly Management System

Eco-friendly Management Strategy

KHNP established an advanced environmental management system by setting three basic directions of eco-friendly management: placing priority on the environment and safety, compliance with domestic and international environmental standards and minimizing pollutant emissions, and leading environmental protection activities while ensuring the transparent disclosure of environmental information. KHNP is carrying out its duty for environmental preservation to the fullest by conducting a variety of projects according to its environmental management strategy.

Basic Directions of Eco-friendly Management

Key Businesses and Plans



Environmental Management System

Renewed Environment Management System

ISO 14001

According to the Environmental Impact Assessment, KHNP establishes measures to reduce environmental impact by predicting and analyzing the impact of nuclear power plants on the natural environment, living environment, society, and the economy, throughout their entire lifecycle from construction to operation. KHNP's Environmental Impact Assessment Report, in particular, reflects its environmental impact reduction measures and the opinions of local residents, and is prepared after a public hearing and upon the approval of relevant government agencies. KHNP constructs and operates its NPPs in compliance with the approved assessment report. In addition, KHNP was re-certified for the International Standard for Environment Management System ISO 14001 in 2017 and is maintaining its advanced environmental management system in compliance with the international standards.

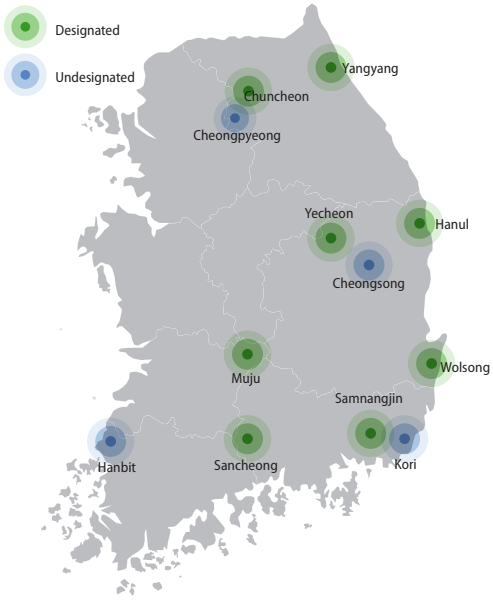
General Environment Management

Designation of Green Companies

Companies and business sites that are designated as green companies by the Ministry of Environment are those that greatly contribute to environmental improvement with a green management system by greatly reducing pollutants and saving resources and energy. As of August 2018, eight KHNP business sites have been designated as green companies.

Green Companies

(As of August 2018)



* Cheongpyeong (undesignated). Re-designation in progress

Sewage and Wastewater Management 306-1

All sewage and wastewater generated in KHNP's power plants is discharged after being treated by sewage and wastewater treatment facilities so that it can be managed in compliance with environmental laws. The quality of discharged water is strictly managed in real time by the Telemonitoring System (TMS) in accordance with KHNP's own standards, which are 50% stricter than those defined by law. NPP wastewater consisting of inorganic wastewater, wastewater containing oil, and a small amount of organic wastewater is discharged after a physical and chemical treatment processes, such as neutralization, condensation, precipitation, and filtration.

Emission of Water Pollutants

(Unit: kg*)

		2015	2016	2017
Nuclear power sites	Chemical Oxygen Demand (COD)	18,504	20,987	17,340
	Suspended Solids (SS)	3,096	3,276	2,326
	Total Nitrogen (T-N)	39,085	41,704	45,929

* Discharge concentration x Amount of discharge

Wastewater Discharge and Recycling

(Unit: 1,000 ㎥)

		2015	2016	2017
Nuclear power sites	Wastewater discharge	3,783	4,051	3,673
	Recycling amount	502	496	389
	Recycling rate (%)	13.3	12.3	10.6

Waste Management 306-2

Waste is categorized into general waste, designated waste, and construction waste, and the entire waste treatment process from generation to final treatment is thoroughly managed. Furthermore, KHNP has reduced waste by building and expanding waste storage facilities at each NPP site and categorizing waste by type, property, and method of treatment for thorough management.

Waste Discharge

(Unit: tons)

		2015	2016	2017
Nuclear power sites	General waste	10,045	10,817	9,821
	Designated waste	735	1,037	1,238
	Total waste	10,780	11,854	11,059
	Recycling rate (%)*	68	67	71.8

* Rate of recycling to general waste

Management of Hazardous Chemical Substances 306-3

In order to prevent chemical accidents and strengthen its response capacity, KHNP has developed the "Standard Emergency Response Guidelines for NPP Chemical Accidents" containing the emergency response procedure and emergency treatment protocol, and applies it to the company's business sites. It also jointly conducts regular safety inspections on chemical storage facilities of NPPs with safety experts. Since 2015, KHNP has adopted and applied a risk management system to the entire company for the diagnosis and evaluation of risk factors of hazardous chemical substances.

Discharge of Hazardous Chemical Substances

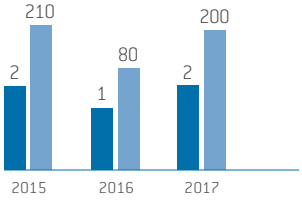
(Unit: tons)

	2015	2016	2017
Chemicals used by nuclear power site	7,406	7,391	6,668
No. of hazardous chemical substances leak (cases)*	0	0	0

* Source: Chemical Safety Information Sharing System by the National Institute of Chemical Safety

Violations of Environmental Laws

(Unit: Case, KRW 10 thousand)



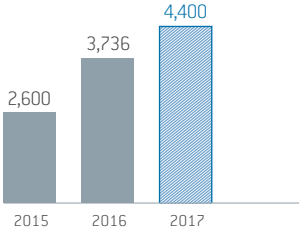
Efforts to Prevent the Recurrence of Environmental Law Violations 307-1

Cracking down on environmental law violations resulted in the discovery of two violations in 2017, followed by the KHNP establishing measures to prevent the recurrence of such violations. As a follow-up measure for a supplier exempted from prevention facilities, which failed to comply with the regulations, KHNP installed a water gauge at the supplier's wastewater tank and requested that they comply with the regulations. KHNP has also completed a licensing process in the early stages and shared similar cases from business and construction sites as way of handling cases of license omission for the installation of an actual chemistry laboratory.

Radioactive Waste Management

Radioactive Waste Transferred for Treatment

(Unit: 200ℓ drum)



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 by applying available technology, such as compression and cutting, and sealing radioactive waste in containers after treatment for safe management. KHNP has been transferring radioactive waste kept in the NPPs to the radioactive waste treatment facility located in Gyeongju since 2010. Continuous efforts have enabled the gradual reduction in the storage of radioactive waste of the NPP sites since 2015. KHNP will increase the amount and types of radioactive waste transferred for treatment in order to safely manage radioactive waste that is expected to be generated during mid-to to long-term facility replacement and nuclear decommissioning.

Spent Nuclear Fuel Management

High-level radioactive waste, such as spent nuclear fuel, is temporarily stored for a certain period of time in a storage facility with special equipment before being treated in accordance with the government's basic plans for high-level radioactive waste management. KHNP is working to increase the storage capacity in preparation for the saturation of spent nuclear fuel from storage facilities of some NPPs, including Wolsong and Hanul, while continuing its efforts to gain credibility with the local community and prepare for a long-term license assessment.

Prediction of radiation employees are exposed to prediction decreased by

32% year on year

Management of Occupational Exposure

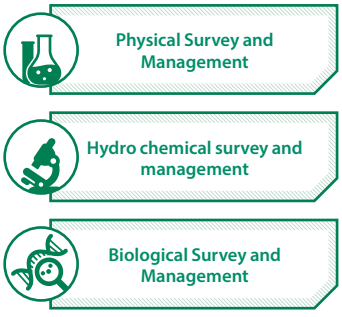
Reducing occupational radiation exposure levels for NPP workers has been the driving force in KHNP conducting a mid- and long-term radiation exposure reduction project. It injected zinc to reactor coolants and removed radiation sources and corrosion products through the use of ultrasound waves to cleanse the fuel in order to create a safe NPP environment from radiation. As a result, the occupational exposure was reduced by 32% year on year.

Marine Management

Marine Environmental Management

KHNP is conducting physical, chemical, and biological surveys to investigate the marine environment of the waters surrounding the NPPs. In particular, the company has installed and operated bathythermographs, water quality analyzers, direction meters, and flow meters at the waters near the intake and discharge channels of Kori, Hanbit, Wolsong, and Hanul plants. Observation results from this equipment are subject to wireless remote monitoring and disclose real-time footage via the Internet and the promotion and exhibition center of each NPP.

Marine Environment Survey and Management Items



- A regular survey on water temperature, salinity, transparency, and sea water flow (current direction, current speed, tide, etc.), coolant, intake, and discharge channels and water temperature of the waters near NPPs
- A seasonal survey on water temperature, salinity, sea water flow near NPPs, etc.

- A seasonal survey on sea water's hydrogen ion concentration (pH), suspended solids (SS), dissolved oxygen (DO), residual chlorine, nutrient salts, chemical oxygen demand (COD), ignition loss of ocean deposits, grain-size composition, grain-size composition, and heavy metal
- A semi-annual survey on specific harmful substances and heavy metals (copper, chrome, etc.)

- A seasonal survey on the species composition and standing crop of zooplankton and phytoplankton (including chlorophyll), benthic organisms, marine plants, fish species, etc.
- A seasonal survey on the species, number and weight of organisms colliding with the intake screen
- A seasonal survey on the species and number of organisms drawn into the cooling system

Marine Water Quality Management

KHNP is investigating the water quality and marine ecosystem near NPPs. There were no issues of concern regarding changes in the surrounding marine environment resulting from NPPs. In addition, marine algae near NPPs had similar community structures to the ecosystem of the neighboring natural environment and NPPs were concluded to be free of any particularly negative, environmental impact.

Marine Water Quality near NPPs

(Unit: mg/ℓ)

Item	Plant	2015	2016	2017
Dissolved Oxygen (DO)	Kori	7.9	7.6	7.9
	Wolsong	8.4	8.2	8.0
	Hanbit	8.5	8.1	8.0
	Hanul	8.0	8.4	8.2
Chemical Oxygen Demand (COD)	Kori	1.7	1.8	1.8
	Wolsong	1.6	1.8	1.5
	Hanbit	1.5	1.8	2.1
	Hanul	1.8	1.3	1.1
Phosphate (PO4-P)	Kori	0.01	0.01	0.01
	Wolsong	0.01	0.01	0.01
	Hanbit	0.02	0.02	0.02
	Hanul	0.01	0.01	0.01

Average Standing Crop of Macroalgal Community near NPPs

(Unit: g·dry·wt/m2)

Item	Plant	2015	2016	2017
No. of species	Kori	51	58	58
	Wolsong	52	60	68
	Hanbit	26	26	27
	Hanul	86	87	86
Average standing crop	Kori	192	201	194
	Wolsong	189	181	176
	Hanbit	3	3	2
	Hanul	93	88	84

Management of Heated Effluents

Seawater is used as indirect cooling water to cool down and condense the steam used to rotate the generators, and then discharged into the sea at 7℃ or higher in a form referred to as 'heated effluents'. As heated effluents have a positive impact on the reproduction of commercially-valuable warm water fish, KHNP released fish and shellfish out into the seas near the NPPs for aquaculture using heated effluents. As of August 2018, KHNP has released higher value-added marine species, including 9.54 million fish, 17.54 million abalones, 88 million crustaceans, 1,235 tons of shellfish, and 830,000 sea cucumbers, suited for the characteristics of the ocean water. This greatly contributed to increasing local resident income and preserving marine resources of the neighboring waters.

Responses to Climate Change

Establishment of Climate Change Response System

With its corporate philosophy of "Making Life Prosperous through Eco-friendly Energy," KHNP has established the Climate Change Response Roadmap in order to fulfill the national goal of reducing GHG emissions, followed by its systematic implementation. It is notably proactive in responding to climate change issues by identifying four main areas and 17 tasks.

Four Main Areas and Tasks for Climate Change Response

Implementing government policies

- Coping with GHG emissions trading scheme
- Expanding new and renewable energy businesses
- Introducing eco-friendly and high-efficiency buildings
- Establishing plan for adaptation to climate change

Securing carbon sinks

- Constructing green parks on idle corporate land
- Expanding open spaces
- Establishing a water resource (e.g. rainwater) management system

Reducing GHGs

- Maintaining an appropriate proportion of NPPs
- Increasing nuclear power usage rate
- Promoting use and supply of hydro power facilities
- Introducing eco-friendly vehicles, such as electric cars

Building infrastructure and promoting cooperation

- Pursuing global certifications for carbon management
- Supporting photovoltaic power businesses near NPPs
- Supporting GHG reduction of SMEs in Gyeongju
- Participating in COP as an industrial representative
- Promoting industrial-academic-research collaboration for climate change response

Greenhouse Gas Emissions

(Unit: Thousand tCO2eq)

classification	2015	2016	2017
Scope 1	65	94	54
Scope 2	2,933	2,963	3,391*
Total emissions	2,998	3,057	3,445

* A rise in Scope 2 resulted from an extension of the NPP safety inspection period and an increase in the government's direction for urgent pumped-storage power generation.

Contribution to Reducing GHG Emissions

305-1, 305-2

KHNP contributes to reducing GHG emissions by generating energy from nuclear power, hydro power, and pumped-storage power, which emit very menial amounts of GHGs. It is also proactively responding to the carbon emissions trading system which was introduced to fulfill the national goal of efficiently reducing GHG emissions. As its ability to reduce GHG emissions developed, KHNP sold and carried forward its emission allowances which were additionally secured. Furthermore, KHNP has established its own GHG inventory management system amid continuous improvements.

Operation of GHG Inventory Management System

KHNP is operating a GHG inventory management system in order to respond to the carbon emissions trading system by quantifying GHG emissions. With this system, KHNP is establishing an optimized carbon emissions trading plan by monitoring its GHG emissions in real time and calculating expected annual GHG emissions. It may measure GHG emissions in person and enter the results, or obtain automatically calculated results based on emission factors. KHNP is systematically operating GHG emissions by monitoring and managing measurements, registrations, and other numerous tasks.

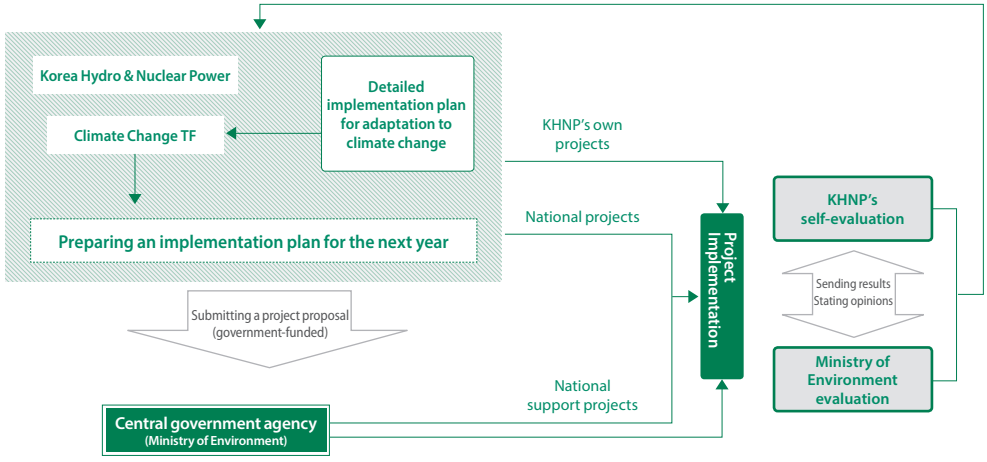
Establishment of Response System for Carbon Emissions Trading

The carbon 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 their emission allowances with other companies, according to their ability to reduce GHG emissions. In order to proactively respond to the carbon emissions trading system, KHNP established a systematic response by securing a skilled workforce and setting a trading procedure, while also establishing a joint response system and a roadmap for reducing GHG emissions with other power companies by co-developing GHG emissions reduction projects and technologies.

Adaptation to Climate Change

In preparation for an uncertain future, which may be brought about by climate change, KHNP set a mid-term roadmap for adaptation to climate change and evaluated its potential risks. As a result of considering seven climate factors, the possibility including heavy rains, heat waves, cold waves, heavy snow and etc. was found to be relatively high, however, the impact was found to be of no great significance, pointing to the favorable level of sustainability. KHNP is fulfilling its social responsibility as it pertains to the protection of facilities and public safety against the impact of climate change, a sustainable power supply, and other areas. In addition, KHNP is thoroughly implementing such policy having established two core climate-change adaptation sectors, as well as specific tasks, in order to promote the capacity to adapt under such circumstances.

Adaption to Climate Change



Two Main Areas and Tasks for Adaptation to Climate Change

Strengthening infrastructure for adaptation to climate change

- Conducting safety inspection on all NPPs in preparation for extreme disasters
- Installing flooding protection facilities at NPPs
- Establishing communications network to respond to natural disasters and emergencies
- Conducting precise inspection and precise safety diagnosis on dams
- Reinforcing harbor structures
- Introducing seawater desalination facilities

Improving crisis management and response capability

- Reinforcing industrial safety and health and establishing Business Continuity Management System
- Founding Disaster Response Center
- Standardizing disaster response regulations and improving manual
- Modernizing new and renewable energy business and hydro power/pumped-storage plants
- Improving countermeasure implementation system against climate change
- Establishing infrastructure for low-income bracket in preparation for adaption to climate change

Mid-term Roadmap for Climate Change Adaptation Project

	2016~2017	2018 (present)	2019~2020	2021
Goals according to each phase	[Phase 1] Establishment of foundation	[Phase 2] Advancement of adaptation project	[Phase 3] Expansion of project	[Phase 4] Adaptation-based value creation
Details	• Climate change adaptation risk evaluation • Establishment of countermeasure to adapt to climate change • Inspection on implementing adaptation to climate change	• Development of guidelines for adaptation to climate change • Implementation of suppliers' climate change risk management trial operations • Implementation management monitoring system of adaption to climate change (review on incorporation)	• Expansion of suppliers' climate change risk management systems • Expansion of facility manager-centered business, rather than focusing on preexisting facility-centered business • Implementation management monitoring system of adaption to climate change (implementation)	• Improvement in suppliers' climate change risk management systems • Implementation management monitoring system of adaption to climate change (completion)
Flow of response	Installation of infrastructure	Completion of mandatory response	Growth and development	Maturity

Material Flow

KHNP is monitoring and managing the use and discharge of resources used to operate its nuclear power plants. Through such efforts, KHNP is practicing eco-friendly management by minimizing pollutants and maximizing the conservation resources.

NPP Fuel Consumption 301-1 (Unit: kgU)

		2017
NPP fuel	Light water reactor (enriched uranium)	360,520
	Heavy water reactor (natural uranium)	256,143

Energy Consumption 302-1 (Unit: 10TJ)

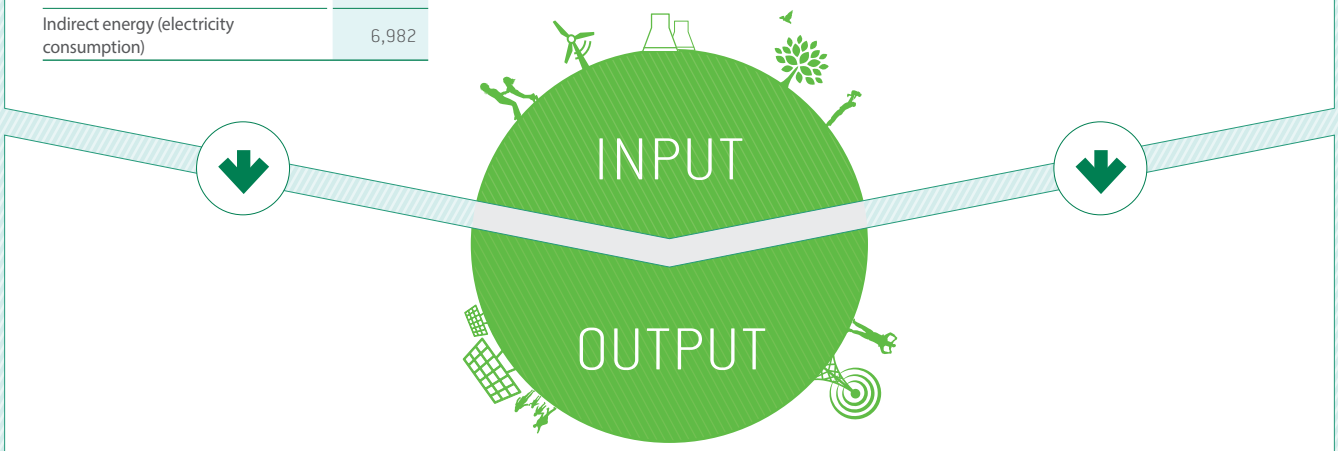
	2017
Direct energy (fuel consumption)	26
Indirect energy (electricity consumption)	6,982

Investment in Environment (Unit: KRW 100 million)

	2017
Amount of Investment in Environment	17.6
Purchase of green products	270

Water Consumption 303-1 (Unit: thousand tons)

	2017
Underground water	75
Industrial water	1,893
Water supply	330
Surface water	4,512
Total water consumption	6,810



Discharge of Hazardous Chemical Substances 306-3 (Unit: tons, cases)

	2017
Chemicals used at NPPs	6,668
Leakage of hazardous chemical substances*	0

* Source: Chemical Safety Information Sharing System by the National Institute of Chemical Safety

Waste Discharge 306-2 (Unit: tons)

		2017
Nuclear power sites	General waste	9,821
	Designated waste	1,238
	Total waste	11,059
	Recycling rate (%)*	71.8

* Rate of recycling to general waste

Greenhouse Gas Emissions 305-1,305-2 (Unit: Thousand tCO2eq)

	2017
SCOPE 1	54
SCOPE 2*	3,391
Total emissions	3,445

* Using necessary external electric power for pumped-storage and safe nuclear operations

Wastewater Discharge and Recycling 306-1 (Unit: 1,000 ㎥)

		2017
Nuclear power sites	Wastewater discharge	3,673
	Recycling amount	389.04
	Recycling rate (%)	10.6

Emission of Water Pollutants 306-3 (Unit: kg*)

		2017
Nuclear power sites	Chemical Oxygen Demand (COD)	17,340
	Suspended Solids (SS)	2,326
	Total Nitrogen (T-N)	45,929

* Discharge concentration x Amount of discharge

Radioactive Waste Transferred for Treatment (Unit: 200ℓ drum)

	2017
Radioactive waste transferred for treatment	4,400

SOCIAL RESPONSIBILITY

Happy Growth with Local Communities

KHNP PERFORMANCE

Earned the KCCI & Forbes **CSR Award**

Earned Presidential Prize at the 2nd **Crime Prevention Award**

Dandelion Spore Fund of KRW **20.85** billion

Earned **3** consecutive years of NPP acceptability from local communities

RELEVANT SDGs

SUSTAINABILITY CONTEXT

Companies are contributing to the long-term development of local communities through systematic social contribution in association with their management vision. As the nuclear power industry needs the support of local communities and citizens due to its industrial characteristics, nuclear power companies have to make an effort to pursue mutual growth and increase its acceptability from the local community through continuous social contributions that reflect social values. As Korea's leading public energy company, KHNP is contributing to the national economic development and enriching many lives through supplying stable power while upholding its social responsibility as as a corporate citizen.

KHNP APPROACH

KHNP has established a social contribution system based on the creation of social values and has conducted social contribution activities to enhance both safety and comfort. In addition to the Photovoltaic-powered Streetlight Installation Project for ensuring the safety of communities, contributions are also being made to provide better education for local children, enhance the residential environment and improve vision care for those in the low-income bracket. Since its headquarters was relocated to Gyeongju-si, KHNP has been implementing the Gyeongju Growth Plan in promotion of mutual growth while tirelessly conducting global volunteer work in Vietnam and the Czech Republic. The KHNP seeks continued growth as a public energy enterprise for the people by sustaining its practical social contribution activities geared for the local communities.

Social Contribution System

Earned the KCCI & Forbes
CSR Award

More and more governmental policies encourage public enterprises to create social values, while the demand for the tangible results of social contribution for local communities is growing. Under the vision of creating "A Safe and Happy World for All," KHNP reestablished a social contribution system with higher social values. For its social contribution activities in 2017, KHNP strengthened its responsibility for social contribution in three areas: "Safety and Happiness," "Regional Needs," and "Global Social Welfare."

KHNP's Social Contribution System

Social contribution vision	A Safe and Happy World for All		
Slogan	"Love for Neighbors, Hope for Society"		
Core values	Protecting social safety	Pursuing the happiness of communities	Putting people first
Strategy	Improving social contribution for safety and happiness as its brand	Projects for mutual growth with local communities	Strengthening a foundation for overseas businesses by expanding global social contribution activities
tasks	Photovoltaic Power Safety Streetlight Project Happiness Plus, Hopeful Wings Project Happiness Wings Home Makeover Project Blindness Prevention Project	Gyeongju mutual growth plan	Social contribution activities in countries that KHNP may conduct its overseas business in the future (Czech Republic, Vietnam)

Employees' Volunteer Work

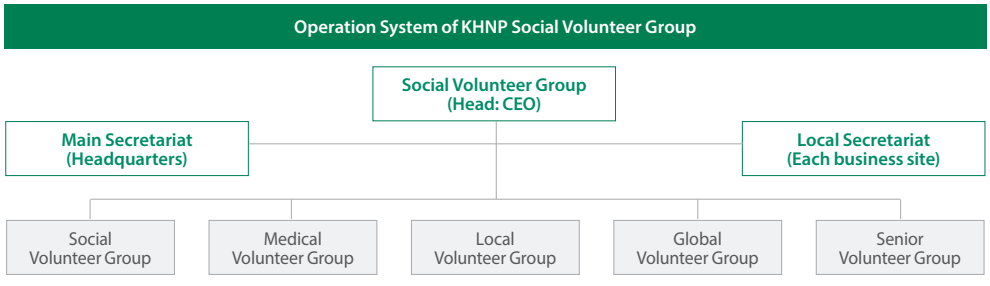
(Unit: Hours)

	Volunteer hours per person
2015	10
2016	7.8
2017	6.4

KHNP Social Volunteer Group

In June 2004, KHNP Social Volunteer Group (SVG) was first formed with the CEO as its head in order to carry out its social responsibility and role to the fullest as Korea's largest electric power company. Since then, KHNP has been taking an active part in sharing activities. The SVG consists of social, medical, regional, global, and senior subgroups while employees of headquarters and local offices are participating in volunteer work for children, marginalized populations, and the environment. In 2017, 11,000 staff members recorded 74,000 hours of participated volunteer work.

Organization of KHNP Social Volunteer Group



Sharing Fund

KHNP carries out its social contribution activities through the Dandelion Spore Fund consisting of two subfunds: "Love Fund," raised from employees' voluntary donations, and "Matching Grant," the company's sharing and donation fund. As of the end of 2017, about 77% of the total employees are participating in the Love Fund, while the Dandelion Spore Fund was able to raise as much as KRW 20.845 billion and was used for various social contribution activities.

Sharing Fund Use

(Unit: KRW 100 million)

	2015	2016	2017
Love Fund	11.4	11	10.7
Matching Grant	90	132	197.75
Total	101.4	143	208.5

KHNP's Social Contribution 203-1, 413-1

Provided Vans for the Happiness Plus, Hopeful Wings Project

Happiness Plus, Hopeful Wings Project

The Happiness Plus, Hopeful Wings Project has been conducted for six years to improve the learning environment of local children's centers and the KHNP has been striving to improve the happiness of underprivileged children by narrowing the education divide between classes. In 2017, 80 vans were donated to 4,000 local children's centers and installed in 30 Hopeful Libraries. In addition, 480 children were given the opportunity to participate in cultural programs. Following the relocation of the headquarters to Gyeongju, it provided online English education and overseas English training for 26 local children's centers in Gyeongju. KHNP seeks to continually provide generous support to fuel the dreams and aspirations of children in need.

Classification	No. of vans	No. of libraries	Cultural experience (No. of people)
2015	50	20	154
2016	95	55	433
2017	80	30	480

Happiness Wings Home Makeover Project

Happiness Wings Home Makeover Project

In order to improve the standard of living for low income individuals by resolving their residential environment issues, KHNP and Habitat for Humanity Korea ran the Happiness Wings Home Makeover Project to enhance the residential and welfare facilities of those in the low-income bracket. Through the second-year project commenced in the second half of 2017, KHNP repaired one welfare facility and 89 outdated houses and demolished old slate roofs containing a large amount of carcinogens. Residents of the repaired houses demonstrated great satisfaction which stimulated the continuation of this uniquely-themed project to enhance the quality of life for low-income families.

Classification	No. of houses improved	No. of welfare facilities improved	No. of roofs improved
2016	66	4	-
2017	87	2	54

Blindness Prevention Project

Blindness Prevention Project

KHNP and the Korean Foundation for the Prevention of Blindness supported expenses for eyesight restoration operations for the individuals in the low-income bracket who were at risk for total vision loss and provided free eye exams for local residents living near power plants to improve their well-being and happiness. In addition to basic eye exams, such as visual acuity tests and tonometries, KHNP examined cataracts and screened for conditions like retina disease using state-of-the-art equipment. It also provided funding for operation expenses for these local low income residents. In 2017, KHNP conducted the Blindness Prevention Project in eight more local communities than it did the previous year, for a total of 16. KHNP provided funding for the eyesight restoration operation expenses for 363 people with visual impairment and provided free eye exams for 1,264 local residents living near power plants. Under the vision of "Clear sight envisions a world of happiness," KHNP is giving the light of hope to local residents by providing more comprehensive treatment for eye disease.

Classification	Free eye exam (No. of people)	No. of patients receiving operation
2016	1,812	527
2017	1,264	366

Projects for mutual growth with local communities

203-1, 413-1

Promotion of Gyeongju Growth Plan

Following the relocation of the headquarters to Gyeongju, KHNP implemented the Gyeongju Growth Plan consisting of five projects for mutual growth with Gyeongju. In 2017, KHNP created local jobs by constructing the On-site NPP Workers Training Center and commenced the construction of a dormitory for college students studying in Seoul who come from Gyeongju and other NPP regions. In addition, KHNP has successfully invited 60 business partners to Gyeongju, with the goal of inviting a total of 100 nuclear power business partners. KHNP also promoted higher value-added MICE industries by holding nuclear power events. Lastly, KHNP contributed to creating a sports culture for local residents by founding the KHNP Women's Soccer Team.

Key Projects and Performances

Classification	Details	Performances
Inviting 100 nuclear power suppliers	• Opened Corporate Relocation Support Center to help business partners that want to relocate • Held a presentation for business relocation and an agreement ceremony	• Relocated 60 companies and created 683 jobs (accumulated performance as of December) • Deposited KRW 140 billion for Win-win Growth Fund
Setting up On-site NPP Workers Training Center	• Formed organization/personnel for administrative construction and commenced construction	• Created jobs for operation and construction • Contributed to nuclear safety operation by strengthening maintenance personnel's capability
Constructing a dormitory	• Supported a dormitory for college students studying in the Seoul who are native to NPP regions	• Invitee public participation for design competitions
Promoting MICE industries	• Invited major domestic and foreign nuclear power events and meetings to Gyeongju	• Held the Korea Atomic Power Annual Conference • Held WANO BGM
Founded women's soccer team	• Founded KHNP Women's Soccer Team and participated in WK League	• Created a harmonious atmosphere with the local community by founding a team among the less popular sports

Social Contribution for Children in Gyeongju

Installed yellow carpets at an elementary school in Gyeongju-si

Following the relocation of the headquarters to Gyeongju, KHNP has been conducting a wide range of activities to resolve childhood issues in Gyeongju. KHNP founded "Gyeongju Youth Seed Orchestra" for children from multicultural and low income families, as well as those living in Gyeongju. Encouragement is also given to foster the emotional development of children through music education by sponsoring the orchestra. In addition, KHNP prevented traffic accidents involving children by installing 10 yellow carpets for the safety of elementary school students in Gyeongju so that drivers could recognize children more easily.

Atom Engineering Technology Class

Atom Engineering Technology Class

As part of its education projects for NPP regions, KHNP has been operating the Atom Engineering Technology Class since 2005, for a total of 13 years. KHNP's employees teach elementary school students scientific principles in a way that's easy to comprehend as a means of donating one's talent in hopes of arousing their interest in science and technology. In 2017, KHNP provided Atom Engineering Technology Class 23 times at four nuclear power sites and the surrounding business sites, resulting in 926 students acquiring basic scientific knowledge relevant to their daily lives. Employees, as volunteer teachers, oversaw small groups consisting of four to five students and led science kit assembly experiments which helped in furthering the fostering of future talented individuals in the field of science.

Uljin Music Farm Festival

Uljin Music Farm Festival

KHNP provided more support for Uljin Music Farm Festival so that the festival could revitalize NPP local communities and become a representative summer music festival of the East Sea. KHNP improved event quality by participating in the entire festival process from planning, PR, and implementation, to provided goods and shuttle buses for visitor convenience, as well as the operation of a variety of marine activities. As a result, about 15,000 people attended the festival in 2017. Uljin Music Farm Festival allowed KHNP to widely promote the ecosystem and culture of the community and contributed to economic revitalization by attracting a number of summer tourists.

Global Volunteer Work 203-1

Mural painting in the Czech Republic

The Czech Republic is a potential target country for the exportation of NPPs, where the KHNP is also establishing a foundation for NPP export by conducting volunteer work in local communities. KHNP selected 36 global volunteer group members from Haeoreum Alliance Colleges, an industrial-academic-government cooperative agency relating to nuclear power. The volunteer workers painted murals at the Center for the Disabled located near the Dukovany Nuclear Power Station in the Czech Republic. KHNP held the "Grand Opening of Murals" to present the finished murals and the Korean Ambassador to the Czech Republic and the Vice-Minister of the Ministry for Human Rights of the Czech Republic were able to both attend this event. It strengthened the long-term partnership between the Republic of Korea and the Czech Republic, which increased the possibility for KHNP's NPP export.

Volunteer Work in Binh Dinh, Vietnam

Since KHNP concluded a business agreement for volunteer work with Vietnam in 2015, it has been dispatching the Seoul National University Global Volunteers. In 2017, 55 volunteer workers were dispatched to Binh Dinh Elementary School, where volunteer workers installed water treatment facilities to improve the drinking water environment and offered education programs involving the sharing of scientific knowledge. KHNP provided water treatment technology, as well as the workforce required for improving the local community environment of Vietnam. Its efforts were helpful for resolving the social issues of Vietnam.

Industrial-academic Global Volunteer Work

	Time Period	Site	Description	Partnered College	No. of Personnel Dispatched
2017	Summer	Binh Dinh, Vietnam	Installation of water treatment facilities utilizing rainwater and sunlight	Seoul National University	36
	Summer	Dukovany, Czech Republic	Installation of water treatment facilities utilizing rainwater and sunlight	Haeoreum Alliance Colleges*	55
	Winter	Binh Dinh, Vietnam	Installation of water treatment facilities utilizing rainwater and sunlight, education, and cultural activities	Seoul National University	56
2018	Summer	Trebitsch, Czech Republic	Facility repair, cultural exchange, and education volunteer	Haeoreum Alliance Colleges	44

* Haeoreum Alliance Colleges: Ulsan (University of Ulsan and UNIST), Gyeongju (Dongguk University and Uiduk University), and Pohang (Handong Global University and POSTECH)

Mural painting in the Czech Republic

Volunteer Work in Binh Dinh, Vietnam

SPECIAL SECTION 4

Safe and Secure Environment

Expansion of Photovoltaic-powered Streetlight Installation Project

203-1, 413-1

Illuminating Safety-susceptible Regions

Utilizing its energy business, KHNP has been conducting the Photovoltaic-powered Streetlight Installation Project since 2014. This project was followed with the installation of photovoltaic-powered streetlights in regions with safety vulnerabilities, such as dark alleys and economically challenged areas. This created a great peace of mind for people traveling during the evening hours. KHNP installed 401 streetlights in seven regions in 2017 and a total of 1008 streetlights have been installed so far amid KHNP's contributing to crime prevention and the creation of a safe environment for local communities.

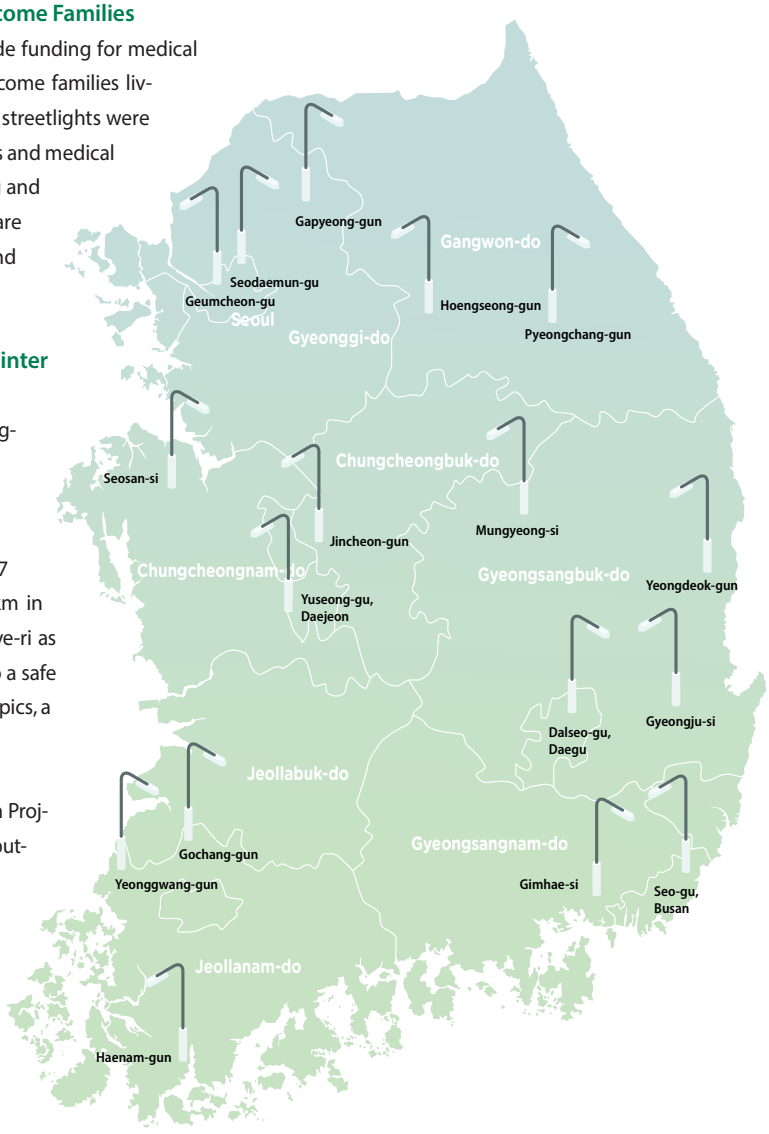
Switching on the Light of Hope for Low Income Families

KHNP is conducting the Firefly Project to provide funding for medical expenses and living expenses targeting low-income families living in the regions where photovoltaic-powered streetlights were installed. In 2017, KHNP provided living expenses and medical expenses for 394 families living in Pyeongchang and six other regions so that those residing in welfare dead zones could become more independent and contribute to society.

Switching on the Light of Safety for 2018 Winter Olympics

KHNP installed streetlights in Pyeongchang, Gangwon-do Province, to allow athletes, visitors, and local residents to see clearly during the 2018 Winter Olympics celebration. KHNP commenced the streetlight installation project in August 2017 and installed 90 streetlights along a strip of 3km in the Pyeongchang Olympic Village and Hoenggye-ri as of October. This resulted in KHNP contributing to a safe crime-free environment for the 2018 Winter Olympics, a landmark worldwide event.

The Photovoltaic-powered Streetlight Installation Project was well received thanks to its greatly contributing to the protection of the underprivileged. In 2017, KHNP was selected as the best company for crime prevention activities and earned a Presidential Prize at the "2nd Crime Prevention Awards". Through this project, KHNP has its sights set on creating a safe and harmonious society for all to enjoy.



TIMELESS INTEGRITY

Establishment of Culture of Integrity & Ethics

KHNP PERFORMANCE

Earned Presidential Prize at the 5th Day of Civil Rights in the **Anti-corruption** Sector

Selected as an organization in the **Integrity & Ethics** Sector displayed excellence

Certified for Anti-bribery Management System **ISO37001**

Obtained **Grade 1** at Anti-corruption Initiative Assessment

RELEVANT SDGs

10 REDUCED INEQUALITIES

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SUSTAINABILITY CONTEXT

Amid the governmental initiatives to eradicate corruption, the entire society is demanding complete absolution of social irregularities and corruption. As the nuclear power industry is directly related to people's lives and safety, all companies should strive to create a transparent NPP Climate by preventing corruption and irregularities, such as corruption in NPP operation and construction. KHNP, as a leader of integrity culture, is doing its best to propagate a culture of integrity and ethics throughout the entirety of the nuclear power industry.

KHNP APPROACH

In 2017, KHNP reestablished an ethical management system based on human rights and safety, which are representative social values, and practiced ethical management by guaranteeing equal opportunities for employee recruitment and treatment while taking responsibility for suppliers' safety. In addition, it improved its internal regulation system to strengthen the anti-corruption infrastructure, while expanding upon ethical management programs for suppliers. In 2017, it set up a corruption prevention system by obtaining Anti-bribery Management Systems ISO 37001. KHNP is running its businesses transparently based on internal check systems, such as internal auditing and external monitoring. KHNP, as an ethical management leader, will contribute to spreading a healthy ethical culture throughout the nuclear power industry by strengthening its will for integrity.

Ethical Management System 102-16

According to the people's demand for realization of social values, the Korean government has established a five-year anti-corruption plan and has been making efforts to spread ethical management to public enterprises. KHNP reestablished its ethical management system with additional social values and took the initiative in realizing social values based on strict public service ethics in order to practice ethical management. In addition, it set up a system of ethical management in promotion of a climate with greater integrity. Lastly, KHNP led in the realization of social values and conducted the expansion of participatory ethical management programs among suppliers who were selected as primary tasks, following the creation of an anti-corruption infrastructure.

KHNP Ethical Management System

Goal	KHNP, A Global T.O.P. Ethical Enterprise Transparency, Obligation, Partnership		
Future Direction	Leading in the realization of social values and creation of a greater climate of integrity based on strict public service ethics		
Tasks	1. Taking initiative in realizing social values based on human rights and safety	2. Establishing the best anti-corruption infrastructure among public enterprises and enhancing transparency	3. Expanding ethical management programs for suppliers

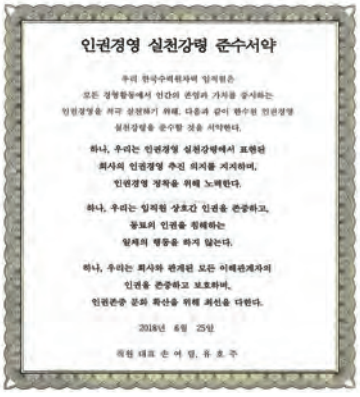
Helped **7** suppliers obtain occupational health and safety management system certifications

Taking initiative in realizing social values based on human rights and safety

In order to spread a culture that respects human rights, KHNP established a foundation for human rights management by announcing the Charter of Human Rights Management, while expanding its recruitment to be inclusive for vulnerable social groups including the disabled and women. In addition, KHNP established a general plan for a safety culture and aided suppliers in building a foundation for safety management to systematically prevent accidents at the headquarters and supplier locations. In 2017, an additional 50 people with disabilities and persons of distinguished service to the State were employed, in comparison with last year, totaling 96 people. It also increased female employees by 22.2%. KHNP provided consulting services and assessment expenses for suppliers with over 20 employees in order to help them establish an occupational health and safety management system.

Establishment of a Foundation for Human Rights and Safety

Classification	Description	Performances
Establishment of a foundation for human rights management	Declaring the Charter of Human Rights Management Pledging to respect human rights	Employed more people with disabilities and persons of distinguished service to the State 2016: 46.5 people → 2017: 96 people Increase of female employees 2016: 17% → 2017: 22.2%
Improvement in safety culture	Establishing a general plan for improving safety culture	Provided consulting service and initial assessment expenses for seven companies for their occupational health and safety management system certification



Declaration Ceremony for the Practical Principle for Human Rights Management

Establishment of Anti-corruption Infrastructure and Continuous Improvement 205-1

Identified **74** corruption risk factors and established plans for improvement

Anti-bribery Management Systems (ISO 37001) Certification

KHNP previously focused on corruption management education and corruption exposure for anti-corruption activities. However, in order to effectively prevent corruption and irregularities in advance, it decided to work on the Anti-bribery Management Systems (ISO 37001) Certification. Certification procedures required the KHNP to author an anti-corruption management manual, as well as to establish a corruption risk evaluation procedure, and discovered a total of 74 risk factors by evaluating the corruption risks of each department. After establishing an improvement plan for each risk and completing improvements, it obtained the ISO 37001 Certification, before going on to establish an infrastructure for the regular monitoring of corruption risks.

ISO 37001 Certification Process

Schedule	Description
August 2017	• Prepared an anti-corruption management manual • Developed a corruption risk evaluation procedure • Provided ISO 37001 corruption risk evaluation training
September to October, 2017	• Conducted a corruption risk evaluation on each department • Established improvement plans for high risk factors • Provided internal auditor training education for ISO 37001 • Conducted cross assessment between departments (offices)
November 2017	• Completed first screening of ISO 37001 • Completed second screening of ISO 37001

Achieved "Error-free" Management Information Disclosure at the Integrated Information Disclosure Inspection

Transparent Disclosure

KHNP should strengthen transparent disclosure in order to fulfill stakeholders' right to know and ensure management transparency by providing significant management information. KHNP disclosed information faithfully by innovating its information disclosure process and developing information disclosure of personnel competency. In order to enhance the information disclosure process, KHNP assigned a responsible department to each disclosure item on a one-to-one basis so that each department could take the responsibility for information disclosure. In addition, it strengthened information disclosure personnel's competencies by sharing disclosure error cases. As a result, KHNP achieved Error-free Management Information Disclosure proving its faithful disclosure during the 2017 Integrated Information Disclosure Inspection on Public Organizations conducted by the Ministry of Economy and Finance.

Improvement in Internal Regulations and Systems

KHNP improved anti-corruption infrastructure for internal regulations and systems in the fields of auditing, recruitment, and contracting as a means of the prevention of ethical risks during the work operations. An anti-corruption management manual was also established per step of operations to optimize the auditing system, and the necessary action was conducted for the identified 74 risks following the systematic evaluation of corruption risks of primary work operations. In addition, KHNP prepared a recruitment manual for fair hiring and recruited employees transparently in order to prevent any irregular practices during the hiring process. The impartiality of contracts was also promoted in pursuit of the recording and disclosure during contractual deliberations after having formulated the Contract Committee comprised of external members occupying the majority of the committee.

Improvement and Performance of Auditing, Recruitment, Contract Regulations and Systems

Classification	Summary	Performances
Audit	• Established an anti-corruption management manual per step of work operations • Conducted corruption risk evaluation and performed necessary action for 74 risks	Certified for Anti-bribery Management Systems
Recruitment	• Prepared a recruitment manual for work standardization and hiring transparency	No hiring corruption pointed out by the Board of Audit and Inspection of Korea
Contract	• Reinforced internal control and optimized transparency by establishing an integrated objection system • Formed the Contract Committee with external members accounting for a majority of the committee, and recorded and disclosed the contract deliberation process	Increased Anti-corruption and Civil Rights Commission's external integrity index 2016: 8.86 points→ 2017: 8.92 points

Ethical Management Program Based on Communication, Empathy, and Participation 205-2

Production of Ethical Management Sitcom with Suppliers

The KHNP encourages private suppliers, currently not obligated to receive ethics training, to participate in ethical management programs to fortify the integrity of the supply chain network. KHNP produced a sitcom with suppliers under the theme of integrity, safety, and security so that they can communicate and empathize about ethical issues. It collected on-site opinions about integrity and safety ethics through an interview and prepared a scenario with suppliers that reflected their opinions. KHNP distributed the sitcom consisting of 12 episodes to about 90 suppliers and posted it up on its web portal so as to raise ethics awareness among suppliers.

Production of Sitcom with Suppliers

Satisfaction with 2017 KHNP-BEX ethical management education and communication

88 points

Ethics Education

KHNP is providing customized ethical education that reflects the employee job life cycle and ethical education groups. Employees are categorized into new employees, 3rd level or under staff, 2nd level or higher staff, and management. KHNP provides each group's employees with education on the basic mindset of officials, how to handle corruption, integrity for highly-ranked public officials, and integrity leadership. In addition, it designated additional targets whose sense of ethics should be strengthened, including areas and suppliers susceptible to corruption, as well as persons involved in the act of corruption, while providing education in promotion of a higher ethics awareness.

Introduction of Job Life Cycle-Customized Educational Contents

Target	New employees	3rd level or under staff	2nd level or higher staff	Management
Education description	Basic mindset of officials Compliance with Code of Ethics, etc.	How to handle corruption cases using ethical norms, etc.	Sharing of integrity policy goals Integrity for highly-ranked public officials	Integrity leadership and leading by example, etc.
Required training hours	Completion of over 2 hours of training for new employees	Completion of over 2 hours per year	Completion of over 5 hours per year	Completion of over 2 hours per year

Customized Education on Management Integrity to Strengthen Ethics Awareness

Category	Program	Target	Description
Offline	Integrity training for employees susceptible to corruption	Employees working in a certain field	Special education for employees working in the fields susceptible to corruption, such as HR, accounting, budget, contract, etc.
	Win-win growth academy	Suppliers	Include integrity management education in occupational training programs for suppliers
	Education by specialized agency	Persons involved in the act of corruption	Mandate those who are disciplined as a result of the act of corruption to take "Integrity Culture Education"
Online	Integrity cyber education	All employees	"Understanding of Improper Solicitation and Graft Act "(Required / 3 hours) "Whistleblowing" (Permanent / 8 hours)

Operation and Performance of Internal Check Systems 102-17

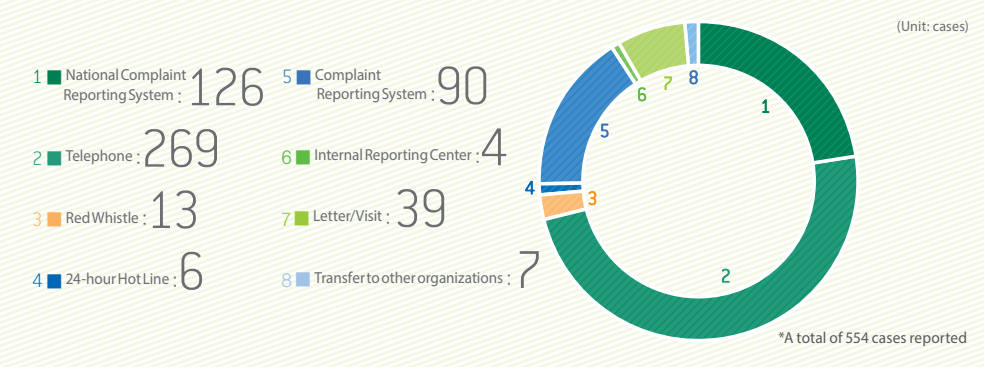
Strengthened Internal Auditing and External Monitoring

Companies should enhance management transparency and their corporate values by auditing the entire management processes and accounting records. KHNP made efforts to improve the professionalism and independence of internal auditing and strengthened its internal check systems by operating a meeting group consisting of out-house specialists. The best of auditing personnel are selected through an impartial auditor recruitment system in order to enhance the professionalism of internal auditing. KHNP also provides 100% coverage for expenditures required for the acquisition of auditing licenses. Out-house specialists participate in the Audit Result Deliberation Committee to promote uninterfered, independent auditing. In addition, the KHNP bolsters auditing quality by operating external monitoring groups, including the KHNP Ombudsman and Auditing Advisory Committee.

Unethical Act Whistleblowing Systems 205-3

KHNP is operating unethical act whistleblowing systems in order to swiftly handle employee law violations, wrongful acts, and sexual harassment while also serving as a means of prevention. In addition to Red Whistle, which is an external whistleblowing system, the KHNP is utilizing a variety of internal and external whistleblowing systems that go on to include Executive Auditors' Hot Line, 24-hour Hot Line, Complaint Reporting System, Internal Reporting Center, National Complaint Reporting System, Letter/Visit, etc. In 2017, a total of 554 cases were reported through various reporting channels, among which 29 requests for disciplinary action were followed up upon against 47 employees.

Reporting Channels



Internal and External Evaluations on Ethical Management

The Anti-corruption & Civil Rights Commission (ACRC) is conducting an anti-corruption initiative assessment in order to effectively improve public organizations' anti-corruption competencies by evaluating their efforts to eradicate corruption. Following KHNP's efforts to innovate anti-corruption management and promote a culture of integrity, it has received the highest grade of the ACRC Anti-corruption Initiative Assessment for three consecutive years. In addition, KHNP was recognized as one of the best public enterprises of integrity with the earning of the highest grade among public enterprises with over 3,000 employees at the ACRC integrity assessment. Sharing the assessment results with the entire company, KHNP will strengthen its internal auditing, vitalize the reporting channels, and expand integrity education for zero violation of the Improper Solicitation and Graft Act.

Internal and External Evaluations on Ethical Management

Classification	2015	2016	2017	Performances
ACRC Anti-corruption Initiative Assessment	Grade 1	Grade 1	Grade 1	Received the highest grade for three consecutive years
ACRC Integrity Assessment	Grade 2	Grade 1	Grade 2	Received the highest grade among public enterprises with over 3,000 employees
KHNP-BEX (KHNP's self-diagnosis index for ethical management)	85.6	86.9	87.7	Showing rising trend over three consecutive years

SPECIAL SECTION 5

Watch, Listen, Understand, and Empathize

Ethical Education Play for KHNP Employees and Suppliers 205-2

Raising Employees' Ethics Awareness with Stakeholders

As part of the ethical management plan, KHNP operates the ethical education play program for all employees of KHNP and its suppliers. KHNP focuses on delivering a meaningful message to employees through a play, instead of using cramming education. This program was first introduced in 2015 in promotion of employee ethics awareness and since 2016, KHNP has been developing KHNP-customized scenarios to win sympathy from employees.

Reflecting on the Meaning of Ethics

In 2017, KHNP presented an ethical education play titled, "On Your Mark," that covered the meaning of employees' work and their sense of duty, as well as integrity. The play is about the story of a new employee named Han Su-yeon that delivers a message to all employees, standing together as one family, friends, and guardians of things we hold dear, that everyone should strive to promote safe NPP operation based on strong ethics awareness.

Experiencing the Fun Side of Ethics

The play tells about KHNP employees' concerns and difficulties in an insightful way, which was able to relate with employees while also communicating a positive message. KHNP looks to improve employee satisfaction with integrity training and its educational influence by introducing various forms of performances that go beyond plays to include musicals and other genre performances.

"KHNP is generating 30% of domestic electricity.
We are elite specialists when it comes to the perhaps hazardous, yet necessary, field of nuclear power.
We are all good people striving to make the world better.
Everyone, give yourselves a round of applause."

- On Your Mark

SECTION 03

SUSTAINABLE FUNDAMENTALS

Sound Corporate Governance

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

Composition of Board of Directors

102-18, 102-22

The Board of Directors is KHNP's supreme decision-making body with a right of supervision and performs both a review of major management strategies, while supervising overall business operations. As of August 2018, the BOD of KHNP consists of a total of 13 directors, including six executive directors and seven non-executive directors. Among them, one executive auditor and two non-executive auditors are working for the Audit Committee. The board 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, which encourages responsible decision-making. KHNP ensures the independence of the board by electing the chairperson among non-executive directors. In addition, non-executive directors make up a majority of the board in accordance with pertinent regulations.

Board of Directors

(As of August 2018)

Name	Affiliation and position	Term	Classification
Chung Jae-hoon	Head of Organization (President & CEO)	- Apr. 4, 2021	Executive Directors
Nam Joo-sung	Executive Auditor	- Jan. 16, 2019	
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	- Jan. 10, 2019	
Lee Jae-dong	Director of Safety, Quality and Technology Division	- Jun. 5, 2020	
Lee Yong-hi	Director of Construction Division	- Jan. 10, 2019	
Lee Sang-jick	Former researcher at Korea Institute for Industrial Economics & Trade	- Sep. 28, 2018	Non-executive Directors
Seo Joung-hae	Current professor at College of Economics & Business Administration, Kyungpook National University	- Sep. 28, 2018	
Kwon Hae-sang	Former Diplomat of OECD Korean Delegation	- Feb. 21, 2019	
Kim Kyu-ho	Acting Graduate School President of Gyeongju University	- May 9, 2020	
Kim Hae-chang	Current professor at College of Environmental Science, Kyungpook National University	- May 9, 2020	
Kang Rae-gu	Acting President of Conference of Regional Chairpersons outside the Assembly, Democratic Party of Korea	- May 9, 2020	
(Vacant)	-		

Board of Directors Performances

Classification	2015	2016	2017
No. of meetings	9	11	13
Agendas resolved	58	48	52
Agendas reported	13	14	17
Preliminary deliberation rate	100%	100%	100%
Non-executive directors' participation rate	90.5%	92.2%	94.5%

Composition and Activities of Subcommittees

102-22

Subcommittees deliberate agendas and help promote the board of directors' operational efficiency by assigning executive and non-executive directors to proper fields. The KHNP's board has three subcommittees, all of which aided in the board's operational efficiency by expanding upon non-executive director management consulting and support.

Introduction and Activities of Subcommittees

Classification	Composition	Role	Major activities in 2017
Audit Committee	1 Executive 2 Non-executives	Audit of business and accounting	• Held six meetings to deliberate agendas - Established an annual audit plan and reported self-audit results
Executive Recommendation Committee	4 Non-executives 2 Out-house specialists	Recommendation of candidates for executives	• Held two meetings - Assessed candidates for non-executive directors whose term had expired
Non-executive Directors Committee	7 Non-executives	Discussion of board operation	• Discussed how to promote the board activities and improve operational efficiency by holding regular video conferences

Impartial and Transparent Appointment

102-23, 102-24

The Executive Recommendation Committee is composed of non-executive directors and out-house specialists to ensure transparency. The Committee selects professionals in relevant fields who have no conflicts of interest with KHNP and recommends these candidates for positions as CEO, executive auditor, and non-executive directors. The CEO is appointed by the President upon the resolution of the General Meeting of Shareholders and the request of the Minister of Trade, Industry and Energy. The executive auditor is also appointed by the President upon the resolution of the General Meeting of Shareholders and the request of the Minister of Economy and Finance. Non-executive directors are appointed by the Minister of Economy and Finance, while executive directors are appointed by the CEO at the General Meeting of Shareholders with no separate procedure for recommendation.

Non-executive Directors' Capacity-building Programs

- Visit to NPP facilities
  April 4-5, 2017 / Wolsong Nuclear Power Site, Gyeongju Radioactive Waste Plant / Six non-executive directors in attendance
- Visit to Wolsong Disaster Drill May 31, 2017 / Vicinity of Power Plant 2 of Wolsong Nuclear Power Site / Two non-executive directors in attendance

Non-executive Directors' Professionalism and Communication

As non-executive directors check and monitor management activities, they should actively communicate with stakeholders with professionalism. KHNP received monitoring and consultation on major issues relating to corporate operation from seven non-executive directors who account for the majority of the board and possess seasoned experience in the fields of industry, business operation, press, and local communities. Non-executive directors are invited to domestic and overseas power plants and capacity-building programs so that they can develop their expertise in the nuclear power business.

Sustainable Decision-making

102-33, 102-34

The Board of Director prioritizes sustainability issues as agendas and performs decision-making processes based upon sustainability. In 2017, KHNP resolved major issues relating to safety, energy, local communities, and economic performances.

Sustainability-focused Decision-making

Date	Sustainability issue	Description	Performances
03.2017	Secured of movable facilities in preparation for extreme disasters (proposal)	Secured emergency response capacity in early stages and improved public confidence	Planned to secure additional 21 movable generator cars and 27 movable pumps
03.2017	General plan for construction of photovoltaic power facilities in Samnangjin Pumped-storage Plants (proposal)	Increased supply of new and renewable energy	Commenced construction of 7MW photovoltaic power plant
08.2017	Happiness Wings Home Makeover Project Plan (proposal)	Repaired houses of low-income bracket families to enhance quality of life	Eliminated roofs containing carcinogens throughout four local communities
12.2017	Joint R&D project with six Haeoreum alliance colleges (proposal)	Led joint R&D of nuclear power and provided opportunity for talent development	Opened Haeoreum Alliance Nuclear Power Innovation Center in the main college among six colleges in Gyeongsangnam-do and provided financial support for three years

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 Meeting of Shareholders. The total remuneration of the directors in 2017 is approximately KRW 120,078 and the remuneration for each director is dependent on a regular executive performance evaluation. The kind, basis, and total amount of remuneration of executive directors receiving remuneration above criteria are disclosed separately to ensure transparency.

Directors' Remuneration

(Unit: KRW 10,000)

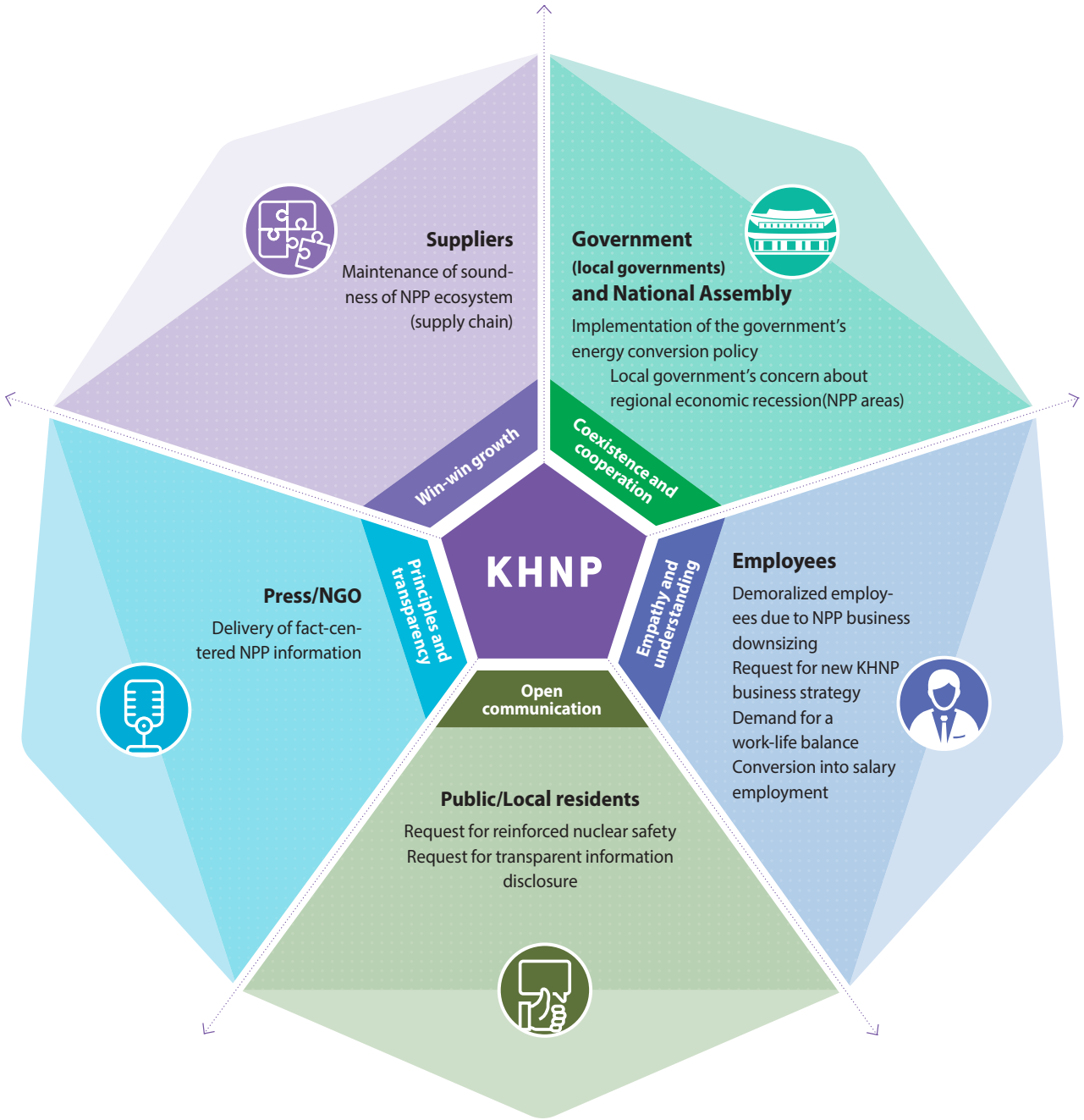
	No. of people	Total remuneration	Average remuneration per director	Notes
Head of Organization	1	17,485	17,485	Including bonus
Executive Directors	5	81,593	16,318	Including bonus
Non-executive Directors	7	21,000	3,000	KRW 2.5 million per month for service allowance

Communi-cation with Stakeholders

102-40, 102-41, 102-43, 102-44

Stakeholders refer to those affecting an organization's decision-making or are affected by its business activities. Companies should, therefore, communicate with stakeholders to collect and incorporate their various opinions into management strategies and corporate operations. The KHNP practices sustainable management by communicating with stakeholders via various channels and reflecting their interests in management.

Establishment of Strategy for Communication with Stakeholders



Stakeholders	Communication channel	Interests	Communication performances
 • Employees and Labor Union • Female employees • Non-salary employment	• Labor-Management Council, Corporate workshop • CEO-Female employees meeting • Labor-Management-Government Council, Committee for Conversion to salary employment	• Proposed strategy and vision for future corporate growth in response to employee concerns about NPP reduction • Improving working environment to reduce childcare burden • Improving the working environment and conditions of temporary workers	• Proposed vision to become an integrated energy leader • Operated Sexual Harassment Counseling Center, Operated Gender Equality Committee • Determined to convert 32 of 295 temporary staff into salary staff
 • Government (local governments) • National Assembly	• Explanations about issues, Parliamentary review • Public organization workshop and meeting of heads of relevant organizations	• Responding to and communicating about NPP issues, Close cooperation, Expanding information disclosure, Improving disaster safety and management system, NPP technology information	• Activated bilateral online communication channels, Conducted campaigns in association with national safety and core values • Responded to Shin-Kori 5 and 6 construction
 • Suppliers of Shin-Kori 5 and 6 construction • Business partners of operating NPPs	• Emergency meeting and practical consultative group of suppliers • Suppliers questionnaire about nuclear power supply chain, Online communication channel between CEO and suppliers	• Compensating suppliers for losses resulting from construction suspension, Maintaining on-site management personnel and construction sites • Quality and technical support to maintain the supply chain, Alleviating business difficulties arising from NPP reduction	• Determined suppliers compensation for the discussion period in cooperation with the National Assembly, Supported emergency liquidity of construction suspension for suppliers • Helped suppliers develop overseas markets utilizing Korea Nuclear Partners in response to shrinking domestic market
 • Local residents • The Public	• Regional Development Council, NPP Communication Committee, Committee for Win-win Growth with Local Communities, Nuclear Safety Council • SNS including National Suggestion Bulletin Board and Safety Experience Centers	• Creating quality local jobs, Strengthening nuclear safety, Increasing local residents' income and revitalizing regional economies • Delivering easy-to-understand NPP information, Fortifying nuclear safety to ease public concerns	• Invited NPP business partners to Gyeongju through of Business Transfer Center, Founded Naa Cooperative Union for local residents, Completed construction of greenhouses utilizing heated effluents • Q&A Bulletin Board in association with local government's website, Established a plan for a NPP construction civic inspection group, Strengthened seismic performance of NPPs in operation and under construction
 • NGOs • Press	• Nuclear Power Academy, Safety Communication Committee • Discussion, Forum, PR Media Center	• Disclosing NPP information, if possible, in an expedient, transparent manner and verifying information objectively, Broadening the scope of disclosure	• First disclosed power plant licensing documents online, Opened KHNP Information Reliability Center • Provided correct NPP information, Opened the website of technology and safety information, Opened Kori 1 completely

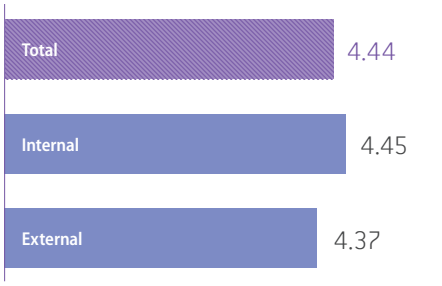
Core Sustainability Management Issues

KHNP is pursuing sustainable growth by communicating with stakeholders and incorporating their opinions in management. KHNP conducted a materiality assessment to satisfy stakeholder curiosity about major issues through this sustainability report and selected core issues closely related to the energy industry, in which stakeholders expressed a high interest. Through a questionnaire survey on the awareness of sustainability management conducted in August 2018, the KHNP collected opinions from 563 internal stakeholders and 98 external stakeholders about KHNP's social responsibility, sustainable development goals, and creation of social values.

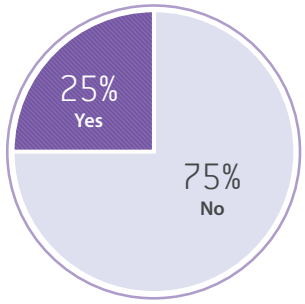
Questionnaire Survey on Awareness of Sustainability Management

Do you think KHNP is a public organization that fully carries out its environmental and social responsibilities while developing its business?

(Unit: points out of 5)

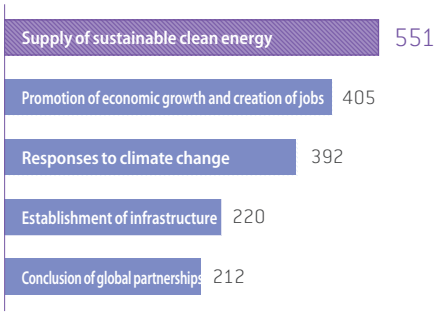


Are you aware that KHNP publishes a sustainability report consisting of its performances in creating economic, social, and environmental values?



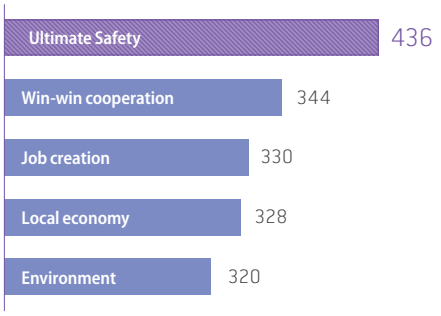
What kinds of UN SDGs do you think the KHNP can effectively contribute to?

(Unit: No. of people)



Which sector of social values do you think KHNP can create effectively?

(Unit: No. of people)

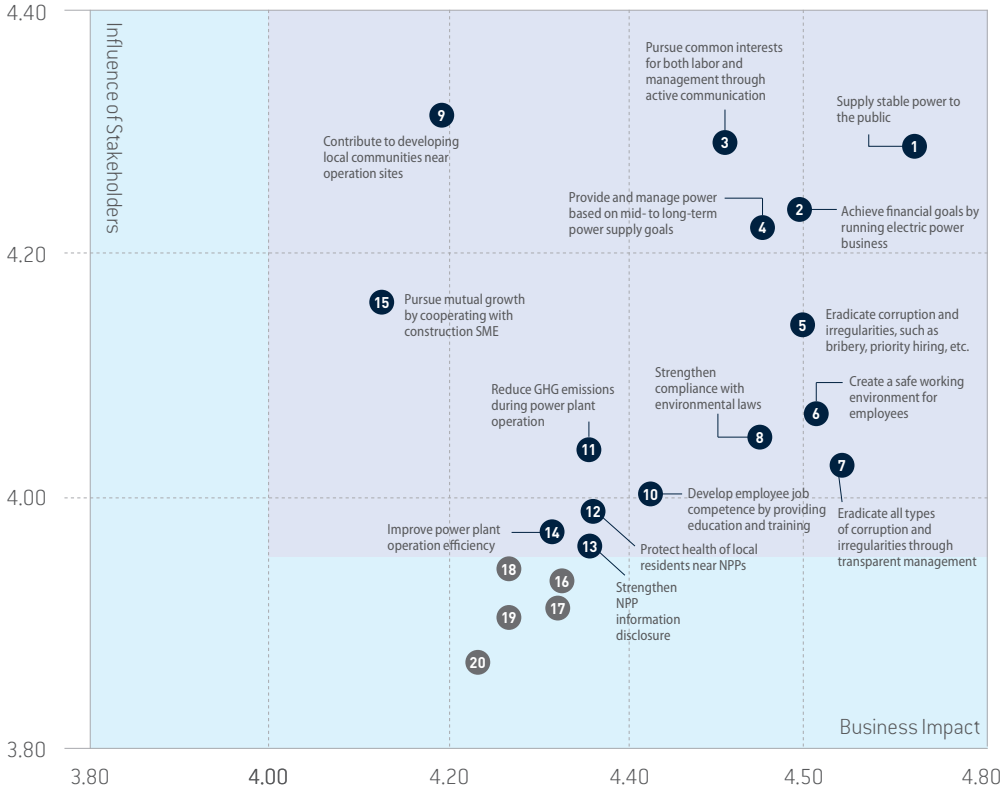


Materiality Assessment

STEP 1 Form a sustainability management issue pool	STEP 2 Conduct a materiality assessment Media analysis + Benchmarking + Questionnaire survey	STEP 3 Determine core reporting issues
An issue pool of 30 sustainability management issues was created that covered economic, environmental, and social areas through a comprehensive analysis on previous reports and media, corporate benchmarking, GRI standards, and energy industry issues.	The significance of 30 issues was identified based on the results of a medial analysis, corporate benchmarking, and stakeholders' questionnaire survey. A total of 661 internal and external stakeholders answered the questionnaire survey.	Based on the results of the materiality assessment, the importance of each issue was identified, mapping the top 15 core issues.

Sustainability Management Issues

102-46, 102-47, 102-49

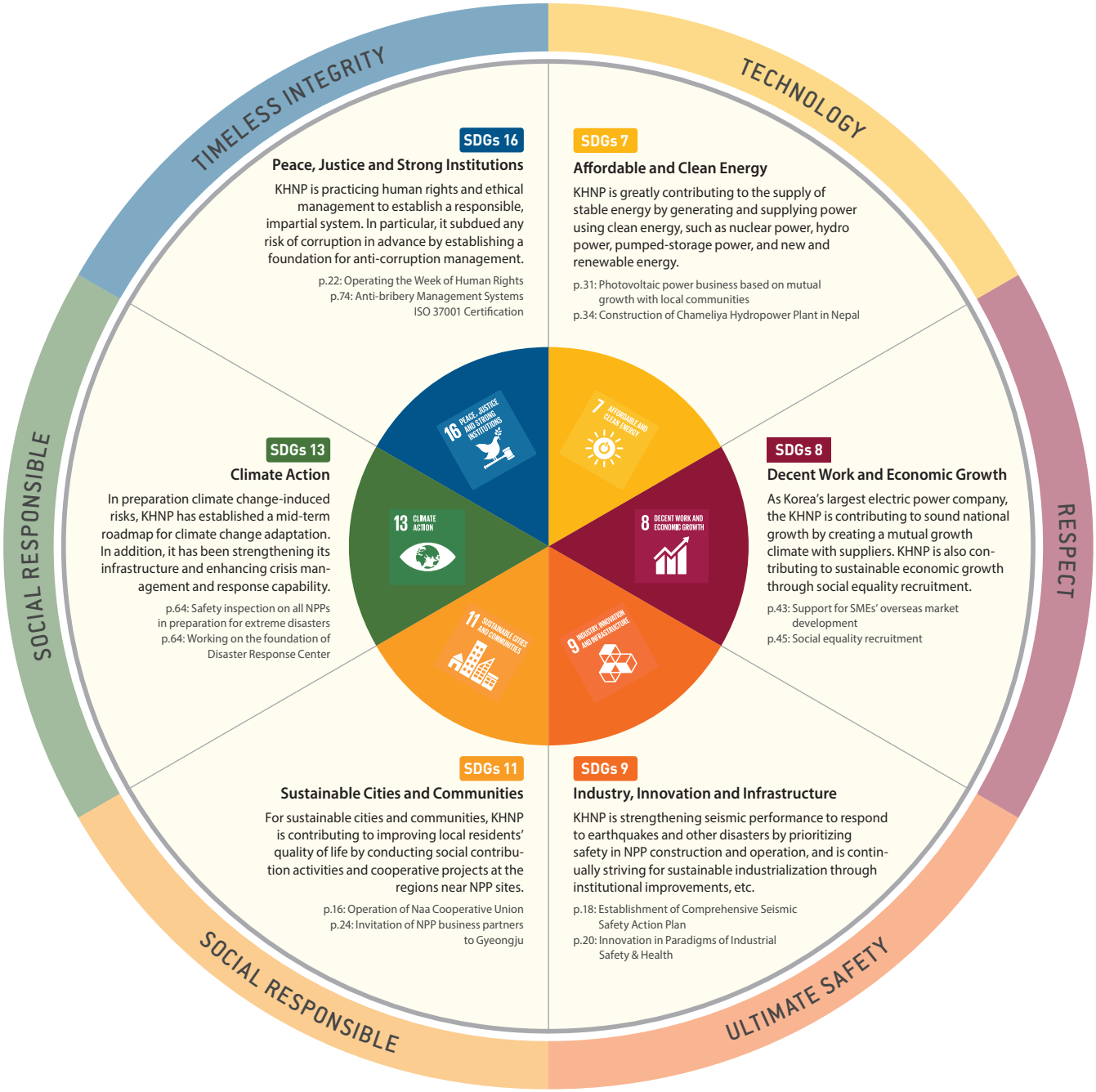


Core values	Core theme of sustainability	Core issue	GRI standards	Relation to UN SDGs	Page
Technology	Securing of Future Growth Engines	①②	201-1, 201-2		30~35
	Development of Top Global Energy Technology	⑭	201-1		36~39
Respect	Win-win Cooperation with Suppliers	⑮	204-1		40~43
	People-centered Corporate Culture	③⑩	402-1, 404-2		44~47
Ultimate Safety	Safety-centered NPP Operation	⑥⑫⑬	403-2, 416-1, 417-1		48~53
	Construction of Safe NPPs	④	416-1		54~57
Social Responsibility	Minimization of Environmental Impacts	⑧⑪	305-5, 307-1		58~65
	Happy Growth with Local Communities	⑨	413-1		66~71
Timeless Integrity	Establishment of Culture of Integrity & Ethics	⑤⑦	102-17, 205-2		72~77

Implementation of UN Sustainable Development Goals(SDGs)

102-12

The Sustainable Development Goals (SDGs) are 17 goals and 169 targets set by the United Nations aimed at responding to economic, environmental, and social issues around the globe. The SDGs should be achieved by the international communities together from 2016 to 2030. KHNP is actively participating in achieving the SDGs to bolster its sustainability. Most notably, it is responsibly implementing the six SDGs drawn from the five core values of KHNP's sustainability management.



SDGs 16

Peace, Justice and Strong Institutions

KHNP is practicing human rights and ethical management to establish a responsible, impartial system. In particular, it subdued any risk of corruption in advance by establishing a foundation for anti-corruption management.

p.22: Operating the Week of Human Rights
p.74: Anti-bribery Management Systems ISO 37001 Certification

SDGs 7

Affordable and Clean Energy

KHNP is greatly contributing to the supply of stable energy by generating and supplying power using clean energy, such as nuclear power, hydro power, pumped-storage power, and new and renewable energy.

p.31: Photovoltaic power business based on mutual growth with local communities
p.34: Construction of Chameliya Hydropower Plant in Nepal

SDGs 13

Climate Action

In preparation climate change-induced risks, KHNP has established a mid-term roadmap for climate change adaptation. In addition, it has been strengthening its infrastructure and enhancing crisis management and response capability.

p.64: Safety inspection on all NPPs in preparation for extreme disasters
p.64: Working on the foundation of Disaster Response Center

SDGs 8

Decent Work and Economic Growth

As Korea's largest electric power company, the KHNP is contributing to sound national growth by creating a mutual growth climate with suppliers. KHNP is also contributing to sustainable economic growth through social equality recruitment.

p.43: Support for SMEs' overseas market development
p.45: Social equality recruitment

SDGs 11

Sustainable Cities and Communities

For sustainable cities and communities, KHNP is contributing to improving local residents' quality of life by conducting social contribution activities and cooperative projects at the regions near NPP sites.

p.16: Operation of Naa Cooperative Union
p.24: Invitation of NPP business partners to Gyeongju

SDGs 9

Industry, Innovation and Infrastructure

KHNP is strengthening seismic performance to respond to earthquakes and other disasters by prioritizing safety in NPP construction and operation, and is continually striving for sustainable industrialization through institutional improvements, etc.

p.18: Establishment of Comprehensive Seismic Safety Action Plan
p.20: Innovation in Paradigms of Industrial Safety & Health

"UN SDGs are the common goals of all mankind to solve global social issues."

In order to respond to sustainable development, the biggest challenge of the international community, many companies are utilizing the SDGs as a frame for the establishment, communication, and reporting of corporate strategies and activities. The UN Global Compact (UNGC), as an initiative helping corporate sustainability, is encouraging companies to incorporate the global principles of human rights, labor, environment, and anti-corruption into corporate strategies and operation and implement the SDGs. About 13,000 companies from 160 countries are members of the UNGC, while in Korea, 260 companies are participating in the SDGs.

"I highly regard KHNP's sustainable development based on the six SDGs."

As an electric power company, KHNP is contributing to the development of the national economy and enhancing the people's quality of life. Its key businesses are closely-related to SDGs. In particular, KHNP's effort to grow as an energy leader by increasing new and renewable energy is a great step toward achieving its goal of supplying sustainable energy. Additionally, KHNP contributed to regional economic revitalization by supporting cooperative unions and inviting NPP business partners, as part of its efforts for mutual growth with local communities following the relocation of the Headquarters to Gyeongju. The continuous strides toward creating a sustainable local community can be deemed an excellent example of the achievement of the SDGs.

"I hope KHNP becomes a global energy leader by strengthening its sustainability values."

Since KHNP joined the UNGC in 2007, it has been managing major economic, environmental, and social issues relating to its key businesses grounded in communication with stakeholders. I hope that the KHNP becomes the global standard in responsible global energy leadership by setting detailed and measurable sustainability within necessary time constraints and strengthening its value in sustainability.

Park Suk-bum, UN Global Compact Network Korea Secretary General

SECTION 04

APPENDIX

Sustainability Performances

Economy

Financial Performances (Year on year) 201-1

Economic Performances

(Unit: KRW 100 million)

Classification	2015	2016	2017
Sales	107,470	112,771	95,109
Operating income	37,917	38,472	13,972
Net income	24,571	24,721	8,618

Financial Position

(Unit: KRW 100 million)

Classification	2015	2016	2017
Assets			
Current assets	55,650	60,632	57,693
Non-current assets	456,878	469,593	494,634
Total assets	512,528	530,225	552,327
Liabilities			
Current liabilities	27,502	31,882	27,339
Non-current liabilities	248,737	243,897	267,116
Total liabilities	276,239	275,779	294,455
Equity			
Paid-in capital	107,045	107,045	107,045
Surplus	129,680	147,401	150,844
Other equity	-668	-367	-396
Total equity	236,289	254,446	257,872

Investment in R&D

Classification	Unit	2015	2016	2017
Investment in R&D	KRW 100 million	3,841	5,057	4,945
R&D against net sales	%	4.04	4.64	4.71

Distribution of Economic Value 201-1

Classification	Unit	2015	2016	2017
Government - Corporate tax payment (government subsidy)	KRW 100 million	8,038	7,155	2,798
Employees - Avg. compensation per employee	KRW 1 thousand	80,746	88,920	88,849
Local communities - Social contribution expenses: Dandelion Spore Fund	KRW 100 million	100	142	208.5
Suppliers - Subsidies for small and medium-sized enterprises	KRW 10 million	302	512	547

Financial Stability

Financial Information

(Unit: KRW 100 million)

Classification	Unit	2015	2016	2017
Interest coverage rate	Multiples	6.98	7.94	2.82
Reliance on borrowings	%	18.96	16.49	15.93
Financial information	%	116.9	108.4	114.2
Total assets turnover rate	%	44.131	43.973	36.818

Credit Rating

Classification	Organization	2015	2016	2017
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

Classification	Unit	2015	2016	2017
NPP usage	%	85.3	79.7	71.2
No. of unplanned auto-stops	Cases (cases/unit)	3(0.13)	4(0.16)	1(0.04)
Power sales	100 million kWh	1,614.89	1,588.10	1464.09
Investment in NPP construction	KRW 100 million	24,039	21,897	16,342

Environment

Major Environmental Performances

Energy Consumption by Business Site 302-1

(Unit: 10TJ)

Classification	2015	2016	2017
Nuclear power sites	1,425	1,611	1,711
Pumped-storage plants	4,641	4,834	5,268
Hydropower plants	6	6	7
Other special business units	16	23	23
Total	6,088	6,174	7,008

Energy Consumption in 2017 302-1

(Unit: 10TJ)

Classification	2015	2016	2017
Fuel	50	72	26
Electricity	6,038	6,102	6,982
Steam	-	0	0
Total	6,088	6,174	7,008

Water Consumption 303-1

(Unit: 1,000 tons)

Classification	2015	2016	2017
Underground water	56	40	75
Industrial water	2,368	1,877	1,893
Water supply	827	819	330
Surface water	4,828	4,977	4,512
Total water consumption	8,079	7,714	6,810

Greenhouse Emissions by Business Site 305-1, 305-2

(Unit: 1,000tCO2eq)

Classification	2015	2016	2017
Nuclear power sites	731	839	872
Pumped-storage plants	2,256	2,203	2,560
Hydropower plants	3	3	3
Other special business units	8	12	10
Total	2,998	3,057	3,445

Direct/Indirect GHG Emissions 305-1, 305-2

(Unit: 1,000tCO2eq)

Classification	2015	2016	2017
Scope 1	65	94	54
Scope 2	2,933	2,963	3,391
Total emissions	2,998	3,057	3,445

Waste Treatment 306-2

(Unit: tons)

Classification	2015	2016	2017
Recycling	6,854	7,273	7,048
Incineration	936	1,020	1,360
Landfill	2,990	3,557	2,597
Others	0	3	53
Total waste amount	10,780	11,854	11,059

Green Product Purchase

(Unit: KRW 1 thousand)

Classification	2015	2016	2017
Total purchase	24,213,830	21,652,902	28,394,883
Purchase of green products	22,688,359	19,635,397	27,021,028
Green product purchase ratio (%)	93.7	90.7	95.2

Eco-friendly Power Generation Plan

(Unit: GWh)

Classification		2015	2016	2017
Mandatory supply [A]		2,882	2,915	2,915
Carry-over [B]		560	447	450
Implementation performance	Photovoltaic	383	80	87
	Hydro	819	950	908
	Fuel cell	668	1,022	950
	Wind	-	-	-
	Geothermal	-	-	-
	Biomass	-	-	-
	External purchase	1,130	1,056	1,100
	Total [C]	3,000	3,108	3,045
Implementation performance for the year [D=C-B]		2,440	2,661	2,595
Implementation rate [E=D/A](%)		84.7	91.2	89

Sustainability Performances

Society

Human Resources and Recruitment

102-8, 401-1, 405-1

(Unit: No. of people)

Classification		2015	2016	2017
Total		10,842	11,507	11,870
Gender				
Male		9,640	10,218	10,474
Female		1,202	1,289	1,396
Female employee ratio (%)		11	11	12
Age group				
20s		1,773	2,047	2,109
30s		3,725	3,805	3,857
40s		3,188	3,220	3,335
50s & older		2,156	2,435	2,569
Region				
Korea		10,299	10,806	10,927
Overseas		543	701	943
Business site				
Headquarters		1,245	1,363	1,357
Nuclear power sites		7,594	7,884	7,965
Hydropower & Pumped-storage		773	809	803
Other sites		1,230	1,451	1,745
By rank				
Executive	Total	6	6	6
	Male	6	6	6
	Female	-	-	-
1st level position	Total	185	182	181
	Male	185	182	181
	Female	-	-	-
2nd level position	Total	742	756	771
	Male	734	747	758
	Female	8	9	13
3rd level position	Total	2,684	2,723	2,795
	Male	2,604	2,639	2,701
	Female	80	84	94
4th level position	Total	6,157	6,439	6,563
	Male	5,313	5,548	5,600
	Female	844	891	963
Others	Total	1,068	1,401	1,554
	Male	798	1,096	1,228
	Female	270	305	326

(Unit: No. of people)

Classification		2015	2016	2017
Employment type				
Salary employment	Total	10,836	11,501	11,864
Permanent contract employment	Total	37	45	49
Non-salary employment	Total	254	217	234
Disabled employees				
No. of disabled employees		1,209	1,289	399
Rate of disabled employees (%)		3.1	3.1	3.27
Employment and retirement				
New employees	Total	1,369	821	602.5
	Male	1,109	682	469
	Female	260	139	133.5
Regular retirement	Total	220	0	60
Voluntary retirement	Total	6	30	32
Turnover and retirement	Total	5	12	7
	Male	4	11	5
	Female	1	1	2

Flexible Work Hours

(Unit: No. of people)

Classification		2015	2016	2017
Alternative work schedule system		89	133	136
Flex time type		3,351	6,116	3,770
Flexible working system	Flexible working time	68	2,364	2,688
	Compressed work time	-	52	82
Total number of employees			8,665	6,676

Industrial safety and health

403-2

Classification	Unit	2015	2016	2017
No. of severe disasters	Cases	0	0	3
Nuclear industrial disaster rate	%	2.17	1.38	0.92

Employee Training 404-1, 412-2

Classification		Unit	2016	2017
Total No. of trainees	Total	No. of people	23,311	23,316	23,466
	Male	No. of people	21,144	21,200	21,152
	Female	No. of people	2,167	2,116	2,314
Total education hours	Total	Hours	2,132,955	2,201,458	1,709,771
	Male	Hours	1,934,675	2,001,668	1,541,169
	Female	Hours	198,280	199,789	168,602
Total training expenditure (distribution based upon proportions of male and female employees)	Total	KRW 100 million	380	422	584
	Male	KRW 100 million	344.7	383.7	526
	Female	KRW 100 million	35.3	38.3	58
Total cases of training (distribution based upon proportions of male and female employees)	Total	Cases	1,200	1,383	1,416
	Male	Cases	1,088	1,257	1,276
	Female	Cases	112	126	140
Average education expense per person	Total	KRW 1 thousand / person	3.91	4.22	4,83
	Male	KRW 1 thousand / person	3.91	4.22	4,83
	Female	KRW 1 thousand / person	3.91	4.22	4,83
Training hours per person	Total	Hours	219.62	220.3	166.9
	Male	Hours	91	94	166.9
	Female	Hours	91	94	166.9
No. of ethical management training (excludes duplicate cases)	Total	No. of people	6,739	8,839	11,259
	Male	No. of people	6,015	7,880	9,684
	Female	No. of people	724	959	1,575
No. of ethical management training (offline)	Total	No. of people	2,342	2,503	4,559
	Male	No. of people	2,055	2,167	3,921
	Female	No. of people	287	336	638
No. of sexual harassment prevention education (indistinguishable by gender)	Total	Cases	56	46	45

Development and Current Status of Labor-Management Relations

Development and Current Status of Labor-Management Relations 102-41

In order to improve irrational business practices, the KHNP agreed to provide rational compensation and welfare systems through effective collective agreements in compliance with the government's guidelines by re-establishing a collective agreement process and shortening the intervals of a regular meeting and working-level meeting. Such efforts contributed to advancing collective agreements and improving labor-management relations. A total of 7,397 employees, accounting for 63% of the total employees, are subject to collective agreements. In addition, any changes in collective agreements are announced within 14 days from the date on which the grounds occur.

Current Status of Labor Union Registration

Classification	Unit	2015	2016	2017
No. of employees who have joined the labor union	No. of people	6,812	6,911	7,397
Ratio of employees who have joined the labor union	%	64	60	63

Scale of Procurement from SMEs and Social Enterprises

(Unit: KRW 1 million)

Classification	2015	2016	2017
SMEs	567,348	782,856	842,545
Social enterprises	10,298	16,505	17,346

Sharing Fund Use

(Unit: KRW 100 million)

Classification	2015	2016	2017
Love Fund	11.4	11	10.7
Matching Grant	90	132	197.75
Total	101.4	143	208.5

GRI Standards Content Index 102-55

Universal Standards							
Topic	**No.**	**Disclosure**	**Description**	**ISO 26000**	**SDGs**	**Page**	**Assurance**
GRI 102: General Disclosure							
Organizational profile	102-1	Name of the organization	Korea Hydro & Nuclear Power Co., Ltd.	6.3.10/ 6.4.1/6.4.2/ 6.4.3/6.4.4/ 6.4.5/7.8		08	○
	102-2	Activities, brands, products, and services	Development of electric power resources/Power generation, R&D, Affiliated businesses/Overseas businesses			08	○
	102-3	Location of headquarters	1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do, Korea			08	○
	102-4	Location of operations	[Headquarters] 8 Divisions, 28 Departments (offices) [Branches] 6 Nuclear power sites, 7 Pumped-storage plants, and 8 other branches			08	○
	102-5	Ownership and legal form	A public enterprise under the Ministry of Trade, Industry and Energy			08	○
	102-6	Markets served	Power generation and electricity business (nuclear power, pumped-storage power, and new and renewable energy): 43			08	○
	102-7	Scale of the organization	No. of employees: 11,559 Sales: KRW 9,510.9 billion			08	○
	102-8	Information on employees and other workers	Refer to Sustainable Performance. Society, Human Resources and Recruitment.			92	○
	102-9	Supply chain	Conduct mutual growth projects to establish a healthy nuclear supply chain			40-43	○
	102-10	Significant changes to the organization and its supply chain	No significant change			40-43, 92	○
	102-11	Precautionary Principle or approach	Determine projects for adaptation to climate change in preparation for extreme disasters resulting from climate change			64	○
	102-12	External initiatives	Support UN Global Compact and UN SDGs		17	86-87, 102	○
	102-13	Membership of associations	Refer to Memberships		17	100	○
Strategy	102-14	Statement from senior decision-maker	Refer to CEO Message	4.7/6.2/ 7.4.2		04-05	○
Ethics and integrity	102-16	Values, principles, standards and norms of behavior	Refer to Ethical Management System	4.4/6.6.3	16	73	○
Governance	102-18	Governance structure	Operate the Board of Directors, the supreme decision-making body	6.2/7.4.3/ 7.7.5		80-81	○
Stakeholder engagement	102-40	List of stakeholder groups	Employees, Government, Suppliers, Public/Local residents, Press/NGO			82-83	○

Universal Standards							
Topic	**No.**	**Disclosure**	**Description**	**ISO 26000**	**SDGs**	**Page**	**Assurance**
GRI 102: General Disclosure							
Stakeholder engagement	102-41	Collective bargaining agreements	Collective agreements apply to 63% of the total employees	5.3		93	O
	102-42	Identifying and selecting stakeholders	Refer to Communication with Stakeholders			82	O
	102-43	Approach to stakeholder engagement	Refer to Communication with Stakeholders			83	O
	102-44	Key topics and concerns raised	Refer to Communication with Stakeholders			82-83	O
Reporting practice	102-45	Entities included in the consolidated financial statements	Refer to Page 55 of 2018 KHNP Business Report	5.2/7.3.2/ 7.3.3/7.3.4		90	O
	102-46	Defining report content and topic Boundaries	Refer to Core Sustainability Management Issues and Topic Boundary			90	O
	102-47	List of material topics	Refer to Core Sustainability Management Issues and Topic Boundary			85, 99	O
	102-48	Restatements of information	Not applicable				O
	102-49	Changes in reporting	Refer to Core Sustainability Management Issues and Topic Boundary			85, 99	O
	102-50	Reporting period	From January 1, 2017 to December 31, 2017 (Major performances are included in 2018.)	7.5.3/7.6.2		02	O
	102-51	Date of most recent report	November 2017			02	O
	102-52	Reporting cycle	December 2018, 9th report			02, 05	O
	102-53	Contact point for questions regarding the report	Planning Team, Planning Dept., Korea Hydro & Nuclear Power Co., Ltd. (Tel. +82-54-704-4133)			02	O
	102-54	Claims of reporting in accordance with the GRI Standards	Complying with GRI Standards Core option			94-99	O
	102-55	GRI Context Index	At least one indicator is reported by key indicator of a common theme and major aspect of a certain theme.			94-99	O
	102-56	External assurance	A third-party verification was conducted by Lloyd's Register.			100-101	O

GRI Standards Content Index 102-55

Topic-specific Standards								
Topic	**No.**	**Disclosure**	**Description**		**ISO 26000**	**SDGs**	**Page**	**Assurance**
GRI 200: Economic disclosures								
Economic Performance	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to KHNP Profile, KHNP Business Model, and KHNP Sustainability Management.				08, 10~11,12	○
	201-1	Direct economic value generated and distributed	Sales	KRW 9510.9 billion	6.8.1-6.8.2/ 6.8.3/ 6.8.7/6.8.9		90	○
			Corporate tax payment	KRW 279.8 billion				
			Avg. compensation per employee	KRW 88.849 million				
			Social contribution expenses (Dandelion Spore Fund)	KRW 20.85 billion				
			Subsidies for SMEs	KRW 5.47 billion				
Indirect Economic Impacts	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to KHNP Sustainability Management				12-13	○
	203-1	Infrastructure investments and services supported	KHNP created indirect economic effects by conducting a variety of social value creation activities such as the support for Naa Cooperative Union and the establishment of On-site NPP Workers Training Center.		6.3.9/6.8.1-6.8.2/6.8.7/ 6.8.9		16-17	○
Procurement Practices	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Respect. Win-win Cooperation with Suppliers				40	○
	204-1	Proportion of spending on local suppliers	Public purchasing in 2017 (Unit: KRW 100 million)		6.4.3/6.6.6/ 6.8.1-6.8.2/6.8.7		42	○
			SMEs	8,352				
			Technology development	608				
			Female-owned businesses	1,368				
Anti-corruption	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Timeless Integrity. Establishment of Culture of Integrity & Ethics				72	○
	205-2	Communication and training about anti-corruption	Provided integrity training for employees working in the fields susceptible to corruption, such as HR, accounting, budget, contract, etc.		6.6.1-6.6.2/6.6.3		75	○
Anti-competitive Behavior	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Respect. Win-win Cooperation with Suppliers				40	○

Topic-specific Standards							
Topic	**No.**	**Disclosure**	**Description**	**ISO 26000**	**SDGs**	**Page**	**Assurance**
GRI 200: Economic disclosures							
Anti-competitive Behavior	206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	No. of Sanctions against Unfair Suppliers 41 cases	6.6.1-6.6.2/6.6.5/6.6.7		41	○
GRI 300: Environmental disclosures							
Energy	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Social Responsibility. Minimization of Environmental Impacts	6.5.4		58	○
	302-1	Energy consumption within the organization	2017 Corporate Energy Consumption (Unit: 10TJ) Direct energy (fuel consumption): 26 Indirect energy (electricity consumption): 6,982			65	○
Water	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Social Responsibility. Minimization of Environmental Impacts			58	○
	303-1	Water withdrawal by source	Water Consumption in 2017 by Water Source (Unit: thousand tons) Underground water: 75 Industrial water: 1,893 Water supply: 330 Surface water: 4,512 Total water consumption: 6,810	6.5.4		65	○
Emissions	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Social Responsibility. Minimization of Environmental Impacts			58	○
	305-1	Direct (Scope 1) GHG emissions	Direct GHG Emissions in 2017: 54,000tCO2eq	6.5.5		63	○
	305-2	Energy indirect (Scope 2) GHG emissions	Indirect GHG Emissions in 2017: 3,391,000tCO2eq	6.5.5		63	○
Effluents and Waste	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Social Responsibility. Minimization of Environmental Impacts			58	○
	306-1	Water discharge by quality and destination	**Wastewater Discharge in 2017: 3,673,000㎥** Emission of Water Pollutants in 2017 (Unit: kg) Chemical Oxygen Demand (COD): 17,340 Suspended Solids (SS): 2,326 Total Nitrogen (T-N): 45,929	6.5.3/6.5.4		60	○
	306-2	Waste by type and disposal method	Waste Treatment in 2017 Waste Discharge (tons): 11,059 Radioactive Waste Transferred for Treatment (200ℓ Drum): 4,400	6.5.3		60	○
	306-3	Significant spills	Total number and total volume of recorded significant spills: 0	6.5.3		61	○

GRI Standards Content Index 102-55

<table>
<tr><th colspan="8">Topic-specific Standards</th></tr>
<tr><th>Topic</th><th>No.</th><th>Disclosure</th><th>Description</th><th>ISO 26000</th><th>SDGs</th><th>Page</th><th>Assurance</th></tr>
<tr><td colspan="8">GRI 300: Environmental disclosures</td></tr>
<tr><td rowspan="2">Environmental Compliance</td><td>103-1-3</td><td>Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach</td><td>Social Responsibility
Refer to Social Responsibility. Minimization of Environmental Impacts.</td><td></td><td rowspan="2">16</td><td>58</td><td>○</td></tr>
<tr><td>307-1</td><td>Non-compliance with environmental laws and regulations</td><td>No. of Violations of Environmental Laws: 2 cases
Fine: KRW 2 million</td><td>4.6</td><td>61</td><td>○</td></tr>
<tr><td colspan="8">GRI 400: Social disclosures</td></tr>
<tr><td rowspan="2">Employment</td><td>103-1-3</td><td>Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach</td><td>Refer to Respect. People-centered Corporate Culture.</td><td></td><td rowspan="2"></td><td>44</td><td>○</td></tr>
<tr><td>401-1</td><td>New employee hires and employee turnover</td><td>No. of New Employees, Employee Turnover, and Retired Employees (Unit: No. of people)
<table>
<tr><th colspan="2"></th><th>2015</th><th>2016</th><th>2017</th></tr>
<tr><td rowspan="2">New employees</td><td>Male</td><td>1,109</td><td>682</td><td>469</td></tr>
<tr><td>Female</td><td>260</td><td>139</td><td>133.5</td></tr>
<tr><td rowspan="2">Turnover and retirement (based on employees joining KHNP during the year)</td><td>Male</td><td>4</td><td>11</td><td>5</td></tr>
<tr><td>Female</td><td>1</td><td>1</td><td>2</td></tr>
</table></td><td>6.4.3</td><td>8</td><td>92</td><td>○</td></tr>
<tr><td rowspan="2">Labor/ Management Relations</td><td>103-1-3</td><td>Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach</td><td>Refer to Sustainable Performances. Society.</td><td rowspan="2">6.4.3/6.4.5</td><td rowspan="2">10</td><td>93</td><td>○</td></tr>
<tr><td>402-1</td><td>Minimum notice periods regarding operational changes</td><td>Any changes in collective agreements are announced with 14 days from the date on which the grounds occur.</td><td>93</td><td>○</td></tr>
<tr><td rowspan="2">Occupational Health and Safety</td><td>103-1-3</td><td>Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach</td><td>Refer to Ultimate Safety. Safety-centered NPP Operation.</td><td></td><td rowspan="2">9</td><td>48</td><td>○</td></tr>
<tr><td>403-2</td><td>Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities</td><td>Industrial Disasters (Unit: Cases, %)
<table>
<tr><th></th><th>2015</th><th>2016</th><th>2017</th></tr>
<tr><td>No. of severe disasters</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Nuclear industrial disaster rate</td><td>2.17</td><td>1.38</td><td>0.92</td></tr>
</table></td><td>6.4.6/6.8.8</td><td>92</td><td>○</td></tr>
<tr><td rowspan="2">Training and Education</td><td>103-1-3</td><td>Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach</td><td>Refer to Respect. People-centered Corporate Culture.</td><td></td><td rowspan="2">4</td><td>44</td><td>○</td></tr>
<tr><td>404-1</td><td>Average hours of training per year per employee</td><td>Average Training Hours per Person (Unit: Hours)
<table>
<tr><td>2015</td><td>219.62</td></tr>
<tr><td>2016</td><td>220.3</td></tr>
<tr><td>2017</td><td>166.9</td></tr>
</table></td><td>6.4.7</td><td>93</td><td>○</td></tr>
<tr><td>Diversity and Equal Opportunity</td><td>103-1-3</td><td>Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach</td><td>Refer to Respect. People-centered Corporate Culture.</td><td></td><td>5</td><td>44</td><td>○</td></tr>
</table>

Topic-specific Standards							
Topic	**No.**	**Disclosure**	**Description**	**ISO 26000**	**SDGs**	**Page**	**Assurance**
GRI 400: Social disclosures							
Diversity and Equal Opportunity	405-1	Diversity of governance bodies and employees	Refer to Human Resources and Recruitment.	6.2.3/6.3.7/ 6.3.10/6.4.3	5	92	○
Human Rights Assessment	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Respect. People-centered Corporate Culture.		10	44	○
	412-2	Employee training on human rights policies or procedures	No. of Sexual Harassment Prevention Education (Unit: cases) 2015: 56 2016: 46 2017: 45	6.3.5		92	○
Local Communities	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Social Responsibility. Happy Growth with Local Communities.		11	66	○
	413-1	Operations with local community engagement, impact assessments, and development programs	KHNP is participating in local communities through social contribution and local economy revitalization for NPP local communities. KHNP communicates with local communities through various channels, such as the Regional Development Council and the Committee for Win-win Growth with Local Communities.	6.3.9/ 6.5.1-6.5.2/ 6.5.3 / 6.8		68-71, 16-17, 24-25	○
Customer Health and Safety	103-1-3	Explanation of the material topic and its Boundary, The management approach and its components, Evaluation of the management approach	Refer to Ultimate Safety. Safety-centered NPP Operation.		9	48	○
	416-1	Assessment of the health and safety impacts of product and service categories	Combined Disaster Drill and Education Completed safety inspection according to WANO and IAEA SEED international standards	6.7.1-6.7.2/ 6.7.4/6.7.5/ 6.8.8		52	○

BOUNDARY

102-46, 102-47

○ Topic boundary (All stakeholders who directly affect and are affected by the topics of the GRI Standards)
◎ Reporting boundary (The range of data reported as KHNP's major issues relating to the topics of the GRI Standards)

Topic	Internal boundary			External boundary			
	Headquarters	Domestic power plants (13)	Overseas business sites	Government/Local governments	Suppliers	Public/local communities	Press/NGO
Supply stable power to the public	◎	◎	◎	◎		◎	
Achieve financial goals by running electric power business	◎	◎	◎		◎		
Pursue common interests for both labor and management through active communication	◎	◎	○				
Provide and manage power based on the mid- to long-term power supply goals	◎	◎	◎	◎			
Eradicate corruption and irregularities, such as bribery, priority hiring, etc.	◎	◎	○	◎	◎	◎	
Create a safe working environment for employees	◎	◎	○				
Eradicate all types of corruption and irregularities through transparent management	◎	◎	○	◎		◎	
Strengthen compliance with environmental laws	◎	◎	○	◎		◎	◎
Contribute to developing local communities near operation sites	◎	◎	○			◎	
Develop employee job competence by providing education and training	◎	◎	○				
Reduce GHG emissions during power plant operation	◎	◎	○				
Protect health of local residents near NPPs	◎	◎	○			◎	
Strengthen NPP information disclosure	◎	◎	○	◎		◎	
Improve power plant operation efficiency	◎	◎	◎				
Pursue mutual growth by cooperating with construction SME	◎	◎	○		◎		

Third Party Assurance Statement 102-56

Dear Korea Hydro & Nuclear Power Co., Ltd. Management and Stakeholders,

▣ INTRODUCTION

The Korean Standards Association (hereinafter "the Assurers") was commissioned by Korea Hydro & Nuclear Power Co., Ltd. (KHNP) to perform a third-party Assurance Engagement of "KHNP Sustainability Report 2018" (hereinafter the "Report"). The Assurers present independent opinions based on the feasibility of the data contained in the Report. KHNP has sole responsibility for content and performance contained in this Report.

▣ INDEPENDENCE

As an independent assurance agency, the Assurers does not have any commercial interest in businesses of KHNP apart from undertaking a third-party assurance on the Report. We have no other contract with KHNP that may undermine credibility and integrity as an independent assurance agency.

▣ ASSURANCE STANDARDS AND LEVEL

This Assurance Engagement followed the AA1000AS (2008) assurance standards to provide Moderate Level assurance. We checked the three principles of inclusivity, materiality, and responsiveness in combination with information credibility of the Report. We also verified whether the Report content was created in accordance with the GRI standard.

▣ ASSURANCE TYPE, SCOPE AND LIMITATIONS

We performed a Type 2 Assurance Engagement in accordance with AA1000AS. This implies that we verified the accuracy and quality of the statements made by KHNP and the sustainability performance data included in this Report. The scope of verification is a period from Jan 1, 2017 to Dec 31, 2017. The scope of this Assurance Engagement primarily includes the systems and initiatives undertaken by KHNP including its sustainable management policies, goals, projects, standards and performance during the reporting period defined in the Report. While the environmental and social data as well as financial data was verified, the scope of review concerning stakeholder engagement was limited to the materiality test process.

▣ METHODOLOGY

The Assurers collected data, information, and evidence via following method

- Review and analyze media coverage on KHNP sustainability management
- Investigate issues of sustainability reporting selected by the Assurers in consultation with KHNP
- Visit in head office of the KHNP and interview sustainability managers and employees in charge of individual issues
- Review systems and processes that were used in improving the performance of sustainability management and preparing the Report
- Crosscheck between financial performance data in the Report and the data in the Assurers' report on KHNP's financial statements and disclosures
- Track and examine internal documents and basic data

▣ RESULTS AND OPINIONS [Principles and Process]

The Assurers have reviewed the content of the draft report and offered our opinions, and the report has been revised accordingly. The Assurers have not found any material errors or inappropriate statements regarding the content of this report. The Assurers offers the following opinions on "KHNP Sustainability Report 2018".

■ Inclusiveness

●Has KHNP include stakeholders in the process of strategically responding to issues of sustainability management?

The Assurers have verified that KHNP encouraged stakeholders' involvement in the process of sustainability management and that the KHNP is operating a variety of channels for communication with stakeholders such as employees, labor union/ temporary employees, government, supply chain, the people and local people, media and NGO. We have not found any important group of stakeholders overlooked on the above-mentioned process. KHNP has communication channels to the stakeholder group to ensure that the ideas of stakeholders are reflected in their management activities.

■ Materiality

●Has KHNP included material information in the Report to help stakeholders make informed decisions?

The Assurers have verified that KHNP has not omitted or excluded material information for stakeholders. In addition, it is found that KHNP conducted materiality assessment for key issues that are derived from internal and external environmental analysis and reported on its actual results.

■ Responsiveness

●Has KHNP appropriately responded to stakeholder requirements and interest in the Report?

The Assurers confirmed that KHNP had reflected the opinions of stakeholders in the Report and had strived to respond to their requirements and interests. In addition, there is no evidence showing that KHNP's response to material stakeholder issues was falsely reported.

▣ GRI STANDARDS APPLICATION

The Assurers have verified that the Report was prepared in accordance with the Core Option of GRI Standards. Based on the data provided by KHNP, contents in relation to Universal Standards and Topic-specific Standards are confirmed facts.

■ Universal Standards

The Assurers have verified that the Report complied with the requirements of Core Option of GRI Standard and the following indices
102-1 to 102-13 (Organizational profile), 102-14 (Strategy), 102-16 (Ethics and integrity), 102-18 (Governance), 102-40 to 102-44 (Stakeholder engagement), 102-45 to 102-56 (Report practice), 103 (Management Approach).

■ Topic-specific Standards

The Assurers have verified that specified disclosure list on Material Aspect that was deduced disclosure list determination process, and the following indices.
Economic: 201-1, 203-1, 204-1, 205-2, 206-1
Environmental: 302-1, 305-1, 305-2
Social: 401-1, 401-2, 403-2, 404-1, 405-1, 412-2, 413-1, 416-1

▣ Opinions and Recommendations [Performance/Issues]

The Assurers offer the following proposal to implement strategies in sustainability management in response to the issues with coherence at an organizational level.

■ Economic performance

KHNP has envisioned to become a trusted global energy leader, while putting its best effort to achieve safety-first management, switch to the clean energy, realization of social value and transparent and fair management as the strategic goals. As the level of uncertainty on economy rises due to the energy policies change globally. To uphold the vision and value in coherence manner in fluctuating market situation, we advise to be innovatively aligned with 4th Industrial Revolution and constantly manage financial and non-financial risks to achieve responsible and transparent management with goal-oriented mindset, through strengthening proactive and comprehensive responds in long-term approach.

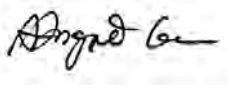
■ Environmental performance

The effort of KHNP implementing the environmental management system to minimize the negative effect on environment and the pollution level is highly valued. Although it is recommended to clarify the detailed tasks and value structure in environmental improvement goals. Especially, it is advised to strategically approach to analyze risk and opportunity to solve climate change that human race face nowadays.

■ Social performance

KHNP is actively involve creating social value that the government suggest through its sustainability report. KHNP is thoroughly reporting following topics 'job creation', 'implementation of coherent plans on earthquake', 'Innovation in Industrial health and safety paradigm', 'respect of human rights' and 'shared growth with local community'. It is positive to find the effort of stakeholders from various fields in the committee to achieve social value creation. There are number of recent news coverage for corruption scandals in public corporations, which raised various stakeholders voice for transparency. To proactively response to the external and internal need for transparency, it is recognizable achievement for KHNP to be ISO37001(Anti-bribery management systems) certified. We anticipate for KHNP to internalize anti-corruption management system in the organization through constant control in anti-corruption risk and internally rising awareness on corruption.

November 2018
Sang-Jin Lee, KSA Chairman & CEO



KSA 한국표준협회 KOREAN STANDARDS ASSOCIATION

AA1000
Licensed Assurance Provider
000-70

Participation in Initiatives and Memberships 102-13

Join and Support the UN Global Compact

KHNP joined the UN Global Compact, an international initiative for corporate social responsibilities, in March 2007. In line with the initiative, we have been complying with its 10 principles in 4 sectors of human rights, labor, environment and anti-corruption.

Human Rights	Labor	Environment	Anti-corruption
Principle 1 Businesses should support and respect the protection of internationally proclaimed human rights	Principle 3 Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining	Principle 7 Business should support a precautionary approach to environmental challenges	Principle 10 Businesses should work against corruption in all its forms, including extortion and bribery
Principle 2 Businesses should make sure that they are not complicit in human rights abuses	Principle 4 Businesses should uphold the elimination of all forms of forced and compulsory labor	Principle 8 Businesses should undertake initiatives to promote greater environmental responsibility	
	Principle 5 Businesses should uphold the effective abolition of child labor	Principle 9 Businesses should encourage the development and diffusion of environmentally friendly technologies	
	Principle 6 Businesses should uphold the elimination of discrimination in respect of employment and occupation		

Memberships

Domestic					Overseas	
K-Forum	Institute for Social Responsibility of Public Sector Institutions	Korea Atomic Industrial Forum	Korea Management Association	Korea Nuclear Association for International Cooperation	CANDU Procurement Audit Committee (CANPAC)	World Nuclear Fuel Market (WNFM)
Gyeongju Chamber of Commerce & Industry	Future Energy Policy Institute	Korea Academy of Nuclear Safety	Korean Radioactive Waste Society	Korea Electric Engineers Association	CANDU Owners Group (COG)	World Energy Congress (WEC) Korea
Climate Change Center	Korea Fisheries Resources Agency	Korea Asset Management Association	Korea Industrial Technology Association	Korea Electrical Manufactures Association	Framatome Owners Group (FROG)	
Public Institution Audit Committee	Energy Industry Promotion Agency	Earthquake Engineering Society of Korea	Korea Fire Safety Institute	The Korean Institute of Electrical and Electronic Material Engineers	International Hydropower Association (IHA)	
Daedeok Research Association of Safety	Korea Business Council for Sustainable Development	Korea Society of Energy & Climate Change	Korea Smart Grid Association	Korea Power Exchange	Nuclear Energy Institute (NEI)	
The Korean Society of Mechanical Engineers	Korean Association for Radiation Application	The Korean Women's Nuclear Expert Association	Korea Energy Engineers Association	Korea Photovoltaic Industry Association	Nuclear Procurement Issues Committee (NUPIC)	
Korean Association of Clinical Pathology	The Korean Society for Nondestructive Testing	The Association of Energy Future Forum	Korea Energy Foundation	Korea National Quality Award	Pressurized Water Reactor Owners Group (PWROG)	
The Korean Institute of Electrical Engineers	Korea Industrial Technology Association	The Korean Association for Conflict Studies	Korea Atomic Energy Agency	Korea Society for Quality Management	World Association of Nuclear Operators (WANO)	
Public Institutional Audit Forum	Korea New & Renewable Energy	The Institute of Internal Auditors	Korean Nuclear Society	Institute of Nuclear Materials Management- Korea Chapter	World Nuclear Association (WNA)	

RELIABLE GLOBAL
ENERGY LEADER,

KHNP

Planning Team, Planning Dept.,
Korea Hydro & Nuclear Power Co., LTD.
1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si,
Gyeongsangbuk-do, Korea
Tel. +82-54-704-4133 Fax. +82-54-704-4198
E-mail sooho.jung@khnp.co.kr
Homepage www.khnp.co.kr

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KOREA HYDRO & NUCLEAR POWER CO., LTD