

# THINK GLOBAL JUMP TOGETHER

Korea Hydro & Nuclear Power Co.,LTD  
Sustainability Report 2016





# About this Report

## Introduction

Korea Hydro & Nuclear Power Co., Ltd. (KHNP) has been publishing the sustainability report every year with the aim of releasing its sustainability management goals and performances in a transparent manner and sharing its commitment to creating future value with the public. This is KHNP's seventh sustainability report focused on introducing changes and directions in management activities in line with the head office relocation to Gyeongju in 2016.

## Reporting scope and period

This report includes major financial and non-financial performances from January 1 through December 31, 2015. Quantitative data of the three most recent fiscal years from 2013 through 2015 were utilized to provide time-series trends, while some qualitative data included performances in 2016. The scope of this report covers the head office and all domestic and overseas offices. Time and region based boundaries were also complied.

## Reporting and verification guidelines

This report was compiled in accordance with the Global Reporting Initiative (GRI) G4 Core options. In particular, major issues in the power plant facility category recommended in the GRI Sustainability Topics for Sector were adopted with the purpose of selecting key issues suitable for our business. Some unchanged performances and information since the previous report were also restated to help readers understand better and revised data were reported with separate notification. The reliability of the contents was verified by a third-party assurance institutes and detailed results of verification can be found in the independent assurance statement in the Appendix (page 86 to 87).

## Additional information of the report

Korean and English versions of this report are available at the KHNP website (www.khnp.co.kr) and are downloadable as PDF file. For further inquiries in relation to the sustainability report, please contact us below.

Planning Team, Planning Dept., Korea Hydro & Nuclear Power Co., LTD.

1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do, Korea  
Tel. +82-54-704-4135 Fax. +82-54-704-4198  
Homepage www.khnp.co.kr  
E-mail ojs24601@khnp.co.kr

# Contents

- 04 CEO Message
- 06 KHNP, Creating Greater Value for Korea

## Recognition



- 16 About KHNP
- 17 KHNP Vision 2030
- 20 Stakeholder Engagement
- 24 Core Sustainability Management Issues

## Strategic Approach



- 28 Transparent and Stable Operation of the BOD
- 30 Nurture Competent Talents

## Sustainability Plan and Goals



- T Technology**
  - 38 KHNP, Growing into Global Nuclear Power Generation Leader
- R Respect**
  - 44 KHNP, Opening a New Chapter in Gyeongju
  - 50 KHNP, Creating Healthy NPP Ecosystem
- U Ultimate Safety**
  - 54 KHNP, Placing Utmost Importance on Safety
- S Social Responsibility**
  - 65 KHNP, Practicing Eco-friendly Management for Next Generations
  - 73 KHNP, Growing with Local Communities
- T Timeless Integrity**
  - 78 KHNP, Pursuing Culture of Integrity and Honesty

## Accountability

- 83 Performance Data
- 86 Third-party Assurance Statements
- 88 GRI Content Index
- 90 SR10 Certificate
- 91 Implementation of the UN SDGs
- 92 Participation in Initiatives and Memberships



## CEO Message



We promise to grow into a global energy company respected and trusted by people.

The largest power company generating about 30% of the nation's electricity power, Korea Hydro & Nuclear Power (KHNP) constitutes the reliable backbone fueling the national economic growth and enriching quality of life.

### Dear valued stakeholders,

Throughout the year 2015, Korea Hydro & Nuclear Power has continued journey toward realizing the vision of “KHNP, the Reliable Global Energy Leader” as we committed to safe nuclear operation and new growth engine discovery. As a result, we recorded the best-ever financial performance since our establishment; the annual revenue in 2015 reached KRW 10.7 trillion, and the net income was KRW 2.5 trillion. We resolved key issues like continued operation permit of Wolsong #1. In July 2016, we demonstrated once again our excellence in nuclear operation by concluding the OSSA (Operating Support Services Agreement) after completing the construction of the four nuclear plants in UAE. Our all-out efforts at stable supply of electricity power and safe nuclear operation have resulted in a dramatic reduction in failures, allowing us to record a remarkable NPP usage of 85.3%.

What makes year 2016 especially meaningful for KHNP is that we relocated to Gyeongju this year. Having moved into the new HQ in April, KHNP embarked on a fresh journey toward the energy future of Korea. The slogan “New & Clear Energy Silk Road” represents our aspiration of “trailblazing a new Silk Road with nuclear energy in Gyeongju”. Under this new vision, we carry out 5 key projects aimed at mutual growth with Gyeongju and 10 key projects for local communities in the city. KHNP is now poised to make a second leap forward to stand tall in the global arena while re-establishing itself as a corporation respected by local citizens that lives up to the expectations of our time to contribute to the balanced regional development. To that end, KHNP commits itself to delivering on the following three promises:

#### First, we will ensure operational safety of the nuclear power plants.

It is our responsibility to form the foundation to win trust from the general public to ensure stable supply of electricity power through safe nuclear operation. Having set safety as the top priority, KHNP strives to foster safety-first culture and attain the world-class technology. We also seek to advance nuclear plant operation and management system while enhancing employee capabilities and facility reliability to embrace for operation expansion. We pledge to maintain strict security measures both in online and physical environment.

#### Second, we promise to usher in the safe nuclear era to grow with communities.

Nuclear industry cannot grow without support and trust from local communities and the general public. KHNP pledges to reach out to people in a closer communication, thereby resolving issues facing us. We also recognize that it is also our responsibility to seek shared growth with our suppliers and build a sound and future-oriented industrial ecosystem. Our unique supply chain management rooted upon the win-win partnership will ensure transparent management of component supply channel and ultimately enhance the competitive edge of the nation's nuclear business.

#### Thirds, we will identify new future growth engine.

KHNP enhances comprehensive capabilities to deliver the next 15 years of greater growth over the past 15 years, 30 years of trust and respect from people, and 100 years of the national energy security. For starter, we promise to engage employees, suppliers, and local communities in open communication as we push ahead with new nuclear power plant projects including Kori #1 and #4 and NPP construction in Yeongdeok County. Additionally, we will develop “OSSA after completing the construction of the NPP”, recently signed with UAE, into a new business model, extending solid support for the global expansion of nuclear power plant, hydropower, and renewable energy. We will also expedite the completion of the entire cycle of nuclear plant construction-operation-decommissioning by securing technologies for reactor decommissioning and used nuclear fuel treatment.

Valued stakeholders,

KHNP is committed to safe nuclear operation, rising into a “corporation that fosters the nation's economic growth”, “global energy leader generating new growth engine”, and “a corporate citizen trusted by people fulfilling its social responsibility”. I would appreciate your lasting support and encouragement as we continue to deliver sustainable management.

Thank you.

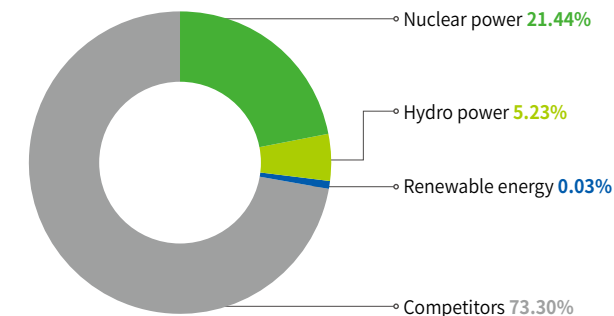
President & CEO, Korea Hydro & Nuclear Power Co., Ltd. **Cho Seok**



## About Our Sustainable Growth and Development

For 37 years since April 1978 when Kori #1 reactor first went into commercial operation, the share of nuclear power generation in Korea has kept increasing. Currently, three out of every 10 households in Korea consume electricity generated by nuclear power plants. In addition to nuclear power generation, KHNP generates 34.3% the domestic electricity power with renewable energy such as hydropower and pumped storage power, contributing to stable power supply for the nation.

**Domestic market share in facility capacity** (as of end of August 2016)



**Legend:**

- Nuclear power
- Hydro power
- Pumped storage

**Nuclear power**

Operation	24 units
Under construction (preparation)	12 units

**Hydro power**

Hydro power	21 units
Pumped storage	16 units

**Power Plant Locations and Status:**

- Nuclear Power:**
  - Hanbit #1-6: Operation (6)
  - Seomjin River Hydro: Operation (6)
  - Hanbit Nuclear Power Site: Operation (6)
  - Kori Nuclear Power Site: Operation (6)
  - Wolsong Nuclear Power Site: Operation (4)
  - Shin-Wolsong #1 & #2: Operation (2)
  - Cheongsong Pumped Storage: Operation (4)
  - Muju Pumped Storage: Operation (4)
  - Goisan Hydro: Operation (4)
  - Yecheon Hydro: Operation (4)
  - Yeongdeok: Operation (4)
  - Hanul Nuclear Power Site: Operation (6)
  - Shin-Hanul #1 & #2: Under construction (2)
  - Shin-Hanul #3 & #4: Preparation (2)
  - Cheonji #1 & #2: Preparation (2)
  - Wonsong #1-#4: Operation (4)
  - Kori #1-#4/ Shin-Kori #1 & #2: Operation (6)
  - Shin-Kori #3-#6: Under construction (4)
- Hydro Power:**
  - Cheongpyeong Pumped Storage
  - Cheongyeong Hydro
  - Paldang Hydro
  - Gangneung Hydro
  - Uiam Hydro
  - Hwancheon Hydro
  - Han River Hydro Power Site
- Pumped Storage:**
  - Yangyang Pumped Storage
  - Hanul Pumped Storage
  - Samrangjin Pumped Storage
  - Sancheong Pumped Storage

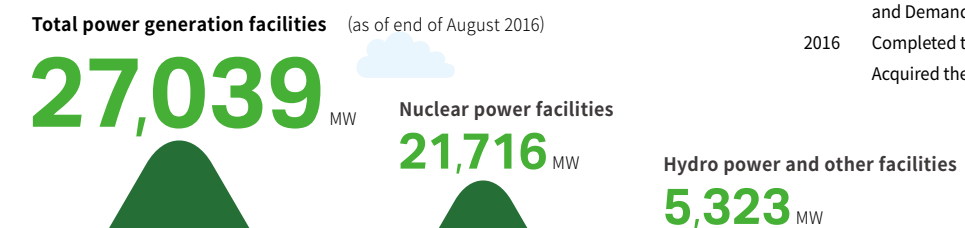
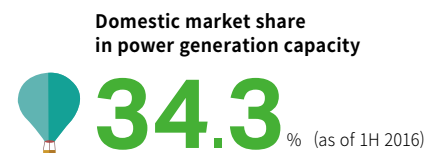
<b>1978</b>	Started commercial operation of Kori #1 (recognized as the world's 21st nuclear power generating country)
<b>1983</b>	Started commercial operation of Wolsong #1 and Kori #2
<b>1984</b>	Established a plan to secure a proprietary nuclear plant construction technologies
<b>1985</b>	Started commercial operation of Kori #3
<b>1986</b>	Started commercial operation of Kori #4 and Hanbit #1
<b>1987</b>	Started commercial operation of Hanbit #2 Commenced proprietary nuclear plant construction technology project Exceeded 100 billion KWh of nuclear power generation
<b>1988</b>	Started commercial operation of Hanul #1
<b>1989</b>	Started commercial operation of Hanul #2

<b>1995</b>	Started commercial operation of Hanbit #3
<b>1996</b>	Started commercial operation of Hanbit #4
<b>1997</b>	Started commercial operation of Wolsong #2
<b>1998</b>	Started commercial operation of Wolsong #3
	Started commercial operation of Hanul #3, Korea's first Standard NPP (OPR1000)
	Won the first overseas NPP contract (Guangdong NPP technical advisory)
<b>1999</b>	Started commercial operation of Hanul #4 and Wolsong #4

- 2000** Exceeded 1 trillion KWh of nuclear power generation
- 2001** Launched Korea Hydro & Nuclear Power Co., Ltd. (spin off from KEPCO)
- 2002** Started commercial operation of Hanbit #5 and #6  
  
Ranked 6th in the World's Power Generation Facility Capacity  
  
Developed a next generation light water reactor (APR1400)
- 2004** Implemented ERP system Founded KHNP Community Service Group
- 2005** Completed construction of renewable energy plants (Kori Wind Plant and Yeonggwang Solar Park), Hanul #5 and #6

<b>2007</b>	Acquired continued operation of Kori #1
<b>2008</b>	Exceeded 2 trillion KWh of nuclear power generation
<b>2009</b>	Won the NPP project of UAE (USD 40 billion)
<b>2010</b>	Installed a nuclear reactor at Shin-Kori #3 (first adopted APR1400)
<b>2011</b>	Started commercial operation of Shin-Kori #1 (first adopted QPR1000)
	Acquired pumped storage power generation from a thermo-power generation company (4,700MW)
	Selected as an excellent family-friendly company
	Selected as the top Korean company in quality competitiveness
	Founded the Nuclear Safety Committee

- 2012** Started commercial operation of Shin-Kori #2 and Shin-Wolsong #1
- 2013** Signed a contract with ACRC for integrity success project  
First obtained the license for heavy water reactor safety analysis with domestic technologies
- 2014** Acquired a standard design approval (Korean reactor APR+)  
Held the groundbreaking ceremony for new head office building (Gyeongju)
- 2015** Exceeded 3 trillion KWh of nuclear power generation  
Acquired continued operation for Wolsong #1  
Started commercial operation of Shin-Wolsong #2  
Concluded permanent shutdown of Kori #1 and secured a bridgehead for new business of decommissioning  
Confirmed the construction of Cheonji nuclear power plant (Yeongdeok) in line with the 7th Basic Plan for Electricity Supply and Demand
- 2016** Completed the movement of the head office to Gyeongju  
Acquired the construction permit of Shin-Kori #5 and #6





Construction progress rate vs. plan

**100.12** %

(as of end of December 2015)

## Recovering People's Trust on Safety

### Timely Construction of Nuclear Power Plants

Since becoming the 21<sup>st</sup> nuclear power generating country in April 1987 with the operation of Kori #1 unit, Korea has kept investing in constructing NPPs. As a result, 24 NPPs are operating as of July 2016. Furthermore, 12 additional NPPs will be constructed by 2029 under the 7th Basic Plan for Electricity Supply and Demand. Currently, a total of six NPPs (Shin-Kori #3 to #6 and Shin-Hanul #1 and #2 units) are under construction without setbacks in accordance with the schedule.



Shin-Kori #3 and #4

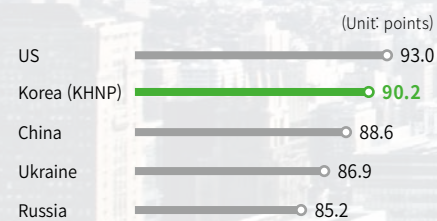
Level of all nuclear power plants in safety inspection by WANO

**Excellent**

(Target: Kori #1 & #2, Hanbit #1 & #2, Wolsong #3)

WANO's safety performance index (as of 1Q 2016)

**90.2** points



### Secure Nuclear Safety

KHNP has demonstrated safe operation of nuclear power plants as we were rated "excellent" in the conformity test of international nuclear power safety standard conducted by World Association of Nuclear Operators in all categories including operation, maintenance, radiation, organization, and administration.



Wolsong #3 and #4

### Evaluation on disaster management system and recognitions

(Supervised by the Ministry of Public Safety and Security)

**Target:** 72 institutions in 9 sectors including energy

**Evaluation:** 5 categories including disaster control capability, disaster situation management, and emergency plan

2014 2015  
B level A level

### Evaluation on disaster control capability

(Supervised by the Ministry of Trade, Industry and Energy)

**Target:** 22 institutions with responsibility and in cooperation for disaster control

**Evaluation:** Disaster management organization, safety management activities, training and education capability, etc.

2014 2015  
13<sup>th</sup> 1<sup>st</sup>

### Advance Disaster Response

KHNP has won the first prize in the "General Evaluation of Disaster Response Activities of Disaster Response Agencies" conducted by the Ministry of Trade, Industry and Energy. Furthermore, KHNP received Grade A in the disaster response system evaluation of agencies that manage national infrastructure conducted by the Ministry of Public Safety and Security.



Drill for fighting against gas leak and fire

### Activities to Recover People's Trust on Nuclear Power Generation

KHNP carries out promotional activities for NPP safety customized for the general public and local communities. The communication activities, ranging from media campaigns and planned broadcast to meeting with CEO commercials, contribute to raising people's approval rate and receptivity of nuclear plant operation.



CEO Talk Concert at Konkuk University

### Increased approval rating for nuclear power

2014 2015  
50% 59%

### Increased local community's receptivity

2014 2015  
45.5% 54.7%



Construction and Operation of Sustainable Nuclear Power Plant

World-class Nuclear Operation

KHNP ranked No. 1 in the world in terms of unplanned loss rate for two years in a row. Also, our unplanned long-term shutdown is at an all-time low at 0.13. KHNP is committed to securing the world-class nuclear operation capabilities in preparation for the year 2029 when 35 nuclear power plants are introduced.



Safe nuclear power plant operation

Localize Nuclear Reactor Vessel Head

To ensure safety for older NPPs, key anticipatory replacement is carried out for core equipment of nuclear reactor vessel head. KHNP has dramatically cut replacement cost and at the same time enhanced safety of facilities by adopting localized nuclear reactor vessel heads for Hanbit reactor 3 and 4. Furthermore, having let residents around NPPs observe the entire replacement process, we have eased their safety concerns over NPP.



Replacement of Hanbit nuclear reactor head

World's No.1 unplanned loss rate

Country	Unplanned loss rate (%)
Korea	1.34
Russia	1.86
US	2.00
UK	2.79
France	3.20
Canada	4.07
Germany	4.23

(as of 2015)

Number of unplanned nuclear reactor auto-stops

Country	Unplanned nuclear reactor auto-stops (case/unit)
Korea	0.13
China	0.55
Russia	0.80
US	0.80
UK	1.07
Canada	1.42
France	2.67

(as of 2015)

Reduction of nuclear reactor head replacement expenses

Existing units (Kori #1 & #2)

KRW 97.9 billion

New projects (Hanbit #3 & #4)

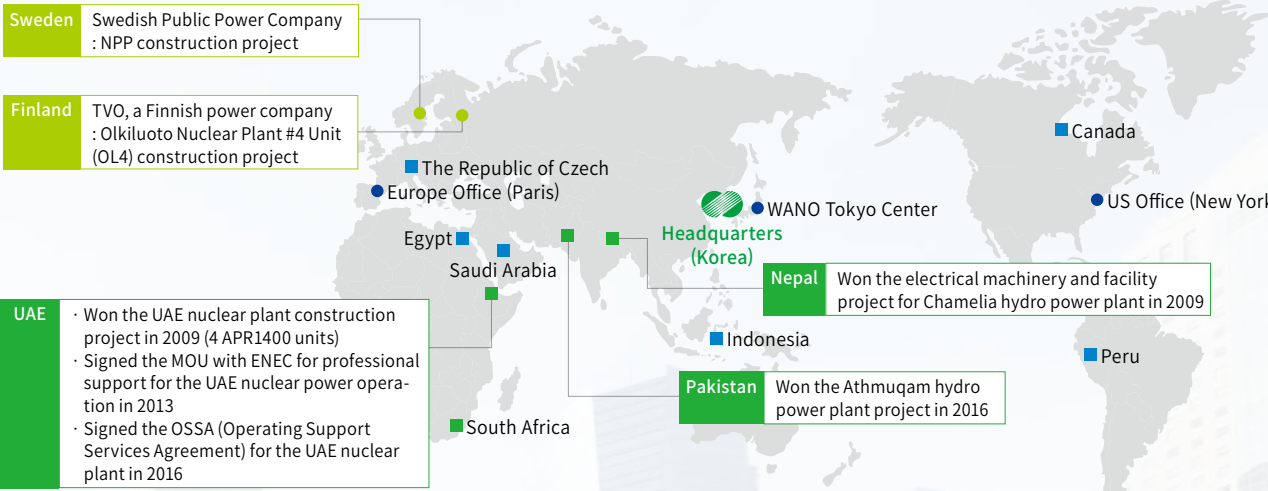
KRW 39.9 billion

Secure New Growth Engines for Future

Continue to Win Orders for New Nuclear Plant Construction Projects

While the demand for nuclear plant is in on the rise globally, the competition to win nuclear plant construction project are increasingly getting fiercer with the emergence of new rivals. Advancing competitiveness of export reactors while diversifying business portfolio, KHNP secures competitive edge in the global nuclear markets.

Overseas business status



OSSA for the UAE nuclear plant

Contract period

10 years after the completion of construction Until 2030

Contract volume

USD 920 million  
(main contract: USD 600 million, indirect expenses: USD 320 million)

Dispatch qualified plant operators and staff

Until 2030  
3,052 persons Up to maximum 436 annually

“Nuclear Plant Operation Support,” New Export Model

KHNP endeavors to identify new business model in addition to NPP export. We not only build nuclear plants with our highly competitive technology but also strive to win bids in order to generate additional revenue by continuously supporting operation after completion. These efforts have resulted us in signing the Operating Support Service Agreement, or OSSA for the 4 APR 1400s in UAE in July 2016. We expect to export rich experience and expertise in nuclear plant operation which we have obtained over the past 40 years.



OSSA for the UAE nuclear plant between KHNP and ENEC



### Develop Reactors with Purely Domestic Technology

KHNP concentrates all of its resources into technology development to enhance its exporting competitive edge and at the same time identifies future growth engine by obtaining world-class technology by 2030. APR1400, the 3rd generation Korean NPP, is now undergoing main inspection following the preliminary inspection by the US Nuclear Regulatory Commission (NRC) in March 2015. Meanwhile, the 3.5th generation Korean proprietary new nuclear power plant development is underway in accordance with the Government's technology development goal. The next generation new nuclear power APR+ features upgraded structural safety based on Korea's standard NPP (OPR1000) and APR1400.

#### APR1400 passed the preliminary inspection of the US NRC\*(March 2015)

2015.3 Begin main inspection of the NRC  
2016.1 Complete the first stage inspection  
2016.2 Under the 2nd stage inspection

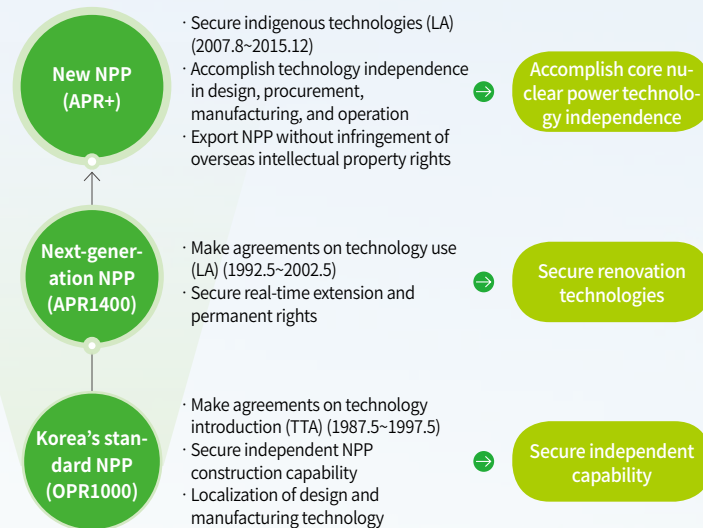
\*NRC: Nuclear Regulatory Commission

#### Expected effect for Korean NPP export

Sales from exporting 2 units

KRW **10** trillion

#### Roadmap for developing APR+



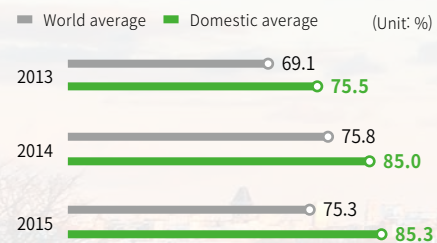
### Excellence in Nuclear Plant Facilities and Operation

The utilization rate of the NPP is an index that evaluates nuclear plant integrity, excellence in operational workforce, and operation level. Korea's utilization rate of the NPP in 2015 was 85.3%, about 10.0%p higher compared to the global average of 75.3%.



APR1400, Korean third-generation NPP

#### NPP utilization rate



#### Conclusion of permanent shutdown of Kori #1 unit

**June 16, 2015**

### Establish a Foundation to Advance into Global Nuclear Decommissioning Market

Since the decision of permanent shutdown of Kori #1, KHNP has been preparing its successful decommissioning and site restoration. We aim to secure the complete decommissioning technologies and develop high-valued equipment for remote control and system decontamination by 2021. The technologies will lay the foundation for KHNP to secure competitive edge in the future nuclear decommissioning market.



Workshop for decommissioning business

### Contribute to the National Energy Security with Renewable Energy

Major energy sources such as oil, coal, and natural gas on the planet are becoming depleted. The ensuing uncertainty gives rise to demand for alternative energy and renewable energy. Nuclear energy is essential for economic and stable power supply while renewable energy should be approached from a long-term and sustainable point of view. To meet these trends and grow into an eco-friendly corporation, KHNP is focusing on renewable energy business as a pillar of our new growth engine.



Kori wind power plant

#### Renewable energy facilities

Total

**682.25** MW



Hydro power

**606.7** MW



Wind power

**0.75** MW



Photovoltaic power

**16** MW



Fuel cell

**58.8** MW

(as of August 2016)





# Recognition

This part explains how our strategy is built around sustainable management and the communication channels through which we interact with stakeholders.

Learn about key issues facing KHNP identified by stakeholders' participation and the ensuing crisis and opportunity.

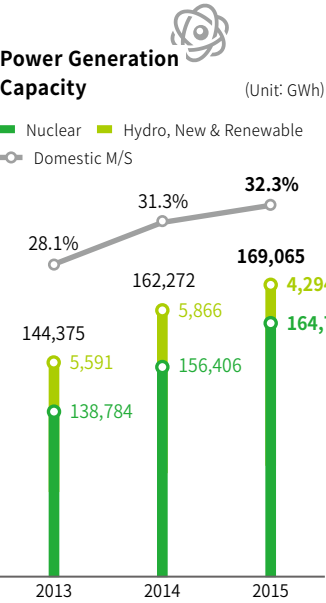
About KHNP	16
KHNP Vision 2030	17
Stakeholder Engagement	20
Core Sustainability Management Issues	24



About KHNP



KHNP Head Office Building



Corporate Profile

KHNP is a public corporation specializing in energy business which was established in April 2001 through the spin-off of the power distribution division from Korea Electric Power Corporation (KEPCO) in accordance with the government’s Electricity Industry Restructuring Program. We are committed to contributing to the enhancement of national energy competitiveness as well as people’s quality of life through the stable supply of eco-friendly and high-quality energy and technology sharing.

	Company name	Korea Hydro & Nuclear Power Co., Ltd		Governing Organization	Ministry of Trade, Industry and Energy
	CEO	Cho Seok		Institution type	Public enterprise
	Establishment	April 2, 2001		Paid-in capital	KRW 1,212.2 billion (as of Dec. 31, 2015)
	Head office	1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do, Korea		Employees	10,842 persons (as of Dec. 31, 2015)
	Basis of establishment	Act on the Promotion of Electric Power Sector Restructuring (Act No. 6282)		Ownership	KEPCO 100 %
	Major function	Development of electric power resources / power generation and related businesses / R&D and affiliated businesses / overseas business		Organization	7 HQs, 26 departments and offices (Head Office), 4 nuclear power sites (Kori, Hanbit, Wolsong, Hanul), 1 hydro power site, 7 pumped storage power plants, and 8 other offices

Main Business

Our business domain covers power generation (nuclear power, hydro power, and new and renewable energy), construction, R&D, and overseas business. As Korea’s largest power generation company which accounts for about 30% of domestic electricity power supply, KHNP operates 24 nuclear, 16 pumped storage, 5 photovoltaic, 1 wind, and 14 small hydro power plants.

**Power Plant Facilities** (As of end of August 2016)

Classification	Nuclear				Hydro (incl. Pumped Storage)	New and Renewable*	Total
	Kori	Hanbit	Wolsong	Hanul			
Units in operation	6	6	6	6	37	20	81
Capacity (MW)	5,137	5,900	4,779	5,900	5,295	28	27,039
Total (Domestic M/S)	21,716(21.44%)				(5.23%)	(0.03%)	(26.70%)

\*Small hydro power, wind power, and photovoltaic facilities

**New Power Plants under Construction** (As of end of August 2016)

Classification	Under Construction (6 units)			Preparation for Construction (6 units)		
	Shin-Kori #3 & #4	Shin-Hanul #1 & #2	Shin-Kori #5 & #6	Shin-Hanul #3 & #4	Cheonji #1 & #2	Other (2 units)
Capacity	1,400MW×2 units (APR1400)	1,400MW×2 units (APR1400)	1,400MW×2 units (APR1400)	1,400MW×2 units (APR1400)	1,500MW×2 units (APR+)	Unfixed
Const. Period	2007.9~2017.3	2010.4~2019.2	2016.6~2022.10	2017.2~2023.12	2021.5~2027.12	-
Status	Commissioning	Electro-mechanical works	Basic excavation works for main facility	Evaluation on enforcement plan	Preparation for applying enforcement plan	-
Progress	99.34%	88.34%	-	-	-	-

KHNP Vision 2030



Global Leader Ushering in New Era of Hope

Establish Mid-term Management Strategy 2030 to Reflect Changes in Management Environment

As the prolonging stagnation in the global economy affects domestic growth rate, power consumption is on the decrease. Furthermore, new paradigm of low carbon power mix is emerging in power industry in preparation for Post 2020. To respond to the changes in management environment, both internal and external, and to carry out business activities aligned with the corporate philosophy, KHNP has established the “2030 mid-term management strategy.”

Modification of Strategic Direction in Line with Domestic and Overseas Power Business Issues

	Issues in Power Business	Strategic Direction	2030 Management Goals
Domestic	· Release of the Basic Plan for Electricity Supply and Demand and conclusion of new NPP construction plan	Safe NPP operation first / stable promotion	Sales: KRW 25 trillion Proportion of overseas sales: 16 %
Overseas	· Fierce competition in NPP export market and diversification of ways for winning orders	Phased overseas business promotion / gradual expansion	
Hydro	· Increasing demand for developing hydro power sources in underdeveloped countries · Increasing demand for improving hydro power performance such as facility upgrade	Targeting countries where our business operates / promotion of tailored businesses	Domestic: Operate 37 NPPs Overseas: Win 11 new NPP orders in the world Technological prowess: Global No. 1
New Business	· Conclusion of permanent shutdown of Kori #1 · Growing trend in low-carbon electricity mix policy for GHG reduction in preparation for POST-2020	Expansion of technology-driven businesses / cultivation of new energy businesses	

KHNP’s Mid to Long-term Management Strategy

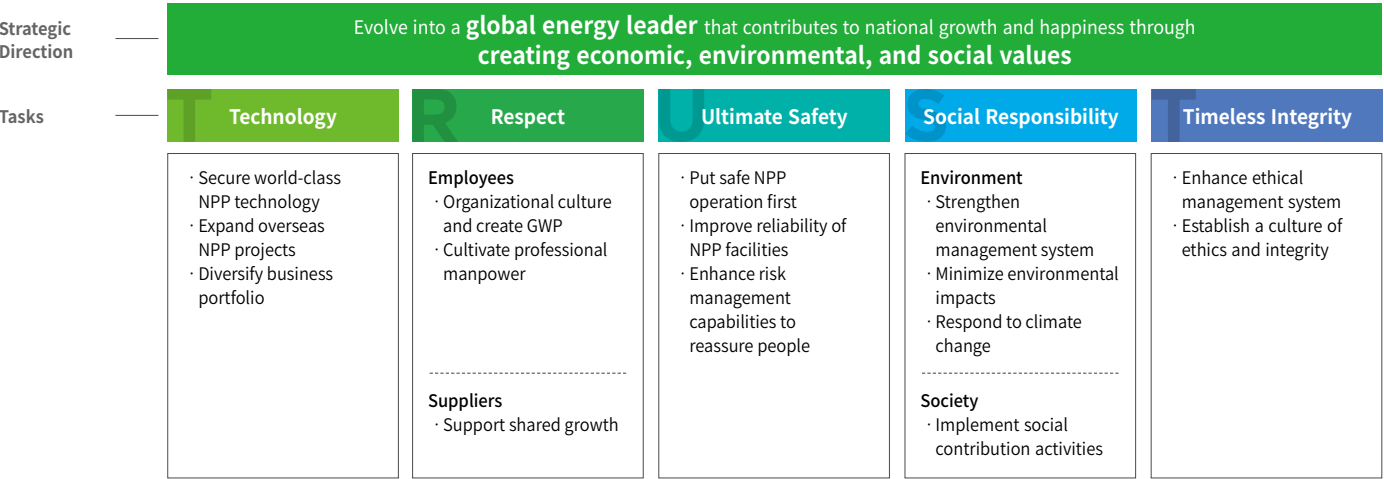
Purpose of Establishment	Contribute to the enhancement of national energy competitiveness as well as people’s quality of life through the stable supply of eco-friendly energy			
Vision	Reliable Global Energy Leader, KHNP			
Core Values	Technology	Respect	Ultimate Safety	Social Responsibility
3 Strategic Directions	Prioritize safe operation of nuclear power plants	Promote overseas business in phases	Expand technology-oriented businesses	
Business Strategies	Domestic Nuclear Power	Overseas Nuclear Power	Hydro Power	New Businesses
	· Establish KHNP’s own integrated management model · Strengthen engineering capability · Sharpen procurement capability and secure integrity of SCM · Build professional manpower cultivation system · Secure global leading nuclear power technology · Diversify talent recruitment pool · Improve efficiency of HQ organization and enhance execution capability of local business sites · Restructure the organization for promoting 2030 mid to long-term business strategy · Expand performance-oriented HR evaluation · Enhance construction process and secure leading technologies · Secure quality and safety improvement system · Improve process for enhancing PR/PA³ effects	· Foster global competitiveness of nuclear reactor technology for export · Secure project development capability · Enhance financing capability · Establish overseas manpower cultivation system	· Improve efficiency by upgrading facilities and sharpening technological competence · Secure reference for overseas operation projects · Expand overseas operation projects centered on countries with reference	· Lay the foundation for decommissioning business and promote exports · Develop unit technology business based on customer needs · Pursue new and renewable energy business portfolio with economic feasibility
Strategic Tasks				



Sustainable Management Built around Five Core Values

KHNP operates under our sustainable management strategies to grow into a leading energy company that generates values in economy, environment, and society. The strategies are rooted in “T.R.U.S.T”, the five core values of our 2030 mid-term management goals. KHNP fulfills its social responsibilities as it achieves key management goals and raises environmental and social performances by faithfully implementing the sustainable management strategies.

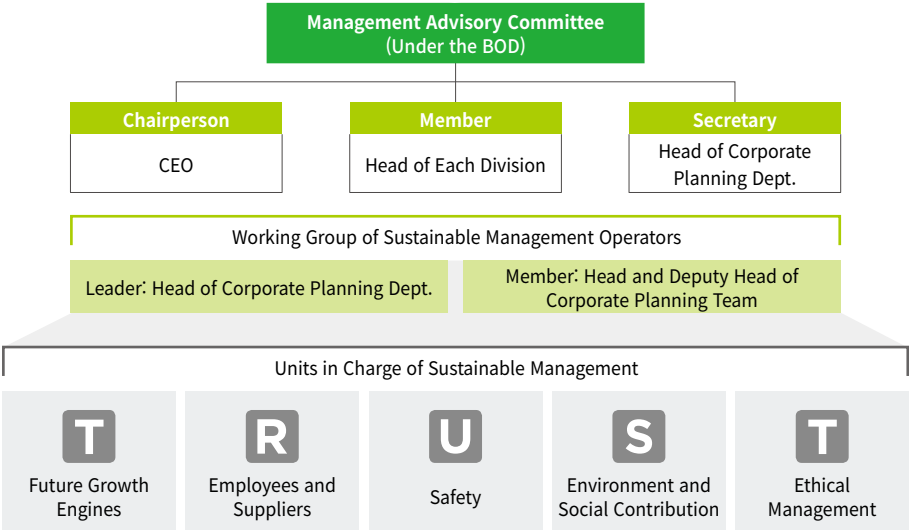
Sustainability Management Strategy



Sustainable Management Task Force and Committee

KHNP operates teams dedicated to the general administration of sustainable management. The Planning Team, for example, handles general tasks such as sustainability report, education, and annual review of annual initiatives while the Management Advisory Committee (MAC) serves as both consultative and decision-making body on key sustainable management issues. In 2015, the MAC carried out additional discussion on safety improvements of NPP, social contribution activities review, previous value sharing activities for local communities, and other core issues. Meanwhile, by emphasizing the communications with onsite workers and assigning operators to each area of “T.R.U.S.T”, we share information on key activities and conduct monitoring activities on a regular basis.

Sustainability Management Organization



Major Sustainability Management Performances

Indicator	Unit	2013 Results	2014 Results	2015 Targets	2015 Results	Evaluation	2016 Targets
R&D Investment	KRW in billions	336.9	303.1	384.1	323.6	▶	505.7
Overseas Sales	USD in millions	105.43	176.26	269.94	280.05	●	301.6
RPS Execution	GWh	1,770	1,812	2,133	2,161	●	2,335

Family-friendliness	Points	131.8	146	161	161.7	●	(Plan to change indicator)
Per-capita Education Expense	KRW in millions	3.4	3.41	3.5	3.91	●	3.9
Labor-Management Relationship	Points	3.03	3.13	3.21	3.31	●	3.48
Purchase of SME Products	%	50.2	50.3	52.5	52.7	●	54.3
HR Support (including Atom Mentor)	Persons	15	25	44	48	●	50
Overseas/Domestic Marketing Support	Cases	473	499	500	503	●	520
Financial Support for SMEs	KRW in billions	79.2	91.7	95.0	86.7	▶	100.0
Performance Sharing Tasks	Cases	12	77	76	81	●	100

Failure & Shutdown	Cases/Unit	0.26	0.22	0.33	0.13	●	0.33
Radioactive Dose	man-Sv/Unit	0.53	0.36	≤0.57	0.36	●	0.55
Comprehensive NPP Safety Performance Index	Points	99.731	99.804	99.5	99.853	●	99.957
Operating NPP Safety Management Index	%	12.228	6.7112	≤9.90	3.07	●	8.90
Follow-up Measures after Fukushima Crisis	%	65.2	73.9	100	87.5	▶	91.07

Dandelion Spore Fund	KRW in billions	4.3	5.2	9.0	10.0	●	12.0
Local Community's Receptivity	Points	46.1	45.5	52	54.7	●	54
Environmental Performance Index*	Points	150.6	182.7	201	257.6	●	283.3

Integrity Index	Grade	5	3	2	2	●	1
Assessment of Anti-Corruption Plans	Grade	3	2	2	1	●	1

\*The tightened scoring criteria of performance indicators such as waste recycling rate was applied retroactively to data in 2013 and 2014, thereby there are some differences from data of the previous report.

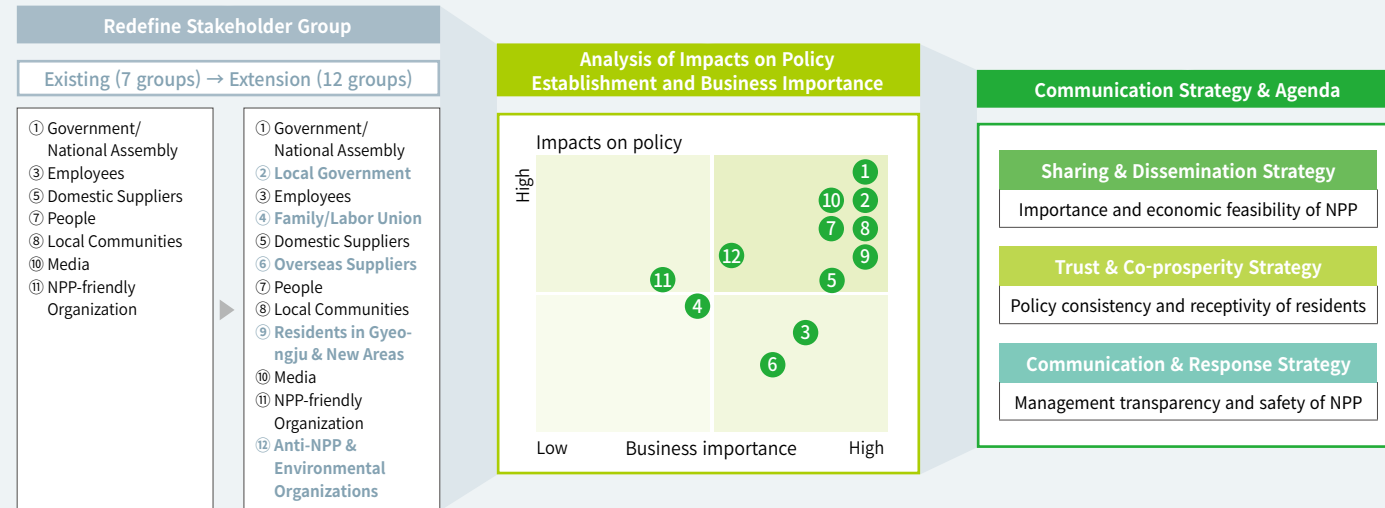


# Stakeholder Engagement



## Promote Sustainability Management along with Stakeholders

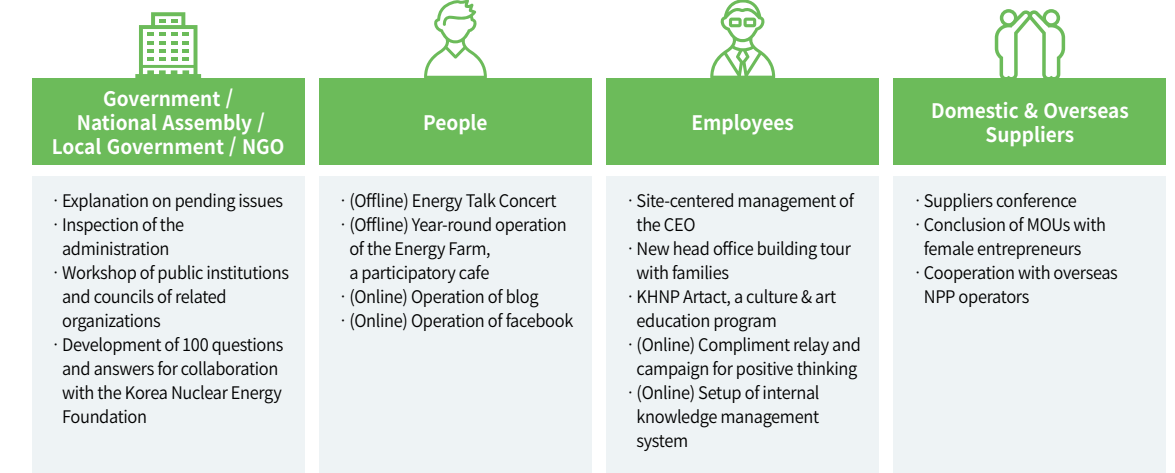
We classify our stakeholders into 12 groups and listen to their opinions through communication channels suitable for their characteristics. Collected opinions are reflected to our management activities and also used for continuous improvement. We will be proactive in paying attention to their interests and concerns and adopting requirements to our sustainability management activities.



## Sharing & Dissemination Strategy



Sharing of the Value of Necessity and Importance of NPP and Dissemination of Sympathy



## Communication & Response Strategy



Transparent Communication and Timely Response to Pending Issues



## Trust & Co-prosperity Strategy



Continuous Effort to Enhance Trust on Nuclear Power Policies and Receptivity of Residents





## Communication with Stakeholders



### Sustainability Management

Professor Lee Byung Wook (Sejong University Graduate School of Public Policy, former Vice Minister of Environment)

KHNP represents a considerable amount of electricity power generated in resource-poor Korea having an enormous impact on the nation's sustainable development. It is a good news that KHNP is growing into a sustainable company respected by the general public by carrying out mutual growth and social contribution activities following the relocation to Gyeongju. It is of paramount importance to **win the trust from people** if KHNP is to establish itself as a truly sustainable company that supplies energy to the national infrastructure. Also, KHNP should carry out **in-depth analysis of varied stakeholders and take strategic responses** accordingly from the perspective of sustainable management to seek balanced values in economy, environment, and society. I look forward to seeing KHNP developing into a global energy company that recognizes "future generations" and "eco system" as most critical to realizing sustainable management.



### Technology

Director Seo Ga Ram (Nuclear Plant Export Promotion Division, Ministry of Trade, Industry and Energy)

There are two tasks that KHNP must perform to generate sustainable outcomes. First, R&D for technology advancement. Though KHNP possesses excellent technology, it is integral to maintain consistent nuclear performance and efficiency to be competitive in the global arena. With the planned permanent shutdown of Kori #1 reactor, KHNP should **secure decommissioning technology** going forward. Second, overseas business diversification. In addition to obtaining international certificates like EU, KHNP will have to attain recognition of nuclear safety to take the lead in the global markets. Furthermore, like KHNP has recently created a new business model when it signed OSSA, the company needs to **diversify its export models in preparation for the future energy era**.



### Respect

President Choi Jung Sam (La-Tech Co., Ltd.)

The education programs developed and offered by KHNP Human Resources Development Institute including consortium course for SMEs and other customized quality improvement seminars contribute to increasing work capabilities and understanding of nuclear quality system. In addition, a wide range of technical support for technology domestication **helps SEMs to enhance their competitive edge**. KHNP's support for NPP equipment domestication, implemented as part of shared growth initiative, leads to technology development and increases quality confidence, paving the way for NPP export. My company benefitted from this initiative when we joined NPP projects in the UK and China. This experience has helped us to continue bidding activities in Turkey. If KHNP **expands education programs through the shared growth initiative** while concentrating resources into increasing workforce for equipment verification, the dream of becoming global energy leader as well as boosting the nation's economic growth will be realized before long.



As the awareness of nuclear safety increases globally following the Fukushima disaster, nuclear operators increasingly recognize safety as essential to sustain nuclear business. Nuclear safety is based upon the general safety culture and nuclear skills are the ultimate expression. Skills in nuclear industry mean quality workforce and investment. Increased awareness of safety in nuclear operation ensures safety of today. To secure safety for the future, however, we need to perform more than just NPP operation, for example, by **staying updated with the changing trend and investing in R&D**. As KHNP is the only NPP operator in Korea, it is important to have a **comprehensive understanding of the NPP industry** ranging from construction, operation, global trend, and R&D to policy, export, electricity power markets, decommissioning, used fuel, nuclear waste and disposal to safety.



### Ultimate Safety

Professor Chung Bum Jin (Department of Nuclear Engineering, Kyunghee University)

In order for KHNP to carry out nuclear business and even fulfill its social responsibilities, it is important to **place emphasis on communication with the general public**. Instead of a unilateral communication, a two-way channel must be established where politicians, press, and academia come together to build the national consensus. I also highly appreciate KHNP's social contribution activities. However, I would like to suggest that KHNP publish "Social contribution white book" in order to systemically manage social contribution fund and maximize the effect of the activities. Wonderful ideas will be generated if social contribution white book is published in each region. Outstanding social contribution cases will serve as good standards for benchmark. Also, if KHNP **introduces social contribution cases to local communities and reflect their feedback** on a regular basis, a human network of trust will be created.



### Social Responsibility

Chairman Kim Ho Sung (Korea Nuclear Energy Agency)

KHNP has been dedicated to establishing integrity and ethics management culture by improving ethical management system and carrying out preventive ethical activities and participatory ethics programs. These efforts have resulted in selecting as the best institution in anti-corruption policy evaluation by the Anti-Corruption & Civil Rights Commission, jumping two grades in general integrity evaluation, and improving the KHNP-BEX in 2015. KHNP is also confident that our efforts for disseminating integrity practices through cooperation networks with relevant agencies have contributed to maintaining the most optimal level of integrity in nuclear industry ecosystem. KHNP is now poised to depart from the regulation-based ethics culture to the **internalization of ethics** by reviewing the existing strategies and practices, thereby setting up a **more systematic and effective ethical management**. In addition, we promise to **never tolerate illegal solicitation or receipt of gift** while ensuring that whistleblowers are always protected from unfair treatment by taking appropriate measures upon report of violations.



### Timeless Integrity

Manager Son Byung Oh (KHNP, Planning Dept. Planning Team)



# Core Sustainability Management Issues



## Identification of Core Issues

Checking stakeholders' interests and identifying core issues are very significant activities for ensuring management transparency and trust. As the first step to figure out KHNP's material issues, we formed an issue pool by reviewing the trend of domestic and overseas energy business, management issues of related companies, and our news articles reported in the media. And then, the issue pool was reevaluated by collecting stakeholder opinions through diverse monitoring channels. After these processes, we identified core reporting issues that KHNP have to cope with preferentially. The materiality analysis process was systematically conducted in a transparent and consistent manner and verified by a third-party assurance institution.

## Materiality Analysis Process



### STEP 01

#### Form Sustainability Management Issue Pool

Review of diverse internal and external data to understand KHNP's sustainability management issues

- 1 Media research
- 2 Study on management issues of global leading companies
- 3 Analysis of issue trends in energy industry
- 4 Review of international standards for sustainability management
- 5 Review of internal data such as operating performances



### STEP 02

#### Conduct Materiality Analysis

We conducted materiality analysis of the issue pool in accordance with importance for business and society.

- 1 Importance for business
  - Review of short, mid, and long-term financial impacts
  - Survey of internal stakeholders
- 2 Importance for society
  - Survey of external stakeholders
  - Media research
  - Benchmarking of global leading companies



### STEP 03

#### Determine Core Reporting Issues

Core reporting issues were determined in the aspect of importance among issues selected through materiality analysis.

- 1 Selection of core issues through materiality analysis
- 2 Setup of table of contents in line with GRI G4 Core type



### Step 01 Form Sustainability Management Issue Pool

We formed a pool comprised of 112 issues through reviews of international sustainability management standards such as GRI G4 and ISO 26000, benchmark of reporting issues of global leading energy companies, and media research in 2015. The issues were condensed into 19 core issues in accordance with materiality and categorized into three sectors of economy, environment, and society.

#### Economy

- 1 Strengthen management innovation and efficiency
- 2 Promote listing on KRX by improving financial structure and transparency
- 3 Secure new engines for global growth
- 4 Ensure substantiality in overseas business
- 5 Promote integrated risk management
- 6 Secure leading technological competitiveness
- 7 Improve sustainability management strategy by adopting UN SDGs

#### Environment

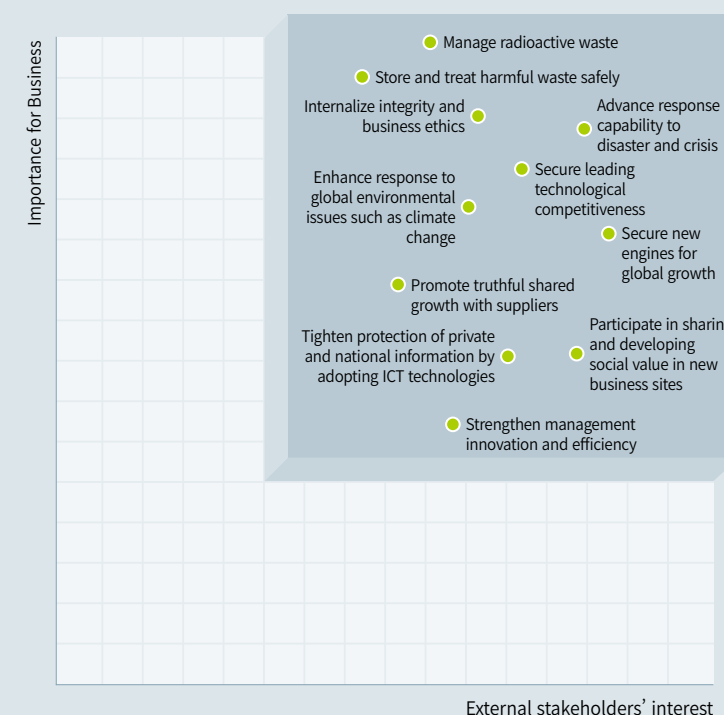
- 8 Enhance response to global environmental issues such as climate change
- 9 Manage sources and energy efficiently
- 10 Manage emissions safely
- 11 Store and treat harmful waste safely
- 12 Manage radioactive waste
- 13 Protect biodiversity around business sites

#### Society

- 14 Advance response capability to disaster and crisis
- 15 Tighten protection of private and national information by adopting ICT technologies
- 16 Internalize integrity and business ethics
- 17 Promote truthful shared growth with suppliers
- 18 Participate in sharing and developing social value in new business sites
- 19 Expand stakeholder communication channels

### Step 02 Conduct Materiality Analysis

We surveyed internal and external stakeholders on 19 material issues in three categories. And then, we identified core issues through a comprehensive study of their direct and indirect influences, goals, and performances.



### Step 03 Determine Core Reporting Issues

We compiled this report by realigning 11 core issues identified through the materiality analysis in the aspect of KHNP's five core values - "Technology," "Respect," "Ultimate Safety," "Social Responsibility," and "Timeless Integrity." Each issue section contains its background, goals, and performances to help stakeholders understand better.

Core Reporting Issue	Five Core Values	Page
Secure leading technological competitiveness	Technology	39
Secure new engines for global growth		40-41
Strengthen management innovation and efficiency	Respect	48-49
Promote truthful shared growth with suppliers		50-53
Advance response capability to disaster and crisis	Ultimate Safety	54-63
Tighten protection of private and national information by adopting ICT technologies		64
Enhance response to global environmental issues such as climate change	Social Responsibility	67
Store and treat harmful waste safely		70
Manage radioactive waste		72
Participate in sharing and developing social value in new business sites		73-77
Internalize integrity and business ethics	Timeless Integrity	78-81



# Strategic Approach

It is frontline employees who realize sustainable growth. Employees are the essential strategic resources and at the same time the values driving the company's growth and development.



# Transparent and Stable Operation of the BOD



## Enhancement of the Corporate Governance Transparency

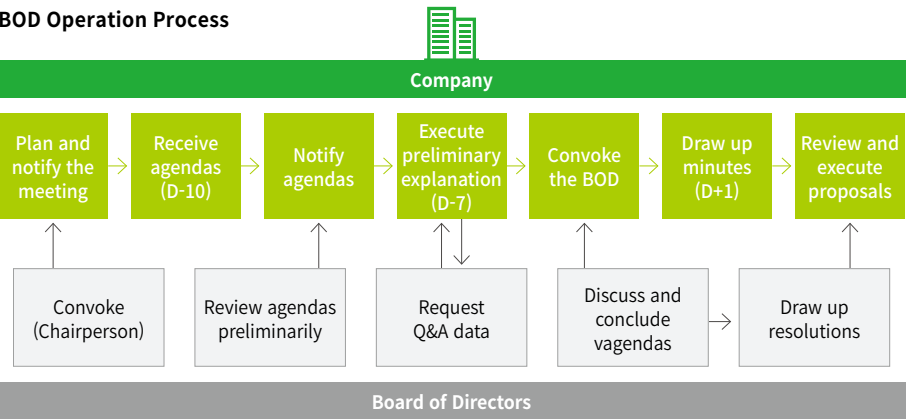
### Composition of the BOD

The Board of Directors (BOD) is a supreme decision-making body at KHNP which not only reviews major management strategies but supervises overall business operations. The BOD consists of six executive directors and seven non-executive directors with three-year term, making responsible decisions and participating in management activities in a proactive manner. The independence of the BOD is assured by electing the chairperson among non-executive directors and making them hold a majority of the BOD.

### Operation of the BOD and Subcommittees

The roles of the BOD cover decisions on management activities in line with government policies, matters stipulated in rules and articles of association, basic corporate principles, and business executions as well as supervision of performance of the CEO’s duties. Six subcommittees are operating under the BOD, which offer management consultation and professional supports, facilitating the operational efficiency of the BOD. The subcommittee members meet regularly and are proactive in supporting the BOD.

BOD Operation Process



Composition and Operation of Subcommittees

Subcommittee	Composition	Role	Major Activities in 2015
Audit Committee	1 executive 2 non-executives	Audit on business & accounting	· 28 meetings (19 resolutions, 26 reports) · 4 site-centered communication activities · Comments on insufficiencies in reporting audit results
Executive Recommendation Committee	5 non-executives 2 external experts	Recommendation of executive candidates	· 7 meetings → Screening an executive audit member and 6 non-executive directors · Launch of the committee before two months of the expiration of executive terms
Financial Management Committee	1 executive 2 non-executives	Consulting on finance & management	· Review of responses and countermeasures to cyber security and discuss on future actions plans · Consultation on mid to long-term financial plans and management goals · Suggestion on invested businesses
Press Relationship Committee	1 executive 2 non-executives	Consulting on PR	· Preliminary review of 2014 PR plans and proposal · Consultation on TV ads · Suggestion on PR activities in Seoul and Gyeonggi-do after the relocation to Gyeongju
Local Community Development Committee	1 executive 2 non-executives	Consulting on regional & civil complaints	· Reexamination of the company housing project in Gyeongju and request on alternatives · Priority-execution of social contribution activities in regions where nuclear power plants are located
Non-Executive Directors Committee	7 non-executives	Discussion on the BOD operation	· Conclusion of assets redemption volume in line with former CEO's and executive director's violation of integrity policy · Discussion on continued operation of Kori #1 unit · Amendment of the BOD rule

Executive Directors

Name	Position
Cho Seok	President & CEO
Wi Jae Min	Executive Auditor
Kim Bum Nyun	Head of Power Generation Division (VP)
Yoon Chung Ro	Head of Quality & Safety Division
Chun Young Taek	Head of Planning Division
Lee Young Il	Head of Construction Division

Non-executive Directors

Name	Position
Cho Seong Hee	Director of Research Council of Energy & Resources Industrial Development
Lee Tae Hyeong	Chairman of Soobong Educational Foundation
Jeon Seong Hwan	Chair-professor at Konkook Univ.
Ryu Sung Kyu	Former president of Korea Coal Corporation
Cho Jeong Je	Chairman of Daehannews Media Group
Park Kyu Ho	CEO of Korea Electric Vehicle Charging Service
Lee Jin Gu	Former non-executive director of Korea Radioactive Waste Agency

## Decision-making Process of the BOD

The BOD is chaired by a non-executive director. Major agendas are shared with all BOD members before the meeting to ensure smooth decision-making. They have an equal opportunity for statements at the meeting, while exclusive statements are prevented and checks on majority rule are also ensured in making decisions. In 2015, we strived to advance communication further between the company and the BOD and established a culture of conducting in-depth discussion before the BOD meeting. As a result, the average deliberation time per meeting increased 87% from 80 minutes in 2013 to 150 minutes in 2015.

## Enhance the Professionalism of and Communication with Non-executive Directors

Non-executive directors check and monitor activities of the management. They boast rich experiences in the fields of business operation, corporate management, media, and community relation. They are proactive in reviewing and consulting major agendas and management issues in each field. To help newly nominated non-executives better understand our businesses, we invite them to domestic and overseas power plants and hold workshops for capability enhancement.

Programs to Enhance Non-executives’ Understanding of Our Business

For newly nominated non-executives	· Start-up program · Workshops to strengthen capabilities of new non-executives
For better understanding of pending issues	· Site tour of nuclear power plants at home and abroad · Kori NPP, Samrangjin pumped storage (Feb.) / Wolsong NPP, Korea Radioactive Waste Agency, Gyeongju Head Office (Aug.) · Barakah NPP tour in UAE (Nov.)

## Remuneration and Compensation

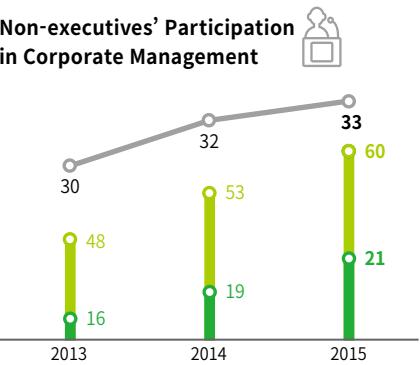
The BOD remuneration limit complies with “Executive Wage Guideline” that the Minister of Strategy and Finance established through deliberation and conclusion of the Management Committee, and is appropriated at the shareholders’ meeting. Total remuneration in 2015 amounted to KRW 840 million. The remuneration volume depends on regular evaluation on their performances. The kind, basis, and total amount of remuneration of executive directors who receive remuneration above criteria are disclosed separately to ensure the transparency.

Remuneration Status

(Unit: KRW in thousands)

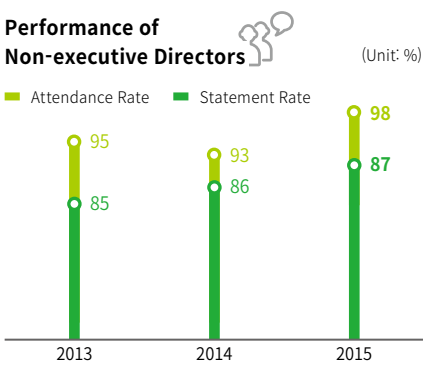
	No. of Members	Total Remuneration	Remuneration per Member	Remarks
Executive Auditor	1	126,396	126,396	CEO
Executive Director	5	505,585	101,117	-
Non-executive Director	7	210,000	30,000	KRW 2.5 million per month for service allowance

Non-executives’ Participation in Corporate Management



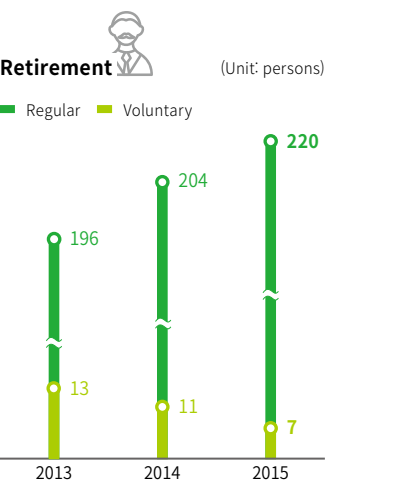
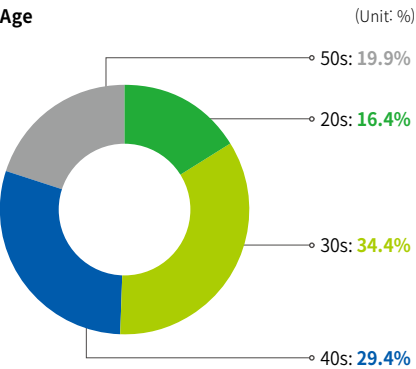
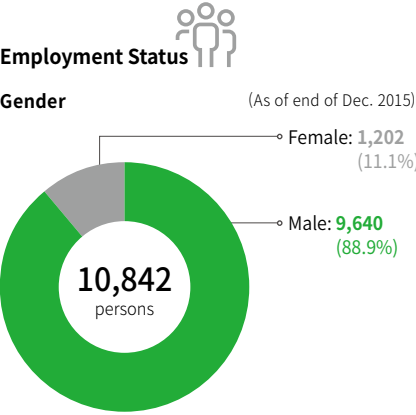
Performance of Non-executive Directors

(Unit: %)





# Nurture Competent Talents

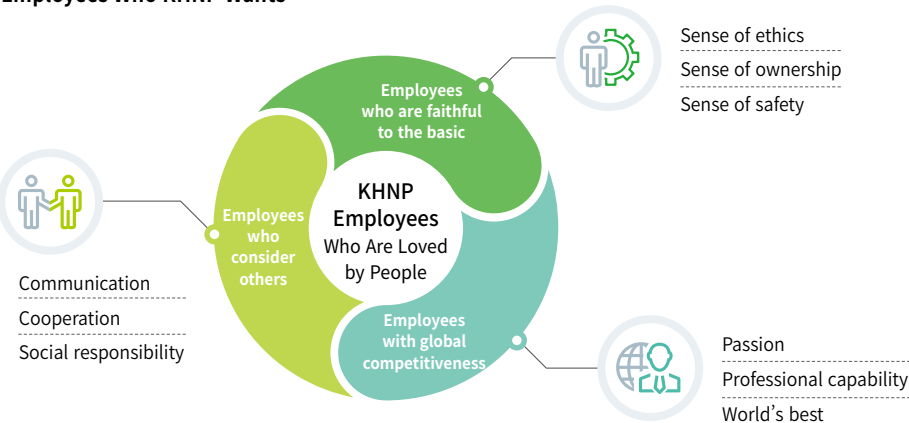


## Talents, the Key Competitive Edge to Nuclear Industry of Future

### HR Philosophy

Under the overarching HR philosophy of “KHNP people loved by the general public”, we look for professionals “who are faithful to the basics, considerate of others, mutually respect, and global professional”. The three criteria serve as the standard for recruitment, personnel management, and talent training, as KHNP works to achieve its goals and management vision.

#### Employees Who KHNP Wants



### Recruitment

#### New Recruitment Plan

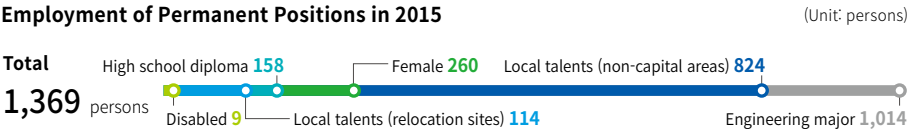
KHNP forecasts long-term recruitment demand based on new NPP construction and overseas expansion in accordance with the 2<sup>nd</sup> National Energy Framework Plan. We plan to increase the current number of employees from around 10,000 to 18,000 by 2030 while expanding social equality recruitment programs for the disabled and increasing local talent quota to enhance the company’s diversity.

#### Expert Recruitment

As demand for highly skilled workforce in sophisticated positions is on the rise because of NPP expansion, decommissioning, and other new projects, KHNP has increased slots for professional contract experts. To hire professionals in equipment and design verification, patent lawyers, accountants as well as on-site engineers with proven experience in maintenance, KHNP has in place systematic wage system and personnel policies.

Employees		(Unit: persons)		
		2013	2014	2015
Total		9,553	9,816	10,842
Type of employment	Permanent	17	28	33
	Temporary	232	230	255
Gender equality	Female permanent positions	899(9.4%)	971(9.9%)	1,202(11.1%)
	Female managers	7(0.79%)	7(0.72%)	10(1.05%)
Social equity	Disabled	324	336	341
	High school diploma	2,829	2,757	2,780
	Local talents	6,050	6,196	6,780

#### Employment of Permanent Positions in 2015



### Human Rights-based HR

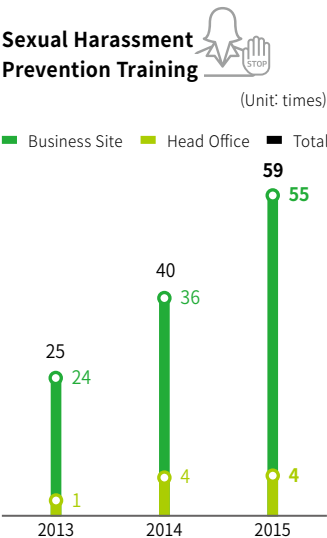
KHNP faithfully abides by the principles on human rights and labor of the UN Global Compact which we joined in 2007. Our human rights-based HR policy allows no discrimination regarding gender, academic background, or career, stipulating that no one is ever discriminated against for employment, promotion, rewarding, or retirement because of their physical disability or race.

#### Prohibit Child Labor and Forced Labor

KHNP observes the Labor Standard Act and the UNGC principles on labor in taking preemptive measures against child labor and forced and compulsory labor. We monitor any potential form of forced labor via the regular labor-management council meetings, taking strict measures on any of confirmed cases regardless of rank. We also pay additional 150% of legal wage for work on holidays. Those efforts have resulted in us recording no cases of labor dispute or violation of child labor or forced labor in 2015.

#### Prevent Sexual Harassment and Sexual Discrimination

We hold education on sexual harassment preventions at workplace in the HQ and 14 regional offices more than once a year. The education is delivered by outside lecturer. Heads of department are required to be present in all of education. We also set up guidelines on prevention of sexual harassment, ensuring stringent and immediate measures on any cases reported to head of department or HR team.



## Transparent Performance Evaluation and Reward

### Performance Evaluation and Reward Principles

Employees at KHNP have personal goals clearly aligned with those of the company. KHNP strives to ensure stable working environment where employees can deliver the goals by letting them unleash potential in full. Heads of department engage with employees in sincerity while monitoring their progress in reaching both the individual and company goals. Meanwhile, achievements and performance are evaluated in a fair and transparent manner. Objective two-way evaluation process ensures that all employees are rewarded according to their duties and capabilities in a fair manner. Any form of discriminatory factor is excluded from this process.

### Performance-based System

KHNP applies the performance-based system introduced in 2011 to evaluate employees’ work values and performance for promotion and reward. We evaluate performance based on their capabilities and performance, instead of academic background, region, or gender. All process ranging from recruitment, placement, promotion to evaluation are conducted in accordance with the objectively defined qualitative and quantitative index.

### Reasonable Reward System

Our employees are rewarded in a reasonable manner under the transparent and fair system. Our decisions on HR and reward are made based on the data that is complied according to individual performance and capabilities in an objective manner. Also, by offering incentives involving multi-dimensional organization evaluations aimed at strengthening structural cooperation, we strive to create working environment to let employees fully engage in implementing their responsibilities.

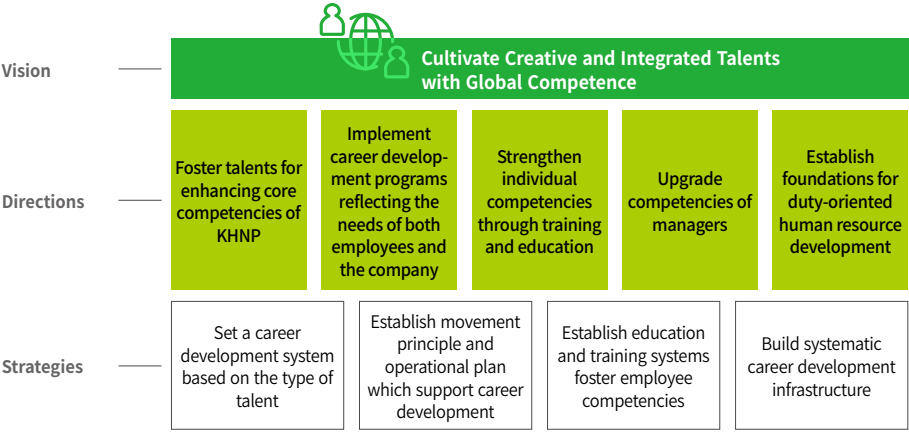


## Strengthen HR Capabilities

### HR Development Strategy

In order to secure quality competitiveness and nuclear safety, KHNP endeavors to improve employees' work capabilities. KHNP conducts customized training for each job category, position, and level to strengthen employee capabilities. We introduced the “Job performance ability certification system” in 2014, issuing certificates to KHNP employees who meet assessment requirements of knowledge and skill for each job. Certified employees are acknowledged for their unique capability of job performance. As of 2015, the rate of inside experts who obtained the certificate rose by 4.9%p to 62.7%.

#### Talent Cultivation Strategy



### Train Specialists

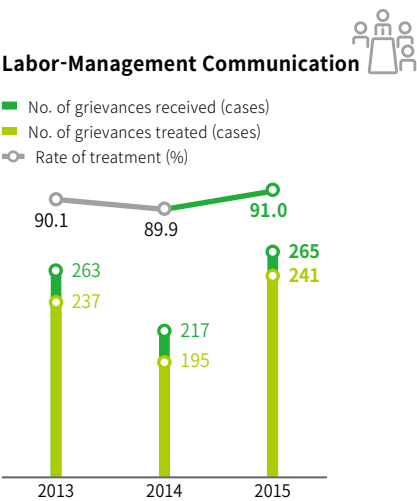
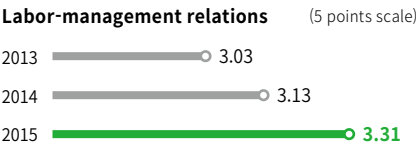
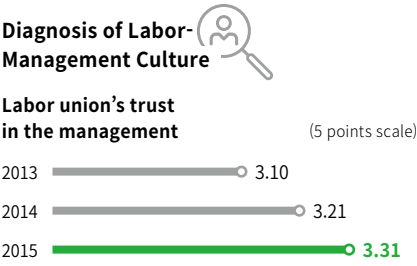
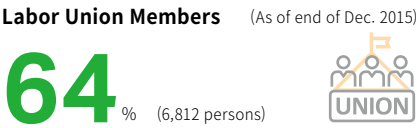
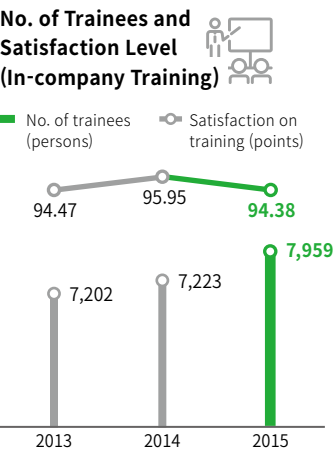
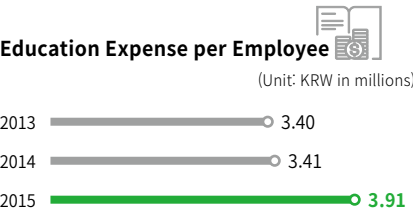
KHNP introduced in-house professional lecturer system to transfer and share knowledge in core areas. We either recruit or designate a total of 50 professional lecturers from the pool managed via the in-out system on a yearly basis. We also operate education & training center for hydropower. The company introduced an additional simulation trainer for nuclear conductor.

#### Select Core Duty Professionals

KHNP has selected 100 core duties from the fields of development, safety, machinery, measurement, and quality. We then designated core duty professionals in charge of technical consultations and knowledge management, thereby facilitating information and knowledge sharing across the supply chain and raising productivity industry-wide. As of 2015, 180 core task specialists were designated.

### Strengthen Employees' Competitive Edge

KHNP provides a wide variety of education programs including OJT, leadership education, and global education to help employee achieve individual goals and deliver performance. Employees with proven business knowledge are dispatched to leading overseas companies to review business expansion into international nuclear markets. KHNP has updated the materials and lecturer line-up according to the global education and training process of Systematic Approach to Training. The Global Village in the Professionals Development Center is a 24-hour language-learning center that was specifically established for language training. KHNP plans to expand education courses on overseas export to meet the expected training demand for the UAE project in the NPP-adopting Middle East, Europe, and Asia. KHNP works to improve its competitive edge by training employees through programs such as circulatory position system, department and business unit circulation, and career development program.



## Labor-management Relationship of Mutual Respect

### Labor-management Advancement Strategy

KHNP has put forward our labor-management vision as “Creation of future-oriented labor-management relationship of mutual respect and harmony” based on our core value “T.R.U.S.T”. Our labor-management vision and strategy system consists of three values of “capability”, “respect”, and “communication”, and 19 implementation tasks. Employees at KHNP are committed to delivering the future-oriented labor-management ties under this strategy. As a result, we set the record of negotiation without dispute for 15 years in a row.

#### Establish Reasonable Labor-management Relationship

KHNP has defined labor-management relationship as the “relationship of trust that comes with freedom and responsibility based on rules and principles”. The company has established practical labor management system to thoroughly prevent unfair labor practices and expand cooperation with suppliers. Labor and management at KHNP practice social responsibilities while delivering the foundation for sustainable management. In 2015, KHNP joined the Union Corporate Committee (UCC), the Korean consultative body of the UN SDG to carry out social responsibility as a public corporation.

### Enhance Labor Management Capabilities

Under the defining leadership by its CEO to establish advanced labor-management relationship, KHNP has expanded company-wide labor organization by designating labor officers in NPPs. The company holds customized and intensive education for team managers and labor officers to ensure field-oriented labor management. In addition, we conducted research satisfaction with workplace through enhanced communication among team members, company vision aligned with management goals, and organizational culture improvement. The company plans to establish capability evaluation system of team managers and intensive course on labor management in 2016.

### Efforts to Prevent Labor-management Conflicts

To take preemptive measures against labor-management conflicts, KHNP has established the “integrated grievance process system”. Launched in 2015, the integrated grievance process system serves to prevent and resolve conflicts between labor and management by analyzing the compiled data on employee complaints. Furthermore, KHNP collects inputs from employees through a variety of communication channels including the Labor-Management Joint Committee and Labor-Management Council. Issues regarding management are disclosed to employees in a transparent manner. KHNP also monitors the council to ensure the appropriate operation of the Labor-Management Council in accordance with laws and purposes.

#### Communication with Employees to Create Consensus

KHNP recognizes that “communication” comes before everything if we are to implement the Government's policies and to create new corporate culture to keep abreast of internal change and innovation. We therefore strive to understand employees' needs and build consensus. In order to promote company-wide communication, which would be otherwise difficult due to differences in duty and position, KHNP endeavors to restore trust by engaging with employees in events such as labor-management festival and labor-management meeting. The company also commits to strengthening strategic communication between department, job category, generation, and region. Meanwhile, KHNP has formed the Special Committee on Labor-Management Relationship of outside professionals to bring balanced third-party perspective.



## Reasonable Welfare System





### Principles of Welfare System

While maintaining reasonable and appropriate welfare system, KHNP addresses lax management practices by managing a strict welfare system. To eradicate lax management practices, in particular, the company has established a 24/7 monitoring system of the welfare benefits based on labor-management consensus, thus proactively carrying out the Government’s welfare system for public organization.

### Develop Sustainable Welfare System

Our reasonable welfare system ensures that employees are fully engaged in work enjoying stable working environment. In addition to four major public insurances and other basic welfare benefits, KHNP offers optional welfare system designed around lifecycles, helping raise employees’ work engagement.

#### Improvement of Welfare System

Key improvement	Relevant regulations		
<ul style="list-style-type: none"><li>· Conversion of college expense scholarship system</li><li>· Observe the Government standard for school expense for middle and high school children</li><li>· Improve vacation system</li></ul>	Collective agreement, employment rules, reward regulations, Intra-company fund management rules, welfare system management rules	 <b>Lay basis for system improvement by revising rules</b>	 <b>Review system appropriateness and execution record</b>
<ul style="list-style-type: none"><li>· Rational adjustment of retirement memorial gift</li><li>· Adjust subsidy for family events</li><li>· Pay wage equivalent to the amount of public officials for sick leave</li></ul>	Collective agreement, employment rules, reward regulations, HR management regulations, Intra-company fund management rules, welfare system management rules	 <b>Monitor application of improved regulations</b>	 <b>Eliminate lax management practices</b>

### KHNP Work & Family Advantage Program

“Work & Family Advantage Project”, one of the core programs implemented by KHNP to create a work and life balance, takes its inspiration from the Korean proverb known as “Il-geo-yang-deuk”, which means killing two birds with one stone. KHNP strives to create a pleasant workplace by hosting programs such as organization revitalization education and cultural events. We pursue the balance between work and family by boosting company loyalty and employees’ dedication. Employees are contributing to the expansion of a positive company culture after recovering their pride after experiencing work-life balance.

### Enhance Flexible Work

KHNP operates flexible work to support employees commuting long distances and to deliver a balanced work-family life through childcare and education subsidies. Alternative work schedule, introduced in 2013, has been diversified as the operation method was expanded. Work hour selection system has increased practical benefits for employees. Those who take the work hour selection system are free to work from 4 to 12 hours a day for up to 5 days as long as they work 40 hours during weekdays. KHNP prohibits discrimination in wages, working conditions, evaluation, and promotion against employees who use this system.

### Certification on Family-friendly Management from the Ministry of Gender Equality and Family

**5** years in a row



### Results of Flexible Workplace System

#### Working hour selection



#### Difference in commuting time

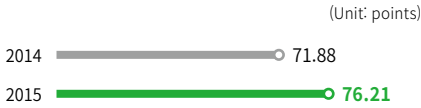


#### Working schedule selection\*



\*Newly introduced in 2015

### Satisfaction on 10 Pledges



### Create Happy Workplace

KHNP has initiated the “10 Resolutions for Making a Happy Workplace” in order to remove unhealthy practices at the workplace in 2014. Ten improvement tasks were identified in a survey of all employees in the company. KHNP encourages employees’ participation in the campaign by selecting one issue on a regular basis, and producing promotional videos. In 2015, we selected three practices – vacation, meeting, and events – based on the survey conducted last year and sent e-mails encouraging employees to address them.

#### 10 Pledges for Happy Workplace

1. Clarify the background, direction, and timeline when ordering works
2. Involve only necessary staff in a meeting and set closing time
3. Do not speak or act if it can disregard personality of others
4. Minimize the scale of events and streamline the process of protocols
5. Minimize overtime works and maximize the efficiency if necessary
6. Establish monthly vacation plans by each team and encourage higher positions to use the vacation first
7. Complete company dinner at the first round and do not press a drink
8. Treat suppliers as partners for co-prosperity
9. Respect others’ privacy in company housing
10. Dedicate oneself to works and minimize private affairs during the workday



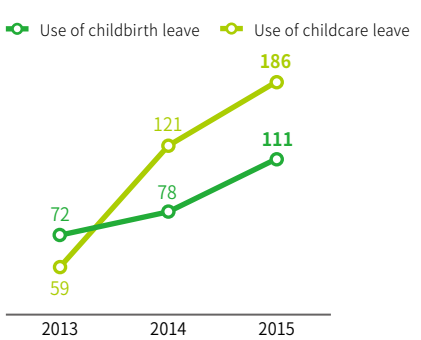
### Employees’ Receptivity to Welfare System



### Childbirth Support Programs for Female Employees

<b>MOM’s Package</b>	Offer pregnant employees a package including guidance for in-company rules and benefits, work support materials, and gifts
<b>Culture of Maternity Protection</b>	Promote action guides to protect pregnant employees and enforce maternal protection indicators
<b>“Restart” Program</b>	Operate a program to help employees with career discontinuity due to childbirth and childcare return to work

### Use of Childbirth and Childcare Leaves



### Maternity Protection and Gender Equality

KHNP operates programs for maternity protection and gender equality to prevent women’s career discontinuity and ensure continued career development. Female employees can take maternity leave for up to 3 years for marriage, childbirth, and child care. Female workers can choose to take the shortened work hour system for maternity protection instead of maternity leave. In addition, KHNP has established the Women’s Committee for the first time as a government-owned organization to listen to female employees voices regarding management in general. As of 2015, there are 1,202 female workers in KHNP, or 11.1% of the entire workforce, and rising.

#### KHNP Women’s Committee

KHNP Women’s Committee (KWC) is a special committee that seeks to enforce policies regarding the training of female workers. In 2014, the committee selected eight promotion tasks, including “Working Mom Program”, and completed eight tasks in 2015.

### Health Promotion for Employees

KHNP is providing psychology consultation to help employees deal with stress from work and daily lives so that they can effectively carry out their duties. Employees can receive stress coaching and psychological consultation at a professional psychological consultant center contracted with the company. A “Visiting Counseling Service” has been operating for remote areas in order to increase accessibility. Also, to deal with radiation emergency situations and offer preliminary medical assistance in case of emergencies, the Radiation Emergency Medical Center (REMC) was opened at the head offices of the four NPPs (Kori, Hanbit, Wolsong and Hanul). The REMC minimizes damage by giving first aid to patients exposed to radiation and taking them to hospital in cooperation with the National Radiation Emergency Treatment Center. During normal operation, the REMC serves as health care center, providing measurement services like cerebral blood flow and body fat. In case of industrial accident, the REMC protects the health and safety of employees by carrying out preliminary medical treatment, the transportation of emergency patients and other related tasks.





# Sustainability Plan and Goals

As the Korea’s largest power generating company producing 30% of the nation’s electric power through nuclear power, hydropower and pumped storage hydroelectric power, Korea Hydro & Nuclear Power (KHNP) is growing into the “trusted global energy leader” carrying out the management activities rooted in the five core values, “T.R.U.S.T”.

<b>Technology</b>	
KHNP, Growing into Global Nuclear Power Generation Leader	38
<b>Respect</b>	
KHNP, Opening a New Chapter in Gyeongju	44
KHNP, Creating Healthy NPP Ecosystem	50
<b>Ultimate Safety</b>	
KHNP, Placing Utmost Importance on Safety	54
<b>Social Responsibility</b>	
KHNP, Practicing Eco-friendly Management for Next Generations	65
KHNP, Growing with Local Communities	73
<b>Timeless Integrity</b>	
KHNP, Pursuing Culture of Integrity and Honesty	78



# Technology

## KHNP, Growing into Global Nuclear Power Generation Leader



### Aspect Report

#### Report Context

As awareness and concerns over NPP safety mount, receptivity of new NPP construction and operation in local communities is increasingly on the decline. Furthermore, the tightening regulations and policies on nuclear power industry are creating greater hurdles to carrying out nuclear business on a sustainable manner. In response, major nuclear operators across the world are engaged in fierce competition to secure safer and more effective core technology. However, due to difficulties in accessing the technological information and the limitations in acquiring technology, businesses and countries with leading technology are gaining monopoly in the industry.

#### Sustainable Progress & Future Plan

KHNP has put forward the “securing proprietary nuclear plant technologies” as the top priority to address safety concerns at home and abroad and overcome technological limitations. KHNP is committed to enhancing nuclear safety while raising efficiency by acquiring Korean proprietary nuclear technology. Drawing upon the abundant experience and technological competitiveness in NPP construction and operation, KHNP is advancing into the global markets, thereby establishing nuclear technology as the new growth engine for the nation’s economy. KHNP is growing into a sustainable energy company by continuously investing in hydropower and renewable energy.



### Case for Sustainable KHNP

#### Acquire International Certification of APR1400

The standard design of the Korean reactor APR1400 has passed the preliminary inspection of the USNRC Design Certification (DC). The standard design of APR1400 features anti-aircraft collision technology as well as earthquake-resistant technology with greatly enhanced safety in electric system. The second inspection is underway in the first half of 2016. We expect the certificate to greatly improve the awareness of Korean NPP while increasing our chances for business expansion into the US market.



Blueprint of APR1400

### Sustainability Plan and Goals



#### Secure world-class technologies

- APR1400 passed the preliminary inspection on design certification of the Nuclear Regulatory Commission (NRC).
- APR+ was involved in the Basic Plan for Electricity Supply and Demand of Korea



#### Rate of Construction Process of the UAE NPP Project

**61.4 %**

(As of end of 2015)



#### RPS Implementation Rate in 2015

**81.2 %**



Technology



Respect



Ultimate Safety



Social Responsibility



Timeless Integrity

## Lead World-class NPP Technology Development

### R&D Strategy System

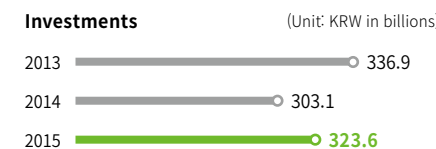
KHNP concentrates its resources into technology development to secure the global top technology and future growth engine by 2030. Pursuing the R&D strategy aligned with management strategy, KHNP spearheads the 3.5<sup>th</sup> generation NPP in accordance with the Government’s technology development goals.

#### R&D Strategy System

R&D Vision	Lead World-class NPP Technology Development			
Strategy	Enhance nuclear safety	Raise facility reliability	Secure stability in power supply	Generate growth momentum
Main technology	1. Safety enhancement 2. Radiation safety management 3. Response to natural disaster	4. Material degradation from long operation 5. Raise equipment reliability 6. Hydrochemistry 7. Inspection and equipment	8. Operation 9. Used fuel 10. Construction	11. New NPP 12. Dismantling 13. Renewable energy
Key technology	· Major accident prevention and response · Optimal safety analysis · Radiation life safety evaluation · Radioactive waste vitrification	· Equipment and structure degradation evaluation · Optimum reliability base operation · Major equipment monitoring, diagnosis and verification	· Human error prevention and MMIS · Used nuclear fuel safe storage · Data (ICT) based NPP life cycle management technology	· New concept lightwater reactor development · NPP dismantling and environment recovery · Hydraulic and renewable energy



#### R&D Investments



### Develop Korean Proprietary Technology and Secure Competitive Edge

Featuring anti-aircraft collision technology and earthquake-resistant technology, the domestically built advanced power reactor APR1400 was introduced to Shin Kori #3 and #4 in 2007. APR1400 is the 1400MW pressurized water reactor, the power generation capacity of which has increased by 40% compared to the Korea’s standard NPP. In 2009, KHNP beat advanced countries in nuclear industry such as the US and France to win the USD 40 billion worth of UAE project. KHNP promises to secure future growth momentum by investing in proprietary technology development.

#### Develop Korean Proprietary NPP Technologies

In the second half of 2014, after seven years of development, KHNP received NPP standard design approval from the Nuclear Safety and Security Commission for APR+, the 1,500MW NPP, which has been developed with purely domestic technology. Boasting superior safety compared to foreign competitors, APR+ has been reflected in the basic construction plan of Chunji # 1 and #2. APR+ is touted as innovative in that the proprietary technology will allow KHNP to negotiate overseas export independently.

#### APR+





## Expand Overseas NPP Business

### Enhance NPP Export Competitiveness

KHNP expects to overcome the limitations in the local power supply market by raising management efficiency with improved revenue as well as by advancing into overseas NPP markets. To that end, KHNP continues to expand overseas business based on the proven technology and expertise obtained from local NPP business activities. The recent global NPP market is shifting from EPC(Engineering, Procurement, Construction), where design, procurement, and construction are signed in package, to EPC+Operation that includes operation and maintenance service. Having signed the EUR consultancy agreement with Skoda-Praha of the Czech Republic, KHNP embarked on Korean NPP marketing activities in Brazil. KHNP has also signed an agreement on technical support for NPP operation with China's largest power generator CNNO in its effort to diversify profit model to meet clients' needs. The business in Finland has been suspended due to the client's request after being chosen as the final suppliers but the cooperation channel is still open with the client for the next business order.

### Organize Task Force

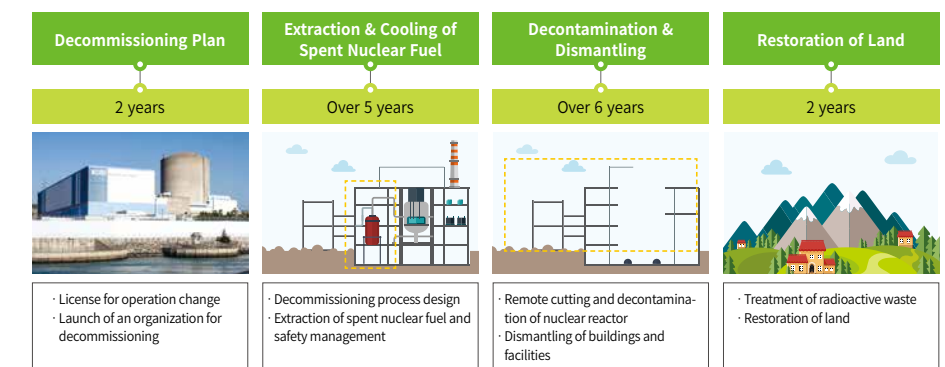
KHNP has undertaken restructuring of overseas business department to maximize work efficiency. The "Global Strategy Office" has been newly organized under the direction of CEO. The formerly overseas departments including overseas nuclear business development, overseas hydropower business development, international relations, and overseas office operation were integrated. This restructuring has streamlined the decision-making process, creating synergy in the company's overseas business activities.

## Secure NPP Post-management Technology

### Permanent Decommissioning of Kori #1 and Dismantling Preparation

In June 2015, KHNP decided that Kori #1 reactor completely cease its operation. The Kori #1 reactor is being shut down permanently in June 2017 with dismantling scheduled for 2022 after the stable suspension period. Preparatory dismantling, used fuel cooling and uploading, decontamination and demolition, and site restoration will be phased in according to the nuclear decommissioning technology development roadmap of 2015 over the expected period of 15 years. KHNP is currently establishing the basic principles and strategy for dismantling while coming up with measures for dedicated teams and workforce. KHNP has also identified a total of 58 commercial technologies in five categories and analyzed advanced foreign cases. We have secured 41 of them so far. The remaining 17 technologies will be obtained independently based on additional development plan by 2021.

#### Expected Decommissioning Process (Kori #1 Unit)

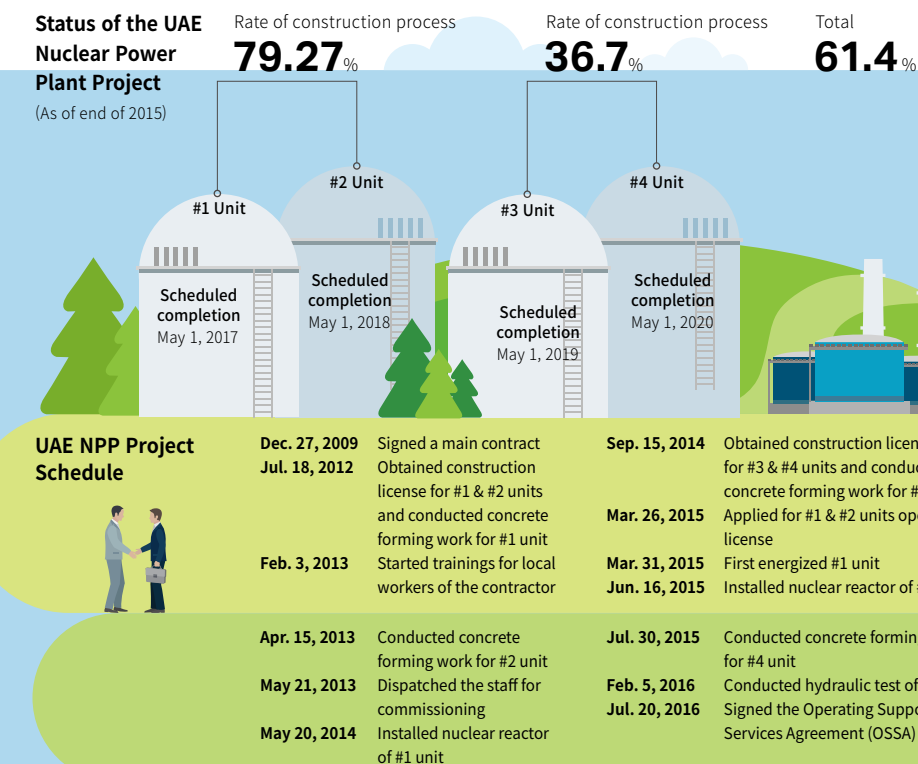


#### Focus Business

### UAE NPP Business

#### NPP Construction Project: from Contract to Construction

Korea's KEPCO consortium led by KHNP beat the largest competitor to be selected as the supplier for UAE's NPP business in December 2009. This marks the first time in 30 years that Korea exported APR1400, the new light water reactor. With this achievement, Korea became the 6<sup>th</sup> country in the world to join the ranks of NPP exporters following the US, France, Russia, Canada, and Japan. Following the construction of reactor #1 in July 2012, KHNP has started to build reactor #2 in April 2013, #3 in September 2014, and #4 in July 2015.



Signed the Operating Support Services Agreement (OSSA) between KHNP and UAE ENEC

#### OSSA Contract with UAE ENEC

Contract Volume	Period	Duties
USD <b>920</b> million (Main contract: USD 600 million, indirect expenses (residential costs of dispatched employees, etc.): USD 320 million)	Since completing the UAE Barakah NPP #4~ <b>2030</b>	<b>Dispatch of KHNP staff</b> for NPP operation (accumulative 3,052 persons until 2030)

#### OSSA Contract, Start of Another New Business Model

KHNP has strived to identify new growth engine by creating new business model ranging from winning NPP construction projects to operation. KHNP pursues Operating Support Service Agreement (OSSA) to dispatch workforce in charge of operation and management after NPP construction. In April 2013, we dispatched workforce to the Abu Dhabi office in UAE to support the Baraka NPP construction while signing an MOU on human resources exchange. Thanks to those efforts, KHNP succeeded in concluding OSSA with the Emirates Nuclear Energy Corporation on July 20<sup>th</sup>, 2016 in the first case of NPP human resources and know-how export in Korea. Under the agreement, KHNP will supply around 400 qualified operators and operation workforce a year by 2030, 10 years after the completion of the UAE reactor #4. In addition, we plan to establish a long-term cooperative relationship with UAE to share our experience and expertise in NPP operation of 40 years.

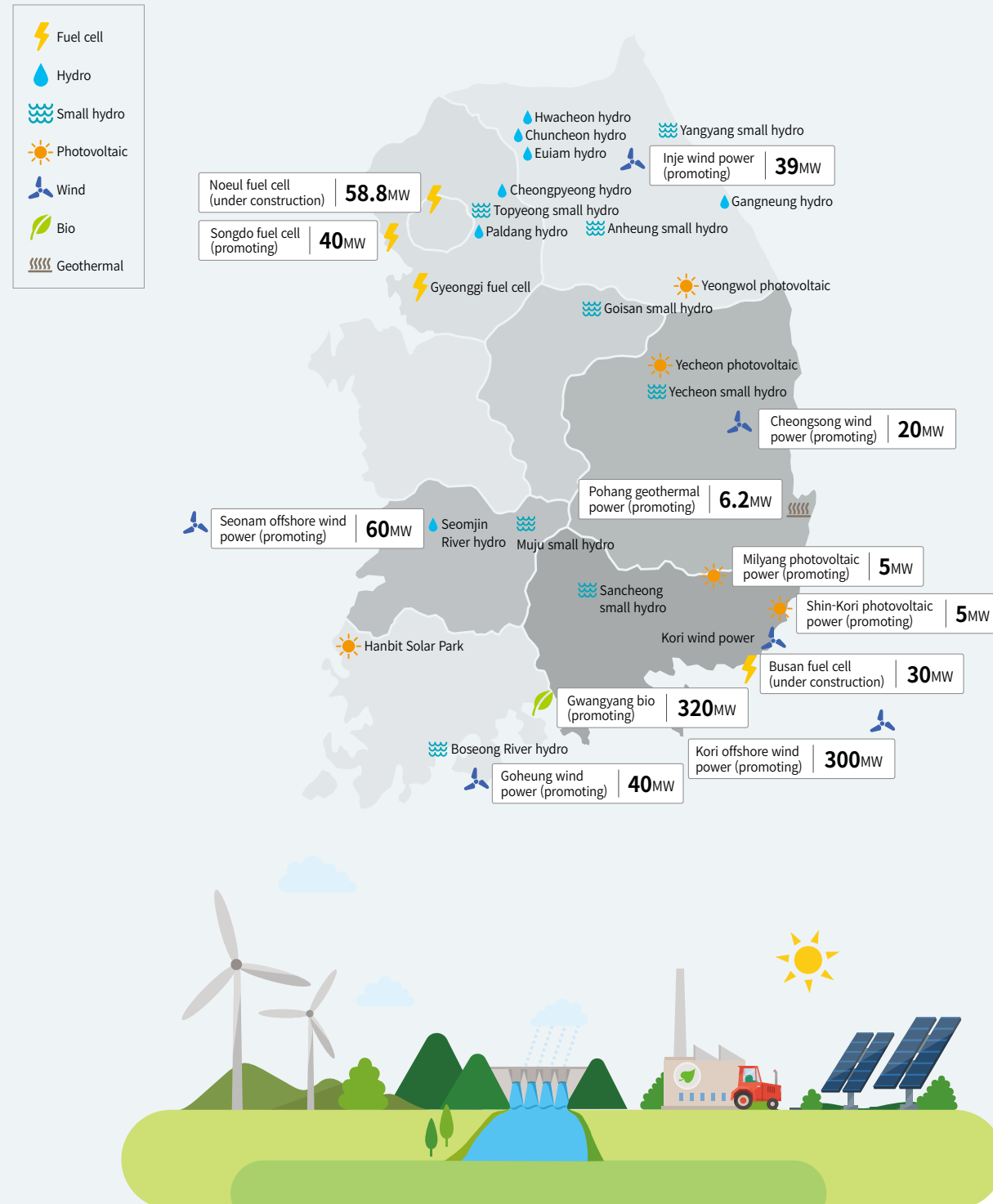


## Expand Renewable Energy Business

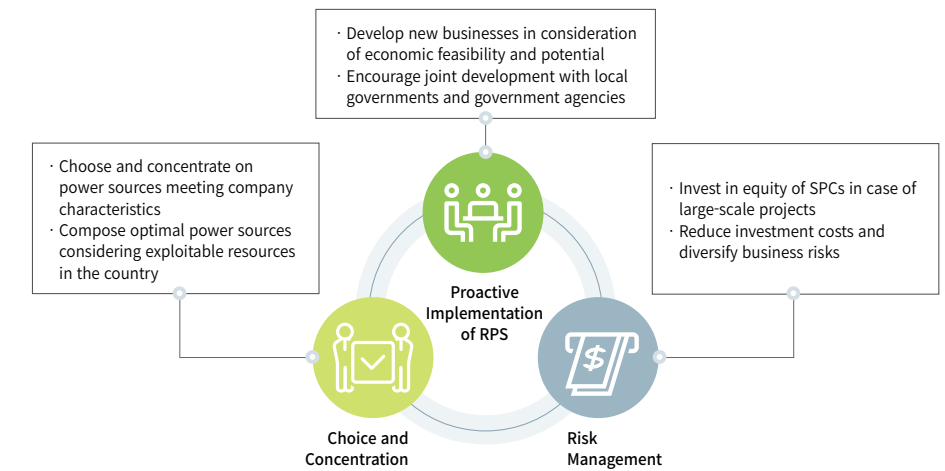
### Renewable Energy Strategy

The largest electricity power supplier in Korea, KHNP develops renewable energy to replace coal and oil that are gradually being depleted. KHNP operates 51 hydropower and pumped storage plants while engaging in solar, wind, bio, and fuel cell industry.

#### Promotion of Renewable Energy Business



#### Renewable Energy Business Strategy



### Implement Renewable Energy Portfolio Standard

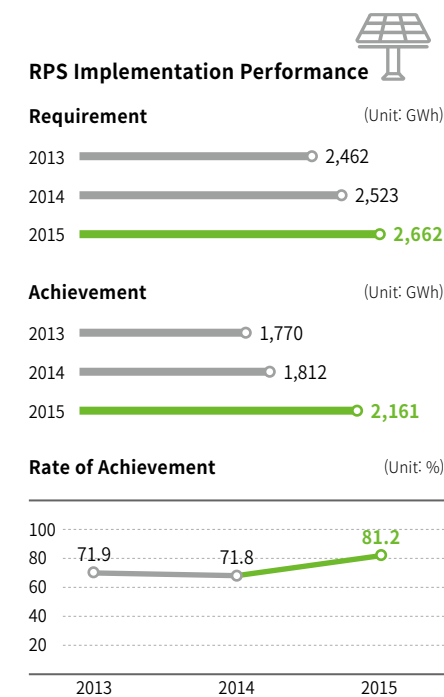
Implementing the Renewable Portfolio Standard, KHNP is growing into a global green energy leader that values people, environment, and technology. The company has constructed independent facilities while engaging in joint development projects to meet the required amount of renewable energy. The company also has secured Renewable Energy Certificate through selection agreement, independent agreement, and spot market. Our new power generation facilities are registered in the CDM, laying the groundwork to obtain the Certified Emission Reductions (CER).

### Noeul Fuel Cell Power Generation Business

Generating electricity power with electrochemical reaction between hydrogen and oxygen, fuel cell power generation is an eco-friendly energy. Fuel cell power generation does not require long transmission line but yields high efficiency with virtually no emission of harmful substances compared to other renewable energy sources. KHNP signed shareholders' agreement for "Noeul Fuel Cell Power Generation Business" in May 2014. Having invested the share of 29% in the KRW 121.9 billion project, KHNP plans to construct the 20MW fuel cell power generation facilities in Sangamdong, Seoul. Once completed, the facility will be capable of generating electricity power of 157.6 million kWh and heat of 65 billion kcal per year. This takes up 1.5% of the household electricity consumption of Seoul, an equivalent to the electricity enough to power 50,000 households. KHNP expects to cut 20,000 tons of CO<sub>2</sub> emission every year.

### Advance into Customized Overseas Hydropower Business

As it is expected that the facility capacity of hydropower generation in Asia and Latin America will increase by 700GW over the next two decades, KHNP is developing customized business in accordance with business environment and risk level in different countries. KHNP teams up with specializing partners, local or international, when advancing into overseas markets to manage risks involved, thus raising chances of winning projects. The company also identifies small and medium sized promising projects in key markets to selectively carry out low-risk business. We seek to enhance expertise in business development by promoting collaboration between in-house professionals in finance, accounting, and legal affairs while operating experts' groups. In addition, we mainly target EPC business in consideration of investment risks. For regions where electricity power markets are mature and investment environment is stable, we carry out bidding activities for private power generation. As a result, KHNP was selected as the preferred bidder in the Cerro Campama hydropower project in Peru and Song Ma 3 hydropower in Vietnam in 2015.





# Respect

## KHNP, Opening a New Chapter in Gyeongju



### Aspect Report

#### Report Context

The existing power generation markets including nuclear power that have been around for a long time have a relatively predictable revenue structure with proven technical stability and response capability to regulations. However, the increasing uncertainty surrounding the global management environment and the fluctuations in the global energy prices present power generators of today with new tasks in management. Not just this, as environmental issues keep emerging over new energy industry such as renewable energy, companies are increasingly coming under pressure to undertake structural transformation. This changing environment will require the existing leading players in the power and energy industry to improve management efficiency, implement market-friendly strategy, invest in environmental infrastructure, and push ahead with innovation tasks for management.

#### Sustainable Progress & Future Plan

To keep abreast of the changes in the energy consumption markets, KHNP designs power generation capacity in a flexible and reasonable manner while striving to maintain competitive energy prices. The company address the exiting authoritative and conventional policies to improve the general public's awareness of nuclear power generation, thereby overhauling the management environment and corporate culture to develop into customer-friendly energy company. KHNP promises to generate synergy in cost and technology by sharpening its competitive edge through the integrated management model and proactive communication with stakeholders.



### Case for Sustainable KHNP

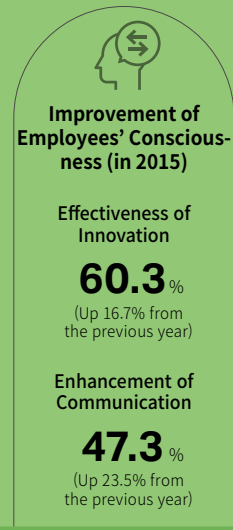
#### Introduce Integrated Management Model

KHNP has introduced the integrated management model aimed at growing into the world's leading nuclear operator. The integrated management model classifies nuclear operation business into 35 functional area and 155 processes, effectively managing plants with multiple reactors as if they are single-reactor plant under clearly specified structure of HQ and regional offices. The model complies with standards and regulations, both domestic and international, placing emphasis on defining duties for individual organization and establishing cooperative system. GOSP – Governance, Oversight, Support, and Perform – in the model leads to clarification of duties and functions, re-establishment of task implementation document, performance monitoring, and cooperation system. The system prepares for simultaneous operation of more than 30 NPPs, departing from worker-oriented operation to process-oriented. In March 2016, we held CFAM/SFAM workshop for the settlement of the integrated management model.

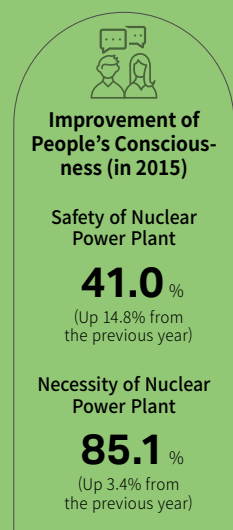


Workshop for the establishment of integrated management operation

### Sustainability Plan and Goals



\*Surveyed by KCF Partners



\*Surveyed by the Korea Nuclear Energy Agency



Technology



Respect



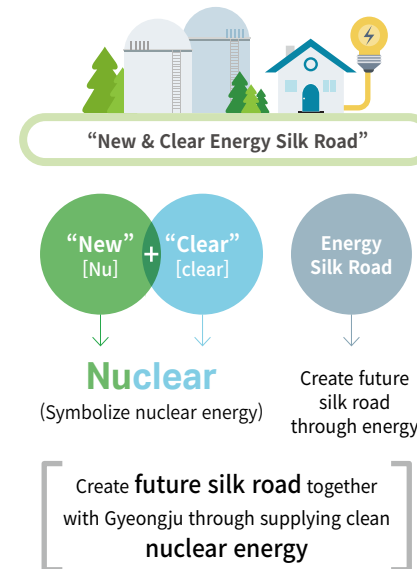
Ultimate Safety



Social Responsibility



Timeless Integrity



#### 10 Daily Experience Projects



#### Best Practice



Agreement ceremony for New & Clear-Gyeongju Shared Growth Fund

## New & Clear Energy Silk Road

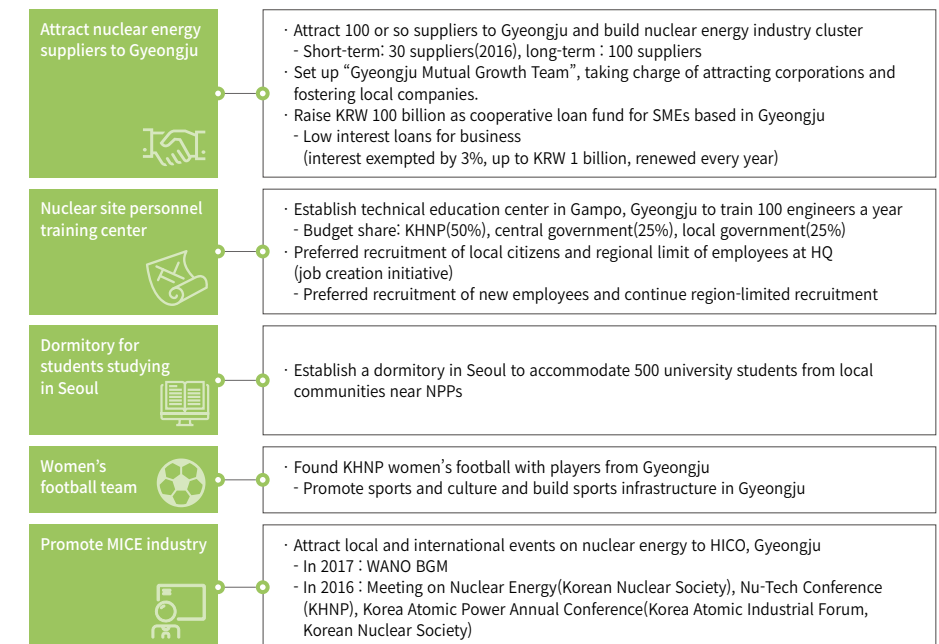
### Future Synergy Slogan

In 2016, eight years after the Government's approval in 2008, KHNP relocated to Gyeongju. Upon the completion of relocation, KHNP put forward our future synergy slogan "New & Clear Energy Silk Road" along with five key projects and 10 social initiatives aimed at promoting shared growth with local communities and boosting local economy.

### 5 Key Projects and 10 Social Initiatives

For the five mid and long-term initiatives to promote shared growth with Gyeongju, KHNP has announced "Attract nuclear energy suppliers to Gyeongju", "Nuclear site personnel training center", "Dormitory in Seoul to accommodate university students from local communities near NPPs", "Women's football team", and "Promote MICE industry through HICO". 10 Social Initiatives, designed to improve the quality of life for citizens of Gyeongju, include social contribution for happiness sharing, foster decent cultural infrastructure, cultivate next-generation talent, and more.

#### Five Major Projects



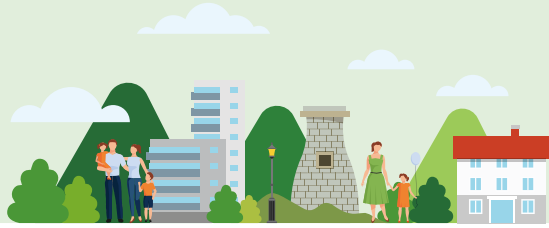
### New & Clear- Gyeongju Mutual Growth Fund Agreement

KHNP signed "New & Clear- Gyeongju Mutual Growth Fund Agreement" with Gyeongju city, Gyeongju Chamber of Commerce and Industry, and IBK. In this low-interest credit program for businesses based in Gyeongju, KHNP deposited KRW 100 billion with IBK. Businesses can take out up to KRW 1 billion in credit. The fund will help SMEs in Gyeongju have better access to capital and ultimately contribute to boosting the local economy. KHNP promises to seek mutual growth with local businesses.



## Special Report

## Stakeholders' Meeting for Mutual Growth and Local Communities



KHNP held stakeholders' meeting of local communities on September 1st, 2016, where we listened to Gyeongju citizens' expectations on our relocation and discussed cooperation works with the city as a partner for mutual growth. The participating stakeholders included local organizations, NGOs, media, and academia who shared ideas on cooperation between KHNP and Gyeongju.



Secretary General Kim Hyeong Cheol  
Gyeongju Environment  
Protection Council

Director Kim Shin Jae  
Talent Development division,  
Dongguk University at Gyeongju

Lee Seung Pyo  
Gyeongju Headquarter,  
Daeagu Daily

Professor Lee Sang Deok  
Social Welfare department of College  
of Health and Welfare, Sorabol College

## Discussion 1 Community Issues following KHNP's Relocation to Gyeongju

A variety of both positive and negative factors have arisen since KHNP's relocation to Gyeongju. Participants discussed whether the issues would threaten or provide opportunity for KHNP; and effective measures to respond to the situation.

**Kim Shin Jae** It was expected that KHNP's relocation to Gyeongju would bring about increase the influx of population to the city. The recent reports show the population is declining although it was increasing during the early days of the relocation. In order to prevent the outflow, KHNP is required to lay the foundation for better educational environment for children as well as increase the level of residential satisfaction.

**Kim Hyeong Cheol** Citizens in Gyeongju expected to have inflow of population and regional economic revitalization after the relocation of KHNP. But the number of people who moved to Gyeongju was not as large as expected. Instead, most of them settled in the east side of Gyeongju, bringing about only a marginal impact on the downtown area. I hope that brisk economic activities help invigorate the local economy even if it's only the east Gyeongju area.

**Lee Sang Deok** I welcome KHNP with open arms because of their well-designed social responsibility programs consisting of five projects for win-win partnership and 10 social initiatives. But first, the residents have to be assured of safe operation of NPPs to accept these great pledges. KHNP must understand what people want and make its best effort to ensure safety.

**Lee Seung Pyo** The expectations of the residents toward KHNP are all positive except that it's difficult to find any positive impact resulting from the relocation. It's meaningful for KHNP to be situated near radioactive waste storage facility, but some people don't even know that KHNP is located in Janghang-ri that is quite distant from the downtown area. The first thing to ensure a stronger presence, the company should actively promote itself and accurately inform residents of its roles and businesses.

## Discussion 2 Measures to Win Trust and Support from Citizens of Gyeongju

Participants shared ideas on the roles and activities for KHNP to win residents' trust and support for its business including NPP operation and used fuel process.

**Kim Shin Jae** Even if the mutual growth program between KHNP and the local community works successfully, the impact of the program will be limited unless KHNP ensures the safety of nuclear power and old reactors. In particular, KHNP and local communities have to discuss high-level nuclear waste management to reach an agreement that satisfies both parties.

**Kim Hyeong Cheol** Immediate information disclosure about NPP safety is necessary. As there is no system to inform leaks, breakdown or shutdown in operating NPPs, citizens of Gyeongju have no choice but to become concerned over the safety of NPPs. Therefore, transparent information including negative issues must be made public immediately to help them be relieved.

**Lee Sang Deok** We need to win trust by carrying out policies and pledges regarding NPP. The most troubling issues of local people are long-term operation of Wonsong #1 unit and the saturation of temporary storage facility for used fuel. In particular, as policies for used nuclear fuel treatment have been repeatedly created, revised and modified, citizens of Gyeongju Gyeongju are concerned that the period of temporary storage of high-level radioactive waste could be extended. The policies and pledges must be put into action to relieve residents of their concerns.

**Lee Seung Pyo** It may be a good idea to found a consultative body, for example, committee on development of Gyeongju between KHNP and Gyeongju. Locally based scholars, experts, media and NGOs can create a united group to discuss and share opinions to develop the city. KHNP should listen to the voices of different social groups and reflect them in the company's policies to build a solid foundation of trust and support.

## Discussion 3 Measures to Create Values for Mutual Growth between KHNP and Local Communities

Participants discussed measures to enhance co-prosperity and create environment where KHNP can ensure sustainable operation based on the support from the local community and the local community can enjoy economic growth, cultural prosperity and job creation.

**Kim Shin Jae** KHNP's 5 projects and 10 social initiatives are all necessary for the city of Gyeongju. Therefore, more detailed schedule and plans need to be known to the citizens. Meanwhile, those are partially concentrated on particular groups such as women, senior citizens and students. Projects and initiatives to help all ages and genders are required in the future. In this regard, I suggest parks for citizens and tourists and expansion of sports facilities in the town.

**Kim Hyeong Cheol** KHNP should have included a project for farmers in the 5 projects and 10 social initiatives. I think operating NPPs has negative impacts more on the rural communities. With this in mind, I suggest an additional program for farmers, that is, stabilization fund for minimum produce price. If negative sentiment of food produced in the area near NPPs spreads, the price may drop below the production cost. Many farmers in Gyeongju would welcome this kind of buffer fund.

**Lee Sang Deok** KHNP unveiled the "Comprehensive Plan for Gyeongju Development" on April 27 to celebrate the relocation to Gyeongju. However, the local government is working on its own comprehensive development plan. It may add to confusion to operate two different plans independently. In order to ensure sustainable and effective development of Gyeongju, an integrated master plan should be implemented by integrating the plans prepared by KHNP and Gyeongju City.

**Lee Seung Pyo** The most effective way of downtown revitalization is to create tourist attractions. I think setting up a landmark tower is more influential than building culture street proposed by KHNP. The tower will be a landmark of Gyeongju for tourists. KHNP can also use it as a museum of energy, which will help promote and improve brand awareness of the company.

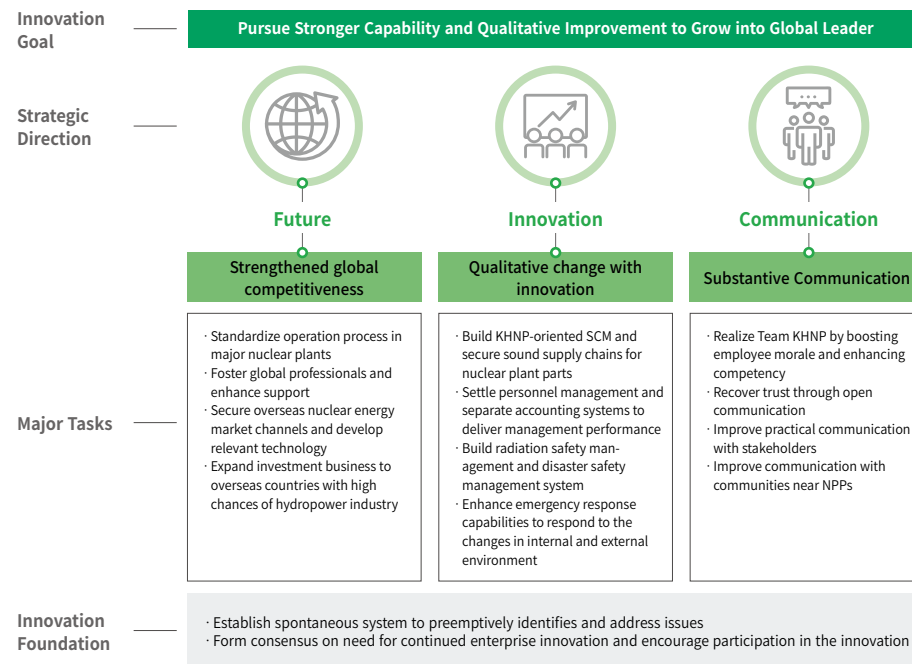


## Create Foundation for Sustainable and Systematic Innovation

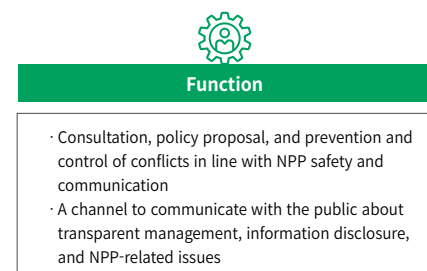
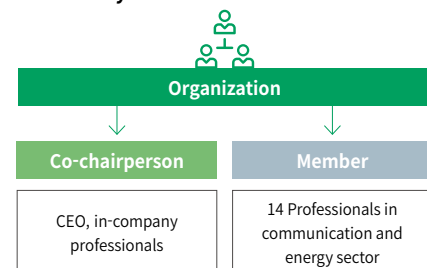
### Management Innovation

KHNP strives innovate itself to grow into a global company while contributing to the national competitiveness. The Nuclear Safety and Communication Committee of outside experts led by the Management Innovation Office under the CEO, in particular, reviews implementation outcomes of management innovation tasks.

#### 2016 Management Innovation



#### NPP Safety · Communication Committee



Best Practice

#### Nuclear Safety & Communication Committee's Site Visit and Workshop

KHNP expanded the Future Development Committee into the Nuclear Safety and Communication Committee for the purpose of restoring the public's trust on nuclear safety. The committee members visited sites and held workshops in November 2015. During the visit to Kori #1 plant and #2 construction site, they reviewed the status of NPP construction and operation and listened to conflict and communication status. They also discussed and shared ideas on KHNP promotion strategy, key civilian conflicts, and committee operation. It was proposed that KHNP win people's trust by explaining about NPP to the public in a detailed manner while institutionalizing agenda identified. KHNP pledges to reflect suggestions raised during the workshop and to implement a wide range of activities to restore people's trust.

### Four Major Process Innovation

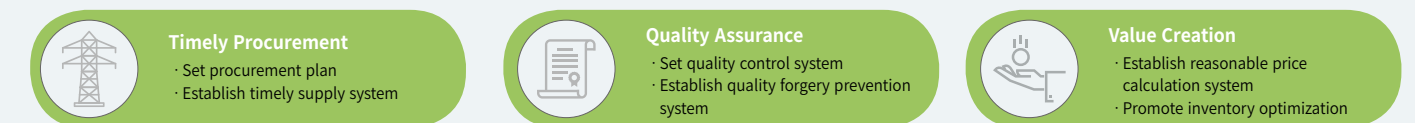
KHNP has undertaken the four major process innovation covering management model, procurement, finance, and human resources. For management model, KHNP has developed the integrated management model to realize the Fleet Management where NPP of multiple reactors are managed like a single reactor plant. This system has allowed KHNP to standardize tasks related to NPP operation and realize management model with an enhanced cooperation system. For procurement, we established an integrated system to manage internal procurement process and suppliers based on our unique supply chain management system. For procurement, meanwhile, separate accounting system has been introduced to measure and analyze financial performance of different business units, improving the efficiency in financial management. KHNP also established the career development system to innovate HR management. KHNP enhances employee capabilities and identify demands for education by utilizing the career development system while managing human resources based on functions and capabilities.

Best Practice

#### Lay Foundation for SCM System

KHNP pursues SCM innovation as it strives to integrate internal procurement process covering procurement request, contract, and material management. Our SCM system is being established under the three goals of "creating value", "quality guarantee" and "on-time delivery". Once completed, a series of process from item and volume planning, procurement and delivery process, SCM control, monitoring to control will be integrated into a single system. KHNP has finished 12 tasks of the phase 1 including opening of private contract items and document simplification, laying the foundation for productivity increase.

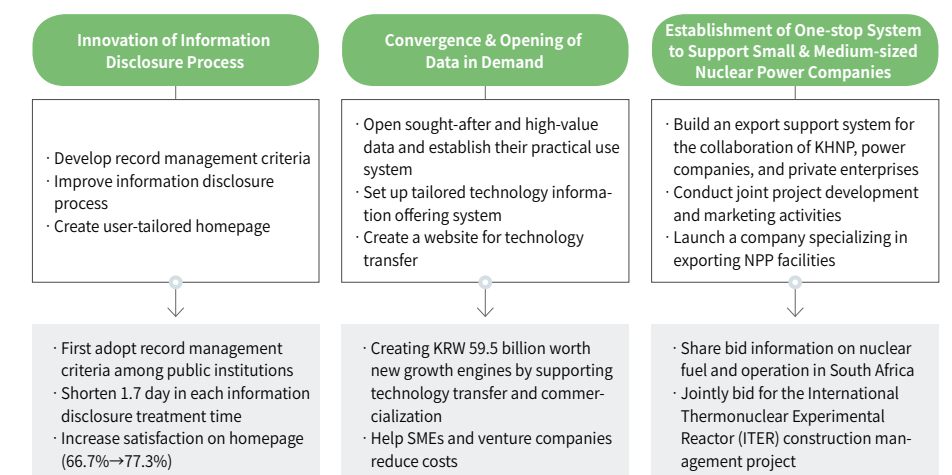
#### 3 Goals for Building SCM System



### Opinion Collection and Service Development

KHNP commits itself to collecting opinions from the general public while restoring trust on NPP safety via the Nuclear Safety and Communication Committee. We carry out Government 3.0 tasks to relate with people by communicating and sharing information and work to raise service satisfaction as a public organization.

#### Development and Execution of the Government 3.0 Tasks





# Respect

## KHNP, Creating Healthy NPP Ecosystem



### Aspect Report

#### Report Context

It is essential to create a healthy and fair industrial ecosystem to ensure the sustainable growth of our economy. Mutual growth and win-win environment may be one solution to such task but the private sector has been relatively slow to follow suit with the perception that businesses should bear the cost for mutual growth. Large conglomerates may regard assistance for SMEs in the form of technology, capital, and marketing as short-term burden. However, they should realize that they can sharpen competitive edge with the very technology developed by small companies. Meanwhile, SMEs can become more self-sufficient while increasing sales. The Government and public organizations are required to cultivate success cases so that mutual growth and win-win culture take foothold throughout the society while raising awareness that mutual growth translates into opportunity. Furthermore, by eradicating unfair business practices with suppliers and establishing fair transaction practices, they should create a vibrant ecosystem for SMEs and help improve the competitive edge of not just large conglomerates but also the nation's overall industry.

#### Sustainable Progress & Future Plan

KHNP contributes to creating a sound and vibrant nuclear ecosystem. Under the strong leadership of CEO and the management for mutual growth, KHNP supports promising SMEs by transferring technology, marketing, and financing. Furthermore, we help SMEs stay competitive with our SCM to maintain soundness industry-wide. KHNP promises to keep discovering mutually cooperative support programs for SMEs, not simply short-term and unilateral, in order to enhance the competitiveness of nuclear industry.



### Case for Sustainable KHNP

#### Establish Export Company of Nuclear Equipment

The Korea Nuclear Partners (KNP) was established in November 2015 as an exporting agency of nuclear equipment and technology. KHNP and other 29 private companies have invested 29% and 71% into the agency, respectively. KNP will participated in exporting project of equipment, investigation, and service worth of KRW 650 billion over the next 10 years. Other services include registration of qualification for overseas nuclear constructor and local operators, and certification for local companies for major international technology standards. KHNP expects that KNP will help Korean exporting businesses to overcome barriers of stringent quality requirements. KNP will also contribute to promoting mutual growth with SMEs while helping raise their exporting capabilities.



Established the Korea Nuclear Partners

#### Sustainability Plan and Goals



Evaluation on Shared Growth of Public Institutions (in 2015)

Satisfactory



SMEs' Satisfaction on Shared Growth (in 2015)

84 points

T Technology

R Respect

U Ultimate Safety

S Social Responsibility

T Timeless Integrity

Evaluation on Shared Growth of Public Institutions by the Ministry of Trade, Industry and Energy



2013 General

2014 General

2015 Satisfactory

## Responsible Management of SCM

### Establish and Operate Strategic System for Mutual Growth

Under the overarching vision for mutual growth “Global leader KHNP, creating a healthy NPP ecosystem”, KHNP has put forward the slogan “KHNP helps SMEs realize their big dream”. KHNP extends its full support to SMEs with overseas expansion and technology development through its core mutual growth values “KHNP WITH”.

#### KHNP's Shared Growth Strategy

Vision	Global Top KHNP That Creates a Healthy NPP Ecosystem			
Slogan	“KHNP helps SMEs realize their big dream.”			
Core Values	World-class	Innovation	Transparency	Harmony
	Lead shared growth	Differentiate through consistent innovation	Create a culture of clean and transparent shared growth	Create NPP ecosystem for harmony and coexistence
Strategies	Strengthen supports for overseas sales	Upgrade technology innovation capability	Promote fair competition	Pave the way for shared growth
	· Establish a company to support SMEs' exports · Support oversea marketing	· Support the establishment of quality system · Energize R&D activities · Transfer owned technologies	· Enforce advance verification system · Enhance supervision of payment system · Lower entrance barriers	· Expand public procurement · Expand financial supports · Industrial Innovation Movement 3.0
Core Tasks				
Review and Feedback	Performance review and feedback on shared growth by utilizing K-PGI (a composite index consisting of eight indicators such as rate of purchasing SME products)			

### W (World-class) Enhance Support for Overseas Expansion

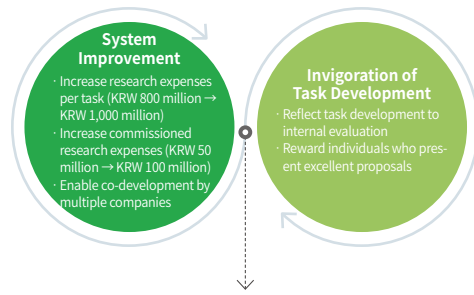
Having finished feasibility test on overseas equipment market and export company model in July 2015, KHNP launched the Korea Nuclear Partners to support SMEs struggling with entry barriers in the global nuclear industry and limited marketing strategy in November 2015. Also, to ensure better access to information for SMEs advancing overseas, the company carries out customized service for different steps including preparation, advancement, and settlement. To help SMEs targeting overseas expansion, KHNP supports their participation in exhibitions at home and abroad and market exploration projects. In 2015, 109 companies benefitted from the programs as they participated in seven global exhibitions including Power-Gen USA. 41 SMEs received support when they dispatched foreign market exploration team to the Middle East. We cooperated with KOTRA to let businesses in the early stage of overseas expansion use their offices as temporary foreign office. KHNP also donated KRW 11 million to five SMEs in 2015. In the meantime, we helped 19 exporting SMEs to purchase overseas product liability (PL) insurances and also provided support so that local SMEs could export maintenance equipment once UAE project is completed.

#### Tailored Projects for Supporting SMEs' Exports

1st Phase	2nd Phase	3rd Phase
· Support participation in overseas exhibitions (Market Frontier Corp) · Counseling on export with foreign buyers	· Support participation in KOTRA-led projects · Survey on overseas market information, etc.	· Support application to overseas PL insurance · Promote joint entrance into overseas markets
SMEs with plans for entering overseas markets	SMEs at the initial stage of overseas business	Export enterprises



## Invigoration of Joint R&amp;D Activities



## Performances

- Increase task proposals (16 cases → 102 cases) and new joint R&D activities (2 cases → 7 cases)
- Designate 4 development items including Digital Rod Position Indication System and purchase 3 items (secure stable sales channels for R&D products and reduce KRW 4.51 billion compared with purchasing foreign equipment)
- Reward SMEs' outstanding researchers (President Prize: 3 persons, prize money: 2 teams)

## SMEs' Grievances and Opinions (2015)

(Unit: cases)

Received

369

Treated

347

## SMEs' Satisfaction on Joint Projects

(Unit: points)

2014

82

2015

84

**I (Innovation) Enhance Technology Innovation Capabilities**

With the cost to maintain quality certificate rising due to toughening safety regulations on suppliers in nuclear industry, the number of small domestic suppliers leaving the industry is on the rise. In order to discover new suppliers and also to retain existing suppliers, KHNP operates quality support programs for SMEs. This program comes in two parts; support for certificate obtainment and renewal such as instruction cost and evaluation cost; and support for consultation service on nuclear quality system for SMEs. KHNP expects this program to give SMEs better access to markets as NPP equipment suppliers while strengthening procurement reliability by diversifying supply channels.

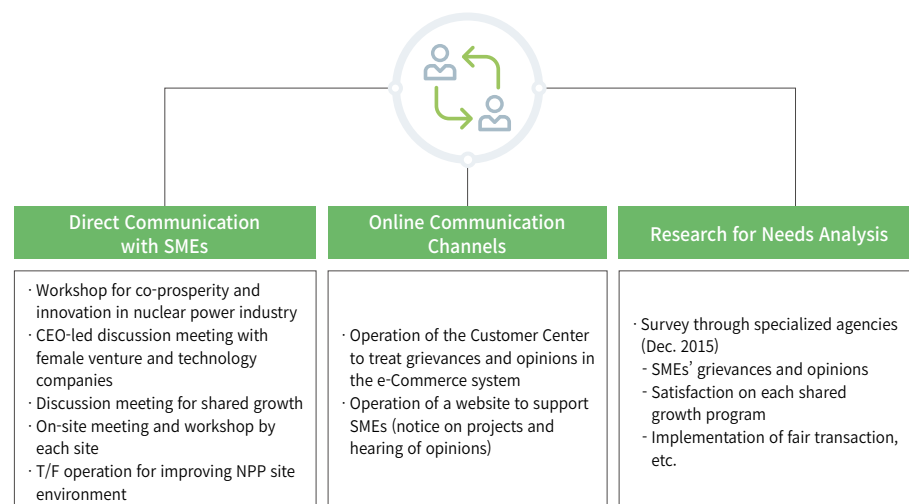
In the meantime, KHNP operates the “support for technology transfer and marketing for SMEs” to attract SMEs into R&D projects. In 2015, we transferred a total of seven technology on IRWST filter inspecting robot of APR1400. We also supported production of prototype and marketing to contribute to sales increase. Furthermore, KHNP operates the “joint research project support for SMEs” and “conditional support for procurement for new development project” to provide fund for NPP equipment localization and new product development.

**T (Transparency) Promote Fair Competition**

KHNP's prior opening of procurement specifications ensures transparency and fair competition in procurement. Procured items are announced on-line for 20 days before signing contract under “Opening of private contract”. “Prior opening of procurement specification” ensures that no specific supplier has preferable position by opening the specification on-line before confirmation. “Permanent opening of private contract items” ensures that all suppliers have equal access to fair opportunity and information. The “Collusive tender detection system” prevents unfair practices by suppliers and encourages fair competition. KHNP also runs a system to ease entry barrier for social disadvantaged businesses. Start-up companies, women-owned businesses, and disabled people-owned business receive incentives on qualification evaluations in our expanded preferred procurement.

Furthermore, KHNP promotes fair competition through meetings, surveys, and online channels through which we understand SMEs' needs. KHNP purchased employer's liability insurance after safety concerns were raised over employees of suppliers engaging in dangerous work while establishing an emergency medical support center for NPP workers. In response to a call for a channel to resolve conflicts filed by suppliers, the company set up the contract conflict resolution committee and designated outside expert as chair. KHNP promises to listen to the voices of suppliers to improve policies.

## Diverse Communication Channels

**H (Harmony) Lay Foundation for Mutual Growth**

KHNP, the largest buying company in nuclear industry, has increased purchasing expense from SMEs, technology products, and women-owned business goods to KRW 19.1 billion. We also operate phased financial support for suppliers to provide flexible customized support while carrying out Industrial Innovation Campaign 3.0 aimed at enhancing productivity through on-site inspection.

## Tailored Financial Supports

(Unit: KRW in billions)

Cooperation Level	Financial Support Programs	Performances	
		2014	2015
Cooperative SMEs	· Shared Growth Cooperation Loan (1.2%p lower interest rate)	385	54.2
Companies under contract	· Power Energy Loan, Shared Growth Loan	19.2	21.5
	· Advance payment	101.6	106.0
2nd-tier suppliers	· Shared Growth Cooperation Loan (1.2%p lower interest rate)	10.9	11.0

## Best Practice

**High Value Award System to Promote Mutual Growth**

KHNP is faced with difficulties in business management following the recent bankruptcy of 1st and 2nd tier suppliers due to low-priced bid (awarding rate of Shin-Kori #3 and #4: 61.52%) and the past five failures in the bid for the main facility construction project of Shin-Hanul #1 and #2. KHNP recognizes that a healthy contract practice is the foundation for a sound NPP ecosystem for technology development and quality construction. KHNP thus runs technology proposal to prevent low-priced bid in order to guarantee appropriate construction cost for suppliers while raising technological competitiveness and quality. For example, the company limits technical evaluation to 80% and price evaluation to 20%, to prevent disputes over low-priced award through price calculation method. Furthermore, having introduced the mandatory standard subcontractor contract and subcontract plan evaluation, KHNP secured the appropriate subcontract rate of 91.8%. The company addresses unfair subcontract practices while preventing subcontractor from going bankrupt or sub-standard construction. Going forward, KHNP promises to commit itself to discovering mutual growth initiatives to create sustainable nuclear ecosystem.

## Major Contents

## Block up Disputes over Low Price Bid

- Encourage technology competition beyond price (technical proposal bid)
- Calculate and assess budgets based on cost accounting method

## Improve Technological Competitiveness and Construction Quality

- Develop technical evaluation items meeting construction process features
- Enable bidders to propose their owned technologies and new methods
- Introduce cyber security and advanced safety and environment control methods

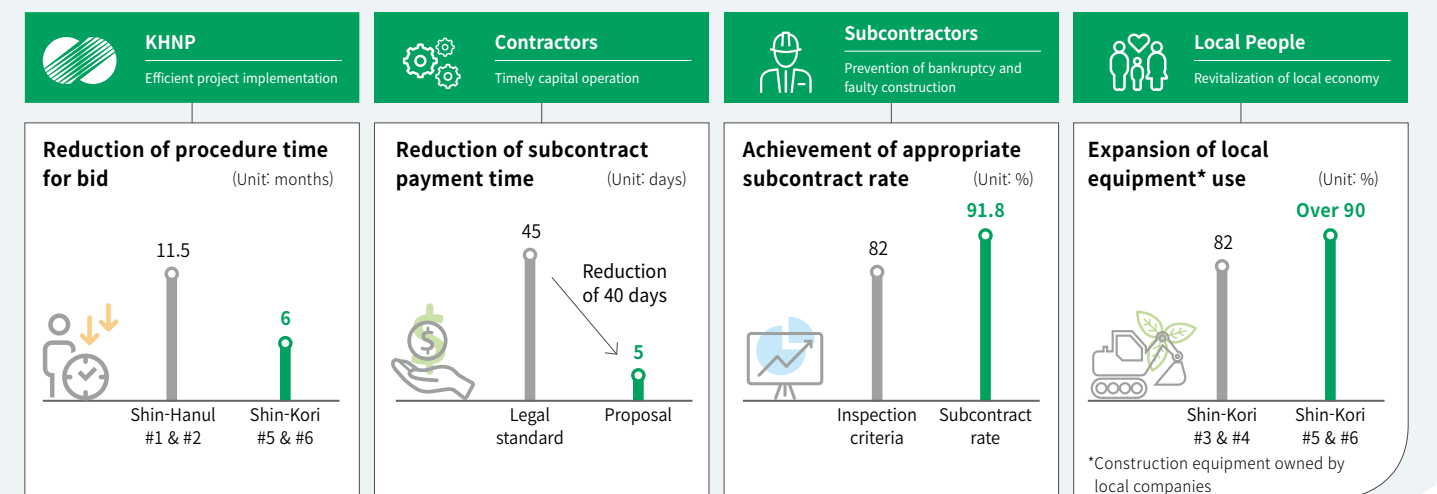
## Break Unfair Subcontract Custom

- Identify unfair transaction cases between contractors and subcontractors (on-site hearing of opinions, subcontractor meeting, etc.)
- Make standard subcontract agreement compulsory
- Evaluate subcontract agreement

## Promote Transparent and Fair Bid Process

- Secure professionalism of evaluation committee (five multiple evaluators, of which 40% are external evaluators)
- Submit technical proposals anonymously
- Do not disclose bid evaluation place and conduct collective evaluation

## Performances





# Ultimate Safety

## KHNP, Placing Utmost Importance on Safety



### Aspect Report

#### Report Context

Producing approximately 30% of the electric power in Korea, nuclear power is the nation's major power source that constitutes the backbone of the national economy. Operating 24 reactors, Korea is one of the six largest NPP operating countries in the world. Boasting the lowest failure rate per reactor in the world, Korea is recognized for its excellence in NPP operation, maintenance, and management. Following the Tohoku earthquake and the Fukushima disaster in March 2011, however, we learned that we should never stay complacent with our NPP safety. Recognizing that safety issue may arise anytime, anywhere from NPPs built with state-of-the-art technology, it is of utmost importance to ensure that we are capable of responding to disasters 24/7 with a sense of accountability.

#### Sustainable Progress & Future Plan

KHNP recognizes that it is our duty to ensure stable supply of electricity power through NPP and at the same time protect people's lives and preserve environment based on the transparent operation. KHNP has thus announced the NPP operator's safety charter of six initiatives; secure the top safety; transparent NPP operation; create safety culture; transparent information disclosure; communication with people; and reassurance for the general public. In addition, KHNP takes thorough measures to ensure that no radiation is leaked by carrying out simulated accident from design, production, construction, to operation. KHNP pledges to win the general public's trust by engaging with them in continued communication and information sharing.



### Case for Sustainable KHNP

#### Company-wide Expansion of Information Security Management System

In February 2016, KHNP held the certification ceremony to expand company-wide the global information security standard by ISO "Information Security Management System (ISO/IEC27001:2013)" at Seoul HQ. The global standard for information protection management established jointly by ISO and IEC, ISO27001 is awarded to businesses or institutions who meet requirements in four areas and 114 items. KHNP was certified by Bureau Veritas, the internationally recognized certification agency based in France. KHNP expanded the certification obtained by HQ and Data Center in December 2014 to head office of NPP, Han River hydropower head office, pumped storage power plant, and research center. ISO27001 certification will serve as a chance for KHNP to take information protection capability as an operator of the nation's major infrastructure to the next level, thus elevating its competitive edge in the global nuclear industry.



Obtained the ISO27001 certification throughout the company



**WANO\* Safety Performance Index**

**90.2** points  
(As of 1Q 2016)

\*WANO: World Association of Nuclear Operators



**Evaluation of Disaster Safety Management (in 2015)**

**A** rating  
(Evaluation on Disaster Safety Management System by the Ministry of Public Safety and Security)

**No.1**  
(Evaluation on Disaster Management Activities by the Ministry of Trade, Industry and Energy)



**No. of Serious Disasters (in 2015)**

**Zero**



Technology



Respect



Ultimate Safety



Social Responsibility



Timeless Integrity

## Safety Management Trusted by People

### Establish Safety Management Strategy

Under the goal of safety management trusted by the general public, KHNP has put forward three key projects in reflection of the changing management environment home and abroad and the contribution of government policies – “NPP safety management”, “disaster response”, and “safety communication.” KHNP has also identified implementation tasks for safety aligned with strategies of individual business.

#### Safety Management Strategy System

Goal	Nuclear Power Safety Management Trusted by People		
Core Projects	Safe NPP Management	Response to Disasters	Communication for Safety
Strategic Directions	Advance NPP safety and management system	Enhance integrated disasters control capabilities	Restore trust in NPP safety
Performance Targets	Improve comprehensive NPP safety performance	Secure omnidirectional disasters control capabilities	Increase trust in NPP safety
Tasks	<ul style="list-style-type: none"> <li>Establish advanced NPP safety check and monitoring systems</li> <li>Secure objective safety evaluation system</li> <li>Implant safety culture in employees' mind</li> <li>Innovate radiation safety management</li> </ul>	<ul style="list-style-type: none"> <li>Advance disaster response systems to protect national infrastructure</li> <li>Reinforce disaster prevention and accident control capabilities</li> <li>Enhance cyber threat control capabilities</li> <li>Advance disaster control networks</li> </ul>	<ul style="list-style-type: none"> <li>Restore trust in NPP safety by tailored PR activities</li> <li>Expand stakeholder communication through diverse PR activities</li> <li>Provide tailored information through online channels</li> </ul>

### Operate Safety Supervision and Safety Inspection System

KHNP operates under the advanced safety inspection system which lives up to the international safety standards. The company continues to enhance safety management capability by identifying and analyzing safety issues based on the safety inspection system. Our safety supervision group is responsible for practices that compromise safety culture by employees while monitoring repeated recommendations by WANO's peer review. In addition, in case reported case occurs, the 3-step direct reporting system is mobilized where the case is reported from NPP safety officer through safety inspector to the management.

#### Operation of Safety Inspection System

Inspected by		Method	Period
Government (KNRB)		Regular inspection	Planned maintenance
Regulatory agency (KINS)		Commissioned inspection	Frequently
International organizations	IAEA	Safety inspection (OSART)	When necessary
	WANO	Safety inspection (Peer Review)	Every 4 years
	INPO	Technology exchange (TEV)	When necessary
KHNP	Safety evaluation	PSR*, PSA**	10 years

\*PSR: Periodic Safety Review

\*\*PSA: Probabilistic Safety Assessment

### Certification of Safety and Health Management System

The certifications on safety and health management system were prepared to evaluate the practices of voluntary activities for safety and health and relevant programs. The certificates serve as a yardstick to evaluate the status of the practices, contributing to preventing human and property loss and improving quality. Our head office, five hydro power sites (Kori, Hanbit, Wolsong, Hanul and Han River) and five pumped storage power plants (Simnyangjin, Cheongsong, Muju, Sancheong, Yecheon) obtained both KOSHA 18001 and OHSAS18001 certifications. Yangyang and Cheongpyeong pumped storage power plants obtained the KOSHA 18001 certification.



## Objective Nuclear Safety Evaluation System

### Operating NPP – Safety Evaluation through Systematic Safety Management System

KHNP carries out an effective safety evaluation based on PSR, PSA, RIMS, and ORION. We evaluate the 14 safety factors recommended by IEAE once every decade through Periodic Safety Review (PSR). We also enhance critical accident response capability through Probabilistic Safety Assessment (PSA). Risk Monitoring System (RIMS) lets us monitor risks involved in the conditions of NPP while Outage Risk Indicator of Nuclear Power Plants (ORION) enables us to manage risks depending on NPP conditions during planned preventive maintenance.

### Aged NPPs – Establish Additional Safety Enhancement Measures

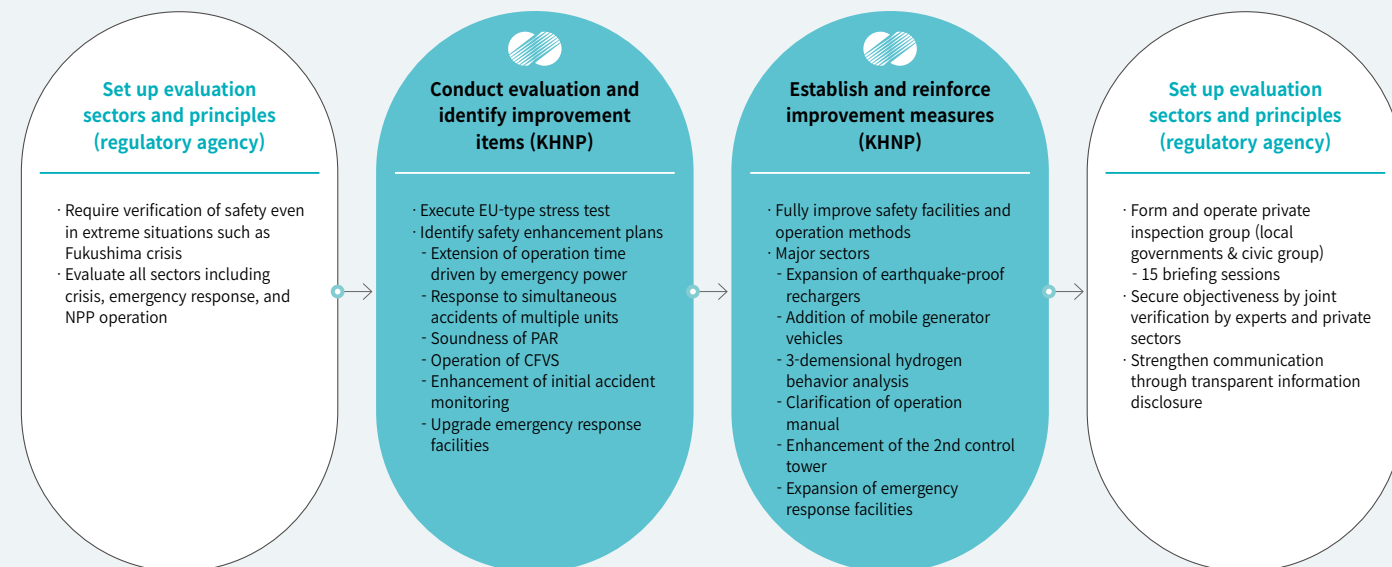
KHNP carries out stress test to evaluate the impact of extreme cases of natural disasters on aged NPPs and to identify vulnerability and improvement tasks. The results are verified by experts in earthquake, tsunami, critical accident, and fire to secure accuracy and reliability. KHNP then determines whether to continue the operation of aged NPPs in accordance with the vote and approval of the Nuclear Safety and Security Commission.

#### Focus Business

### Approval of Continued Operation of Wolsong #1 after Stress Test

Stress test is conducted to confirm safety of aged NPPs by evaluating their capability to respond to major natural disasters which exceed design standard. Wolsong #1, whose design life has expired, passed stringent stress test to be approved to continue operation. KHNP plans to reinforce Wolsong #1 to raise its response capability to extreme natural disaster.

#### Detailed Contents

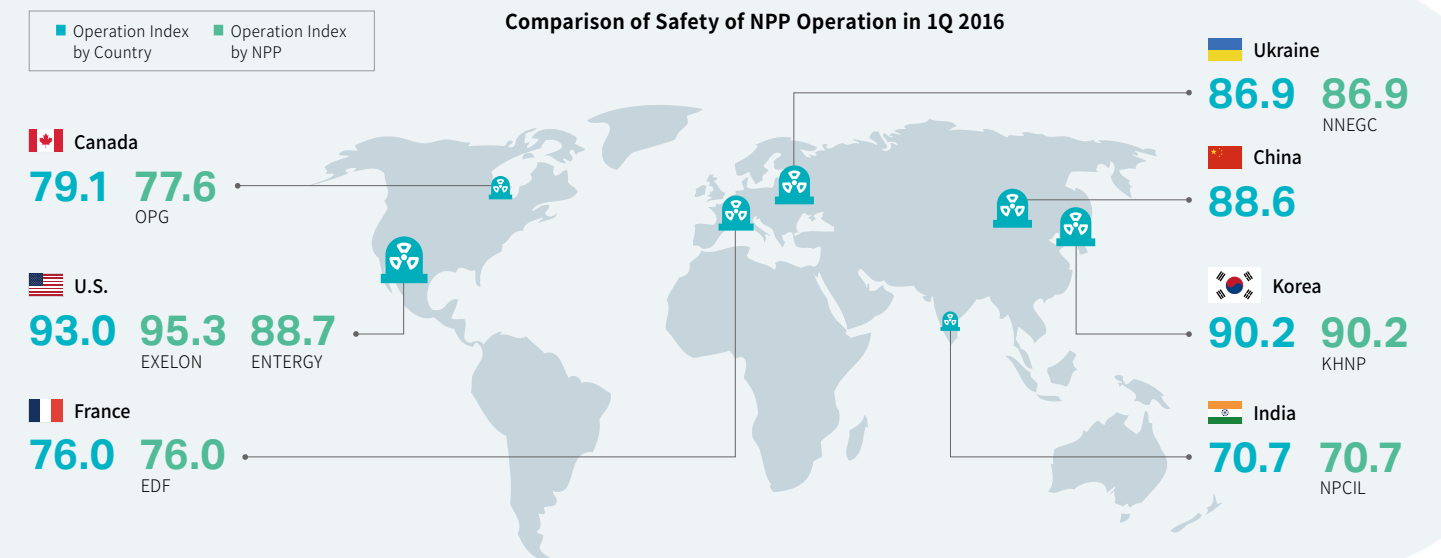


#### Performances



### Strengthen Global Competitiveness through International Evaluation

NPP operators diagnose their NPP operation levels, compare performances, and set up improvement strategies through WANO PI (World Association of Nuclear Operators Performance Index). In 1Q 2016, KHNP ranked the 2nd on WANO PI evaluation among the countries with more than 10 NPPs in the world, proving its world-class safety level. In particular, we were highly recognized in three fields of “radiation exposure dose,” “the number of unplanned nuclear reactor auto-stop,” and “nuclear fuel trust.” Meanwhile, three tasks of “development available index,” “auxiliary water feeding system,” and “unplanned loss rate” were identified as needing improvement efforts. In this regard, KHNP will improve weak areas such as unplanned long-term shutdown and strengthen preemptive operational maintenance. In 2015, KHNP’s five NPPs subject to be evaluated by WANO won the “Excellent” level or better and fully implemented follow-up measures for WANO CPR in 2015.



## Safety Management Process

### Promote Nuclear Safety Real-Name System

KHNP operates Nuclear Safety Real-Name System to ensure safe management of NPPs. The “Integrated Information Management System”, in particular, allows KHNP to track equipment, person in charge of parts, real name of part owners, and historical details of each part throughout the entire cycle of NPP in real time, ensuring transparent safety management.

### Evaluate Safety Culture Practices

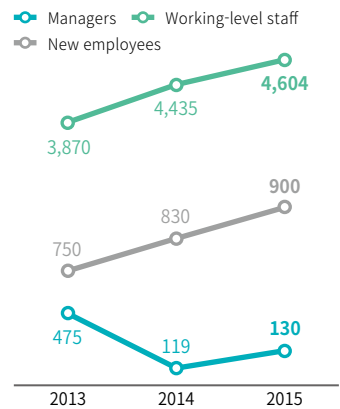
KHNP has crafted its own safety culture evaluation criteria based on international standards on safety. We evaluated our safety culture by utilizing the criteria and identified improvement tasks and best practices through interviews with internal and external professionals as well as employees. The results were shared throughout the company. Furthermore, our safety culture practices were verified by third-party institutions such as the Korea Nuclear Safety Commission and the results were reflected in creating safety culture enhancement measures.

### Enhance Safety Education for Supplier

Safety trainings customized for each position and jobs are provided to suppliers to foster safety culture and to enhance capacity for execution. Partnerships are reinforced by sharing solutions to conflicts. KHNP contributes to raise partnership by providing education on conflict resolution and sharing ideas on conflict resolution.



### Safety Culture Training Results



## Establish Safety Culture Company-Wide

As regulations on nuclear safety toughen and rate of new employees at power plants increases, it is increasingly required to establish safety culture company-wide through education. KHNP has thus established strategy to raise employees' awareness of safety culture by providing customized education on safety and job capability enhancement.

### Safety Culture Internalization Strategy



### Customized Education

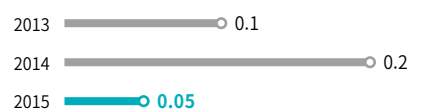
KHNP offers a variety of on and off-line safety education customized for employees from newly hired to executives, raising their awareness of safety and promoting safety culture. New employees learn about the importance of safety through introductory course. Mid-level employees receive safety culture curriculums through e-learning. Managers take safety culture expert course to reinforce their safety capabilities.

### Employees' Safety & Health

#### No. of disasters



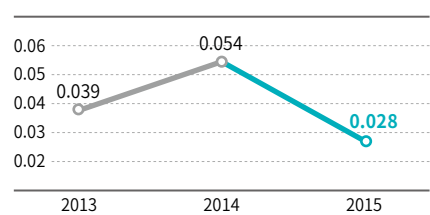
#### Accident rate



#### No. of deaths



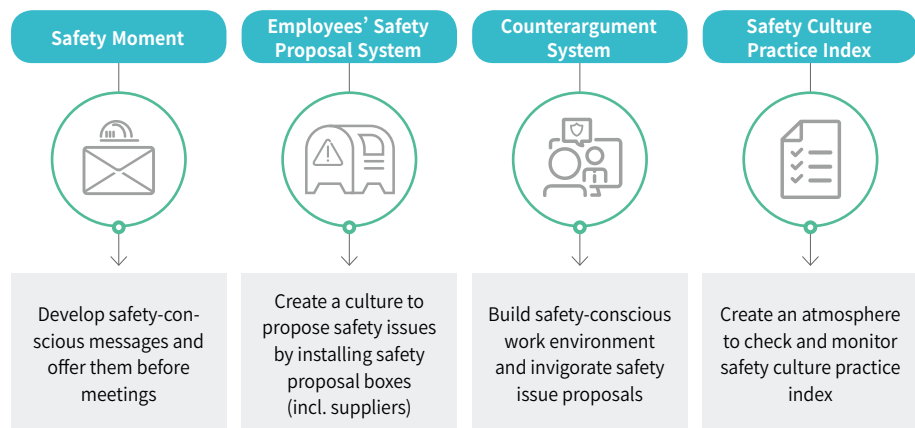
#### Severity rate\*



\*Loss days related to accidents per 1,000 working hours

### Programs to Promote Safety Culture

Safety Moment, Safety Suggestion System, Positive Objection System, Safety Culture Practice Indicator are the field-oriented programs aimed at promoting safety culture company-wide.



### Safety and Health Council

KHNP operates the Safety and Health Council to ensure pleasant and safe working environment for all employees. The Industrial Safety and Health Committee, a consultative body represented between labor and management in an equal number, serves as a communication channel to establish disaster-free workplace. The Company-wide Safety Council promotes effective information sharing. Furthermore, the Regional Safety Council is operated in order to elevate safety management level and prevent safety accident by categorizing all workplaces into five regions.

## Reinforce Disaster Response and Management

### Secure Disaster Response Capability

KHNP's advanced disaster response system based on the integrated management model clearly specifies roles and responsibility between the HQ and regional plants in case of disaster, thus ensuring effective collaboration. In 2015, in particular, KHNP set up the general situation room in the HQ in Gyeongju and developed the disaster-specific response guidelines for both individual and institution. Furthermore, KHNP has devised preventive measures against fire or flooding of hydropower plants. Our e-Learning on disaster safety management, the first to be developed by a power generation company in Korea, has contributed to advancing the disaster response system.

### Advance Disaster Response system

It is necessary to set up an integrated system to standardize safety management for operating NPPs and to clearly specify collaboration and separation of duties between the HQ and regional offices. To that end, KHNP operates disaster response system based on "Governance, Oversight, Support and Perform (GOSP)".

### Disaster Safety Management System

#### Governance

- Establish detailed execution plans for national safety management
- Establish detailed execution plans for national critical infrastructure protection
- Establish disaster safety management, training, and evaluation plans

#### Perform

- Build site-owned plans linked with HQ policies
- Build and implement detailed plans for enhancing disaster safety management
- Build and implement disaster response training plans

#### Oversight

- Monitor the execution of detailed disaster safety management plans
- Monitor 36 disaster safety management indices
- Monitor the achievements of disaster safety management indices

#### Support

- Conduct coaching of risk evaluation for all NPP sites
- Purchase electric pollution protectors and distribute them company-wide
- Open e-learning courses about disaster safety management

## Secure Preemptive Anti-Disaster Infrastructure

KHNP has expanded the emergency planning zone from 8~10km radius of reactor to 20~30km, thus enhancing preparedness against radiation leakage and expanding protective measures for communities near NPPs. The company also increased the thyroid protection medication by 100 pills. The emergency alarming network was expanded from the existing 42 centers to 206 while the local government's emergency communication network from 40 lines to 96 to secure anti-disaster infrastructure. Following the recent accidents in Fukushima, KHNP has carried out safety inspections into NPPs to implement the improvement tasks identified.

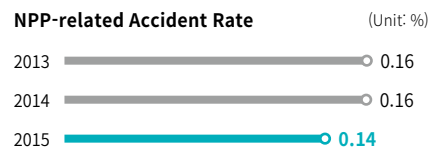
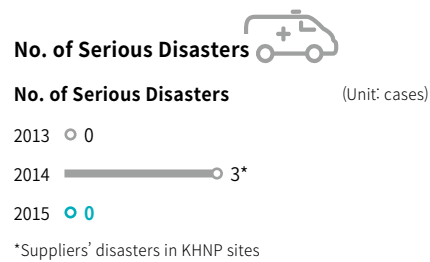
## Establish Emergency Response Preparedness

In order to secure emergency response preparedness in case of accident in NPPs, KHNP carries out a wide range of disaster drills for natural and social disaster, radiation response, cyber terrorism, operator's emergency response, and more.

### Disaster Response Drill in 2015

Natural & Social Disasters	Radioactivity Prevention	Protection of Cyber Terror and Facilities	Emergency Drill for NPP Operators
<ul style="list-style-type: none"> <li>Disaster Response Safety Korea Drill (20 times)</li> <li>Spot disaster response drill (30 times)</li> <li>Individual drill at NPP and hydro plants (310 times)</li> <li>Firefighting drill (685 times)</li> </ul>	<ul style="list-style-type: none"> <li>Spot drill (36 times)</li> <li>Company-wide drill (11 times)</li> <li>Joint drill (once)</li> <li>Combined drill (once)</li> </ul>	<ul style="list-style-type: none"> <li>Cyber terror response &amp; recovery drill (4 times)</li> <li>Control system attack response drill (10 times)</li> <li>Cyber attack response drill (3 times)</li> <li>Facility protection drill (216 times)</li> </ul>	<ul style="list-style-type: none"> <li>Unusual situation response drill (228ghl)</li> <li>Emergency response drill (228 times)</li> <li>Serious accident response drill (114 times)</li> </ul>

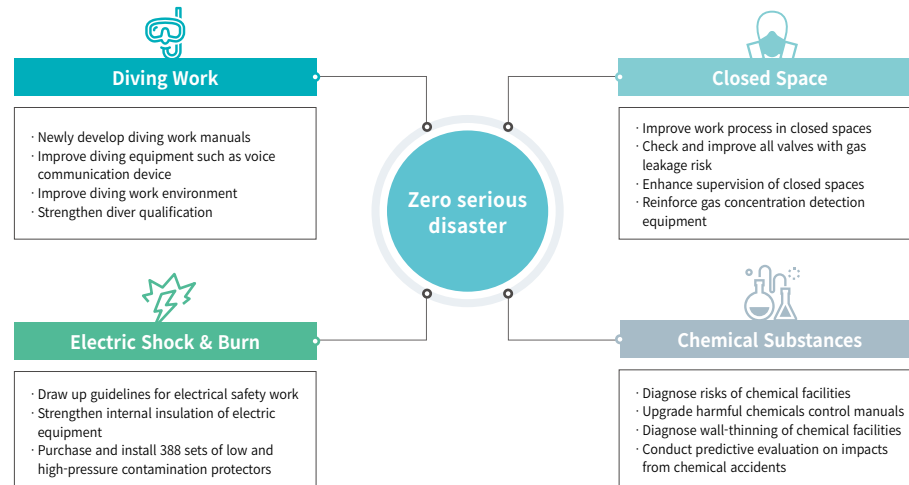




## Zero-Critical Accident

Even a single critical accident of NPP may seriously compromise people's trust, leading to serious management risks. To prevent such accident from occurring, KHNP has elected four major critical accidents; "underwater work", "work in closed space", "electric shock and burn", and "harmful chemical substances." Furthermore, KHNP has established customized critical accident response system, achieving no record of critical accident in 2015. In recognition of its efforts to protect NPP facilities, KHNP was awarded the President's prize for Hanul NPP and the prize from Minister Trade, Industry and Energy for Kori and Wolsong NPP.

### Serious Disaster Prevention System



## Promote Fire Safety

To take preemptive response to the tightened regulations on fire safety of NPPs, KHNP has established 24 fire safety promotion measures in four areas. In 2015, we independently developed technology standards on NPP fire protection and established comprehensive relevant facility improvement plans. In addition, we not only standardized manuals for fire protection, fire response, and fire drill in line with increasing NPP operations, but enhanced our firefighting capability through fire department capability evaluation and advanced training course.

Best Practice



Won the Minister Citation of Trade, Industry and Energy in disaster management evaluation

### Disaster management evaluation by the Ministry of Trade, Industry and Energy

1<sup>st</sup> (S rating)

※ Scope of ratings: Ministry of Trade, Industry and Energy - S (best/excellent/participation)/A/B, Ministry of Public Safety and Security - A/B/C

### Disaster management evaluation by the Ministry of Public Safety and Security

A rating in energy sector

### Disaster management evaluation by the Ministry of Public Safety and Security

A rating in nuclear power sector

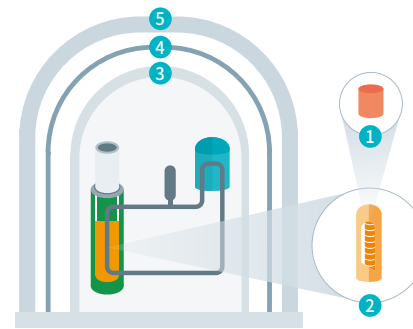
## Improve Reliability of Nuclear Facility Operation

### Establish Safe Nuclear Facilities

Nuclear power generation is safe because radioactive substance generated during nuclear fission is isolated to prevent leakage. KHNP operates the Defense in Depth system where appropriate measures are taken for different phases of accident to protect local communities near nuclear plants. KHNP adopts both the Multiple Levels of Protection and the Multiple Barriers system. The Multiple Levels of Protection consists of five levels; maintain normal situation, early response to abnormal situation, accident prevention, accident alleviation, and response measures. The protective walls are built in multi-layer to prevent radioactive substances from being leaked.

### Five-layered Protective Walls of KHNP's NPP

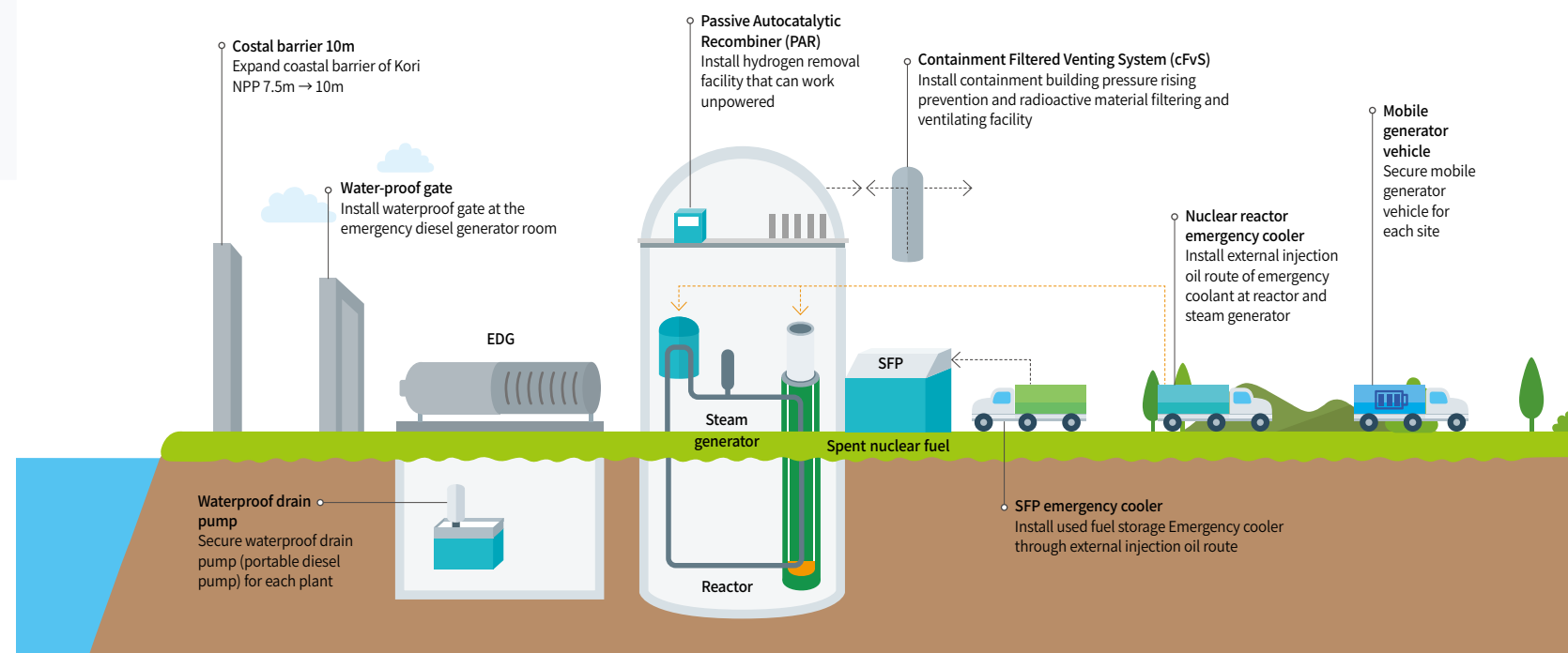
1 Protective wall's fuel fillet	Initially seals off most of radioactive material generated during nuclear fission
2 Protective wall's fuel cladding conduit	Composed of zirconium alloy, resistant to heat, radiation and corrosion, and seals off even small amount of gaseous radioactive material from the fuel fillet
3 Protective wall's reactor carriers	Completely seals off radioactive material even when radioactive material leaks due to defect of the cladding conduit, as it is steel carrier with 25~30cm thick
4 Inside walls of NPP buildings	Protects the NPP buildings with 6mm-thick steel protective walls
5 Outer walls of NPP buildings	Prevents any leakage of radioactive material outside the buildings with 120cm-thick ferroconcrete walls



## Improvement Measures Following Fukushima Accident

Following the Tohoku earthquake and the Fukushima accident in March 2011, KHNP has been developing improvement measures to protect NPP from any major natural disaster. KHNP has come up with 56 safety improvement initiatives in six areas including response to major accident in electricity and cooling system in case of earthquake, tsunami, and flooding, emergency response and emergency medical treatment, Kori #1, and aged plants in operation. As of June 2016, the company has completed 49 improvement initiatives.

### NPP Safety Facilities





## Are Our NPPs Safe from Earthquakes?

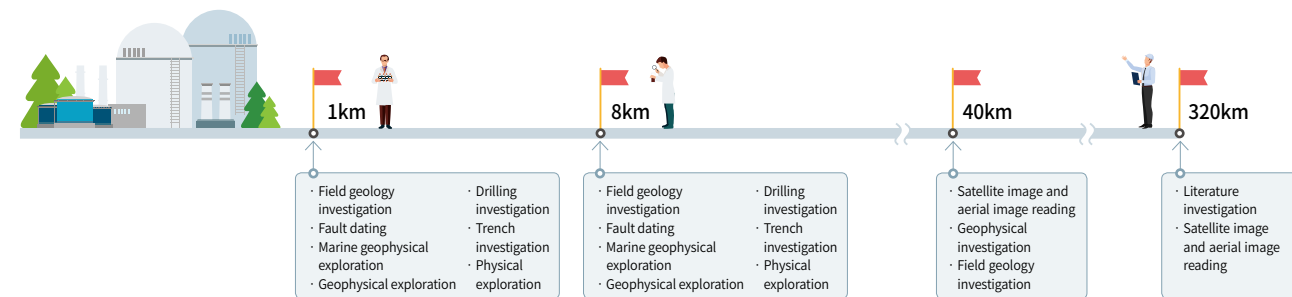
Recently, a series of earthquakes occurred across the southeast region in Korea: a 5.0-magnitude earthquake with epicenter 52 km of the southeastern area of Ulsan (Jul. 5, 2016); and a 5.1 and 5.8-magnitude earthquakes centered 9km southwest of Gyeongju (Sep. 12, 2016). The public is raising safety concerns over the NPPs in the regions where Wolsong #1 ~#4, Shin-Wolsong #1 and #2, Kori #1 ~ #4, and Shin-Kori #1 and #2 are located. However, our NPPs are managed to be earthquake-resistant in all processes ranging from site survey and selection to design, construction, and operation at the global level.

**Q** Are the locations of NPPs safe from earthquakes?

**A** **YES, the NPP sites are selected by utilizing the most advanced technology and surveying a 320-km radius of the proposed site.**

We use technologies in all areas from the stage of site survey. In compliance with the Nuclear Safety Act, an extensive survey including literature, satellite image, and aerial image reading is conducted within a 320-km radius of the site. In area within a 40-km radius, geophysical survey and geological field investigation are conducted to see geological structure, fault distribution and rock quality. In area within an 8-km and 1-km radius, we execute phased precise survey such as geophysical and field-geology investigation, fault dating, marine geophysical exploration, drilling investigation, seismic survey, and trench investigation.

### Phased Site Survey



**Q** Should an earthquake hit, can the NPPs stand?

**A** **YES, NPPs are designed to be earthquake-resistant and constructed on solid bedrock.**

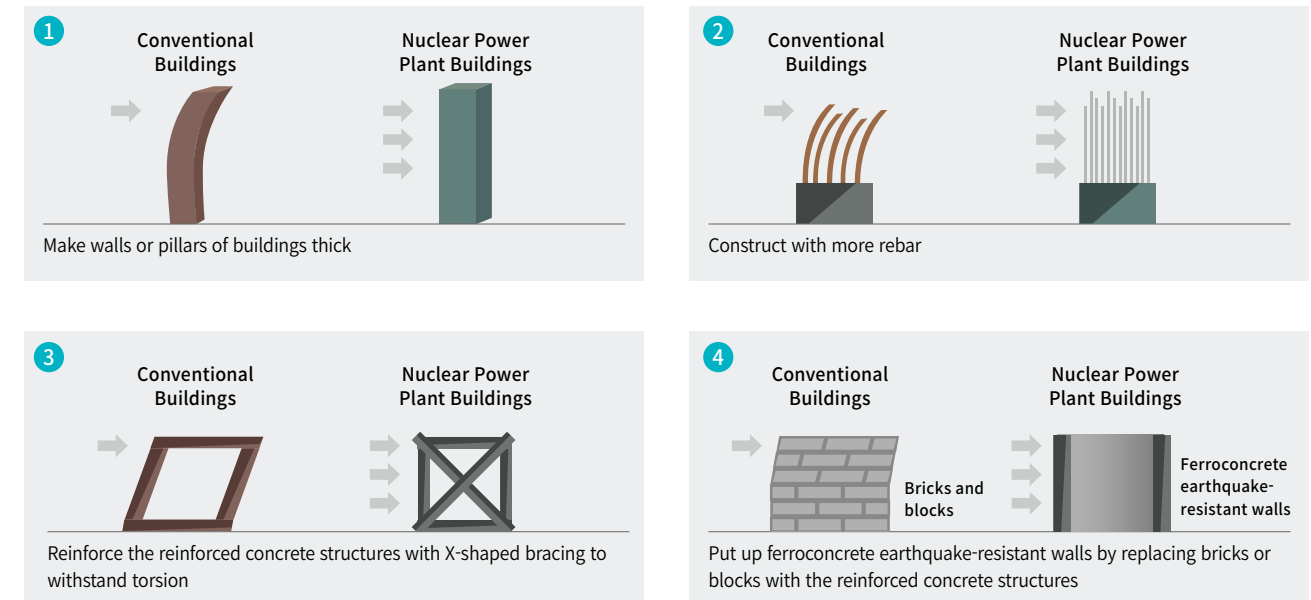
The maximum earthquake magnitude is determined after considering all earthquake histories and faults in Korea based on the detailed data analyzed from the site survey. Then the level of earthquake resistance of NPPs is set by adding safety margin. NPPs in Korea are safe even in case a major earthquake hits because they are designed for the largest conceivable earthquake. Not just this, when constructing an NPP, strict quality control is conducted at every stage including selecting materials, manufacturing equipment, and constructing structures. And the rigorous inspection and tests by regulatory authorities are mandatory. In particular, major facilities and equipment are constructed when strict seismic qualification such as precise seismic analysis or shaking table test are confirmed. Seismic qualification means the rigorous examination of facilities and equipment after experiencing operating basis earthquake (5 times) and safe shutdown earthquake (once). Meanwhile, reactor containment building is constructed in a solid manner by excavating solid base rock, densely installing reinforcing bars, and depositing concrete. An NPP constructed on the solid base rock can reduce earthquake vibration by 30 to 50 percent compared to buildings on ordinary ground.



### What is the value of seismic design?

The value of seismic design is represented with “g” after the initial letter of “gravity.” “g” is based on acceleration of gravity. 1g thus is 981cm/sec<sup>2</sup>. The value of seismic design for NPPs in Korea is 0.2g. However, APR1400 reactor – installed in Shin-Kori #3 ~ #6 and Shin-Hanul #1 and #2 – was designed to a 0.3g earthquake acceleration and has a 60-year lifespan. The technology was developed with the purpose of export.

### Seismic Design of NPPs

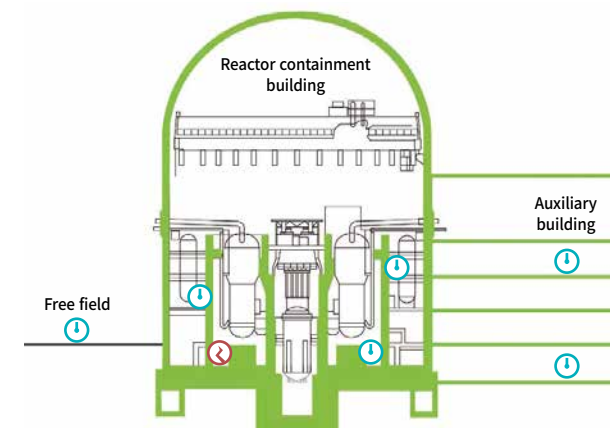
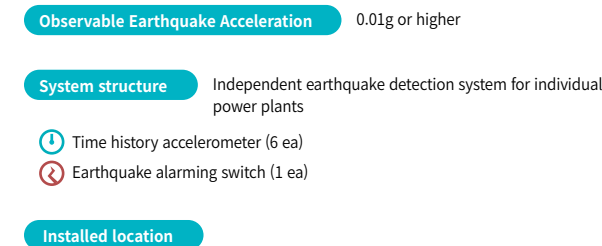


**Q** Are there safety measures prepared for earthquakes?

**A** **NPPs are operated with state-of-the-art monitoring system.**

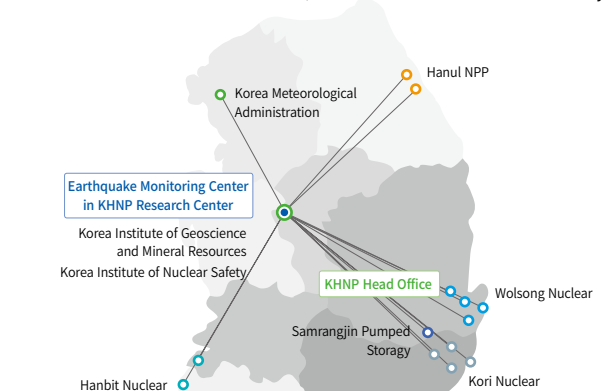
NPPs in Korea are safely operated with the cutting edge earthquake monitoring system such as earthquake measuring instrument installed in reactor building and major structures and equipment. Also, our emergency response procedure ensures that we are ready for earthquakes with alerting system and NPP shut down depending on the seismic scale.

### Earthquake Detection System in NPPs of Korea



### Earthquake Monitoring Network

KHNP operates earthquake observatories in 13 locations near power plants in addition to the earthquake detection system. The observed data is shared via the network between Korea Meteorological Administration, Korea Institute of Geoscience And Mineral Resources, and Korea Institute of Nuclear Safety.



### Seismograph Network (As of 2016)

Korea Meteorological Administration	145 units	Korea Institute of Geoscience and Mineral Resources	38 units
Korea Institute of Nuclear Safety	5 units	KHNP	13 units

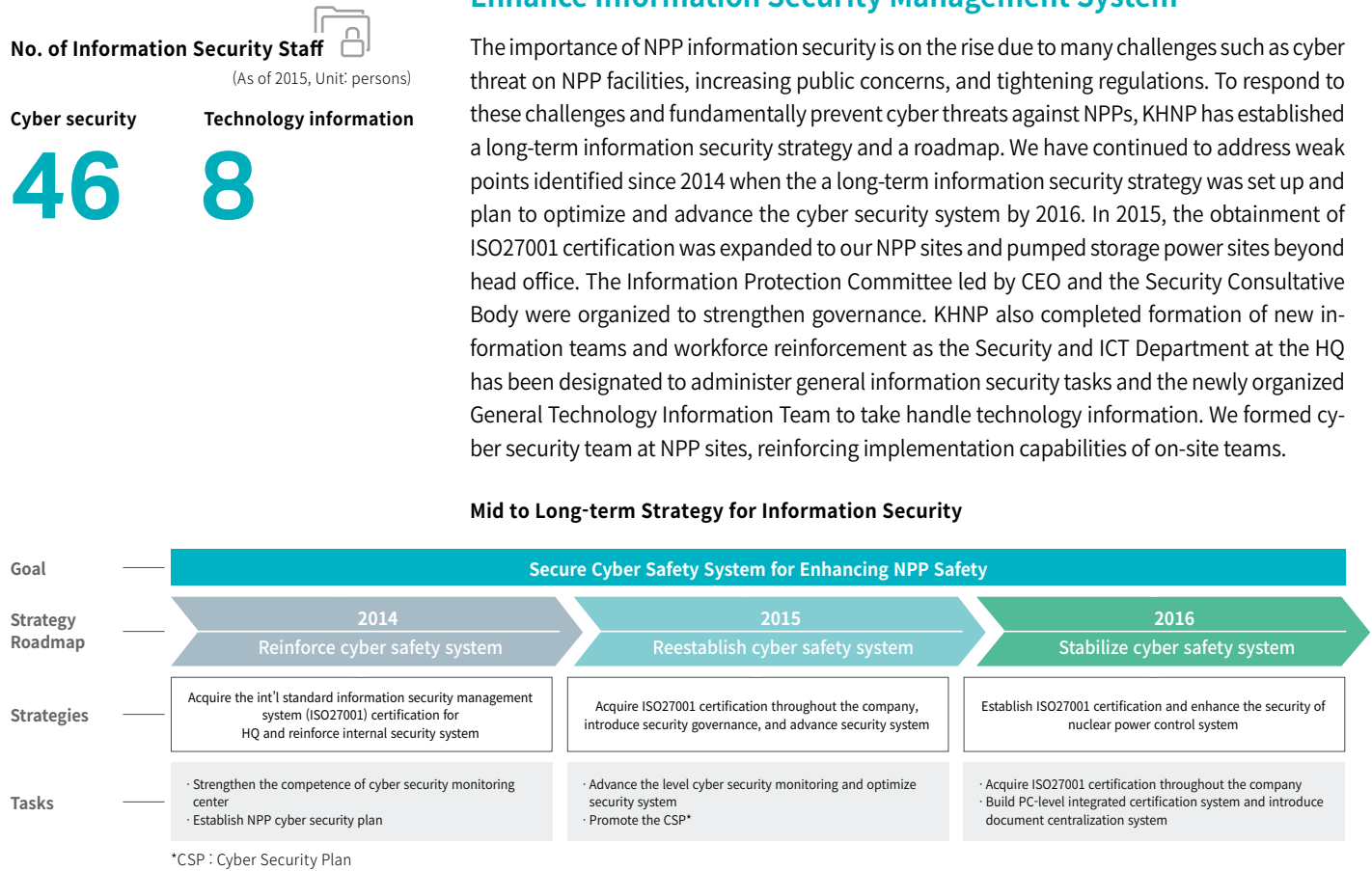


Advance Information Security Management System

Enhance Information Security Management System

The importance of NPP information security is on the rise due to many challenges such as cyber threat on NPP facilities, increasing public concerns, and tightening regulations. To respond to these challenges and fundamentally prevent cyber threats against NPPs, KHNP has established a long-term information security strategy and a roadmap. We have continued to address weak points identified since 2014 when the a long-term information security strategy was set up and plan to optimize and advance the cyber security system by 2016. In 2015, the obtainment of ISO27001 certification was expanded to our NPP sites and pumped storage power sites beyond head office. The Information Protection Committee led by CEO and the Security Consultative Body were organized to strengthen governance. KHNP also completed formation of new information teams and workforce reinforcement as the Security and ICT Department at the HQ has been designated to administer general information security tasks and the newly organized General Technology Information Team to take handle technology information. We formed cyber security team at NPP sites, reinforcing implementation capabilities of on-site teams.

Mid to Long-term Strategy for Information Security



Reinforce NPP Cyber Security

KHNP has reinforced security in control system by identifying vulnerabilities in points in NPP control network and inspecting points of NPP control system. The company has also laid the foundation for safe NPP operation by tightening security on USB memory and other portable storage devices to protect facilities vulnerable to virus, revising cyber threat response manual, and carrying out simulation drills.

Prevent Cyber Terrorism

KHNP has maximized its capabilities to prevent and respond to cyber terrorism by reinforcing the cyber security system in five areas including early detection of cyber terrorism and cyber security control. Furthermore, the company proactively responds to cyber threats by controlling data leakage by printing or wireless communication.

Strengthen Cyber Security System

Classification	Details	Effect
Early detection of cyber terror	· Advance the Anti-APT* system	· Prevent cyber terror and respond preemptively
Cyber security control	· Establish next-generation crisis response and analysis system	· Maximize cyber terror monitoring effect (10 thou. → 100 mil. cases a day)
Document and data management	· Reinforce printed materials and document security systems and build document centralization system	· Prevent outflow of corporate data (enhancing security and collaboration)
Control of wireless and smart phones	· Build wireless internet blocking system at the new head office building and smart phone control system at NPPs	· Prevent outflow of NPP information and wireless communication
Information security management of suppliers	· Establish exclusive work system for suppliers, tighten internet security of residential suppliers, and evaluate information security status of suppliers	· Prevent data outflow by suppliers

\*APT : Advanced Persistent Threat

Social Responsibility

KHNP, Practicing Eco-friendly Management for Next Generations



Aspect Report

Report Context

In December 2015, COP21 of UNFCCC agreed on Post 2020 that requires all parties to cut greenhouse gases. Accordingly, it is expected that stricter greenhouse gases policies than Kyoto Protocol would be in place, and the Korean government is seeking countermeasures such as GHGs emission cut target by 2030 and adaptation guideline for public agencies. Given that, industries and businesses must pay attention to not only cutting GHGs emission but also make efforts to turn risk coming from GHGs reduction into opportunity. In particular, as it has become a requirement to develop alternative energy due to limitations in the existing fossil fuel and its environmental impact, the role and weight of renewable energy including nuclear power has been highlighted. Meanwhile, environmental load from business operation has become a huge issue. While attentions have been only paid to the impact on air or water quality in the past, now it even goes to harm to human bodies and effect on next generation. Thus, it is required to have a continuous and thorough management on radioactive waste of nuclear energy.

Sustainable Progress & Future Plan

KHNP, based on an advanced environmental management system, is practicing diverse environment conservation activities as a leading environment-friendly energy company. The company established the environmental management system in compliance with ISO 14001 while conducting continuous environmental management and internal and external environmental examination. The company controls emissions including radioactive waste to protect environment around NPPs while taking measures for heated effluents not to have an environmental impact. At the same time, our effort extends from saving energy internally, responding to emission trading scheme, to registering new power generation facilities to CDM in order to prepare for post 2020 era.



Case for Sustainable KHNP

Introduce EVs for Work

A public enterprise specializing in power, KHNP has introduced electric vehicles for work in order to foster the new energy industry. As of June 2016, the company operates a total of 25 electric cars and allocated them to different offices according to their business size with 14 charging stations installed. Electric cars are known to save about 70% fuel cost compared to gasoline counterparts. In addition, they can reduce GHGs (CO2) by 3.2 tones when running 20,000km as they does not emit any CO2. KHNP plans to introduce about 100 electric cars by 2020 while installing 20 fast charging stations. Introduction of electric cars would be a chance for the company to become a leader of new energy industry.



Introduction of electric vehicles for business



Environmental Performance Index\*

2013  
150.6points

2014  
182.7points

2015  
257.6points

\*The tightened scoring criteria of performance indicators such as waste recycling rate was applied retroactively to data in 2013 and 2014, thereby there are some differences from data of the previous report.



GHG Emissions  
(Unit: 1000tCO<sub>2</sub>eq)

2013  
3,296

2014  
3,753

2015  
2,998

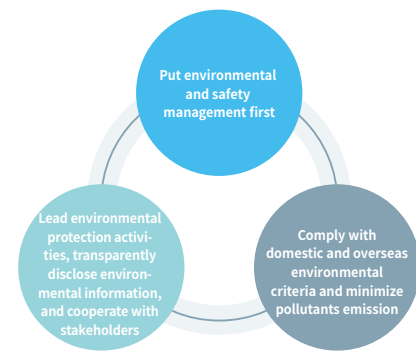


## Eco-friendly Management

### Environment-friendly management strategy

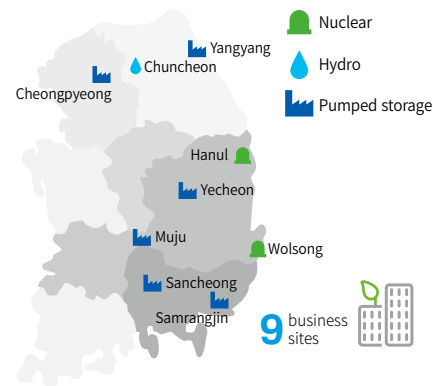
KHNP has established advanced environmental management system based on three basic directions of “environment · safety first management”, “lead environmental protection actions, disclose environmental information and cooperate with stakeholders” and “compliance with national & international environmental standards and minimize pollutant emission.” The company is also setting up mid and long-term environmental business plans by 2019.

#### Basic Direction of Environmental Management



#### Designation as a Green Company

(As of July 2016)



#### Major Projects

Major projects in 2015	<ul style="list-style-type: none"> <li>· Designation (Yecheon pumped storage) and re-designation as a green company (Sancheong &amp; Samrangjin pumped storage)</li> <li>· Implementation of safety training tailored to features of employees who handle harmful chemicals at NPP and establishment of safety culture</li> <li>· Wall-thinning diagnosis and safety assessment of old chemicals storage tanks (16 tanks of 3 kinds such as sulfuric acid)</li> </ul>
Major plans in 2016	<ul style="list-style-type: none"> <li>· Promotion of re-designation as a green company (Wolsong &amp; Hanul site, Chuncheon hydro)</li> <li>· Development of CPP's high-density organic recycled wastewater treatment technology</li> <li>· Identification of plans for stable reuse of NPP wastewater and on-site verification test</li> <li>· Follow-up measures in line with diagnosis results on old chemicals storage tanks (replacement or repair)</li> </ul>

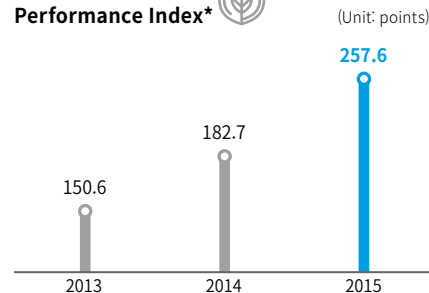
### Green Certificate and Designation as a Green Company

For systematic environmental management to meet the international standards, KHNP has established an environmental management system in compliance with international standard (ISO 14001.) Furthermore, environmental performance is continuously monitored and improved by identifying and implementing new approaches through KHNP's own internal assessment and consultations with specialized organizations. Meanwhile, KHNP has been designating green company since 2010. As of 2015, nine of our sites, Wolsong, Hanul, Chooncheon, Moojoo, Yangyang, Cheongpyeong, have been designated as green companies and the status has been maintained up to now.

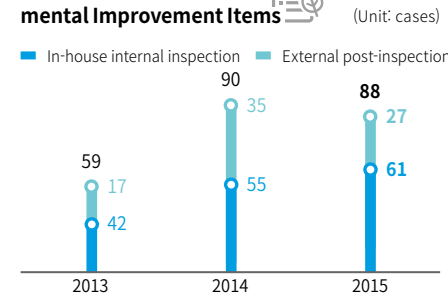
### Measure and Manage Environmental Performance

In order to proactively respond to regulatory standards and enhance company-wide capability of environmental management, KHNP developed an environmental performance index, which has been applied to measure and monitor environmental performance. The index consists of 17 detailed indexes in 6 areas and is calculated based on the management performance of environmental management and compliances, and operational performance of input and output. KHNP measures environmental performance index every year and conducts comparative evaluations of NPPs for improvement. KHNP scored 257.6 on its environmental performance index in 2015, confirming that it has continued to improve environmental performance for the latest three years.

#### Environmental Performance Index\*



#### Identification of Environmental Improvement Items



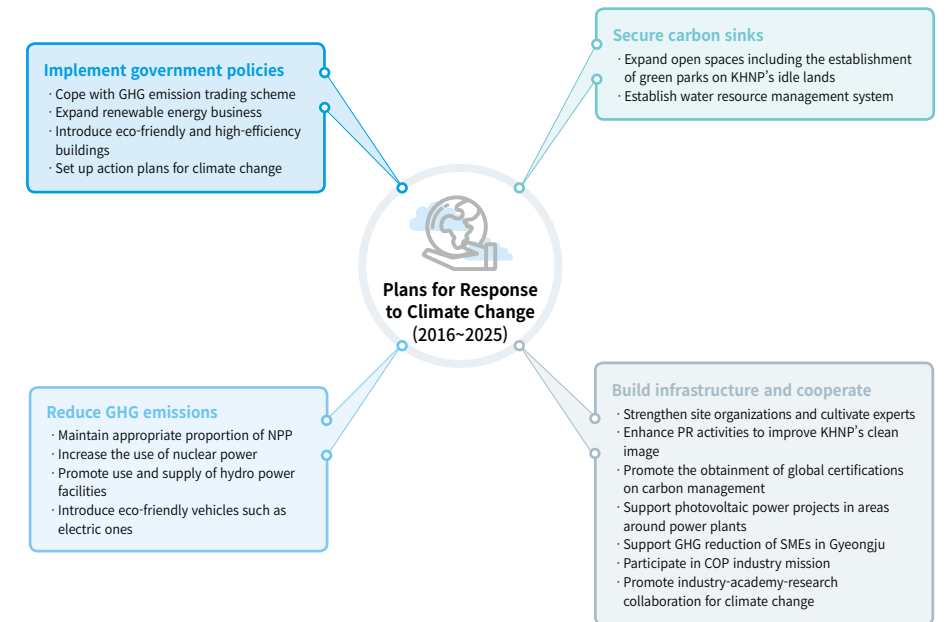
\*The tightened scoring criteria of performance indicators such as waste recycling rate was applied retroactively to data in 2013 and 2014, thereby there are some differences from data of the previous report.

## Efforts to Respond to Climate Change

### Nuclear Energy and Climate Change

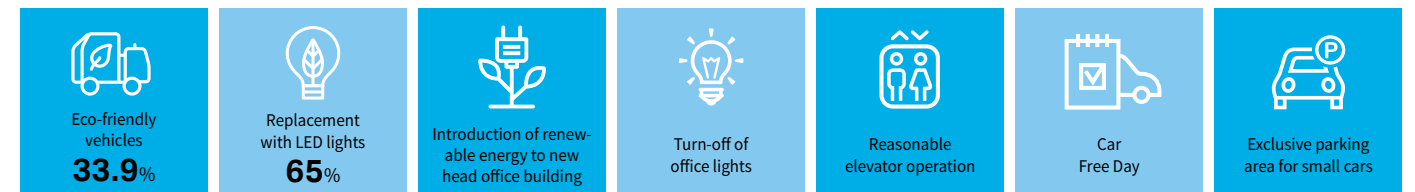
Nuclear energy does not emit any GHGs during the process of power generation. And the total amount of GHGs emitted throughout the whole lifecycle from construction to dismantlement is lesser than that of renewable energy. Likewise, KHNP is actively participating in the national campaign to cut the GHGs having set 4 key areas and established detailed tasks in order to inherit sustainable habitat to the next generation with nuclear power, a promising alternative to GHGs reduction.

#### 4 Major Areas and Detailed Tasks for Response to Climate Change



### Energy Reduction Activities

All plants of KHNP engage in diverse activities for an effective energy use and energy consumption reduction to minimize GHGs emitted directly and indirectly from business operation.



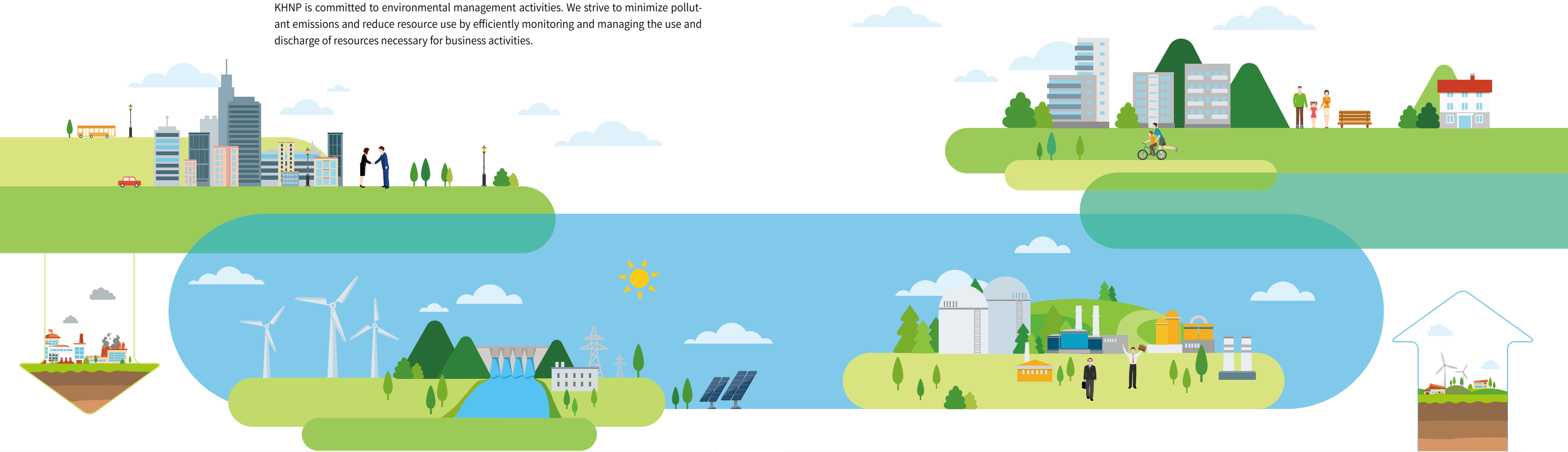
### Response to Carbon Emission Trading

Korea has begun implementing carbon emission trading since 2015. Pumped storage power plant takes up about 80% of the total emission of KHNP and is thus subject to the government GHGs indirect emission control. To cope with it, KHNP has established emission trading guideline and company regulations, and come up with an effective response scheme by designating managers dealing with emission trading, setting up and implementing a long-term strategy for reducing carbon emission. In addition, a joint response system for emission trading with other power generating companies has been established. Exchange activities for GHGs reduction as developing GHGs cut technologies and joint participation in industrial development are promoted.



Material flow at a glance

KHNP is committed to environmental management activities. We strive to minimize pollutant emissions and reduce resource use by efficiently monitoring and managing the use and discharge of resources necessary for business activities.



Fuel Consumption



		(Unit: kgU)		
		2013	2014	2015
Nuclear fuel	Light-water reactor (enriched uranium)	380,222	373,523	343,358
	Heavy-water reactor (natural uranium)	291,143	359,617	278,635

Energy Consumption



		(Unit: 10×TJ)		
		2013	2014	2015
Direct energy (fuel)		27	15	50
Indirect energy (electricity)		6,655	7,660	6,038
Total Energy Consumption		6,682	7,675	6,088

Environmental Investment



		(Unit: KRW in billions)		
		2013	2014	2015
Environmental Investment		1.0	7.8	1.1
	Purchase of green products	16.4	16.3	22.7

Water Consumption



		(Unit: thousand m³)		
		2013	2014	2015
Nuclear power plants	Underground water	38	29	56
	Industrial water	2,686	2,772	2,368
	Water supply	1,006	1,075	827
	Surface water	3,853	3,951	4,828
	Total water consumption	7,583	7,827	8,079

Hazardous Chemicals Emission



		(Unit: tons)		
		2013	2014	2015
Nuclear power plants	Hazardous chemicals consumption	6,673	7,537	7,406
	No. of hazardous chemicals emission (cases)	0	0	0

Wastewater Discharge and Recycling



		(Unit: thousand m³)		
		2013	2014	2015
Nuclear power plants	Waste water discharge	3,845	3,642	3,783
	Recycled water	528	419	502
	Recycling rate (%)	13.7	11.5	13.3

Waste Discharge



		(Unit: tons)		
		2013	2014	2015
Nuclear power plants	General waste	11,651	9,769	10,045
	Designated waste	1,561	571	735
	Total waste	13,212	10,340	10,780
Recycling rate* (%)		80.7	70.1	68.2

\*Recycling rate compared to the amount of general waste

Water Pollutants Emission



		(Unit: kg*)		
		2013	2014	2015
Nuclear power plants	COD	19,918	18,566	18,504
	SS	4,968	4,667	3,096
	T-N	34,235	33,476	39,085

\*Emissions intensity × Emissions volume

GHG Emission



		(Unit: 1000tCO <sub>2</sub> eq)		
		2013	2014	2015
Scope 1		64	33	65
Scope 2*		3,232	3,720	2,933
Total emissions		3,296	3,753	2,998

\*Usage of necessary external electric power for pumped storage and safe nuclear operations

Self-disposal of Radioactive Waste



		(Unit: drums)		
		2013	2014	2015
Self-disposal results		1,015	1,320	1,410

\*Environmental Data Estimation Criteria

- “Nuclear power plants” report aggregated data of energy input and water supply to operate Kori, Hanbit, Wolsong, and Hanul plants and their data of pollutant emissions.
- Hydro and pumped storage power plants which do not emit pollutants aggregate environmental data centered on energy consumption and GHG emissions.
- Hydro power plants (10 units in Cheongpyeong, Uiam, etc.), pumped storage power plants (7 units in Muju, Samrangjin, etc.)



## Eco-friendly Value Creation through Minimizing Environmental Impact

### Environment Management System

According to the “Environmental Impact Assessment Act,” KHNP expects and analyzes the impacts on environment, life, society, and economy in all process from power plant construction to operation and conducts in-detail impact reduction measures by sector. In addition, power plants are constructed are operated in compliance with environmental impact report that is finalized after discussions with local communities and governmental bodies. Environmental management for NPPs are conducted in general and marine aspects under the ISO14001 system.

### General Environment Management

In order to control environmental pollutants generated from plant operation legally, the company builds and operates wastewater disposal facility and waste storage and treatment facilities. The company also continues to survey and evaluate the impact on ecosystems nearby the plant in accordance with “Environment Survey Guidelines for Surroundings.”

#### Sewage and Wastewater Management

KHNP monitors the quality of sewage, wastewater, and affluent in real time with TMS (Telemetering system.) Sewage and wastewater treatment facilities are managed under 50% stricter criteria than the effluent quality standard. Nuclear plant wastewater, composing of non-organic wastewater, wastewater containing oil, and small amount of organic wastewater, is discharged after going through physicochemical treatment such as neutralization, condensation, sediment, and filtering. Sewage from toilet or shower room is discharged after being biochemically treated.

#### Waste Disposal Management at NPPs

Waste generated from NPPS is classified into various categories, that is, general waste, designated, and construction waste discharged from regions other than radiation-controlled area. KHNP has a system to control the entire process from waste generation to final treatment. Waste storage facilities are expanded and newly built in each NPP to minimize air pollution generated from incinerating waste. In addition, approximately 90% of combustible waste is reused by sorting waste according to types, components, and process methods.

#### Hazardous Chemical Substances Control

Thorough supervision and prevention of leakage of hazardous substances are essential since they may come in contact with the human body and the environment in the stages of production, use, and disposal. KHNP has thus developed the “NPP-customized Standard Emergency Response Guideline for Chemical Accidents” which covers control standards for chemicals, emergency response processes, and emergency protocols, and applied it on the sites. In addition, we expanded the number of hazardous chemicals managers from 12 to 54 to conduct regular safety inspection on nuclear plants with experts. KHNP also upgraded maintenance class for 1,115 safety-related equipment out of a total of 13,762 environmental facilities and introduced a risk assessment system which tests and diagnoses diverse hazardous substances based tightened national regulations company-wide, strengthening capabilities for managing hazardous chemicals.

#### Water Reuse Management

KHNP makes diverse efforts to reduce water consumption. In order to deliver effective water consumption, each plant reuses a certain amount of effluent water which is processed by wastewater disposal devices for filter cleansing, chemicals dilution, and road sprinkling. New NPPs are installed with wastewater reclamation systems to reuse water and to increase water use efficiency.

## Management of Marine Environment

### Marine Environment Monitoring System

KHNP has installed and operated bathythermograph, water quality analyzer, flow meter and current meter around intake hole and drain outlet of Kori, Hanbit, Wolsong, and Hanul plants. A total of nine systems, three for each new NPP, have been established for monitoring marine environment changes in areas where new NPPs (Shin-Kori, Shin-Wolsong, and Shin-Hanul) are located. Observed parameters are marine environment elements such as water temperature, salinity, current direction and flow velocity and metrological elements such as temperature, wind direction, wind velocity, and atmosphere. And the observed environmental data is recorded both in the national monitoring system operated by the Korea Hydrographic and Oceanographic Agency and in promotion and exhibition center of each NPP and is available to the public in real time.

Measurement Items of Marine Environment Monitoring System

Category	Measurement Items	Period
Marine organism	Fish assemblages, standing stock of zooplankton, phytoplankton(including chlorophyll), benthic organism, marine plants, fish, and kinds, number, weight of organism bumping into intake screen, and kinds and number of organism sucked into the cooling	Seasonal basis
Physical survey	water temperature, salinity, transparency, quantity of cooling water intake, weather (temperature, humidity, direction of the wind, wind speed, precipitation), sea water flow (current direction, current speed, tide, etc.)	Seasonal basis
hydro chemical survey	hydrogen ion concentration(pH), suspended solid(SS), dissolved oxygen(DO), residual chlorine, nutrient salts, chemical oxygen demand (COD), ocean deposits(ignition loss, grain-size composition, heavy metal)	Seasonal basis
	Specific harmful substance or heavy metal (copper, chrome or others)	Half-yearly basis

### Use of Heated Effluents

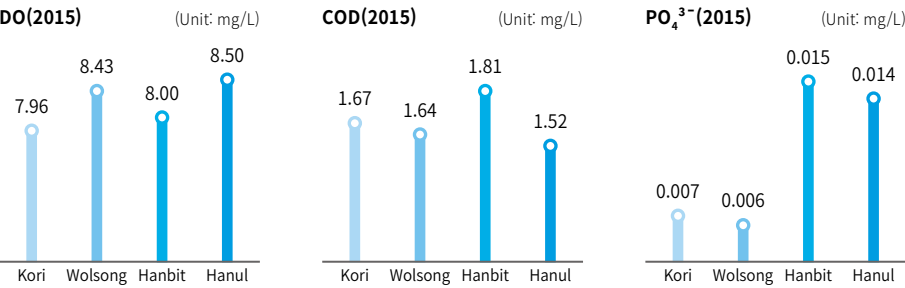
KHNP promote a wide range of business using heated effluents. First of all, Hanbit NPP, sitting on 2,600㎡ size of site, has a fish farm using heated effluent with 17-ton of adult fish production capacity and marine biodiversity exhibition hall. The exhibition hall is utilized as a learning place that demonstrates the safety of heated effluents to NPP visitors. Furthermore, starting from 1997, KHNP has used hot wastewater discharged from NPPs to cultivate fish and shellfish. Cultivated fish and shellfish are released in the sea near the NPP around May 31<sup>st</sup> every year on “Marine Day” to build up fishery resources. As of September 2016, high-valued fish consisting of 8.5 million fish, 16.74 million abalones, 71 million crustaceans, 3.8 tons of shellfishes, and 0.83 million sea cucumbers and all matching with the characteristics of natural marine life in the sea have been released to contribute to the development of fishery resources and increase in fishery resources and increase in fishermen’s income.

### Reliability and Effect of Environmental Monitoring of NPP

The environmental monitoring of NPPs has been conducted by reliable research centers such as monitoring agencies, KEPRI, national/public universities or laboratories around the NPP to secure reliability. In addition, KHNP has asked a civil association for sea conservation to conduct the physical disability evaluation related to environmental hormone and heated effluent to raise transparency and reliability of the test. Considering overall test result for the past 28 years, considerable changes from surroundings of NPPs have not been witnessed. As its ecosystem generally shows similar community structure as other natural ecosystem, it is estimated that NPP operation has not had particular impact on the environment.

Marine Water Quality around NPPs

(Unit: mg/L)				
Item	Region	2013	2014	2015
DO	Kori	8.40	7.60	7.96
	Wolsong	8.60	8.10	8.43
	Hanbit	8.10	8.50	8.00
	Hanul	8.43	8.35	8.50
COD	고리	1.54	1.34	1.67
	월성	1.47	1.54	1.64
	한빛	1.59	1.69	1.81
	한울	1.30	1.59	1.52
PO <sub>4</sub> <sup>3-</sup>	고리	0.006	0.009	0.007
	월성	0.006	0.009	0.006
	한빛	0.026	0.020	0.015
	한울	0.021	0.018	0.014



Use of Hazardous Chemicals

Chemicals	Use
Sulfuric acid	Water treatment room : Recycling of ion exchange resin
Hydrochloric acid	Condensate polishing plan : Recycling of ion exchange resin
Sodium hydroxide	Waste water treatment plant : ph control
Hydrazine	Secondary system : Elimination of dissolved oxygen
Ammonium hydroxide	Secondary system : ph control
Sodium nitrite	Sub system : Corrosion prevention
Hydrogen peroxide	Electricity dismantle facility : Elimination of residual chlorine



Radioactive Waste Control

KHNP transfers safety radioactive waste, which is inevitably generated during the operation of NPP to a radioactive waste facility located in Gyeongju. This is safely stored in a secured warehouse located inside NPPs before it is Isolated from the residential areas. Radioactive waste is classified into used fuel, high-level waste, and low and intermediate level radioactive waste, to be managed accordingly.

Low and Intermediate Level Radioactive Waste Control

Low and intermediate level radioactive waste is packed inside drums that have guaranteed stability and then stored in a temporary storehouse located inside NPPs. KHNP disposed of 93,351 drums (200 liter) of waste in 2015. The company disposes of non-radioactive polluted waste or polluted waste below the legal standard level through methods such as incineration or landfill. KHNP will reduce systematically the occurrence of radioactive waste by introducing new technologies and vitalizing self-disposal, as the number of reactors operated n NPPs as well as the number of replacements of obsolete equipment are expected to increase in the future.

Safe Control of Used Fuel

Since nuclear fuel generates radioactive emissions and heat, used fuel must be disposed according to a finalized management plan after being temporarily stored for a certain period in interim storage equipped with specific equipment. Regarding this, the Public Engagement Commission has conducted activities to form a social consensus and set up a transparent follow-up used fuel management plan from October 2013 to June 2015. KHNP has cooperated with the commission and participated in the TF organized by the government for the plan. When the high-level radioactive waste management plan is finalized, KHNP will execute the follow-up measures for used fuel saturation at a timely manner to control used fuel safely. Meanwhile, we are making efforts to stably ontrol used fuel until the interim storage facility is built as part of the final management plan. For Shin-Kori #1 and #2, we have installed a high-density storage rack of wet storage system, which maximizes storage capacity by using materials with excellent neutron absorption function. For Hanbit #2, its saturation year extended from 2019 to 2024 with replacement of high-density storage rack. For Shin-Kori #3 and #4 and Shin-Hanul #1 and #2, KHNP plans to earn the operation permit of high-density storage rack to install.

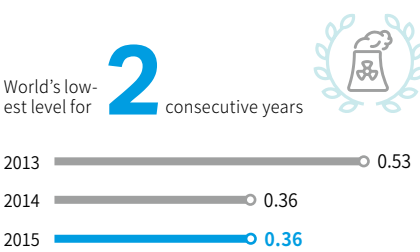
Expand Used Fuel Storage Capacity and Establish Management Plan

Category	Expected Schedule	Activities
Expand storage for used fuel	~2024	<ul style="list-style-type: none"><li>Start construction to expand storage for used fuel in operating plants in preparation of storage saturation</li><li>Extend saturation year by replacing the high-density storage rack of Hanbit #2 (2019→2024)</li><li>Complete construction of the high-density storage rack of Shin-Kori #1, #2 and obtain operating license (2016)</li><li>Plan to operate construction of the high-density storage rack of Shin-Kori #3, #4, Shin-Hanul #1, #2 and obtain operating license</li></ul>
Secure carriers for used fuel	~February, 2016	<ul style="list-style-type: none"><li>Complete manufacturing Korea's standard nuclear fuel carriers and pass the manufacture test (total 18 rods, 4 carriers)</li></ul>
Develop management plan of used fuel at Kori plant	~December, 2015	<ul style="list-style-type: none"><li>Develop a roadmap on management used fuel in preparation of decommissioning of Kori #1</li></ul>

Manage Workers' Exposure Dose

To reduce radioactive exposure dose of employees, KHNP has established mid and long-term radioactive exposure dose reduction plan (by 2025) while identifying 31 items to lower exposure level by sector. In addition, as part of implementing radioactive safety management and exposure reduction plan during high-radioactive operation, we cut working time to minimize the exposure dose. As a result, radiation exposure for employees was 0.36man·Sv/unit in 2015, down 32% from the five-year average of 0.53man·Sv/unit.

Radiation Exposure Dose of NPP Workers



Social Responsibility

KHNP, Growing with Local Communities



Aspect Report

Report Context

The construction and operation of NPPs require understanding and cooperation from the local communities. Therefore, the company must earn supports for the business from local communities and the public and contribute to the development of the region and co-prosperity through value creation. It is consistent with the concept of Creating Shared Value (CSV), creating social values while pursuing economic profits at the same time, as suggested by professor Michael E. Porter in 2011. In this regard, the company is required to identify needs of local communities and develop and operate programs linked with its value, strategy, and capability to support their growth. In addition, it is essential to raise awareness and trust in nuclear power business through consistent communication with local communities. At the same time, KHNP should make a concerted effort to listen their opinions and fulfill its social responsibility.

Sustainable Progress & Future Plan

KHNP appreciates the trust and support shown by local communities around our NPPs. In response, we pursue co-prosperity with them by implementing social contribution activities that support long-term development of local communities beyond one-off benefits. As part of this, KHNP has been implementing diverse social contribution activities such as installation of safe streetlight and utilization of waste heat in which all employees are proactively participating. These efforts resulted in winning the Prime Minister's Award for Social Welfare Enhancement in 2015. In addition, we are proactive in communicating with local communities and promoting our role as a public energy corporation. KHNP will continue its social contribution activities to contribute to the development of local communities.



Case for Sustainable KHNP

“Happiness Plus, Hopeful Wings” Ceremony

On October 15<sup>th</sup> 2015, KHNP held a ceremony of delivering school buses named “Happiness Plus, Hopeful Wings” at the Peace Square of Seoul Olympic Park to hand over 50 vehicles (11 passenger capacity) to 50 local childcare centers to help children return home safely. This project intends to improve educational environment of local children's learning center. Since it was launched in 2012, a total of 150 units of vehicles have been given to local childcare centers. The fund for the project was raised from “Dandelion Spore Fund” and those donated vehicles are expected to be utilized for safety trip of children and various activities. For children to live safe and fulfilling lives, KHNP will continue to carry out diverse contribution activities and do its best to build a safety net for children who need social care to find dreams.



Ceremony of school bus support (Happiness Plus, Hopeful Wings) in 2015



  
**Dandelion Spore Fund**  
(in 2015)

KRW **10** billion



**Contribution to Social Welfare Promotion**

**Prime Minister Prize**

(hosted by the Ministry of Health and Welfare and Korea National Council on Social Welfare)



**Voluntary Service Hours per Employees**  
(in 2015)

**10** hours






## KHNP, Contributing to the Development of Local Communities

### Social Contribution Strategy and System

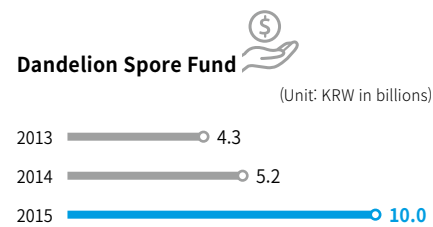
KHNP aims to understand the needs of the public and implement customized social contribution activities to make Korea where all citizens lead happy lives. Under a vision of “the world where all of us are safe and happy”, we practice a wide array of sharing initiatives such as “People”, “Public Responsibility”, and “Public Interest.”

#### Strategy for Social Contribution

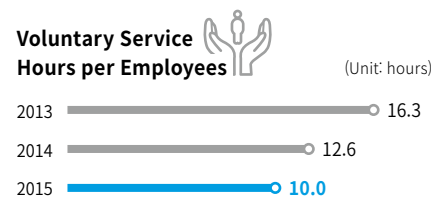
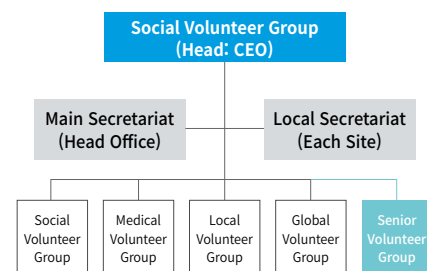
Vision	The world Where All of Us are Safe and Happy			
Slogan	“Loving Neighbors, Giving Hope to Society”			
Core Values	People 	Public Responsibility 	Public Interest 	
Areas	Safety & Happiness	Loving Community	Talent Cultivation	Global
Tasks	<ul style="list-style-type: none"> <li>Safety streetlights</li> <li>Happiness Plus, Hopeful Wings project</li> <li>Hope sharing concert</li> </ul>	<ul style="list-style-type: none"> <li>Investment on local communities</li> <li>Health keeper in rural areas</li> <li>Tailored social contributions</li> </ul>	<ul style="list-style-type: none"> <li>Einstein Class</li> <li>Atom Engineering School</li> <li>KHNP scholarships</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of living environment</li> <li>Culture &amp; education sharing</li> <li>Solution of developing countries' social issues</li> </ul>

#### Financial Source of Social Contribution Activity, “Dandelion Spore Fund”

KHNP raises fund named “Dandelion spore fund.” It is to support its social contribution activities and consists of two sub-funds: “love fund” of employees’ voluntary donation and “matching grant” of the company’s sponsorship. Approximately 82% of employees are participating in the “Love Fund” as of 2015, raising KRW 10 billion in total for “Dandelion spore fund.” Raised funds are used to support welfare facilities and the vulnerable, promote local culture and healthcare, sponsor education and scholarships, and environmental protection.



#### Social Volunteer Group Structure



#### KHNP Social Volunteer Group

To fulfill its role and responsibility as a corporate citizenship, KHNP launched Social Volunteer Group (SVG) in June 2004 to engage in various activities. Under the leadership of CEO, it comprises of KHNP employees from HQs, regional offices, other offices and functional unit volunteer groups of social, medical, regional, and global. In particular, senior Social Volunteer Group (SSVG), comprised of retired KHNP employees and their spouses was launched in September 2014. SSVG is extending their experiences and knowledge to society through practice of sharing.

#### The Charter of the Social Contribution

We, KHNP, as a corporate citizenship with the public, put dignity and happiness first to fulfill our social responsibility.

One, We shall humbly work to have all live to the fullest regardless of physical, social, economic conditions.

One, We shall always be attentive to any opinion or complaint from our neighbors.

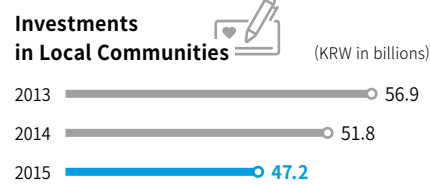
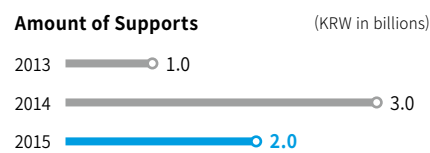
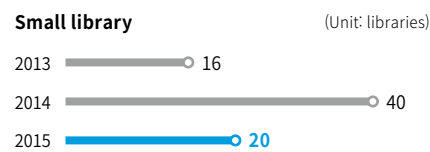
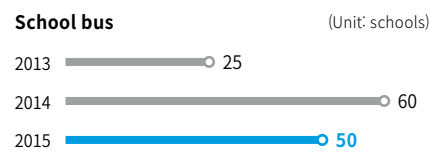
One, We shall be our neighbor’s hands and legs and learn from them.

One, We shall share our neighbor’ joys and sorrows.

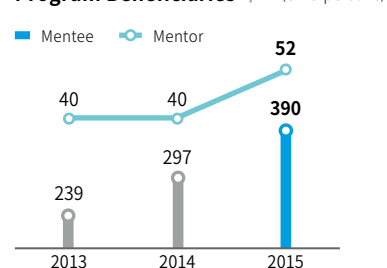


Lighting ceremony for the Safety Streetlight (Gyeongju)

#### Support for the Happiness Plus, Hopeful Wings Program



#### No. of Einstein Class Program Beneficiaries



### Social Contribution Strategy 1 「Safety and Happiness」

#### Installation of Safe Solar-powered Streetlights

The Safety Streetlight is KHNP’s flagship social contribution activity. It helps local people return home safe at late night as well as contributes to preventing crimes and saving public utility bills. The streetlights are made with solar LED and can last about 5 days on a single charge. Receiving public electricity, those do not go out even when the power is not generated by solar energy. KHNP has installed a total of 290 LED streetlights: 37 in Hongje Dong, Seoul in 2014, and 69 in Youngdeok, Gyeongbuk, 48 in Gochang, Jeonbuk, 9 Yooseong-gu, Daejeon, 66 Gyeongju, Gyeongbuk, 36 in Seo-gu, Busan, and 25 in Geumcheon-gu, Seoul in 2015.

#### Happiness Plus, Hopeful Wings

The “Happiness Plus, Hopeful Wings” is an initiative to support local childcare centers with school bus provision and hope library construction with the fund drawn from the “Dandelion Spore Fund.” Until 2015, KHNP has donated about 150 school buses for free to local childcare centers and built 92 Hope libraries, improving environment of children centers. Across the nation including the city of Gyeongju where KHNP is headquartered, we will continuously expand this project to give wings of dreams and hope to children in need.

### Social Contribution Strategy 2 「Loving Community」

#### Investment in Local Communities

To return the favor of local communities who allow us to use local resources for a long period of time, KHNP has raised investment fund since 2006 to dedicate to the development of local communities through revitalization of the economy, promotion of the culture, nurture of human potential, and environment improvement.

#### Medical Check-ups for Farming and Fishing Communities

Since 2007, KHNP has been providing high-quality free medical check-up services ranging from conscious sedation endoscope, abdominal ultrasonography, to cancer screening to communities with poor medical facilities around NPPs every year. We also help them receive medical treatment from physicians and surgeons and drug prescriptions, playing a role as a local community health supporter.

#### Local Community Engagement for Social Contribution

To raise sense of unity with local residents, KHNP has promoted social contribution activities such as caring the underprivileged, vitalizing local economy, and building houses. We donate free lunch and daily necessity to low-income families living around four NPP sites, Gyeongju, and Yeongdeok. Vitalizing local economy is conducted by purchasing local products and helping farmers during busy season for 299 sister-villages near NPPs. Furthermore, KHNP has spent KRW 1.39 billion in total in improving living condition of 127 units of houses of single senior citizens and multi-culture families.

### Social Contribution Strategy 3 「HR Development」

#### Einstein Class

A mentoring program “Einstein Class” has been held to minimize educational gap between urban and rural communities and develop human resources since 2010. College student mentors are selected via industry & academy cooperation program and help teenagers in rural area to achieve their goals by guiding their studies and providing career counseling services. Currently, the class is held at four NPP sites and for student living near the Han River Hydro site. KHNP will foster local talents by providing various high-quality education endowment programs.

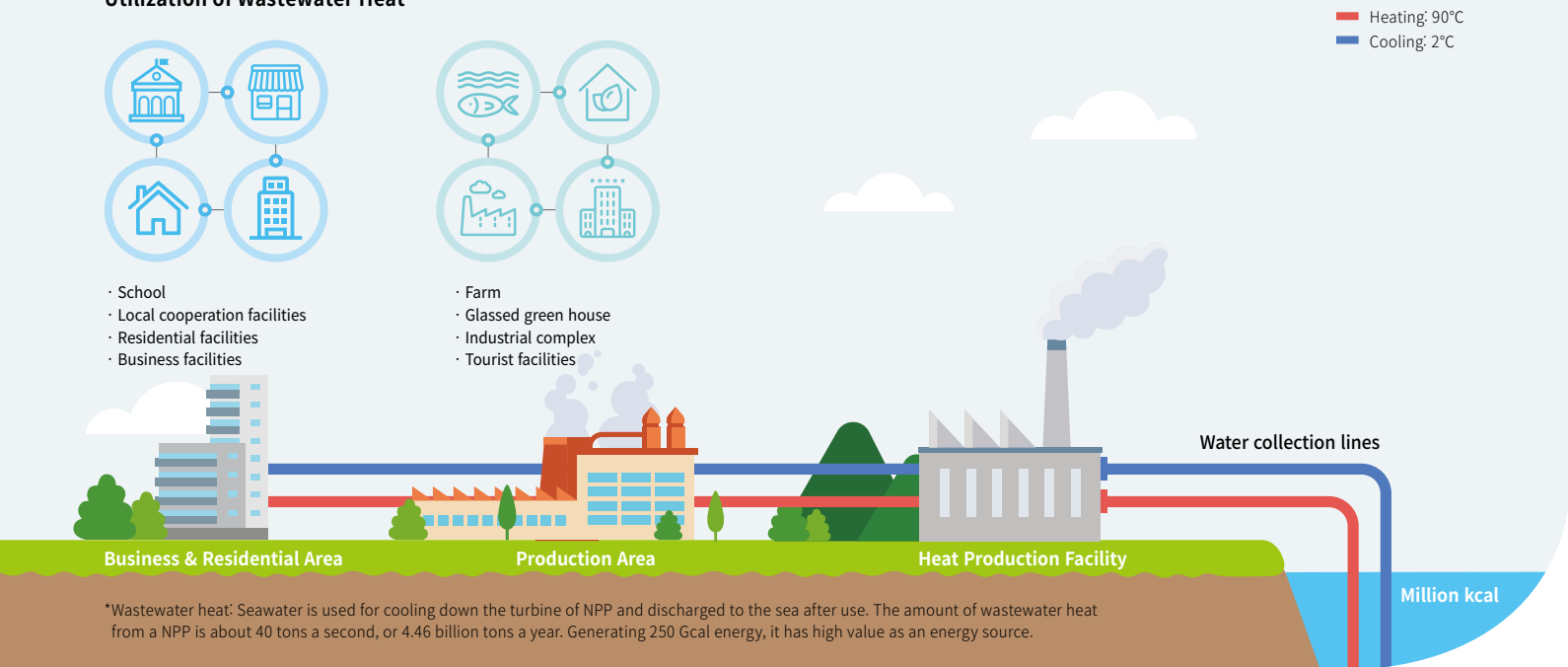


## Best Practice

## Greenhouse That Uses Waste Heat of NPP

KHNP contributes to increasing the income of local communities by supporting high-tech greenhouse farming project utilizing waste heat\*. Greenhouses using recovered waste heat have approximately 10 times higher productivity than plastic greenhouses and can save 70-80% of production costs due to its excellence in reducing energy, heating costs, and CO<sub>2</sub> emissions. This project also makes it possible to control the harvest time of agricultural products, increasing farming household incomes. KHNP expects this project will contribute to vitalizing the local economy.

## Utilization of Wastewater Heat



## Atom Engineering Technology Class

We train children interested in science through “Atom Engineering Technology Class” in co-operation with the Korea Engineering Academy twice a year. This class consists of diverse science lab, “engineering camp,” and “visiting engineering car” programs to awaken their curiosity and creativity and finally nurture future engineers. About 2,000 children have participated in this class.

## Social Contribution Strategy 4 「Global Social Welfare」

Our social contribution activities are extended to countries where the NPP export is scheduled and has already made. We have dispatched 260 academic-industrial volunteers over 6 times to Vietnam since 2013 in order to improve education, environment, health and sanitary, and portable water conditions in remote villages. In September 2015, our employees visited Phuoc An elementary school in Vietnam with students of Seoul National University to install rainwater harvest tanks, water-purifying filters, and drinking fountains. In addition, KHNP teamed up with students of Ulsan University to help children living in Yvanopka, Kyrgyzstan by improving their living environment and providing educational programs. Going forward, KHNP will support emerging countries to resolve global social issues by improving living environment and offering educational and cultural activities.



Global Volunteer Group in Vietnam in summer

## KHNP, Communicating with the General Public

## Information Disclosure and Diverse Communication Channels

Nuclear energy, an affordable and convenient energy source, has contributed to the development of national industries and improvement of living conditions in modern society. However, as the concerns and anxiety over safety issues of radioactivity and nuclear power have continued to escalate, it is required to deliver correct information and seek understanding from the general public about nuclear energy. To respond to the demands, KHNP strives to communicate with the public more actively via diverse channels. While KHNP is communicating with stakeholders, it keeps listening to the feedback of employees. As a result, KHNP received the grand prize of communication management of Korea management award organized by KMAC in 2015.

## Media Channel

Through diverse medial channels (blog, SNS, YouTube, etc.), KHNP shares all kinds of information associated with nuclear power and energy. The company prevents incorrect information from circulating online and makes timely response when such issues appear. By doing so, the company operates an active 2-way communication with the public.

## Blog and SNS Operation

Classification	한수원블로그					
	Blog	Facebook	Twitter	Kakao Story	YouTube	Instagram
Address	blog.khnp.co.kr	facebook.com/ilovekhnp	twitter.com/ikhnp	story.kakao.com/ch/khnp	youtube.com/user/ikhnp	instagram.com/ilovekhnp/

## Promotion to Local Communities

To realize the vision of “local community-centered management with residents”, KHNP is actively engaging in cooperative projects in the region under the goal of “making better-off community, building a community for all.” To this end, each NPP comes up with all different communication channels and makes dynamic social contribution activities, reinforcing engagement with local communities.

## PR Activities for Local Communities by Business Site

Site	Activities
Kori	<ul style="list-style-type: none"><li>Publication of a magazine “Kori Hill” (10,000 copies every other month)</li><li>Diverse volunteer services and special PR activities</li><li>Supports for local sports events (improvement of corporate image)</li><li>Invitation of local people and organizations</li><li>Cultural events (movie show, music concert on Wednesday, etc.)</li><li>Participation in restoration of flood damage</li></ul>
Wolsong	<ul style="list-style-type: none"><li>Provision of real-time NPP operation information through SMS (transparency and safety)</li><li>Publication of a magazine “Yangji”</li><li>Special lecture on nuclear energy by one-day teachers</li><li>Diverse educational supports</li><li>Region-tailored social contribution activities</li><li>Revitalization of tourism for villages around NPPs to help economic development</li></ul>
Hanbit	<ul style="list-style-type: none"><li>Provision of real-time NPP operation information through SMS (transparency and safety)</li><li>Expansion of fishing areas around ditch (leisure and increase of local income)</li><li>Release of fry and shellfish (harmlessness of wastewater from NPPs)</li><li>Proactive social contribution activities</li><li>Marine environment cleanup activities</li><li>Publication of a magazine (Hanbit News (monthly), Hanbit Sympathy (quarterly))</li><li>Site tour (local communities, public officials, social organizations, etc.)</li><li>Sponsorship of local events</li></ul>
Hanul	<ul style="list-style-type: none"><li>Invitation to NPPs and site tour</li><li>Press release through local media (communication with local communities)</li><li>Movie show and lectures by celebrities</li><li>Special lectures at elderly colleges and one-day teacher program on nuclear power</li><li>Region-tailored social contribution activities (Music Farm Festival, mobile PR booth, special campus lectures, corporate presentation at Nuclear Meister High School, special lectures for energy saving, etc.</li></ul>



# Timeless Integrity

## KHNP, Pursuing Culture of Integrity and Honesty



### Aspect Report

#### Report Context

Korea has recently made diverse efforts to create a social culture of integrity and ethics by eradicating irregularities and corruption. At the government level, all different awards and rewards have been given while some public agencies put forward their own ethical management, restructuring overall integrity culture. As the “Improper Solicitation and Graft Act” entered into force in September 2016, the attention on the integrity and ethics has risen across the nation. Of course, KHNP is well aware that a single mismanagement would put the entire company at a huge risk due to its nature of business. Because the management of nuclear power plant directly relates to the life and safety of people, KHNP may lose trust of Korean people for a single corruptive behavior. Accordingly, KHNP is going through a tough restructuring process to meet the public expectations for corruption eradication. Based on solid ethical management system, all employees will internalize the philosophy of integrity and ethics to win the trust and support from internal and external stakeholders.

#### Sustainable Progress & Future Plan

Since 2013, KHNP has continued to improve its ethical management system and prevent reoccurrence of illegal behaviors through preventive ethical activities. Stronger integrity education helps employees internalize the ethics while ethical organization culture has settled. KHNP belonged to near-bottom group of integrity level evaluation conducted by the Anti-Corruption & Civil Rights Commission (ACRC) in 2013. However, thanks to multi-dimensional efforts, the company jumped to the 1<sup>st</sup> level of anti-corruption scheme and 2<sup>nd</sup> of integrity in 2015. At the same time, KHNP won Korean Ethics Management Awards for two years in a row, standing as an integral company. KHNP commits to advancing its ethical management system and settle down global best ethical culture. In addition, the company promises to spread its commitment to all nuclear power industry, growing into a company trusted by the public.



### Case for Sustainable KHNP

#### Selected as 1<sup>st</sup> Class “Best Agency” of Anti-Corruption Scheme in 2015

KHNP was selected as the “Best Agency” of anti-corruption scheme in 2015 conducted by the ACRC. Since 2013, the company has put every effort to recover the trust of the public by promoting three major innovation campaigns at organizational, HR, and cultural levels. In particular, the company has strengthened punishment regulations for work-related mismanagement to tighten discipline among employees. As a result, KHNP became the first public agency to introduce the disclosure system of private contracts. Likewise, the company reforms processes of procurement, contract and quality control that are directly linked to the life of the public. In addition, KHNP has engaged in all-out efforts for management innovation and integrity culture with “bringing integrity education to employees” to raise employees’ awareness of ethics. These efforts have resulted in KHNP receiving the 2<sup>nd</sup> class at the ACRC’s integrity level evaluation in 2015, which put the company at the lowest level for 2 consecutive years from 2013. Furthermore, KHNP was selected as the best agency of anti-corruption scheme.



\*Hosted by the Korean Association of Ethics

## Strengthening Ethical Management System

### Establish Effective Ethical Management System

While suggesting “the Reliable Global Energy Leader” as a vision of ethical management, KHNP endeavors to create transparent organization culture with ethical management activities highlighting participation and sympathy. By putting both the ethical management system and system advancement as mid and long-term strategy, KHNP has made all-out efforts to improve the system while preventing corruption scandals. At the same time, the company strengthens participatory ethical management programs to embed the highest level of integral and ethical culture company-wide, internalizing the ethics of employees.

#### Ethical Management System

Vision	Become a Clean Energy Leader Trusted by People			
Mid to Long-term Strategy	Advance ethical management scheme and system		Establish world’s top-class integrity and ethics cultures	
Tasks	Continuously improve ethical management system	Prevent recurrence of corruption by preemptive ethical activities	Strengthen participatory ethical management programs	Implant business ethics in employees’ mind
Responsible Organization	Planning Dept. (ethical management & sustainability management)		Audit Office (anti-corruption, integrity, and internal control)	
Major Activities	Ethical management program, integrity ombudsman, BOD		Code of ethics, Integrity Committee, anti-corruption citizen watch group	

#### Establish Employees’ Code of Conduct

KHNP has continuously revised the code of ethical conduct, which stipulates the ethical behavior and standards for its employees to meet the needs of the public. For those who encourage or coerce corruptive behavior, the company takes stricter disciplinary measures while exploring additional items of accusation or request for investigation regarding work-related crimes. At the same time, KHNP adheres to the oath of compliance of code of ethical conduct with suppliers.

### Prevent Reoccurrence of Nuclear Plant Mismanagement

To fundamentally prevent any misconduct similar to the NPP-related corruption and test report alteration scandals occurred in 2013, KHNP has identified 6 major tasks aimed at eradicating misuses of connections and improvement of procurement system and has been focusing on preventive ethical activities. To prevent retirees of KHNP from being hired by suppliers, we have extended the limit of reemployment prohibition to the 2nd level and asks them to agree on the code of this ethical conduct. In addition, suppliers that hired former KHNP retirees cannot participate in bids for our projects. For employees who have worked for a long time and meet customers at work, the company regulates them to rotate their position on a regular basis. Furthermore, KHNP newly established a quality control monitoring process by designating Lloyd Register Group as a third-party institution, while enhancing the independence of procurement department. KHNP will continue to root out any corruption scandal by faithfully implementing these systems.

#### Best Practice



Pledge on integrity in 2015

#### High-ranking Employees’ Pledge on Integrity

In June 2015, KHNP held a ceremony for making a pledge on integrity and awarding integral staff with a total of 53 employees including executive directors and department leaders in attendance. The written pledge contains five integrity practice principles such as “compliance with laws and principles,” “public interest first,” “prohibition of abusing power and authority,” “prohibition of accepting bribery and special treatment,” and “exclusion of outsiders’ interference.” All of participants made a commitment to playing a leading role in practicing integrity, eliminate corruption, and creating a fair society.



Establish Ethical Culture Company-Wide

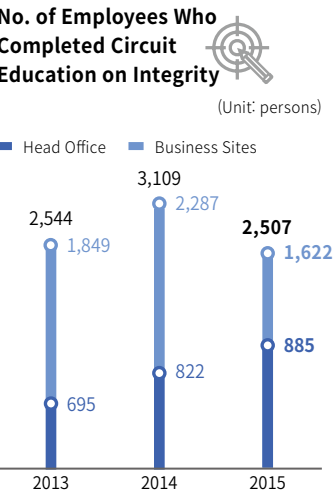
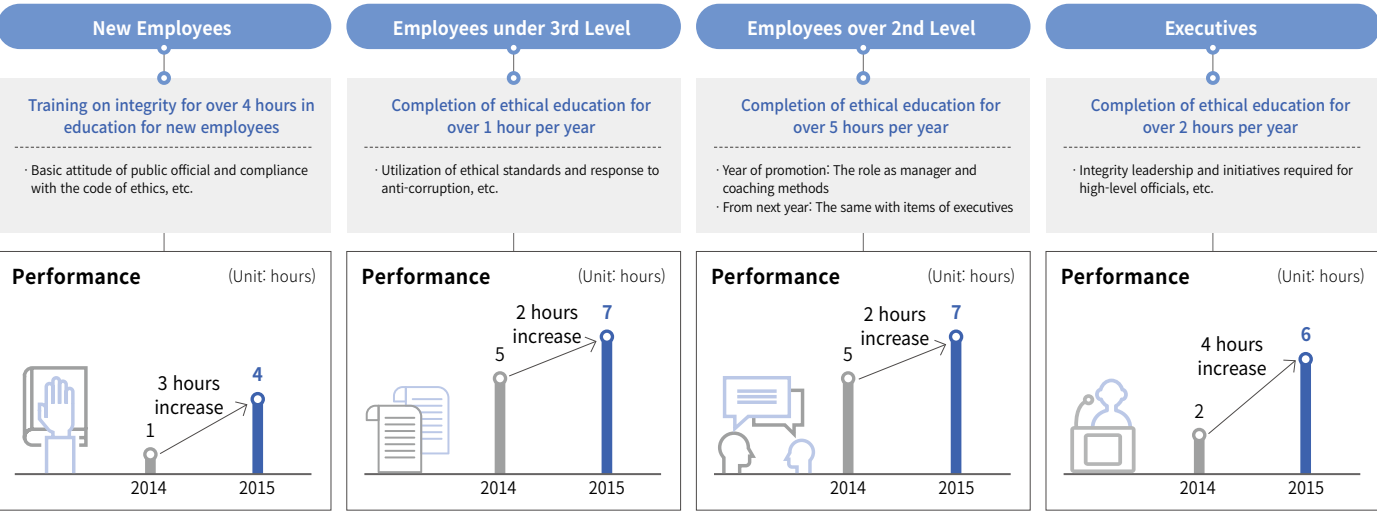
Internalize Ethical Management

KHNP implements ethical educations by position and collective education on integrity in business sites to enhance employees’ awareness of anti-corruption and integrity. Each team discusses core values every Wednesday and the results are shared through the bulletin board. In addition, our employees attend integrity-themed plays and other participatory training programs, which help embed integrity into their daily lives.

Lifecycle Ethical Education

From newly hired employees to board members, every employee working at KHNP has to complete ethical education without exception. The subject to the ethical education is categorized into new employees, employees of 3<sup>rd</sup> level or under, employees of 2<sup>nd</sup> level or higher, and board members to give them customized programs and minimum requirement hours.

Ethical Education by Lifecycle of Public Officials



Bring Ethical Education to Employees

The circuit education on integrity is provided to all employees. This program covers the direction of integrity policies, studies on corruption cases, and measures, arousing their attention to complying with business ethics. We also continue to improve ethics and integrity policies by listening to their opinions about integrity. These efforts for ethical management resulted in achieving the highest level in the evaluation on anti-corruption scheme by the Anti-Corruption and Civil Rights Commission in 2015.

Ethical Education in 2015

Classification	Course	Operation	Target	Details
Offline	Circuit education on integrity	21 times	All employees	Education on integrity for employees working at all business sites by the Audit Office
	International anti-corruption academy	Once	Employee of merit	Basics and case studies in line with anti-corruption, etc.
	Humanities academy	25 times	All employees	Education to enhance humanistic knowledge such as four Chinese classics
	Ethics leader	Once	Over 2nd level	Ethical management, ethical culture, solution of ethical dilemma, etc.
	Ethical decision-making	5 times	Under 3rd level	On-site ethics, case study on anti-corruption and integrity, etc.
Online	All courses at HR Development Center	Ordinary	Trainees	Reflection of integrity to all courses
	New public servant ethics	Ordinary	All employees	E-learning to enhance integrity

Create Environment to Encourage Participation in Ethics Management

KHNP creates an environment where the management lead by examples to encourage practicing the ethical management. The Integrity Oath ceremony of high-ranking employees served as a chance to reaffirm our commitment to corruption eradication. KHNP takes strict measures against those who violate integrity regulations.

Encourage Employees’ Participation in the Ethical Management

By operating various ethical programs aimed at creating ethical culture and facilitating employee participation, KHNP strives to form a consensus on the concepts of integrity and an ethical culture. KHNP shares diverse cases through the company-wide EM programs to encourage employees to consent on integrity while internalizing ethics with employees.

Company-wide Ethical Management Programs in 2015

Program	Details	Sharing
Ethical management slogan (Jun.)	· Slogan contest for ethical management → Selected 6 items including the “Right Work Process Ensures Trust”	Company-wide dissemination of screensaver containing the slogans
Recommend a man of integrity (Aug.)	· Recommend employees of integrity → Selected 6 persons including a man who wrote an article “Preemptive anti-corruption behaviors”	Insertion of the articles in company magazine
KHNP’s ethical dilemma UCC (Sep.)	· Ethical dilemma UCC made by employees, their families, and suppliers (selected 6 teams)	Company-wide showing of UCCS after the company news
Integrity postcard (Oct.)	· Made postcards containing integrity cases by team (selected 3 teams)	Integrity Tree exhibition
Wallpaper of groupware log-in screen (Nov.)	· Development of integrity-related phrases (selected 12 items)	Showing of the wallpapers in groupware every month

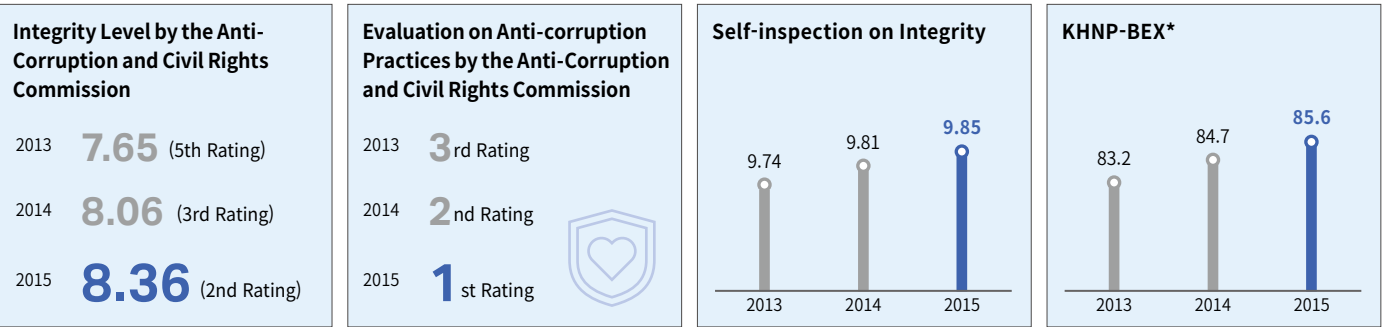
Ordinary Integrity & Ethics Programs

15 Minutes for Core Values Every Wednesday	KHNP Integrity & Ethics Day 3rd Thursday	Integrity Log-in Screen Ordinary	Integrity & Ethics Film/Quiz 1st and 3rd Thursday
· Discussion on core values by each team and sharing the results through management innovation website · Ordinary broadcasting through in-company TV · Distribution of handbook about core values	· Dissemination of integrity message through company broadcasting · Pledge on self-diagnosis of ethics and commitment	· Exhibition of well-known sayings in line with integrity and code of ethics · Publication of employees’ opinions on integrity	· Automatic showing during groupware log-in · Showing of films and quizzes about business ethics and the code of ethics

Nurture EM Instructors

EM instructors are specialists with in-depth knowledge in EM. They offer consultation and coaching services to handle tasks related to ethical issues through education classes for suppliers. Chosen from among employees who either have been recognized by KHNP for exemplary ethical conduct or completed the EM course, the instructors hold meetings with suppliers working at different branches of KHNP while helping suppliers to better understand the concept of an ethical corporate culture through suitable educational contents.

Evaluation on Our Ethical Management



\*KHNP-BEX: Self-inspection on the level of ethics



# Accountability

Performance Data	83
Third-party Assurance Statements	86
GRI Content Index	88
SR10 Certificate	90
Implementation of the UN SDGs	91
Participation in Initiatives and Memberships	92

## Performance Data

### Economy

#### Financial Performances

Economic Performances (KRW in billions)				
Classification	2013	2014	2015	
Sales	6,398.4	9,503.5	10,747	
Operating income	261.0	2,520.6	3,791.7	
Net income	(188.3)	1,440.5	2,457.1	

Financial Position (KRW in billions)				
Classification	2013	2014	2015	
Assets	Current assets	3,642.4	4,240.2	5,565.0
	Non-current assets	43,338.0	45,243.3	4,568.8
	Total assets	46,980.4	49,483.5	51,252.8
Liabilities	Current liabilities	2,946.5	2,594.0	2,750.2
	Non-current liabilities	23,796.8	25,254.5	24,873.7
	Total liabilities	26,743.3	27,848.5	27,623.9
Equity	Pain-in capital	10,704.5	10,704.5	10,704.5
	Surplus	9,563.9	10,975.7	12,968.0
	Other equity	(31.3)	(45.2)	(66.8)
	Total equity	20,237.1	21,635.0	23,628.9

Investment in R&D (KRW in billions)				
Classification	2013	2014	2015	
Investment in R&D	336.9	303.1	323.6	

#### Financial Stability


Financial Information				
Classification	Unit	2013	2014	2015
Interest coverage rate	Multiples	0.48	4.32	7.11
Reliance on borrowings	%	43.3	44.0	46.4
Cashflow coverage rate	%	95.5	244.0	424.1
Total assets turnover rate	%	26.5	35.4	40.5

Credit Rating			
S&P	A+	Moody's	Aa2
Fitch	AA-	R&I	A+





#### Major Operating Performance

Classification	Unit	2013	2014	2015
NPP usage	%	75.5	85.0	85.3
Failures	(Cases/unit)	6(0.26)	5(0.22)	3(0.13)
Power sales	Billion kWh	138.0	155.0	161.5
Investment in plant construction	KRW in billions	1,762.9	2,131.2	2,403.9

### Distribution of Economic Value



KHNP

	<b>Government</b> Corporate tax	<b>2013</b> KRW 18,183 thousand	<b>2014</b> KRW 590,687,272 thousand	<b>2015</b> KRW 803,836,320 thousand
	<b>Employees</b> Avg. compensation per employee	<b>2013</b> KRW 76,272 thousand	<b>2014</b> KRW 79,947 thousand	<b>2015</b> KRW 80,746 thousand
	<b>Local Communities</b> Social contribution expenses*	<b>2013</b> KRW 4.3 billion	<b>2014</b> KRW 5.2 billion	<b>2015</b> KRW 10 billion
	<b>Suppliers</b> Supports for SMEs	<b>2013</b> KRW 1.42 billion	<b>2014</b> KRW 2.06 billion	<b>2015</b> KRW 3.02 billion

\*Dandelion Spore Fund (enforced amount)



# Performance Data



## Environment

### Energy Consumption & GHG Emission

Energy Consumption by Business Site (Unit: 10×TJ)				
Classification	2013	2014	2015	
Nuclear power HQ	1,464	1,268	1,425	
Pumped storage plant	5,201	6,388	4,641	
Hydro power plant	4	5	6	
Other special business units	14	15	16	
Total	6,683	7,676	6,088	

GHG Emission by Business Site (Unit : 1,000tCO <sub>2</sub> eq)				
Classification	2013	2014	2015	
Nuclear power HQ	761	641	731	
Pumped storage plant	2,526	3,103	2,256	
Hydro power plant	2	2	3	
Other special business units	7	7	8	
Total	3,296	3,753	2,998	

Waste Treatment (Unit: tons)				
Classification	2013	2014	2015	
Recycling	9,404	6,843	6,854	
Incineration	1,081	815	936	
Land-fill	2,662	2,581	2,990	
Others	105	101	0	
Total waste amount	13,212	10,340	10,780	

### Green Product Purchase

Since signing the “Voluntary Green Purchase Agreement” with the Ministry of Environment in 2005, KHNP has established the infrastructure for purchasing green products by revising related guide-lines and contract rules and developing purchase record moni-toring system. In line with this, we have established and executed green product purchase plans and implemented regular employee trainings to expand green product purchase.

Classification	Unit	2013	2014	2015
Total purchase	KRW in thousands	16,971,170	17,399,575	24,213,830
Green product purchase	KRW in thousands	16,332,413	16,252,203	22,688,359
Green product purchase ratio	%	96.2	93.4	93.7

\*Source & calculation basis: Green Purchase Information System of Korea Environmental Industry & Technology Institute (http://gd.greenproduct.go.kr), Public Procurement Service of Korea, Green Market purchase data.

### Marine Environment Preservation

Changes in Seaweed Clusters around NPPs (Unit: species, g·dry·wt/m²)				
Classification		2013	2014	2015
Captured species	Kori	48	48	51
	Wolsong	49	52	52
	Hanbit	23	27	26
	Hanul	77	87	86
Average standing species	Kori	199	211	192
	Wolsong	189	204	189
	Hanbit	4	4	3
	Hanul	86	101	93

Marine Zoobenthos around NPPs (Unit: species, population/m²)				
Classification		2013	2014	2015
Captured species	Kori	134	155	137
	Wolsong	142	141	128
	Hanbit	83	102	107
	Hanul	286	304	320
Average standing species	Kori	687	823	673
	Wolsong	683	695	626
	Hanbit	159	174	170
	Hanul	1,952	1,948	1,832

Eco-friendly Power Generation Plan (Unit: GWh)				
Classification		2015	2016 Plan	2024 Mid-term Plan
Mandatory supply (A)		2,662	2,882	12,056
Carry-over (B)		515	559	1,121
Implementation performance	Photovoltaic	324	429	1,674
	Hydro	601	784	1,225
	Fuel-cell	723	774	3,315
	Wind	-	-	444
	Geothermal	-	-	98
	Biomass	-	-	3,640
	External purchase	1,028	907	1,116
	Total (C)	2,676	2,894	11,512
	Implementation performance for the year(D=C-B)	2,161	2,335	10,391
Implementation rate (E=D/A)		81.2%	81.0%	86.2%

## Society

### Employment Status

Employment Type & Human Resources by Region (Unit: persons)				
Classification		2013	2014	2015
Total employee		9,533	9,816	10,842
Position	Executives	4	6	6
	Middle managers	3,193	3,404	3,633
	Staff	6,356	6,406	7,203
Region	Head office	1,194	1,290	1,245
	NPP site	6,919	6,789	7,594
	Hydro & pumped storage	771	763	773
	Other sites	669	974	1,230
Average tenure (years)		15.2	15.1	14.0

Retirement and New Employment (Unit: persons)				
Classification		2013	2014	2015
Regular retirement		196	204	220
Voluntary retirement		13	11	7
New employment in permanent position	Female	125	114	260
	Disabled	7	3	9
	Local talents	409	453	938
	High school diploma	189	196	158
	Engineering major	561	349	1,014
	Subtotal	627	678	1,369
New employment in temporary position	Internship	686	939	483
	Short-term workers	232	230	255
	Subtotal	918	1,169	738

Female and Disabled Employees					
Classification		Unit	2013	2014	2015
Total female employees	No. of employees	Persons	899	971	1,202
	Percentage	%	9.4	9.9	11.1
Female team leaders and higher positions	No. of employees	Persons	7	7	10
	Percentage	%	0.79	0.72	1.05
Percentage of the disabled		%	3.11	3.07	3.02

### Development of Human Resources

Education Courses in 2015					
Classification	Common	Leadership	Job Capability	Global	Total
No. of courses	37	41	1,079	43	1,200
No. of trainees	4,047	1,687	16,229	984	22,947

Education Expense per Employee (KRW in millions)				
Classification	2013	2014	2015	
In-company education	2.29	2.32	2.32	
External education	1.01	1.01	1.50	
Online education	0.10	0.08	0.09	
Total	3.40	3.41	3.91	

Education on Security				(Unit: persons)	
Classification	Method	Course	2013	2014	2015
Security staff	Collective	Education on personal information handling (HQ)	66	66	215
	Commissioned (MOTIE, etc.)	Education for infrastructure managers and information protection staff	-	67	57
General staff	E-learning	Education on information security	3,384	3,384	8,660
		Understanding of personal information protection	-	7,267	8,669
	Collective	Special lecture on personal information protection (HQ)	66	719	578
		Education on information security and infrastructure (business sites)	756	163	7,606
		Security education for new and experienced employees (HR Development Center)	-	876	1,691
Total			4,339	12,572	27,476


### Advancement of Labor-Management Relations

Status of Labor Union (As of end of Dec. 2015) (Unit: persons)	
Site	No. of Union Members
Head Office	385
NPP Sites	5,338
Han River Hydro Sites	216
Pumped Storage Sites	334
R&D centers and education institutes	206
Overseas sites and others	333
Total	6,812

**Collective Agreement to Correct Irrational Labor Practices**  
KHNP agreed to provide rational compensation and welfare system in compliance with the government’s guide by reestablishing collec-tive agreement process and shortening the period of meetings for collective agreement. These activities contributed to advancing col-lective agreement and improving labor-management relations. A to-tal of 6,812 persons, or 64% of total employees, are union members.



# Third-party Assurance Statements



## Preface

### Verification Statement of KOREA HYDRO & NUCLEAR POWER Co., LTD 2016 Sustainability Report

KFQ have been engaged by KOREA HYDRO & NUCLEAR POWER Co., LTD (Hereinafter “KNHP”) to perform an independent assurance in regard to the following aspects of this Sustainability Report (Hereinafter “the Report”). KNHP has responsibility to establish compilation criteria including content of this Report and KFQ’s responsibility is to provide a verification conclusion of KNHP 2016 Sustainability Report based on its verification procedures in accordance with the selected standards and criteria.

## Independence

KFQ was not involved in the preparation of any part of the Report, other than providing a verification opinion, and there has been no conflict of interest between KNHP and KFQ. Further to this KFQ has no biased opinion on stakeholders of KNHP.

## Verification standards

Assurance/verification standards

- AA 1000 Assurance Standard 2008
  - AA 1000 Accountability Principles Standard 2008
  - GRI G4.0 Sustainability Reporting Guidelines
- GRI G4.0 Electricity Utilities Sector Supplement
  - ISO 26000: Social Responsibility Standard

## Verification scope

The followings are included in the scope of this verification.

- Report contents in relation to the headquarter, entire local nuclear power plants and hydropower plants, overseas business and construction of new nuclear power plants of KNHP
  - Application of GRI 4.0 Core option for the Report preparation
  - Application of GRI G4.0 EUSS
  - GRI G4.0 Compliance assessment regarding contents of the Report and assurance principles of reporting quality
- Application of Type 1 verification approach according to AA 1000 and AA1000 AS 2008 to assess compliance with inclusiveness, materiality and responsiveness principles and reliability of sustainability performance information
  - The term “Moderate Assurance” used in AA1000AS is designed to be consistent with “Limited assurance” as articulated in ISAE 3000. Our assurance is a Type I assurance engagement as defined in the Guidance for AA1000AS.
  - Core subjects in ISO 26000

## Verification procedure

KFQ considered the procedures to achieve reasonable assurance of any apparent misstatements or material inconsistencies with the sustainability information, as well as internal process and system of data collection to have reliability of sustainability performance information provided in the Report.

### • Desk review

KFQ has performed GAP analysis of key issues and sustainability performance information provided in the Report against GRI guidelines and information acquired through media survey. With regard to the financial data included in the Report, our procedures were limited to verifying that they were correctly derived from the KNHPs audited 2016 statement of accounts for the first half year.

### • Site visit

KFQ visited KNHP headquarter to understand and assess the systems and processes in place for managing and reporting the sustainability data. KFQ Reviewed internal documents selected under sampling technique considering materiality and interviewed with interested person to confirm contents of the Report. Also, KFQ closely reviewed KNHP internal data controlling system and the Report compilation process.

### • Resolution of findings

KFQ Reviewed the final report to check the errors and issues identified during above process to provide correct and reliable sustainability performance information, and conducted an independent assessment of the Report in relation to GRI Guidelines.

### • Consideration and limitation

Completeness and responsiveness of sustainability performance information reported in the Report are subject to inherent limitation due to their nature and the methodology used determining, calculating and estimating such data.

## Verification opinion

Based in the verification activity stated herein, KFQ confirmed that this Report meets the GRI G4.0 “Core” option. According to the three principles of AA 1000 AS, namely, inclusiveness, materiality and responsiveness, sustainability performance information was assessed and KFQ could secure reasonable evidences to provide Type 1 level of assurance through followings.

1. KNHP has subdivided stakeholders as 12 core stakeholder group related to the major issues of sustainable management. To hear any concerns and opinions from them, KNHP has a customized communication channel of each stakeholder group and reflected it KNHP’s business strategy and intensify sustainable management activities.
2. According to the materiality test process, KNHP identified most relevant and significant sustainability issues then pool it in groups. Those issues were finally grouped as 11 major issues based on stakeholder survey, media analysis and opinion of external specialist, and reflect it KNHP’s 5 business strategy.
3. KNHP has included in the Report its response to the material sustainability issues that were identified through material analysis process. KNHP responded properly with coherent actions and concerned active response to their sustainability management work.

## Recommendation for improvement

1. Systematic monitoring strategy of sustainability performance index through Social Responsibility Management System (SR 10) would help planning a long-and short-term of business strategy ahead. Thus it is necessary to use SR 10 as a tool to evaluate sustainability performance and make up for the weak points of sustainability management activities.
2. In order to improve internal management system updating of sustainable management issues are required periodically thus, it is recommended to monitor major issues identified through material analysis according to the appointed cycle. Furthermore, it is necessary to improve series of process to report sustainability performance data from data generation, gathering and analysis.

October 2016 Seoul, Korea  
CEO **Dae hyun Nam**  
Korean Foundation for Quality (KFQ)





# GRI Content Index



● : Full   ● : Half   ○ : Not   N/A: Not Applicable

Category	Aspect	Index	Indicators	Level of report	Page	Note
Strategy and Analysis		G4-1	Provide a statement from the most senior decision-maker of the organization (such as CEO, chair, or equivalent senior position) about the relevance of sustainability to the organization and the organization's strategy for addressing sustainability.	●	4-5	
		G4-2	Provide a description of key impacts, risks, and opportunities.	●	24-25, 38, 44, 50, 54, 65, 73, 78	
		G4-3	Report the name of the organization	●	16	
		G4-4	Report the primary brands, products, and services.	●	16	
		G4-5	Report the location of the organization's headquarters.	●	16	
		G4-6	Report the number of countries where the organization operates, and names of countries where either the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report.	●	11	
		G4-7	Report the nature of ownership and legal form.	●	16	
		G4-8	Report the markets served (including geographic breakdown, sectors served, and types of customers and beneficiaries).	●	11, 16	
		G4-9	Report the scale of the organization, including: · Total number of employees · Total number of operations · Net sales (for private sector organizations) or net revenues (for public sector organizations) · Total capitalization broken down in terms of debt and equity (for private sector organizations) · Quantity of products or services provided	●	16, 83, 85	
		G4-10	a. Report the total number of employees by gender. b. Report the total number of permanent employees by employment type and gender. c. Report the total workforce by employees and supervised workers and by gender. d. Report the total workforce by region and gender. e. Report whether a substantial portion of the organization's work is performed by workers who are legally recognized as self-employed, or by individuals other than employees or supervised workers, including employees and supervised employees of contractors. f. Report any significant variations in employment numbers (such as seasonal variations in employment in the tourism or agricultural industries).	●	16, 85	
	Organizational Profile	G4-11	Report the percentage of total employees covered by collective bargaining agreements.	●	85	
		EU1	INSTALLED CAPACITY, BROKEN DOWN BY PRIMARY ENERGY SOURCE AND BY REGULATORY REGIME	●	7, 13, 16	
		EU2	NET ENERGY OUTPUT BROKEN DOWN BY PRIMARY ENERGY SOURCE AND BY REGULATORY REGIME	●	16	
		EU3	NUMBER OF RESIDENTIAL, INDUSTRIAL, INSTITUTIONAL AND COMMERCIAL CUSTOMER ACCOUNTS	N/A	-	No direct power sales to common consumers
		EU4	LENGTH OF ABOVE AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES BY REGULATORY REGIME	N/A	-	No power transmission and distribution facilities
		EU5	ALLOCATION OF CO2E EMISSIONS ALLOWANCES OR EQUIVALENT, BROKEN DOWN BY CARBON TRADING FRAMEWORK	●	65, 67	There is no result in emissions trading. But we are preparing responses to the emissions trading scheme and relevant contents are disclosed partially.
		G4-12	Describe the organization's supply chain.	●	49, 50-53	
		G4-13	Report any significant changes during the reporting period regarding the organization's size, structure, ownership, or its supply chain, including: - Changes in the location of, or changes in, operations, including facility openings, closings, and expansions - Changes in the share capital structure and other capital formation, maintenance, and alteration operations (for private sector organizations) - Changes in the location of suppliers, the structure of the supply chain, or in relationships with suppliers, including selection and termination	●	88	There is no significant change in organization scale and share ownership during the reporting period. Meanwhile, the head office was relocated and power generation capacity increased due to commercial operation of Shin-Wolsong #2 unit in July 2015.
		G4-14	Report whether and how the precautionary approach or principle is addressed by the organization.	●	65-72	
		G4-15	List externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses.	●	2, 91-93	
		G4-16	List memberships of associations (such as industry associations) and national or international advocacy organizations in which the organization: - Holds a position on the governance body - Provides substantive funding beyond routine membership dues - Participates in projects or committees - Views membership as strategic	●	93	
		G4-17	· List all entities included in the organization's consolidated financial statements or equivalent documents. · Report whether any entity included in the organization's consolidated financial statements or equivalent documents is not covered by the report.	●	83	
		G4-18	a. Explain the process for defining the report content and the Aspect Boundaries. b. Explain how the organization has implemented the Reporting Principles for Defining Report Content.	●	24-25	
Identified Material Aspects and Boundaries		G4-19	List all the material Aspects identified in the process for defining report content.	●	25	
		G4-20	For each material Aspect, report the Aspect Boundary within the organization, as follows: · Report whether the Aspect is material within the organization · If the Aspect is not material for all entities within the organization (as described in G4-17), select one of the following two approaches and report either: – The list of entities or groups of entities included in G4-17 for which the Aspect is not material or – The list of entities or groups of entities included in G4-17 for which the Aspects is material · Report any specific limitation regarding the Aspect Boundary within the organization	●	25	
		G4-21	For each material Aspect, report the Aspect Boundary outside the organization, as follows: - Report whether the Aspect is material outside of the organization - If the Aspect is material outside of the organization, identify the entities, groups of entities or elements for which the Aspect is material. In addition, describe the geographical location where the Aspect is material for the entities identified - Report any specific limitation regarding the Aspect Boundary outside the organization	●	25	
		G4-22	Report the effect of any restatements of information provided in previous reports, and the reasons for such restatements.	●	2	
		G4-23	Report significant changes from previous reporting periods in the Scope and Aspect Boundaries.	●	88	No significant change
		G4-24	Provide a list of stakeholder groups engaged by the organization.	●	20-21	
		G4-25	Report the basis for identification and selection of stakeholders with whom to engage.	●	20-21	
	Stakeholder Engagement	G4-26	Report the organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group, and an indication of whether any of the engagement was undertaken specifically as part of the report preparation process.	●	21, 22-23, 46-47	
		G4-27	Report key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting. Report the stakeholder groups that raised each of the key topics and concerns.	●	20-21, 22-23, 46-47	
Report Profile		G4-28	Reporting period (such as fiscal or calendar year) for information provided.	●	2	
		G4-29	Date of most recent previous report (if any).	●	2	

● : Full   ● : Half   ○ : Not   N/A: Not Applicable

Category	Aspect	Index	Indicators	Level of report	Page	Note
Report Profile		G4-30	Reporting cycle (such as annual, biennial).	●	2	
		G4-31	Provide the contact point for questions regarding the report or its contents.	●	2	
		G4-32	a. Report the "in accordance" option the organization has chosen. b. Report the GRI Content Index for the chosen option (see tables below). c. Report the reference to the External Assurance Report, if the report has been externally assured. GRI recommends the use of external assurance but it is not a requirement to be "in accordance" with the Guidelines.	●	2	
		G4-33	a. Report the organization's policy and current practice with regard to seeking external assurance for the report. b. If not included in the assurance report accompanying the sustainability report, report the scope and basis of any external assurance provided. c. Report the relationship between the organization and the assurance providers. d. Report whether the highest governance body or senior executives are involved in seeking assurance for the organization's sustainability report.	●	2, 86-87	
	Governance	G4-34	Report the governance structure of the organization, including committees of the highest governance body. Identify any committees responsible for decision-making on economic, environmental and social impacts.	●	28-29	
Ethics and Integrity		G4-56	Describe the organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics.	●	78-81	
Economic	Economic Performance	EC1	DIRECT ECONOMIC VALUE GENERATED AND DISTRIBUTED	●	83	
		DMA	Disclosures on Management Approach	●	38, 44	
	Indirect Economic Impacts	EC7	DEVELOPMENT AND IMPACT OF INFRASTRUCTURE INVESTMENTS AND SERVICES SUPPORTED	●	40-41	
		EC8	SIGNIFICANT INDIRECT ECONOMIC IMPACTS, INCLUDING THE EXTENT OF IMPACTS	●	40-41, 45	
	Research and Development	DMA	Disclosures on Management Approach	●	38	
		EU8	Research and development activity and expenditure aimed at providing reliable electricity and promoting sustainable development	●	39, 83	
Environmental	Plant Decommissioning	EU9	Provisions for decommissioning of nuclear power sites	●	41	
	Materials	EN1	MATERIALS USED BY WEIGHT OR VOLUME	●	68	
		EN3	ENERGY CONSUMPTION WITHIN THE ORGANIZATION	●	68	
	Energy	EN6	REDUCTION OF ENERGY CONSUMPTION	●	67	
		EN7	REDUCTIONS IN ENERGY REQUIREMENTS OF PRODUCTS AND SERVICES	●	67	
	Water	EN8	TOTAL WATER WITHDRAWAL BY SOURCE	●	68	
		EN10	PERCENTAGE AND TOTAL VOLUME OF WATER RECYCLED AND REUSED	●	69	
	Biodiversity	EN12	DESCRIPTION OF SIGNIFICANT IMPACTS OF ACTIVITIES, PRODUCTS, AND SERVICES ON BIODIVERSITY IN PROTECTED AREAS AND AREAS OF HIGH BIODIVERSITY VALUE OUTSIDE PROTECTED AREAS	●	71, 84	
		EN13	HABITATS PROTECTED OR RESTORED	●	71-72	
	Emissions	DMA	Disclosures on Management Approach	●	65	
		EN15	DIRECT GREENHOUSE GAS (GHG) EMISSIONS (SCOPE 1)	●	69	
		EN16	ENERGY INDIRECT GREENHOUSE GAS (GHG) EMISSIONS (SCOPE 2)	●	69	
		DMA	Disclosures on Management Approach	●	65	
	Effluents and Waste	EN23	TOTAL WEIGHT OF WASTE BY TYPE AND DISPOSAL METHOD	●	69, 84	
		EN24	TOTAL NUMBER AND VOLUME OF SIGNIFICANT SPILLS	●	69, 70, 72	
		EN25	WEIGHT OF TRANSPORTED, IMPORTED, EXPORTED, OR TREATED WASTE DEEMED HAZARDOUS UNDER THE TERMS OF THE BASEL CONVENTION <sup>2</sup> ANNEX I, II, III, AND VIII, AND PERCENTAGE OF TRANSPORTED WASTE SHIPPED INTERNATIONALLY	●	89	No waste shipped overseas
		EN26	IDENTITY, SIZE, PROTECTED STATUS, AND BIODIVERSITY VALUE OF WATER BODIES AND RELATED HABITATS SIGNIFICANTLY AFFECTED BY THE ORGANIZATION'S DISCHARGES OF WATER AND RUNOFF	●	71, 84	
Social	Compliance	EN29	MONETARY VALUE OF SIGNIFICANT FINES AND TOTAL NUMBER OF NON-MONETARY SANCTIONS FOR NON-COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS	●	89	No violation against laws
		LA1	TOTAL NUMBER AND RATES OF NEW EMPLOYEE HIRES AND EMPLOYEE TURNOVER BY AGE GROUP, GENDER AND REGION	●	32, 84	
	Employment	EU17	DAYS WORKED BY CONTRACTOR AND SUBCONTRACTOR EMPLOYEES INVOLVED IN CONSTRUCTION, OPERATION & MAINTENANCE ACTIVITIES	●	89	All suppliers' employees engaging in the construction, operation, and maintenance of NPPs comply with legal working hours (8 hours a day) in accordance with the Labor Standards Act.
		EU18	PERCENTAGE OF CONTRACTOR AND SUBCONTRACTOR EMPLOYEES THAT HAVE UNDERGONE RELEVANT HEALTH AND SAFETY TRAINING	○	57	We do not calculate relevant ratios, while conducting safety trainings for suppliers.
	Occupational Health and Safety	DMA	Disclosures on Management Approach	●	54	
		LA5	PERCENTAGE OF TOTAL WORKFORCE REPRESENTED IN FORMAL JOINT MANAGEMENT-WORKER HEALTH AND SAFETY COMMITTEES THAT HELP MONITOR AND ADVISE ON OCCUPATIONAL HEALTH AND SAFETY PROGRAMS	●	58, 85	
		LA6	TYPE OF INJURY AND RATES OF INJURY, OCCUPATIONAL DISEASES, LOST DAYS, AND ABSENTEEISM, AND TOTAL NUMBER OF WORK-RELATED FATALITIES, BY REGION AND BY GENDER	●	58	
		LA8	HEALTH AND SAFETY TOPICS COVERED IN FORMAL AGREEMENTS WITH TRADE UNIONS	●	57-58	
	Labor Practices	LA16	NUMBER OF GRIEVANCES ABOUT LABOR PRACTICES FILED, ADDRESSED, AND RESOLVED THROUGH FORMAL GRIEVANCE MECHANISMS	●	33	
	Local Communities	DMA	Disclosures on Management Approach	●	73	
		SO1	PERCENTAGE OF OPERATIONS WITH IMPLEMENTED LOCAL COMMUNITY ENGAGEMENT, IMPACT ASSESSMENTS, AND DEVELOPMENT PROGRAMS	●	74-76	
	Anti-corruption	SO2	OPERATIONS WITH SIGNIFICANT ACTUAL AND POTENTIAL NEGATIVE IMPACTS ON LOCAL COMMUNITIES	●	54-63, 66-72	
		DMA	Disclosures on Management Approach	●	78	
	Supplier Assessment for Impacts on Society	SO4	COMMUNICATION AND TRAINING ON ANTI-CORRUPTION POLICIES AND PROCEDURES	●	79-81	
		DMA	Disclosures on Management Approach	●	50	
	Customer Privacy	SO10	SIGNIFICANT ACTUAL AND POTENTIAL NEGATIVE IMPACTS ON SOCIETY IN THE SUPPLY CHAIN AND ACTIONS TAKEN	●	51-53	
		DMA	Disclosures on Management Approach	●	64	
	Compliance	PR8	TOTAL NUMBER OF SUBSTANTIATED COMPLAINTS REGARDING BREACHES OF CUSTOMER PRIVACY AND LOSSES OF CUSTOMER DATA	●	89	No complaint
		PR9	MONETARY VALUE OF SIGNIFICANT FINES FOR NON-COMPLIANCE WITH LAWS AND REGULATIONS CONCERNING THE PROVISION AND USE OF PRODUCTS AND SERVICES	●	89	No violation against laws
	Access	EU28	POWER OUTAGE FREQUENCY	●	10, 19	
		EU30	AVERAGE POWER OUTAGE DURATION	●	12	



SR10 Certificate



Implementation of the UN SDGs

The UN Sustainable Development Goals (SDGs) consists of 169 detailed goals under 17 main goals that the international society should achieve with the aim of solving universal problems of mankind as well as environmental, economic, and social problems. The SDGs was come into force on September 28, 2015 when 193 countries signed at the UN General Assembly and will be conducted for 15 years from 2016 to 2030. KHNP supports the UN SDGs and strives to adopt the goals to our management activities, thereby pursuing co-prosperity with all mankind and strengthening our sustainability.

<div>1 NO POVERTY</div> <div></div>	<div>1. No Poverty</div> <div><ul style="list-style-type: none"><li>· Voluntary free meal service and donation of necessities to low-income families</li><li>· Global social contribution activities (living condition improvement in developing countries, supports for cultural activities, etc.)</li></ul></div>	<div>2 ZERO HUNGER</div> <div></div>	<div>2. Zero Hunger</div> <div><ul style="list-style-type: none"><li>· Sisterhood with local villages around power plants</li><li>· Purchase of local specialties</li><li>· Supports in farming season</li></ul></div>	<div>3 GOOD HEALTH AND WELL-BEING</div> <div></div>	<div>3. Good Health and Well-being</div> <div><ul style="list-style-type: none"><li>· Employee health checkup and EAP</li><li>· Visit for consulting service</li><li>· Operation of emergency centers</li><li>· Creation of happy workplace</li></ul></div>
<div>4 QUALITY EDUCATION</div> <div></div>	<div>4. Quality Education</div> <div><ul style="list-style-type: none"><li>· Employee training</li><li>· Educational supports in Kyrgyzstan</li><li>· Talent cultivation programs such as Einstein Class, Atom Engineering Class, etc.</li></ul></div>	<div>5 GENDER EQUALITY</div> <div></div>	<div>5. Gender Equality</div> <div><ul style="list-style-type: none"><li>· Indiscriminate recruitment and HR policy</li><li>· KHNP Women's Committee</li><li>· Maternity protection and gender equality systems</li></ul></div>	<div>6 CLEAN WATER AND SANITATION</div> <div></div>	<div>6. Clean Water and Sanitation</div> <div><ul style="list-style-type: none"><li>· Installation of rain-receiving tanks, water-purifying filters, and drinking fountains in Vietnam</li></ul></div>
<div>7 AFFORDABLE AND CLEAN ENERGY</div> <div></div>	<div>7. Affordable and Clean Energy</div> <div><ul style="list-style-type: none"><li>· Supply of nuclear power</li><li>· Supply of renewable energies such as water, wind, and photovoltaic power</li></ul></div>	<div>8 DECENT WORK AND ECONOMIC GROWTH</div> <div></div>	<div>8. Decent Work and Economic Growth</div> <div><ul style="list-style-type: none"><li>· Open recruitment</li><li>· Advanced labor-management culture</li><li>· Safety and health management for employees and suppliers</li><li>· Creation and distribution of economic value</li><li>· Job creation in the private sector</li></ul></div>	<div>9 INDUSTRY INNOVATION AND INFRASTRUCTURE</div> <div></div>	<div>9. Industry, Innovation and Infrastructure</div> <div><ul style="list-style-type: none"><li>· Safety-focused management</li><li>· Sustainable NPP operation</li></ul></div>
<div>10 REDUCED INEQUALITIES</div> <div></div>	<div>10. Reduced Inequalities</div> <div><ul style="list-style-type: none"><li>· Social contribution activities at home and abroad</li></ul></div>	<div>11 SUSTAINABLE CITIES AND COMMUNITIES</div> <div></div>	<div>11. Sustainable Cities and Communities</div> <div><ul style="list-style-type: none"><li>· Supports for and cooperation with local communities around NPPs</li><li>· Social contribution activities for local communities</li><li>· Safe treatment of nuclear waste</li></ul></div>	<div>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</div> <div></div>	<div>12. Responsible Consumption and Production</div> <div><ul style="list-style-type: none"><li>· Purchase of SMEs' products</li><li>· Purchase of environmental products</li></ul></div>
<div>13 CLIMATE ACTION</div> <div></div>	<div>13. Climate Action</div> <div><ul style="list-style-type: none"><li>· Reduction of GHG emissions</li><li>· Securing carbon sinks</li><li>· Energy saving activities</li><li>· Response to emissions trading scheme</li></ul></div>	<div>14 LIFE BELOW WATER</div> <div></div>	<div>14. Life below Water</div> <div><ul style="list-style-type: none"><li>· Usage of waste heat</li><li>· Survey and control of marine water quality around NPPs</li><li>· Marine environment monitoring system</li></ul></div>	<div>15 LIFE ON LAND</div> <div></div>	<div>15. Life on Land</div> <div><ul style="list-style-type: none"><li>· Nuclear waste management</li><li>· Hazardous chemicals management</li><li>· Wastewater management</li></ul></div>
<div>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</div> <div></div>	<div>16. Peace, Justice and Strong Institutions</div> <div><ul style="list-style-type: none"><li>· Ethical management system</li><li>· Principles and educations for anti-corruption</li><li>· Personal information protection and information security</li></ul></div>	<div>17 PARTNERSHIPS FOR THE GOALS</div> <div></div>	<div>17. Partnerships for the Goals</div> <div><ul style="list-style-type: none"><li>· Application to and endorsement of UNGC</li><li>· Membership activities including WANO</li></ul></div>	<div></div>	



# Participation in Initiatives and Memberships



## 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 has been complying with its 10 principles in 4 sectors of human rights, labor, environment and anti-corruption.

Human Rights

Principle 1.  
Businesses should support and respect the protection of internationally proclaimed human rights.

Principle 2.  
Businesses should make sure that they are not complicit in human rights abuses.

Labor

Principle 3.  
Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.

Principle 4.  
Businesses should uphold the elimination of all forms of forced and compulsory labor.

Principle 5.  
Businesses should uphold the effective abolition of child labor.

Principle 6.  
Businesses should uphold the elimination of discrimination in respect of employment and occupation.

Environment

Principle 7.  
Businesses should support a precautionary approach to environmental challenges.

Principle 8.  
Businesses should undertake initiatives to promote greater environmental responsibility.

Principle 9.  
Businesses should encourage the development and diffusion of environmentally friendly technologies.

Anti-corruption

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

## Memberships

Domestic			
Climate Change Center	Public Institution Audit Committee	Korea Welding Connection Association	Korea Institute of Electrical Engineers
Korea Electric Association	Future Energy Forum	Emissions Trading Market - KRX	Hydro and Pumped Storage Power Research Society
Korea Society for New and Renewable Energy	Korea Business Council for Sustainable Development	Quality Competitiveness Excellent Company Association	Korea Association of Conflict Solution
Korea International Trade Association	Korea Association for Radiation Application	Korea Society for Radioactive Waste	Korean Society for Nondestructive Testing
Korea Industrial Technology Association	Korea Industrial Technology Association	Korea Industrial Asset Management Association	Korea Smart Grid Association
Korea New and Renewable Energy Association	Korea Energy Engineer Association	Korea Society for Energy & Climate Change	Korean Women Nuclear Energy Professional Association
Korea Nuclear Energy Promotion Agency	Korea Atomic Industrial Forum	Korean Nuclear Society	Korea Nuclear Association for International Cooperation
Korea Electric Engineers Association	Korea Suggestion System Association	Earthquake Engineering Society of Korea	Korea Standards Association
Korea Society for Quality Management	Korea Project Management Association	Korea Environmental Engineers Association	Environmental Protection Association

Overseas			
CANDU Procurement Audit Committee (CANPAC)	CANDU Owners Group Inc. (COG)	Framatome Owners Group (FROG)	Institute of Nuclear Power Operations (INPO)
Nuclear Energy Institute (NEI)	Nuclear Procurement Issues Committee (NUPIC)	Pressurized Water Reactor Owners Group (PWROG)	World Association of Nuclear Operators (WANO)
World Nuclear Association (WNA)	World Nuclear Fuel Market (WNFM)	World Energy Congress (WEC) Korea	World Nuclear Transportation Institute (WNTI)



Planning Team, Planning Dept., Korea Hydro & Nuclear Power Co., LTD.

1655, Bulguk-ro, Yangbuk-myeon, Gyeongju-si, Gyeongsangbuk-do, Korea  
Tel. +82-54-704-4135    Fax. +82-54-704-4198  
Homepage [www.khnp.co.kr](http://www.khnp.co.kr)  
E-mail [ojs24601@khnp.co.kr](mailto:ojs24601@khnp.co.kr)





This Report was printed on FSCTM  
(Forest Stewardship Council TM) certified paper with soy ink.