KOREA ELECTRIC POWER CORP
Form 20-F
April 30, 2019
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As filed with the Securities and Exchange Commission on April 30, 2019

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 20-F

(Mark One)

REGISTRATION STATEMENT PURSUANT TO SECTION 12(b) OR (g) OF THE SECURITIES EXCHANGE ACT OF 1934

OR

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2018

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

OR

SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Date of event requiring this shell company report

For the transition period from to

Commission File Number: 001-13372

KOREA ELECTRIC POWER CORPORATION

(Exact name of registrant as specified in its charter)

N/A	**The Republic of Korea**
(Translation of registrant s name into English)	***(Jurisdiction of incorporation or organization)***

55 Jeollyeok-ro, Naju-si, Jeollanam-do, 58322, Korea

(Address of principal executive offices)

Yoon Hye Cho, +82 61 345 4213, yoonhye.cho@kepco.co.kr, +82 61 345 4299

55 Jeollyeok-ro, Naju-si, Jeollanam-do, 58322, Korea

(Name, telephone, e-mail and/or facsimile number and address of company contact person)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of each class:	Name of each exchange on which registered:
Common stock, par value Won 5,000 per share	New York Stock Exchange*
American depositary shares, each representing	New York Stock Exchange

one-half of share of common stock

* Not for trading, but only in connection with the listing of American depositary shares on the New York Stock Exchange, pursuant to the requirements of the Securities and Exchange Commission.

Securities registered or to be registered pursuant to Section 12(g) of the Act:

None

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

One Hundred Year 7.95% Zero-to-Full Debentures, due April 1, 2096

6% Debentures due December 1, 2026

7% Debentures due February 1, 2027

6¾% Debentures due August 1, 2027

Indicate the number of outstanding shares of each of the issuer s classes of capital or common stock as of the close of the period

covered by the annual report:

641,964,077 shares of common stock, par value of Won 5,000 per share

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Yes No

Note Checking the box above will not relieve any registrant required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 from their obligations under those Sections.

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days: Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files): Yes No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, or a non-accelerated filer, or an emerging growth company. See definition of large accelerated filer , accelerated filer , and emerging growth company in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer Non-accelerated filer Emerging Growth Company

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

The term new or revised financial accounting standard refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP International Financial Reporting Standards as issued by the International Accounting Standards Board Other

If Other has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow. Item 17 Item 18

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

(APPLICABLE ONLY TO ISSUERS INVOLVED IN BANKRUPTCY PROCEEDINGS DURING THE PAST FIVE YEARS)

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Sections 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes No

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CERTAIN DEFINED TERMS AND CONVENTIONS

All references to Korea or the Republic in this annual report on Form 20-F, or this annual report, are references to the Republic of Korea. All references to the Government in this annual report are references to the government of the Republic. All references to we, us, our, ours, the Company or KEPCO in this annual report are references to K Electric Power Corporation and, as the context may require, its subsidiaries, and the possessive thereof, as applicable. All references to the Ministry of Trade, Industry and Energy and the Ministry of Economy and Finance include the respective predecessors thereof. All references to tons are to metric tons, equal to 1,000 kilograms, or 2,204.6 pounds. Any discrepancies in any table between totals and the sums of the amounts listed are due to rounding. All references to IFRS in this annual report are references to the International Financial Reporting Standards as issued by the International Accounting Standard Board. Unless otherwise stated, all of our financial information presented in this annual report has been prepared on a consolidated basis and in accordance with IFRS.

In addition, in this annual report, all references to:

EWP are to Korea East-West Power Co., Ltd.,

KHNP are to Korea Hydro & Nuclear Power Co., Ltd.,

KOMIPO are to Korea Midland Power Co., Ltd.,

KOSEP are to Korea South-East Power Co., Ltd.,

KOSPO are to Korea Southern Power Co., Ltd., and

KOWEPO are to Korea Western Power Co., Ltd.,

each of which is our wholly-owned generation subsidiary.

FORWARD-LOOKING STATEMENTS

This annual report includes forward-looking statements (as defined in Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934), including statements regarding our expectations and projections for future operating performance and business prospects. The words believe, expect, anticipate, estimate, project similar words used in connection with any discussion of our future operation or financial performance identify forward-looking statements. In addition, all statements other than statements of historical facts included in this annual report are forward-looking statements. Although we believe that the expectations reflected in such forward-looking statements are reasonable, we can give no assurance that such expectations will prove to be correct. We caution you not to place undue reliance on the forward-looking statements, which speak only as of the date of this annual report.

This annual report discloses, under the caption Item 3.D. Risk Factors and elsewhere, important factors that could cause actual results to differ materially from our expectations (Cautionary Statements). All subsequent written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the Cautionary Statements.

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PART I

ITEM 1. *IDENTITY OF DIRECTORS, SENIOR MANAGEMENT AND ADVISERS*

Not applicable.

ITEM 2. *OFFER STATISTICS AND EXPECTED TIMETABLE*

Not applicable.

ITEM 3. *KEY INFORMATION*

Item 3.A. Selected Financial Data

The selected consolidated financial data set forth below as of and for the years ended December 31, 2014, 2015, 2016, 2017 and 2018 have been derived from our audited consolidated financial statements which have been prepared in accordance with IFRS.

You should read the following data with the more detailed information contained in Item 5. Operating and Financial Review and Prospects and our consolidated financial statements included in Item 18. Financial Statements. Historical results do not necessarily predict future results.

Consolidated Statement of Comprehensive Income (Loss) Data

	2014	2015	2016	2017	2018	2018
	(in billions of Won and millions of US$, except per share data)[1]					
Sales	57,123	58,582	59,763	59,336	60,033	$ 53,943
Cost of sales	49,763	45,458	45,550	52,099	58,208	52,303
Gross profit	7,360	13,124	14,213	7,237	1,825	1,640
Selling and administrative expenses	1,924	2,153	2,639	2,763	2,628	2,362
Other income, net	666	699	652	689	739	664
Other gains (losses), net	107	8,611	70	157	(621)	(558)
Operating profit (loss)	6,209	20,281	12,296	5,320	(685)	(616)
Finance expense, net	(2,255)	(1,832)	(1,646)	(1,596)	(1,674)	(1,504)
Income (loss) before income taxes	4,229	18,656	10,513	3,614	(2,001)	(1,798)
Income tax (expense) benefit	(1,430)	(5,239)	(3,365)	(2,173)	826	742
Profit (loss) for the period	2,799	13,416	7,148	1,441	(1,175)	(1,056)
Other comprehensive income (loss)	(358)	34	(2)	(95)	(107)	(96)
Total comprehensive income (loss)	2,441	13,450	7,146	1,346	(1,282)	(1,152)
Profit (loss) attributable to:						
Owners of the Company	2,687	13,289	7,048	1,299	(1,315)	(1,182)
Non-controlling interests	112	127	100	142	140	126

Total comprehensive income (loss) attributable to:						
Owners of the Company	2,336	13,308	7,042	1,230	(1,426)	(1,281)
Non-controlling interests	105	142	104	116	144	129
Earnings (loss) per share						
Basic(2)	4,290	20,701	10,980	2,023	(2,048)	(1.84)
Earnings (loss) per ADS						
Basic(2)	2,145	10,351	5,490	1,012	(1,024)	(0.92)
Dividends per share	500	3,100	1,980	790		

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Consolidated Statements of Financial Position Data

	As of December 31,					
	2014	2015	2016	2017	2018	2018
	(in billions of Won and millions of US$, except share and per share data)[1]					
Net working capital deficit[3]	(4,780)	(686)	(5,031)	(4,283)	(2,096)	$ (1,883)
Property, plant and equipment, net	135,812	141,361	145,743	150,882	152,743	137,248
Total assets	163,708	175,257	177,837	181,789	185,249	166,456
Total shareholders equity	54,825	67,942	73,051	72,965	71,093	63,881
Equity attributable to owners of the Company	53,601	66,634	71,724	71,682	69,744	62,669
Non-controlling interests	1,224	1,308	1,327	1,283	1,349	1,212
Share capital	3,210	3,210	3,210	3,210	3,210	2,884
Number of common shares as adjusted to reflect any changes in capital stock	641,964,077	641,964,077	641,964,077	641,964,077	641,964,077	641,964,077
Long-term debt (excluding current portion)	55,720	50,907	44,700	45,624	53,073	47,689
Other long term liabilities	31,563	33,697	35,347	39,776	39,242	35,261

Notes:

(1) The financial information denominated in Won as of and for the year ended December 31, 2018 has been translated into U.S. dollars at the exchange rate of Won 1,112.9 to US$1.00, which was the Noon Buying Rate as of December 31, 2018.

(2) Basic earnings (loss) per share are calculated by dividing net income available to holders of our common shares by the weighted average number of common shares issued and outstanding for the relevant period. Basic earnings (loss) per ADS have been computed as if all of our issued and outstanding common shares are represented by ADSs during each of the years presented. Each ADS represents two common shares. Dilutive earnings (loss) per share were the same as basic earnings (loss) per share for the years ended December 31, 2014 through 2018 since there were no potential dilutive instruments.

(3) Net working capital is defined as current assets minus current liabilities. For the periods indicated, current liabilities exceeded current assets, which resulted in working capital deficit for such periods.

Currency Translations and Exchange Rates

In this annual report, unless otherwise indicated, all references to Won, KRW or are to the currency of Korea, all references to U.S. dollars, Dollars, USD , $ or US$ are to the currency of the United States of America; all refere to Euro or are references to the currency of the European Union; all references to Yen or ¥ are references to the currency of Japan; all references to A$ are to the currency of Australia; and all references to RMB are to the currency of the People s Republic of China. Unless otherwise indicated, all translations from Won to U.S. dollars were made at Won 1,112.9 to US$1.00, which was the noon buying rate of the Federal Reserve Board (the Noon Buying Rate) in effect as of December 31, 2018, which rates are available on the H.10 statistical release of the Federal Reserve Board. On April 18, 2019, the Noon Buying Rate was Won 1,136.2 to US$1.00. The exchange rate between the U.S. dollar and Korean Won may be highly volatile from time to time and the U.S. dollar amounts referred to in this annual report should not be relied upon as an accurate reflection of our results of operations. No representation is made that the Won or U.S. dollar amounts referred to in this annual report could have been or could be converted into U.S. dollars or Won, as the case may be, at any particular rate or at all.

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The following table sets forth, for the periods and dates indicated, certain information concerning the Noon Buying Rate in Won per US$1.00.

Year Ended December 31,	At End of Period	Average[(1)]	High	Low
		(Won per US$1.00)		
2014	1,090.9	1,054.0	1,117.7	1,008.9
2015	1,169.3	1,133.7	1,196.4	1,063.0
2016	1,203.7	1,160.5	1,242.6	1,090.0
2017	1,067.4	1,141.6	1,207.2	1,067.4
2018	1,112.9	1,099.3	1,141.7	1,054.6
October	1,140.8	1,130.9	1,141.7	1,112.4
November	1,118.6	1,125.7	1,132.3	1,117.5
December	1,112.9	1,122.4	1,133.2	1,108.8
2019 (through April 18)	1,136.2	1,127.0	1,143.3	1,111.8
January	1,111.8	1,120.3	1,129.5	1,111.8
February	1,124.7	1,121.8	1,128.0	1,116.1
March	1,136.3	1,131.6	1,138.1	1,126.5
April (through April 18)	1,136.2	1,136.4	1,143.3	1,131.7

Source: Federal Reserve Board

Note:

(1) The average rates for annual and interim periods were calculated by taking the simple average of the Noon Buying Rates on the last day of each month during the relevant period. The average rates for the monthly periods (or a portion thereof) were calculated by taking the simple average of the daily Noon Buying Rates during the relevant month (or a portion thereof).

Item 3.B. Capitalization and Indebtedness

Not Applicable

Item 3.C. Reasons for the Offer and Use of Proceeds

Not Applicable

Item 3.D. Risk Factors

Our business and operations are subject to various risks, many of which are beyond our control. If any of the risks described below actually occurs, our business, financial condition or results of operations could be seriously harmed.

Risks Relating to KEPCO

Increases in fuel prices will adversely affect our results of operations and profitability as we may not be able to pass on the increased cost to customers at a sufficient level or on a timely basis.

In 2018, fuel costs constituted 34.5% of our cost of sales, and the ratio of fuel costs to our sales was 33.5%. Our generation subsidiaries purchase substantially all of the fuel that they use (except for anthracite coal) from suppliers outside Korea at prices determined in part by prevailing market prices in currencies other than Won. For example, most of the bituminous coal requirements (which accounted for approximately 52.6% of our fuel requirements in 2018 in terms of electricity output) are imported principally from Indonesia, Australia, Russia and, to a lesser extent, South Africa and others, which accounted for approximately 35%, 30%, 14%, 8% and

13%, respectively, of the annual bituminous coal requirements of our generation subsidiaries in 2018. Approximately 83% of the bituminous coal requirements of our generation subsidiaries in 2018 were purchased under long-term contracts and the remaining 17% from the spot market. Pursuant to the terms of our long-term supply contracts, prices are adjusted periodically based on prevailing market conditions. In addition, our generation subsidiaries purchase a significant portion of their fuel requirements under contracts with limited duration. See Item 4.B. Business Overview Fuel.

The prices of our main fuel types, namely, bituminous coal, oil and liquefied natural gas, or LNG, fluctuate, sometimes significantly, in tandem with their international market prices. For example, the average daily spot price of free on board Newcastle coal 6300 GAR published by Platts increased from US$88.3 per ton in 2017 to US$107.7 per ton in 2018 and decreased to US$84.0 per ton as of April 18, 2019. The prices of oil and LNG are substantially dependent on the price of crude oil, and according to Bloomberg (Bloomberg Ticker: PGCRDUBA), the average daily spot price of Dubai crude oil increased from US$53.1 per barrel in 2017 to US$69.3 per barrel in 2018 and to US$70.4 per barrel as of April 18, 2019. Furthermore, because the prices of LNG are dependent on the price of crude oil, an increase in such fuel prices can result in an increase in the prices of LNG, which, in turn, affect the cost of purchasing electricity from independent power producers. We cannot assure you that fuel prices will remain stable or will not significantly increase in the remainder of 2019 or thereafter. In addition, effective from January 1, 2020, the International Maritime Organization regulation referred to as IMO 2020 will mandate, among other requirements, a reduction in the fuel sulfur content cap from 3.5% currently to 0.5%. The implementation of new environmental regulations, such as IMO 2020, is expected to significantly increase the operating cost of the shipping lines, which are expected to pass on these additional costs to customers like us via higher freight rates. If fuel prices increase substantially in the future within a short span of time, our generation subsidiaries may be unable to secure requisite fuel supplies at prices commercially acceptable to them. In addition, any significant interruption or delay in the supply of fuel, bituminous coal in particular, from any of their suppliers may cause our generation subsidiaries to purchase fuel on the spot market at prices higher than the prices available under existing supply contracts, which would result in an increase in fuel costs.

Because the Government regulates the rates we charge for the electricity we sell to our customers (see Item 4.B. Business Overview Sales and Customers Electricity Rates), our ability to pass on fuel and other cost increases to our customers is limited. If fuel prices increase rapidly and substantially and the Government, out of concern for inflation or for other reasons, maintains the current level of electricity tariff or does not increase it to a level to sufficiently offset the impact of high fuel prices, the fuel price increases will negatively affect our profit margins or even cause us to suffer operating and/or net losses, and our business, financial condition, results of operations and cash flows would suffer.

The Government may also set or adjust electricity tariff rates that may not be necessarily responsive to fuel price movements. For example, effective January 1, 2017, the Government made several adjustments to the existing rate structure in order to ease the burden of electricity tariff on residential consumers as well as promote the use of renewable energy. First, the progressive rate structure applicable to the residential sector, which applies a gradient of increasing tariff rates for heavier electricity usage, was changed from a six-tiered structure with the highest rate being no more than 11.7 times the lowest rate (which gradient system has been in place since 2005) into a three-tiered structure with the highest rate being no more than three times the lowest rate, in order to reflect the changes in the pattern of electricity consumption and reduce the electricity charges payable by consumers. Second, a new tariff structure was implemented to encourage energy saving by offering rate discounts to residential consumers that voluntarily reduce electricity consumption while charging special high rates to residential consumers with heavy electricity consumption during peak usage periods in the summer and the winter. Third, a temporary rate discount will apply during 2017 to 2019 to investments in environmentally friendly facilities such as energy storage systems, renewable energy and electric cars. The temporary rate discount to investments in energy storage systems and renewable energy was extended until 2020. Additionally, during July and August 2018, the Government reduced residential electricity charges by temporarily relaxing the application of the current tariff structure and offering higher rate discounts to economically or otherwise disadvantaged households to ease the burden on households that have significantly increased their use of air conditioners during a heatwave. Such adjustments may lower our revenues from the sale of electricity and accordingly have a material adverse effect on our results of operation, financial condition and cash flows.

In addition, partly because the Government may have to undergo a lengthy deliberative process to approve an increase in electricity tariff, which represents a key component of the consumer price index, the electricity tariff may not be adjusted to a level sufficient to ensure a fair rate of return to us in a timely manner or at all, and we cannot assure that any future tariff increase by the Government will be sufficient to fully offset the adverse impact on our results of operations from current or potential rises in fuel costs. On the other hand, if fuel prices decrease, the public may demand a corresponding decrease in electricity tariff rates, and as a result the Government may decrease electricity tariff rates; however, we cannot assure you that the resulting tariff rate reduction will not be excessive and thus have a detrimental effect on our profit margins, results of operations or cash flows or that, if the fuel prices were to rise again subsequent to the tariff reduction, the tariff rates would be further adjusted upwards in a timely manner, in sufficient amounts or at all so as to fully offset the adverse impact from the increase in fuel prices.

The Government may adopt policy measures to substantially restructure the Korean electric power industry or our operational structure, which may have a material adverse effect on our business, operations and profitability.

From time to time, the Government considers various policy initiatives to foster efficiency in the Korean electric power industry, and at times have adopted policy measures that have substantially modified our business and operations. For example, in January 1999, with the aim of introducing greater competition in the Korean electric power industry and thereby improving its efficiency, the Government announced a restructuring plan for the Korean electric power industry, or the Restructuring Plan. For a detailed description of the Restructuring Plan, see Item 4.B. Business Overview Restructuring of the Electric Power Industry in Korea. As part of this initiative, in April 2001 the Government established the Korea Power Exchange to enable the sale and purchase of electricity through a competitive bidding process, established the Korea Electricity Commission to ensure fair competition in the Korean electric power industry, and, in order to promote competition in electricity generation, split off our electricity generation business to form one nuclear generation company and five non-nuclear generation companies, in each case, to be wholly owned by us. In 2002, the Government introduced a plan to privatize one of our five non-nuclear generation subsidiaries, but this plan was suspended indefinitely in 2004 due to prevailing market conditions and other policy considerations.

In August 2010, the Ministry of Trade, Industry and Energy announced the Proposal for the Improvement in the Structure of the Electric Power Industry, which was designed to promote responsible management by and improve operational efficiency of government-affiliated electricity companies by fostering competition among them. Pursuant to this proposal, while our six generation subsidiaries continued to be our wholly-owned subsidiaries, in January 2011 the six generation subsidiaries were officially designated as market-oriented public enterprises (same as us) under the Act on the Management of Public Institutions, whereupon the President of Korea appoints the president and the standing director who is to become a member of the audit committee of each such subsidiary; the selection of non-standing directors of each such subsidiary is subject to approval by the minister of the Ministry of Economy and Finance; the president of each such subsidiary is required to enter into a management contract directly with the minister of the Ministry of Trade, Industry and Energy; and the Public Agencies Operating Committee (which is comprised largely of Government officials and those recommended by Government officials) conducts performance evaluation of such subsidiaries. Previously, our president appointed the president and the statutory auditor of each such subsidiary; the selection of non-standing directors of each such subsidiary was subject to approval by our president; the president of each such subsidiary entered into a management contract with our president; and our evaluation committee conducted performance evaluation of such subsidiaries. As a result of these changes, our six generation subsidiaries took on additional operational responsibilities and management autonomy with respect to construction and management of generation units and procurement of fuel, while we as the parent company continued to oversee and coordinate, among others, finances, corporate governance, overseas businesses, including nuclear export technology and overseas resource development, that jointly affect us and our generation subsidiaries. See also Item 16G. Corporate Governance The Act on the Management of Public Institutions Applications of the Act on Our Generation Subsidiaries,

In June 2016, the Government announced the Proposal for Adjustment of Functions of Public Institutions (Energy Sector) for the purpose of streamlining the operations of government-affiliated energy companies by discouraging them from engaging in overlapping or similar businesses with each other, reducing non-core assets and activities and improving management and operational efficiency. The initiatives contemplated in this proposal that would affect us and our generation subsidiaries include the following: (i) the generation companies should take on greater responsibilities in overseas resource exploration and production projects as these involve procurement of fuels necessary for electricity generation while fostering cooperation among each other through closer coordination, (ii) KHNP should take a greater role in export of nuclear technology, and (iii) the current system of retail sale of electricity to end-users should be liberalized to encourage more competition. In accordance therewith, we transferred a substantial portion of our assets and liabilities in our overseas resource business to our generation subsidiaries as of December 31, 2016. In addition, pursuant to this Proposal, we considered a sale in the public market of a minority of our shares in our five non-nuclear generation subsidiaries, KEPCO KDN and KHNP. However, the planned sales have been put on hold, primarily due to prevailing market conditions. In any event, we plan to maintain a controlling stake in each of these subsidiaries.

Other than as set forth above, we are not aware of any specific plans by the Government to resume the implementation of the Restructuring Plan or otherwise change the current structure of the electric power industry or the operations of us or our generation subsidiaries materially in the near future. However, for reasons relating to changes in policy considerations, socio-political, economic and market conditions and/or other factors, the Government may resume the implementation of the Restructuring Plan or initiate other steps that may change the structure of the Korean electric power industry or the operations of us or our generation subsidiaries materially. Any such measures may have a negative effect on our business, results of operations and financial condition. In addition, the Government, which beneficially owns a majority of our shares and exercises significant control over our business and operations, may from time to time pursue policy initiatives that could directly or indirectly impact our business and operations, and such initiatives may vary from the interest and objectives of our other shareholders.

Our capacity expansion plans, which are principally based on projections on long-term supply and demand of electricity in Korea, may prove to be inadequate.

We and our generation subsidiaries make plans for expanding or upgrading our generation capacity and transmission infrastructure based on the Basic Plan Relating to the Long-Term Supply and Demand of Electricity, or the Basic Plan, which is generally revised and announced every two years by the Government. In July 2015, the Government announced the Seventh Basic Plan relating to the future supply and demand of electricity, focusing on stable supply of electricity and increasing the portion of low carbon electricity supply sources, among others. In December 2017, the Government announced the Eighth Basic Plan to revise the Seventh Basic Plan, for the former to be effective for the period from 2017 to 2031. The Eighth Basic Plan focuses on, among other things, (i) decreasing the reliance on nuclear and coal-based supply sources, (ii) increasing utilization of renewable energy sources and (iii) balancing the existing cost-based pool system of purchase of electricity with an environmentally-focused pool system. Furthermore, the Eighth Basic Plan includes the following implementing measures: (i) six new nuclear generation units in a planning stage would not be constructed, (ii) extension of life of 10 decrepit nuclear generation units would not be granted, (iii) Wolsong #1 unit is not counted as part of domestic energy generation capacity, (iv) seven decrepit coal-fired generation plants will be retired by 2022, (v) six other coal-fired generation plants shall be converted to LNG fuel use and (vi) domestic renewable energy generation capacity shall be expanded to 58.5 gigawatts by 2030.

In January 2014, prior to the announcement of the Seventh Basic Plan, the Ministry of Trade, Industry and Energy adopted the Second Basic National Energy Plan following consultations with representatives from civic

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groups, the power industry and academia. The Second Basic National Energy Plan, which is a comprehensive plan that covers the entire spectrum of energy industries in Korea, covers the period from 2014 to 2035 and focuses on the following six key tasks: (i) shifting the focus of energy policy to demand management with a goal of reducing the growth of electricity demand by 15% by 2035 through efficiency enhancement programs compared to the projected growth in the absence of such efficiency enhancement programs, (ii) establishing a geographically decentralized electricity generation system so as to reduce transmission losses with a goal of supplying at least 15% of total electricity through such system by 2035, (iii) applying latest greenhouse gas emission reduction technologies to newly constructed generation units in order to further promote safety and environmental friendliness, (iv) strengthening resource exploration and fuel procurement capabilities to enhance Korea s energy security, (v) ensuring stable supply of energy and increasing the portion of electricity supplied from renewable sources to 11% by 2035, (vi) reinforcing the system for stable supply of conventional energy, such as oil and gas, and (vii) introducing in 2015 an energy voucher system in lieu of a tariff discount system for the benefit of consumers in the low income group. In addition, the Second Basic National Energy Plan revised the target level of electricity generated by nuclear sources as a percentage of total electricity generated to 29%, compared to 41% under the First Basic National Energy Plan announced in 2008, which covered the period from 2008 to 2030. In March 2018, the Government announced its plan to establish the Third Basic National Energy Plan and formed a working group consisting of government and industry officials and civilian experts. On November 7, 2018, the working group submitted its set of recommendations to the Ministry of Trade, Industry and Energy, and the formal discussions regarding the Third Basic National Energy Plan are ongoing.

We cannot assure that the Eighth Basic Plan, the Second Basic National Energy Plan, or their respective successor plans will successfully achieve their intended goals, the foremost of which is to ensure, through carefully calibrated capacity expansion and other means, balanced overall electricity supply and demand in Korea to end users while promoting efficiency and environmental friendliness in the consumption and production of electricity. If there is significant variance between the projected electricity supply and demand considered in planning our capacity expansions and the actual electricity supply and demand, or if these plans otherwise fail to meet their intended goals or have other unintended consequences, this may result in inefficient use of our capital, and undue financing costs on the part of us and our generation subsidiaries, among others, which may have a material adverse effect on our results of operations, financial condition and cash flows.

From time to time, we may experience temporary power shortages or circumstances bordering on power shortages due to factors beyond our control, such as extreme weather conditions. Such circumstances may lead to increased end-user complaints and greater public scrutiny, which may in turn require us to modify our capacity expansion plans, and if we were to substantially modify our capacity plans, this might result in additional capital expenditures and, as a result, have a material adverse effect on our results of operations, financial condition and cash flows.

Although the Government makes significant efforts to encourage conservation of electricity, including through public education campaigns, there is no assurance that such efforts will have the desired effect of substantially reducing the demand for electricity or improving efficient use thereof.

We are subject to various environmental regulations and related government initiatives, including in relation to climate change, which could cause significant compliance costs and operational liabilities.

We are subject to national, local and overseas environmental laws and regulations, including increasing pressure to reduce emission of carbon dioxide from our electricity generation activities as well as our natural resource development endeavors overseas. Our operations could expose us to the risk of substantial liability relating to environmental, health and safety issues, such as those resulting from the discharge of pollutants and carbon dioxide into the environment and the handling, storage and disposal of hazardous materials. We may be responsible for the investigation and remediation of environmental conditions at current or former operational sites. We may also be subject to related liabilities (including liabilities for environmental damage, third party property damage or personal injury) resulting from lawsuits brought by governments or private litigants. In the course of our operations, hazardous wastes may be generated, disposed of or treated at third party-owned or -operated sites. If those sites become contaminated, we could also be held responsible for the cost of investigation and remediation of such sites for any related liabilities, as well as for civil or criminal fines or penalties.

We intend to fully comply with our environmental obligations. However, our environmental measures, including the use of, or replacement with, environmentally friendly but more expensive parts and equipment and budgeting capital expenditures for the installation or modification of such facilities, may result in increased operating costs and liquidity requirement. The actual cost of installation, replacement, modification and/or operation of such equipment and related liquidity requirement may depend on a variety of factors that are beyond our control. There is no assurance that we will continue to be in material compliance with legal or regulatory requirements or satisfy social norms and expectations in the future in relation to the environment, including in respect of climate change.

In recent years, partly driven by growing public awareness and sensitivity toward climate change and other environmental issues as well as in an effort to capture the economic and social potential associated with renewable energy and new energy -related industries (such as smart grids, energy storage systems and electrical vehicles, among others), the Government has introduced and implemented a number of new measures designed to reduce carbon emission, minimize environmental damage and spur related business opportunities. Some key examples of such Government initiatives pertinent to our and our generation subsidiaries operations are as follows:

Carbon Emission Trading System, Related Emission Reduction Targets and the Greenhouse Gas Reduction Roadmap. In accordance with the Act on Allocation and Trading of Greenhouse Gas Emission Allowances, enacted in March 2013, the Government is currently in the process of implementing a carbon emission trading system under which the Government will allocate the amount of permitted carbon emission to companies by industry and a company whose business emits more carbon than the permitted amount may purchase the right to emit more carbon through the carbon emission trading exchange. This system is expected to be implemented in three stages. During the first phase (2015 to 2017), the Government set up and made a test run of the trading system to ensure its smooth operation; during this phase, the carbon emission rights were allocated without charge. In July 2018, the Government released the allocation plan for the second phase (2018 to 2020). During the second phase, 97% of the carbon emission rights may be allocated free of charge, with 3% allocated through an auction. During the third phase (2021 to 2025), the Government plans to run the system on an expanded scale with aggressive carbon emission reduction targets, with 10% of the carbon emission rights allocated through an auction. In December 2016, the Government announced the Climate Change Response Initiatives and 2030 National Greenhouse Gas Reduction Roadmap, which set forth the carbon emission trading system as one of the primary means to reach the emission and greenhouse gas reduction targets of the policies. The 2030 National Greenhouse Gas Reduction Roadmap was amended on July 24, 2018 and sets forth a national target of greenhouse gas level as 536 million tons in the aggregate, representing a 37% reduction from the base case projection of greenhouse gas in 2030. In the electricity conversion sector, greenhouse gas reduction of 24 million tons (with a potential additional reduction of 34 million tons) is requested by year 2030, and our business is classified as part of this sector. The additional potential reduction amount will be confirmed prior to the finalization of the Government s 2020 Nationally Determined Contributions (NDCs). Adhering to such emission and greenhouse gas reduction requirement may result in our incurring significant compliance costs.

Regulation of Coal-Fired Generation Units. As a measure to address the high level of particulate matter pollution, the Government temporarily suspended the operations of eight coal-fired generation units that are

30 years or older throughout the month of June 2017. Subsequently, in July 2017, two of these units were shut down completely and one unit switched fuel from coal to wood pallets. One of these units stopped its operation in January 2019 for switching fuel to wood pallets. As part of the Comprehensive Measures against Particulate Matter and the Eighth Basic Plan, announced by the Government in September 2017 and December 2017, respectively, the Government set forth the

following policy directions relating to coal-fired generation units: (i) two coal-fired generation units scheduled for construction and four existing coal-fired generation units shall convert to LNG fuel use, (ii) in principle, construction of new coal-fired generation units shall not be planned, (iii) seven of the coal-fired generation units that are 30 years or older will be shut down on an accelerated schedule, (iv) beginning in 2018, coal-fired generation units that are 30 years or older shall temporarily cease operations from March through June of each year, (v) coal-fired generation units shall be put through comprehensive functional and environmental upgrades and (vi) coal-fired generation units shall be subject to emission standards that came into effect in January 2019 that are twice as more rigorous than the previous standards. In October 2018, the Government introduced a pilot regulation to lower the output of 35 coal-fired power plants to approximately 80% of their capacity that emit more than a certain amount of particulate matter. The regulation was formally implemented in January 2019, targeting 40 coal-fired power plants with high emissions of particulate matter. From March to June 2019, the scope expanded to cover 60 units in total. In addition, coal-fired generation units scheduled for preventive maintenance during the second half of 2019 will be required to undertake such maintenance earlier in the spring of 2019. Although such plans may be subject to change, compliance with such measures is expected to result in our incurring costs, including in connection with adherence to more stringent particulate matter pollution regulations, retrofitting and overall replacement of environmental facilities.

Coal Consumption Tax. In January 2014, largely based on policy considerations of tax equity among different fuel types as well as environmental concerns, the Ministry of Economy and Finance announced that, effective July 1, 2014, consumption tax will apply to bituminous coal, which previously was not subject to consumption tax unlike other fuel types such as LNG or bunker oil. Pursuant to the amended Individual Consumption Tax Act effective as of April 1, 2019, which involved an increase of the unit tax rate for coal by Won 10 per kilogram across the board, the base tax rate (which is subject to certain adjustments) is Won 46 per kilogram for bituminous coal; however, due to concerns on the potential adverse effect on industrial activities, the applicable tax rate is applied differently based on the net heat generation amount. The currently applicable tax rate for bituminous coal is Won 43 per kilogram for net heat generation of less than 5,000 kilocalories, Won 46 per kilogram for net heat generation of 5,000 to 5,500 kilocalories and Won 49 per kilogram for net heat generation of 5,500 kilocalories or more. In contrast, the consumption tax and surcharge on importation of LNG decreased by Won 48 and Won 20.4 per kilogram, respectively, which came into effect in April 2019. The currently applicable consumption tax rate and surcharge on importation of LNG are Won 12 and Won 3.8 per kilogram, respectively. We expect an increase in our overall fuel costs, as bituminous coal currently represents the largest fuel type for our electricity generation, while the decrease in consumption tax and surcharge on importation of LNG will result in a decrease of our power purchase cost.

Renewable Portfolio Standard. Under this program, each of our generation subsidiaries is required to generate a specified percentage of total electricity to be generated by such generation subsidiary in a given year in the form of renewable energy or, in case of a shortfall, purchase a corresponding amount of a Renewable Energy Certificate (a form of renewable energy credit) from other generation companies whose renewable energy generation surpass such percentage. The target percentage was 3.0% in 2015, 3.5% in 2016, 4.0% in 2017, 5.0% in 2018, 6.0% in 2019 and will incrementally increase to 10.0% by 2023. Fines are to be levied on any subsidiary that fails to do so in the prescribed timeline. In 2017, all six of our generation subsidiaries met the target through renewable energy generation and/or the purchase of a Renewable Energy Certificate. Compliance by our generation subsidiaries of the 2018 target is currently under evaluation, and if any generation subsidiary is found to have failed to meet the target for 2018 or for subsequent years, such generation subsidiary may become subject to fines. Additionally, as the target percentage is subject to change, changes to the target percentage may result in additional expenses for our generation subsidiaries.

Renewable Energy 3020 Plan. In December 2017, the Ministry of Trade, Industry and Energy announced the Renewable Energy 3020 Plan, an initiative to increase the generation and use of renewable energy on a nationwide basis. The Government plans to increase the required percentage of total electricity to be generated from renewable energy sources from 7% in 2016 to 10.5% and 20% by 2022 and 2030, respectively. Moreover, the Government plans to increase the domestic renewable energy generation capacity to 63.8 gigawatts by 2030 through the expansion of solar and wind power generation capacities to 36.5 gigawatts and 17.7 gigawatts, respectively, by 2030.

New Energy Industry Fund. In January 2016, the Ministry of Trade, Industry and Energy announced an initiative to promote the new energy industry by creating the New Energy Industry Fund, which is made up of funds sponsored by government-affiliated energy companies. We contributed Won 500 billion to the funds in 2016. The purpose of these funds is to invest in substantially all frontiers of the new energy industry, including renewable energy, energy storage systems, electric vehicles, small-sized self-sustaining electricity generation grids known as micro-grids , among others, as well as invest in start-up companies, ventures, small- to medium-sized enterprise and project businesses that engage in these businesses but have not previously attracted sufficient capital from the private sector.

Environmental and safety considerations in electricity supply and demand planning. In March 2017, the Electric Utility Act was amended to the effect that starting in June 2017, future national planning for electricity supply and demand in Korea should consider the environmental and safety impacts of such planning. However, to-date, no specific guidelines have been provided by the Government as to how to implement this provision, and it is therefore difficult to assess in advance what impact such provision will have on our business, results of operations or financial condition.

Complying with these Government initiatives and operating programs in furtherance thereof has involved and will likely involve significant costs and resources on our part. We and our generation subsidiaries could also become subject to substantial fines and other forms of penalties for non-compliance. There is no assurance that, particularly given the wide-ranging policy priorities for the Government, it will in fact raise the electricity tariff to a level sufficient to fully cover additional costs associated with implementing and operating these programs and otherwise complying with these programs, do so on a timely basis or at all. If the Government does not do so or provide us and our generation subsidiaries with other forms of assistance to offset the costs involved, our results of operation, financial condition and cash flows may be materially and adversely affected.

See Item 4.B. Business Overview Environmental Programs.

We may require a substantial amount of additional indebtedness to refinance existing debt and for future capital expenditures.

We anticipate that a substantial amount of additional indebtedness will be required in the coming years in order to refinance existing debt, make capital expenditures for construction of generation plants and other facilities and/or make acquisitions, invest in renewable energy and the new energy industry projects and fund our overseas businesses. In 2016, 2017 and 2018, our capital expenditures in relation to the foregoing amounted to Won 13,950 billion, Won 13,711 billion and Won 13,695 billion, respectively, and our budgeted capital expenditures for 2019, 2020 and 2021 amount to Won 16,831 billion, Won 19,138 billion and Won 18,804 billion, respectively.

While we currently do not expect to face any material difficulties in procuring short-term borrowings to meet our liquidity and short-term capital requirements, there is no assurance that we will be able to do so. We expect that a portion of our long-term debt will need to be paid or refinanced through foreign currency-denominated borrowings and capital raising in international capital markets. Such financing may not be available on terms commercially acceptable to us or at all, especially if the global financial markets experience significant turbulence or a substantial reduction in liquidity or due to other factors beyond our control. If we are unable to obtain financing on commercially acceptable terms on a timely basis, or at all, we may be unable to meet our funding requirements for capital expenditures or debt repayment obligations, which could have a material adverse impact on our business, results of operations and financial condition.

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We and our generation subsidiaries have undertaken various programs to reduce debt and improve the overall financial health. For further information, see Item 4.B. Business Overview Debt Reduction Program and Related Activities. Despite our best efforts, however, for reasons beyond our control, including macroeconomic environments, government regulations and market forces (such as international market prices for our fuels), we cannot assure whether we or our generation subsidiaries will be able to successfully reduce debt burdens or otherwise improve our financial health to a level that would be optimal for our capital structure. If we or our generation subsidiaries fail to do so or the measures taken by us or our generation subsidiaries to reduce debt levels or improve financial health have unintended adverse consequences, such developments may have an adverse effect on our business, results of operations and financial condition.

The movement of Won against the U.S. dollar and other currencies may have a material adverse effect on us.

The Won has fluctuated significantly against major currencies from time to time. Even slight depreciation of Won against U.S. dollar and other foreign currencies may result in a material increase in the cost of fuel and equipment purchased by us from overseas since the prices for substantially all of the fuel materials and a significant portion of the equipment we purchase are denominated in currencies other than Won, generally in U.S. dollars. Changes in foreign exchange rates may also impact the cost of servicing our foreign currency-denominated debt. As of December 31, 2018, 17.7% of our long-term debt (including the current portion but excluding issue discounts and premium) without taking into consideration of swap transactions, was denominated in foreign currencies, principally U.S. dollars. In addition, even if we make payments in Won for certain fuel materials and equipment, some of these fuel materials may originate from other countries and their prices may be affected accordingly by the exchange rates between the Won and foreign currencies, especially the U.S. dollar. Since the substantial majority of our revenues are denominated in Won, we must generally obtain foreign currencies through foreign currency-denominated financings or from foreign currency exchange markets to make such purchases or service such debt. As a result, any significant depreciation of Won against the U.S. dollar or other major foreign currencies will have a material adverse effect on our profitability and results of operations.

We may not be successful in implementing new business strategies.

As part of our overall business strategy, we plan to (i) expand clean energy and stabilize electricity supply and demand, (ii) enhance sales profitability and competitiveness, (iii) explore convergence-based new businesses and markets, (iv) secure future strategic technologies and establish infrastructure for digital transformation, and (v) strengthen management efficiency and embody social value.

Due to their inherent uncertainties, such new and expanded strategic initiatives expose us to a number of risks and challenges, including the following:

- new and expanded business activities may require unanticipated capital expenditures and involve additional compliance requirements;

- new and expanded business activities may result in less growth or profit than we currently anticipate, and there can be no assurance that such business activities will become profitable at the level we desire or at all;

- certain of our new and expanded businesses, particularly in the areas of renewable energy, require substantial government subsidies to become profitable, and such subsidies may be substantially reduced or entirely discontinued;

- we may fail to identify and enter into new business opportunities in a timely fashion, putting us at a disadvantage vis-à-vis competitors, particularly in overseas markets; and

- we may need to hire or retrain personnel to supervise and conduct the relevant business activities.

As part of our business strategy, we may also seek, evaluate or engage in potential acquisitions, joint ventures, strategic alliances, restructurings, combinations, rationalizations, divestments or other similar opportunities. The prospects of these initiatives are uncertain, and there can be no assurance that we will be able to successfully implement or grow new ventures, and these ventures may prove more difficult or costly than what we originally anticipated. In addition, we regularly review the profitability and growth potential of our existing and new businesses. As a result of such review, we may decide to exit from or to reduce the resources that we allocate to new or existing ventures in the future. There is a risk that these ventures may not achieve profitability or operational efficiencies to the extent originally anticipated, and we may fail to recover investments or expenditures that we have already made. Any of the foregoing may have a material adverse effect on our reputation, business, results of operations, financial condition and cash flows.

We plan to pursue overseas expansion opportunities that may subject us to different or greater risks than those associated with our domestic operations.

While our operations have, to-date, been primarily based in Korea, we and our generation subsidiaries may expand, on a selective and opportunistic basis, overseas operations in the future. In particular, we and our generation subsidiaries may further expand our project portfolio to include the construction and operation of conventional thermal generation units, nuclear generation units and renewable energy power plants, transmission and distribution and (primarily through our generation subsidiaries) mining and development of fuel sources.

Overseas operations often involve risks that are different from those we face in our domestic operations, including the following:

- challenges of complying with multiple foreign laws and regulatory requirements, including tax laws and laws regulating our operations and investments;

- volatility of overseas economic conditions, including fluctuations in foreign currency exchange rates;

- difficulties in enforcing creditors   rights in foreign jurisdictions;

- risk of expropriation and exercise of sovereign immunity where the counterparty is a foreign government;

- difficulties in establishing, staffing and managing foreign operations;

- differing labor regulations;

- political and economic instability, natural calamities, war and terrorism;

- lack of familiarity with local markets and competitive conditions;

- changes in applicable laws and regulations in Korea that affect foreign operations; and
- obstacles to the repatriation of earnings and cash.

Any failure by us to recognize or respond to these differences may adversely affect the success of our operations in those markets, which in turn could materially and adversely affect our business and results of operations.

Furthermore, while we seek to enter into overseas business opportunities in a prudent manner, some of our new international business ventures carry inherent risks that are different from our traditional business of electricity power generation, transmission and distribution. While the overseas businesses in the aggregate currently do not comprise a material portion of our overall business, as we are relatively inexperienced in these new types of overseas businesses, the actual revenues and profitability from, and investments and expenditures into, such ventures may be substantially different from what we plan or anticipate and may have a material adverse impact on our overall business, results of operations, financial condition and cash flows.

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An increase in electricity generated by and/or sourced from private power producers may erode our market position and hurt our business, growth prospects, revenues and profitability.

As of December 31, 2018, we and our generation subsidiaries owned approximately 68.3% of the total electricity generation capacity in Korea (excluding plants generating electricity for private or emergency use). New entrants to the electricity business will erode our market share and create significant competition, which could have a material adverse impact on our financial condition and results of operations.

In particular, we compete with independent power producers with respect to electricity generation. The independent power producers accounted for 26.7% of total power generation in 2018 and 31.7% of total generation capacity as of December 31, 2018. As of December 31, 2018, there were 19 independent power producers in Korea, excluding renewable energy producers. Private enterprises became permitted to own and operate coal-fired power plants in Korea only after the Ministry of Trade, Industry and Energy approved plans for independent power producers to construct coal-fired power plants under the Sixth Basic Plan announced in February 2013. Under the Eighth Basic Plan announced in December 2017, (i) six coal-fired units under construction with aggregate generation capacity of 6,260 megawatts are scheduled to be completed between 2021 and 2022, and (ii) two coal-fired units scheduled for construction shall be converted to LNG fuel use. Currently there are no additional plans for construction of coal-fired power plants by independent power producers beyond 2022. While it remains to be seen whether construction of these generation units will be completed as scheduled, if these units were to be completed as scheduled and/or independent power producers are permitted to build additional generation capacity (whether coal-fired or not), our market share in Korea may decrease, which may have a material adverse effect on our results of operations and financial condition.

In addition, under the Community Energy System adopted by the Government in 2004, a minimal amount of electricity is supplied directly to consumers on a localized basis by independent power producers outside the cost-based pool system used by our generation subsidiaries and most independent power producers to distribute electricity nationwide. The purpose of this system is to geographically decentralize electricity supply and thereby reduce transmission losses and improve the efficiency of energy use. These entities do not supply electricity on a national level but are licensed to supply electricity on a limited basis to their respective districts under the Community Energy System. As of March 31, 2019, the aggregate generation capacity of suppliers participating in the Community Energy System amounted to less than 1% of that of our generation subsidiaries in the aggregate. We currently do not expect the Community Energy System to be widely adopted, especially in light of the significant level of capital expenditure required for such direct supply. However, if the Community Energy System is widely adopted, it may erode our currently dominant market position in the generation and distribution of electricity in Korea and may have a material adverse effect on our business, results of operations and financial condition.

Our market dominance in the electricity distribution in Korea also may face potential erosion in light of the recent Proposal for Adjustment of Functions of Public Institutions (Energy Sector) announced by the Government in June 2016. This proposal contemplates a gradual opening of the electricity trading market to the private sector although no detailed roadmap has been provided for such opening. It is currently premature to predict to what extent, or in what direction, the liberalization of the electricity trading market will happen. Nonetheless, any significant liberalization of the electricity trading market may result in substantial reduction of our market share in electricity distribution in Korea, which would have a material adverse effect on our business, results of operation and cash flows.

See also Item 4.B. Business Overview Competition.

Labor unrest or increases in labor cost may adversely affect our operations.

We and each of our generation subsidiaries have separate labor unions. As of December 31, 2018, approximately 69.4% of our and our generation subsidiaries employees in the aggregate were members of these

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labor unions. Since a six-week labor strike in 2002 by union members of our generation subsidiaries in response to a proposed privatization of one of our generation subsidiaries, there has been no material labor dispute. However, we cannot assure you that there will not be a major labor strike or other material disruptions of operations by the labor unions of us and our generation subsidiaries if the Government resumes privatization or other restructuring initiatives or for other reasons, which may adversely affect our business and results of operations.

Furthermore, the Government, as part of a response to low fertility amidst an aging population in Korea and to make the lives of workers more stable, has pledged to reduce the number of non-permanent workers and increase the employment of permanent workers, in part by transitioning from non-permanent to permanent positions in the public sector. In accordance with guidelines announced by the Government in July 2017, we have completed transitioning temporary workers to permanent positions as of December 31, 2018. In addition, we have agreed with the subcontracted workers who provide meter-reading and security services to transition them to permanent positions by establishing subsidiaries and hiring these workers through such subsidiaries. We plan to finalize the measures by the end of 2019. Our generation subsidiaries have partially completed transitioning of non-permanent workers to permanent positions by hiring them for an indefinite period or establishing subsidiaries and hiring them through such subsidiaries. Our thermal generation subsidiaries plan to form a labor-management consultative body to transition the in-house subcontracted workers for the fuel and environmental facilities to permanent positions. Although the Government guidelines suggest that we transition the non-permanent workers to permanent positions within our existing budget for the related business, we cannot assure you that this will not result in increased costs for us or our generation subsidiaries and have an adverse impact on us or our generation subsidiaries financial condition and results of operations.

Additionally, domestic and international policy changes may affect our relationship with our employees, such as the Government s potential ratification of four of the eight essential conventions of International Labor Organization and potential reformation of the public employee wage structure. We cannot assure you that such policy changes will not negatively affect our relationship with our employees, which may in turn adversely affect our business and results of operations.

Operation of nuclear power generation facilities inherently involves numerous hazards and risks, any of which could result in a material loss of revenues or increased expenses.

Through KHNP, we currently operate 23 nuclear-fuel generation units. Operation of nuclear power plants is subject to certain hazards, including environmental hazards such as leaks, ruptures and discharge of toxic and radioactive substances and materials. These hazards can cause personal injuries or loss of life, severe damage to or destruction of property and natural resources, pollution or other environmental damage, clean-up responsibilities, regulatory investigation and penalties and suspension of operations. Nuclear power has a stable and relatively inexpensive cost structure (which is least costly among the fuel types used by our generation subsidiaries) and is the second largest source of Korea s electricity supply, accounting for 23.4% of electricity generated in Korea in 2018. Due to significantly lower unit fuel costs compared to those for thermal power plants, our nuclear power plants are generally operated at full capacity with only routine shutdowns for fuel replacement and maintenance, with limited exceptions.

From time to time, our nuclear generation units may experience unexpected shutdowns or maintenance-related stoppage. For example, following an earthquake in the vicinity in September 2016, four nuclear generation units at the Wolsong site were shut down for approximately three months as part of a preventive and safety assurance program although these units were not directly affected by the earthquake. Furthermore, the utilization rates of our nuclear generation units fell in 2018 as our nuclear generation units stopped operation for safety and maintenance inspection more frequently in 2018 as compared to 2017, due to strengthening of safety enhancement measures. Any prolonged or substantial breakdown, failure or suspension of operation of a nuclear unit could result in a material loss of revenues, an increase in fuel costs related to the use of alternative power sources, additional repair and maintenance costs, greater risk of litigation and increased social and political hostility to the use of nuclear power, any of which could have a material adverse impact on our financial condition and results of operations.

In addition, heightened concerns regarding the safety of operating nuclear generation units could impede with our ability to operating them for an extended period of time or at all. For example, the nuclear power plant at Wolsong #1 unit began operations in 1982 and ended its operations in 2012 pursuant to its 30-year operating license. In February 2015, the Nuclear Safety and Security Commission (NSSC) evaluated the safety of operating Wolsong #1 unit and approved its extended operation until November 2022. However, a civic group filed a lawsuit to annul such decision, and in February 2017, the Seoul Administrative Court ruled against the NSSC. The NSSC appealed this decision, and the civic group filed an injunction to suspend the operation of the Wolsong #1 unit. The civic group s injunction was denied in July 2017. KHNP, which operated the unit pursuant to the NSSC s initial decision, has joined this lawsuit. On June 15, 2018, the board of directors of KHNP decided to (i) retire Wolsong #1 unit earlier than planned due to its economic inefficiency and (ii) discontinue the construction of Chunji #1 and #2 as well as Daejin #1 and #2 units. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Wolsong #1 unit was Won 570,408 million and the provision for decommissioning costs of Wolsong #1 increased by Won 28,196 million, as the timing of actual cash outflows was accelerated due to the shortened operating period. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Chunji #1 and #2 as well as Daejin #1 and #2 units amounted to Won 38,886 million. Although the board of directors did not make any decisions regarding Shin-Hanul #3 and #4 units, which are new nuclear plants under construction, we cannot assure you that the construction of these units will not be discontinued. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Shin-Hanul #3 and #4 units was Won 132,725 million. There are ten other nuclear generation units whose life under their initial operating license will expire in the next ten years, or by 2029, and we may find it more difficult to have the life of other nuclear units extended as well. The failure to extend the life of these units would result in a loss of revenues from such units and the increase in our overall fuel costs (as nuclear fuel is the cheapest compared to coal, LNG or oil), which could adversely affect our results of operation and financial condition. Furthermore, in September 2016, Greenpeace and 559 Korean nationals brought a lawsuit against the NSSC to revoke the permit the NSSC granted to KHNP in relation to the construction of Shin-Kori #5 and #6 nuclear generation units. Although the lawsuit was dismissed on February 14, 2019, we cannot assure you that there will not be new challenges to prohibit the construction of these new nuclear units in the future, whereby we may experience a loss of revenues and an increase in fuel costs (as nuclear fuel is the cheapest compared to coal, LNG or oil) as a result of such prohibition, which could adversely affect our results of operation and financial condition.

In order to prevent damages to the nuclear facilities such as a result of the tsunami and earthquake in March 2011 in Japan, KHNP prepared a comprehensive safety improvement plan including, but are not limited to, installing additional automatic shut-down systems for earthquakes, extending coastal barriers for seismic waves, procuring mobile power generators and storage batteries, installing passive hydrogen removers at nuclear facilities and improving the radiology emergency medical system. All follow-up measures were finalized in December 2015. KHNP also developed 10 additional supplementary safety measures by analysis of overseas plants and its current operations and implemented eight of such measures in 2017, with the two remaining measures to be implemented by 2021. However, there is no assurance that a similar or worse natural disaster may require the adoption and implementation of additional safety measures, which may be costly and have a material adverse impact on our financial condition and results of operations.

Subsequently, the Government unveiled its roadmap to shift in energy sources in October 2017 and announced the Eighth Basic Plan to implement such roadmap in December 2017. The Eighth Basic Plan focuses on, among other things, (i) decreasing the reliance on nuclear and coal-based supply sources, (ii) increasing utilization of renewable energy sources and (iii) balancing the existing cost-based pool system of purchase of electricity with an environmentally-focused pool system. Accordingly, six new nuclear generation units in a planning stage (Shin-Hanul

#3 and #4, Chunji #1 and #2 and Singyu #1 and #2) would not be constructed, while five new nuclear plants under construction (Shin-Kori #4, #5, #6, Shin-Hanul #1 and #2) shall begin operation by 2024 upon completion of the construction. Future extensions of life of decrepit nuclear generation units would not be granted and the proportion of renewable energy sources would be increased. We cannot assure you that these policies will not have an adverse impact on our or our generation subsidiaries financial condition and results of operations.

The construction and operation of our generation, transmission and distribution facilities involve difficulties, such as opposition from civic groups, which may have an adverse effect on us.

From time to time, we encounter social and political opposition against construction and operation of our generation facilities (particularly nuclear units) and, to a lesser extent, our transmission and distribution facilities. For example, we recently faced intense opposition from local residents and civic groups to the construction of transmission lines in the Milyang area, which we resolved through various compensatory and other support programs. Such opposition delayed the schedule for completion of this project. Although we and the Government have undertaken various community programs to address concerns of residents in areas near our facilities, civic and community opposition could result in delayed construction or relocation of our planned facilities, which could have a material adverse impact on our business and results of operations.

Our risk management policies and procedures may not be fully effective at all times.

In the course of our operations, we must manage a number of risks, such as regulatory risks, market risks and operational risks. Although we devote significant resources to developing and improving our risk management policies and procedures and expect to continue to do so in the future, our risk management practices may not be fully effective at all times in eliminating or mitigating risk exposures in all market environments or against all types of risk, including risks that are unidentified or unanticipated, such as natural disasters or employee misconduct. For example, in May 2013, the Nuclear Safety and Security Commission (NSSC) of Korea discovered that certain parts used in several of our then-operating nuclear generation units had been supplied based on falsified certificates. This discovery led to full internal investigation and investigation by the Prosecutor s Office, which in turn led to prosecutions and convictions of several current and former employees of KHNP on related and separate bribery charges, as well as termination of the then-president of KHNP as part of a broad disciplinary action. The incident also led to suspended operation of the related nuclear generation units for several months pending safety inspection. A similar incident involving falsified certificates and bribery occurred also in November 2012. We and KHNP have fully cooperated with the authorities in terms of investigations as well as remedial and preventive measures, including enhanced internal compliance policies and procedures.

In April 2019, a forest fire broke out in Goseong in Gangwon Province, about 210 kilometers from Seoul, causing damages to nearby towns, covering approximately 700 hectares. The National Forensic Service has investigated the cause of the fire and has determined that the fire seems to have started by an electrical arc from our utility pole s wire, which broke as a result of a strong wind. Based on this finding, the police has begun a follow-up investigation, and the Ministry of the Interior and Safety is currently assessing the magnitude of the resulting losses. As the investigations are ongoing and the results of which are uncertain, we cannot assure you that we will not be found accountable for the fire and that the extent of our liabilities from the fire will not be significant, in which event our reputation and results of operations may be adversely affected.

Further, our operational activities like the generation of electricity involve inherent operating risks that may result in accidents involving serious injury or loss of life, environmental damage or property damage. In December 2018, an employee of KOWEPO s subcontractor died in an accident at a Taean thermal power unit, leading to a public scrutiny and review by the Ministry of Employment and Labor. As a result, KOWEPO was required to halt the operations of three Taean thermal power units (Taean #9 and #10 units as well as Taean Integrated Gasification Combined Cycle

(IGCC)) since December 2018. These thermal power units have not resumed their operations yet, and the re-start date is still undecided. We cannot assure you that the suspension of such operations will not result in an adverse impact on our and our subsidiaries results of operations.

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We believe we and our subsidiaries are in compliance in all material respects with internal compliance policies and procedures and all other additional safety measures initiated internally or required by regulatory and governmental agencies. However, we cannot assure you that, despite all precautionary and reform measures undertaken by us, these measures will prove to be fully effective at all times against all the risks we face or that an incident that could cause harm to our reputation and operation will not happen in the future, including due to factors beyond our control.

Our risk management procedures may not prevent losses in debt and foreign currency positions.

We manage interest rate exposure for our debt instruments by limiting our variable rate debt exposure as a percentage of our total debt and closely monitoring the movements in market interest rates. We also actively manage currency exchange rate exposure for our foreign currency-denominated liabilities by measuring the potential loss therefrom using risk analysis software and entering into derivative contracts to hedge such exposure when the possible loss reaches a certain risk limit. To the extent we have unhedged positions or our hedging and other risk management procedures do not work as planned, our results of operations and financial condition may be adversely affected.

The amount and scope of coverage of our insurance are limited.

Substantial liability may result from the operations of our nuclear generation units, the use and handling of nuclear fuel and possible radioactive emissions associated with such nuclear fuel. KHNP carries insurance for its generation units and nuclear fuel transportation, and we believe that the level of insurance is generally adequate and is in compliance with relevant laws and regulations. In addition, KHNP is the beneficiary of Government indemnity that covers damages which the insurance cannot cover. However, such insurance is limited in terms of amount and scope of coverage and does not cover all types or amounts of losses which could arise in connection with the ownership and operation of nuclear plants. Accordingly, material adverse financial consequences could result from a serious accident or a natural disaster to the extent it is neither insured nor covered by the government indemnity.

In addition, our non-nuclear generation subsidiaries carry insurance covering certain risks, including fire, in respect of their key assets, including buildings and equipment located at their respective power plants, construction-in-progress and imported fuel and procurement in transit. Such insurance and indemnity, however, cover only a portion of the assets that these generation subsidiaries own and operate and do not cover all types or amounts of loss that could arise in connection with the ownership and operation of these power plants. In addition, our generation subsidiaries are not permitted to self-insure, and accordingly have not self-insured, against risks of their uninsured assets or business. Accordingly, material adverse financial consequences could result from a serious accident to the extent it is uninsured.

In addition, because neither we nor our non-nuclear generation subsidiaries carry any insurance against terrorist attacks, an act of terrorism would result in significant financial losses. See Item 4.B. Business Overview Insurance.

We may not be able to raise equity capital in the future without the participation of the Government.

Under applicable laws, the Government is required to directly or indirectly own at least 51% of our issued capital stock. As of February 7, 2019, the last day on which our shareholders registry was closed, the Government, directly and through Korea Development Bank (a statutory banking institution wholly owned by the Government), owned 51.1% of our issued capital stock. Accordingly, without changes in the existing Korean law, it may be difficult or impossible for us to undertake, without the participation of the Government, any equity financing in the future.

We may be exposed to potential claims made by current or previous employees for unpaid wages for the past three years under the expanded scope of ordinary wages and become subject to additional labor costs arising from the broader interpretation of ordinary wages under such decision.

Under the Labor Standards Act, an employee is legally entitled to ordinary wages. Under the guidelines previously issued by the Ministry of Employment and Labor, ordinary wages include base salary and certain fixed monthly allowances for work performed overtime during night shifts and holidays. Prior to the Supreme Court decision described below, many companies in Korea had typically interpreted these guidelines as excluding from the scope of ordinary wages fixed bonuses that are paid other than on a monthly basis, namely on a bi-monthly, quarterly or semi-annual basis, although such interpretation had been a subject of controversy and had been overruled in a few court cases.

In December 2013, the Supreme Court of Korea ruled that regular bonuses fall under the category of ordinary wages on the condition that those bonuses are paid regularly and uniformly, and that any agreement which excludes such regular bonuses from ordinary wage is invalid. One of the key rulings provides that bonuses that are given to employees (i) on a regular and continuous basis and (ii) calculated according to the actual number of days worked (iii) that are not incentive-based must be included in the calculation of ordinary wages. The Supreme Court further ruled that in spite of invalidity of such agreements, employees shall not retroactively claim additional wages incurred due to such court decision, in case that such claims bring to employees unexpected benefits which substantially exceeds the wage level agreed by employers and employees and cause an unpredicted increase in expenditures for their company, which would lead the company to material managerial difficulty or would be a threat to the existence of the company. In that case, the claim is not acceptable since it is unjust and is in breach of the principle of good faith.

As a result of such ruling by the Supreme Court of Korea, we and our subsidiaries became subject to a number of lawsuits filed by various industry-wide and company-specific labor unions based on claims that ordinary wage had been paid without including certain items that should have been included as ordinary wage. In July 2016, the court ruled against us, and in accordance with the court s ruling, in August 2016 we paid Won 55.1 billion to the employees for three years of back pay plus interest. As of December 31, 2018, 51 lawsuits were pending against our subsidiaries for an aggregate claim amount of Won 152 billion, for which our subsidiaries set aside an aggregate amount of Won 39 billion to cover any potential future payments of additional ordinary wage in relation to the related lawsuits. We cannot presently assure you that the court will not rule against our subsidiaries in these lawsuits, or that the foregoing reserve amount will be sufficient to cover the amounts payable under the court rulings.

Additionally, since the issue of determining which labor costs should be additionally included as part of ordinary wages has not been fully resolved by the courts reviewing the lawsuits to which our subsidiaries are a party and other ordinary wage lawsuits filed against other companies, we cannot presently assure you that there will not be additional lawsuits in relation to ordinary wages and that we or our subsidiaries may not become liable for greater amount of damages as a result of these lawsuits. Furthermore, court decisions or labor legislations expanding the definition of ordinary wages may prospectively increase the labor costs of us and our subsidiaries. As a result, there can be no assurance that the above-described lawsuits and circumstances will not have a material adverse effect on our results of operations. See Item 8.A. Consolidated Statements and Other Financial Information Legal Proceedings.

We are subject to cyber security risk.

Recently, our activities have been subject to an increasing risk of cyber-attacks and information leakages, the nature of which is continually evolving. For example, in December 2014, KHNP became subject to a cyber terror incident. Hackers hacked into the computer network of former KHNP employees and threatened to shut down certain of

KHNP s nuclear plants. The hacking incident did not jeopardize our nuclear operation in any material respect and none of the stolen information was material to our nuclear operation or the national nuclear policy. In response to such incident, we and our subsidiaries have further bolstered anti-hacking and other preventive and remedial measures in relation to potential cyber terror. In December 2018, we have obtained Personal Information Management System certification granted by the Korea Internet and Security Agency. Further, KHNP has established an organization dedicated to nuclear control security in accordance with the Government s strengthened information security regulation. However, there is no assurance that a similar or more serious hacking or other forms of cyber terror will not happen with respect to us and our generation subsidiaries, which could have a material adverse impact on our business, financial condition and results of operations.

We previously engaged in limited activities relating to Iran and may become subject to sanctions under relevant laws and regulations of the United States and other jurisdictions as a result of such activities, which may adversely affect our business and reputation.

The U.S. Department of the Treasury s Office of Foreign Assets Control, or OFAC, administers and enforces certain laws and regulations (which we refer to as the OFAC sanctions) that impose restrictions upon activities or transactions within U.S. jurisdiction with certain countries, governments, entities and individuals that are the subject of OFAC sanctions, including Iran. Even though non-U.S. persons generally are not directly bound by OFAC sanctions, in recent years OFAC has asserted that such non-U.S. persons can be held liable on various legal theories if they engage in transactions completed in part in the United States or by U.S. persons (such as, for example, wiring an international payment that clears through a bank branch in New York). The European Union also enforces certain laws and regulations that impose restrictions upon nationals and entities of, and business conducted in, member states with respect to activities or transactions with certain countries, governments, entities and individuals that are the subject of such laws and regulations, including Iran. The United Nations Security Council and other governmental entities also impose similar sanctions.

In addition to the OFAC sanctions described above, the United States also maintains indirect sanctions under authority of, among others, the Iran Sanctions Act, the Comprehensive Iran Sanctions, Accountability and Divestment Act of 2010, or CISADA, the National Defense Authorization Act for Fiscal Year 2012, or the NDAA, the Iran Threat Reduction and Syria Human Rights Act of 2012, or ITRA, various Executive Orders, the Iran Freedom and Counter-Proliferation Act of 2012, or IFCA, and the Countering America s Adversaries Through Sanctions Act, or CAATSA. These indirect sanctions, which we refer to collectively as U.S. secondary sanctions, provide authority for the imposition of U.S. sanctions on foreign parties that provide services in support of certain Iran-related activities.

On July 14, 2015, the so-called P5+1 powers (consisting of the United States, the United Kingdom, Germany, France, Russia, and China) and the European Union, or the EU, entered into an agreement with Iran known as the Joint Comprehensive Plan of Action Regarding the Islamic Republic of Iran s Nuclear Program, or the JCPOA. The JCPOA was intended to significantly restrict Iran s ability to develop and produce nuclear weapons. Upon implementation of the JCPOA on January 16, 2016 the United States, the EU, and the UN suspended certain nuclear-related sanctions against Iran following an announcement by the International Atomic Energy Agency that Iran had fulfilled its initial obligations under the JCPOA. Most U.S. secondary sanctions concerning Iran were suspended following January 16, 2016.

However, on May 8, 2018, the U.S. Government announced that it was ending its participation in the JCPOA and that it would take steps to re-impose secondary sanctions targeting Iran. Sanctions that had been lifted pursuant to the JCPOA were re-imposed after two wind down periods; one ending on August 6, 2018 and one ending on November 4, 2018. Since November 4, 2018, sanctions that have been lifted pursuant to the JCPOA have been re-imposed. Consequently, dealings with Iran may now subject foreign parties to U.S. secondary sanctions.

Violations of OFAC sanctions via transactions with a U.S. jurisdictional nexus can result in substantial civil or criminal penalties. A range of sanctions may be imposed on companies that engage in sanctionable activities within the scope of U.S. secondary sanctions, including, among other things, the blocking of any property subject to U.S. jurisdiction in which the sanctioned company has an interest, which could include a prohibition on transactions or dealings involving securities of the sanctioned company or the sanctioned company effectively losing access to the U.S. financial system.

We previously engaged in limited activities relating to Iran, but all of such activities have been terminated upon the withdrawal of the United States from the JCPOA. We are currently in the process of closing down our representative office in Tehran, Iran, which is expected to take more than one year due to relevant legal procedures. We have announced to all relevant Iranian counterparties, all of which were either the Government of Iran or state-owned enterprises, our intention to terminate all business activities in Iran.

We previously entered into agreement with counterparties in Iran including the following:

- We engaged Mehr Renewable Energy Company for project design documentation services to register with United Nations Framework Convention on Climate Change our CDM business to be conducted in Iran.

- Korea Electric Power Research Institute, which is operated by us, entered into cooperation agreements with Iran s Niroo Research Institute regarding various joint research and development efforts relating to power plants, renewable energy, smart grids and other energy-related technologies.

To the extent any of our subsidiaries have dealings in or relating to Iran, we have internal policies and procedures, as well as a monitoring system, which are designed to prevent and detect violations of applicable laws, including applicable sanctions laws. We do not believe that our previous activities relating to Iran violated OFAC sanctions or were sanctionable under U.S. secondary sanctions, and in any event, we believe we were in compliance with applicable sanctions laws. We believe we were not in violation of any laws concerning re-exports of U.S.-origin goods to Iran.

There can be no guarantee that our previous activities relating to Iran will not be found to violate the OFAC sanctions or involve sanctionable activities under U.S. secondary sanctions, or that any other government will not determine that our activities violate applicable sanctions of other countries. Laws related to Iran sanctions are complex, dynamic, and subject to evolving interpretations by the regulatory authorities.

Certain institutional investors, including state and municipal governments in the United States and universities, as well as financial institutions, have proposed or adopted initiatives regarding investments in companies that do business with countries that are the target of OFAC sanctions, including Iran. Accordingly, as a result of our activities related to Iran, certain investors may not wish to invest in our shares or ADSs or do business with us. In September 2016, the New Jersey Department of the Treasury s Division of Investment notified of its preliminary determination of divestment pursuant to the New Jersey divestment laws. Such preliminary determination was reversed in February 2017 after we explained such determination was based on incorrect information about our business in Iran. As of February 2019, we were listed on the Iowa Public Employees Retirement System s (IPERS) Iran Prohibited Companies List. Such divestment initiatives and the decision not to invest in, or to divest from our shares or ADSs may have a material negative impact our reputation and the value of our shares or ADSs.

Violations of sanctions can result in penalties or other consequences adverse to us. Certain of our counterparties may be subjected to sanctions. If we violate sanctions, we may ourselves be subjected to sanctions or penalties. Our business and results of operations may be adversely affected or we may suffer reputational damage. In addition, such sanctions may prevent us from consummating or continuing any of the projects we are currently pursuing in Iran, which could adversely affect our results of operations. Also, at any time, certain investors may divest their interests in our shares if we are found to have violated or are suspected of violating applicable sanctions law arising from our operation in a sanctioned country such as Iran.

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We purchase goods and services from Russia and those activities may be adversely impacted in a material manner by economic sanctions concerning Russia imposed by the United States and other jurisdictions.

The United States and the European Union have imposed economic sanctions concerning Russia. OFAC sanctions concerning Russia, *inter alia*, block the property of certain designated individuals and entities, target certain sectors of the Russian economy and prohibit certain transactions with certain targeted persons in targeted sectors of the Russian economy, and restrict investment in and trade with the Crimea region of Ukraine. Additionally, non-U.S. persons that engage in certain prohibited transactions concerning Russia or with certain sanctioned Russian persons or entities may be subject to secondary sanctions. In August 2017, the United States Congress passed CAATSA, which introduced a host of new U.S. secondary sanctions concerning Russia including, *inter alia*, for certain dealings with the Russian energy sector, support for Russia s energy export pipelines and engaging in a significant transaction with a person that is part of, or operates for or on behalf of, Russia s defense or intelligence sectors. Additionally, a non-U.S. person that knowingly facilitates a significant transaction or transactions for or on behalf of any person subject to sanctions imposed by the U.S. with respect to the Russian Federation or any child, spouse, parent, or sibling of such a sanctioned person may also be subject to secondary sanctions.

In 2018, we purchased 14% of our bituminous coal requirements from Russia. Additionally, we also purchase uranium and uranium separation services from a Russian supplier. In 2018, the total value of all goods and services purchased from Russia was approximately US$1 billion.

Risks Relating to Korea and the Global Economy

Unfavorable financial and economic conditions in Korea and globally may have a material adverse impact on us.

We are incorporated in Korea, where most of our assets are located and most of our income is generated. As a result, we are subject to political, economic, legal and regulatory risks specific to Korea, and our business, results of operations and financial condition are substantially dependent on the Korean consumers demand for electricity, which are in turn largely dependent on developments relating to the Korean economy.

The Korean economy is closely integrated with, and is significantly affected by, developments in the global economy and financial markets. In recent years, adverse conditions and volatility in the worldwide financial markets, fluctuations in oil and commodity prices and the general weakness of the global economy have contributed to the uncertainty of global economic prospects in general and have adversely affected, and may continue to adversely affect, the Korean economy, which in turn could adversely affect our business, financial condition and results of operations. As the Korean economy is highly dependent on the health and direction of the global economy, the prices of our securities may be adversely affected by investors reactions to developments in other countries. In addition, due to the ongoing volatility in the global financial markets, the value of the Won relative to the U.S. dollar has also fluctuated significantly in recent years, which in turn also may adversely affect our financial condition and results of operations.

Factors that determine economic and business cycles in the Korean or global economy are for the most part beyond our control and inherently uncertain. In light of the high level of interdependence of the global economy, any of the foregoing developments could have a material adverse effect on the Korean economy and financial markets, and in turn on our business and profitability.

More specifically, factors that could have an adverse impact on Korea s economy in the future include, among others:

increases in inflation levels, volatility in foreign currency reserve levels, commodity prices (including oil prices), exchange rates (particularly against the U.S. dollar), interest rates, stock market prices and inflows and outflows of foreign capital, either directly, into the stock markets, through derivatives or

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otherwise, including as a result of increased uncertainty in the wake of a referendum in the United Kingdom in June 2016 that voted in favor of exiting from the European Union, commonly known as Brexit ;

difficulties in the financial sectors in Europe, China and elsewhere and increased sovereign default risks in select countries and the resulting adverse effects on the global financial markets;

adverse developments in the economies of countries and regions to which Korea exports goods and services (such as the United States, Europe, China and Japan), or in emerging market economies in Asia or elsewhere that could result in a loss of confidence in the Korean economy, including potentially as a result of the Brexit;

potential escalation of the ongoing trade war between the U.S. and China as each country introduces tariffs on goods traded with the other;

social and labor unrest or declining consumer confidence or spending resulting from lay-offs, increasing unemployment and lower levels of income;

uncertainty and volatility and further decreases in the market prices of Korean real estate;

a decrease in tax revenues and a substantial increase in the Government s expenditures for unemployment compensation and other social programs that together could lead to an increased Government budget deficit;

political uncertainty, including as a result of increasing strife among or within political parties in Korea, and political gridlock within the government or in the legislature, which prevents or disrupts timely and effective policy making to the detriment of Korean economy, as well as the impeachment and indictment of the former president following a series of scandals and social unrest, which also involved the investigation of several leading Korean conglomerates and arrest of their leaders on charges of bribery and other possible misconduct;

deterioration in economic or diplomatic relations between Korea and its trading partners or allies, including deterioration resulting from territorial or trade disputes or disagreements in foreign policy, including as a result of any potential renegotiation of free trade agreements, or the ongoing tension between Korean and China in relation to the decision to allow deployment by the United States of the Terminal High Altitude Defense system known as THAAD in Korea;

increases in social expenditures to support the aging population in Korea or decreases in economic productivity due to the declining population size in Korea;

- any other development that has a material adverse effect in the global economy, such as an act of war, the spread of terrorism or a breakout of an epidemic such as SARS, avian flu, swine flu, Middle East Respiratory Syndrome, ebola or Zika virus, or natural disasters, earthquakes and tsunamis and the related disruptions in the relevant economies with global repercussions;

- hostilities involving oil-producing countries in the Middle East and elsewhere and any material disruption in the supply of oil or a material increase in the price of oil resulting from such hostilities; and

- an increase in the level of tensions or an outbreak of hostilities in the Korean peninsula or between North Korea and the United States.

Any future deterioration of the Korean economy could have an adverse effect on our business, financial condition and results of operations.

Tensions with North Korea could have an adverse effect on us and the market value of our shares.

Relations between Korea and North Korea have been tense throughout Korea s modern history. The level of tension between the two Koreas has fluctuated and may increase abruptly as a result of current and future events.

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In particular, there continues to be uncertainty regarding the long-term stability of North Korea s political leadership since the succession of Kim Jong-un to power following the death of his father in December 2011, which has raised concerns with respect to the political and economic future of the region. In February 2017, Kim Jong-un s half-brother, Kim Jong-nam, was reported to have been assassinated in an international airport in Malaysia.

In addition, there continues to be heightened security tension in the region stemming from North Korea s hostile military and diplomatic actions, including in respect of its nuclear weapons and long-range missile programs. Some examples from recent years include the following:

In November 2017, North Korea conducted a test launch of another intercontinental ballistic missile, which, due to its improved size, power and range of distance, may potentially enable North Korea to target the United States mainland.

Recently, on September 3, 2017, North Korea conducted its sixth nuclear test, claiming it had tested a hydrogen bomb that could be mounted on an intercontinental ballistic missile. In response, on September 12, 2017, the United Nations Security Council unanimously adopted a resolution imposing additional sanctions on North Korea including new limits on gas, petrol and oil imports, a ban on textile exports and measures to limit North Korean laborers from working abroad.

On August 29, 2017, North Korea tested an intermediate-range ballistic missile which flew directly over northern Japan before landing in the Pacific Ocean. In response, the United Nations Security Council unanimously adopted a statement condemning such launch, reiterating demands that North Korea halt its ballistic missile and nuclear weapons programs.

On July 4, 2017, North Korea tested its first intercontinental ballistic missile. In response, the U.S. government and the Government both issued statements condemning North Korea and conducted a joint military exercise on July 5, 2017. On July 28, 2017, North Korea tested a second intercontinental ballistic missile which landed in the Sea of Japan, inside Japan s Economic Exclusion Zone. In response, on August 5, 2017, the United Nations Security Council unanimously adopted a resolution that strengthened sanctions on North Korea. The resolution includes a total ban on all exports of coal, iron, iron ore, lead, lead ore and seafood, which is expected to reduce North Korea s export revenue by a third each year.

In March 2017, North Korea launched four mid-range missiles, which landed off the east coast of the Korean peninsula.

On September 9, 2016, North Korea conducted its fifth nuclear test, which has been the largest in scale among North Korea s nuclear tests thus far. According to North Korean announcements, the test was successful in detonating a nuclear missile. The test created a sizable earthquake in South Korea. In response, in February 2017 the U.N. Security Council adopted Resolution 2321 (2016) against North Korea, the purpose of which is to strengthen its sanctions regime against North Korea and to condemn North Korea s September 9, 2016 nuclear test in the strongest terms.

On February 10, 2016, in retaliation of North Korea s recent launch of a long-range rocket, South Korea announced that it would halt its operations of the Kaesong Industrial Complex to impede North Korea s utilization of funds from the industrial complex to finance its nuclear and missile programs. In response, North Korea announced on February 11, 2016 that it would expel all South Korean employees from the industrial complex and freeze all South Korean assets there.

On February 7, 2016, North Korea launched a rocket, claimed by them to be carrying a satellite intended for scientific observation. The launch was widely suspected by the international community to be a cover for testing a long-range missile capable of carrying a nuclear warhead. On February 18, 2016, the President of the United States signed into law mandatory sanctions on North Korea to punish it for its recent nuclear and missile tests, human rights violations and cybercrimes. The bill, which marks the first measure by the United States to exclusively target North Korea, is intended to seize the assets of anyone engaging in business related to North Korea s weapons program, and authorizes US$50 million over five years to transmit radio broadcasts into the country and support humanitarian assistance projects. On March 2, 2016, the United Nations Security Council voted unanimously to adopt a resolution to impose sanctions against North Korea, which include inspection of all cargo going to and from North Korea, a ban on all weapons trade and the expulsion of North Korean diplomats who engage in illicit activities. Also, on March 4, 2016, the European Union announced that it would expand its sanctions on North Korea, adding additional companies and individuals to its list of sanction targets. On April 1, 2016, North Korea fired a short-range surface-to-air missile in apparent protest of these sanctions adopted by the United States and the United Nations Security Council.

On January 6, 2016, North Korea announced that it had successfully conducted its first hydrogen bomb test, hours after international monitors detected a 5.1 magnitude earthquake near a known nuclear testing site in the country. The claims have not been verified independently. The alleged test followed a statement made in the previous month by Kim Jong-un, who claimed that North Korea had developed a hydrogen bomb.

In August 2015, two Korean soldiers were injured in a landmine explosion near the South Korean demilitarized zone. Claiming the landmines were set by North Koreans, the South Korean army re-initiated its propaganda program toward North Korea utilizing loudspeakers near the demilitarized zone. In retaliation, the North Korean army fired artillery rounds on the loudspeakers, resulting in the highest level of military readiness for both Koreas. High-ranking officials from North and South Korea subsequently met for discussions and entered into an agreement on August 25, 2015 intending to deflate military tensions.

From time to time, North Korea has fired short- to medium-range missiles from the coast of the Korean peninsula into the sea. In March 2015, North Korea fired seven surface-to-air missiles into waters off its east coast in apparent protest of annual joint military exercises being held by Korea and the United States.

North Korea renounced its obligations under the Nuclear Non-Proliferation Treaty in January 2003 and conducted three rounds of nuclear tests between October 2006 to February 2013, which increased tensions in the region and elicited strong objections worldwide. In response, the United Nations Security Council unanimously passed resolutions that condemned North Korea for the nuclear tests and expanded sanctions against North Korea.

North Korea s economy also faces severe challenges, including severe inflation and food shortages, which may further aggravate social and political tensions within North Korea. In addition, reunification of Korea and North Korea could occur in the future, which would entail significant economic commitment and expenditure by Korea that may outweigh any resulting economic benefits of reunification. On April 27, 2018, May 26, 2018 and September 18, 2018, President Moon Jae-in met Kim Jong-un in a summit to discuss, among other matters, denuclearization of the Korean Peninsula. On June 12, 2018, President Donald Trump and Kim Jong-un in turn had an official summit in Singapore and on February 27, 2019, the parties held the second official summit in Hanoi, Vietnam. However, in March 2019, announcement was made that no agreement was reached in the second bilateral summit meeting between the United States and North Korea.

There can be no assurance that the level of tension on the Korean peninsula will not escalate in the future or that the political regime in North Korea may not suddenly collapse. Any further increase in tension or uncertainty relating to the military, political or economic stability in the Korean peninsula, including a breakdown of diplomatic negotiations over the North Korean nuclear program, occurrence of military hostilities, heightened concerns about the stability of North Korea s political leadership or its actual collapse, a leadership crisis, a breakdown of high-level contacts or accelerated reunification could have a material adverse effect on our business, financial condition and results of operations, as well as the price of our common shares and our American depositary shares.

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We are generally subject to Korean corporate governance and disclosure standards, which differ in significant respects from those in other countries.

Companies in Korea, including us, are subject to corporate governance standards applicable to Korean public companies which differ in many respects from standards applicable in other countries, including the United States. As a reporting company registered with the Securities and Exchange Commission and listed on the New York Stock Exchange, we are, and will continue to be, subject to certain corporate governance standards as mandated by the Sarbanes-Oxley Act of 2002, as amended. However, foreign private issuers, including us, are exempt from certain corporate governance standards required under the Sarbanes-Oxley Act or the rules of the New York Stock Exchange. We and our generation subsidiaries are also subject to a number of special laws and regulations to Government-controlled entities, including the Act on the Management of Public Institutions. For a description of significant differences in corporate governance standards, see Item 16G. Corporate Governance. There may also be less publicly available information about Korean companies, such as us, than is regularly made available by public or non-public companies in other countries. Such differences in corporate governance standards and less public information could result in less than satisfactory corporate governance practices or disclosure to investors in certain countries.

You may not be able to enforce a judgment of a foreign court against us.

We are a corporation with limited liability organized under the laws of Korea. Substantially all of our directors and officers and other persons named in this annual report reside in Korea, and all or a significant portion of the assets of our directors and officers and other persons named in this annual report and substantially all of our assets are located in Korea. As a result, it may not be possible for holders of the American depository shares to affect service of process within the United States, or to enforce against them or us in the United States judgments obtained in United States courts based on the civil liability provisions of the federal securities laws of the United States. There is doubt as to the enforceability in Korea, either in original actions or in actions for enforcement of judgments of United States courts, of civil liabilities predicated on the United States federal securities laws.

Risks Relating to Our American Depositary Shares

There are restrictions on withdrawal and deposit of common shares under the depositary facility.

Under the deposit agreement, holders of shares of our common stock may deposit those shares with the depositary bank s custodian in Korea and obtain American depositary shares, and holders of American depositary shares may surrender American depositary shares to the depositary bank and receive shares of our common stock. However, under current Korean laws and regulations, the depositary bank is required to obtain our prior consent for the number of shares to be deposited in any given proposed deposit which exceeds the difference between (i) the aggregate number of shares deposited by us for the issuance of American depositary shares (including deposits in connection with the initial and all subsequent offerings of American depositary shares and stock dividends or other distributions related to these American depositary shares) and (ii) the number of shares on deposit with the depositary bank at the time of such proposed deposit. We have consented to the deposit of outstanding shares of common stock as long as the number of American depositary shares outstanding at any time does not exceed 80,153,810 shares. As a result, if you surrender American depositary shares and withdraw shares of common stock, you may not be able to deposit the shares again to obtain American depositary shares.

Ownership of our shares is restricted under Korean law.

Under the Financial Investment Services and Capital Markets Act, with certain exceptions, a foreign investor may acquire shares of a Korean company without being subject to any single or aggregate foreign investment ceiling. As one such exception, certain designated public corporations, such as us, are subject to a 40% ceiling on acquisitions of shares by foreigners in the aggregate. The Financial Services Commission may impose other restrictions as it deems necessary for the protection of investors and the stabilization of the Korean securities and derivatives market.

In addition to the aggregate foreign investment ceiling, the Financial Investment Services and Capital Markets Act and our Articles of Incorporation set a 3% ceiling on acquisition by a single investor (whether domestic or foreign) of the shares of our common stock. Any person (with certain exceptions) who holds our issued and outstanding shares in excess of such 3% ceiling cannot exercise voting rights with respect to our shares exceeding such limit.

The ceiling on aggregate investment by foreigners applicable to us may be exceeded in certain limited circumstances, including as a result of acquisition of:

- shares by a depositary issuing depositary receipts representing such shares (whether newly issued shares or outstanding shares);
- shares by exercise of warrant, conversion right under convertible bonds, exchange right under exchangeable bonds or withdrawal right under depositary receipts issued outside of Korea;
- shares from the exercise of shareholders rights; or
- shares by gift, inheritance or bequest.

A foreigner who has acquired our shares in excess of any ceiling described above may not exercise his voting rights with respect to our shares exceeding such limit and the Financial Services Commission may take necessary corrective action against him.

Holders of our ADSs will not have preemptive rights in certain circumstances.

The Korean Commercial Code and our Articles of Incorporation require us, with some exceptions, to offer shareholders the right to subscribe for new shares in proportion to their existing ownership percentage whenever new shares are issued. If we offer any rights to subscribe for additional shares of our common stock or any rights of any other nature, the depositary bank, after consultation with us, may make the rights available to you or use reasonable efforts to dispose of the rights on your behalf and make the net proceeds available to you. The depositary bank, however, is not required to make available to you any rights to purchase any additional shares unless it deems that doing so is lawful and feasible and:

- a registration statement filed by us under the U.S. Securities Act of 1933, as amended, is in effect with respect to those shares; or
- the offering and sale of those shares is exempt from or is not subject to the registration requirements of the U.S. Securities Act.

We are under no obligation to file any registration statement with the U.S. Securities and Exchange Commission in relation to the registration rights. If a registration statement is required for you to exercise preemptive rights but is not filed by us, you will not be able to exercise your preemptive rights for additional shares and you will suffer dilution of your equity interest in us.

The market value of your investment in our ADSs may fluctuate due to the volatility of the Korean securities market.

Our common stock is listed on the KRX KOSPI Division of the Korea Exchange, which has a smaller market capitalization and is more volatile than the securities markets in the United States and many European countries. The market value of ADSs may fluctuate in response to the fluctuation of the trading price of shares of our common stock on the Stock Market Division of the Korea Exchange. The Stock Market Division of the Korea Exchange has experienced substantial fluctuations in the prices and volumes of sales of listed securities and the Stock Market Division of the Korea Exchange has prescribed a fixed range in which share prices are permitted to move on a daily basis. Like other securities markets, including those in developed markets, the Korean securities market has experienced problems including market manipulation, insider trading and

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settlement failures. The recurrence of these or similar problems could have a material adverse effect on the market price and liquidity of the securities of Korean companies, including our common stock and ADSs, in both the domestic and the international markets.

The Korean government has the ability to exert substantial influence over many aspects of the private sector business community, and in the past has exerted that influence from time to time. For example, the Korean government has promoted mergers to reduce what it considers excess capacity in a particular industry and has also encouraged private companies to publicly offer their securities. Similar actions in the future could have the effect of depressing or boosting the Korean securities market, whether or not intended to do so. Accordingly, actual or perceived actions or inactions by the Korean government may cause sudden movements in the market prices of the securities of Korean companies in the future, which may affect the market price and liquidity of our common stock and ADSs.

Your dividend payments and the amount you may realize in connection with a sale of your ADSs will be affected by fluctuations in the exchange rate between the U.S. dollar and the Won.

Investors who purchase the American depositary shares will be required to pay for them in U.S. dollars. Our outstanding shares are listed on the Korea Exchange and are quoted and traded in Won. Cash dividends, if any, in respect of the shares represented by the American depositary shares will be paid to the depositary bank in Won and then converted by the depositary bank into U.S. dollars, subject to certain conditions. Accordingly, fluctuations in the exchange rate between the Won and the U.S. dollar will affect, among other things, the amounts a registered holder or beneficial owner of the American depositary shares will receive from the depositary bank in respect of dividends, the U.S. dollar value of the proceeds which a holder or owner would receive upon sale in Korea of the shares obtained upon surrender of American depositary shares and the secondary market price of the American depositary shares.

If the Government deems that certain emergency circumstances are likely to occur, it may restrict the depositary bank from converting and remitting dividends in U.S. dollars.

If the Government deems that certain emergency circumstances are likely to occur, it may impose restrictions such as requiring foreign investors to obtain prior Government approval for the acquisition of Korean securities or for the repatriation of interest or dividends arising from Korean securities or sales proceeds from disposition of such securities. These emergency circumstances include any or all of the following:

- sudden fluctuations in interest rates or exchange rates;

- extreme difficulty in stabilizing the balance of payments; and

- a substantial disturbance in the Korean financial and capital markets.

The depositary bank may not be able to secure such prior approval from the Government for the payment of dividends to foreign investors when the Government deems that there are emergency circumstances in the Korean financial markets.

ITEM 4. *INFORMATION ON THE COMPANY*

Item 4.A. History and Development of the Company

General Information

Our legal and corporate name is Korea Electric Power Corporation. We were established by the Government on December 31, 1981 as a statutory juridical corporation in Korea under the Korea Electric Power Corporation (KEPCO) Act as the successor to Korea Electric Company. Our registered office is located at 55 Jeollyeok-ro, Naju-si, Jeollanam-do, 58322, Korea, and our telephone number is 82-61-345-4213. Our website address is www.kepco.co.kr.

Our agent in the United States is Korea Electric Power Corporation, North America Office, located at 7th Floor, Parker Plaza, 400 Kelby Street, Fort Lee, NJ 07024.

The Korean electric utility industry traces its origin to the establishment of the first electric utility company in Korea in 1898. On July 1, 1961, the industry was reorganized by the merger of Korea Electric Power Company, Seoul Electric Company and South Korea Electric Company, which resulted in the formation of Korea Electric Company. From 1976 to 1981, the Government acquired the private minority shareholdings in Korea Electric Company. After the Government acquired all the remaining shares of Korea Electric Company, Korea Electric Company was dissolved, and we were incorporated in 1981 and assumed the assets and liabilities of Korea Electric Company. We ceased to be wholly owned by the Government in 1989 when the Government sold 21% of our common stock. As of February 7, 2019, the last day on which our shareholders registry was closed, the Government maintained 51.1% ownership in aggregate of our common shares by direct holdings by the Government and indirect holdings through Korea Development Bank, a statutory banking institution wholly owned by the Government.

Under relevant laws of Korea, the Government is required to own, directly or indirectly, at least 51% of our capital. Direct or indirect ownership of more than 50% of our outstanding common stock enables the Government to control the approval of certain corporate matters relating to us that require a shareholders resolution, including approval of dividends. The rights of the Government and Korea Development Bank as holders of our common stock are exercised by the Ministry of Trade, Industry and Energy, based on the Government s ownership of our common stock and a proxy received from Korea Development Bank, in consultation with the Ministry of Economy and Finance.

We operate under the general supervision of the Ministry of Trade, Industry and Energy. The Ministry of Trade, Industry and Energy, in consultation with the Ministry of Economy and Finance, is responsible for approving, subject to review by the Korea Electricity Commission, the electricity rates we charge our customers. See Item 4.B. Business Overview Sales and Customers Electricity Rates. We furnish reports to officials of the Ministry of Trade, Industry and Energy, the Ministry of Economy and Finance and other Government agencies and regularly consult with such officials on matters relating to our business and affairs. See Item 4.B. Business Overview Regulation. Our non-standing directors, who comprise a majority of our board of directors, must be appointed by the Ministry of Economy and Finance following the review and resolution of the Public Agencies Operating Committee (which is established by law and chaired by the minister of the Ministry of Economy and Finance and whose members consist of Government officials and others appointed by the President of the Republic based on recommendation by the minister of the Ministry of Economy and Finance) from a pool of candidates recommended by the director nomination committee. Our president and standing directors who concurrently serve as members of our audit committee must be appointed by the President of the Republic upon the motion of the minister of the Ministry of Trade, Industry and Energy (in the case of our president) and the minister of the Ministry of Economy and Finance (in the case of our standing director who concurrently serves as a member of the audit committee) and following the nomination by our director nomination committee, the review and resolution of the Public Agencies Operating Committee and an approval at the general meeting of shareholders. See Item 6.A. Directors and Senior Management Board of Directors and Item 16G. Corporate Governance The Act on the Management of Public Institutions).

Item 4.B. Business Overview

Introduction

We are an integrated electric utility company engaged in the transmission and distribution of substantially all of the electricity in Korea. Through our six wholly-owned generation subsidiaries, we also generate the substantial majority of electricity produced in Korea. As of December 31, 2018, we and our generation subsidiaries owned approximately 68.3% of the total electricity generation capacity in Korea (excluding plants generating electricity primarily for private or emergency use). In 2018, we sold to our customers 526,149 gigawatt-hours of electricity. We purchase electricity principally from our generation subsidiaries and, to a lesser extent, from independent power producers. Of the 536,287 gigawatt-hours of electricity we purchased in 2018, 24.6% was generated by KHNP, our wholly-owned nuclear and hydroelectric power generation subsidiary, 49.4% was generated by our wholly-owned five non-nuclear generation subsidiaries and 26.0% was generated by independent power producers that trade electricity to us through the cost-based pool system of power trading (excluding independent power producers that supply electricity under power purchase agreements with us). Our five non-nuclear generation subsidiaries are KOSEP, KOMIPO, KOWEPO, KOSPO and EWP, each of which is wholly owned by us and is incorporated in Korea. We derive substantially all of our revenues and profit from Korea, and substantially all of our assets are located in Korea.

In 2018, we had sales of Won 60,033 billion and net loss of Won 1,175 billion, compared to sales of Won 59,336 billion and net profit of Won 1,441 billion in 2017.

Our revenues are closely tied to demand for electricity in Korea. Demand for electricity in Korea increased at a compounded average growth rate of 2.1% per annum from 2014 to 2018, compared to the real gross domestic product, or GDP, which increased at a compounded average growth rate of 3.0% during the same period, according to the Bank of Korea. During 2018, the GDP growth rate was 2.7%, which was in tandem with the growth in demand for electricity in Korea during the same year, which also grew by 3.6%.

Strategy

As our overall strategy, we seek to become a leading global energy enterprise by actively responding to the market s demand for a stable supply of clean, safe, affordable and convenient source of energy. To this end, we plan to develop key competencies needed for digital transformation of our operations and energy transition. We also aim to strengthen competitiveness in our core operations and to develop new businesses and markets by focusing on low-carbon and renewable energy projects. We evaluate and renew our mid- to long-term strategy every three years, and in 2019 established the Vision 2030 Mid- to Long-Term Strategy. Under this vision, we will aim for sustainable growth of our operations through the supply of clean energy as well as a balanced new industry initiatives with growth potential.

Expand clean energy and stabilize electricity supply and demand. We plan to contribute to the Government s Nationally Determined Contributions (NDCs) by reducing carbon emissions from our generation subsidiaries and leading large-scale projects to promote the use of renewable energy. In addition, we will focus on ensuring smooth and stable connection for the renewable energy as part of our energy networks. We will also seek to enhance the efficiency of our electricity networks through the use of advanced technology.

Enhance sales profitability and competitiveness. We will seek to become a market leader through the development of customized tariffs and new services. We will also maintain profitability through the cost-based tariff system and improve the demand-side efficiency to streamline energy use at the national level.

Explore convergence-based new businesses and markets. We plan to selectively focus on and pursue profitable new businesses through in-depth market analysis (considering the market environment and our capabilities) to build a business ecosystem. In connection with our overseas business, we plan to explore opportunities to develop low-carbon, renewable energy to expand our market and to diversify our portfolio and provide suitable solutions meeting the different needs of various countries.

We will focus on R&D and commercialization of technologies essential to achieving our strategy. We will also create a platform for developing new businesses and enhance the efficiency of our operations based on digital technology.

In order to develop a management system suitable for sustainable growth, we will continue to develop sound corporate governance, financial structure and human resources. In addition, we will continue to implement the environment, health and safety management system and focus on fostering shared social values and growth with local communities.

Government Ownership and Our Interactions with the Government

The KEPCO Act requires that the Government own at least 51% of our capital stock. Direct or indirect ownership of more than 50% of our outstanding common stock enables the Government to control the approval of certain corporate matters which require a shareholders resolution, including approval of dividends. The rights of the Government and Korea Development Bank as holders of our common stock are exercised by the Ministry of Trade, Industry and Energy in consultation with the Ministry of Economy and Finance. We are currently not aware of any plans of the Government to cease to own, directly or indirectly, at least 51% of our outstanding common stock.

We play an important role in the implementation of the Government s national energy policy, which is established in consultation with us, among other parties. As an entity formed to serve public policy goals of the Government, we seek to maintain a fair level of profitability and strengthen our capital base in order to support the growth of our business in the long term.

The Government, through its various policy initiatives for the Korean energy industry as well as direct and indirect supervision of us and our industry, plays an important role in our business and operations. Most importantly, the electricity tariff rates we charge to our customers are regulated by the Government taking into account, among others, our needs to recover the costs of operations, make capital investments and recoup a fair return on capital invested by us, as well as the Government s overall policy considerations, such as inflation. See Item 4.B. Business Overview Sales and Customers Electricity Rates.

In addition, pursuant to the Basic Plan determined by the Government, we and our generation subsidiaries have made, and plan to make, substantial expenditures for the construction of generation plants and other facilities to meet demand for electric power. See Item 5.B. Liquidity and Capital Resources Capital Requirements.

Restructuring of the Electric Power Industry in Korea

On January 21, 1999, the Ministry of Trade, Industry and Energy published the Restructuring Plan. The overall objectives of the Restructuring Plan consisted of: (i) introducing competition and thereby increasing efficiency in the Korean electric power industry, (ii) ensuring a long-term, inexpensive and stable electricity supply, and (iii) promoting consumer convenience through the expansion of consumer choice.

The following provides further details relating to the Restructuring Plan.

Phase I

During Phase I, which served as a preparatory stage for Phase II and lasted from the announcement of the Restructuring Plan in January 1999 until April 2001, we undertook steps to split our generation business units off into one wholly-owned nuclear generation subsidiary (namely, KHNP) and five wholly-owned non-nuclear generation subsidiaries (namely, KOSEP, KOMIPO, KOWEPO, KOSPO and EWP), each with its own management structure, assets and liabilities. These steps were completed upon approval at our shareholders meeting in April 2001.

The Government s principal objectives in the split-off of the generation units into separate subsidiaries were to: (i) introduce competition and thereby increase efficiency in the electricity generation industry in Korea, and (ii) ensure a stable supply of electricity in Korea.

Following the implementation of Phase I, we have substantial monopoly with respect to the transmission and distribution of electricity in Korea.

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While our ownership percentage of our generation subsidiaries will depend on further adjustments to the Restructuring Plan to be adopted by the Government, we plan to retain 100% ownership of our transmission and distribution business.

Phase II

At the outset of Phase II in April 2001, the Government introduced a cost-based competitive bidding pool system under which we purchase power from our generation subsidiaries and other independent power producers for transmission and distribution to customers. For a further description of this system, see Purchase of Electricity Cost-based Pool System below.

Pursuant to the Electric Utility Act amended in December 2000, the Government established the Korea Power Exchange in April 2001. The primary function of the Korea Power Exchange is to deal with the sale of electricity and implement regulations governing the electricity market to allow for electricity distribution through a competitive bidding process. The Government also established the Korea Electricity Commission in April 2001 to regulate the Korean electric power industry and ensure fair competition among industry participants. To facilitate this goal, the Korea Power Exchange established the Electricity Market Rules relating to the operation of the bidding pool system. To amend the Electricity Market Rules, the Korea Power Exchange must have the proposed amendment reviewed by the Korea Electricity Commission and then obtain the approval of the Ministry of Trade, Industry and Energy.

The Korea Electricity Commission s main functions include implementation of standards and measures necessary for electricity market operation and review of matters relating to licensing participants in the Korean electric power industry. The Korea Electricity Commission also acts as an arbitrator in tariff-related disputes among participants in the Korean electric power industry and investigates illegal or deceptive activities of the industry participants.

Privatization of Generation Subsidiaries

In April 2002, the Ministry of Trade, Industry and Energy released the basic privatization plan for five of our generation subsidiaries other than KHNP. Pursuant to this plan, we commenced the process of selling our equity interest in KOSEP in 2002. According to the original plan, this process was, in principle, to take the form of a sale of management control, potentially supplemented by an initial public offering as a way of broadening the investor base. In November 2003, KOSEP submitted its application to the Korea Exchange for a preliminary screening review, which was approved in December 2003. However, in June 2004, KOSEP made a request to the Korea Exchange to delay its stock listing due to unfavorable stock market conditions at that time.

In accordance with the Proposal for Adjustment of Functions of Public Institutions (Energy Sector) announced by the Government in June 2016, we considered a sale in the public market of a minority of our shares in our five non-nuclear generation subsidiaries, KEPCO KDN and KHNP gradually. However, the planned sales have been put on hold, primarily due to prevailing market conditions. In any event, we plan to maintain a controlling stake in each of these subsidiaries.

Suspension of the Plan to Form and Privatize Distribution Subsidiaries

In 2003, the Government established a Tripartite Commission consisting of representatives of the Government, leading businesses and labor unions in Korea to deliberate on ways to introduce competition in electricity distribution, such as by forming and privatizing new distribution subsidiaries. In 2004, the Tripartite Commission recommended not pursuing such privatization initiatives but instead creating independent business divisions within us to improve operational efficiency through internal competition. Following the adoption of such recommendation by the

Government in 2004 and further studies by Korea Development Institute, in 2006 we created nine strategic business units (which, together with our other business units, were subsequently restructured into 14 such units in February 2012) that have a greater degree of autonomy with respect to management, financial accounting and performance evaluation while having a common focus on increasing profitability.

Initiatives to Improve the Structure of Electricity Generation

In August 2010, the Ministry of Trade, Industry and Energy announced the Proposal for Improvement in the Structure of the Electric Power Industry in order to resolve uncertainty related to restructuring plans for the electric power industry and maintain competitiveness of the electric power industry. Key initiatives of the proposal included the following: (i) maintain the current structure of having six generation subsidiaries and designate the six generation subsidiaries as market-oriented public enterprises under the Act on the Management of Public Institutions in order to foster competition among the generation subsidiaries and promote efficiency in their operations, (ii) clarify the scope of the business of us and the six generation subsidiaries (namely, that we shall manage the financial structure and governance of the six generation subsidiaries and nuclear power plant and overseas resources development projects, while the six generation subsidiaries will have greater autonomy with respect to construction and management of generation units and procurement of fuel), (iii) create a nuclear power export business unit to systematically enhance our capabilities to win projects involving the construction and operation of nuclear power plants overseas, (iv) further rationalize the electricity tariff by adopting a fuel-cost based tariff system in 2011 and a voltage-based tariff system in a subsequent year, and (v) create separate accounting systems for electricity generation, transmission, distribution and sales with the aim of introducing competition in electricity sales in the intermediate future.

In January 2011, the Ministry of Economy and Finance created a joint cooperation unit consisting of officers and employees selected from the five thermal power generation subsidiaries in order to reduce inefficiencies in areas such as fuel transportation, inventories, materials and equipment and construction, etc. and allow the thermal power generation subsidiaries to continue utilizing the benefits of economy of scale after split off of our generation business units into separate subsidiaries. The purpose of the joint cooperation unit was to give greater autonomy to the generation subsidiaries with regard to power plant construction and management and fuel procurements, and thereby enhance efficiency in operating power plants. The main functions of the joint cooperation unit are as follows: (i) maintain inventories of bituminous coal through volume exchanges and joint purchases, (ii) reduce shipping and demurrage expenses through joint operation and distribution of dedicated vessels, (iii) reduce costs by sharing information on generation material inventories and (iv) sharing human resources among the five thermal power generation subsidiaries for construction projects, among other things.

Furthermore, in January 2011 the six generation subsidiaries were officially designated as market-oriented public enterprises, whereupon the President of Korea appoints the president and the statutory auditor of each such subsidiary; the selection of non-standing directors of each such subsidiary is subject to approval by the minister of the Ministry of Economy and Finance; the president of each such subsidiary is required to enter into a management contract directly with the minister of the Ministry of Trade, Industry and Energy; and the Public Enterprise Management Evaluation Team which is established by the Public Agencies Operating Committee conducts performance evaluation of such subsidiaries. Previously, our president appointed the president and the statutory auditor of each such subsidiary; the selection of non-standing directors of each such subsidiary was subject to approval by our president; the president of each such subsidiary entered into a management contract with our president; and our evaluation committee conducted performance evaluation of such subsidiaries. For further details of the impact of the designation of our generation subsidiaries as market-oriented public enterprises, see Item 16G. Corporate Governance The Act on the Management of Public Institutions.

Proposal for Adjustment of Functions of Public Institutions (Energy Sector)

In June 2016, the Government announced the Proposal for Adjustment of Functions of Public Institutions (Energy Sector) for the purpose of streamlining the operations of government-affiliated energy companies by discouraging them from engaging in overlapping or similar businesses with each other, reducing non-core assets and activities and improving management and operational efficiency. The initiatives contemplated in this proposal that would affect us and our generation subsidiaries include the following: (i) the generation companies should take on greater responsibilities in overseas resource exploration and production projects as these involve procurement of fuels necessary for electricity generation while fostering cooperation among each other through closer coordination, (ii) KHNP should take a greater role in export of nuclear technology, and (iii) the current system of retail sale of electricity to end-users should be liberalized to encourage more competition. In accordance therewith, we transferred a substantial portion of our assets and liabilities in our overseas resource business to our generation subsidiaries as of December 31, 2016. In addition, this Proposal contemplated selling a minority stake in our generation subsidiaries and KEPCO KDN, but the planned sales have been put on hold, as discussed above in Privatization of Generation Subsidiaries.

Purchase of Electricity

Cost-based Pool System

Since April 2001, the purchase and sale of electricity in Korea is required to be made through the Korea Power Exchange, which is a statutory not-for-profit organization established under the Electric Utility Act with responsibilities for setting the price of electricity, handling the trading and collecting relevant data for the electricity market in Korea. The suppliers of electricity in Korea consist of our six generation subsidiaries, which were split-off from us in April 2001, and independent power producers, which numbered 19 (excluding renewable energy producers) as of December 31, 2018. We distribute electricity purchased through the Korea Power Exchange to end users.

Our Relationship with the Korea Power Exchange

The key features of our relationships with the Korea Power Exchange include the following: (i) we and our six generation subsidiaries are member corporations of the Korea Power Exchange and collectively own 100% of its share capital, (ii) three of the 11 members of the board of directors of the Korea Power Exchange are currently our or our subsidiaries employees, and (iii) one of our employees is currently a member in three of the key committees of the Korea Power Exchange that are responsible for evaluating the costs of producing electricity, making rules for the Korea Power Exchange and gathering and disclosing information relating to the Korean electricity market.

Notwithstanding the foregoing relationships, however, we do not have control over the Korea Power Exchange or its policies since, among others, (i) the Korea Power Exchange, its personnel, policies, operations and finances are closely supervised and controlled by the Government, namely through the Ministry of Trade, Industry and Energy, and are subject to a host of laws and regulations, including, among others, the Electric Utility Act and the Act on the Management of Public Institutions, as well as the Articles of Incorporation of the Korea Power Exchange, (ii) we are entitled to elect no more than one-third of the Korea Power Exchange directors and our representatives represent only a minority of its board of directors and committees (with the other members being comprised of representatives of the Ministry of Trade, Industry and Energy, employees of the Korea Power Exchange, businesspersons and/or scholars), and (iii) the role of our representatives in the policy making process for the Korea Power Exchange is primarily advisory based on their technical expertise derived from their employment at us or our generation subsidiaries. Consistent with this view, the Finance Supervisory Service issued a ruling in 2005 that stated that we are not deemed to have significant influence or control over the decision-making process of the Korea Power Exchange relating to its business or financial affairs.

Pricing Factors

The price of electricity in the Korean electricity market is determined principally based on the cost of generating electricity using a system known as the cost-based pool system. Under the cost-based pool system,

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the price of electricity has two principal components, namely the marginal price (representing in principle the variable cost of generating electricity) and the capacity price (representing in principle the fixed cost of generating electricity).

Under the merit order system, the electricity purchase allocation, the system marginal price (as described below) and the final allocation adjustment are automatically determined based on an objective formula. The variable cost (including the adjusted coefficient as described below) and the capacity price are determined in advance of trading by the Cost Evaluation Committee, which is comprised of representatives from the Ministry of Trade, Industry and Energy, the Korea Power Exchange, us, generation companies, scholars and researchers. Accordingly, a supplier of electricity cannot exercise control over the merit order system or its operations to such supplier s strategic advantage.

Marginal Price

The primary purpose of the marginal price is to compensate the generation companies for fuel costs, which represents the principal component of the variable costs of generating electricity. We currently refer such marginal price as the system marginal price.

The system marginal price represents, in effect, the marginal price of electricity at a given hour at which the projected demand for electricity and the projected supply of electricity for such hour intersect, as determined by the merit order system, which is a system used by the Korea Power Exchange to allocate which generation units will supply electricity for which hour and at what price. To elaborate, the projected demand for electricity for a given hour is determined by the Korea Power Exchange based on a forecast made one day prior to trading, and such forecast takes into account, among others, historical statistics relating to demand for electricity nationwide by day and by hour, seasonality and on-peak-hour versus off-peak hour demand analysis. The projected supply of electricity at a given hour is determined as the aggregate of the available capacity of all generation units that have submitted bids to supply electricity for such hour. These bids are submitted to the Korea Power Exchange one day prior to trading.

Under the merit order system, the generation unit with the lowest variable cost of producing electricity among all the generation units that have submitted a bid for a given hour is first awarded a purchase order for electricity up to the available capacity of such unit as indicated in its bid. The generation unit with the next lowest variable cost is then awarded a purchase order up to its available capacity in its bid, and so forth, until the projected demand for electricity for such hour is met. We refer to the variable cost of the generation unit that is the last to receive the purchase order for such hour as the system marginal price, which also represents the highest price at which electricity can be supplied at a given hour based on the demand and supply for such hour. Generation units whose variable costs exceed the system marginal price for a given hour do not receive purchase orders to supply electricity for such hour. The variable cost of each generation unit is determined by the Cost Evaluation Committee on a monthly basis and reflected in the following month based on the fuel costs two months prior to such determination. The purpose of the merit order system is to encourage generation units to reduce its electricity generation costs by making its generation process more efficient, sourcing fuels from most cost-effective sources or adopting other cost savings programs.

The final allocation of electricity supply is further adjusted on the basis of other factors, including the proximity of a generation unit to the geographical area to which power is being supplied, network and fuel constraints and the amount of power loss. This adjustment mechanism is designed to adjust for transmission losses in order to improve overall cost-efficiency in the transmission of electricity to end-users.

The price of electricity at which our generation subsidiaries sell electricity to us is determined using the following formula:

Variable cost + [System marginal price Variable cost] * Adjusted coefficient

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An adjusted coefficient applies in principle to all generation units operated by our generation subsidiaries and the coal-fired generation units operated by independent power producers. The adjusted coefficient applicable to the generation units operated by our generation subsidiaries is determined based on considerations of, among others, electricity tariff rates, the differential generation costs for different fuel types and the relative fair returns on investment in respect of us compared to our generation subsidiaries. The purpose of the adjusted coefficient here is to prevent electricity trading from resulting in undue imbalances as to the relative financial results among generation subsidiaries as well as between us (as the purchaser of electricity) and our generation subsidiaries (as sellers of electricity). Such imbalances may arise from excessive profit taking by base load generators (on account of their inherently cheaper fuel cost structure compared to non-base load generators) as well as from fluctuations in fuel prices (it being the case that during times of rapid and substantial rises in fuel costs which are not offset by corresponding rises in electricity tariff rates charged by us to end-users, on a non-consolidated basis our profitability will decline compared to that our generation subsidiaries since our generation subsidiaries are entitled to sell electricity to us at cost plus a guaranteed margin). In comparison, the adjusted coefficient applicable to the coal-fired generation units operated by independent power producers is determined to enable such independent power producers to recover the total costs of building and operating such units.

The adjusted coefficient applicable to our generation subsidiaries is currently set at the highest level for the marginal price of electricity generated using nuclear fuel, followed by coal and (depending the prevailing relative market prices) oil and/or LNG. The differentiated adjusted coefficients reflect the Government s prevailing energy policy objectives and have the effect of setting priorities in the fuel types to be used in electricity generation.

The adjusted coefficient is determined by the Cost Evaluation Committee in principle on an annual basis, although in exceptional cases driven by external or structural factors such as rapid and substantial changes in fuel costs, adjustments to electricity tariff rates or changes in the electricity pricing structure, the adjusted coefficient may be adjusted on a quarterly basis.

Previously, it was contemplated that the vesting contract system would gradually replace the application of the adjusted coefficient. However, since the implementation of the vesting contract system has been suspended indefinitely, it is unlikely to impact the application of the adjusted coefficient in the foreseeable future.

Capacity Price

In addition to payment in respect of the variable cost of generating electricity, generation units receive payment in the form of capacity price, the purpose of which is to compensate them for the fixed costs of constructing generation facilities, provide incentives for construction of new generation units and maintain reliability of the nationwide electricity transmission network.

The capacity price is determined by the Cost Evaluation Committee as a function of the following factors: (i) reference capacity price, (ii) reserve capacity factor, (iii) time-of-the-day capacity coefficient and (iv) since October 2016, fuel switching factor. The time-of-the-day capacity coefficient are determined annually before the end of December for the subsequent 12-months period. The reference capacity price, reserve capacity factor and the fuel switching factor are determined annually before the end of June for the subsequent 12-months period.

The reference capacity price refers to the Won amount per kilowatt-hour payable annually for annualized available capacity indicated in the bids submitted the day before trading (provided that such capacity is actually available on the relevant day of trading), and is determined based on the construction costs and maintenance costs of a standard generation unit and related transmission access facilities, and a base rate for loading electricity. Prior to October 2016, the same reference capacity price applied uniformly to all generation units. Since October 2016, the reference capacity price applies differentially to each generation unit depending on the start year of its commercial operation. Accordingly, the reference capacity price currently ranges from Won 9.17 to 10.07 per kilowatt hour.

The reserve capacity factor relates to the requirement to maintain a standard capacity reserve margin in the range of 15% in order to prevent excessive capacity build-up as well as induce optimal capacity investment at the regional level. The capacity reserve margin is the ratio of peak demand to the total available capacity. Under this system, generation units in a region where available capacity is insufficient to meet demand for electricity as evidenced by failing to meet the standard capacity reserve margin receive increased capacity price. Conversely, generation units in a region where available capacity exceeds demand for electricity as evidenced by exceeding the standard capacity reserve margin receive reduced capacity price. Since October 2016, the reserve capacity factor also factors in the transmission loss per generation unit in order to favor transmission of electricity from a nearby generation unit.

The time-of-the-day capacity coefficient allows hourly and seasonal adjustments in order to incentivize our generation subsidiaries to operate their generation facilities at full capacity during periods of highest demand. For example, the capacity price paid differs depending on whether the relevant hour is an on-peak hour, a mid-peak hour or an off-peak hour (the capacity price being highest for the on-peak hours and lowest for the off-peak hours) and the capacity price paid is highest during the months of January, July and August when electricity usage is highest due to weather conditions.

The fuel switching factor, which was introduced in October 2016 to promote environmental sensitivities to climate change, seeks to encourage reduced carbon emission by penalizing generation units (mostly coal-fired units) for excessive carbon emission.

Other than subject to the aforementioned variations, the same capacity pricing mechanism applies to all generation units regardless of fuel types used.

Vesting Contract System

In May 2014, the Electric Utility Act was amended to introduce a vesting contract system in determining the price and quantity of electricity to be sold and purchased between the purchaser of electricity (namely, us) and the sellers of electricity (namely, our generation subsidiaries and independent power producers). Under the vesting contract system, electricity generators using base load fuels (such as nuclear, coal, hydro and by-product gas) at a particular generation unit were to be required to enter into a contract with the purchaser of electricity (namely, us), which specifies, among other things, the quantity of electricity to be generated and sold at a particular generation unit and the price at which such electricity is sold, subject to certain adjustments.

The vesting contract system was introduced principally to prevent excessive profit-taking by low-cost producers of electricity using base load fuels (such as nuclear, coal, hydro and by-product gas) by replacing the adjusted coefficient as the basis for determining the guaranteed return to generation companies, as well as to enhance the stability of electricity supply by requiring long-term contractual arrangements for the purchase and sale of electricity and promote cost savings, productivity enhancements and operational efficiency by providing incentives and penalties depending on the degree to which the generation companies could supply electricity at costs below the contracted electricity prices.

In order to minimize undue shock to the electricity trading market in Korea, the vesting contract system was to be implemented in phases starting with by-product gas-based electricity in 2015, which accounted for 1.8% of electricity purchased by us during such year. The rollout of the vesting contract system was further studied by a task force consisting of representatives from the Government, the Korea Power Exchange and generation companies.

Following such study, the Government announced in June 2016 that, due to changes in the electricity business environment (including an increase in generation capacity relative to peak usage, reduced fuel costs following a decline in oil prices and greater environmental concerns related to coal-fired electricity generation), it will indefinitely suspend any further rollout of the vesting contract system beyond by-product gas-based electricity, and revert to the adjusted coefficient-based electricity pricing adjustment mechanism.

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Power Trading Results

The results of power trading, as effected through the Korea Power Exchange, for our generation subsidiaries and independent power producers in 2018 are as follows:

	Items	Volume (Gigawatt hours)	Percentage of Total Volume (%)	Sales to KEPCO[2] (in billions of Won)	Percentage of Total Sales (%)	Unit Price (Won/kWh)
Generation Companies	KHNP	131,931	24.6	8,889	17.6	67.38
	KOSEP	64,128	12.0	5,793	11.4	90.33
	KOMIPO	45,569	8.5	4,355	8.6	95.57
	KOWEPO	49,222	9.2	5,020	9.9	101.99
	KOSPO	55,525	10.3	5,700	11.2	102.65
	EWP	50,697	9.4	5,157	10.2	101.72
	Others[1]	139,215	26.0	15,770	31.1	113.28
	Total	536,287	100.0	50,684	100.0	94.51
Energy Sources	Nuclear	126,883	23.7	7,889	15.6	62.18
	Bituminous coal	226,585	42.2	18,793	37.1	82.94
	Anthracite coal	2,420	0.5	258	0.5	106.49
	Oil	6,834	1.3	1,185	2.3	173.37
	LNG/Combined-cycle	144,039	26.9	17,485	34.5	121.39
	Renewables	22,165	4.1	2,161	4.3	97.50
	Hydro	2,762	0.5	302	0.6	109.36
	Pumped storage	3,891	0.7	490	1.0	125.81
	RPS		0.0	2,054	4.0	190.14
	Others	708	0.1	67	0.1	96.25
	Total	536,287	100.0	50,684	100.0	94.51
Load	Base load	355,887	66.4	26,940	53.2	75.70
	Non-base load	180,400	33.6	23,744	46.8	131.62
	Total	536,287	100.0	50,684	100.0	94.51

Note:

(1) Others represent independent power producers that trade electricity through the cost-based pool system of power trading (excluding independent power producers that supply electricity under power purchase agreements with us).

(2) Based on the payment made by us through Korea Power Exchange.

Power Purchased from Independent Power Producers Under Power Purchase Agreements

In 2018, we purchased an aggregate of 11,805 gigawatt hours of electricity generated by independent power producers under existing power purchase agreements. These independent power producers had an aggregate generation capacity of 6,474 megawatts as of December 31, 2018.

Power Generation

As of December 31, 2018, we and our generation subsidiaries had a total of 640 generation units, including nuclear, thermal, hydroelectric and internal combustion units, representing total installed generation capacity of 81,362 megawatts. Our thermal units produce electricity using steam turbine generators fired by coal, oil and LNG. Our internal combustion units use oil or diesel-fired gas turbines and our combined-cycle units are primarily LNG-fired. We also purchase power from several generation plants not owned by our generation subsidiaries.

The table below sets forth as of and for the year ended December 31, 2018 the number of units, installed capacity and the average capacity factor for each type of generating facilities owned by our generation subsidiaries.

	Number of Units	Installed Capacity(1) (Megawatts)	Average Capacity Factor(2) (Percent)
Nuclear	23	21,850	65.9
Thermal:			
Coal	59	34,218	74.4
Oil	11	2,950	22.2
LNG			
Total thermal	70	37,168	70.2
Internal combustion	214	339	17.8
Combined-cycle(3)	110	15,726	34.0
Integrated gasification combined cycle(4)	1	346	56.1
Hydro	58	5,352	11.1
Wind	14	140	15.9
Solar	128	151	13.9
Fuel cell	18	121	49.9
Biogas	3	160	70.7
Others(5)	1	9	75.0
Total	640	81,362	58.7

Notes:

(1) Installed capacity represents the level of output that may be sustained continuously without significant risk of damage to plant and equipment.

(2) Average capacity factor represents the total number of kilowatt hours of electricity generated in the indicated period divided by the total number of kilowatt hours that would have been generated if the generation units were continuously operated at installed capacity, expressed as a percentage.

(3) Involves generation through gas and oil.

(4) Involves generation through coal and gasified coal.

(5) Includes waste-to-energy.

The expected useful life of a unit, assuming no substantial renovation, is approximately as follows: nuclear, over 40 years; thermal, over 30 years; internal combustion, over 25 years; and hydroelectric, over 55 years. Substantial renovation can extend the useful life of thermal units by up to 20 years.

We seek to achieve efficient use of fuels and diversification of generation capacity by fuel type. In the past, we relied principally upon oil-fired thermal generation units for electricity generation. Since the oil shock in 1974, however, Korea s power development plans have emphasized the construction of nuclear generation units. While nuclear units are more expensive to construct than thermal generation units of comparable capacity, nuclear fuel is less expensive than fossil fuels in terms of electricity output per unit cost. However, efficient operation of nuclear units requires that such plants be run continuously at relatively constant energy output levels. As it is impractical to store large quantities of electrical energy, we seek to maintain nuclear power production capacity at approximately the level at which demand for electricity is continuously stable. During those times when actual demand exceeds the usual level of electricity supply from nuclear power, we rely on units fired by fossil fuels and hydroelectric units, which can be started and shut down more quickly and efficiently than nuclear units, to meet the excess demand. Bituminous coal is currently the least expensive thermal fuel per kilowatt-hour of electricity produced, and therefore we seek to maximize the use of bituminous coal for generation needs in excess of the stable demand level, except for meeting short-term surges in demand which require rapid start-up and shutdown. Thermal units fired by LNG, hydroelectric units and internal combustion units are the most efficient types of units for rapid start-ups and shutdowns, and therefore we use such units principally to meet short-term surges in demand. Anthracite coal is a less efficient fuel source than bituminous coal in terms of electricity output per unit cost.

Our generation subsidiaries have constructed and operated thermal and internal combustion units in order to help meet power demand. Subject to market conditions, our generation subsidiaries plan to continue to add additional thermal and internal combustion units. These units generally take less time to complete construction than nuclear units.

The high average age of our oil-fired thermal units is attributable to our reliance on oil-fired thermal units as the primary means of electricity generation until mid-1970s. Since then, we have diversified our fuel sources and constructed relatively few oil-fired thermal units compared to units of other fuel types.

The table below sets forth, for the periods indicated, the amount of electricity generated by facilities linked to our grid system and the amount of power used or lost in connection with transmission and distribution.

	2014	**2015**	**2016**	**2017**	**2018**	**% of 2018 Gross Generation[1]**
	(in gigawatt hours, except percentages)					
Electricity generated by us and our generation subsidiaries:						
Nuclear	156,407	164,762	161,995	148,426	133,505	23.4
Coal	203,765	207,533	207,912	227,186	222,818	39.0
Oil	6,838	8,822	13,055	5,242	5,845	1.0
LNG	568	222	369	220		
Internal combustion	656	633	573	496	528	0.1
Combined-cycle	68,134	45,923	46,477	36,957	46,780	8.2
Hydro	5,976	4,424	4,835	5,263	5,187	0.9
Wind	148	181	186	209	195	0.03
Solar, fuel cells and others	422	420	908	2,485	3,469	0.6
Total generation by us and our generation subsidiaries	442,914	432,920	436,310	426,484	418,327	73.3
Electricity generated by IPPs:						
Thermal	63,088	72,316	83,789	103,745	125,830	22.1
Hydro and other renewable	15,968	17,106	20,342	23,238	26,490	4.6
Total generation by IPPs	79,056	89,422	104,131	126,983	152,320	26.7
Gross generation	521,970	522,343	540,441	553,467	570,647	100
Auxiliary use[2]	20,610	21,293	21,605	22,279	22,309	3.9
Pumped-storage[3]	6,644	4,824	4,716	5,477	5,106	0.9
Total net generation[4]	494,716	496,226	514,120	525,711	543,232	95.2

Transmission and distribution losses[5]	18,270	18,063	18,475	18,790	19,359	3.56

IPPs = Independent power producers

Notes:

(1) Unless otherwise indicated, percentages are based on gross generation.
(2) Auxiliary use represents electricity consumed by generation units in the course of generation.
(3) Pumped storage represents electricity consumed during low demand periods in order to store water which is utilized to generate hydroelectric power during peak demand periods.
(4) Total net generation represents gross generation minus auxiliary and pumped-storage use.

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(5) Transmission and distribution losses represents total transmission and distribution losses divided by total net generation.

The table below sets forth our total capacity at the end of, and peak and average loads during, the indicated periods.

	2014	2015	2016	2017	2018
			(Megawatts)		
Total capacity	93,216	94,102	100,180	116,657	117,205
Peak load	80,154	78,790	85,183	85,133	92,478
Average load	59,586	60,284	61,694	63,188	65,142

Korea Hydro & Nuclear Power Co., Ltd.

We commenced nuclear power generation activities in 1978 when our first nuclear generation unit, Kori #1, began commercial operation. On April 2, 2001, all of our nuclear and hydroelectric power generation assets and liabilities were transferred to KHNP.

KHNP owns and operates 23 nuclear generation units at four power plant complexes in Korea, located in Kori, Wolsong, Yonggwang (Hanbit) and Ulchin (Hanul), 51 hydroelectric generation units including 16 pumped storage hydro generation units as well as ten solar generation units and one wind generation unit as of December 31, 2018.

The table below sets forth the number of units and installed capacity as of December 31, 2018 and the average capacity factor by types of generation units in 2018.

	Number of Units	Installed Capacity(1) (Megawatts)	Average Capacity Factor(2) (Percent)
Nuclear	23	21,850	65.9
Hydroelectric	51	5,307	11.2
Solar	10	21	14.86
Wind	1	1	6.1
Total	85	27,179	

Notes:

(1) Installed capacity represents the level of output that may be sustained continuously without significant risk of damage to plant and equipment.

(2) Average capacity factor represents the total number of kilowatt hours of electricity generated in the indicated period divided by the total number of kilowatt hours that would have been generated if the generation units were continuously operated at installed capacity, expressed as a percentage.

KHNP commenced commercial operation of Shin-Kori #3, with a 1,400 megawatt capacity, in December 2016. KHNP is currently building five additional nuclear generation units, three at the Shin-Kori and two at Shin-Hanul sites, each with a 1,400 megawatt capacity. KHNP expects to complete these units between 2019 and 2024. In June 2018, the board of directors of KHNP decided to retire Wolsong #1 unit earlier than planned due to the unit s economic inefficiency. The initial phase of the decommissioning of Kori #1, which primarily involves safety inspections and the removal of spent fuels, has begun after its permanent shutdown in June 2017.

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Nuclear

The table below sets forth certain information with respect to the nuclear generation units of KHNP as of December 31, 2018.

Unit(5)	Reactor Type(1)	Reactor Design(2)	Turbine and Generation(3)	Commencement of Operations	Installed Capacity (Megawatts)	Average Capacity Factor(4) (%)
Kori-2	PWR	W	GEC	1983	650	47.9
Kori-3	PWR	W	GEC, Hitachi	1985	950	63.4
Kori-4	PWR	W	GEC, Hitachi	1986	950	71.5
Shin-Kori-1	PWR	D, KEPCO E&C, W	D, GE	2011	1,000	80.7
Shin-Kori-2	PWR	D, KEPCO E&C, W	D, GE	2012	1,000	79.0
Shin-Kori-3	PWR	D, KEPCO E&C, W	D, GE	2016	1,400	48.7
Wolsong-2	PHWR	AECL, H, K	H, GE	1997	700	83.3
Wolsong-3	PHWR	AECL, H	H, GE	1998	700	73.6
Wolsong-4	PHWR	AECL, H	H, GE	1999	700	83.1
Shin-Wolsong-1	PWR	D, KEPCO E&C, W	D, GE	2012	1,000	80.4
Shin-Wolsong-2	PWR	D, KEPCO E&C, W	D, GE	2015	1,000	77.2
Hanbit-1	PWR	W	W, D	1986	950	62.4
Hanbit-2	PWR	W	W, D	1987	950	53.7
Hanbit-3	PWR	H, CE, K	H, GE	1995	1,000	35.6
Hanbit-4	PWR	H, CE, K	H, GE	1996	1,000	0.0
Hanbit-5	PWR	D, CE, W, KEPCO E&C	D, GE	2002	1,000	83.7
Hanbit-6	PWR	D, CE, W, KEPCO E&C	D, GE	2002	1,000	91.5
Hanul-1	PWR	F	A	1988	950	65.9
Hanul-2	PWR	F	A	1989	950	59.5
Hanul-3	PWR	H, CE, K	H, GE	1998	1,000	67.5
Hanul-4	PWR	H, CE, K	H, GE	1999	1,000	76.8
Hanul-5	PWR	D, KEPCO E&C, W	D, GE	2004	1,000	79.8
Hanul-6	PWR	D, KEPCO E&C, W	D, GE	2005	1,000	84.2
Total nuclear					21,850	65.9

Notes:

(1) PWR means pressurized light water reactor; PHWR means pressurized heavy water reactor.

(2) W means Westinghouse Electric Company (U.S.A.); AECL means Atomic Energy Canada Limited (Canada); F means Framatome (France); H means Hanjung; CE means Combustion Engineering (U.S.A.); D means Doosan Heavy Industries; K means Korea Atomic Energy Research Institute; KEPCO E&C means KEPCO

Engineering & Construction.

(3) GEC means General Electric Company (U.K.); P means Parsons (Canada and U.K.); W means Westinghouse Electric Company (U.S.A.); A means Alstom (France); H means Hanjung; GE means General Electric (U.S.A.); D means Doosan Heavy Industries; Hitachi means Hitachi Ltd. (Japan).

(4) The average fuel cost per kilowatt in 2018 for the entire generation units was Won 9.57 per kilowatt.

(5) Kori-1 was permanently shut down on June 18, 2017. In June 2018, the board of directors of KHNP decided to shut down Wolsong-1.

Under extended-cycle operations, nuclear units can be run continuously for periods longer than the conventional 12-month period between scheduled shutdowns for refueling and maintenance. Since 1987, we have adopted the mode of extended-cycle operations for all of our pressurized light water reactor units and plan to use it for our newly constructed units. The duration of shutdown for fuel replacement, maintenance and the evaluation period for approval to start after maintenance was 2,824.1 days in the aggregate in 2018. In addition,

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KHNP s nuclear units experienced an average of 0.17 unplanned shutdowns per unit in 2018. In the ordinary course of operations, KHNP s nuclear units routinely experience damage and wear and tear, which are repaired during routine shutdown periods or during unplanned temporary suspensions of operations. No significant damage has occurred in any of KHNP s nuclear reactors, and no significant nuclear exposure or release incidents have occurred at any of KHNP s nuclear facilities since the first nuclear plant commenced operation in 1978.

Hydroelectric

The table below sets forth certain information relating to KHNP s pumped-storage and hydroelectric business units, including the installed capacity as of December 31, 2018 and the average capacity factor in 2018.

Location of Unit	Number of Units	Classification	Year Built	Installed Capacity (Megawatts)	Average Capacity Factor (%)
Hwacheon	4	Dam waterway	1944	108.0	17.62
Chuncheon	2	Dam	1965	62.3	18.46
Euiam	2	Dam	1967	48.0	28.47
Cheongpyung	4	Dam	1943	140.1	19.37
Paldang	4	Dam	1973	120.0	22.65
Chilbo (Seomjingang)	3	Basin deviation	1945	35.4	18.00
Boseonggang	2	Basin deviation	1937	4.5	25.23
Kwoesan	2	Dam	1957	2.8	17.70
Anheung	3	Dam waterway	1978	0.4	20.17
Kangreung	2	Basin deviation	1991	82.0	0
Topyeong	1	Dam	2011	0.04	4.36
Muju	1	Dam	2003	0.4	14.62
Sancheong	2	Dam	2001	1.0	18.80
Yangyang	2	Dam	2005	1.4	10.71
Yecheon	1	Dam	2011	0.9	15.15
Cheongpeoung	2	Pumped Storage	1980	400.0	7.62
Samrangjin	2	Pumped Storage	1985	600.0	9.20
Muju	2	Pumped Storage	1995	600.0	11.83
Sancheong	2	Pumped Storage	2001	700.0	9.54
Yangyang	4	Pumped Storage	2006	1,000.0	8.85
Cheongsong	2	Pumped Storage	2006	600.0	9.62
Yecheon	2	Pumped Storage	2011	800.0	13.58
Total	51			5,307.2	11.20

Solar/Wind

The table below sets forth certain information, including the installed capacity as of December 31, 2018 and the average capacity factor in 2018, of the solar and wind power units of KHNP.

Location of Unit	Classification	Year Built	Installed Capacity (Megawatts)	Average Capacity Factor (Percent)
Yonggwang	Solar	2008	13.9	15.7
Yecheon	Solar	2012	2.0	15.9
Kori	Wind	2008	0.8	6.1
Kori	Solar	2017	5.1	15.9
Total			21.8	

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Korea Water Resources Corporation, which is a Government-owned entity, assumes full control of multi-purpose dams, while KHNP maintains the dams used for power generation. Existing hydroelectric power units have exploited most of the water resources in Korea available for commercially viable hydroelectric power generation. Consequently, we expect that no new major hydroelectric power plants will be built in the foreseeable future. Due to the ease of its start-up and shut-down mechanism, hydroelectric power generation is reserved for peak demand periods.

Korea South-East Power Co., Ltd.

The table below sets forth, by fuel type, the weighted average age and installed capacity as of December 31, 2018 and the average capacity factor and average fuel cost per kilowatt in 2018 based upon the net amount of electricity generated, of KOSEP.

	Weighted Average Age of Units (Years)	Installed Capacity (Megawatts)	Average Capacity Factor (Percent)	Average Fuel Cost per kWh (Won)
Bituminous:				
Samcheonpo #1, 2, 3, 4, 5, 6	27.4	3,240	75.6	62.39
Yeongheung #1, 2, 3, 4, 5, 6	9.5	5,080	85.9	58.33
Yeosu # 2	4.8	669	78.6	73.26
Anthracite:				
Yeongdong #1, 2	39.2	200	27.6	75.45
Combined cycle and internal Combustion:				
Bundang gas turbine #1,2,3,4,5,6,7,8; steam turbine #1, 2	25.0	922	25.8	139.52
Hydro, Solar and other renewable energy		266		168.78
Total	16.7	10,377	74.9	66.37

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Korea Midland Power Co., Ltd.

The table below sets forth, by fuel type, the weighted average age and installed capacity as of December 31, 2018 and the average capacity factor and average fuel cost per kilowatt in 2018 based upon the net amount of electricity generated, of KOMIPO.

	Weighted Average Age of Units (Years)	Installed Capacity (Megawatts)	Average Capacity Factor (Percent)	Average Fuel Cost per kWh (Won)
Bituminous:				
Boryeong #1, 2, 3, 4, 5, 6, 7, 8	23.91	4,000	73.07	60.00
Shin Boryeong #1, 2	1.46	1,945	66.17	59.14
Anthracite:				
Seocheon #1, 2(1)				
Oil-fired:				
Jeju #2, 3	18.46	150	62.45	173.75
LNG-fired:				
Seoul #5(1)				
Combined-cycle and internal combustion:				
Boryeong gas turbine #1, 2, 3, 4, 5, 6; steam turbine #1, 2, 3,	19.82	1,350.00	10.27	123.37
Incheon gas turbine #1, 2, 3, 4,5,6; steam turbine #1, 2,3	9.85	1,462.45	37.62	108.97
Jeju gas turbine #1, 2; steam turbine #1, 2	0.52	187.45	3.08	
Sejong gas turbine #1,2; steam turbine #1	5.17	530.44	78.46	107.03
Jeju Gas Turbine #3	24.58	55.00	0.93	615.87
Jeju Internal Combustion Engine #1,2	11.58	80.00	35.66	123.78
Wind:				
Yangyang #1, 2	12.58	3.00	15.14	
Sejong Maebongsan Wind	12.49	8.80	5.91	
Jeju Sangmyung Wind	2.42	21.00	18.96	
Combined heat and power:				
Wonju #1	3.67	10.00	75.22	85.62
Hydroelectric:				
Boryeong	9.86	7.50	24.82	0.26
Shin Boryeong	2.25	5.00	31.03	
Photovoltaic (PV) power and fuel cell generation:				
Boryeong (PV) site	4.45	1.74	13.93	3.13
Shin Boryeong (PV) site	2.58	2.90	14.62	
Seocheon (PV) site	11.00	1.23	13.97	
Jeju (PV) site	5.90	2.34	12.08	
Seoul (PV) site	7.42	1.30	15.43	2.52
Sejong (PV) site	1.08	0.33	14.72	
Yeosu (PV) site	6.83	2.22	15.58	
Incheon (PV) site	7.08	0.30	13.28	

Boryeong (fuel cell) site	10.33	0.30	72.92	165.68
Shin Boryeong (fuel cell) site	1.17	7.48	79.23	144.80
Total	15.04	9,836	56.52	73.00

Note:

(1) Seocheon #1 and Seocheon #2 were shut down in July 2017 and Seoul #5 was shut down in April 2017.

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Korea Western Power Co., Ltd.

The table below sets forth, by fuel type, the weighted average age and installed capacity as of December 31, 2018 and the average capacity factor and average fuel cost per kilowatt in 2018 based upon the net amount of electricity generated, of KOWEPO.

	Weighted Average Age of Units (Years)	Installed Capacity (Megawatts)	Average Capacity Factor (Percent)	Average Fuel Cost per kWh (Won)
Bituminous:				
Taean #1, 2, 3, 4, 5, 6, 7, 8, 9, 10	12.7	6,100	72.7	60.1
Oil-fired:				
Pyeongtaek #1, 2, 3, 4	37.1	1,400	10.4	132.51
Combined cycle:				
Pyeongtaek #2	4.2	868.5	57.1	102.07
Gunsan	8.6	718.4	38.5	116.09
West Incheon	26.5	1,800	20.0	114.05
Hydroelectric:				
Taean	11.3	2.2	17.5	
Solar:				
Taean	1.4	17.3	13.7	
Pyeongtaek	1.5	2.9	13.8	
West Incheon	1.5	1.2	15.2	
Gunsan	3.2	1.0	14.1	
Samryangjin	11.1	3.0	13.9	
Sejong City	6.5	4.9	14.7	
Gyeonggi-do	5.7	2.5	15.0	
Yeongam	5.8	13.3	15.4	
Fuel Cell:				
West Incheon 1	4.3	16.2	43.1	
West Incheon 2	2.6	18.0	71.2	
Wind Power:				
Hwasun	3.0	16	18.21	
Integrated gasification combined cycle:				
Taean	2.4	346.3	56.11	69.49
Total	16.5	11,332	52.0	71.86

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Korea Southern Power Co., Ltd.

The table below sets forth, by fuel type, the weighted average age and installed capacity as of December 31, 2018 and the average capacity factor and average fuel cost per kilowatt in 2018 based upon the net amount of electricity generated, of KOSPO.

	Weighted Average Age of Units (Years)	Installed Capacity (Megawatts)	Average Capacity Factor (Percent)	Average Fuel Cost per kWh (Won)
Bituminous:				
Hadong #1, 2, 3, 4, 5, 6, 7, 8	17.3	4,000	85.1	58.8
Samcheok #1	1.8	2,044	63.2	58.3
Oil-fired:				
Nam Jeju #3, 4	12.0	200	72.8	161.6
Combined cycle:				
Shin Incheon #1, 2, 3, 4	22.2	1,800	22.9	112.2
Busan #1, 2, 3, 4	15.2	1,800	51.6	105.0
Yeongwol #1	8.2	848	16.6	116.8
Hallim	22.5	105	23.9	205.9
Andong #1	4.8	362	64.1	98.9
Wind power:				
Hankyung	12.2	21	20.3	1.32
Seongsan	9.2	20	26.0	0.94
Solar	3.3	17	14.2	0.04
Small Hydropower	1.4	3	37.1	
Fuel Cell	0.7	20	77.3	139.6
Total	13.7	11,240	58.8	74.4

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Korea East-West Power Co., Ltd.

The table below sets forth, by fuel type, the weighted average age and installed capacity as of December 31, 2018 and the average capacity factor and average fuel cost per kilowatt in 2018 based upon the net amount of electricity generated, of EWP.

	Weighted Average Age of Units (Years)	Installed Capacity (Megawatts)	Average Capacity Factor (Percent)	Average Fuel Cost per kWh (Won)
Bituminous:				
Dangjin #1, 2, 3, 4, 5, 6, 7, 8, 9, 10	11.3	6,040	66.7	81.62
Honam #1, 2	45.7	500	64.2	99.43
Anthracite:				
Donghae #1, 2	19.8	400	62.6	113.93
Oil-fired:				
Ulsan #4, 5, 6	38.5	1,200	23.6	171.93
Combined cycle:				
Ulsan gas turbine #1, 2, 3, 4, 5, 6, 7, 8; steam turbine #1, 2, 3, 4	15.1	2,072	45.3	128.37
Ilsan gas turbine #1, 2, 3, 4, 5, 6; steam turbine #1, 2	24.9	900	15.6	200.73
Mini hydro, Photovoltaic, Fuel Cell, Wind-Power, Biomass:		82	48.7	208.23
Total	17.9	11,194	54.6	98.87

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Power Plant Remodeling and Recommissioning

Our generation subsidiaries supplement power generation capacity through remodeling or recommissioning of thermal units. Recommissioning includes installation of anti-pollution devices, modification of control systems and overall rehabilitation of existing equipment. The following table shows recent remodeling and recommissioning initiatives by our generation subsidiaries.

Power Plant	Capacity	Completed (Year)	Extension	Company
Taean #1-10	5,050 MW (500 MW×8, 1,050 MW×2)	EP(1) upgrade (#2, 2016) EP(1) upgrade (#1, 3, 2017) EP(1) upgrade (#2, 4, 2018) SCR(2) upgrade (#2, 4, 7, 2016) SCR(2) upgrade (#1, 3, 8, 9, 10, 2017) SCR(2) upgrade (#5,6, ,10, 2018) FGD(5) upgrade, (#1, 3, 2017) FGD(5) upgrade, (#2, 4, 2018)	Anti-pollution	KOWEPO
Pyeongtaek #1-4	1,400 MW (350 MW×4)	Steam turbine upgrade (#2, 3, 2014)	10-year performance-improvement	KOWEPO
Boryeong #1-2	1,000 MW (500 MW×2)	FGD upgrade (#1, 2, 2014)	Performance-improvement	KOMIPO
Boryeong #3-6	2,000 MW (500 MW×8)	Retrofit(#3, 2019) Retrofit(#5, 6, 2021) Retrofit(#4, 2023) FGD, EP, SCR upgrade (#3, 2019) FGD, EP, SCR upgrade (#5, 6, 2021) FGD, EP, SCR upgrade (#4, 2023)	Lifetime extension & Performance-improvement Performance-improvement	KOMIPO
Boryeong #7, 8	1,000 MW (500 MW×2)	FGD,EP upgrade (#7, 2025) FGD,EP upgrade (#8, 2026)	Performance-improvement	KOMIPO
Seocheon #1-2	400 MW (200 MW×2)	SCR(2): 2012	Anti-pollution	KOMIPO

Yeosu #1, 2	668.6MW (#1:340, #2:328.6MW)	Boiler Type Change (CFBC[3]:#1:2016, #2:2011)	30 years	KOSEP
Samcheonpo #1-2	1,120 MW (560 MW ×2)	Boiler, EP, Draft System Upgrade (#1, 2: 2012)	10 years Refurbishing-modernization	KOSEP
Yeongdong #1	125 MW (125 MW ×1)	Boiler, Hybrid SCR & EP, Draft System Retrofit (Biomass [4] #1: 2017)	Renewable energy	KOSEP
Yeongdong #2	200 MW (200 MW ×1)	Boiler, Hybrid SCR & EP, Draft System Retrofit (Biomass[4] #1: 2020)	Renewable energy	KOSEP
Yeongheung #1,2	1,600 MW (800 MW ×2)	FGD, SCR upgrade (#1, 2021) FGD, SCR upgrade (#2, 2022)	Performance-improvement	KOSEP
Donghae #1,2	400 MW (200 MW×2)	SNCR(2018), DCS(2018)	Anti-pollution & modification of control systems	EWP
Ulsan GT #3-6	600 MW (150 MW×4)	SCR(2019)	Anti-pollution	EWP
Ulsan ST #2~3	300 MW (150 MW×2)	DCS(2019)	Modification of control systems	EWP
Ilsan GT #2-6	500 MW (100 MW×5)	SCR(2019)	Anti-pollution	EWP

Notes:

(1) EP means an electrostatic precipitation system.

(2) SCR means a selective catalytic reduction system.
(3) CFBC means a circulating fluidized bed combustion system.
(4) Biomass means wood pallet powered plant.
(5) FGD means flue-gas desulfurization designed to remove sulfur oxides.

Transmission and Distribution

We currently transmit and distribute substantially all of the electricity in Korea.

As of December 31, 2018, our transmission system consisted of 34,155 circuit kilometers of lines of 765 kilovolts and others including high-voltage direct current lines, and we had 850 substations with aggregate installed transformer capacity of 316,661 megavolt-amperes.

As of December 31, 2018, our distribution system consisted of 120,057 megavolt-amperes of transformer capacity and 9,464,748 units of support with a total line length of 493,331 circuit kilometers.

We make substantial investments in our transmission and distribution systems to minimize power interruptions and improve efficiency. Our current projects principally focus on increasing capabilities of the existing power networks and reducing our transmission and distribution loss, which was 3.56% of our gross generation in 2018. To cope with increasing damages to large-scale transmission and distribution facilities, we plan to reinforce stability of our transmission and distribution facilities through stricter design and material specifications. In addition, we also plan to expand underground transmission and distribution facilities to meet customer demand for more environment-friendly facilities. In order to reduce the interruption time in power distribution, which is an indicator of the quality of electricity transmission, we are also continuing to invest in automation of electricity transmission and development of new transmission technologies, among others.

Some of the facilities we own and use in our distribution system use rights of way and other concessions granted by municipal and local authorities in areas where our facilities are located. These concessions are generally renewed upon expiration.

New Energy Industry Projects

Certain of our new energy industry projects are described below.

Advanced Metering Infrastructure

In July 2012, the Government implemented a master plan to build out a smart grid, which includes the Advanced Metering Infrastructure (AMI) roadmap. In accordance with such plan, we are in the process of installing smart meters and related communication networks and operating systems as part of the smart grid initiative in an effort to enhance efficiency in the power electricity industry and alleviate growing energy shortage concerns. Our goal is to complete such installation for 22 million households by 2020. Smart meters refer to digital meters that record, on a real-time basis, electricity consumption within a household so that consumers will have a price-based incentive to enhance efficiency in their electricity usage. As of December 31, 2018, we have installed 7 million smart meter units, and plan to install an additional 15 million units by 2020. The AMI project is expected to cost Won 1.6 trillion through 2020.

Smart Grids

Smart grids refer to next-generation networks for electricity distribution that integrate information technology into existing power grids with the aim of enabling two-way real time exchange of information between electricity suppliers and consumers for optimal efficiency in electricity use. As part of our overall business strategy, we are currently developing and implementing smart grids based on advanced information technology, in order to promote more efficient allocation and use of electricity by consumers. We expect that such technology will improve efficiency and reduce electricity loss over the course of electricity transmission and distribution. We also expect that the smart grid initiative will significantly increase efficient energy consumption by providing real-time data to customers, which would in turn help to reduce greenhouse gas emission and decrease Korea s reliance on foreign energy sources.

Leveraging our experience gained through high-tech intelligent power transmission and distribution network, or smart grid test beds in Jeju Island from 2009 to 2013, we plan to expand our smart grid project. We successfully implemented the KEPCO-Smart Energy Management (K-SEM) at our Guri-Namyangju branch and the Smart Grid Deployment Project in 2014. In recognition of our achievement, we were awarded a special prize from the International Smart Grid Action Network in 2018. By the end of 2018, we implemented smart grid technology in 120 of our branches and 46 public sites (6 buildings, 5 campuses, 25 factories and 10 dispersed generation). Based on this experience, we plan to expand implementation of smart grid technology to residential and industrial buildings.

Energy Storage Systems

In October 2013, as part of an endeavor to create new markets for energy demand management applications using information and communication technology, we established a business plan to roll out energy storage systems for frequency regulation nationwide. These systems involve the establishment and operation of batteries and transformers with large-sized charge and discharge capabilities adjacent to substations to transmit electricity stably with regulated frequencies and optimize the efficiency of the substation operation. This system allows full conversion of reserve capacity for frequency regulation at existing low-cost generators into electricity storage and, if operated in sizable scale, offers opportunities for substantial cost savings in purchase of electricity.

In December 2014, we conducted a pilot project for this initiative by installing a 52 megawatts energy storage system at the Seo-Anseong substation and the Shin-Yongin substation. In July 2015, these substations began to commercially operate energy storage systems, and we expanded the energy storage capacity nationwide by an additional 184 megawatts in 2016, an additional 140 megawatts in 2017, with a total capacity of 376 megawatts as of December 31, 2018. In addition, we completed construction of one of the world s largest indoor energy storage systems for frequency regulation in Gimje substation with a 48 megawatts capacity.

Electric Vehicle Charging Infrastructure

In order to promote the use of environment-friendly electric vehicles, we began constructing infrastructures for electric vehicles in 2009. Since 2016, we have installed electric vehicle charging stations throughout public space and residential building complexes. In 2017, we created a platform for businesses in the electric vehicle charging industry by charging for the service and making the infrastructures available to the market. We plan to expand such infrastructures and to install 3,000 high speed electric vehicle charging stations by 2022.

In January 2016, the Ministry of Trade, Industry and Energy announced an initiative to promote the new energy industry by creating the New Energy Industry Fund. For further details, see Capital Investment Program.

Fuel Sources and Requirements

Nuclear

Uranium, the principal fuel source for nuclear power, accounted for 37.1%, 34.8% and 31.9% of the fuel requirements for electricity generation by us and our generation subsidiaries in 2016, 2017 and 2018, respectively.

All uranium ore concentrates used by KHNP are imported from, and conversion and enrichment of such concentrates are provided by, sources outside Korea and are paid for with currencies other than Won, primarily U.S. dollars.

In order to ensure stable supply, KHNP enters into long-term and medium-term contracts with various suppliers and supplements such supplies with purchases in spot markets. In 2018, KHNP purchased 100%, or approximately 8,500 tons, of its uranium concentrate requirement under both long-term and spot supply contracts with suppliers in Canada, the United Kingdom, Kazakhstan, Germany, Niger, Australia and the United States. Under the long-term supply contracts, the purchase prices of uranium concentrates are adjusted annually based on base prices and spot market prices prevailing at the time of actual delivery. The conversion and enrichment services of uranium concentrates are provided by suppliers in Canada, France, Germany, Japan, China, Russia, the United Kingdom and the United States. A Korean supplier typically provides fabrication of fuel assemblies. Except for certain fixed contract prices, contract prices for processing of uranium are adjusted annually in accordance with the general rate of inflation. KHNP intends to obtain its uranium requirements in the future, in part, through purchases under medium- to long-term contracts and, in part, through spot market purchases.

Coal

Bituminous coal accounted for 45.9%, 52.2% and 52.6% of the fuel requirements for electricity generation by us and our generation subsidiaries in 2016, 2017 and 2018, respectively, and anthracite coal accounted for 1.8%, 1.0% and 0.6% of our fuel requirements for electricity generation in 2016, 2017 and 2018, respectively.

In 2018, our generation subsidiaries purchased approximately 89 million tons of bituminous coal, of which approximately 35%, 30%, 14%, 8% and 13% were imported from Indonesia, Australia, Russia, South Africa and others, respectively. Approximately 83% of the bituminous coal requirements of our generation subsidiaries in 2018 were purchased under long-term contracts with the remaining 17% purchased in the spot market. Some of our long-term contracts relate to specific generating plants and extend through the end of the projected useful lives of such plants, subject in some cases to periodic renewal. Pursuant to the terms of our long-term supply contracts, prices are adjusted periodically based on market conditions. The average cost of bituminous coal per ton purchased under such contracts amounted to Won 89,118, Won 98,891 and Won 107,233 in 2016, 2017 and 2018, respectively.

In 2018, our generation subsidiaries purchased approximately 1 million tons of anthracite coal. The prices for anthracite coal under such contracts are set by the Government. The average cost of anthracite coal per ton purchased under such contracts was Won 96,121, Won 124,036 and Won 129,976 in 2016, 2017 and 2018, respectively.

Oil

Oil accounted for 3.0%, 1.2% and 1.4% of the fuel requirements for electricity generation by us and our generation subsidiaries in 2016, 2017 and 2018, respectively.

In 2018, our generation subsidiaries purchased approximately 9 million barrels of fuel oil, substantial portion] of which was purchased from domestic refiners through competitive open bidding. Purchase prices are based on the spot market price in Singapore. The average cost per barrel was Won 53,842, Won 77,188 and Won 85,116 in 2016, 2017 and 2018, respectively.

LNG

LNG accounted for 10.7%, 8.7% and 11.2% of the fuel requirements for electricity generation by us and our generation subsidiaries in 2016, 2017 and 2018, respectively. In 2018, for use in electricity generation we purchased approximately 6 million tons of LNG from Korea Gas Corporation, a Government-controlled entity in which we currently own a 21.57% equity interest (excluding treasury shares). In 2018, we purchased a substantial portion of our LNG requirements for use in power generation from Korea Gas Corporation. Under the terms of the LNG contract with Korea Gas Corporation, all of our five non-nuclear generation subsidiaries jointly and severally agreed to purchase a total of 5.2 million tons of LNG in 2018, subject to an automatic price adjustment annually based on a pre-determined formula if the actual purchased amount exceeds or falls short of the contracted amount. We believe the quantities of LNG provided under such contract will be adequate to meet the needs of our generation subsidiaries for LNG for the next several years. The LNG supply contracts between our generation subsidiaries and Korea Gas Corporation generally have a term of 20 years and provide for minimum purchase requirements for our generation subsidiaries, the specific terms of which are subject to negotiation between Korea Gas Corporation and our generation subsidiaries and approval by the Government. The average cost per ton of LNG was Won 594,662, Won 655,127 and Won 763,460, in 2016, 2017 and 2018, respectively.

Hydroelectric

Hydroelectric power generation accounted for 1.1%, 1.2% and 1.2%, of the fuel requirements for electricity generation by us and our generation subsidiaries in 2016, 2017 and 2018, respectively. The availability of water for hydroelectric power depends on rainfall and competing uses for available water supplies, including residential, commercial, industrial and agricultural consumption. Pumped storage enables us to increase the available supply of water for use during periods of peak electricity demand.

Sales and Customers

Our sales depend principally on the level of demand for electricity in Korea and the rates we charge for the electricity we sell to the end-users.

Demand for electricity in Korea grew at a compounded average rate of 2.1% per annum for the five years ended December 31, 2018. According to the Bank of Korea, the compounded growth rate for GDP was approximately 3.0% for the same period. The GDP growth rate was approximately 2.9%, 3.1% and 2.7% during 2016, 2017 and 2018, respectively.

The table below sets forth, for the periods indicated, the annual rate of growth in Korea s GDP and the annual rate of growth in electricity demand (measured by total annual electricity consumption) on a year-on-year basis.

	2014	2015	2016	2017	2018
Growth in GDP	3.3%	2.8%	2.9%	3.1%	2.7%
Growth in electricity consumption	0.6%	1.3%	2.8%	2.2%	3.6%

Electricity demand in Korea varies within each year for a variety of reasons other than the general growth in GDP demand. Electricity demand tends to be higher during daylight hours due to heightened commercial and industrial activities and electronic appliance use. Due to the use of air conditioning during the summer and heating during the winter, electricity demand is higher during these two seasons than the spring or the fall. Variation in weather conditions may also cause significant variation in electricity demand.

We do not use any marketing channels, including any special sales methods, to sell electricity to our customers, other than to install electricity meters on-site and take monthly readings of such meters, based upon which invoices are sent to our customers.

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Demand by the Type of Usage

The table below sets forth consumption of electric power, and growth of such consumption on a year-on-year basis, by the type of usage (in gigawatt hours) for the periods indicated.

	2014 (GWh)	YoY growth (%)	2015 (GWh)	YoY growth (%)	2016 (GWh)	YoY growth (%)	2017 (GWh)	YoY growth (%)	2018 (GWh)	YoY growth (%)	% of Total 2018
Residential	64,457	(2.1)	65,619	1.8	68,057	3.7	68,544	0.7	72,895	6.3	13.9
Commercial	100,761	(1.4)	103,679	2.9	108,617	4.8	111,298	2.5	116,934	5.1	22.2
Educational	7,438	(6.4)	7,691	3.4	8,079	5.1	8,316	2.9	8,678	4.3	1.6
Industrial	272,552	2.7	273,548	0.4	278,828	1.9	285,969	2.6	292,999	2.5	55.7
Agricultural	14,505	4.6	15,702	8.3	16,580	5.6	17,251	4.0	18,504	7.3	3.5
Street lighting	3,221	2.1	3,341	3.7	3,462	3.6	3,557	2.7	3,582	0.7	0.7
Overnight Power	14,658	(11.1)	14,075	(4.0)	13,416	(4.7)	12,811	(4.5)	12,557	(2.0)	2.4
Total	477,592	0.6	483,655	1.3	497,039	2.8	507,746	2.2	526,149	3.6	100.0

The industrial sector represents the largest segment of electricity consumption in Korea. Demand for electricity from the industrial sector was 292,999 gigawatt hours in 2018, representing a 2.5% increase from 2017, largely due to the increased volume of semiconductor and other exports, which resulted in increased industrial output and greater utilization of industrial plants. Demand for electricity from the commercial sector depends largely on the level and scope of commercial activities in Korea, which in recent years have resulted in increased office building construction, office automation and use of air conditioners and heaters. Demand for electricity from the commercial sector increased to 116,934 gigawatt hours in 2018, representing a 5.1% increase from 2017 largely due to the extreme weather conditions that have led to increased demand for heating and air conditioning. Demand for electricity from the residential sector is largely dependent on population growth and use of heaters, air conditioners and other electronic appliances. Demand for electricity from the residential sector increased to 72,895 gigawatt hours in 2018, representing a 6.3% increase compared to 2017, largely due to an increase in household electricity usage for air conditioning and heating.

Demand Management

Our ability to provide adequate supply of electricity is principally measured by the facility reserve margin and the supply reserve margin. The facility reserve margin represents the difference between the peak usage during a year and the installed capacity at the time of such peak usage, expressed as a percentage of such installed capacity. The supply reserve margin represents the difference between the peak usage in a year and the average available capacity at the time of such peak usage, expressed as a percentage of such peak usage. The following table sets forth our facility reserve margin and supply reserve margin for the periods indicated.

	2014	2015	2016	2017	2018
Facility reserve margin	16.3%	19.4%	17.6%	37.0%	26.7%
Supply reserve margin	11.5%	11.6%	8.5%	12.9%	7.7%

While we seek to meet the growing demand for electricity in Korea primarily by continuing to expand our generation capacity, we have also implemented several measures to curtail electricity consumption, especially during peak periods. We apply time-of-use and seasonality tariff, which are structured so that higher tariffs are charged at the time and months of peak demand to select types of customers, and we also apply a progressive rate structure for the residential use of electricity. We have several demand management programs to control demand and induce power conservation during peak hours and peak seasons such as providing incentives for reducing power consumption during peak hours.

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Electricity Rates

The Electric Utility Act and the Price Stabilization Act of 1975, each as amended from time to time, prescribe the procedures for the approval and establishment of rates charged for the electricity we sell. We submit our proposals for revisions of rates or changes in the rate structure to the Ministry of Trade, Industry and Energy. The Ministry of Trade, Industry and Energy then reviews these proposals and, following consultation with the Ministry of Economy and Finance and review by the Korea Electricity Commission, makes the final decision.

Under the Electric Utility Act and the Price Stabilization Act, electricity rates are established at levels that would enable us to recover our operating costs attributable to our basic electricity generation, transmission and distribution operations as well as receive a fair investment return on capital used in those operations.

In May 2014, in order to make conforming changes to the standards for determining the public utility rates and to further bolster the reasonableness of cost determination, the Ministry of Trade, Industry and Energy amended the standards for determining the electricity tariff rates. The main amendments include (i) recording as our cost of electricity (which forms part of our operating costs) the pretax income of our six generation subsidiaries (which was previously deducted from our operating costs), (ii) excluding from our rate base our equity interests in our six generation subsidiaries (which were previously included in the rate base discussed below), and (iii) when determining working capital, considering the actual time of our cost recovery (namely, the accounts receivable collection period and the accounts payable payment period).

For the purposes of rate approval, operating costs are defined as the sum of our operating expenses (which principally consists of cost of sales and selling and administrative expenses) and our adjusted income taxes.

Fair investment return represents an amount equal to the rate base multiplied by the rate of return.

Following the amendments to its computation methods in May 2014 as described above, the rate base is currently equal to the sum of:

- net utility plant in service (which is equal to utility plant minus accumulated depreciation minus revaluation reserve);
- the portion of working capital which is equal to the appropriate level of operating costs minus depreciation and other non-cash charges while taking into account the actual time of cost recovery; and
- the portion of construction-in-progress which is charged from our retained earnings.

The amounts used for the variables in the rates are those projected by us for the periods to be covered by the rate approval.

For the purpose of determining the fair rate of return, the rate base is divided into two components in proportion to our total shareholders equity and our total debt. The rate of return permitted in relation to the debt component of the rate base is set at a level designed to approximate the weighted average interest cost on all types of borrowing for the periods covered by the rate approval. The rate of return permitted in relation to the equity component of the rate base is set by applying the capital asset pricing model which takes account of the risk-free rate, the return on the Korea

Stock Price Index, KOSPI, a Korean equity market index, and the correlation of the stock price of our company with KOSPI. In 2016, the approved rate of return on the debt component of the rate base was 0.9% while the approved rate of return on the equity component of the rate base was 3.34%. As a result of such approved rates of returns, the fair rate of return in 2016 was determined to be 4.24%. The fair rates of return for 2017 and 2018 have not yet been determined.

The Electric Utility Act and the Price Stabilization Act do not specify a basis for determining the reasonableness of our operating expenses or any other items (other than the level of the fair investment return) for the purposes of the rate calculation. However, the Government exercises substantial control over our budgeting and other financial and operating decisions.

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In addition to the calculations described above, a variety of other factors are considered in setting overall tariff levels. These other factors include consumer welfare, our projected capital requirements, the effect of electricity tariff on inflation in Korea and the effect of tariff on demand for electricity.

From time to time, our actual rate of return on invested capital may differ significantly from the fair rate of return on invested capital assumed for the purposes of electricity tariff approvals, for reasons, among others, related to movements in fuel prices, exchange rates and demand for electricity that differ from what is assumed for determining our fair rate of return. For example, between 1987 and 1990, the actual rate of return was above the fair rate of return due to declining fuel costs and rising demand for electricity at a rate not anticipated for purposes of determining our fair rate of return. Similarly, depreciation of the Won against the U.S. dollar accounted for our actual rates of return being lower than the fair rate of return for the period from 1996 to 2000. For the period between 2006 and 2013, our actual rates of return were lower than the fair rate of return largely due to a general increase in fuel costs and additional facility investment costs incurred, the effects of which were not offset by timely increases in our tariff rates. Between 2014 and 2016, however, largely due to a decrease in fuel costs reflective of the drop in oil prices, our actual rate of return has surpassed the fair rate of return; however, substantially all of the resulting excess has been used to fund capital expenditure and repair and maintenance, as well as to offer tariff discounts to economically or otherwise disadvantaged households, and make investments in renewable energy and other environmental programs.

Partly in response to the variance between our actual rates of return and the fair rates of return, the Government from time to time increases the electricity tariff rates, but there typically is a significant time lag for the tariff increases as such increases requires a series of deliberative processes and administrative procedures and the Government also has to consider other policy considerations, such as the inflationary effect of overall tariff increases and the efficiency of energy use from sector-specific tariff increases.

Prior to November 2013, the Government from time to time effected tariff increases that typically covered all sectors, namely, residential, commercial and industrial, mainly in response to sustained increases in fuel prices. No cross-sector tariff increase has been implemented since November 2013 largely due to a general decline in fuel prices and relatively stable exchange rates. However, effective January 1, 2017, the Government made several adjustments to the existing rate structure in order to ease the burden of electricity tariff on residential consumers as well as promote the use of renewable energy. First, the progressive rate structure applicable to the residential sector, which applies a gradient of increasing tariff rates for heavier electricity usage, was changed from a six-tiered structure with the highest rate being no more than 11.7 times the lowest rate (which gradient system has been in place since 2005) into a three-tiered structure with the highest rate being no more than three times the lowest rate in order to reflect the changes in the pattern of electricity consumption and reduce the electricity charges payable by consumers. Second, the new tariff structure encourages energy saving by offering rate discounts to residential consumers that voluntarily reduce electricity consumption while charging special high rates to residential consumers with heavy electricity consumption during peak usage periods during the summer and the winter. Third, a temporary rate discount will apply during 2017 to 2019 to investments in environmentally friendly facilities such as energy storage systems, renewable energy and electric cars. The temporary rate discount to investments in energy storage systems and renewable energy was extended until 2020. Additionally, during July and August 2018, the Government reduced residential electricity charges by temporarily relaxing the application of the current tariff structure and offering higher rate discounts to economically or otherwise disadvantaged households to ease the burden on households that have significantly increased their use of air conditioners during a heatwave. Such adjustments may lower our revenues from the sale of electricity and accordingly have a material adverse effect on our results of operation and cash flows.

The tariff rates we charge for electricity vary among the different classes of consumers, which principally consist of industrial, commercial, residential, educational and agricultural consumers. The tariff also varies depending upon the voltage used, the season, the time of usage, the rate option selected by the user and, in the residential sector, the amount of electricity used per household, as well as other factors. For example, we adjust for seasonal tariff variations by applying higher rates when demand tends to rise such as during the months of

June, July and August (when the demand tends to rise due to increased use of air conditioning) and November, December, January and February (when demand tends to rise due to increased use of heating), which reflects the policy of the Korean government to cope with the rise in electricity demand during peak seasons by encouraging a more efficient use of electricity by customers. In addition, we provide discounts on tariff rates to certain users such as low income households.

Our current tariff schedule, which became effective as of January 1, 2017 reflecting the adjustments outlined above, is summarized below by the type of usage:

Industrial. The monthly basic charge varies from Won 5,550 per kilowatt to Won 9,810 per kilowatt depending on the type of contract, the voltage used and the rate option. The energy usage charge varies from Won 52.8 per kilowatt-hour to Won 196.6 per kilowatt-hour depending on the type of contract, the voltage used, the season, the time of day and the rate option.

Commercial. The monthly basic charge varies from Won 6,160 per kilowatt to Won 9,810 per kilowatt depending on the type of contract, the voltage used and the rate option. The energy usage charge varies from Won 53.7 per kilowatt-hour to Won 196.6 per kilowatt-hour depending on the type of contract, the voltage used, the season, the time of day and the rate option.

Residential. The monthly basic charge varies from Won 910 for electricity usage of less than 200 kilowatt hours to Won 7,300 for electricity usage in excess of 400 kilowatt hours. Residential tariff also includes an energy usage charge ranging from Won 93.3 to Won 280.6 per kilowatt-hour for electricity usage depending on the amount of usage and voltage. During the peak usage periods during the summer and the winter, namely the months of July and August and December to February, a higher energy usage charge of Won 709.5 per kilowatt-hour applies to residential consumers whose monthly electricity consumption exceeds 1,000 kilowatts hour.

Educational. The monthly basic charge varies from Won 5,230 per kilowatt to Won 6,980 per kilowatt depending on the voltage used and the rate option. The energy usage charge varies from Won 43.8 per kilowatt-hour to Won 160.4 per kilowatt-hour depending on the voltage used, the season and the rate option.

Agricultural. The monthly basic charge varies from Won 360 per kilowatt to Won 1,210 per kilowatt depending on the type of usage. The energy usage charge varies from Won 21.6 per kilowatt-hour to Won 41.9 per kilowatt-hour depending on the type of contract, the voltage used and the season.

Street-lighting. The monthly basic charge is Won 6,290 per kilowatt and the energy usage charge is Won 85.9 per kilowatt-hour. For electricity capacity of less than 1 kilowatt or for places where the installation of the electricity meter is difficult, a fixed rate of Won 37.5 per watt applies, with the minimum monthly charge of Won 1,220.

In 2001, as part of implementing the Restructuring Plan, the Ministry of Trade, Industry and Energy established the Electric Power Industry Basis Fund to enable the Government to take over certain public services previously performed by us. In 2018, 3.7% of the tariff we collected from our customers was transferred to this fund prior to recognizing our sales revenue.

Power Development Strategy

We and our generation subsidiaries make plans for expanding or upgrading our generation capacity based on the Basic Plan, which is generally revised and announced every two years by the Government. In July 2015, the Government announced the Seventh Basic Plan relating to the future supply and demand of electricity, focusing on stable supply of electricity and increasing the portion of low carbon electricity supply sources, among others. To revise the Seventh Basic Plan, in December 2017, the Government announced the Eighth Basic Plan which are more environmentally focused than the Seventh Basic Plan and to be effective for the period from 2017 to 2031. The Eighth Basic Plan focuses on, among other things, (i) decreasing the reliance on nuclear and coal-based supply sources, (ii) increasing utilization of renewable energy sources and (iii) balancing the existing cost-based pool system of purchase of electricity with an environmentally-focused pool system. Furthermore, the Eighth Basic Plan includes the following implementing measures: (i) six new nuclear generation units in a planning stage would not be constructed, (ii) extension of life of 10 decrepit nuclear generation units would not be granted, (iii) Wolsong #1 unit is not counted as part of domestic energy generation capacity, (iv) seven decrepit coal-fired generation plants will be retired by 2022, (v) six other coal-fired generation plants shall be converted to LNG fuel use and (vi) domestic renewable energy generation capacity shall be expanded to 58.5 gigawatts by 2030.

In January 2014, prior to the announcement of the Seventh Basic Plan, the Ministry of Trade, Industry and Energy adopted the Second Basic National Energy Plan following consultations with representatives from civic groups, the power industry and academia. The Second Basic National Energy Plan, which is a comprehensive plan that covers the entire spectrum of energy industries in Korea, covers the period from 2014 to 2035 and focuses on the following six key tasks: (i) shifting the focus of energy policy to demand management with a goal of reducing the growth of electricity demand by 15% by 2035 through efficiency enhancement programs compared to the projected growth in the absence of such efficiency enhancement programs, (ii) establishing a geographically decentralized electricity generation system so as to reduce transmission losses with a goal of supplying at least 15% of total electricity through such system by 2035, (iii) applying latest greenhouse gas emission reduction technologies to newly constructed generation units in order to further promote safety and environmental friendliness, (iv) strengthening resource exploration and fuel procurement capabilities to enhance Korea s energy security, (v) ensuring stable supply of energy and increasing the portion of electricity supplied from renewable sources to 11% by 2035, (vi) reinforcing the system for stable supply of conventional energy, such as oil and gas, and (vii) introducing in 2015 an energy voucher system in lieu of a tariff discount system for the benefit of low-income consumers. In addition, the Second Basic National Energy Plan has revised the target level of electricity generated by nuclear sources as a percentage of total electricity generated to 29%, compared to 41% under the First Basic National Energy Plan announced in 2008, which covered the period from 2008 to 2030. In March 2018, the Government announced its plan to establish the Third Basic National Energy Plan and formed a working group consisting of government and industry officials and civilian experts. On November 7, 2018, the working group submitted its set of recommendations to the Ministry of Trade, Industry and Energy, and the formal discussions regarding the Third Basic National Energy Plan are ongoing.

We cannot assure that the Eighth Basic Plan, the Second Basic National Energy Plan or the respective plans to be subsequently adopted will successfully achieve their intended goals, the foremost of which is to ensure, through carefully calibrated capacity expansion and other means, balanced overall electricity supply and demand in Korea at to end users while promoting efficiency and environmental friendliness in the consumption and production of electricity. If there is significant variance between the projected electricity supply and demand considered in planning our capacity expansions and the actual electricity supply and demand or if these plans otherwise fail to meet their intended goals or have other unintended consequences, this may result in inefficient use of our capital, mispricing of electricity and undue financing costs on the part of us and our generation subsidiaries, among others, which may have a material adverse effect on our results of operations, financial condition and cash flows.

Capital Investment Program

The table below sets forth, for each of the years ended December 31, 2016, 2017 and 2018, the amounts of capital expenditures for the construction of generation, transmission and distribution facilities.

2016	2017	2018
	(In billions of Won)	

13,950	13,711	13,695

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The table below sets forth the currently estimated installed capacity for new or expanded generation units to be completed by our generation subsidiaries in each year from 2019 to 2021 based on the Eighth Basic Plan, as amended.

Year	Number of Units	Type of Units	Total Installed Capacity (Megawatts)
2019	2	Nuclear power	2,800
	2	LNG-combined	800
	13	Renewables	244
2020	1	Nuclear power	1,400
	1	LNG-combined	150
	14	Renewables	233
2021	1	Coal-fired	1,000
	15	Renewables	308

For the period from 2022 to 2024, our generation subsidiaries currently plan to complete two additional nuclear units with an aggregate installed capacity of 2,800 megawatts.

As part of our capital investment program, we also intend to add new transmission lines and substations, continue to replace overhead lines with underground cables and improve the existing transmission and distribution systems.

The actual number and capacity of generation units and transmission and distribution facilities we construct and the timing of such construction are subject to change depending upon a variety of factors, including, among others, changes in the Basic Plan, demand growth projections, availability and cost of financing, changes in fuel prices and availability of fuel, ability to acquire necessary plant sites, environmental considerations and community opposition.

The table below sets forth, for the period from 2019 to 2021, the budgeted amounts of capital expenditures pursuant to our capital investment program, which primarily consist of budgets for the construction of generation, transmission and distribution facilities and, to a lesser extent, renewable energy generation and new energy industry projects. The budgeted amounts may vary from the actual amounts of capital expenditures for a variety of reasons, including, among others, the implementation of the Eighth Basic Plan, changes in the number of units to be constructed, the actual timing of such construction, changes in rates of exchange between the Won and foreign currencies and changes in interest rates.

	2019	2020	2021	Total
		(in billions of Won)		
Generation[1]:				
Nuclear	4,040	3,462	3,173	10,675
Thermal	3,367	3,524	3,589	10,480
Renewables and others	1,202	2,297	3,001	6,500
Sub-total	8,609	9,283	9,763	27,655
Transmission and Distribution:				
Transmission	2,718	4,510	4,258	11,486
Distribution	3,434	3,097	3,064	9,595

Sub-total	6,152	7,607	7,322	21,081
Others[(2)]	2,070	2,248	1,719	6,037
Total	16,831	19,138	18,804	54,773

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Notes:

(1) The budgeted amounts for our generation facilities are based on the Eighth Basic Plan, as amended.
(2) Principally consists of investments in telecommunications and new energy industry projects, among others.

In January 2016, the Ministry of Trade, Industry and Energy announced an initiative to promote the new energy industry by creating the New Energy Industry Fund, which is made up of funds sponsored by government-affiliated energy companies. We contributed Won 500 billion to the funds in 2016. The purpose of these funds is to invest in substantially all frontiers of the new energy industry, including renewable energy, energy storage systems, electric vehicles, small-sized self-sustaining electricity generation grids known as micro-grids , among others, as well as invest in start-up companies, ventures, small- to medium-sized enterprise and project businesses that engage in these businesses but have not previously attracted sufficient capital from the private sector.

Furthermore, as part of the Comprehensive Measures against Particulate Matter and the Eighth Basic Plan, announced by the Government in September 2017 and December 2017, respectively, the Government set forth the following policy directions relating to coal-fired generation units: (i) two coal-fired generation units scheduled for construction and four existing coal-fired generation units shall convert to LNG fuel use, (ii) in principle, construction of new coal-fired generation units shall not be planned, (iii) seven of the coal-fired generation units that are 30 years or older will be shut down on an accelerated schedule, (iv) beginning in 2018, coal-fired generation units that are 30 years or older shall temporarily cease operations from March through June of each year, (v) coal-fired generation units shall be put through comprehensive functional and environmental upgrades and (vi) coal-fired generation units shall be subject to emission standards that came into effect in January 2019 that are twice as more rigorous than the previous standards. Compliance with such measures is expected to result in our incurring significant costs.

We have financed, and plan to finance in the future, our capital investment programs primarily through net cash provided by our operating activities and financing in the form of debt securities and loans from domestic financial institutions, and to a lesser extent, borrowings from overseas financial institutions. In addition, in order to prepare for potential liquidity shortage, we and our generation subsidiaries maintain several credit facilities with domestic financial institutions in the aggregate amounts of Won 4,424 billion and US$383 million, the full amount of which was available as of December 31, 2018. We, KHNP, KOMIPO and KOWEPO also maintain global medium-term note programs in the aggregate amount of US$13 billion, of which approximately US$9 billion remains currently available for future drawdown. KOSEP also maintains an A$2 billion Australian dollar medium-term note program, of which approximately A$1.7 billion remains current available for future drawdown. See also Item 5.B. Liquidity and Capital Resources Capital Resources.

Environmental Programs

The Environmental Policy Basic Act, the Air Quality Preservation Act, the Water Quality Preservation Act, the Marine Pollution Prevention Act and the Waste Management Act, collectively referred in this annual report as the Environmental Acts, are the major laws of Korea that regulate atmospheric emissions, waste water, noise and other emissions from our facilities, including power generators and transmission and distribution units. Our existing facilities are currently in material compliance with the requirements of these environmental laws and international agreements, such as the United Nations Framework Convention on Climate Change, the Montreal Protocol on Substances that Deplete the Ozone Layer, the Stockholm Convention on Persistent Organic Pollutants and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. In order to foster coordination among us and our generation subsidiaries in respect of climate change, we and 11 of our electricity-related subsidiaries formed the CEO Coordination Committee in June 2016.

We continuously endeavor to contribute to sustainable growth (whether as an economy, a society or an ecosystem) by actively taking actions that befit our social responsibility as a corporate citizen in the energy industry. For example, in 2005, we became the first public company in Korea to join the United Nations Global Compact, an international voluntary initiative designed to hold a forum for corporations, United Nations agencies, labor and civic groups to promote reforms in economic, environmental and social policies. As part of our involvement with such initiative, we issue an annual report named the Sustainability Report to disclose our activities from the perspectives of economy, environment and society, in accordance with the reporting guidelines of the Global Reporting Initiative, the official collaborating center of the United Nations Environment Program that works in cooperation with United Nations Secretary General. In recognition of our efforts and achievements to reduce carbon emissions in response to global climate change, in May 2013, we obtained the Carbon Trust Standard certification issued by Carbon Trust, a British nonprofit organization with the goal of establishing a sustainable, low carbon economy. In 2015, we obtained recertification from Carbon Trust by satisfying even more rigorous evaluation criteria. We are also a participant of the Carbon Disclosure Project, an international organization that promotes transparency in informational disclosure of carbon management process, and in 2016, 2017 and 2018 we were recognized by the Carbon Disclosure Project and received honors in energy and utility sector. In 2016, 2017 and 2018, pursuant to the Dow Jones Sustainability Indices, which measures management performance in terms of contribution to sustainability, we were selected as one of the notable companies in the Asia Pacific in the global electricity utility sector. We aim to become a global leader in carbon management and reduction.

The table below sets forth the number of emission control equipment installed at thermal power plants by our generation subsidiaries as of December 31, 2018.

	KOSEP	KOMIPO	KOWEPO	KOSPO	EWP
Flue Gas Desulphurization System	14	12	14	15	18
Selective Non-catalytic Reduction System	1				8
Selective Catalytic Reduction System	14	22	16	14	18
Electrostatic Precipitation System	16	14	14	14	18
Low NO2 Combustion System	22	28	25	30	29
Total	67	76	69	73	91

In accordance with the Act on Allocation and Trading of Greenhouse Gas Emission Allowances, enacted in March 2013, the Government is currently in the process of implementing a carbon emission trading system under which the Government will allocate the amount of permitted carbon emission to companies by industry and a company whose business emits more carbon than the permitted amount may purchase the right to emit more carbon through the carbon emission trading exchange. This system is expected to be implemented in three stages. During the first phase (2015 to 2017), the Government set up and made a test run of the trading system to ensure its smooth operation; during this phase, the carbon emission rights were allocated without charge. In July 2018, the Government released the allocation plan for the second phase (2018 to 2020). During the second phase, 97% of the carbon emission rights may be allocated freely, with 3% allocated through an auction. During the third phase (2021 to 2025), the Government plans to run the system on an expanded scale with aggressive carbon emission reduction targets, with 10% of the carbon emission rights allocated through an auction. In December 2016, the Government announced the Climate Change Response Initiatives and 2030 National Greenhouse Gas Reduction Roadmap, which set forth the carbon emission trading system as one of the primary means to reach the emission and greenhouse gas reduction targets of the policies. The 2030 National Greenhouse Gas Reduction Roadmap was amended on July 24, 2018 and sets forth a national target of greenhouse gas level as 536 million tons in the aggregate, representing a 37% reduction from the base case projection of greenhouse gas in 2030. In the electricity conversion sector, for which greenhouse gas reduction of 24 million tons (with a potential additional reduction of 34 million tons) is requested by year 2030, and our business is classified as part of this sector. The additional potential reduction amount will be confirmed prior to the finalization of the Government s 2020 Nationally Determined Contributions (NDCs). Adhering to such emission and greenhouse gas reduction requirement is expected to result in our incurring significant compliance costs.

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The table below sets forth the amount of annual emission from all generating facilities of our generation subsidiaries for the periods indicated. The amount of CO_2 emissions may increase in the near future due to the construction of additional coal thermal power plants but is expected to decrease in the long-term, principally due to an increased use of nuclear power and renewable energy and the implementation of the carbon emission trading system.

Year(1)	SOx (g/MWh)	NOx (g/MWh)	TSP(2) (g/MWh)	CO_2 (kg/MWh)
2015	165	266	8	464
2016	156	246	7	477
2017	138	177	7	506

Notes:

(1) The amounts of annual emission for 2018 are expected to be determined in June 2019.
(2) TSP means Total Suspended Particles.

In order to comply with the current and expected environmental standards and address related legal and social concerns, we intend to continue to install additional equipment, make related capital expenditures and undertake several environment-friendly measures to foster community goodwill. For example, under the Persistent Organic Pollutants Management Act enacted in 2007, we are required to remove polychlorinated biphenyl, or PCB, a toxin, from the insulating oil of our transformers by 2025. In addition, when constructing certain large new transmission and distribution facilities, we assess and disclose their environmental impact at the planning stage of such construction, as well as consult with local residents, environmental groups and technical experts to generate community support for such projects. We exercise additional caution in cases where such facilities are constructed near ecologically sensitive areas such as wetlands or preservation areas. We also make reasonable efforts to minimize any negative environmental impact, for example, by using more environment-friendly technology and hardware. In addition, we also undertake measures to minimize losses during the transmission and distribution process by making our power distribution network more energy-efficient in terms of loss of power, as well as to lower consumption of energy, water and other natural resources. In addition, we and our subsidiaries acquired the ISO 14000 certification, an environmental management system widely adopted internationally, in 2007 and have made it a high priority to make our electricity generation and distribution more environmentally friendly. In addition to the ISO 14000 certification, we further reinforced our environmental management system by acquiring the ISO 14001 certification as well as a domestic GMS (Green Management System), KS I 7001/7002 certification, which relates to the management of resources, energy, green house effects and social responsibilities, in 2013. In 2014, we were awarded the presidential award for environmental contributions as a corporate citizen, after scoring the highest among 102 corporations that competed for the award. In order to encourage the implementation of environment-friendly measures by other corporations and enhance environmental awareness at a social level, we have been disclosing our environment-related activities and achievements to the public through the Environment Information System managed by the Ministry of Environment since 2012.

Our environmental measures, including the use of environment-friendly but more expensive parts and equipment and allocation of capital expenditures for the installation of such facilities, may result in increased operating costs and liquidity requirement. The actual cost of installation and operation of such equipment and related liquidity requirement will depend on a variety of factors which may be beyond our control. There is no assurance that we will continue to be in material compliance with legal or social standards or requirements in the future in relation to the environment.

As part of our long-term strategic initiatives, we plan to take other measures designed to promote the generation and use of environmentally friendly, or green, energy. See Item 4.B. Business Overview Strategy.

Some of our generation facilities are powered by renewable energy sources, such as solar energy, wind power and hydraulic power. While such facilities are currently insignificant as a proportion of our total generation capacity or generation volume of our generation subsidiaries, we expect that the portion will increase in the future, especially since we are required to comply with the Renewable Portfolio Standard program as described below.

The following table sets forth the generation capacity and generation volume in 2018 of our generation facilities that are powered by renewable energy sources.

	Generation Capacity (megawatts)	**Generation Volume (gigawatt-hours)**
Hydraulic Power(1)	651	1,276
Wind Power	140	195
Solar Energy, Fuel Cells, Biogas and others	788	3,468
Subtotal	1,579	4,939
As percentage of total(2)	1.9%	1.2%

Notes:

(1) Excluding generation capacity and volume of pumped storage, which is generally not classified as renewable energy.

(2) As a percentage of the total generation capacity or total generation volume, as applicable, of us and our generation subsidiaries.

In order to deal with shortage of fuel and other resources and also to comply with various environmental standards, in 2012 the Government adopted the Renewable Portfolio Standard program, which replaced the Renewable Portfolio Agreement which had been in effect from 2006 to 2011. Under this program, each of our generation subsidiaries is required to generate a specified percentage of total electricity to be generated by such generation subsidiary in a given year in the form of renewable energy or, in case of a shortfall, purchase a corresponding amount of a Renewable Energy Certificate (a form of renewable energy credit) from other generation companies whose renewable energy generation surpass such percentage. The target percentage was 4.0% in 2017, 5.0% in 2018 and 6.0% in 2019 and will incrementally increase to 10.0% by 2023. Fines are to be levied on any subsidiary that fails to do so in the prescribed timeline. In 2017, all six of our generation subsidiaries met the target through renewable energy generation and/or the purchase of a Renewable Energy Certificate. Compliance by our generation subsidiaries of the 2018 target is currently under evaluation, and if any generation subsidiary is found to have failed to meet the target for 2018 or for subsequent years, such generation subsidiary may become subject to fines.

As to how we plan to finance our capital expenditures related to our environmental programs, see Capital Investment Program.

In March 2017, the Electric Utility Act was amended to the effect that starting in June 2017, future national planning for electricity supply and demand in Korea should consider the environmental and safety impacts of such planning. However, to-date, no specific guidelines have been provided by the Government as to how to implement this provision, and it is therefore difficult to assess in advance what impact such provision will have on our business, results of operations or financial condition. However, the amendment will likely lead to the expansion of our environmental programs.

Furthermore, under the new electricity rate structure effected by the Government effective January 1, 2017, a temporary rate discount will apply in the case of investments in environmentally friendly facilities such as energy storage systems, renewable energy and electric cars. The temporary rate discount will apply during 2017 to 2019 to investments in environmentally friendly facilities such as energy storage systems, renewable energy and electric cars. The temporary rate discount to investments in energy storage systems and renewable energy was extended until 2020.

Community Programs

Building goodwill with local communities is important to us in light of concerns among the local residents and civic groups in Korea regarding construction and operation of generation units, particularly nuclear generation units. The Act for Supporting the Communities Surrounding Power Plants and the Act on the Compensation and Support for Areas Adjacent to Transmission and Substation Facilities require that the generation companies and the affected local governments carry out various activities up to a certain amount annually to address neighboring community concerns. Pursuant to these Acts, we and our generation subsidiaries, in conjunction with the affected local and municipal governments, undertake various programs, including scholarships and financial assistance to low-income residents.

Under the Act for Supporting the Communities Surrounding Power Plants, activities required to be undertaken under the Act are funded partly by the Electric Power Industry Basis Fund (see Sales and Customers Electricity Rates) and partly by KHNP as part of its budget. KHNP is required to make annual contributions to the affected local communities in an amount equal to Won 0.25 per kilowatt-hour of electricity generated by its nuclear generation units during the one-year period before the immediately preceding fiscal year, Won 5 million per thousand kilowatts of hydroelectric generation capacity and Won 0.5 million per thousand kilowatts of pumped-storage generation capacity. In addition, under Korean tax law, KHNP is required to pay local tax levied on its nuclear generation units in an amount equal to Won 1 (effective January 1, 2015, which reflects an increase from the previous Won 0.5 per kilowatt-hour of their generation volume in the affected areas) and Won 2 per 10 cubic meters of water used for hydroelectric generation.

The Act on the Compensation and Support for Areas Adjacent to Transmission and Substation Facilities, enacted in January 2014 with effect from July 2014, prescribes measures to be taken by power generation or transmission companies with respect to the communities adjacent to transmission and substation facilities. Under this Act, those who own land or houses in the vicinity of transmission lines and substation may claim compensation for damages or compel purchase of such properties by the power generation or transmission companies which are legally obligated in principle to pay for such damages or purchase such properties. In addition, under this Act, residents of communities adjacent to transmission and substation facilities are entitled to subsidies on electricity tariff as well as support for a variety of welfare projects and collective business ventures.

Prior to the construction of a generation unit, our generation subsidiaries perform an environmental impact assessment which is designed to evaluate public hazards, damage to the environment and concerns of local residents. A report reflecting this evaluation and proposing measures to address the problems identified must be submitted to and approved by the Ministry of Trade, Industry and Energy following agreement with related administrative bodies, including the Ministry of Environment prior to the construction of the unit. Our generation subsidiaries are then required to implement the measures reflected in the approved report. Despite these activities, civic community groups may still oppose the construction and operation of generation units (including nuclear units), and such opposition could adversely impact our construction plans for generation units (including nuclear units) and have a material adverse effect on our business, results of operations and cash flow.

Upon relocation of our corporate headquarters in November 2014, we developed and established Bitgaram Energy Valley as a smart energy hub city in Gwangju and Jeollanamdo, to attract and facilitate the growth of start-ups and research institutions related to new energy industries while contributing to the local economy, balanced regional development and job creation. To achieve this goal, we provide funding, business networks and research and development assistance to companies which entered into investment contracts with us. As of March 31, 2019, we had signed agreements with 360 companies relating to investments in the Bitgaram Energy Valley, and we currently aim to increase the total number of companies investing in the Bitgaram Energy Valley to 430 companies by the end of 2019 and 500 companies by the end of 2020.

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Nuclear Safety

KHNP takes nuclear safety as its top priority and continues to focus on ensuring the safe and reliable operation of nuclear power plants. KHNP also focuses on enhancing corporate ethics and transparency in the operation of its plants.

KHNP has a corporate code of ethics and is firmly committed to enhancing nuclear safety, developing new technologies and improving transparency. KHNP has also established the Statement of Safety Policy for Nuclear Power Plants to ensure the highest level of nuclear safety. Furthermore, KHNP invests approximately 5% of its total annual sales into research and development for the enhancement of nuclear safety and operational performance.

KHNP implements comprehensive programs to monitor, ensure and improve safety of nuclear power plants. In order to enhance nuclear safety through risk-informed assessment, KHNP conducts probabilistic safety assessments, including for low power-shutdown states, for all its nuclear power plants. In order to systematically verify nuclear safety and identify the potential areas for safety improvements, KHNP performs periodic safety reviews on a 10-year frequency basis for all its operating units. These reviews have been completed for Kori #1, #2, #3, #4; Hanbit #1, #2, #3, #4, #5, #6; Wolsong #1, #2, #3 and #4; and Hanul #1, #2, #3, #4, #5, #6 once or more. Reviews for Wolsong #3, #4 and Hanul #1, #2, #3, #4 are in progress. In order to enhance nuclear safety and plant performance, KHNP has established a maintenance effectiveness monitoring program based on the maintenance rules issued by the United States Nuclear Regulatory Commission, which covers all of KHNP s nuclear power plants in commercial operation.

KHNP has developed the Risk Monitoring System for operating nuclear power plants, which it implements in all of its nuclear power plants. The Risk Monitoring System is intended to help ensure nuclear plant safety. In addition, KHNP has developed and implemented the Severe Accident Management Guidelines and is developing the Severe Accident Management Guidelines for Low Power-Shutdown States in order to manage severe accidents for all of its nuclear power plants.

KHNP conducts various activities to enhance nuclear safety such as quality assurance audits and reviews by the KHNP Nuclear Review. KHNP maintains a close relationship with international nuclear organizations in order to enhance nuclear safety. KHNP invites international safety review teams such as the World Association of Nuclear Operators (WANO) Peer Review Team to its nuclear plants for purposes of meeting international standards for independent review of its facilities. KHNP actively exchanges relevant operational information and technical expertise with its peers in other countries. For example, KHNP conducted three WANO Peer Reviews for Hanbit #5 and #6 units, Wolsong #1 and #2 units as well as Shin-Kori #1 and #2 units in 2018. KHNP also invited second WANO Pre-Startup Peer Review Team at Shin-Kori #4 unit in 2018. The recommendations and findings from this event were shared with KHNP s other nuclear plants to implement improvements at such plants. In addition, KHNP has applied for the Operational Safety Review Team at the International Atomic Energy Agency to conduct a mission at Shin-Kori #3 and #4 units in the second half year of 2020. The purpose of such application was to ensure that KHNP nuclear generation units reflect the global safety standards.

The average level of radiation dose per unit amounted to a relatively low level of 0.36 man-Sv in 2018, which was substantially lower than the global average of 0.49 man-Sv/year in 2018 as reported in the WANO performance indicator report.

In response to the damage to the nuclear facilities in Japan as a result of the tsunami and earthquake in March 2011, the Government conducted additional safety inspections on nuclear power plants by a group of experts from governmental authorities, civic groups and academia. As a result of such inspections, the Government required KHNP to perform 46 comprehensive safety improvement measures. As of December 31, 2018, KHNP has completed implementation of 43 measures and will implement the three remaining measures by 2020. The Government also established the Nuclear Safety & Security Commission in October 2011 for neutral and independent safety appraisals. KHNP developed ten additional measures through benchmarking of overseas cases and internal analysis of current operations. As of December 31, 2018, KHNP has completed implementation of eight measures and will implement the two remaining measures by 2021.

From time to time, our nuclear generation units may experience unexpected shutdowns. For example, on September 12, 2016, multiple earthquakes including a magnitude 5.8 earthquake hit the city of Gyeongju, a home to KHNP s headquarters and Wolsong Nuclear Power Plant. Although there was no material safety issues, KHNP had manually stopped the operations of Wolsong Nuclear Power Plant units #1, 2, 3, and 4 according to the safety guidelines. All units have resumed their operations on December 5, 2016, with the approval by the Nuclear Power Safety Commission. KHNP continues to implement measures to improve the safety by reinforcing seismic capability of its core facilities and performing stress tests across all its nuclear power plants. In 2018, KHNP finished the implementation of such measures for 24 units and enhanced seismic design of the core facilities to withstand a magnitude 7.0 earthquake (6.5 before implementation). As for the units under construction (Shin-Kori#5 and #6), the core facilities will be able to withstand a magnitude 7.4 earthquake.

Low and intermediate level waste, or LILW, and spent fuels are stored in temporary storage facilities at each nuclear site of KHNP. The temporary LILW storage facilities at the nuclear sites had been sufficient to accommodate all LILWs produced up to 2015. Korea Radioactive Waste Agency (KORAD) completed the construction of a LILW disposal facility in the city of Gyeongju, and government approval for its operations was obtained in December 2014.

In order to increase the storage capacity of temporary storage facilities for spent fuels, KHNP has been pursuing various projects, such as installing high-density racks in spent fuel pools and building dry storage facilities. Through these activities, we expect that the storage capacity for spent fuels in all nuclear sites will be sufficient to accommodate all the spent fuels produced by 2019. The policy for spent fuel management options is currently under development.

In 2009, the Radioactive Waste Management Act (RWMA) was enacted in order to centralize management of the disposal of spent fuel and LILW and enhance the security and efficiency of related management processes. The RWMA designates KORAD to manage the disposal of spent fuels and LILW. Pursuant to the RWMA, the Government has established the Radioactive Waste Management Fund. The management expense for LILW is paid when LILW is transferred to KORAD, and the charge for spent fuel is paid based on the quantity generated every quarter. LILW-related management costs and charges for spent fuel are reviewed by the Ministry of Trade, Industry and Energy every two years. In December 2017, after the review by the committee composed of Government officials, KHNP, Korea Radioactive Waste Management Corporation and experts in finance and accounting, LILW-related management costs were increased while charges for spent-fuel remained the same. The change in LILW-related management costs caused an increase in KHNP s expenses relating to radioactive waste.

All of KHNP s nuclear plants are currently in compliance with Korean law and regulations and the safety standards of the IAEA in all material respects. For a description of certain past incidents relating to quality assurance in respect of KHNP, see Item 3.D. Risk Factors Our risk management policies and procedures may not be fully effective at all times.

Decommissioning

Decommissioning of a nuclear power unit is the process whereby the unit is shut down at the end of its life, the fuel is removed and the unit is eventually dismantled. KHNP implements a dismantling policy under which dismantling would take place five to ten years after the unit s closure. KHNP renewed the operating license of Kori #1, the first nuclear power plant constructed in Korea, which commenced operation in 1978, for an additional ten years in 2007.

At the recommendation of the Ministry of Trade, Industry and Energy, KHNP has decided not to renew the operating license of Kori #1 and the initial phase of decommissioning (namely, safety inspection and removal of spent fuels) of Kori #1 has begun after its permanent shutdown in June 2017. In February 2015, KHNP also renewed the operation license of Wolsong #1 (which originally expired in November 2012) for an additional ten years until 2022. In June 2015, reactivation of Wolsong #1 was approved by the NSSC after periodic inspection. However, a civic group has since then brought a lawsuit to reverse such approval, and in February 2017, a lower court ruled to annul the NSSC s approval, which ruling has since been appealed. On June 15, 2018, the board of directors of KHNP decided to (i) retire Wolsong #1 unit earlier than planned due to its economic inefficiency and (ii) discontinue the construction of Chunji #1 and #2 as well as Daejin #1 and #2 units. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Wolsong #1 unit was Won 570,408 million and the provision for decommissioning costs of Wolsong #1 increased by Won 28,196 million, as the timing of actual cash outflows was accelerated due to the shortened operating period. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Chunji #1 and #2 as well as Daejin #1 and #2 units amounted to Won 38,886 million. Although the board of directors did not make any decisions regarding Shin-Hanul #3 and #4 units, which are new nuclear plants under construction, we cannot assure you that the construction of these units will not be discontinued. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Shin-Hanul #3 and #4 units was Won 132,725 million. KHNP retains full financial and operational responsibility for decommissioning its units.

KHNP has accumulated decommissioning costs as a liability since 1983. The decommissioning costs of nuclear facilities are defined by the Radioactive-Waste Management Act, which requires KHNP to credit annual appropriations separately. These costs are estimated based on studies conducted by the relevant committees, and are reviewed by the Ministry of Trade, Industry and Energy every two years. In 2017, the actual discount rates decreased and the decommissioning cost per unit increased. As of December 31, 2018, KHNP was required to accrue Won 16,240 billion for the costs of dismantling and decontaminating existing nuclear power plants, which consisted of dismantling costs of nuclear plants of Won 13,388 billion and dismantling costs of spent fuel and radioactive waste of Won 2,852 billion. For accounting treatment of decommissioning costs, see Item 5.A. Operating Results Critical Accounting Policies Decommissioning Costs.

Overseas Activities

We are engaged in a number of overseas activities. We believe that such activities help us diversify our revenue streams by leveraging the operational experience of us and our subsidiaries gathered from providing a full range of services, such as power plant construction and specialized engineering and maintenance services in Korea, as well as establishing strategic relationships with countries that are or may become providers of fuels.

Throughout the years, we have sought to expand our project portfolio to include the construction and operation of conventional thermal generation units, nuclear generation units and renewable energy power plants, transmission and distribution and mining and development of fuel sources. While strategically important, we believe that our overseas activities, as currently being conducted, are not in the aggregate significant in terms of scope or amount compared to our domestic activities. In addition, a number of the overseas contracts currently being pursued are based on non-binding memoranda of understanding and the details of such projects may significantly change during the course of negotiating the definitive agreements.

Below is a description of our major overseas projects.

Generation projects

Nuclear Generation Project

In December 2009, following an international open bidding process, we entered into a prime contract for the original contract amount of US$18.6 billion with the Emirates Nuclear Energy Corporation (ENEC), a state-owned nuclear energy provider of the United Arab Emirates (UAE), to design and construct four civil nuclear power generation units to be located in Barakah, a region approximately 270 kilometers from Abu Dhabi, for the UAE s peaceful nuclear energy program. Under the contract, we and our subcontractors, some of which are our subsidiaries, are to perform various duties including, among others, designing and constructing four nuclear power generation units each with a capacity of 1,400 megawatts, supplying nuclear fuel for three fuel cycles including initial loading, with each cycle currently projected to last for approximately 18 months, and providing technical support, training and education related to plant operation. In connection with the parties execution of an amendment to the prime contract, the target completion dates for the four units were amended to range between December 2018 and December 2020. The contract amount of US$18.6 billion was increased to US$19.1 billion, and the amendment was signed in November 2017.

On October 20, 2016, in order to foster a long-term strategic partnership and stable management of the units post-construction we entered into an investment agreement with ENEC to jointly establish Barakah One PJSC, a special purpose company which will oversee the operation and management of the nuclear power plant currently being constructed in Barakah, United Arab Emirates. Barakah One PJSC is capitalized with loans in the amount of US$19.6 billion and equity of US$4.7 billion. We have a 18% equity interest in Barakah One PJSC, and also have a 18% equity interest in Nawah Energy Company, a subsidiary of ENEC, which will also be responsible for the operation and maintenance of the Barakah nuclear power plant. On December 20, 2018, the board of directors of KEPCO resolved to invest additional US$380 million in Barakah One PJSC. With the additional investment, KEPCO s total capital investment amount in Barakah One PJSC is expected to be US$1.28 billion. KEPCO s equity interest in the project is 18%, which remains unchanged. The total project cost of the construction and operation of the Barakah nuclear power plant is expected to be approximately US$29.5 billion, and the operational period is expected to be 60 years after the project commercial operation date in 2025. Actual capital contribution is currently scheduled to be made in September 2025.

Non-nuclear Generation Projects

We are currently engaged in three major power projects in the Philippines: (i) a build, operate and transfer of a 1,200-megawatt combined-cycle power plant project in Ilijan, construction of which began in November 1997 and was completed in June 2002 and which is being operated by us until 2022 (the project cost of the Ilijan project was US$721 million, for which project finance on a limited recourse basis was provided), (ii) ownership of a 39.6% equity interest in SPC Power Corporation, an independent power producer, and a 39.6% equity interest in two distribution companies in the Philippines, and (iii) a build, operate and own of a 200-megawatt CFBC coal power plant in Cebu for which construction began in February 2008 and was completed in May 2011, followed by operation thereof until 2036. The project cost of the Cebu project was US$451 million, for which project financing on a limited recourse basis was provided.

In April 2007, we formed a limited partnership with Shanxi International Electricity Group and Deutsche Bank in China to develop and operate power projects and coal mines in Shanxi province, China, which was approved by the Chinese government. The total capital investment in these projects amounted to US$1.33 billion, of which our capital investment was US$450 million. We are expected to participate in the operation of the project for a period of 50 years ending 2057. The total installed capacity of these projects is 6,532 megawatts and capacity under construction was 2,603 megawatts, and our equity interest in the partnership was 34%.

In July 2008, a consortium consisting of us and Xenel of Saudi Arabia won the bid to build, own and operate a gas-fired power plant with installed capacity of 373 megawatts in Al Qatrana, near Amman, and we entered into definitive agreements in October 2009. Construction of this project was completed in December 2011, and the plant is currently in operation and will be operated until 2035. The total project cost was US$461 million, of which the consortium made an equity contribution of US$143 million and the remainder was funded with debt financing. We and Xenel own 80:20 equity interests in the project, respectively.

In December 2008, we formed a consortium with ACWA Power International of Saudi Arabia and submitted a bid for the 1,204 megawatt oil-fired power project in Rabigh, Saudi Arabia. In March 2009, we were selected as the preferred bidder, and in July 2009, we entered into a power purchase agreement with Saudi Electricity Company. Construction of the project was completed in April 2013, and we will participate in the operation of the plant for 20 years. The total project cost was approximately US$2.5 billion. We currently hold a 40.0% equity interest in the joint venture entity, Rabigh Electricity Company, which operates the project.

In August 2010, a consortium led by us was selected as the preferred bidder in an international auction for the construction and operation of the Norte II gas-fueled combined-cycle electricity generation facility in Chihuahua, Mexico, as ordered by the Commission Federal de Electricidad (CFE) of Mexico. The consortium established a special purpose vehicle, KST Electric Power Company (KST), to act as the operating entity, and in September 2010, KST entered into a power purchase agreement with CFE in relation to the construction and operation of a 433-megawatt combined-cycle power plant at Chihuahua in Mexico. In October 2010, KST was licensed by the Mexican government as an independent power producer, which allows it to produce and sell electricity to CFE during the specified contract period. The project will be undertaken on a build, own and operate basis. The total cost of the project is approximately US$430 million. We hold a 56% equity interest in the consortium, with the remaining equity interests held by Samsung C&T (with a 34% equity interest) and Techint, a Mexico company (with a 10% equity interest). Approximately 24% of the total project costs is being financed through equity investments by the consortium and the remaining 77.5% through project financing. Commercial operation commenced in December 2013, and the operation period will run for 25 years until 2038. Our wholly-owned subsidiary, KEPCO Energy Service Company, currently manages the operation of the project.

In October 2010, a consortium including us was selected by Abu Dhabi Water & Electricity Authority (ADWEA), a state-run utilities provider in the UAE, as the preferred bidder in an international bidding for the construction and operation of the combined-cycle natural gas-fired electricity generation facilities in Shuweihat, UAE with aggregate capacity of 1,600 megawatts. Construction was completed in July 2014 and we will participate in the operation of the plant until 2039. The total project cost was approximately US$1.4 billion, of which 20% was financed through equity investments by the consortium members and the remaining 80% through debt financing. Equity interests in the consortium are owned by ADWEA (60.0%), Sumitomo (20.4%) and us (19.6%). The total amount of our equity investment in the project is approximately US$56 million.

In January 2012, a consortium consisting of us, Mitsubishi Corporation and Wartsila Development & Financial Services of Finland was selected by National Electric Power Corporation, a state-run electricity provider in Jordan, to construct and operate a diesel engine power project in Almanakher with an expected total generation capacity of 573 megawatts. Construction of this project was completed in October 2014 and the plant is currently in operation and will be operated until 2039. The total project cost was approximately US$760 million, of which the consortium made an equity contribution of approximately US$190 million and the remainder was funded with debt financing. We, Mitsubishi Corporation and Wartsila Development & Financial Services own 60:35:5 equity interests in the project, respectively. Our equity investment in this project is US$104 million.

In March 2013, a consortium consisting of us and Marubeni, a Japanese corporation, was selected by the Ministry of Industry and Trade of Vietnam for the construction and operation of a 1,200 megawatt coal-fired power plant in Thanh Hoa province, Vietnam. We started construction in July 2018 and to complete completion by July 2022, followed by operation for 25 years. The total project cost is expected to be US$2.5 billion, of which 24% will be funded by equity contribution and the remaining 76% by debt financing. The share capital of the special purpose entity in charge of this project is US$568 million, and we and Marubeni each hold 50% equity interest in such entity.

On October 6, 2016, a consortium comprised of us, Marubeni Corporation and four local entities, with equity interest in the consortium of 24.5%, 24.5% and 51.0%, respectively, was notified that it has been selected by the Republic of South Africa Department of Energy as the preferred bidder for the construction and operation project of a coal-fired power plant in the Republic of South Africa. Once negotiations and financing arrangements are completed, the construction of the coal-fired power plant is expected to commence. The plant is

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expected to have an aggregate capacity of 630 megawatts, and construction is expected to take 52 months to complete. The consortium plans to participate in the operation of the plant for a period of 30 years from the commercial operation date. The total cost of the project is estimated to be around US$2.14 billion, of which our total capital investment is expected to be approximately US$133 million. In connection with the project, we plan to establish a holding company and a project company in the Republic of South Africa.

On September 28, 2017, we entered into a joint development agreement with Tadmax Resources Bhd, a Malaysian corporation, in relation to a gas-fired power plant with capacity of 1,200 megawatts in Pulau Indah, Malaysia. We obtained approval for this project from Malaysian Energy Commission, the project sponsor. We will hold a 25% equity interest in this project, and Tadmax Resources Bhd will hold a 75% equity interest in it. The total project cost is expected to be approximately US$1 billion, and we expect to invest approximately US$50 million for the equity interest. Upon closing of the financing, the construction for this project will begin in the fourth quarter of 2019, following the approval of the applicable tariff rates by the Malaysian Energy Commission, which is currently expected to occur in the second quarter of 2019. This project marks our first entry into the Malaysian power generation market. We expect to enter into a power purchase agreement with Tenaga Nasional Berhad for a term of 21 years, with a goal of generating a stable revenue stream from this project.

Exploration and Production Projects

In order to secure a more reliable supply of fuel for power generation and hedge against fluctuations in fuel price, from 2007 to 2016, we pursued overseas exploration and production projects, including five bituminous coal projects and five uranium projects involving investments of approximately Won 1.4 trillion. However, pursuant to the Government s Proposal for Adjustment of Functions of Public Institutions (Energy Sector) announced in June 2016, as of December 31, 2016, except for the Bylong project described below, we transferred all our assets and liabilities for our overseas resource business to our six generation subsidiaries, which are the end-consumers of fuels and are therefore expected to more responsively manage these projects. The amount of net assets that we transferred to our generation subsidiaries as of December 31, 2016 was Won 622 billion.

Some of the assets transferred include our equity interest in PT Adaro Energy TBK, which is one of the largest coal producers in Indonesia, as well as our 20% equity interest in PT. Bayan Resources Tbk pursuant to which we were entitled to an off-take of 7 million tons per year beginning in 2015.

One exception to the transfers on such date was our 90% equity interest in KEPCO Bylong Pty Ltd., for which we are currently processing a development application and mining leases from the New South Wales government and Environment Protection and Biodiversity Conservation referral from Australian (Commonwealth) government. After the approval of such permit, we and our generation subsidiaries expect to make additional investment (expected to amount to approximately US$400 million paid pro rata by us and our generation subsidiaries over the course of three years). Commercial production is expected to commence in 2021. We transferred 10% of our equity interest in the KEPCO Bylong Pty Ltd. to our five non-nuclear generation subsidiaries as of December 31, 2016, and we plan to gradually transfer the remainder of our interest in the KEPCO Bylong Pty Ltd. to them subject to the progress of the regulatory approval process and resource production phase of the project.

Our nuclear generation subsidiary, KHNP, is also pursuing development projects for procurements of uranium in countries including Canada, the United States and Niger.

Renewable Energy Projects

Our overseas renewable energy projects include the generation of electricity through renewable energy sources.

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Since 2005, joint ventures between us and China Datang Corporation of the People s Republic of China have built and operated a number of wind farms in Inner Mongolia, Liaoning and Gansu provinces. We own 40% of these joint ventures, whose equity in the aggregate amount is approximately US$450 million. The projects are funded one-third by equity contributions and two-thirds by debt financing. As of December 31, 2018, the joint venture operated 22 wind farms with a total capacity of 1,017 megawatts and a 7-megawatt photovoltaic power station.

In December 2015, we entered into an agreement with the Ministry of Energy and Mineral Resources of Jordan to build, own and operate a wind farm with installed capacity of 89.1 megawatts in Fujeij, Ma an, Jordan. Construction is currently underway with commercial operations expected to commence in May 2019. Total project cost is approximately US$184 million, of which 40% is financed through equity investments by us and the remaining 60% through debt financing. We believe that this project will help us to further diversify our business portfolio in the Middle East from the existing focus on nuclear and thermal power plants to expand to renewable energy facilities.

In June 2015, we entered into a memorandum of understanding with Energy Product, a Japanese local developer, to build, own and operate photovoltaic power station with a capacity of 28 megawatts, together with a 13.7 megawatts-hour energy storage system, in Chitose, Hokkaido prefecture in Japan. The parties subsequently signed the joint development agreement and other definitive agreements. The power station, in which we own 80.1% interest, started commercial operation in July 2017. Total project cost is approximately JPY 11.3 billion, of which 20% was financed through 80:20 equity investments by us and EP. The remaining 80% is funded through debt financing.

In August 2016, we entered into a Purchase and Sale Agreement with Cogentrix Solar Holdings to operate a photovoltaic power station in Colorado, United States, with a capacity of 30 megawatts for 25 years. Total project cost is approximately US$85 million, of which 50.1% was financed through 50.1:49.9 equity investments by us and a private equity fund formed by us and National Pension Service. It was our first foray into the North American power market.

In June 2017, a consortium between us and LG CNS Co., Ltd. won a project to build, own and operate a photovoltaic power station in Guam, United States, with a capacity of 60 megawatts for 25 years, including 32 megawatts-hour energy storage system. The total project cost is approximately US$200 million, of which 25% will be financed through equity investment by us and LG CNS Co., Ltd., each holding 70% and 30% of equity interests, respectively, and the remaining 75% will be funded through debt financing. The debt to equity ratio will be fixed upon financial closing. The consortium has entered into a power purchase agreement with Guam Power Authority in August 2018 and the construction of the project is expected to start in the first half of 2019. It is expected the power station will begin commercial operation by June 2021.

In September 2017, we entered into an agreement with Recurrent Energy to operate 3 solar photovoltaic project in southern California, United States, with a capacity of 235MW for 34 years. KEPCO partnered with the Corporate Partnership Fund, a Korean private equity fund. We invested USD 38 million in the project, and the transaction marks our largest investment in the U.S. solar market.

In October 2018, we entered into a Share Purchase Agreement and Share Subscription Agreement to operate a photovoltaic power station with a capacity of 50 megawatts in Calatagan in Philippines. The parties, KEPCO and Solar Philippines Power Project Holdings, Inc., subsequently signed the Shareholders Agreement in December 2018, in which KEPCO owns 38% interest. We financed PHP 2.25 billion (approximately USD 42.8 million) for the Calatagan Project, of which 80% was financed through equity investments and the remaining 20% was funded through debt financing.

Although renewable energy projects are currently insignificant as a proportion of our total overseas activities and our generation activities, we expect the portion of renewable energy projects to increase in the future as we seek to penetrate the overseas renewable energy market, diversify our businesses and actively address climate change. We expect to further diversify our business in the renewable energy sector to also include smart transmission and distribution facilities, smart grids and utilization of new energy related technologies.

North Korea

Kaesong Complex

Since 2005, we have provided electricity to the industrial complex located in Kaesong, North Korea, which was established pursuant to an agreement made during the summit meeting of the two Koreas in June 2000. The Kaesong complex is the largest economic project between the two Koreas and is designed to combine the Republic s capital and entrepreneurial expertise with the availability of land and labor of North Korea. In March 2005, we built a 22.9 kilovolt distribution line from Munsan substation in Paju, Gyeonggi Province to the Kaesong complex and became the first to supply electricity to pilot zones such as ShinWon Ebenezer. In April 2006, we started to construct a 154 kilovolt, 16 kilometer transmission line connecting Munsan substation to the Kaesong complex as well as Pyunghwa substation in the complex and began operations in May 2007.

At the end of 2015, we supplied electricity to 254 units, including administrative agencies, support facilities and resident corporations, using a tariff structure identical to that of South Korea. However, we suspended power transmission to the Kaesong Industrial Complex since February 11, 2016 following the Government s decision to halt operations of the industrial complex to impede North Korea s utilization of funds from the industrial complex to finance its nuclear and missile programs. As of December 31, 2018, the book value of our facility located at the complex was Won 17.5 billion. For the year ended December 31, 2018, the amount of trade receivables from the companies residing in Kaesong complex was Won 2.9 billion. It is currently uncertain if we can exercise the property rights for our facility in the Kaesong complex. No assurance can be given that we will not experience any material losses as a result of the suspension of this project or failure of the project as a result of a breakdown or escalation of hostilities in the relationship between the Republic and North Korea. See Item 3.D. Risk Factors Risks Relating to Korea and the Global Economy Tensions with North Korea could have an adverse effect on us and the market value of our shares.

Insurance

We and our generation subsidiaries carry insurance covering against certain risks, including fire, in respect of key assets, including buildings, equipment, machinery, construction-in-progress and procurement in transit, as well as, in the case of us, directors and officers liability insurance. We and our generation subsidiaries maintain casualty and liability insurance against risks related to our business to the extent we consider appropriate. Other than KHNP, neither we nor our generation subsidiaries separately insure against terrorist attacks. These insurance and indemnity policies, however, cover only a portion of the assets that we own and operate and do not cover all types or amounts of loss that could arise in connection with the ownership and operation of these assets.

Substantial liability may result from the operations of our nuclear generation units, the use and handling of nuclear fuel and possible radioactive emissions associated with such nuclear fuel. KHNP maintains property and liability insurance against risks of its business to the extent required by the related law and regulations or considered as appropriate and otherwise self-insures against such risks. KHNP carries insurance for its generation units against certain risks, including property damage, nuclear fuel transportation and liability insurance for personal injury and property damage. KHNP carries property damage insurance covering up to US$1 billion per accident for all properties within its plant complexes, which includes property insurance coverage for acts of terrorism up to US$300 million and for breakdown of machinery up to US$300 million. In addition to the insurance on operating nuclear power generation units, KHNP has construction insurance for Shin-Kori #4, #5 and #6 and Shin-Hanul #1 and #2. KHNP maintains nuclear liability insurance for personal injury and third-party property damage for coverage of up to 300 million Special Drawing Rights, or SDRs, which amounts to approximately US$435 million, at the rate of 1 SDR = US$1.387090 as posted on the Internet homepage of the International Monetary Fund on April 5, 2019 per plant complex, for a total coverage of 1.5 billion SDRs. KHNP is also the beneficiary of a Government indemnity with respect to such risks for damage claims of up to Won 300 million SDRs per nuclear plant complex, for a total coverage of 1.5 billion SDRs. Under the Nuclear Damage Compensation Act of 1969, as amended, KHNP is liable only up to 300 million SDRs, per single accident per plant complex; provided that such limitation will not apply where KHNP intentionally causes harm or knowingly fails to prevent the harm from occurring. KHNP will receive the Government s support, subject to the approval of the National Assembly, if (i) the damages exceed the insurance coverage amount of 300 million SDRs and (ii) the Government deems such support to be necessary for the purposes of protecting damaged persons and supporting the development of nuclear energy business. KHNP carries insurance for its generation units and nuclear fuel transportation, and we believe that the level of insurance is generally adequate and is in compliance with relevant laws and regulations. In addition, KHNP is the beneficiary of Government indemnity which covers a portion of liability in excess of the insurance. However, such insurance is limited in terms of amount and scope of coverage and does not cover all types or amounts of losses which could arise in connection with the ownership and operation of nuclear plants. Accordingly, material adverse financial consequences could result from a serious accident or a natural disaster to the extent it is neither insured nor covered by the government indemnity. See Item 3.D. Risk Factors Risks Relating to KEPCO The amount and scope of coverage of our insurance are limited.

Competition

As of December 31, 2018, we and our generation subsidiaries owned approximately 68.3% of the total electricity generation capacity in Korea (excluding plants generating electricity for private or emergency use). New entrants to the electricity business will erode our market share and create significant competition, which could have a material adverse impact on our financial condition and results of operations.

In particular, we compete with independent power producers with respect to electricity generation. The independent power producers accounted for 26.7% of total power generation in 2018 and 31.7% of total generation capacity as of December 31, 2018. As of December 31, 2018, there were 19 independent power producers in Korea, excluding renewable energy producers. Private enterprises became permitted to own and operate coal-fired power plants in Korea only after the Ministry of Trade, Industry and Energy approved plans for independent power producers to construct coal-fired power plants under the Sixth Basic Plan announced in February 2013. Under the Eighth Basic Plan announced in December 2017, six coal-fired units under construction with aggregate generation capacity of 6,260 megawatts are scheduled to be completed between 2021 and 2022. While it remains to be seen whether construction of these generation units will be completed as scheduled, if these units were to be completed as scheduled and/or independent power producers are permitted to build additional generation capacity (whether coal-fired or not), our market share in Korea may decrease, which may have a material adverse effect on our results of operations and financial condition.

In addition, under the Community Energy System adopted by the Government in 2004, a minimal amount of electricity is supplied directly to consumers on a localized basis by independent power producers outside the cost-based pool system used by our generation subsidiaries and most independent power producers to distribute electricity nationwide. The purpose of this system is to geographically decentralize electricity supply and thereby reduce transmission losses and improve the efficiency of energy use. These entities do not supply electricity on a national level but are licensed to supply electricity on a limited basis to their respective districts under the Community Energy System. As of March 31, 2019, the aggregate generation capacity of suppliers participating in the Community Energy System amounted to less than 1% of that of our generation subsidiaries in the aggregate. We currently do not expect the Community Energy System to be widely adopted, especially in light of the significant level of capital expenditure required for such direct supply. However, if the Community Energy System is widely adopted, it may erode our currently dominant market position in the generation and distribution of electricity in Korea and may have a material adverse effect on our business, results of operations and financial condition.

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Our market dominance in the electricity distribution in Korea also may face potential erosion in light of the recent Proposal for Adjustment of Functions of Public Institutions (Energy Sector) announced by the Government in June 2016. This proposal contemplates a gradual opening of the electricity trading market to the private sector although no detailed roadmap has been provided for such opening. It is currently premature to predict to what extent, or in what direction, the liberalization of the electricity trading market will happen. Nonetheless, any significant liberalization of the electricity trading market may result in substantial reduction of our market share in electricity distribution in Korea, which would have a material adverse effect on our business, results of operation and cash flows.

The electric power industry, which began its liberalization process with the establishment of our power generation subsidiaries in April 2001, may become further liberalized in accordance with the Restructuring Plan. See Item 4.B. Business Overview Restructuring of the Electric Power Industry in Korea.

In the residential sector, consumers may use natural gas, oil and coal for space and water heating and cooking. However, currently there is no practical substitute for electricity for lighting and other household appliances, which is available on commercially affordable terms.

In the commercial sector, electricity is the dominant energy source for lighting, office equipment and air conditioning. For its other uses, such as space and water heating, natural gas and, to a lesser extent, oil, provide competitive alternatives to electricity.

In the industrial sector, electricity is the dominant energy source for a number of industrial applications, including lighting and power for many types of industrial machinery and processes that are available on commercially affordable terms. For other uses, such as heating, electricity competes with oil and natural gas and potentially with gas-fired combined heating and power plants.

Regulation

We are a statutory juridical corporation established under the KEPCO Act for the purpose of ensuring a stable supply of electric power and further contributing toward the sound development of the national economy through facilitating development of electric power resources and carrying out proper and effective operation of the electricity business. The KEPCO Act (including the amendment thereto) prescribes that we engage in the following activities:

1. development of electric power resources;
2. generation, transmission, transformation and distribution of electricity and other related business activities;
3. research and development of technology related to the businesses mentioned in items 1 and 2;
4. overseas businesses related to the businesses mentioned in items 1 through 3;
5. investments or contributions related to the businesses mentioned in items 1 through 4;

6. businesses incidental to items 1 through 5;

7. Development and operation of certain real estate held by us to the extent that:

    a. it is necessary to develop certain real estate held by us due to external factors, such as relocation, consolidation, conversion to indoor or underground facilities or deterioration of our substation or office; or

    b. it is necessary to develop certain real estate held by us to accommodate development of relevant real estate due to such real estate being incorporated into or being adjacent to an area under planned urban development; and

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8. other activities entrusted by the Government.

The KEPCO Act currently requires that our profits be applied in the following order of priority:

first, to make up any accumulated deficit;

second, to set aside 20.0% or more of profits as a legal reserve until the accumulated reserve reaches one-half of our capital;

third, to pay dividends to shareholders;

fourth, to set aside a reserve for expansion of our business;

fifth, to set aside a voluntary reserve for the equalization of dividends; and

sixth, to carry forward surplus profit.

As of December 31, 2018, the legal reserve was Won 1,605 billion and the voluntary reserve was Won 35,906 billion, which consisted of reserve for business expansion of Won 30,089 billion, reserve for investment in social overhead capital of Won 5,277 billion, reserve for research and human development of Won 330 billion and reserve for equalizing dividends of Won 210 billion.

We are under the supervision of the Ministry of Trade, Industry and Energy, which has principal supervisory responsibility (in consultation with other Government agencies, such as the Ministry of Economy and Finance, as applicable) over us with respect to the appointments of our directors and our other senior management as well as approval of electricity tariff rate adjustments, among others.

Because the Government owns part of our capital stock, the Government s Board of Audit and Inspection may audit our books.

The Electric Utility Act requires that licenses be obtained in relation to generation, transmission, distribution and sales of electricity, with limited exceptions. We hold the license to generate, transmit, distribute and sell electricity. Each of our six generation subsidiaries holds an electricity generation license. The Electric Utility Act governs the formulation and approval of electricity rates in Korea. See Sales and Customers Electricity Rates above.

Our operations are subject to various laws and regulations relating to environmental protection and safety.

Debt Reduction Program and Related Activities

In light of the general policy guideline of the Government for public institutions (including us and our generation subsidiaries) to reduce their respective overall debt levels, we and our generation subsidiaries have, in consultation with the Ministry of Trade, Industry and Energy and as approved by the Public Agencies Operating Committee, previously set target debt-to-equity levels every year from 2014 to 2017 and undertook various programs to reduce debt and improve the overall financial health, including through rationalizing and applying stricter review to (from a profitability and efficiency perspective) various aspects of our operations (both domestic and overseas), inviting private sector investments, disposing of non-core assets (such as non-core or loss-generating overseas operations and real property unrelated to operations), reducing costs, exploring alternative ways to generate additional revenue and developing contingency plans for further cost savings. Such debt-reduction initiatives ended at the end of 2017 as initially planned. However, we plan to continue carry out similar initiatives to manage our level of debt.

Despite our best efforts, however, for reasons beyond our control, including macroeconomic environments, government regulations and market forces (such as international market prices for our fuels), we cannot assure whether we or our generation subsidiaries will be able to successfully reduce debt burdens or otherwise improve our financial health or to a level that would be optimal for our capital structure. If we or our generation subsidiaries fail to do so or the measures taken by us or our generation subsidiaries to reduce debt levels or improve financial health have unintended adverse consequences, such developments may have an adverse effect on our business, results of operations and financial condition.

Establishment of an University

In light of President Moon Jae-in s key policy for Korea s southwestern Honam region and in an effort to cultivate talents and establish a research platform for new market expansions, we plan to establish an university in South Jeolla Province. The university is planned to focus on energy studies and is expected to have 100 professors and more than 1,000 students. The opening date is tentatively scheduled for 2022. The estimated cost of such project is Won 700 billion. Although the source of the funding has not yet been finalized, we are endeavoring to secure funds from both the central government and the municipality government. For example, for ten years after the commencement of the university, we will receive funding (to be used for expenses in operating the school) from the municipality government in the amount of Won 200 billion. We are also currently discussing with the government-wide University Establishment and Support Committee regarding a potential funding from the central government. Other than the funds provided by the municipality and the central governments, we may have to provide a portion of the funds at our own expense, which, if significant, may have an adverse effect on our results of operations and financial condition.

Proposed Sale of Certain Power Plants and Equity Interests

The following table summarizes our current plans for sale of certain of our assets. These sales will be made pursuant to the Government s plans to reduce debt levels and improve management efficiency of public enterprises. The consummation of these plans, however, is subject to, among others, related Government policies and market conditions.

Equity Holdings	Primary Business	Fair Value[(1)] as of December 31, 2018 (in billions of Won)	Ownership Percentage as of December 31, 2018	Ownership Percentage to be Sold
KEPCO Engineering & Construction Co., Inc.	Architectural engineering for utility plants	525	65.77	14.77
Korea Electric Power Industrial Development Co., Ltd.	Electricity metering	34	29.00	29.00

Note:

(1) Fair value has been computed as the product of the closing share price on December 31, 2018 multiplied by the number of shares owned by KEPCO.

KEPCO Engineering & Construction Co., Inc.

Pursuant to the Third Phase of the Public Institution Reform Plan announced by the Government in August 2008, we conducted the initial public offering of Korea Engineering and Construction Co., Inc., or KEPCO E&C formerly known as Korea Power Engineering Co., Ltd., in December 2009 for gross proceeds to us of Won 165 billion, following which we owned 77.9% of KEPCO E&C s shares. In furtherance of the Public Institution Reform Plan and to improve our financial profile, we sold our equity interests representing 3.1%, 4.0%, 4.5% and 0.54% of KEPCO E&C shares in November 2011, December 2013, December 2014 and December 2016, respectively, in each case to third party investors. We currently hold a 65.77% equity interest in KEPCO E&C.

Korea Electric Power Industrial Development Co., Ltd.

In 2003, we privatized Korea Electric Power Industrial Development, or KEPID, formerly our wholly-owned subsidiary, by selling 51.0% of its equity interest to Korea Freedom Federation. Pursuant to the Fifth Phase of the Public Institution Reform Plan announced by the Government in 2009, we sold 20% of the KEPID shares through additional listing. We currently plan to sell the remaining 29.0% of KEPID s equity interest based on, among others, considerations of economic and market conditions.

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Item 4.C. Organizational Structure

As of December 31, 2018, we had 106 subsidiaries, 58 associates and 55 joint ventures (not including any special purpose entities).

Subsidiaries

Our wholly-owned six generation subsidiaries are KHNP, KOSEP, KOMIPO, KOWEPO, KOSPO and EWP. Our non-generation subsidiaries include KEPCO E&C, KEPCO KPS, KEPCO NF, and KEPCO KDN. For a full list of our subsidiaries, including foreign subsidiaries, and their respective jurisdiction of incorporation, please see Exhibit 8.1 attached to this annual report.

Associates and Joint Ventures

An associate is an entity over which we have significant influence and that is neither a subsidiary nor a joint venture. Significant influence is the power to participate in the financial and operating policy decisions of the investee but does not have control or joint control over those policies. A joint venture is a joint arrangement whereby the parties that have joint control of the arrangement (i.e. joint ventures) have rights to the net assets of the arrangement.

The table below sets forth each of our associates and joint ventures as of December 31, 2018 by name, the percentage of our shareholdings and their principal activities.

	Ownership (Percent)	Principal Activities
Associates:		
Korea Gas Corporation(1)	20	Importing and wholesaling LNG
Korea Electric Power Industrial Development Co., Ltd.	29	Electricity metering and others
YTN Co., Ltd.	21	Broadcasting
Cheongna Energy Co., Ltd.	44	Generating and distributing vapor and hot/cold water
Gangwon Wind Power Co., Ltd.(2)	15	Power generation
Hyundai Green Power Co., Ltd.	29	Power generation
Korea Power Exchange(5)	100	Management of power market and others
AMEC Partners Korea Ltd.(3)	19	Resources development
Hyundai Energy Co., Ltd.(8)	31	Power generation
Ecollite Co., Ltd.	36	Artificial light-weight aggregate
Taebaek Wind Power Co., Ltd.	25	Power generation
Taeback Guinemi Wind Power Co., Ltd.	25	Power generation
Pyeongchang Wind Power Co., Ltd.	25	Power generation
Daeryun Power Co., Ltd.(3)	9	Power generation
Changjuk Wind Power Co., Ltd.	30	Power generation
KNH Solar Co., Ltd.	27	Power generation
SPC Power Corporation	38	Power generation
Gemeng International Energy Co., Ltd.	34	Power generation
PT. Cirebon Electric Power	28	Power generation

KNOC Nigerian East Oil Co., Ltd.[4]	15	Resources development
KNOC Nigerian West Oil Co., Ltd.[4]	15	Resources development
PT Wampu Electric Power	46	Power generation
PT. Bayan Resources TBK	20	Resources development
S-Power Co., Ltd.	49	Power generation
Pioneer Gas Power Limited[7]	39	Power generation
Eurasia Energy Holdings	40	Power generation and resources development

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	Ownership (Percent)	Principal Activities
Xe-Pian Xe-Namnoy Power Co., Ltd.	25	Power generation
Hadong Mineral Fiber Co., Ltd.(3)	8	Recycling fly ashes
Green Biomass Co., Ltd.(10)	9	Power generation
PT. Mutiara Jawa	29	Manufacturing and operating floating coal terminal
Samcheok Eco Materials Co., Ltd.(9)	2	Recycling fly ashes
Noeul Green Energy Co., Ltd.	29	Power generation
Naepo Green Energy Co., Ltd.	42	Power generation
Goseong Green Energy Co., Ltd.(2)	1	Power generation
Gangneung Eco Power Co., Ltd.(2)	2	Power generation
Shin Pyeongtaek Power Co., Ltd.	40	Power generation
Heang Bok Do Si Photovoltaic Power Co., Ltd.	28	Power generation
Dongducheon Dream Power Co., Ltd.(14)	34	Power generation
Jinbhuvish Power Generation Pvt. Ltd.(2)	5	Power generation
SE Green Energy Co., Ltd.	48	Power generation
Daegu Photovoltaic Co., Ltd.	29	Power generation
Jeongam Wind Power Co., Ltd.	40	Power generation
Korea Power Engineering Service Co., Ltd.	29	Construction and service
Busan Green Energy Co., Ltd.	29	Power generation
Gunsan Bio Energy Co., Ltd.(2)	19	Power generation
Korea Electric Vehicle Charging Service	28	Electric vehicle charge service
Ulleungdo Natural Energy Co., Ltd.	30	Renewable power generation
Korea Nuclear Partners Co., Ltd.	29	Electric material agency
Tamra Offshore Wind Power Co., Ltd.	27	Power generation
Korea Electric Power Corporation Fund(11)	98	Developing electric enterprises
Energy Infra Asset Management Co., Ltd.(3)	10	Asset management
Daegu clean Energy Co., Ltd.	28	Renewable power generation
YaksuESS Co., Ltd	29	Installing ESS related equipment
Nepal Water & Energy Development Company Private Limited(13)	58	Construction and operation of utility plant
Gwangyang Green Energy Co., Ltd.	20	Power generation
PND solar., Ltd	29	Power generation
Hyundai Eco Energy Co., Ltd.(2)	19	Power generation
YeongGwang Yaksu Wind Electric. Co., Ltd(2)	10	Power generation
Joint Ventures:		
KEPCO-Uhde Inc.(6)	53	Power generation
Eco Biomass Energy Sdn. Bhd.(6)	62	Power generation
Shuweihat Asia Power Investment B.V.	49	Holding company
Shuweihat Asia Operation & Maintenance Company(6)	55	Maintenance of utility plant
Waterbury Lake Uranium L.P.	34	Resources development
ASM-BG Investicii AD	50	Power generation
RES Technology AD	50	Power generation
KV Holdings, Inc.	40	Power generation
KEPCO SPC Power Corporation(6)	75	Construction and operation of utility plant

Gansu Datang Yumen Wind Power Co., Ltd.	40	Power generation
Datang Chifeng Renewable Power Co., Ltd.	40	Power generation
Datang KEPCO Chaoyang Renewable Power Co., Ltd.	40	Power generation

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	Ownership (Percent)	Principal Activities
Rabigh Electricity Company	40	Power generation
Rabigh Operation & Maintenance Company Limited	40	Maintenance of utility plant
Jamaica Public Service Company Limited	40	Power generation
KW Nuclear Components Co., Ltd.	45	Manufacturing
Busan Shinho Solar Power Co., Ltd.	25	Power generation
GS Donghae Electric Power Co., Ltd.	34	Power generation
Global Trade Of Power System Co., Ltd.	29	Exporting products and technology of small or medium business by proxy
Expressway Solar-light Power Generation Co., Ltd.	29	Power generation
Daejung Offshore Wind Power Co., Ltd.	50	Power generation
Amman Asia Electric Power Company(6)	60	Power generation
KAPES, Inc.(6)	51	R&D
Dangjin Eco Power Co., Ltd.	34	Power generation
Honam Wind Power Co., Ltd.	29	Power generation
Chun-cheon Energy Co., Ltd.	30	Power generation
Yeonggwangbaeksu Wind Power Co., Ltd.(3)	15	Power generation
Nghi Son 2 Power LLC	50	Power generation
Kelar S.A(6)	65	Power generation
PT. Tanjung Power Indonesia	35	Power generation
Incheon New Power Co., Ltd.	29	Power generation
Seokmun Energy Co., Ltd.	29	Power generation
Daehan Wind Power PSC	50	Power generation
Barakah One Company(12)	18	Power generation
Nawah Energy Company(12)	18	Operation of utility plant
MOMENTUM	33	International thermonuclear experimental reactor construction management
Daegu Green Power Co., Ltd.	29	Power generation
Yeonggwang Wind Power Co., Ltd.	41	Power generation
Chester Solar IV SpA(6)	82	Power generation
Chester Solar V SpA(6)	82	Power generation
Diego de Almagro Solar SpA(6)	82	Power generation
South Jamaica Power Company Limited	20	Power generation
Daesan Green Energy Co., Ltd.	35	Power generation
RE Holiday Holdings LLC	50	Power generation
RE Pioneer Holdings LLC	50	Power generation
RE Barren Ridge 1 Holdings LLC	50	Power generation
RE Astoria 2 LandCo LLC	50	Power generation
RE Barren Ridge LandCo LLC	50	Power generation
Laurel SpA(6)	82	Power generation
KIAMCO KOWEPO Bannerton Hold Co Pty Ltd(3)	12	Power generation
Chile Solar JV SpA	50	Power generation
Taebaek Gadeoksan Wind Power Co., Ltd.	47	Power generation
Cheong-Song Noraesan Wind Power Co., Ltd.	25	Power generation
Chester Solar I SpA(6)	82	Power generation
Solar Philippines Calatagan Corporation	38	Power generation

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Notes:

(1) The effective percentage of ownership (excluding the treasury stocks) is 21.57%.
(2) Our effective percentage of ownership is less than 20%, but we can exercise significant influence by virtue of our contractual right to appoint directors to the board of directors of this entity and, through such directors, we can influence the financial and operating policy of the board of directors.
(3) Our effective percentage of ownership is less than 20%, but we can exercise significant influence by virtue of our contractual right to appoint a director to the board of directors of this entity.
(4) Our effective percentage of ownership is less than 20%, but we can exercise significant influence by virtue of our contractual right to appoint one out of four members of the steering committee of this entity. Moreover, we have significant financial transactions with this entity to the effect that we can exercise significant influence on this entity.
(5) The Government regulates our ability to make operating and financial decisions over this entity, as the Government requires maintaining arms-length transactions between the Korea Power Exchange and our other subsidiaries. We can exercise significant influence by virtue of our right to nominate directors to the board of directors of this entity.
(6) Our effective percentage of ownership is more than 50%. However, according to the shareholders agreement, all critical financial and operating decisions must be agreed to by all shareholders. For this reason, these entities are classified as joint ventures.
(7) The reporting period of all associates and joint ventures ends on December 31, except for Pioneer Gas Power Limited, whose reporting period ends on March 31.
(8) As of December 31, 2018, 15.64% of ownership of Hyundai Energy Co., Ltd. is held by NH Power II Co., Ltd. and NH Bank. According to the shareholders agreement reached on March 2011, we have a call option to acquire the investment in Hyundai Energy Co., Ltd. from NH Power II Co., Ltd. and NH Bank upon a certain rate of return, and NH Power II Co., Ltd. and NH Bank also have put options to dispose of their investment to us. In connection with this agreement, we applied the equity method on our 46.30% equity investment in Hyundai Energy Co., Ltd.
(9) Our effective percentage of ownership (excluding the redeemable convertible preferred stock) is 25.54%.
(10) Our effective percentage of ownership is less than 20%, but we can exercise significant influence by virtue of our contractual right to appoint a director to the board of directors of this entity and the fact that a dominant portion of the investee s sales transactions is generated from us.
(11) Our effective percentage of ownership is more than 50% but we do not hold control over relevant business while we exercise significant influence by participating in the Investment Decision Committee. For this reason, this entity is classified as an associate.
(12) Our effective percentage of ownership is less than 20%, but we have joint control over this entity as decisions on the major activities require the unanimous consent of the parties that collectively control this entity.
(13) Our effective percentage of ownership is more than 50%, but we do not control this entity according to the shareholders agreement. For this reason, this entity is classified as an associate.
(14) Our effective percentage of ownership is 34.01% considering redeemable convertible preferred stock.

Item 4.D. Property, Plant and Equipment

Our property consists mainly of power generation, transmission and distribution equipment and facilities in Korea. See Item 4.B. Business Overview Power Generation, Transmission and Distribution and Capital Investment Prograi In addition, we own our corporate headquarters building complex at 55 Jeollyeok-ro, Naju-si, Jeollanam-do, 58322, Korea. As of December 31, 2018, the net book value of our property, plant and equipment was Won 152,743 billion. As of December 31, 2018, investment property, which is accounted for separately from our property, plant and equipment, amounted to Won 160 billion. No significant amount of our properties is leased. There are no material encumbrances on our properties, including power generation, transmission and distribution equipment and facilities.

Pursuant to a Government plan announced in 2005, which mandated relocation of the headquarters of select government-invested enterprises from the Seoul metropolitan area to other provinces in Korea as part of an initiative to foster balanced economic growth in the provinces, we, our generation subsidiaries and our certain subsidiaries relocated our respective headquarters to the designated locations during 2014 and 2015. Our headquarters are currently located in Naju in Jeollanam-do Province while the headquarters of our six generation subsidiaries and other subsidiaries are various cities outside of Seoul across Korea.

In connection with the relocation of our headquarters, in September 2014 we entered into an agreement to sell the property housing our prior headquarters to a consortium consisting of members of the Hyundai Motor group for Won 10,550 billion through an open bidding. The sale was completed in September 2015.

During 2018, we completed the sales of 126 properties (including residential properties, storage spaces, and substation lots that are located in Korea) which are not directly related to our operations for an aggregate sale price of approximately Won 166 billion. The book value of such properties amounted to Won 106 billion, representing 1.3% of our total real properties as of December 31, 2018. The foregoing sales reflect our ongoing efforts to improve our financial soundness through debt reduction and enhance our management efficiency, selling noncore properties that have no direct relations to electricity facilities.

ITEM 4A. UNRESOLVED STAFF COMMENTS

We do not have any unresolved comments from the SEC staff regarding our periodic reports under the Securities Exchange Act of 1934, as amended (the Exchange Act).

ITEM 5. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

You should read the following discussion on our operating and financial review and prospects together with our consolidated financial statements and the related notes which appear elsewhere in this annual report. Our results of operations, financial condition and cash flows may materially change from time to time, for reasons including various policy initiatives (including changes to the Restructuring Plan) by the Government in relation to the Korean electric power industry, and accordingly our historical performance may not be indicative of our future performance. See Item 4.B. Business Overview Restructuring of the Electric Power Industry in Korea and Item 3D. Risk Factors The Government may adopt policy measures to substantially restructure the Korean electric power industry or our operational structure, which may have a material adverse effect on our business, operations and profitability.

Item 5.A. Operating Results

Overview

We are a predominant market participant in the Korean electric power industry, and our business is heavily regulated by the Government, including with respect to the rates we charge to customers for the electricity we sell. In addition, our business requires a high level of capital expenditures for the construction of electricity generation, transmission and distribution facilities and is subject to a number of variable factors, including demand for electricity in Korea and fluctuations in fuel costs, which are in turn impacted by the movements in the exchange rates between the Won and other currencies.

Under the Electric Utility Act and the Price Stabilization Act, the Government generally establishes electricity rates at levels that are expected to permit us to recover our operating costs attributable to our basic electricity generation, transmission and distribution operations in addition to receiving a fair investment return on capital used in those operations. For a detailed description of the fair investment return, see Item 4.B. Business Overview Sales and Customers Electricity Rates. From 2014 to 2016, largely due to the general decline of fuel prices, relatively stable exchange rates, the sale of the properties in our previous headquarters and the greater use of coal relative to LNG (the former being a cheaper source of fuel) as a proportion of the fuels used to produce electricity, our gross profit, operating profit and net profit increased significantly.

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If fuel prices were to rise substantially and rapidly in the future, such rise may have a material adverse effect on our results of operations and profitability. In part to address these concerns, the Government from time to time increases the electricity tariff rates. However, such increases may be insufficient to fully offset the adverse impact from the rise in fuel costs, and since such increases typically require lengthy public deliberations in order to be implemented, the tariff increases often occur with a significant time lag and as a result our results of operations and cash flows may suffer. On the other hand, if fuel prices decrease, substantial political pressure may lead the Government to lower the level of electricity tariff in a relatively shorter period of time due to the lack of public opposition, which could negatively affect our profit margins and in turn our financial condition and results of operations.

The results of our operations are largely affected by the following factors:

- demand for electricity;
- electricity rates we charge to our customers;
- fuel costs; and
- the exchange rates of Won against other foreign currencies, in particular the U.S. dollar.

Demand for Electricity

Our sales are largely dependent on the level of demand for electricity in Korea and the rates we charge for the electricity we sell.

Demand for electricity in Korea grew at a compounded average rate of 2.1% per annum for the five years ended December 31, 2018. According to the Bank of Korea, the compounded growth rate for GDP was approximately 3.0% for the same period. The GDP growth rate was approximately 2.9%, 3.1% and 2.7% during 2016, 2017 and 2018, respectively.

The table below sets forth, for the periods indicated, the annual rate of growth in Korea s GDP and the annual rate of growth in electricity demand (measured by total annual electricity consumption) on a year-on-year basis.

	2014	2015	2016	2017	2018
Growth in GDP	3.3%	2.8%	2.9%	3.1%	2.7%
Growth in electricity consumption	0.6%	1.3%	2.8%	2.2%	3.6%

Demand for electricity may be categorized either by the type of its usage or by the type of customers. The following describes the demand for electricity by the type of its usage, namely, industrial, commercial and residential:

- The industrial sector represents the largest segment of electricity consumption in Korea. Demand for electricity from the industrial sector was 292,999 gigawatt hours in 2018, representing a 2.5% increase from

2017, largely due to the increased volume of semiconductor and other exports.

Demand for electricity from the commercial sector depends largely on the level and scope of commercial activities in Korea, which in recent years have resulted in increased office building construction, office automation and use of air conditioners and heaters. Demand for electricity from the commercial sector increased to 116,934 gigawatt hours in 2018, representing a 5.1% increase from 2017 largely due to the extreme weather conditions that have led to increased demand for heating and air conditioning.

Demand for electricity from the residential sector is largely dependent on population growth and use of heaters, air conditioners and other electronic appliances. Demand for electricity from the residential sector increased to 72,895 gigawatt hours in 2018, representing a 6.3% increase compared to 2017, largely due to an increase in household electricity usage for air conditioning and heating. For a discussion on demand by the type of customers, see Item 4.B. Business Overview Sales and Customers Demand by the Type of Usage.

Since our inception, we have had the predominant market share in terms of electricity generated in Korea. As for electricity we purchase from the market for transmission and distribution to our end-users, our generation subsidiaries accounted for 81.5%, 77.8% and 74.0% in 2016, 2017 and 2018, respectively, while the remainder was accounted for by independent power producers. As for transmission and distribution of electricity, we have historically handled, expect to continue to handle, substantially all of such activities in Korea.

We expect that we will continue to have a dominant market share in the generation, transmission and distribution of electricity in Korea for the foreseeable future, absent any substantial changes to the Restructuring Plan or other policy initiatives by the Government in relation to the Korean electric power industry, or an unexpected level of market penetration by independent power producers or localized electricity suppliers under the Community Energy System. However, our market dominance in the electricity distribution in Korea may face potential erosion in light of the recent Proposal for Adjustment of Functions of Public Institutions (Energy Sector) announced by the Government in June 2016. This proposal contemplates a gradual opening of the electricity trading market to the private sector although no detailed roadmap has been provided for such opening. It is currently premature to predict to what extent, or in what direction, the liberalization of the electricity trading market will happen. Nonetheless, any significant liberalization of the electricity trading market may result in substantial reduction of our market share in electricity distribution in Korea, which would have a material adverse effect on our business, results of operation and cash flows. See Item 4.B. Business Overview Competition.

Electricity Rates

Under the Electric Utility Act and the Price Stabilization Act, electricity rates are established at levels that will permit us to recover our operating costs attributable to our basic electricity generation, transmission and distribution operations in addition to receiving a fair investment return on capital used in those operations. For further discussion of fair investment return, see Item 4.B. Business Overview Sales and Customers Electricity Rates.

From time to time, our actual rate of return on invested capital may differ significantly from the fair rate of return on invested capital assumed for the purposes of electricity tariff approvals, for reasons, among others, related to movements in fuel prices, exchange rates and demand for electricity that differs from what is assumed for determining our fair rate of return. For example, between 1987 and 1990, the actual rate of return was above the fair rate of return due to declining fuel costs and rising demand for electricity. In contrast, depreciation of the Won against the U.S. dollar accounted for our actual rates of return being lower than the fair rate of return for the period from 1996 to 2000. Partly in response to the variance between our actual rates of return and the fair rate of return, the Government from time to time increases the electricity tariff rates, but there typically is a significant time lag for the tariff increase as such increase requires a series of deliberative processes and administrative procedures and the Government also has to consider other policy considerations, such as the inflationary effect of overall tariff increases and the efficiency of energy use through sector-specific tariff increases. For the period between 2006 and 2013, our actual rates of return were lower than the fair rate of return largely due to a general increase in fuel costs and additional facility investment costs incurred, the effects of which were not offset by timely increases in our tariff rates. Between 2014 and 2016, however, largely due to the decrease in fuel costs reflective of the drop in oil prices, our actual rate of return has surpassed the fair rate of return; however, substantially all of the resulting excess has been used to fund capital expenditure and repair and maintenance, as well as to offer tariff discounts to economically or otherwise disadvantaged households, and investments in renewable energy and other environmental programs.

Partly in response to the variance between our actual rates of return and the fair rates of return, the Government from time to time increases the electricity tariff rates, but there typically is a significant time lag for the tariff increases as such increases requires a series of deliberative processes and administrative procedures and the Government also has to consider other policy considerations, such as the inflationary effect of overall tariff increases and the efficiency of energy use from sector-specific tariff increases.

In the past, the Government effected tariff increases that typically covered all sectors, namely, residential, commercial and industrial. No cross-sector tariff increase has been implemented since November 2013, largely due to the downward trend in fuel costs. However, effective January 1, 2017, the Government made several adjustments to the existing rate structure in order to ease the burden of electricity tariff on residential consumers as well as promote the use of renewable energy. First, the progressive rate structure applicable to the residential sector, which applies a gradient of increasing tariff rates for heavier electricity usage, was changed from a six-tiered structure with the highest rate being no more than 11.7 times the lowest rate (which gradient system has been in place since 2005) into a three-tiered structure with the highest rate being no more than three times the lowest rate in order to reflect the changes in the pattern of electricity consumption and reduce the electricity charges payable by consumers. Second, the new tariff structure encourages energy saving by offering rate discounts to residential consumers that voluntarily reduce electricity consumption while charging special high rates to residential consumers with heavy electricity consumption during peak usage periods during the summer and the winter. Third, a temporary rate discount will apply during 2017 to 2019 to investments in environmentally friendly facilities such as energy storage systems, renewable energy and electric cars. The temporary rate discount to investments in energy storage systems and renewable energy was extended until 2020. Additionally, during July and August 2018, the Government reduced residential electricity charges by temporarily relaxing the application of the current tariff structure and offering higher rate discounts to economically or otherwise disadvantaged households to ease the burden on households that have significantly increased their use of air conditioners during a heatwave. Such adjustments may lower our revenues from the sale of electricity and accordingly have a material adverse effect on our results of operation, financial condition and cash flows.

Fuel Costs

Our results of operations are also significantly affected by the cost of producing electricity, which is subject to a variety of factors, including, in particular, the cost of fuel.

Cost of fuel in any given year is a function of the volume of fuels consumed and the unit fuel cost for the various types of fuel used for generation of electricity which affects the cost structure for both our generation subsidiaries and independent power producers from whom we purchase electric power. A significant change in the unit fuel costs materially impacts the costs of electricity generated by our generation subsidiaries, which mainly comprise our fuel costs under the cost of sales, as well as, to our knowledge, the costs of electricity generated by the independent power producers that sell their electricity to us (see Item 4.A.   Purchase of Electricity   Cost-based Pool System   ), which mainly comprise our purchased power costs under the cost of sales. We are however unable to provide a comparative analysis since the unit fuel cost information for independent power producers and their cost structures are proprietary information.

Fuel costs constituted 30.9%, 31.7% and 34.5% of our cost of sales, and the ratio of fuel costs to our sales was 23.4%, 27.8% and 33.5% in 2016, 2017 and 2018, respectively. Substantially all of the fuel (except for anthracite coal) used by our generation subsidiaries is imported from outside of Korea at prices determined in part by prevailing market prices in currencies other than Won. In addition, our generation subsidiaries purchase a significant portion of their fuel requirements under contracts with limited quantity and duration. Pursuant to the terms of our long-term supply contracts, prices are adjusted from time to time subject to prevailing market conditions. See Item 4.B.   Business

Overview Fuel.

Uranium accounted for 37.1%, 34.8% and 31.9% of our fuel requirements in 2016, 2017 and 2018, respectively. Coal accounted for 47.7%, 53.3% and 53.2% of our fuel requirements in 2016, 2017 and 2018,

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respectively. LNG accounted for 10.7%, 8.7% and 11.2% of our fuel requirements in 2016, 2017 and 2018, respectively. Oil accounted for 3.0%, 1.2% and 1.4% of our fuel requirements in 2016, 2017 and 2018, respectively. In each case, the fuel requirements are measured by the amount of electricity generated by us and our generation subsidiaries and do not include electricity purchased from independent power producers. In order to ensure stable supplies of fuel materials, our generation subsidiaries enter into long-term and medium-term contracts with various suppliers and supplement such supplies with fuel materials purchased on spot markets.

The price of bituminous coal, which represents our largest fuel requirement, fluctuates significantly from time to time. In 2018, approximately 83% of the bituminous coal requirements of our generation subsidiaries were purchased under long-term contracts and the remaining 17% purchased on the spot market. The average daily spot price of free on board Newcastle coal 6300 GAR published by Platts increased from US$88.3 per ton in 2017 to US$107.7 per ton in 2018 and decreased to US$84.0 per ton as of April 18, 2019. If the price of bituminous coal were to sharply rise, our generation subsidiaries may not be able to secure their respective bituminous coal supplies at prices commercially acceptable to them. In addition, any significant interruption or delay in the supply of fuel, bituminous coal in particular, from any of their suppliers could cause our generation subsidiaries to purchase fuel on the spot market at prices higher than contracted, resulting in an increase in fuel cost.

From 2016 to 2018, the prices of oil and LNG fluctuated significantly. The prices of oil and LNG are substantially dependent on the price of crude oil, and according to Bloomberg (Bloomberg Ticker: PGCRDUBA), the average daily spot price of Dubai crude oil increased from US$53.1 per barrel in 2017 to US$69.3 per barrel in 2018 and to US$70.4 per barrel as of April 18, 2019.

Nuclear power has a stable and relatively low-cost structure and forms a significant portion of electricity supplied in Korea. Due to significantly lower unit fuel costs compared to those for thermal power plants, our nuclear power plants are generally operated at full capacity with only routine shutdowns for fuel replacement and maintenance, with limited exceptions. In case of shortage in electricity generation resulting from stoppages of the nuclear power plants, we seek to make up for such shortage with power generated by our thermal power plants.

Because the Government heavily regulates the rates we charge for the electricity we sell (see Item 4.B. Business Overview Sales and Customers Electricity Rates), our ability to pass on such cost increases to our customers is limited. For example, from 2008 to 2012 we had consecutive net losses and, from time to time, operating losses, largely due to sustained rises in fuel costs that were neither timely nor sufficiently offset by a corresponding rise in electricity tariff rates. If fuel prices substantially increase and the Government, out of concern for inflation or for other reasons, maintains the current level of electricity tariff and does not increase it to a level to sufficiently offset the impact of rising fuel prices, the price increases will negatively affect our profit margins or even cause us to suffer operating and/or net losses, and our business, financial condition, results of operations and cash flows would suffer.

Movements of the Won against the U.S. Dollar and Other Foreign Currencies

Korean Won has fluctuated significantly against major currencies from time to time. For fluctuations in exchange rates, see Item 3.A. Selected Financial Data Currency Translations and Exchange Rates. In particular, Korean Won underwent substantial fluctuations during the recent global financial crisis, and remains subject to significant volatility. The Noon Buying Rate per one U.S. dollar decreased from Won 1,203.7 on December 31, 2016 to Won 1,067.4 on December 31, 2017 and rebounded to 1,112.9 on December 31, 2018 and to Won 1,136.2 on April 18, 2019. In 2018, the Won generally depreciated against U.S. dollar and other foreign currencies, and such depreciation may result in a significant increase in the cost of fuel materials and equipment purchased from overseas as well as the cost of servicing our foreign currency debt. As of December 31, 2018, 17.7% of our long-term debt (including the current portion but excluding issue discounts and premium) without taking into consideration of swap transactions was denominated in foreign currencies, principally U.S. dollars. The prices for substantially all of the fuel materials and a significant portion of the equipment we purchase are

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stated in currencies other than Won, generally in U.S. dollars. Since a substantial portion of our revenues is denominated in Won, we must generally obtain foreign currencies through foreign currency-denominated financings or from foreign currency exchange markets to make such purchases or service such debt, fulfill our obligations under existing overseas investments and make new overseas investments. As a result, any significant depreciation of Won against U.S. dollar or other foreign currencies will have a material adverse effect on our profitability and results of operations. See Item 3.D. Risk Factors Risks Relating to KEPCO The movement of Won against the U.S. dollar and other currencies may have a material adverse effect on us.

Recent Accounting Changes

New Amendments Adopted

New amendments to IFRS and other accounting standards are set forth below.

We have initially applied IFRS 9 Financial Instruments and IFRS 15 Revenue from Contracts with Customers from January 1, 2018. Due to the transition methods chosen by us in applying these standards, comparative information throughout the financial statements has not been restated to reflect the requirements of the new standards.

IFRS 9 Financial Instruments

IFRS 9 sets out requirements for recognizing and measuring financial assets, financial liabilities and certain contracts to buy or sell non-financial items. This standard replaces existing guidance in IAS 39 Financial Instruments: Recognition and Measurement .

We have taken an exemption not to restate comparative information for prior periods upon adoption of IFRS 9. Accordingly, the information presented for 2017 and 2016 has not been restated and differences in the carrying amounts of financial instruments resulting from the adoption of IFRS 9 are recognized in retained earnings and other components in equity at January 1, 2018.

Classification and measurement of financial assets and financial liabilities

IFRS 9 contains three principal classification categories for financial assets: measured at amortized cost, FVOCI and FVTPL. The classification of financial assets under IFRS 9 is generally based on the business model in which a financial assets is managed and its contractual cash flow characteristics. Under IFRS 9, derivatives embedded in contracts where the host is a financial asset in the scope of the standard are never separated. Instead, the hybrid financial instrument as a whole is assessed for classification.

The adoption of IFRS 9 has not had a significant effect on our accounting policies related to financial liabilities and derivative financial instruments (for derivatives that are used as hedging instruments).

The following table reconciles the carrying amounts of financial assets under IAS 39 to the carrying amounts under IFRS 9 on transition to IFRS 9 on January 1, 2018.

Original classification under IAS 39	**New classification under IFRS 9**

		Original carrying amount under IAS 39	New carrying amount under IFRS 9
		(in millions of won)	
Financial assets at FVTPL	FVTPL	111,512	111,512
Loans and receivables	Amortized cost	15,203,663	14,405,570
Loans and receivables	FVTPL		791,324
Available-for-sale financial assets	FVOCI	699,833	471,903
Available-for-sale financial assets	FVTPL		227,930
Held-to-maturity investments	Amortized cost	3,144	3,144
Total financial assets (excluding derivative instruments)		16,018,152	16,011,383

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Impairment of financial assets

IFRS 9 replaces the incurred loss model in IAS 39 with an expected credit loss (ECL) model. The new impairment model applies to financial assets measured at amortized cost and debt investments at FVOCI, but not to investments in equity instruments.

We have used an exemption not to restate comparative information for prior periods with respect to classification and measurement (including impairment) requirements. Differences in the carrying amounts of financial assets resulting from the adoption of IFRS 9 are recognized in other components of equity and retained earnings as at January 1, 2018 as follows:

Type	Equity attributable to owners of the controlling company			
	Retained earnings	Other components of equity	Non-controlling interests	Total equity
	(in millions of won)			
Reclassification of cumulative gain or loss of available-for-sale financial assets	76,851	(76,851)		
Remeasurement of expected credit loss				
Trade and other receivables	(6,769)			(6,769)
Income tax effect	1,846			1,846
Total	71,928	(76,851)		(4,923)

The detailed accounting policies under IFRS 9 are described in Note 3(21) of the notes to our consolidated financial statements included in this annual report.

IFRS 15 Revenue from Contracts with Customers

IFRS 15 Revenue from Contracts with Customers replaced IAS 18 Revenue , IAS 11 Construction Contracts , SIC-31 Revenue-Barter Transactions Involving Advertising Services , IFRIC 13 Customer Loyalty Programs , IFRIC 15 Agreements for the Construction of Real Estate and IFRIC 18 Transfers of Assets from Customers .

Under IFRS 15, revenue is recognized when a customer obtains control of the goods or services. Determining the timing of the transfer of control at a point in time or over time requires judgment.

We have retrospectively applied this standard and recognized the cumulative effect of the adoption of IFRS 15 at the date of initial application (January 1, 2018) and have retrospectively applied IFRS 15 to only those contracts that were not completed as of the date of initial application (January 1, 2018). Accordingly, we have not restated the comparative periods.

IFRS 15 did not have a significant impact on our consolidated financial statements at the date of initial application (January 1, 2018). For additional information about our accounting policies relating to revenue recognition, see Note 3(7) of the notes to our consolidated financial statements included in this annual report.

IFRIC 22 Foreign Currency Transactions and Advance Consideration

We have adopted IFRIC 22 Foreign Currency Transactions and Advance Consideration since January 1, 2018. IFRIC 22 clarifies the date of the transaction for the purpose of determining the exchange rate to use on initial recognition of the related asset, expense or income, when an entity has received or paid advance consideration in a foreign currency. Upon adoption of this interpretation, there is no significant impact on our consolidated financial statements.

Amendments to IAS 40 Investment Property

We have adopted amendments to IAS 40 Investment Property since January 1, 2018. Amendments to IAS 40 clarify when an entity should transfer a property asset to, or from, investment property. Upon adoption of these amendments, there is no significant impact on our consolidated financial statements.

New Standards and Amendments Not Yet Adopted

A number of new standards are effective for annual periods beginning after January 1, 2018 and earlier application is permitted; however, we have not adopted early the new or amended standards in preparing our consolidated financial statements.

IFRS 16 Leases

General information

IFRS 16 replaces existing leases guidance, including IAS 17 Leases , IFRIC 4 Determining whether an Arrangement contains a Lease , SIC-15 Operating Leases Incentives and SIC-27 Evaluating the Substance of Transactions Involving the Legal Form of a Lease .

We plan to apply IFRS 16 retrospectively with the cumulative effect of initially applying the standard recognized at the date of initial application on January 1, 2019. Therefore, the cumulative effect of adopting IFRS 16 will be recognized as an adjustment to the opening balance of retained earnings (or other component of equity, as appropriate) at January 1, 2019, with no restatement of comparative information.

For a contract that is, or contains, a lease, we shall account for each lease component within the contract as a lease separately from non-lease components of the contract. A lessee recognizes a right-of-use asset representing its right to use the underlying asset and a lease liability representing its obligation to make lease payments. There are recognition exemptions for short-term leases and leases of low-value items. In addition, as a practical expedient, a lessee may elect, by class of underlying asset, not to separate non-lease components from lease components, and instead account for each lease component and any associated non-lease components as a single lease component.

Lessor accounting remains similar to the existing guidance IAS 17 Leases i.e. lessors continue to classify leases as finance or operating leases.

Identifying a lease

We assess whether the contract is, or contains, a lease at inception of a contract and also shall identify whether the contract is, or contains, a lease at the date of initial application.

The definition of this new standard is mainly related to the control model. This standard classifies a lease contract and a service contract based on whether the identified asset is controlled by the customer. If the customer has all of the following rights, right-of-use is transferred to the customer.

- Right to obtain substantially all of the economic benefits from use of the identified asset

- Right to direct the use of the identified asset

Lessee accounting

The adoption of IFRS 16 will change the accounting of operating leases, which was previously not included in the consolidated statements of financial position under IAS 17, and at the date of initial application of IFRS 16, we shall account for all leases, except for short-term leases and leases of low-value items, as follows:

- recognizes the present value of the lease payments that are not paid at the date of initial recognition in the consolidated statements of financial position as right-of-use asset and lease liabilities

- recognizes the depreciation charge for right-of-use asset and interest expense on the lease liability in the consolidated statements of comprehensive income

- classifies cash payments for the principal portion (financial activities) and for the interest portion (operating activities) in the consolidated statements of cash flows

Lessor accounting

Under IFRS 16, a lessor continues to classify each of its leases as either a finance leases or an operating leases.

However, under IFRS 16, a lessor shall disclose additional information such as the nature of the lessor s leasing activities and how the lessor manages the risk associated with any rights it retains in underlying assets.

In assessing the financial impact of the initial adoption of IFRS 16, we assessed the impact on our consolidated financial statements for the year 2019 based on the context and available information as of January 1, 2019. As a result of a detailed analysis of the effect on our consolidated financial statements, we expect to increase the amount of right-of-use assets and lease liabilities by Won 4,590,988 million and Won 4,584,555 million as of January 1, 2019, respectively. However, the financial impact assessment may change depending on additional information available in the future.

Critical Accounting Policies

The following discussion and analysis are based on our consolidated financial statements included in this annual report. The fundamental objective of financial reporting is to provide useful information that allows a reader to comprehend our business activities. To aid in that understanding, our management has identified critical accounting policies.

We make a number of estimates and judgments in preparing our consolidated financial statements. These estimates may differ from actual results and have a significant impact on our recorded assets, liabilities, revenues and expenses and related disclosure of contingent assets and liabilities. We consider an estimate to be a critical accounting estimate if it requires a high level of subjectivity or judgment, and a significant change in the estimate would have a material impact on our financial condition or results of operations. Further discussion of these critical accounting estimates and policies is included in the notes to our consolidated financial statements included in this annual report.

The accounting policies set out below have been applied consistently by us and our subsidiaries to all periods presented in the consolidated annual financial statements, unless otherwise indicated.

Sale and Purchase of Electricity

The Government approves the rates we charge to customers. Our utility rates are designed to recover our reasonable costs plus a fair investment return. We purchase electricity principally from our generation subsidiaries based on a competitive bidding process though the Korea Power Exchange.

We recognize electricity sales revenue based on power sold (transferred to the customer) up to the reporting date. To determine the amount of power sold, we make reasonable estimates on daily power volumes for residential, commercial, industrial and other uses. The differences between the current month s estimated amounts and actual (meter-read) amounts are adjusted (trued-up) during the next month period.

Construction Contracts

For each performance obligation satisfied over time, we recognize revenue over time by measuring the progress towards complete satisfaction of that performance obligation. We apply a single method of measuring progress for each performance obligation satisfied over time and apply that method consistently to similar performance obligations and in similar circumstances. Revenue and costs are recognized based on the progress towards complete satisfaction of a performance obligation utilizing the cost-based input method at the end of the reporting period. In applying the cost-based input method, it is necessary to use estimates and assumptions related to our efforts or inputs expected to be incurred in the future, costs incurred which are not related to the performance obligation, changes in our efforts or inputs due to change of the performance obligation, etc. Total revenue is measured based on an agreed contract price; however, it may fluctuate due to the variation of performance obligations. The measurement of revenue is affected by various uncertainties resulting from unexpected future events.

Construction contracts are generally performed over a long term, and the total contract costs are estimated based on estimated future amounts such as material costs, labor costs, outsourcing costs and others which are expected to be incurred during construction period. The actual total contract costs can vary from our original estimates because of changes in conditions that affect material costs, labor costs, outsourcing costs and others. The uncertainty of estimated total contract costs and changes in such estimates have an impact on the completion progress and contract revenue for each reporting period. Also, there is uncertainty in future estimates due to various internal and external factors such as fluctuation of market, the risk of business partner and the experience of project performance and others.

Derivative Instruments

We recognize rights and obligations arising from derivative instruments as assets and liabilities, which are stated at fair value. The gains and losses that result from the change in the fair value of derivative instruments are reported in current earnings. However, for derivative instruments designated as hedging the exposure of variable cash flows, the effective portions of the gains or losses on the hedging instruments are recorded as accumulated other comprehensive income (loss) and credited or charged to operations at the time the hedged transactions affect earnings, and the ineffective portions of the gains or losses are credited or charged immediately to operations.

Significant management judgment is involved in determining the fair value of estimated derivative instruments. The estimates and assumptions used by our management to determine fair value can be impacted by many factors, such as the estimated discount factor derived from observable market data, credit risk of the counterparty and the estimated cash flow based on settlement period, interest convention, and other contract information of the derivative instruments.

As of December 31, 2016 and 2017, we had Won 643 billion as assets and Won 395 billion of net amounts as liabilities. As of December 31, 2018, we had Won 210 billion of net amounts as liabilities. Changes in the estimated discount factor or cash flow, or changes in the assumptions and judgments by management underlying these estimates, may cause material revisions to the estimated total gain or loss effect of derivative instruments, which could have a material effect on the recorded asset or liability.

Decommissioning Costs

We recognize the fair value of estimated decommissioning costs as a liability in the period in which we incur a legal obligation associated with retirement of long-lived assets that result from acquisition, construction, development and/or normal use of the assets. We also recognize a corresponding asset that is depreciated over the life of the asset. Accretion expense consists of period-to-period changes in the liability for decommissioning costs resulting from the passage of time and revisions to either the timing or the amount of the original estimate of undiscounted cash flows. Depreciation and accretion expenses are included in the cost of electric power in the accompanying consolidated statements of comprehensive income.

Significant management judgment is involved in determining the fair value of estimated decommissioning costs. The estimates and assumptions used by our management to determine fair value can be impacted by many factors, such as the estimated decommissioning costs based on engineering studies commissioned and approved by the Korean government, and changes in assumed dates of decommissioning, inflation rate, discount rate, decommissioning technology, regulation and the general economy.

As of December 31, 2016, 2017 and 2018, we had a liability for decommissioning costs in the amounts of Won 13,050 billion, Won 15,985 billion and Won 16,364 billion, respectively. Changes in the estimated costs or timing of decommissioning, or changes in the assumptions and judgments by management underlying these estimates, may cause material revisions to the estimated total cost to decommission these facilities, which could have a material effect on the recorded liability. We used discount rates of 3.55%, 2.94% and 2.94% and inflation rates of 1.40%, 1.21% and 1.21% when calculating the decommissioning cost liability of nuclear plants recorded as of December 31, 2016, 2017 and 2018, respectively, and discount rate of 4.49% and inflation rate of 2.93% when calculating the decommissioning cost liability of spent fuel recorded as of December 31, 2016, 2017 and 2018. In addition, the following is a sensitivity analysis of the potential impact on decommissioning costs from a 0.1% increase or decrease in each of the inflation rate and the discount rate, assuming that all other aforementioned assumptions remain constant:

	Sensitivity to inflation rate		**Sensitivity to discount rate**	
	+0.10%	**-0.10%**	**+0.10%**	**-0.10%**
	(in billions of Won)			
Increase (decrease) of liability for decommissioning costs	347	(337)	(306)	315

See Notes 29 and 48 of the notes to our consolidated financial statements included in this annual report for further related information.

Provision for Decontamination of Transformer

Under the Persistent Organic Pollutants Management Act which was enacted in 2007, we are required to remove PCB from our transformers insulating oil by 2025. We are also required to inspect the PCB levels in our transformers and dispose of any PCBs in excess of established safety standards.

As of December 31, 2016, 2017 and 2018, we had liabilities of Won 192 billion, Won 180 billion and Won 148 billion, respectively, for inspection and disposal costs related to the decontamination of existing transformers.

The estimates and assumptions used by our management to determine fair value can be affected by many factors, such as the estimated costs of inspection and disposal, inflation rate, discount rate, regulations and the general economy.

Changes in the estimated costs or changes in the assumptions and judgments underlying these estimates may cause material revisions to the estimated total costs, which could have a material effect on our recorded liability. When calculating the provision for the decontamination of our transformers, we used a discount rate of 2.77% and an inflation rate of 1.29% as of December 31, 2016, a discount rate of 2.55% and an inflation rate of 1.23% as of December 31, 2017 and a discount rate of 2.18% and an inflation rate of 1.27 % as of December 31, 2018.

Deferred Tax Assets

In assessing the realizability of the deferred tax assets, our management considers whether it is probable that a portion or all of the deferred tax assets will not be realized. The ultimate realization of our deferred tax assets is dependent on whether we are able to generate future taxable income in specific tax jurisdictions during the periods in which temporary differences become deductible. Our management has scheduled the expected future reversals of the temporary differences and projected future taxable income in making this assessment. Based on these factors, our management believes that it is probable that we will realize the benefits of these temporary differences as of December 31, 2018. However, the amount of deferred tax assets that is realized may be different if we do not realize estimated future taxable income during the carry forward periods as originally expected.

In relation to the deferred tax assets recognized for tax loss, future taxable income is estimated considering the following: (i) five-year mid-to long-term financial forecasts of earnings before tax approved by management and submitted to the Ministry of Economy and Finance, and (ii) average amount of tax adjustments for the recent three years.

For tax credits carried forward, similar to deferred tax assets recognized for tax loss, our management estimates the probability timing of future taxable profits in determining the probability of utilization of tax credits carried forward. In addition, our management considers the possible carry forward period and available tax credit or deductible temporary differences within the tax laws of each country in which the tax credits originated.

Similarly, our management also estimates the probability of utilization of temporary differences considering the probability of generating future taxable profits in the periods that the deductible temporary differences reverse. We do not recognize deferred tax assets for certain temporary differences associated with investments in subsidiaries, associates, and interests in joint ventures considering future dividends or disposals.

We recognize deferred tax assets and liabilities based on the differences between the financial statement carrying amounts and the tax bases of assets and liabilities at each separate taxpaying entity. Under IFRS, a deferred tax asset is recognized for temporary differences that will result in deductible amounts in future years and for carry forwards. If, based on the weight of available evidence, it is more likely that some or the entire portion of the deferred tax asset will not be realized, that portion is deducted directly from the deferred tax asset.

We believe that the accounting estimate related to the realizability of deferred tax asset is a critical accounting estimate because: (i) it requires management to make assessments about the timing of future events, including the probability of expected future taxable income and available tax planning opportunities, and (ii) the difference between these assessments and the actual performance could have a material impact on the realization of tax benefits as reported in our results of operations. Management s assumptions require significant judgment because actual performance has fluctuated in the past and may continue to do so.

Useful Lives of Property, Plant and Equipment

Property, plant and equipment are initially measured at cost and after initial recognition, are carried at cost less accumulated depreciation and accumulated impairment losses. The cost of property, plant and equipment includes expenditures arising directly from the construction or acquisition of the asset, any costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management and the initial estimate of the costs of dismantling and removing the item and restoring the site on which it is located.

Economic useful life is the duration of time the asset is expected to be productively employed by us, which may be less than its physical life. Management s assumptions on the following factors, among others, affect the determination of estimated economic useful life: wear and tear, obsolescence, technical standards, changes in market demand and technological changes.

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The estimated useful lives of our property, plant and equipment are as follows:

	Useful lives (years)
Buildings	8 ~ 40
Structures	8 ~ 50
Machinery	2 ~ 32
Vehicles	3 ~ 8
Loaded heavy water	30
Asset retirement costs	18, 30, 40, 60
Finance lease assets	6 ~ 32
Ships	9
Others	4~15

A component that is significant compared to the total cost of property, plant and equipment is depreciated over its separate useful life. Depreciation methods, residual values and useful lives of property, plant and equipment are reviewed at the end of each reporting period and if change is deemed appropriate, it is treated as a change in accounting estimate. As a result of such annual review, useful lives of certain structures and machinery were changed during the year ended December 31, 2018. Depreciation expenses decreased by Won 25,985 million for the year ended December 31, 2018. Depreciation expenses are expected to decrease by Won 157,333 million and Won 170,471 million for the years ending December 31, 2019 and 2020, respectively, and to increase by Won 353,789 million for the years after December 31, 2020.

Impairment of Long-lived Assets

At the end of each reporting period, we review the carrying amounts of tangible and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). Where it is not possible to estimate the recoverable amount of an individual asset, we estimate the recoverable amount of the cash-generating unit to which the asset belongs. Where a reasonable and consistent basis of allocation can be identified, corporate assets are also allocated to individual cash-generating units, or otherwise they are allocated to the smallest group of cash-generating units for which a reasonable and consistent allocation basis can be identified.

Intangible assets with indefinite useful lives and intangible assets not yet available for use are tested for impairment at least annually, and whenever there is an indication that the asset may be impaired. Recoverable amount is the higher of fair value less costs to sell or value in use. In assessing value in use, the estimated future cash flows are discounted to their present values using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted.

If the recoverable amount of an asset (or a cash-generating unit) is estimated to be less than its carrying amount, the carrying amount of the asset (or the cash-generating unit) is reduced to its recoverable amount. An impairment loss is recognized immediately in income or loss, unless the relevant asset is carried at a revalued amount, in which case the impairment loss is treated as a revaluation decrease.

In the event that an impairment loss subsequently reverses, the carrying amount of the asset (or a cash-generating unit) is increased to the revised estimate of its recoverable amount, ensuring that such carrying amount increase does not exceed the carrying amount that would have been determined had no impairment loss been recognized for the asset (or the cash-generating unit) in prior years. A reversal of an impairment loss is recognized immediately in income or loss, unless the relevant asset is carried at a revalued amount, in which case the reversal of the impairment loss is treated as a revaluation increase.

The assessment of impairment is a critical accounting estimate, because significant management judgment is required to determine: (i) whether an indicator of impairment has occurred, (ii) how assets should be grouped, and (iii) the recoverable amount of the asset or asset group in the case of impairment. If management s assumptions about these assets change as a result of events or circumstances, and management believes the assets may have declined in value, we may record impairment charges, resulting in lower profits. Our management uses its best estimate in making these evaluations and considers various factors, including the future prices of energy, fuel costs and other operating costs. However, actual market prices and operating costs could vary from those used in the impairment evaluations, and the impact of such variations could be material. For the year ended December 31, 2016, there were no potential indicators of impairment, and we therefore did not perform an impairment test for such year. For the year ended December 31, 2017, we performed impairment tests on individual assets of KOMIPO and KOWEPO, both of which are wholly owned subsidiaries, due to potential indicators of impairment. For the year ended December 31, 2018, we performed impairment tests on individual assets of KHNP and KOWEPO due to potential indication of impairment. Accordingly, we recognized the amount by which the carrying amount exceeds its recoverable amount as impairment loss on our consolidated statements of comprehensive income. See Note 21 of the notes to our consolidated financial statements included in this annual report for further information.

Accrual for Loss Contingencies for Legal Claims

We are involved in legal proceedings regarding matters arising in the ordinary course of business. In relation to these matters, as of December 31, 2018, we and our subsidiaries were engaged in 570 lawsuits as a defendant and 174 lawsuits as a plaintiff. The total amount claimed against us and our subsidiaries was Won 674 billion and the total amount claimed by us was Won 793 billion as of December 31, 2018. As of December 31, 2018, our provisions for these legal claims amounted to Won 78 billion. These provisions are adjusted when events or circumstances cause these judgments or estimates to change.

Actual amounts of our liabilities as determined upon settlement of legal claims or by final decisions of the courts in relation thereto may be substantially different from the amounts of provisions recognized or contingent liabilities disclosed. If the actual amounts are higher than the amounts of related provisions, the resulting additional liabilities would adversely impact our results of operations, financial condition and cash flows.

Consolidated Results of Operations

2018 Compared to 2017

In 2018, our consolidated sales, which is principally derived from the sale of electric power, slightly increased by 1.2% to Won 60,033 billion in 2018 from 59,336 billion in 2017, primarily reflecting an increase in sales of electric power. Our sale of electric power increased by 3.8% to Won 57,898 billion for 2018 from Won 55,773 billion for 2017, primarily due to an increase in the volume of electricity sold, which was partially offset by a decline in the average unit sales price. The volume of electricity sold increased by 3.6% to 526,149 gigawatt hours in 2018 from 507,746 gigawatt hours in 2017, primarily due to a 2.5% increase in the volume of electricity sold to the industrial sector, which represents the largest segment of electricity consumption in Korea, to 292,999 gigawatt hours in 2018 from 285,969 gigawatt hours in 2017, a 5.1% increase in the volume of electricity sold to the commercial sector, which represents the second largest segment of electricity consumption in Korea, to 116,934 gigawatt hours in 2018 from 111,298 gigawatt hours in 2017, and a 6.3% increase in the volume of electricity sold to the residential sector to 72,895 gigawatt hours in 2018 from 68,544 gigawatt hours in 2017. The increase in the volume of electricity sold to the industrial sector was primarily due to the increased volume of semiconductor and other exports. The increase in the volume of electricity sold to the commercial sector was primarily due to extreme weather conditions that have led to increased demand for heating and air conditioning. The increase in the volume of electricity sold to the residential sector was primarily due to an increase in household electricity usage for air conditioning and heating as a result of extreme weather conditions. Average unit sales price decreased by 0.7% to Won 108.75 per kilowatt-hour in 2018 from Won 109.53 per kilowatt-hour in 2017, primarily due to a decrease in the average tariff resulting from a rate discount applicable to households during the summer of 2018. Our sales of construction services decreased by 45.8% to Won 1,742 billion in 2018 from Won 3,212 billion in 2017, primarily due to a decrease in sales amount recorded from the ongoing construction of our nuclear complex construction projects in the United Arab Emirates as the projects progress over time.

Our consolidated cost of sales, which is principally derived from the purchase of power from independent power producers and to a lesser extent, from raw materials used and depreciation, increased by 11.7%, to Won 58,208 billion in 2018 from Won 52,099 billion in 2017, primarily due to a 28.3% increase in power purchase, a 22.7% increase in raw material used and a 2.3% increase in depreciation, which were offset by a 45.5% decrease in other cost of sales.

Power purchase, which accounted for 31.5% and 27.4% of our cost of sales in 2018 and 2017, respectively, increased by 28.3% to Won 18,307 billion in 2018 from Won 14,264 billion in 2017, primarily due to a 9.0% increase in the unit cost of power purchased from Won 104.3 per kilowatt-hour in 2017 to Won 113.7 per kilowatt-hour in 2018, largely resulting from a general increase in international market prices for the main fuel types, which led to an increase in the price of electricity generated by independent power producers, from whom we are purchasing an increasing amount of electricity.

Raw materials used, which accounted for 33.6% and 30.6% of our cost of sales in 2018 and 2017, respectively, increased by 22.7% to Won 19,538 billion in 2018 from Won 15,925 billion in 2017, largely due to a general increase in international market prices.

Depreciation expense, excluding amortization of nuclear fuel charged to fuel costs in the amounts of Won 923 billion and Won 1,069 billion in 2018 and 2017, respectively, increased by 4.4% to Won 8,760 billion in 2018 from Won 8,393 billion in 2017 primarily due to additional property, plant and equipment acquired in relation to the construction of new generation facilities pursuant to our capital investment program.

Other cost of sales decreased by 45.5% to Won 2,170 billion in 2018 from Won 3,980 billion in 2017 primarily due to a decrease of other cost of overseas sales in relation to our nuclear complex construction projects in the United Arab Emirates.

As a cumulative result of the foregoing factors, our consolidated gross profit decreased by 74.8% to Won 1,825 billion in 2018 from Won 7,237 billion in 2017, and our consolidated gross profit margin decreased to 3.0% in 2018 from 12.2% in 2017. The decreases in our consolidated gross profit and consolidated gross profit margin were largely attributable to a 11.7% increase in our consolidated cost of sales (which was mainly due to a 28.3% increase in power purchase, a 22.7% increase in raw materials used and the 2.3% increase in depreciation, which were offset by a 45.5% decrease in other cost of sales and a 14.6% decrease in welfare and benefit expense), which substantially outpaced the 1.2% increase in our consolidated sales (which was primarily due to the 3.6% increase in the volume of electricity sold, which was offset by a 45.8% decrease in the sales of construction services).

Our consolidated selling and administrative expenses decreased by 4.9% to Won 2,628 billion in 2018 from Won 2,763 billion in 2017, largely due to a 68.6% decrease in bad debt expense to Won 40 billion in 2018 from Won 127 billion in 2017, which mainly related to an allowance in 2017 for KOSEP s accounts receivables with low possibility of collection from Hyundai Energy Co., Ltd., which was not applicable in 2018, and a 73.0% decrease in advertising expenses to Won 31 billion in 2018 from Won 115 billion in 2017, which mainly related to our sponsorships for the PyeongChang 2018 Winter Olympics incurred in 2017, which was not applicable in 2018.

Our consolidated other income, net of expenses, increased by 7.3% to Won 739 billion in 2018 from Won 689 billion in 2017, mainly as a result of an increase in gains on assets contributed, gains on liabilities

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exempted and income related to transfer of assets from customers, which include items of property, equipment, or cash that we receive from customers in relation to supplying electricity.

Our consolidated net other losses increased significantly to Won 621 billion in 2018 from net other gains of Won 157 billion in 2017, primarily due to an increase in impairment loss on property, plant and equipment, largely resulting from the early retirement of Wolsong #1 unit and a recognition of impairment loss related to Shin-Hanul #3 and #4 units.

As a cumulative result of the foregoing factors, our consolidated operating profit decreased by 112.9% to an operating loss of Won 685 billion in 2018 from an operating profit of Won 5,320 billion in 2017, and our consolidated operating income margin decreased to (1.1)% in 2018 from 9.0% in 2017. These decreases were mainly due to an increase in our cost of sales primarily as a result of an increase in raw materials and power purchases due to increases in the fuel costs and the volume of electricity sold.

Our consolidated finance expenses, net, increased by 4.8% to Won 1,674 billion in 2018 from Won 1,597 billion in 2017, primarily as a result of a decrease in net gains on foreign currency translation and transaction, which was partially offset by an increase in net gains on valuation of derivatives.

We recorded consolidated profit of associates or joint ventures using equity method of Won 358 billion in 2018 compared to a loss of Won 108 billion in 2017, primarily as a result of an increase in profit of Korea Gas Corporation.

As a cumulative result of the foregoing factors, our consolidated income (loss) before income taxes decreased by 155.4% to a loss of Won 2,001 billion in 2018 from an income of Won 3,614 billion in 2017.

Our income tax benefit increased significantly to Won 826 billion in 2018 from an income tax expense of Won 2,173 billion in 2017, largely as a result of the decrease in our profit before income taxes. Our effective tax expense rate, which represents tax expense as a percentage of profit before income taxes, was not calculated for income tax benefit in 2018 and was 60.1% in 2017. Our recognition of deferred tax liabilities was mainly due to temporary differences with respect to property, plant and equipment and investments in subsidiaries and associates. The applicable statutory tax rate was 27.5% in 2018 and 2017. See Note 44 to our financial statements included in this annual report.

As a cumulative result of the above factors, our consolidated profit (loss) decreased by 181.5% to a loss of Won 1,175 billion in 2018 from a profit of Won 1,441 billion in 2017. Our consolidated net profit margin also decreased to (2.0)% in 2018 from 2.4% in 2017. Our profit (loss) attributable to the owners of the company was a loss of Won 1,315 billion in 2018 compared to a profit of Won 1,299 billion attributable to the owners of the company in 2017.

We reported consolidated other comprehensive loss of Won 107 billion in 2018 compared to consolidated other comprehensive loss of Won 95 billion in 2017, largely due to our recognition of loss from remeasurements of defined benefit liability whereas we recognized income from such remeasurements in 2017.

As a cumulative result of the above factors, our consolidated total comprehensive income (loss) decreased by 195.2% to a loss of Won 1,282 billion in 2018 from an income of Won 1,346 billion in 2017.

2017 Compared to 2016

In 2017, our consolidated sales, which is principally derived from the sale of electric power, slightly decreased by 0.7% to Won 59,336 billion in 2017 from Won 59,763 billion in 2016, primarily reflecting a decrease in sales of construction services, which was partially offset by an increase in sales of electric power. Our sales of construction services decreased by 20.2% to Won 3,212 billion in 2017 from Won 4,027 billion in

2016, primarily due to a decrease in sales amount recorded from the ongoing construction of our nuclear complex construction projects in the United Arab Emirates as the construction projects progress over time. Our sale of electric power increased by 0.7% to Won 55,773 billion for 2017 from Won 55,379 billion for 2016, primarily due to an increase in the volume of electricity sold, which was partially offset by a decline in the average unit sales price. The volume of electricity sold increased by 2.2% to 507,746 gigawatt hours in 2017 from 497,039 gigawatt hours in 2016, primarily due to a 2.6% increase in the volume of electricity sold to the industrial sector, which represents the largest segment of electricity consumption in Korea, to 285,969 gigawatt hours in 2017 from 278,828 gigawatt hours in 2016, a 2.5% increase in the volume of electricity sold to the commercial sector, which represents the second largest segment of electricity consumption in Korea, to 111,298 gigawatt hours in 2017 from 108,617 gigawatt hours in 2016, and a 0.7% increase in the volume of electricity sold to the residential sector to 68,544 gigawatt hours in 2017 from 68,057 gigawatt hours in 2016. The increase in the volume of electricity sold to the industrial sector was primarily due to the continued export-based growth of the Korean economy, which resulted in increased industrial output and greater utilization of industrial plants. The increase in the volume of electricity sold to the commercial sector was primarily due to the recovery of market demand as a result of various Government policies to boost the economy. The increase in the volume of electricity sold to the residential sector was primarily due to an increase in household electricity usage for air conditioning and heating. Average unit sales price decreased by 1.5% to Won 109.53 per kilowatt-hour in 2017 from Won 111.23 per kilowatt-hour in 2016, primarily due to the amendment to the progressive rate structure to ease the tariff burden on residential customers, effective as of January 1, 2017.

Our consolidated cost of sales, which is principally derived from the purchase of power from independent power producers and to a lesser extent, from raw materials used and depreciation, increased by 14.4%, to Won 52,099 billion in 2017 from Won 45,550 billion in 2016, primarily due to a 32.6% increase in power purchase, a 18.2% increase in raw materials used and a 8.7% increase in depreciation, which were offset by a 11.3% decrease in other cost of sales.

Power purchase, which accounted for 27.4% and 23.6% of our cost of sales in 2017 and 2016, respectively, increased by 32.6% to Won 14,264 billion in 2017 from Won 10,756 billion in 2016, primarily due to a 9.6% increase in the unit cost of power purchased from Won 95.2 per kilowatt-hour in 2016 to Won 104.3 per kilowatt-hour in 2017, largely resulting from a general increase in international market prices for the main fuel types, which led to an increase in the price of electricity generated by independent power producers.

Raw materials used, which accounted for 30.6% and 29.6% of our cost of sales in 2017 and 2016, respectively, increased by 18.2% to Won 15,925 billion in 2017 from Won 13,471 billion in 2016, largely due to a general increase in international market prices.

Depreciation expense, excluding amortization of nuclear fuel charged to fuel costs in the amounts of Won 1,069 billion and Won 1,085 billion in 2017 and 2016, respectively, increased by 10.1% to Won 8,393 billion in 2017 from Won 7,620 billion in 2016 primarily due to an increase of additional property, plant and equipment acquired in relation to new generation facilities pursuant to our capital investment program.

Other cost of sales decreased by 11.3% to Won 3,980 billion in 2017 from Won 4,488 billion in 2016 primarily due to a decrease in other cost of overseas sales.

As a cumulative result of the foregoing factors, our consolidated gross profit decreased by 49.1% to Won 7,237 billion in 2017 from Won 14,213 billion in 2016, and our consolidated gross profit margin decreased to 12.2% in 2017 from 23.8% in 2016. The decreases in our consolidated gross profit and consolidated gross profit margin were largely attributable to a 14.4% increase in our consolidated cost of sales (which was mainly due to a 32.6% increase in power purchase, a 18.2% increase in raw materials used and the 8.7% increase in depreciation, which were offset by a 11.3% decrease in other cost of sales and a 5.9% decrease in taxes and dues), which substantially outpaced the 0.7% decrease in our consolidated sales (which was primarily due to the 2.2% increase in the volume of electricity sold, as well as the 20.2% decrease in the sales of construction services).

Our consolidated selling and administrative expenses increased by 4.7% to Won 2,763 billion in 2017 from Won 2,639 billion in 2016, largely due to a 227.3% increase in bad debt expense to Won 127 billion in 2017 from Won 39 billion in 2016, which mainly related to KOSEP s accounts receivables with low possibility of collection from Hyundai Energy Co., Ltd. and a 230.4% increase in advertising expenses to Won 115 billion in 2017 from Won 35 billion in 2016, related to our sponsorships for the PyeongChang 2018 Winter Olympics and a 11.2% increase in commissions to Won 674 billion in 2017 from Won 606 billion in 2016, for electricity metering, which was offset by a 53.3% decrease in other expenses to Won 155 billion in 2017 from Won 332 billion in 2016, due to a decrease in costs for energy efficiency improvement project.

Our consolidated other income, net of expenses, increased by 5.7% to Won 689 billion in 2017 from Won 652 billion in 2016, mainly as a result of an increase in income related to transfer of assets from customers.

Our consolidated net other gains increased significantly to Won 157 billion in 2017 from Won 70 billion in 2016, primarily due to an increase in net gain on foreign currency transaction, largely resulting from fluctuations in the value of Won against other foreign currencies in 2017.

As a cumulative result of the foregoing factors, our consolidated operating profit decreased by 56.7% to Won 5,320 billion in 2017 from Won 12,296 billion in 2016, and our consolidated operating income margin decreased to 9.0% in 2017 from 20.6% in 2016. These decreases were mainly due to a decrease in our consolidated sales and an increase in our cost of sales primarily as a result of increases in power purchase and raw materials due to increases in the fuel costs and the volume of electricity sold.

Our consolidated finance expenses, net, decreased by 3.0% to Won 1,597 billion in 2017 from Won 1,646 billion in 2016, primarily as a result of an increase in net losses on valuation of derivatives and an increase in net losses on transaction of derivatives, which were partially offset by an increase in net gains on foreign currency translation.

We recorded consolidated loss of associates or joint ventures using equity method of Won 108 billion in 2017 compared to a loss of Won 137 billion in 2016, primarily as a result of a decrease in profit of Korea Gas Corporation.

As a cumulative result of the foregoing factors, our consolidated income before income taxes decreased by 65.6% to Won 3,614 billion in 2017 from Won 10,513 billion in 2016.

Our income tax expense decreased by 35.4% to Won 2,173 billion in 2017 from Won 3,365 billion in 2016, largely as a result of the decrease in our profit before income taxes. Our effective tax expense rate, which represents tax expense as a percentage of profit before income taxes, increased from 32.0% in 2016 to 60.1% in 2017 primarily resulting from an adjustment for our recognition of deferred tax liabilities of Won 1,055 billion in 2017 due to 3.3% increase in tax rate, whereas we did not recognize such increase in 2016. Our recognition of deferred tax liabilities was mainly due to temporary differences regarding property, plant and equipment and investments in subsidiaries and associates. In 2017, the applicable statutory tax rate increased to 27.5% from the prior rate of 24.2% in 2016. See Note 44 to our financial statements included in this annual report.

As a cumulative result of the above factors, our consolidated profit decreased by 79.8% to Won 1,441 billion in 2017 from Won 7,148 billion in 2016. Our consolidated net profit margin also decreased to 2.4% in 2017 from 12.0% in 2016. Our profit attributable to the owners of the company was Won 1,299 billion in 2017 compared to Won 7,048 billion attributable to the owners of the company in 2016.

We reported consolidated other comprehensive loss of Won 95 billion in 2017 compared to consolidated other comprehensive loss of Won 2 billion in 2016, largely due to an increase in loss from equity method investments primarily in relation to Korea Gas Corporation, which was partially offset by our recognition of income from remeasurements of defined benefit liability (whereas we recognized loss from such remeasurements) in 2016.

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As a cumulative result of the above factors, our consolidated total comprehensive income decreased by 81.2% to Won 1,346 billion in 2017 from Won 7,146 billion in 2016.

Inflation

The effects of inflation in Korea on our financial condition and results of operations are reflected primarily in construction costs as well as in labor expenses. Inflation in Korea has not had a significant impact on our results of operations in recent years. It is possible that inflation in the future may have an adverse effect on our financial condition or results of operations.

Segment Results

We operate the following business segments: transmission and distribution, nuclear power generation and thermal power generation and all others. The transmission and distribution segment, which is operated by us, the parent company, consists of operations related to the transmission, distribution and sale to end-users of electricity purchased from our generation subsidiaries as well as from independent power producers. The power generation segment, which is operated by our one nuclear generation subsidiary and five non-nuclear generation subsidiaries, consists of operations related to the generation of electricity sold to us through the Korea Power Exchange. The transmission and distribution segment and the power generation segment together represent our electricity business. The remainder of our operation is categorized as all others. The all other segment consists primarily of operations related to the plant maintenance and engineering service, information services, and sales of nuclear fuel, communication line leasing, overseas businesses and others. In 2016, 2017 and 2018, the unaffiliated revenues of the power generation segment (representing the six generation subsidiaries) and all our other revenues in the aggregate amounted to only 3.0%, 3.2% and 2.9% of our consolidated revenues, respectively, and the results of operations for our business segments substantially mirror our consolidated results of operations. For further information, see Note 4 of the notes to our consolidated financial statements included in this annual report.

Item 5.B. Liquidity and Capital Resources

We expect that our capital requirements, capital resources and liquidity position may change in the course of implementing the Restructuring Plan. See Item 4.B. Business Overview Restructuring of the Electric Power Industry in Korea and Item 3D. Risk Factors Risks Relating to KEPCO The Government may adopt policy measures to substantially restructure the Korean electric power industry or our operational structure, which may have a material adverse effect on our business, operations and profitability.

Capital Requirements

We anticipate that the following represent the major sources of our capital requirements in the short-term to intermediate future:

- capital expenditures pursuant to our capital investment program;

- working capital requirements, the largest component of which is fuel purchases;

- payment of principal and interest on our existing debt; and

- overseas investments.

In addition, if there were to occur unanticipated material changes to the Restructuring Plan, the Basic Plan or other major policy initiatives of the Government relating to the electric power industry, or natural disasters, such developments may require a significant amount of additional capital requirements.

Capital Expenditures

We anticipate that capital expenditures will be the most significant use of our funds for the next several years. Our capital expenditures relate primarily to the construction of new generation units, maintenance of existing generation units and expansion of our transmission and distribution systems. Our capital expenditures generally follow budgets established under the Basic Plan, which contains projections relating to the supply and demand of electricity of Korea based on which we plan the construction of additional generation units and transmission systems.

Our total capital expenditures for the construction of generation, transmission and distribution facilities were Won 13,950 billion, Won 13,711 billion and Won 13,695 billion in 2016, 2017 and 2018, respectively, and under our current budgets, are estimated to be approximately Won 16,831 billion, Won 19,138 billion and Won 18,804 billion in 2019, 2020 and 2021, respectively. We plan to finance our capital expenditures primarily through issuance of securities in the capital markets, borrowings from financial institutions and construction grants.

In January 2016, the Ministry of Trade, Industry and Energy announced an initiative to promote the new energy industry by creating the New Energy Industry Fund, which is made up of funds sponsored by government-affiliated energy companies. We contributed Won 500 billion to the funds in 2016. The purpose of these funds is to invest in substantially all frontiers of the new energy industry, including renewable energy, energy storage systems, electric vehicles, small-sized self-sustaining electricity generation grids known as micro-grids , among others, as well as invest in start-up companies, ventures, small- to medium-sized enterprise and project businesses that engage in these businesses but have not previously attracted sufficient capital from the private sector.

Furthermore, as part of the Comprehensive Measures against Particulate Matter and the Eighth Basic Plan, announced by the Government in September 2017 and December 2017, respectively, the Government set forth the following policy directions relating to coal-fired generation units: (i) two coal-fired generation units scheduled for construction and four existing coal-fired generation units shall convert to LNG fuel use, (ii) in principle, construction of new coal-fired generation units shall not be planned, (iii) seven of the coal-fired generation units that are 30 years or older will be shut down on an accelerated schedule, (iv) beginning in 2018, coal-fired generation units that are 30 years or older shall temporarily cease operations from March through June of each year, (v) coal-fired generation units shall be put through comprehensive functional and environmental upgrades and (vi) coal-fired generation units shall be subject to emission standards that came into effect in January 2019 that are twice as more rigorous than the previous standards. Compliance with such measures is expected to result in our incurring significant costs.

Fuel Purchases

We require significant funds to finance our operations, principally in relation to the purchase of fuels by our generation subsidiaries for generation of electricity. In 2016, 2017 and 2018, fuel costs constituted 30.9%, 31.7% and 34.5% of our cost of sales and the ratio of fuel costs to our sales was 23.4%, 27.8% and 33.5%, respectively. We plan to fund our fuel purchases primarily with net operating cash, although in cases of rapid increases in fuel prices as is the case from time to time, we may also rely on borrowings from financial institutions and issuance of debt securities in the capital markets.

Repayment of Existing Debt

Payments of principal and interest on indebtedness will require considerable resources. The table below sets forth the scheduled maturities of the outstanding interest-paying debt (excluding issue discounts and premium) without taking into consideration of swap transactions of us and our six wholly-owned generation subsidiaries as of December 31, 2018 for each year from 2019 to 2023 and thereafter. As of December 31, 2018, such debt represented 95.7% of our outstanding debt on a consolidated basis.

Year ended December 31	Local Currency Borrowings	Foreign Currency Borrowings	Domestic Debentures	Foreign Debentures	Total
			(in billions of Won)		
2019	825		5,330	1,462	7,617
2020	8		6,140	1,151	7,299
2021	208	8	6,771	1,341	8,328
2022	207	1	5,650	1,398	7,256
2023	556	1	5,790	1,565	7,912
Thereafter	23		18,020	2,076	20,119
Total	1,827	10	47,701	8,993	58,531

We and our six wholly-owned generation subsidiaries incurred interest charges (including capitalized interest) in relation to our interest-paying debt of Won 2,490 billion, Won 2,287 billion and Won 2,362 billion in 2016, 2017 and 2018, respectively. We anticipate that interest charges will increase in future years because of, among other factors, anticipated increases in our long-term debt. See Capital Resources below. The weighted average rates of interest on our and our six wholly-owned generation subsidiaries debt were 3.69%, 3.20% and 3.23% in 2016, 2017 and 2018, respectively.

Overseas Investments

As part of our revenue diversification and fuel procurement strategy, we plan to continue to make overseas investments on a selective basis, which will be funded primarily through foreign currency-denominated borrowings and debt securities issuances as well as net operating cash from such projects.

Capital Resources

We have traditionally met our working capital and other capital requirements primarily from net cash provided by operating activities, issuance of debt securities and borrowings from financial institutions. Net cash provided by operating activities is primarily a function of electricity sales and fuel purchases and is also affected by increases and decreases in trade receivables, trade payables and inventory related to electricity sales and fuel purchases. Net cash provided by operating activities was Won 16,521 billion, Won 11,250 billion and Won 6,680 billion in 2016, 2017 and 2018, respectively.

As of December 31, 2016, 2017 and 2018, our long-term debt (excluding the current portion but including issue discounts and premium), without taking into consideration of swap transactions, amounted to Won 44,700 billion, Won 45,624 billion and Won 53,073 billion, respectively, representing 61.2%, 62.5% and 74.7% of shareholders equity, respectively, as of such dates. As of December 31, 2016, 2017 and 2018, the current portions of our long-term debt were Won 8,134 billion, Won 8,085 billion and Won 7,101 billion, respectively. As of December 31, 2016, 2017 and 2018, our short-term borrowings amounted to Won 806 billion, Won 1,038 billion and Won 861 billion, respectively. See Note 26 of the notes to our consolidated financial statements included in this annual report. Total long-term debt (including the current portion but excluding issue discounts and premium), without taking into consideration of swap transactions, as of December 31, 2018 was Won 60,289 billion, of which Won 49,618 billion was denominated in Won and an equivalent of Won 10,671 billion was denominated in foreign currencies, primarily U.S. dollars. We, KHNP, KOMIPO and KOWEPO also maintain global medium-term note programs in the aggregate amount of US$13 billion, of which approximately US$9 billion remains currently available for future drawdown. KOSEP also maintains an A$2 billion Australian dollar medium-term note program, of which approximately A$1.7 billion remains current available for future drawdown.

Subject to the implementation of our capital expenditure plan and the sale of our interests in our generation subsidiaries and other subsidiaries, our long-term debt may increase or decrease in future years. Until recently, a significant portion of our long-term debt was raised through foreign currency-denominated borrowings. Our foreign currency-denominated long-term debt (including the current portion but excluding issue discounts and premium), without taking into consideration of swap transactions, amounted to Won 10,463 billion and Won 10,671 billion as of December 31, 2017 and 2018, respectively.

Our ability to incur long-term debt in the future is subject to a variety of factors, many of which are beyond our control, including, the amount of capital that other Korean entities may seek to raise in capital markets. Economic, political and other conditions in Korea may also affect investor demand for our securities and those of other Korean entities. In addition, our ability to incur debt will also be affected by the Government s policies relating to foreign currency borrowings, the liquidity of the Korean capital markets and our operating results and financial condition. In case of adverse developments in Korea, the price at which such financing may be available may not be acceptable to us.

We incur our short-term borrowings primarily through commercial papers sold to domestic financial institutions. We have not had, and we do not expect to have, any material difficulties in obtaining short-term borrowings. In addition, in order to prepare for potential liquidity shortage, we maintain several credit facilities with financial institutions, with Won-denominated facilities amounting to Won 4,424 billion in aggregate and foreign currency-denominated facilities amounting to US$1,841 million in aggregate. The full amount of these facilities was available as of December 31, 2018.

We may raise capital from time to time through the issuance of equity securities. However, there are certain restrictions on our ability to issue equity, including limitations on shareholdings by foreigners. In addition, without changes in the existing KEPCO Act which requires that the Government, directly or pursuant to the Korea Development Bank Act, through Korea Development Bank, own at least 51% of our capital stock, it may be difficult or impossible for us to undertake any equity financing other than sales of treasury stock without the participation of the Government. Even if we are able to conduct equity financing with the participation of the Government, prevailing market conditions may be such that we may not be able conduct equity financing on terms that are commercially acceptable to us. See Item 3D. Risk Factors Risks Relating to Korea and the Global Economy.

Our total shareholders equity decreased by 2.6% from Won 72,965 billion as of December 31, 2017 to Won 71,093 billion as of December 31, 2018, mainly as a result of a decrease in total comprehensive income.

Liquidity

Our liquidity is substantially affected by our acquisition of property, plant and equipment, fuel purchases and schedule of repayment of debt. Our property, plant and equipment increased by 1.2% from Won 150,882 billion as of December 31, 2017 to Won 152,743 billion as of December 31, 2018. As fuel costs increased by 21.6% from Won 16,524 billion in 2017 to Won 20,093 billion in 2018, our current trade and other payables which is closely related to fuel costs increased by 6.8% from Won 6,000 billion as of December 31, 2017 to Won 6,405 billion as of December 31, 2018. Our current financial liabilities decreased by 13.2% from Won 9,195 billion as of December 31, 2017 to Won 7,982 billion as of December 31, 2018 according to our debt repayment schedule.

Our cash flows are also impacted by other factors. Our net cash provided by operating activities decreased by 40.6% from Won 11,250 billion in 2017 to Won 6,680 billion in 2018. The decrease in net cash provided by operating activities in 2018 compared to 2017 was mainly due to a decrease in profit for the period. Our cash flows from investing activities are affected by acquisition of and proceeds from disposals of financial assets. Our net cash used in investing activities increased by 3.2% from Won 12,607 billion in 2017 to Won 13,014 billion in 2018, mainly because our acquisition of financial assets outpaced disposals of financial assets. Our cash flows from financing activities are mainly affected by borrowings and issuance of debt securities and repayment thereof, as well as dividends paid. Our net cash from financing activities was Won 746 billion in 2017 and Won 5,302 billion in 2018, respectively, largely due to an increase in proceeds from long-term borrowings and debt securities.

Due to the capital-intensive nature of our business as well as significant volatility in fuel prices, from time to time we operate with working capital deficits, and we may have substantial working capital deficits in the future. As of December 31, 2016, 2017 and 2018, we had a working capital deficit of Won 5,031 billion, Won 4,283 billion and Won 2,096 billion, respectively. We have traditionally met our working capital and other capital requirements primarily with net cash provided by operating activities, issuance of debt securities, borrowings from financial institutions and construction grants. We also incur short-term borrowings primarily through commercial papers sold to domestic financial institutions. We have not had, and we do not expect to have, any material difficulties in obtaining short-term borrowings. See Capital Resources.

We may face liquidity concerns in the case of sudden and sharp depreciation of the Won against major foreign currencies or depreciation over a sustained period of time. While substantially all of our revenues and our cash and cash equivalents are denominated in Won, we pay for substantially all of our fuel purchases in foreign currencies and a substantial portion of our long-term debt is denominated in foreign currencies, and payment of principal and interest thereon is made in foreign currencies. In the past, we have incurred foreign currency debt principally due to the limited availability and the high cost of Won-denominated financing in Korea. However, in light of the increasing sophistication of the Korean capital markets and the recent increase in Won liquidity in the Korean financial markets, we plan to reduce the portion of our debt which is denominated in foreign currencies although we intend to continue to raise certain amounts of capital through long-term foreign currency debt for purposes of maintaining diversity in our funding sources as well as paying for overseas investments and fuel procurements in foreign currencies. As of December 31, 2018, 17.7% of our long-term debt (including the current portion but excluding issue discounts and premium) without taking into consideration of swap transactions was denominated in currencies other than Won.

We enter into currency swaps and other hedging arrangements with respect to our debt denominated in foreign currencies only to a limited extent due primarily to the limited size of the Korean market for such derivative arrangements. Such instruments include combined currency and interest rate swap agreements, interest rate swaps and foreign exchange agreements. We do not enter into derivative financial instruments in order to hedge market risk resulting from fluctuations in fuel costs. Our policy is to hold or issue derivative financial instruments for hedging purposes only. Our derivative financial instruments are entered into with major financial institutions, thereby minimizing the risk of credit loss. See Note 14 of the notes to our consolidated financial statements.

We paid dividends of Won 1,980 per share in respect of fiscal year 2016, Won 790 per share in respect of fiscal year 2017. We did not pay any dividends in respect of fiscal year 2018.

Other

Our operations are materially affected by the policies and actions of the Government. See Item 4.B. Business Overview Regulation.

Item 5.C. Research and Development, Patents and Licenses, etc.

Research and Development

Our research and development program is focused on developing advanced electric power, renewable energy, smart grid and customer-friendly electricity service technologies that will enable us to become a global leader in the energy industry. In order to achieve our corporate vision of becoming a A Smart Energy Creator in 2014, we adopted the KEPCO Technology Strategy, which emphasizes enhanced technological convergence and customer service. As part of such strategy, we are continuously investing in technology development to preemptively respond to changes in the energy paradigm and to improve the quality of the electricity. As a result, we secured 20 core strategic technologies and 23 first-in-class technologies and 49 domestic top-level technologies in the related fields such as power network upgrading, 4th industrial revolution and renewable energy. In 2019, consistent with the Government guidelines, we plan to invest approximately 4.93% of our annual estimated net sales in the research and development. We also actively cope with changes in the external environment represented by 3Ds (Digitalization, Decarbonization and Decentralization) and established medium and long-term technology development strategies for core strategies to create sustainable new growth engines. We plan to invest in the following: (i) a system platform that combines technologies such as big data, artificial intelligence and cloud computing; (ii) digitalization technology of electric power facility; (iii) power energy storage technology; (iv) advanced renewable energy technology; (v) energy consumption optimization demand management technology; (vi) advanced power generation technology; (vii) international power grid connection technology and (viii) active distribution system technology to secure 150 core technologies that can contribute to national development and quality of life of our customers.

Our high-priority creative smart energy projects currently include the following:

- acquiring integrated gasified process technology;
- establishing smart energy cities for high efficient grid;
- developing highly efficient absorbents for carbon capture;
- commercializing offshore wind power plants;
- obtaining high-voltage direct currents technology suitable for domestic operation; and
- experimental testing of large-scale energy storage systems with capacities ranging from four to eight megawatts.

Our research and development activities also focus on the following:

- in the thermal power generation sector, reducing the greenhouse effect, enhancing efficiency and reducing cost in power plant construction and operation as well as in our plant maintenance, including through improvements in damage analysis and environment-friendly inspections;
- in the renewable energy sector, enhancing efficiency, lowering costs of power generation, identifying new energy sources and exploring new business opportunities;
- in the electric power system sector, enhancing the stability and reliability in the operation of our electric power grid as well as enhancing efficiency in electricity distribution, including through build-out of large-sized electricity storage facilities and superconducting transmission cable grids, introducing preventive

maintenance measures for substations and developing technologies related to system automation, power utilization and power line communication;

in the customer service sector, developing technologies enabling a greater range of business opportunities and heightened customer service in anticipation of the upcoming rollout of the smart grid system; and

in the technological convergence sector, identifying new business opportunities through convergence among technologies and businesses and maximizing synergy from such convergence in tandem with the promotion of creative economy in Korea as well as globally.

In addition, we cooperate closely with several other electric utility companies and research institutes, both foreign and domestic, on various projects to diversify the scope and scale of our research and development activities.

We and our six generation subsidiaries invested Won 530 billion, Won 975 billion and Won 929 billion in 2016, 2017 and 2018, respectively, and currently plan to invest Won 1,044 billion in 2019, on research and development. Our current focus in research and development is primarily in the area of ICT-based smart energy technological development. We had 1,208 employees engaged in research and development activities as of December 31, 2018. As a result of our research, we had 5,218 registered patents and 6,426 patent applications outstanding in Korea and abroad as of December 31, 2018.

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Item 5.D. Trend Information

Trends, uncertainties and events which could have a material impact on our sales, liquidity and capital resources are discussed above in Item 5.A. Operating Results and Item 5.B. Liquidity and Capital Resources.

Item 5.E. Off-Balance Sheet Arrangements

We had no significant off-balance sheet arrangements as of December 31, 2018.

Item 5.F. Tabular Disclosure of Contractual Obligations

The following summarizes certain of the contractual obligations of us and our six wholly-owned generation subsidiaries as of December 31, 2018 and the effect such obligations are expected to have on liquidity and cash flow in future periods.

		Payments Due by Period			
Contractual Obligations[1]	**Total**	**Less than 1 year**	**1 3 years**	**3 5 years**	**After 5 years**
			(in billions of Won)		
Long-term debt[2]	57,714	6,799	15,627	15,169	20,119
Short-term borrowings	817	817			
Interest payments[3]	10,209	1,709	2,682	1,755	4,063
Total	68,740	9,325	18,309	16,924	24,182

Notes:

(1) Other than as set forth in this table, we have several other contractual obligations, including finance lease agreements, fuel purchase agreements and consecutive voyage charter agreements. We believe the remaining annual payments under finance lease agreements as of December 31, 2018 were immaterial. Contractual obligations related to payment of debt of us and our six wholly-owned generation subsidiaries represented 94.2% of our outstanding debt as of December 31, 2018 on a consolidated basis. As for fuel purchase agreements, our generation subsidiaries have entered into several contracts under which they are committed to purchasing minimum quantities of fuel, including approximately 90 million tons of bituminous coal annually. As for all uranium ore concentrates, in order to ensure stable supply, our subsidiary enters into long-term and medium-term contracts with various suppliers and supplements such supplies with purchases in spot markets. We negotiate annually with Korea Gas Corporation and other suppliers, to purchase LNG. The fuel purchase price is typically negotiated near or at time of purchase subject to prevailing market conditions. In 2018, we purchased fuel in the amount of Won 20.1 trillion and the operating lease payment in connection with the consecutive voyage charter agreements was Won 872 billion.

(2) Includes the current portion.

(3)

A portion of our debt carried a variable rate of interest. We used the interest rate in effect as of December 31, 2018 for the variable rate of interest in calculating the interest payments on debt for the periods indicated.

For a description of our commercial commitments and contingent liabilities, see Note 53 of the notes to our consolidated financial statements included in this annual report.

We entered into a power purchase agreement with GS EPS Co., Ltd. and two other non-renewable energy independent power producers that are not part of the Community Energy System, under which we are required to purchase all electricity generated by these companies to the extent such electricity is traded through the Korea Power Exchange. The purchase prices for such electricity are predetermined under the power purchase agreements, subject to annual adjustments. We purchased power from these companies in the amounts of Won 896 billion, Won 941 billion and Won 966 billion in 2016, 2017 and 2018, respectively.

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We meet our coal requirements primarily through purchases of bituminous coal and anthracite coal under long-term supply contracts with domestic and foreign suppliers to purchase. Under these long-term supply contracts, purchase prices are adjusted periodically based on prevailing market conditions. We also purchase a substantial portion of our LNG requirements from Korea Gas Corporation, a related party. We have also entered into long-term transportation contracts with Pan Ocean Co., Ltd. and others.

We import all uranium ore concentrates from sources outside Korea (including the United Kingdom, Kazakhstan, France, Germany, Niger, Canada and Japan) through medium- to long-term contracts and pay for such concentrates with currencies other than Won, primarily U.S. dollars. Contract prices for processing of uranium are generally based on market prices. See Note 52 of the notes to our consolidated financial statements for further details of these contracts.

Under the Long-term Transmission and Substation Plan approved by the Ministry of Trade, Industry and Energy, we are liable for the construction of all of our power transmission facilities and the maintenance and repair expenses for such facilities.

Payment guarantee and short-term credit facilities from financial institutions as of December 31, 2018 were as follows:

Payment guarantee

Description	Financial Institutions	Credit Lines (In millions of Won or thousands of USD, JPY, INR, CAD, SAR, NPR, ZAR and EUR)	
Payment of import letter of credits	Shinhan Bank and others	USD	992,434
Inclusive credits	Shinhan Bank	INR	70,028
	KEB Hana Bank	KRW	258,000
	KEB Hana Bank and others	USD	30,930
Performance guarantees on Contract	KEB Hana Bank and others	EUR	4,158
	KEB Hana Bank and others	INR	237,321
	Korea Development Bank and others	JPY	637,322
	Seoul Guarantee Insurance and others	KRW	89,335
	First Abu Dhabi Bank and others	USD	923,915
	KEB Hana Bank	SAR	6,508
	Bank of Kathmandu	NPR	36,304
	KEB Hana Bank	CAD	617
Guarantees for bid	KEB Hana Bank and others	USD	110,000
	Shinhan Bank	ZAR	55,730
Warranty bond and others	Export-Import Bank of Korea and others	USD	3,934,928
Payment on payable from foreign country	Kookmin Bank and others	USD	44,680
Trade finance	BNP Paribas and others	USD	800,000
Other guarantees	Shinhan Bank	JPY	381,210
	Nonghyup Bank and others	KRW	307,436

Export-Import Bank of Korea and others	USD	1,171,470

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Overdraft and Others

Description	Financial Institutions	Credit Lines (In millions of Won, thousands of USD or thousands of PHP)	
Overdraft	Nonghyup Bank and others	KRW	2,135,000
Commercial paper	KEB Hana Bank and others	KRW	1,050,000
Limit amount available for card	KEB Hana Bank and others	KRW	55,904
	Banco de Oro	PHP	5,000
Loan limit	Kookmin Bank and others	KRW	1,238,500
	DBS Bank and others	USD	1,840,700

In order to secure our status as a shareholder of Navanakom Electric Co., Ltd., we have signed a fund supplement contract. According to the contract, in case Navanakom Electric Co., Ltd. does not have sufficient funds for its operation or repayment of borrowings, we bear a payment obligation in proportion to our ownership.

We have outstanding borrowings with a limit of US$275,600 thousand from creditors such as International Finance Corporation. Regarding the borrowing contract, we have guaranteed capital contribution of US$69,808 thousand and additional contribution up to US$19,000 million for contingencies, if any. For one of the electricity purchasers, Central Power Purchasing Agency Guarantee Ltd., we have provided payment guarantee up to US$2,777 thousand, in case of a construction delay or insufficient contract volume after commencement of the construction.

We have provided PT. Perusahaan Listrik Negara performance guarantee up to US$2,293 thousand and Mizuho Bank and others investment guarantee up to US$43,500 thousand in proportion to our ownership in the electricity purchase contract with PT. Cirebon Energi Prasarana in relation to the second electric power generation business in Cirebon, Indonesia.

We have provided MUFG Bank, Ltd. (MUFG) (formerly, the Bank of Tokyo Mitsubishi UFJ. Ltd. (BTMU)) borrowing guarantee up to US$ 41,258 thousand in connection with the equity bridge loan for PT. Cirebon Energi Prasarana in relation to the second electric power generation business in Cirebon, Indonesia. The guarantee amount is proportional to our equity interest in PT. Cirebon Energi Prasarana.

We have provided the Export-Import Bank of Korea, BNP Paribas and ING Bank guarantee of mutual investment of US$ 2,192 thousand, which is equivalent to the ownership interest of PT BS Energy and PT Nusantara Hydro Alam, in order to guarantee the expenses related to hydroelectric power business of Tanggamus, Indonesia.

We have provided the Export-Import Bank of Korea and SMBC guarantee of mutual investment of US$401 thousand, which is equivalent to the ownership interest of PT Mega Power Mandiri, in order to guarantee the expenses related to hydroelectric power business of PT Wampu Electric Power, our associate.

Existing guarantees provided by us to our associates and joint ventures as of December 31, 2018 are as follows.

Primary Guarantor (Providing Company)	Principal Obligator (Provided Company)	Type of Guarantees	Currency	Credit Limit	Guarantee (Final Provided Company)
	(In millions of Won or thousands of USD and SAR)				
KEPCO	Shuweihat Asia Operation & Maintenance Company	Performance guarantees	USD	11,000	SAPCO

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Primary Guarantor (Providing Company)	Principal Obligator (Provided Company)	Type of Guarantees	Currency	Credit Limit	Guarantee (Final Provided Company)
		(In millions of Won or thousands of USD and SAR)			
KEPCO	Rabigh Operation & Maintenance Company Limited	Performance guarantees and others	USD	1,387	RABEC
KEPCO	Barakah One Company	Debt guarantees	USD	900,000	Export-Import Bank of Korea and others
		Performance guarantees and others	USD	3,404,275	Export-Import Bank of Korea and others
KEPCO	RE Holiday Holdings LLC	Performance guarantees	USD	223,000	EPS Renewables Holdings, LLC, Santander Bank and others
KEPCO	RE Pioneer Holdings LLC	Performance guarantees	USD	170,000	EPS Renewables Holdings, LLC, Santander Bank and others
KEPCO	RE Barren Ridge 1 Holdings LLC	Performance guarantees	USD	149,000	Firstar Development, LLC, Santander Bank and others
KEPCO	Nghi Son 2 Power LLC	Performance guarantees	USD	28,000	SMBC Ho Chi Minh
KOWEPO	Cheongna Energy Co., Ltd.	Collateralized money invested	KRW	3,465	KEB Hana Bank and others
		Guarantees for supplemental funding and others(1)			KEB Hana Bank and others
KOWEPO	Xe-Pian Xe-Namnoy Power Co., Ltd.	Payment guarantees for business reserve	USD	2,500	Krung Thai Bank
		Collateralized money invested	KRW	77,165	Krung Thai Bank
		Impounding bonus guarantees	USD	5,000	SK E&C
KOWEPO	Rabigh Operation & Maintenance Company Limited	Performance guarantees and others	SAR	5,600	Saudi Arabia British Bank
KOWEPO	Daegu Photovoltaic Co., Ltd.	Collateralized money invested	KRW	2,002	Korea Development Bank
KOWEPO	Dongducheon Dream Power Co., Ltd.	Collateralized money invested(7)	KRW	41,389	Kookmin Bank and others
		Debt guarantees	KRW	20,300	BNK Securities and others
KOWEPO	PT. Mutiara Jawa		KRW	365	Woori Bank

		Collateralized money invested			
KOWEPO	Heang Bok Do Si Photovoltaic Power Co., Ltd.	Collateralized money invested	KRW	202	Nonghyup Bank

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Primary Guarantor (Providing Company)	Principal Obligator (Provided Company)	Type of Guarantees	Currency	Credit Limit	Guarantee (Final Provided Company)
	(In millions of Won or thousands of USD and SAR)				
KOWEPO	Shin Pyeongtaek Power Co., Ltd.	Collateralized money invested	KRW	67,600	Kookmin Bank
		Guarantees for supplemental funding[1]			Kookmin Bank
EWP	Busan Shinho Solar Power Co., Ltd.	Collateralized money invested	KRW	4,761	Korea Development Bank and others
EWP	Seokmun Energy Co., Ltd.	Collateralized money invested	KRW	16,751	Kookmin Bank and others
EWP	Chun-cheon Energy Co., Ltd.	Collateralized money invested	KRW	42,505	Kookmin Bank and others
		Guarantees for supplemental funding[1]	KRW	20,000	Kookmin Bank and others
EWP	Honam Wind Power Co., Ltd.	Collateralized money invested	KRW	4,860	Shinhan Bank and others
EWP	GS Donghae Electric Power Co., Ltd.	Collateralized money invested	KRW	240,591	Korea Development Bank and others
EWP	Yeonggwangbaeksu Wind Power Co., Ltd.	Collateralized money invested	KRW	2,843	Kookmin Bank and others
EWP	Yeonggwang Wind Power Co., Ltd.	Collateralized money invested	KRW	15,304	KDB Capital Corporation and others
EWP	Daesan Green Energy Co., Ltd.	Collateralized money invested	KRW	17,433	IBK
EWP	Taebaek Gadeoksan Wind Power Co., Ltd.	Collateralized money invested	KRW	8,508	Samsung Fire & Marine Insurance Co., Ltd. and others
EWP	PT. Tanjung Power Indonesia	Debt guarantees	USD	46,983	MUFG Bank, Ltd.(MUFG) (formerly, the Bank of Tokyo Mitsubishi UFJ, Ltd.(BTMU)) and others
		Other guarantees	USD	3,150	PT Adaro Indonesia
EWP	South Jamaica Power Company Limited	Performance guarantees	USD	14,400	Societe Generale
EWP Barbados 1 SRL	South Jamaica Power Company Limited	Guarantees for supplemental funding[1, 3]	USD	18,350	JCSD Trustee Services Limited and others
KOSPO	KNH Solar Co., Ltd.	Collateralized money invested	KRW	2,337	Shinhan Bank and Kyobo Life Insurance Co., Ltd.

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Primary Guarantor (Providing Company)	Principal Obligator (Provided Company)	Type of Guarantees	Currency	Credit Limit	Guarantee (Final Provided Company)
		(In millions of Won or thousands of USD and SAR)			
		Performance guarantees and guarantees for supplemental funding(1)			
KOSPO	Daeryun Power Co., Ltd.	Collateralized money invested	KRW	26,099	Korea Development Bank and others
		Guarantees for supplemental funding and others(1)			Korea Development Bank and others
KOSPO	Changjuk Wind Power Co., Ltd.	Collateralized money invested	KRW	8,086	Shinhan Bank
		Guarantees for supplemental funding(1)			Shinhan Bank
KOSPO	Daegu Green Power Co., Ltd.	Collateralized money invested	KRW	41,110	Shinhan Bank and others
KOSPO	Kelar S.A	Performance guarantees	USD	63,707	KEB Hana Bank, SMBC, Mizuho Bank, MUFG, Natixis
KOSPO	Daehan Wind Power PSC	Debt guarantees	USD	18,200	Shinhan Bank
		Performance guarantees	USD	3,000	Shinhan Bank
		Guarantees for supplemental funding(1)			Shinhan Bank
KOSPO	Pyeongchang Wind Power Co., Ltd.	Collateralized money invested	KRW	5,419	Woori Bank and Shinhan Bank and others
		Performance guarantees			Woori Bank and Shinhan Bank and others
KOSPO	Taebaek Wind Power Co., Ltd.	Guarantees for supplemental funding(1)			Shinhan Bank and others
KOSPO	Jeongam Wind Power Co., Ltd.	Collateralized money invested	KRW	4,589	IBK, SK Securities Co., Ltd. and others
		Performance guarantees			IBK, SK Securities Co., Ltd. and others
KOSPO	Samcheok Eco Materials Co., Ltd.	Payment guarantees(4)			SEM Investment Co., Ltd.
KOMIPO			KRW	127,160	

	Hyundai Green Power Co., Ltd.	Collateralized money invested			Korea Development Bank and others
KOMIPO	PT. Cirebon Electric Power	Debt guarantees	USD	11,825	Mizuho Bank
KOMIPO	PT Wampu Electric Power	Debt guarantees	USD	4,854	SMBC

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Primary Guarantor (Providing Company)	Principal Obligator (Provided Company)	Type of Guarantees	Currency	Credit Limit	Guarantee (Final Provided Company)
	(In millions of Won or thousands of USD and SAR)				
KOMIPO	YaksuESS Co., Ltd	Collateralized money invested	KRW	460	Hanwha Life Insurance Co., Ltd.
		Guarantees for supplemental funding[1]			Hanwha Life Insurance Co., Ltd.
KOMIPO	YeongGwang Yaksu Wind Electric. Co., Ltd	Collateralized money invested	KRW	533	Hanwha Life Insurance Co., Ltd. and others
KOSEP	Hyundai Energy Co., Ltd.	Collateralized money invested[5]			Korea Development Bank and others
		Guarantees for supplemental funding and others[1, 6]	KRW	78,600	Korea Development Bank and others
KOSEP	RES Technology AD	Collateralized money invested	KRW	15,209	UniCredit Bulbank and others
KOSEP	ASM-BG Investicii AD	Collateralized money invested	KRW	21,379	UniCredit Bulbank and others
KOSEP	Expressway Solar-light Power Generation Co., Ltd.	Guarantees for supplemental funding[1, 2]	KRW	2,500	Woori Bank
KOSEP	S-Power Co., Ltd.	Collateralized money invested	KRW	114,566	Korea Development Bank and others
KOSEP	Goseong Green Energy Co., Ltd.	Collateralized money invested	KRW	2,459	Kyobo Life Insurance Co., Ltd. and others
KOSEP	Gangneung Eco Power Co., Ltd.	Collateralized money invested	KRW	2,495	Kyobo Life Insurance Co., Ltd. and others
KOSEP	PND solar., Ltd.	Collateralized money invested	KRW	1,020	IBK and others
KOSEP	Tamra Offshore Wind Power Co., Ltd.	Collateralized money invested	KRW	10,401	Nonghyup Life Insurance Co., Ltd. and others
KOSEP	Hyundai Eco Energy Co., Ltd.	Collateralized money invested	KRW	3,388	Samsung Life Insurance and others
KHNP	Noeul Green Energy Co., Ltd.	Collateralized money invested	KRW	8,016	KEB Hana Bank and others
KHNP	Busan Green Energy Co., Ltd.	Collateralized money invested	KRW	12,537	Shinhan Bank and others

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Primary Guarantor (Providing Company)	Principal Obligator (Provided Company)	Type of Guarantees	Currency	Credit Limit	Guarantee (Final Provided Company)
		(In millions of Won or thousands of USD and SAR)			
KEPCO Plant Service & Engineering Co., Ltd.	Incheon New Power Co., Ltd.	Collateralized money invested	KRW	579	Shinhan Bank
		Guarantees for supplemental funding and others(1)			Shinhan Bank

Notes:

(1) We guarantee to provide supplemental funding for businesses with respect to excessive business expenses or insufficient repayment of borrowings.

(2) We have granted the right to Hana Financial Investment Co., Ltd., as an agent for the creditors to Express Solar-light Power Generation Co., Ltd.(ESPG), to the effect that in the event of acceleration of ESPG s payment obligations under certain borrowings to such creditors, Hana Financial my demand us to dispose of shares in ESPG held by us and apply the resulting proceeds to repayment of ESPG s obligations.

(3) This includes a guarantee for the shareholder s capital payment in connection with the business of 190MW has complex thermal power plant in Jamaica. EWP (Barbados) 1 SRL s capital contribution amount is USD 14,730 thousand and the total amount of guarantees is USD 8,257.5 thousand which consists of USD 3,670 thousand of EWP (Barbados) 1 SRL s contribution obligation and USD 4,587.5 thousand of South Jamaica Energy Holding Limited s portion (50%) of contribution obligation.

(4) We have the obligation to purchase the stocks should preferred stockholders elect to sell their stocks on the expected sell date (3 years from preferred stock payment date) and are required to guarantee the promised yield when preferred stockholders sell their stocks. In relation to this guarantee, we have recognized Won 2,155 million of derivative liabilities as of December 31, 2018.

(5) We recognized impairment loss on all of the equity securities of Hyundai Energy Co., Ltd. in prior years, and the acquisition cost of the securities provided as collateral is Won 47,067 million.

(6) Pursuant to the guarantee agreement, we recognized other provisions of Won 40,898 million as the possibility of economic outflow to fulfill the obligation was probable and the amount could be reasonably estimated.

(7) The common stocks of Dongducheon Dream Power Co., Ltd. held by us were pledged as collateral.

Other than as described in this annual report and also in Notes 50 and 53 of the notes to our consolidated financial statements included in this annual report, we did not have any other material credit lines and guarantee commitments provided to any third parties as of December 31, 2018.

ITEM 6. *DIRECTORS, SENIOR MANAGEMENT AND EMPLOYEES*

Item 6.A. Directors and Senior Management

Board of Directors

Under the KEPCO Act, the Act on the Management of Public Institutions and our Articles of Incorporation, our board of directors, which is required to consist of not more than 15 directors, including the president, is vested with the authority over our management.

Pursuant to our Articles of Incorporation and the Act on the Management of Public Institutions, we have two types of directors: standing directors (sangim-isa in Korean) and non-standing directors (bisangim-isa in Korean). The standing directors refer to our directors who serve their directorship positions in full-time capacity. The non-standing directors refer to our directors who do not serve their directorship positions in full-time capacity. The non-standing directors currently do not hold any executive positions with us or our subsidiaries.

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Under our Articles of Incorporation, there may not be more than seven standing directors, including our president, and more than eight non-standing directors. The number of non-standing directors must exceed the number of standing directors, including our president. A senior non-standing director appointed by the Ministry of Economy and Finance becomes our chairman of the board following the review and resolution of the Public Agencies Operating Committee.

Our president serves as our chief executive officer and represents us and administers our day-to-day business in all matters and bears the responsibility for the management s performance. Our president is appointed by the President of the Republic upon the motion of the Ministry of Trade, Industry and Energy following the nomination by our director nomination committee, the review and resolution of the Public Agencies Operating Committee pursuant to the Act on the Management of Public Institutions and an approval at the general meeting of our shareholders.

Our standing director who concurrently serve as members of the audit committee are appointed through the same appointment process applicable to our president, except that the motion for appointment is made by the Ministry of Economy and Finance instead of the Ministry of Trade, Industry and Energy. Standing directors other than our president or those who concurrently serve as members of the audit committee are appointed by our president with the approval at the general meeting of our shareholders.

Our non-standing directors must be appointed by the minister of the Ministry of Economy and Finance following the review and resolution of the Public Agencies Operating Committee from a pool of candidates recommended by the director nomination committee and must have ample knowledge and experience in business management. Appointment of non-standing directors to become part of the audit committee is subject to approval at the general meeting of our shareholders. Government officials that are not part of the teaching staff in national and public schools are ineligible to become our non-standing directors.

The term of our president is three years, while that of our directors (standing or non-standing, but not the president) is two years. According to the Act on the Management of Public Institutions, our president s term cannot be terminated unless done so by the President of the Republic pursuant to the Act on the Management of Public Institutions or upon an event as specified in our Articles of Incorporation.

Attendance by a majority of the board members constitutes a voting quorum for our board meetings, and resolutions can be passed by a majority of the board members. In the event the president acts in violation of law or the Articles of Incorporation, is negligent in his duties, or otherwise is deemed to be significantly impeded in performing his official duties as president, the board of directors may by resolution request the minister of the Ministry of Trade, Industry and Energy to dismiss or recommend the dismissal of the president.

Our non-standing directors may request any information necessary to fulfill their duties from our president, and except in special circumstances, our president must comply with such request.

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The names, titles and outside occupations, if any, of the directors as of April 15, 2019 and the respective years in which they took office are set forth below.

Name (Gender)	Age	Title	Outside Occupation	Position Held Since
JongKap KIM (Male)	67	President, Chief Executive Officer and Standing Director	None	April 13, 2018
Lee, Jung-Hee (Male)	64	Standing Director and Member of the Audit Committee	None	August 13, 2018
Kim, Hoe-Chun (Male)	58	Senior Executive Vice President for Business Management, Standing Director	None	July 16, 2018
Kim, Dong-Sub (Male)	59	Senior Executive Vice President for Business Operations, Standing Director	None	July 16, 2018
Park, Hyung-Duck (Male)	58	Senior Executive Vice President for Strategy & Finance, Chief Financial Officer, Standing Director	None	July 16, 2018
Lim, Hyun-Seung (Male)	58	Senior Executive Vice President for Nuclear Power Generations, Standing Director	None	July 16, 2018
Kim, Sung-Arm (Male)	59	Senior Executive Vice President for Power Grid, Standing Director	None	March 4, 2019
Kim, Tai-Yoo (Male)	68	Non-Standing Director and Chairman of the Board of Directors	Emeritus Professor of Engineering College, Seoul National University	October 10, 2018
Kim, Chang-Joon (Male)	74	Non-Standing Director	Chairman of the Sport for All subcommittee, Korean Sport and Olympic Committee	March 19, 2018
Yang, Bong-Ryull (Male)	67	Non-Standing Director	None	April 4, 2018
Kim, Jwa-Kwan (Male)	59	Non-Standing Director	Professor of Environmental Engineering, Catholic University of Pusan	April 4, 2018
Jung, Yeon-Gil (Male)	52	Non-Standing Director and Member of the Audit	Professor of New Materials Engineering, Changwon	April 4, 2018

		Committee	University, Energy Policy Consultant of the Ministry of Trade, Industry and Energy	
Noh, Geum-Sun (Female)	57	Non-Standing Director and Member of the Audit Committee	None	June 12, 2018
Choi, Seung-Kook (Male)	53	Non-Standing Director	Director of Solar and Wind Energy Cooperative Association	June 12, 2018
Park, Cheol-Su (Male)	50	Non-Standing Director	Head of Self-Support Center in Naju Director of the Naju Social Economy Network	June 12, 2018

JongKap KIM has been our President and CEO since April 13, 2018. Prior to his current position, he served as the Chief Executive Officer of Siemens Korea, the Chief Executive Officer of SK Hynix, a Commissioner of Korean Intellectual Property Office, and a Vice Minister of Ministry of Trade, Industry and Energy. Mr. Kim received a Ph. D. in public administration from Sungkyunkwan University, M.A. in economics from Indiana University and M.B.A. from New York University.

Lee, Jung-Hee has been our Standing Director since August 13, 2018. Mr. Lee previously served as a visiting professor of Law School of Chonnam National University, a committee member of Presidential Committee on Judicial Reform and the Senior Vice President of Korean Bar Association. Mr. Lee received a L.L.B. from Chonnam National University.

Kim, Hoe-Chun has been our Standing Director since July 16, 2018. Mr. Kim also currently serves as our Senior Vice President for Business Management and previously served as the Executive Vice President & Chief HR Officer and the Vice President of Corporate Planning Department. Mr. Kim received a Korean Executive MBA from Helsinki School of Economics.

Kim, Dong-Sub has been our Standing Director since July 16, 2018. Mr. Kim also currently serves as our Senior Executive Vice President for Business Operations and previously served as the Executive Vice President & Chief Technology Officer and the Vice President of KEPCO Research Institute. Mr. Kim received a Ph.D. of engineering in technology policy from Yonsei University.

Park, Hyung-Duck has been our Standing Director since July 16, 2018. Mr. Park also currently serves as our Senior Executive Vice President for Strategy and Finance and Chief Financial Officer. Mr. Park previously served as the Vice President at Regional Headquarters KEPCO Gyeonggi and the Vice President of Sales and Marketing Department. Mr. Park received an Executive MBA in utilities management from Helsinki School of Economics.

Lim, Hyun-Seung has been our Standing Director since July 16, 2018. Mr. Lim also currently serves as our Senior Executive Vice President for Nuclear Power Generations and previously served as the Vice President of UAE Nuclear Project Department in KEPCO and the Vice President of Global Nuclear Project Department. Mr. Lim received a B.ME from Sungkyunkwan University.

Kim, Sung-Arm has been our Standing Director since March 4, 2019. Mr. Kim also currently serves as our Senior Executive Vice President for Power Grid and previously served as the Vice President at Regional Headquarters KEPCO Namseoul and the Vice President of Transmission and Substation Construction Department. Mr. Kim received a B.S. in electrical engineering from Hongik University.

Kim, Tai-Yoo has been our Non-Standing Director since October 10, 2018. Mr. Kim is currently Emeritus Professor of Engineering College at Seoul National University. Mr. Kim previously served as the Information Science Technology Advisor of Cheongwadae, Office of President. Mr. Kim received a B.S. in mining and minerals engineering from Seoul National University and a Ph. D. in mineral and energy economics from Colorado School of Mines.

Kim, Chang-Joon has been our Non-Standing Director since March 19, 2018. Mr. Kim is currently chairman of the Sport for All subcommittee of the Korean Sport and Olympic Committee. Mr. Kim previously served as a member of the Electricity Regulatory Commission (KOREC). Mr. Kim received a B.S. in veterinary science at Chonnam National University.

Yang, Bong-Ryull has been our Non-Standing Director since April 4, 2018. Mr. Yang previously served as the Ambassador of the Republic of Korea to Malaysia and the Vice President of Public Affairs in Gwangju Institute of Science and Technology. Mr. Yang received a B.A. in politics at Seoul National University and a Ph.D. in business administration from Gwangju University.

Kim, Jwa-Kwan has been our Non-Standing Director since April 4, 2018. Mr. Kim is currently Professor of Environmental Engineering at Catholic University of Pusan. Mr. Kim previously served as a visiting professor at the Seoul National University Graduate School of Environmental Studies. Mr. Kim received a B.S. in environmental engineering from Pukyong National University and a Ph.D. in public administration from Seoul National University.

Jung, Yeon-Gil has been our Non-Standing Director since April 4, 2018. Mr. Jung is currently Professor of New Materials Engineering at Changwon University and the Energy Policy Consultant of the Ministry of Trade, Industry and Energy. Mr. Jung previously served as vice-chairman of the Korean Ceramic Society. Mr. Jung received a B.S. and a Ph.D in material engineering from Hanyang University.

Noh, Geum-Sun has been our Non-Standing Director since June 12, 2018. Ms. Noh is a certified public accountant and previously served as the President of EOS Partners, the Executive Auditor of National Pension Service and co-representative of Mirae Accounting Firm. Ms. Noh received a B.S. in nursing from Seoul National University.

Choi, Seung-Kook has been our Non-Standing Director since June 12, 2018. Mr. Choi currently serves as the Director of Solar and Wind Energy Cooperative Association. Mr. Choi previously served as a co-representative of Korea NGO s Energy Network. Mr. Choi received a B.A. in sociology from Hanyang University and a M.A. in urban administration from the University of Seoul.

Park, Cheol-Su has been our Non-Standing Director since June 12, 2018. Mr. Park currently serves as the head of Self-Support Center in Naju and the director of Naju Social Economy Network. Mr. Park received a B.A. in English literature from Gwangju University and a M.A. in public administration from Chonnam National University.

The business address of our directors is 55 Jeollyeok-ro, Naju-si, Jeollanam-do, 58322, Korea.

Audit Committee

Under the Act on the Management of Public Institutions, which took effect as of April 1, 2007, we are designated as a market-oriented public enterprise and, as such, are required to establish an audit committee in lieu of the pre-existing board of auditors upon expiration of the term of the last remaining member of the board of auditors. In September 2007, we amended our Articles of Incorporation to establish, in lieu of the pre-existing board of auditors, an audit committee meeting the requirements under the Sarbanes-Oxley Act. Under the Act on the Management of Public Institutions, the Korean Commercial Code and the amended Articles of Incorporation, we are required to maintain an audit committee consisting of three members, of which not less than two members are required to be non-standing directors. The roles and responsibilities of our audit committee members are to perform the functions of an audit committee meeting the requirements under the Sarbanes-Oxley Act. Our audit committee was established on December 8, 2008.

Lee, Jung-Hee, a standing director, and Noh, Geum-Sun and Jung, Yeon-Gil, both non-standing directors, are currently members of our audit committee. All such members of the audit committee are independent within the meaning of the Korea Stock Exchange listing standards, the regulations promulgated under the Korean Commercial Code and the New York Stock Exchange listing standards.

Item 6.B. Compensation

The aggregate amount of remuneration paid to our standing and non-standing directors in the aggregate consist of (i) salaries and wages paid to standing and non-standing directors, which amounted to Won 1,346 million in aggregate in 2018, and (ii) accrued retirement and severance benefits for standing directors, which amounted to Won 24 million in 2018. Under the Act on the Management of Public Institution, our executive officers consist of the president and the standing and non-standing directors. Standing directors, except the standing director who concurrently serves as a member of our audit committee, take executive positions with our company while the other directors, including non-standing directors, do not. We do not have any other officer who is in charge of a principal business unit, division or function, any other officer who performs a policy making function or any other person who performs similar policy making functions for us.

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Item 6.C. Board Practices

Under the Act on the Management of Public Institutions and our Articles of Incorporation, for appoints made after April 1, 2007, the term of office for our president is three years and the term of our office for our directors (whether standing or non-standing but not the president) is two years. Our president and directors may be reappointed for one or more additional terms of one year. In order to be reappointed, the president must be evaluated on the basis of his management performance; a standing director, on the basis of the performance of the duties for which he was elected to perform, or if the standing director has executed an incentive bonus contract, on the basis of his performance under the contract; and a non-standing director, on the basis of his performance of the duties for which he was elected to perform.

Our board currently does not maintain a compensation committee. See Item 16G. Corporate Governance. However, we currently maintain an audit committee meeting the requirements of the Sarbanes-Oxley Act to perform the roles and responsibilities of the compensation committee. Prior to the establishment of the audit committee on December 8, 2008 pursuant to the Act on the Management of Public Institutions, we maintained a board of auditors, which performed the roles and responsibilities required of an audit committee under the Sarbanes-Oxley Act, including the supervision of the financial and accounting audit by the independent registered public accountants.

Our president s management contract includes benefits upon termination of his employment. The amount for termination benefits payable equals the average value of compensation for one month times the number of years the president is employed by us, provided that the president is only eligible for termination benefits after more than one year of continuous service.

The termination benefits for our standing directors are determined in accordance with our internal regulations for executive compensation. Standing directors are eligible for benefits only upon termination of employment or death following one year of continuous service.

See also Item 16G. Corporate Governance for a further description of our board practices.

Item 6.D. Employees

As of December 31, 2018, we and our generation subsidiaries had a total of 46,377 regular employees, almost all of whom are employed within Korea. Approximately 10.5% of our regular employees (including employees of our generation subsidiaries) are located at our head office.

The following table sets forth the number of and other information relating to our regular employees, not including directors or senior management, as of December 31, 2018.

	KEPCO	KHNP	KOSEP	KOMIPO	KOWEPO	KOSPO	EWP	Total
Regular Employees								
Administrative	5,015	1,049	269	308	274	279	395	7,589
Engineers	11,605	9,529	1,904	2,119	1,900	1,709	2,055	30,821
Others	5,652	1,200	237	241	255	376	6	7,967
Total	22,272	11,778	2,410	2,668	2,429	2,364	2,456	46,377

Head Office Employees	1,695	1,273	401	352	392	378	372	4,863
% of total	7.6%	10.8%	16.6%	13.2%	16.1%	16.0%	15.1%	10.5%
Members of Labor Union	16,592	7,361	1,746	1,651	1,627	1,553	1,653	32,183
% of total	74.5%	62.5%	72.4%	61.9%	67.0%	65.7%	67.3%	69.4%

We and each of our generation subsidiaries have separate labor unions. Approximately 69.4% of our and our generation subsidiaries employees in the aggregate are members of these labor unions, each of which negotiates

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a collective bargaining agreement for its members each year. Under applicable Korean law, an employee-employer cooperation committee comprised of an equal number of representatives of management and labor (which shall be no less than three and no more than ten representatives from each of management and labor) is required to be established. Accordingly, an employee-employer cooperation committee composed of eight representatives of management and eight representatives of labor has been established at us and at each of our generation subsidiaries. The committee meets periodically to discuss various labor issues.

Since our formation in 1981, our businesses had not been interrupted by any work stoppages or strikes except in early 2002, when employees belonging to our five non-nuclear generation subsidiaries went on strike for six weeks to protest the Government s decision to privatize such non-nuclear generation subsidiaries according to the Restructuring Plan, which privatization plan has since been suspended indefinitely. See Item 3.D. Risk Factors Risks Relating to KEPCO The Government may adopt policy measures to substantially restructure the Korean electric power industry or our operational structure, which may have a material adverse effect on our business, operations and profitability.

We believe our relations with our employees are generally good.

Item 6.E. Share Ownership

None of our directors and members of our administrative, supervisory or management bodies own more than 0.1% of our common stock.

ITEM 7. *MAJOR SHAREHOLDERS AND RELATED PARTY TRANSACTIONS*

Item 7.A. Major Shareholders

The following table sets forth certain information relating to certain owners of our capital stock as of February 7, 2019, the date we last closed our shareholders registry:

Title of Class	Identity of Person or Group	Shares Owned	Percentage of Class[1] (%)
Common stock	Government	116,841,794	18.2
	Korea Development Bank[2]	211,235,264	32.9
	Subtotal	328,077,058	51.1
	National Pension Corporation	46,063,396	7.2
	Employee Stock Ownership Association	184,253	0.0
	Directors as a group	750	0.0
	Public (non-Koreans)	179,864,932	28.0
	Common shares	151,719,934	23.6
	American depositary shares	28,144,998	4.4
	Public (Koreans)	87,773,688	13.7
	Total	641,964,077	100.0

Notes:

(1) Percentages are based on issued shares of common stock.
(2) Korea Development Bank is a Government-controlled entity.

All of our shareholders have equal voting rights. See Item 10.B. Memorandum and Articles of Incorporation Description of Capital Stock Voting Rights.

Item 7.B. Related Party Transactions

We are engaged in a variety of transactions with our affiliates. We have related party transactions with Government-controlled entities such as Korea Gas Corporation, our consolidated subsidiaries and our equity investees. In addition, we engage in related party transactions with Korea Development Bank, one of our major shareholders. See Note 50 of the Notes to our consolidated financial statements included in this annual report for a description of transaction and balances with our related parties.

In the past three years, our related party transactions principally consisted of purchases of LNG from Korea Gas Corporation and long-term borrowings from Korea Development Bank. In 2016, 2017 and 2018, we and our generation subsidiaries purchased LNG from Korea Gas Corporation in the aggregate amount of Won 3,633 billion, Won 3,246 billion and Won 5,191billion, respectively. As of December 31, 2018, we had long-term borrowings from Korea Development Bank in the aggregate amount of Won 169 billion.

We also engage in extensive transactions with our consolidated generation subsidiaries, including the purchase of electricity from them through Korea Power Exchange, sales of electricity to them, payment and receipt of commissions for services and receivables and payables transactions. These are eliminated in the consolidation process. We also provide guarantees for certain of our affiliates. See Item 5.F. Tabular Disclosure of Contractual Obligations Overdraft and Others. We also have certain relationships with the Korea Power Exchange. See Item 4.B. Business Overview Purchase of Electricity Cost-based Pool System.

For a further description of our transactions with our affiliates, see Note 50 of the Notes to our consolidated financial statements included in this annual report.

Item 7.C. Interests of Experts and Counsel

Not Applicable

ITEM 8. *FINANCIAL INFORMATION*
Item 8.A. Consolidated Statements and Other Financial Information

We prepare our consolidated financial statements in compliance with requirements under Item 18. Financial Statements.

Legal Proceedings

As of December 31, 2018, we and our subsidiaries were engaged in 570 lawsuits as a defendant and 174 lawsuits as a plaintiff. As of the same date, the total amount of damages claimed against us and our subsidiaries was Won 674 billion, for which we have made a provision of Won 78 billion as of December 31, 2018, and the total amount claimed by us and our subsidiaries was Won 793 billion as of December 31, 2018. While the outcome of any of these lawsuits cannot presently be determined with certainty, our management currently believes that the final results from these lawsuits will not have a material adverse effect on our liquidity, financial position or results of operations.

The following are potentially significant claims pertaining to us and our subsidiaries.

In September 2013, Hyundai Engineering & Construction Co., Ltd. (Hyundai E&C), SK Engineering & Construction Co., Ltd. and GS Engineering & Construction Co., Ltd. filed a lawsuit against KHNP seeking from KHNP extra contractual payments in the total amount of Won 204 billion on grounds of design change under the construction contract relating to Shin-Hanul #1 and #2 units. In November 2016, the court ruled against KHNP, and KHNP has paid Won 217 billion of the claimed amounts in full and has subsequently appealed the ruling. The lawsuit is currently pending in the Supreme Court of Korea.

In December 2013, the Supreme Court of Korea ruled that regular bonuses fall under the category of ordinary wages on the condition that those bonuses are paid regularly and uniformly, and that any agreement which excludes such regular bonuses from ordinary wage is invalid. One of the key rulings provides that bonuses that are given to employees (i) on a regular and continuous basis and (ii) calculated according to the actual number of days worked (iii) that are not incentive-based must be included in the calculation of ordinary wages. The Supreme Court further ruled that in spite of invalidity of such agreements, employees shall not retroactively claim additional wages incurred due to such court decision, in case that such claims bring to employees unexpected benefits which substantially exceeds the wage level agreed by employers and employees and cause an unpredicted increase in expenditures for their company, which would lead the company to material managerial difficulty or would be a threat to the existence of the company. In that case, the claim is not acceptable since it is unjust and is in breach of the principle of good faith. As a result of such ruling by the Supreme Court of Korea, we and our subsidiaries became subject to a number of lawsuits filed by various industry-wide and company-specific labor unions based on claims that ordinary wage had been paid without including certain items that should have been included as ordinary wage. In July 2016, the court ruled against us, and in accordance with the court s ruling, in August 2016 we paid Won 55.1 billion to the employees for three years of back pay plus interest. As of December 31, 2018, however, 51 lawsuits were pending against our subsidiaries for an aggregate claim amount of Won 152 billion, for which our subsidiaries set aside an aggregate amount of Won 39 billion to cover any potential future payments of additional ordinary wage in relation to the related lawsuits. All cases are currently on-going at various stages of proceedings. We cannot presently assure you that the courts will not ultimately rule against our subsidiaries in these lawsuits, or that the amount of our reserves against these lawsuits will be sufficient to cover the amounts actually payable under court rulings. Any of these developments would adversely affect our results of operations.

During the period from 2014 to 2018, certain residential customers filed class action lawsuits against us based on the claim that electricity tariffs, determined under the progressive rate structure, were excessive. As of December 31, 2018, we were subject to 14 such lawsuits brought by approximately 10,000 plaintiffs with an aggregate claim amount of Won 5.3 billion. Of these 14 lawsuits, five cases are currently pending in the third round of proceedings (for which we won all of the first and second rounds of proceedings) and four cases are currently pending in the second round of proceedings (for which we won all of the first rounds of proceedings, except for one case). Five cases are currently pending in the first round of proceedings.

In addition, our generation subsidiaries, currently and from time to time, are involved in lawsuits incidental to the conduct of their business. A significant number of such lawsuits are based on the claim that the construction and operation of the electricity generation units owned by our generation subsidiaries have impaired neighboring fish farms. For example, in May 2012, a group of merchants and fishermen in the Jeolla region have sued KHNP for damages from pollutants released by a generation unit. The case is still pending. Our generation subsidiaries normally pay compensation to the members of fishery associations near our power plant complex for expected losses and damages arising from the construction and operation of their power plants in advance. Despite such compensation paid by us, a claim may still be filed against our generation subsidiaries challenging the compensation paid by us.

The nuclear power plant at Wolsong #1 unit began operations in 1982 and ended its operations in 2012 pursuant to its 30-year operating license. In February 2015, the Nuclear Safety and Security Commission (NSSC) evaluated the safety of operating Wolsong #1 unit and approved its extended operation until November 2022. However, a civic group filed a lawsuit to annul such decision, and in February 2017, the Seoul Administrative Court ruled against the NSSC. The NSSC appealed this decision, and the civic group has filed an injunction to suspend the operation of the Wolsong #1 unit. The civic group s injunction was denied in July 2017. KHNP, which operated the unit pursuant to the NSSC s initial decision, has joined this lawsuit. On June 15, 2018, the board of directors of KHNP decided to (i) retire Wolsong #1 unit earlier than planned due to its economic inefficiency and (ii) discontinue the construction of Chunji #1 and #2 as well as Daejin #1 and #2 units. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Wolsong #1 unit was Won 570,408 million and the provision for decommissioning costs of Wolsong #1 increased by Won 28,196 million, as the timing of actual cash outflows was accelerated due to the shortened operating period. As of December 31, 2018, impairment loss in connection with the property, plant and

equipment of Chunji #1 and #2 as well as Daejin #1 and #2 units amounted to Won 38,886 million. Although the board of directors did not make any decisions regarding Shin-Hanul #3 and #4 units, which are new nuclear plants under construction, we cannot assure you that the construction of these units will not be discontinued. As of December 31, 2018, impairment loss in connection with the property, plant and equipment of Shin-Hanul #3 and #4 units was Won 132,725 million. There are ten other nuclear generation units whose life under their initial operating license will expire in the next ten years, or by 2029. We may find it more difficult to have the life of other nuclear units extended as well. Furthermore, in June 2016, Greenpeace and 559 Korean nationals brought a lawsuit against the NSSC to revoke the permit the NSSC granted to KHNP in relation to the construction of Shin-Kori #5 and #6 nuclear generation units. Although the lawsuit was dismissed in February 2019, we cannot assure you that there will not be new challenges to prohibit the construction of new nuclear units in the future, whereby we may experience a loss of revenues and an increase in our overall fuel costs (as nuclear fuel is the cheapest compared to coal, LNG or oil) as a result of such prohibition, which could adversely affect our results of operation and financial condition.

We and our subsidiaries are also involved in the following arbitrations, among others.

- SAP Korea Ltd brought a breach of contract claim against us and KEPCO KDN Co., Ltd., one of our subsidiaries, in relation to the enterprise resource planning software serviced by SAP Korea. In that connection, arbitration was filed in the International Chamber of Commerce International Court of Arbitration. We have not recognized any losses because the probability of economic benefit outflow is remote and the related amount cannot be reasonably determined.

- Hyundai Samsung Joint Venture, one of our subcontractors, filed an arbitration case against us at the London Court of International Arbitration in 2016 in relation to certain disagreements involving the United Arab Emirates nuclear power plant construction project, but as of December 31, 2018, we have not recognized any losses because the probability of economic benefit outflow is remote and the related amount cannot be reasonably determined.

- Hyundai E&C, GS Engineering & Construction Corp. and Hansol SeenTec Co., Ltd. filed an arbitration case against us at the Korea Commercial Arbitration Board to request payment for additional construction costs. As of December 31, 2018, we have recognized the litigation provisions of Won 204,787 million in relation to this arbitration case and made the payment according to the results of this arbitration.

- Halla Corporation filed an arbitration case against us at the Korea Commercial Arbitration Board to request payment for additional construction costs, and we filed an arbitration case against Halla Corporation to request penalty payment for the delayed construction work. As of December 31, 2018, we have recognized Won 19,754 million of provision estimated to be required to fulfill our obligations in relation to this arbitration.

- Enzen, one of our subcontractors, filed an arbitration case against us over a contractual dispute in connection with the electric power IT modernization project in Kerala, India. We have not recognized any losses because the probability of economic benefit outflow is remote and the related amount cannot be reasonably determined.

From 2017 to 2018, the Korea Customs Service (KCS) conducted an investigation on a group of individuals and companies suspected of illegally importing North Korean coal. KOSEP was subject to a written investigation in 2018, as it had procured coal from a direct supplier that, in turn, purchased the coal from one of the traders who was suspected of such illegal activity. The transaction between KOSEP and the direct supplier was denominated in U.S. dollars. Neither KOSEP nor its direct supplier were found to have committed any wrongdoing. KCS concluded the investigation in August 2018 and ultimately accused three individuals and three companies (none of which included KOSEP or its direct supplier) of document forgery and violation of applicable customs and compliance law. Prosecutors have pressed charges against these individuals and companies, and the trial is still ongoing. Neither KOSEP nor its direct supplier were implicated. However, we cannot assure you that this investigation and/or related events will not have any material adverse effect on us, our reputation, our common shares or our American depositary shares.

On November 9, 2018, certain of our former executive and employees have been convicted in a district court on charges for receiving bribes. The individuals have appealed, and the appeal is currently ongoing. As part of our efforts to prevent recurrence of similar cases, we have implemented the following measures:

- Implementing web training program on integrity for all employees,
- Strengthening integrity and anti-corruption evaluation systems for high-ranking officers and reflecting such results in performance evaluations, and
- Increasing the punishment and penalties for employee corruption.

We do not believe such claims or proceedings, individually or in the aggregate, have had or will have a material adverse effect on us and our generation subsidiaries. However, we cannot assure you that this will be the case in the future, given the possibility that we may become subject to more legal and arbitral proceedings arising from changes in the environmental laws and regulations as they become applicable to us and our generation subsidiaries, and the related growth in demand for more compensation by actual and potential affected parties. Further, we cannot assure you that the above convictions and/or related events will not have an adverse effect on our reputation as well as the price of our common shares and our American depositary shares.

Dividend Policy

For our dividend policy, see Item 10.B. Memorandum and Articles of Incorporation Description of Capital Stock Dividend Rights. For a description of the tax consequences of dividends paid to our shareholders, see Item 10.E. Taxation Korean Taxes Shares or ADSs Dividends on the Shares of Common Stock or ADSs and Item 10.E. Taxation U.S. Federal Income Tax Consideration for U.S. Persons Tax Consequences with Respect to Common Stock and ADSs Distributions on Common Stock or ADSs.

Item 8.B. Significant Changes

Not Applicable

ITEM 9. ***THE OFFER AND LISTING***

Item 9.A. Offer and Listing Details

Notes

We have issued the following registered notes and debentures, which are traded principally in the over-the-counter market:

- 7.95% Zero-To-Full Debentures, due April 1, 2096 (the 7.95% Debentures);

6% Debentures due December 1, 2026, (the 6% Debentures);

7% Debentures due February 1, 2027 (the 7% Debentures); and

6-3/4% Debentures due August 1, 2027 (the 6-3/4% Debentures, and together with the 7.95% Debentures, the 6% Debentures and the 7% Debentures, the Registered Debt Securities).

Sales prices for the Registered Debt Securities are not regularly reported on any United States securities exchange or other United States securities quotation service.

Share Capital

The principal trading market for our common stock is the Korea Exchange. Our common stock is also listed on the New York Stock Exchange in the form of ADSs. The ADSs have been issued by Citibank, N.A. as depositary and are listed on the New York Stock Exchange under the symbol KEP. One ADS represents one-half of one share of our common stock. As of February 7, 2019, the date we last closed our shareholders registry, 56,289,996 ADSs representing 4.4% shares of our common stock were outstanding.

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Common Stock

Shares of our common stock are listed on the KRX KOSPI Market of the Korea Exchange. The table below shows the high and low closing prices on the KRX KOSPI Market of the Korea Exchange for our common stock since 2014.

Period	Price High	Price Low
	(In Won)	
2014		
First Quarter	37,800	33,400
Second Quarter	41,900	37,050
Third Quarter	48,200	36,800
Fourth Quarter	49,450	40,350
2015		
First Quarter	46,000	39,150
Second Quarter	48,500	42,450
Third Quarter	52,200	46,300
Fourth Quarter	53,300	47,500
2016		
First Quarter	60,600	49,800
Second Quarter	63,000	57,400
Third Quarter	62,900	54,000
Fourth Quarter	54,500	43,200
2017		
First Quarter	48,750	40,350
Second Quarter	46,700	40,800
Third Quarter	45,500	38,200
Fourth Quarter	41,100	37,350
2018		
First Quarter	37,750	30,850
Second Quarter	37,750	32,000
Third Quarter	33,300	28,700
Fourth Quarter	34,350	23,850
October	29,350	23,850
November	30,800	26,600
December	34,350	29,750
2019		
First Quarter	35,800	29,900
January	35,450	32,550
February	34,950	33,000
March	35,800	29,900
April (through April 18)	30,350	28,750

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ADSs

The table below shows the high and low closing prices on the New York Stock Exchange for the outstanding ADSs since 2014. Each ADS represents one-half of one share of our common stock.

Period	Closing Price per ADS	
	High	Low
	(In US$)	
2014		
First Quarter	17.75	15.51
Second Quarter	20.56	17.66
Third Quarter	22.44	18.17
Fourth Quarter	22.87	18.90
2015		
First Quarter	21.01	18.26
Second Quarter	22.53	19.29
Third Quarter	22.13	19.45
Fourth Quarter	23.31	20.28
2016		
First Quarter	21.01	18.26
Second Quarter	26.90	24.67
Third Quarter	28.31	24.38
Fourth Quarter	24.34	18.48
2017		
First Quarter	21.35	17.53
Second Quarter	20.80	17.82
Third Quarter	20.38	16.73
Fourth Quarter	18.22	16.60
2018		
First Quarter	17.83	14.28
Second Quarter	17.43	14.34
Third Quarter	14.70	12.62
Fourth Quarter	14.96	10.52
October	13.06	10.52
November	13.61	11.79
December	14.96	13.27
2019		
First Quarter	15.75	13.01
January	15.70	14.39
February	15.64	14.65
March	15.75	13.01
April (through April 18)	13.20	12.54

Item 9.B. Plan of Distribution

Not Applicable

Item 9.C. Markets

The Korea Exchange

The Korea Exchange began its operations in 1956, originally under the name of the Korea Stock Exchange. On January 27, 2005, pursuant to the Korea Securities and Futures Exchange Act, the Korea Exchange was officially created through the consolidation of the Korea Stock Exchange, the Korea Futures Exchange, the KOSDAQ Stock Market, Inc., or KOSDAQ, and the KOSDAQ Committee within the Korea Securities Dealers Association, which was in charge of the management of the KOSDAQ. The KRX KOSPI Market of the Korea Exchange, formerly the Korea Stock Exchange, has a single trading floor located in Seoul. The Korea Exchange is a limited liability company, the shares of which are held by (i) securities companies and futures companies that were the members of the Korea Stock Exchange or the Korea Futures Exchange and (ii) the shareholders of the KOSDAQ.

As of March 29, 2019, the aggregate market value of equity securities listed on the KOSPI of the Korea Exchange was approximately Won 1,417,246 billion. The average daily trading volume of equity securities for the first quarter of 2019 was approximately 386 million shares with an average transaction value of Won 5,377 billion.

The Korea Exchange has the power in some circumstances to suspend trading of shares of a given company or to de-list a security. The Korea Exchange also restricts share price movements. All listed companies are required to file accounting reports annually, semi-annually and quarterly and to release immediately all information that may affect trading in a security.

The Government has in the past exerted, and continues to exert, substantial influence over many aspects of the private sector business community which can have the intention or effect of depressing or boosting the market. In the past, the Government has informally both encouraged and restricted the declaration and payment of dividends, induced mergers to reduce what it considers excess capacity in a particular industry and induced private companies to publicly offer their securities.

The Korea Exchange publishes the Korea Composite Stock Price Index, or KOSPI, every ten seconds, which is an index of all equity securities listed on the KRX KOSPI Market of the Korea Exchange. On January 1, 1983, the method of computing KOSPI was changed from the Dow Jones method to the aggregate value method. In the new method, the market capitalizations of all listed companies are aggregated, subject to certain adjustments, and this aggregate is expressed as a percentage of the aggregate market capitalization of all listed companies as of the base date, January 4, 1980.

Movements in KOSPI in the past five years are set out in the following table:

	Opening	**High**	**Low**	**Closing**
2014	1,967.2	2,082.6	1,886.9	1,915.6
2015	1,926.4	2,173.4	1,829.8	1,961.3
2016	1,918.8	2,068.7	1,835.3	2,026.5
2017	2,026.2	2,558.0	2,026.2	2,467.5
2018	2,479.7	2,598.2	1,996.1	2,041.0
2019 (through April 18)	2,010.0	2,248.6	1,993.7	2,213.8

Source: The Korea Exchange

Shares are quoted ex-dividend on the first trading day of the relevant company s accounting period; since the calendar year is the accounting period for the majority of listed companies, this may account for the drop in KOSPI between its closing level at the end of one calendar year and its opening level at the beginning of the following calendar year.

With certain exceptions, principally to take account of a share being quoted ex-dividend and ex-rights, upward and downward movements in share prices of any category of shares on any day are limited under the rules of the Korea Exchange to 30% of the previous day s closing price of the shares, rounded down as set out below:

Previous Day s Closing Price (Won)	Rounded Down to (Won)
less than 5,000	5
5,000 to less than 10,000	10
10,000 to less than 50,000	50
50,000 to less than 100,000	100
100,000 to less than 500,000	500
500,000 or more	1,000

As a consequence, if a particular closing price is the same as the price set by the fluctuation limit, the closing price may not reflect the price at which persons would have been prepared, or would be prepared to continue, if so permitted, to buy and sell shares. Orders are executed on an auction system with priority rules to deal with competing bids and offers.

Due to deregulation of restrictions on brokerage commission rates, the brokerage commission rate on equity securities transactions may be determined by the parties, subject to commission schedules being filed with the Korea Exchange by the securities companies. In addition, a securities transaction tax will generally be imposed on the transfer of shares or certain securities representing rights to subscribe for shares. A special agricultural and fishery tax of 0.15% of the sales prices will also be imposed on transfer of these shares and securities on the Korea Exchange. See Item 10.E. Taxation Korean Taxes.

The number of companies listed on the KRX KOSPI Market of the Korea Exchange since 2012, the corresponding total market capitalization at the end of the periods indicated and the average daily trading volume for those periods are set forth in the following table:

		Total Market Capitalization on the Last Day for Each Period		Average Daily Trading Volume, Value		
Year	Number of Listed Companies	(Millions of Won)	(Thousands of U.S. dollars)(1)	(Thousands of Shares)	(Millions of Won)	(Thousands of U.S. dollars)(1)
2014	773	1,192,252,867	1,084,655,082	278,082	3,983,580	3,624,072
2015	770	1,242,832,089	1,060,436,936	455,256	5,351,734	4,566,326
2016	779	1,308,440,373	1,082,697,868	376,772	4,523,043	3,742,692
2017	774	1,605,820,912	1,498,806,153	340,463	5,335,418	4,979,856
2018	788	1,343,971,857	1,202,014,003	397,972	6,548,622	5,856,920
2019 (through April 18)	791	1,467,185,238	1,291,422,619	392,280	5,384,142	4,739,144

Source: The Korea Exchange

Note:

(1) Converted at the market average exchange rate as announced by Seoul Money Brokerage Services, Ltd. in Seoul at the end of the periods indicated.

The Korean securities markets are principally regulated by the Financial Services Commission and the Financial Investment Services and Capital Markets Act. The law imposes restrictions on insider trading and price manipulation, requires specified information to be made available by listed companies to investors and establishes rules regarding margin trading, proxy solicitation, takeover bids, acquisition of treasury shares and reporting requirements for shareholders holding substantial interests.

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Protection of Customer s Interest in Case of Insolvency of Financial Investment Companies with a Brokerage License

Under Korean law, the relationship between a customer and a financial investment company with a brokerage license in connection with a securities sell or buy order is deemed to be consignment, and the securities acquired by a consignment agent (i.e., the financial investment company with a brokerage license) through such sell or buy order are regarded as belonging to the customer insofar as the customer and the consignment agent s creditors are concerned. Therefore, in the event of bankruptcy or reorganization procedures involving a financial investment company with a brokerage license, the customer of such financial investment company is entitled to the proceeds of the securities sold by such financial investment company.

When a customer places a sell order with a financial investment company with a brokerage license which is not a member of the Korea Exchange and this financial investment company places a sell order with another financial investment company with a brokerage license which is a member of the Korea Exchange, the customer is still entitled to the proceeds of the securities sold received by the non-member company from the member company regardless of the bankruptcy or reorganization of the non-member company.

Likewise, when a customer places a buy order with a non-member company and the non-member company places a buy order with a member company, the customer has the legal right to the securities received by the non-member company from the member company because the purchased securities are regarded as belonging to the customer insofar as the customer and the non-member company s creditors are concerned.

Under the Financial Investment Services and Capital Markets Act, the Korea Exchange is obliged to indemnify any loss or damage incurred by a counterparty as a result of a breach by its members. If a financial investment company with a brokerage license which is a member of the Korea Exchange breaches its obligation in connection with a buy order, the Korea Exchange is obliged to pay the purchase price on behalf of the breaching member.

As the cash deposited with a financial investment company with a brokerage license is regarded as belonging to such financial investment company, which is liable to return the same at the request of its customer, the customer cannot take back deposited cash from the financial investment company with a brokerage license if a bankruptcy or reorganization procedure is instituted against such financial investment company and, therefore, can suffer from loss or damage as a result. However, the Depositor Protection Act provides that Korean Deposit Insurance Corporation will, upon the request of the investors, pay investors up to Won 50 million per depositor per financial institution in case of the such financial investment company s bankruptcy, liquidation, cancellation of securities business license or other insolvency events (collectively, the Insolvency Events). Pursuant to the Financial Investment Services and Capital Markets Act, subject to certain exceptions, financial investment companies with a brokerage license are required to deposit the cash received from their customers with the Korea Securities Finance Corporation, a special entity established pursuant to the Financial Investment Services and Capital Markets Act. Set-off or attachment of cash deposits by financial investment companies with a brokerage license is prohibited. The premiums related to this insurance under the Depositor Protection Act are paid by financial investment companies with a brokerage license.

Item 9.D. Selling Shareholders

Not Applicable

Item 9.E. Dilution

Not Applicable

Item 9.F. Expenses of the Issue

Not Applicable

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ITEM 10.*ADDITIONAL INFORMATION*
Item 10.A. Share Capital

Not Applicable

Item 10.B. Memorandum and Articles of Incorporation

Set forth below is information relating to our capital stock, including brief summaries of material provisions of our Articles of Incorporation, the KEPCO Act, the Financial Investment Services and Capital Markets Act, the Korean Commercial Code and certain related laws of Korea, all currently in effect. The following summaries are qualified in their entirety by reference to our Articles of Incorporation and the applicable provisions of the KEPCO Act, Financial Investment Services and Capital Markets Act, the Korean Commercial Code, the Act on the Management of Public Institutions and certain related laws of Korea. On November 11, 2016, we amended our Articles of Incorporation to strike references to acting directors (while keeping references to Standing Directors), as acting directors have not been appointed since 2003 and the system of acting directors was deemed obsolete.

Objects and Purposes

We are a statutory juridical corporation established under the KEPCO Act for the purpose of ensuring stabilization of the supply and demand of electric power, and further contributing toward the sound development of the national economy through expediting development of electric power resources and carrying out proper and effective operation of the electricity business. The KEPCO Act and our Articles of Incorporation contemplate that we engage in the following activities:

1. development of electric power resources;
2. generation, transmission, transformation and distribution of electricity and other related business activities;
3. research and development of technology related to the businesses mentioned in items 1 and 2;
4. overseas businesses related to the businesses mentioned in items 1 through 3;
5. investments or contributions related to the businesses mentioned in items 1 through 4;
6. businesses incidental to items 1 through 5;
7. Development and operation of certain real estate held by us to the extent that:

   a.

it is necessary to develop certain real estate held by us due to external factors, such as relocation, consolidation, conversion to indoor or underground facilities or deterioration of our substation or office; or

b. it is necessary to develop certain real estate held by us to accommodate development of relevant real estate due to such real estate being incorporated into or being adjacent to an area under planned urban development; and

8. other activities entrusted by the Government.

Our registered name is Hankook Chollryuk Kongsa in Korean and Korea Electric Power Corporation in English. Our registration number in the commercial registry office is 114671-0001456.

Directors

Under the KEPCO Act and our Articles of Incorporation, our board of directors consists of our president, standing directors and non-standing directors. A majority of the board members constitutes a voting quorum, and resolutions will be passed by a majority of the board members. Directors who have an interest in certain agenda proposed to the board may not vote on such issues.

The standards of remuneration for our officers, including directors, shall be determined by a resolution of the board of directors, provided that the maximum amount of remuneration to be paid to our officers shall be determined by shareholder resolution and provided that the remuneration standards for the president and standing directors shall be determined by board resolution in accordance with the guideline thereon established by the minister of the Ministry of Economy and Finance through review and resolution of our management committee. Directors who have an interest may not participate in the meeting of the board of directors for determining the remuneration for officers.

Neither the KEPCO Act nor our Articles of Incorporation have provisions relating to (i) borrowing powers exercisable by the directors and how such borrowing powers can be varied, (ii) retirement or non-retirement of directors under an age limit requirement, or (iii) the number of shares required for a director s qualification.

Share Capital

Currently, our authorized share capital is 1,200,000,000 shares, which consists of shares of common stock and shares of non-voting preferred stock, par value Won 5,000 per share. Under our Articles of Incorporation, we are authorized to issue up to 150,000,000 non-voting preferred shares. As of February 7, 2019, the last day on which our shareholders registry was closed for purposes of identifying shareholders of record, 641,964,077 common shares were issued and no non-voting preferred shares have been issued. All of the issued and outstanding common shares are fully-paid and non-assessable and are in registered form. Share certificates are issued in denominations of 1, 5, 10, 50, 100, 500, 1,000 and 10,000 shares.

Description of Capital Stock

Dividend Rights

Under the KEPCO Act, we are authorized to pay preferential dividends on our shares held by public shareholders as opposed to those held by the Government. Dividends to public shareholders are distributed in proportion to the number of shares of the relevant class of capital stock owned by each public shareholder following approval by the shareholders at a general meeting of shareholders. Korea Development Bank may receive dividends in proportion to the numbers of our shares held by them. Under the Korean Commercial Code and our Articles of Incorporation, we will pay full annual dividends on newly issued shares.

Under our Articles of Incorporation, holders of non-voting preferred shares (of which there are currently none) are entitled to receive an amount not less than 8% of their par value as determined by a resolution of the board of directors at the time of their issuance. However, stock dividends shall be paid based on par value and may not exceed the amount equivalent to a half of the total amount of profit available for dividend payment.

We declare our dividend annually at the annual general meeting of shareholders which is held within three months after the end of the fiscal year. The annual dividend is paid to the shareholders on record as of the end of the fiscal year preceding the annual shareholders meeting. Annual dividends may be distributed either in cash or in our shares. However, a dividend of shares must be distributed at par value, and dividends in shares may not exceed one-half of the annual dividend.

Under the Korean Commercial Code and our Articles of Incorporation, we do not have an obligation to pay any annual dividend unclaimed for five years from the payment date.

The KEPCO Act provides that we shall not pay an annual dividend unless we have made up any accumulated deficit and set aside as a legal reserve an amount equal to 20.0% or more of our net profit until our accumulated reserve reaches one-half of our stated capital.

Distribution of Free Shares

In addition to dividends in the form of shares to be paid out of retained or current earnings, the Korean Commercial Code permits us to distribute to our shareholders an amount transferred from our capital surplus or legal reserve to stated capital in the form of free shares.

Voting Rights

Holders of our common shares are entitled to one vote for each common share, except that voting rights with respect to any common shares held by us or by a corporate shareholder, more than one-tenth of whose outstanding capital stock is directly or indirectly owned by us, may not be exercised. Any person (with certain exceptions) who holds more than 3% of our issued and outstanding shares cannot exercise voting rights with respect to the shares in excess of this 3% limit. See Limitation on Shareholdings. Pursuant to the Korean Commercial Code, cumulative voting is permissible in relation to the appointment of directors. Under the Korean Commercial Code, a cumulative vote can be requested by the shareholders of a corporation representing at least 1% of the total voting shares of such corporation if the relevant shareholders meeting is intended to elect more than two seats of the board of directors and the request for cumulative voting is made to the management of the corporation in writing at least six weeks in advance of the shareholders meeting. Under this new voting method, each shareholder will have multiple voting rights corresponding to the number of directors to be appointed in such voting and may exercise all such voting rights to elect one director. Shareholders are entitled to vote cumulatively unless the Articles of Incorporation expressly prohibit cumulative voting. Our current Articles of Incorporation do not prohibit cumulative voting. Except as otherwise provided by law or our Articles of Incorporation, a resolution can be adopted at a general meeting of shareholders by affirmative majority vote of the voting shares of the shareholders present or represented at a meeting, which must also represent at least one-fourth of the voting shares then issued and outstanding. The holders of our non-voting preferred shares (other than enfranchised preferred shares (as described below)) are not entitled to vote on any resolution or to receive notice of any general meeting of shareholders unless the agenda of the meeting includes consideration of a resolution on which such holders are entitled to vote. If we are unable to pay any dividend to holders of non-voting preferred shares as provided in our Articles of Incorporation, the holders of non-voting preferred shares will become enfranchised and will be entitled to exercise voting rights until such dividends are paid. The holders of these enfranchised preferred shares have the same rights as holders of our common shares to request, receive notice of, attend and vote at a general meeting of shareholders. Pursuant to the KEPCO Act and our Articles of Incorporation, the appointment of standing directors, the president and standing statutory auditor are subject to shareholder approval.

Under the Korean Commercial Code, for the purpose of electing our statutory auditor, a shareholder (together with certain related persons) holding more than 3% of the total shares having voting rights may not exercise voting rights with respect to shares in excess of such 3% limit.

The Korean Commercial Code provides that the approval by holders of at least two-thirds of those shares having voting rights present or represented at a meeting, where such shares also represent at least one-third of the total issued and outstanding shares having voting rights, is required in order to, among other things:

- amend our Articles of Incorporation;
- remove a director or statutory auditor;

effect any dissolution, merger, consolidation or spin-off of us;

transfer the whole or any significant part of our business;

effect the acquisition by us of all of the business of any other company;

effect the acquisition by us of the business of another company that may have a material effect on our business;

reduce capital; or

issue any new shares at a price lower than their par value.

Under our Articles of Incorporation, an approval by the Ministry of Trade, Industry and Energy is required in order to amend the Articles of Incorporation. Any change to our authorized share capital requires an amendment to our Articles of Incorporation.

In addition, in the case of amendments to our Articles of Incorporation or any merger or consolidation of us or in certain other cases which affect the rights or interests of the non-voting preferred shares a resolution must be adopted by a meeting of the holders of non-voting preferred shares approving such event. This resolution may be adopted if approval is obtained from holders of at least two-thirds of those non-voting preferred shares present or represented at such meeting and such non-voting preferred shares also represent at least one-third of our total issued and outstanding non-voting preferred shares.

A shareholder may exercise his voting rights by proxy. The proxy shall present the power of attorney prior to the start of the general meeting of shareholders. Under the Financial Investment Services and Capital Markets Act and our Articles of Incorporation, no one other than us may solicit a proxy from shareholders.

Subject to the provisions of the deposit agreement, holders of our American Depositary Shares (ADSs) are entitled to instruct the depositary, whose agent is the record holder of the underlying common shares, how to exercise voting rights relating to those underlying common shares.

Preemptive Rights and Issuance of Additional Shares

Authorized but unissued shares may be issued at such times and, unless otherwise provided in the Korean Commercial Code, upon such terms as our board of directors may determine. The new shares must be offered on uniform terms to all our shareholders who have preemptive rights and who are listed on the shareholders register as of the record date. Subject to the limitations described under Limitation on Shareholdings below and with certain other exceptions, all our shareholders are entitled to subscribe for any newly issued shares in proportion to their existing shareholdings. Under the Korean Commercial Code, we may vary, without shareholder approval, the terms of such preemptive rights for different classes of shares. Public notice of the preemptive rights to new shares and their transferability must be given not less than two weeks (excluding the period during which the shareholders register is closed) prior to the record date. Our board of directors may determine how to distribute shares for which preemptive rights have not been exercised or where fractions of shares occur.

Our Articles of Incorporation provide that new shares that are (1) publicly offered pursuant to the Financial Investment Services and Capital Markets Act, (2) issued to members of our employee stock ownership association, (3) represented by depositary receipts, (4) issued through offering to public investors, or (5) issued to investors in kind under the State Property Act may be issued pursuant to a resolution of the board of directors to persons other than existing shareholders, who in such circumstances will not have preemptive rights.

Under our Articles of Incorporation, we may issue convertible bonds or bonds with warrants each up to an aggregate principal amount of Won 2,000 billion and Won 1,000 billion, respectively, to persons other than existing shareholders. However, the aggregate principal amount of convertible bonds and bonds with warrants so issued to persons other than existing shareholders may not exceed Won 2,000 billion.

Under the Financial Investment Services and Capital Markets Act and our Articles of Incorporation, members of our employee stock ownership association, whether or not they are our shareholders, have a preemptive right, subject to certain exceptions, to subscribe for up to 20.0% of any shares publicly offered pursuant to the Financial Investment Services and Capital Markets Act. This right is exercisable only to the extent that the total number of shares so acquired and held by members of our employee stock ownership association does not exceed 20.0% of the total number of shares then outstanding.

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Liquidation Rights

In the event of our liquidation, the assets remaining after payment of all debts, liquidation expenses and taxes will be distributed among shareholders in proportion to the number of shares held. Holders of our non-voting preferred shares have no preference in liquidation.

Rights of Dissenting Shareholders

In certain limited circumstances (including, without limitation, the transfer of the whole or any significant part of our business or the merger, or consolidation upon a split-off of us with another company), dissenting holders of shares have the right to require us to purchase their shares. To exercise such right, shareholders must submit a written notice of their intention to dissent to us prior to the general meeting of shareholders or the class meeting of holders of non-voting preferred shares, as the case may be. Within 20 days after the date on which the relevant resolution is passed at such meeting, such dissenting shareholders must request us in writing to purchase their shares. We are obligated to purchase the shares of dissenting shareholders within one month after the expiration of such 20-day period. The purchase price for such shares must be determined through negotiation between the dissenting shareholders and us. Under the Financial Investment Services and Capital Markets Act, if we cannot agree on a price through negotiation, the purchase price will be the average of (1) the weighted average of the daily share price on the Korea Exchange for a two-month period before the date of adoption of the relevant board resolution, (2) the weighted average of the daily share price on the Korea Exchange for the one month period before such date and (3) the weighted average of the daily share price on the Korea Exchange for the one week period before such date. However, if we or dissenting shareholders who requested us to purchase their shares oppose such purchase price, the determination of a purchase price may be filed with a court. Holders of ADSs will not be able to exercise dissenter s rights unless they have withdrawn the underlying Common Stock and become our direct shareholders.

Transfer of Shares

Under the Korean Commercial Code, the transfer of shares is effected by delivery of share certificates, but in order to assert shareholders rights against us, the transferee must have his name and address registered on our register of shareholders. For this purpose, shareholders are required to file one s name, address and seal with our transfer agent. Under our Articles of Incorporation, non-resident shareholders must appoint an agent authorized to receive notices on their behalf in Korea and file a mailing address in Korea. From September 16, 2019, when the Act on Electronic Registration of Stocks, Bonds, Etc. will become effective, all of our shares are expected to be electronically registered on an electronic registry and the physical share certificates issued prior thereto are expected to lose effect, with the transfer of electronically registered stocks to be made by electronic registration of such transfer between accounts.

These requirements do not apply to the holders of ADSs. Under current Korean regulations, the Korea Securities Depository, foreign exchange banks (including domestic branches of foreign banks), financial investment companies with a dealing, brokerage or collective investment license and internationally recognized foreign custodians are authorized to act as agents and provide related services for foreign shareholders. Our transfer agent is Kookmin Bank, located at 26, Gukjegeumyung-ro 8-gil, Yeongdeungpo-gu, Seoul, Korea. Certain foreign exchange controls and securities regulations apply to the transfer of our shares by non-residents of Korea or non-Koreans. See Item 9. The Offer and Listing.

Acquisition of Our Own Shares

Under the Korean Commercial Code, we may acquire our own shares through (1) purchases on a stock exchange or (2) purchase of the shares in proportion to the number of shares held by each shareholder on equal terms and conditions, by a resolution at a Shareholders meeting. The aggregate amount of the acquisition price shall not exceed the excess of our net assets, on a non-consolidated basis, over the sum of (1) our stated capital,

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(2) the total amount of our capital surplus reserve and earned surplus reserve which have accumulated up to the end of the previous fiscal year, (3) our earned surplus required to be accumulated for the then current fiscal year and (4) our net assets stated in the balance sheet as being increased as a result of the evaluation of the assets and liabilities in accordance with our accounting principles without being set off against any unrealized losses. In addition, under the Korean Commercial Code, we may not acquire our own shares if our net assets may fall short of the aggregate amount of the item (1) to (4) above, on a non-consolidated basis, as of the conclusion of the relevant business year of us. In general, our subsidiaries 50% or more of whose shares are owned by us may not acquire our shares.

General Meeting of Shareholders

The ordinary general meeting of our shareholders is held within three months after the end of each fiscal year, and subject to board resolution or court approval, an extraordinary general meeting of our shareholders may be held as necessary or at the request of shareholders holding an aggregate of 1.5% or more of our outstanding common shares for at least six consecutive months. Under the Korean Commercial Code, an extraordinary general meeting of shareholders may be convened at the request of our audit committee, subject to a board resolution or court approval. Holders of non-voting preferred shares may only request a general meeting of shareholders once the non-voting preferred shares have become enfranchised as described under Description of Capital Stock Voting Rights above. Written notices setting forth the date, place and agenda of the meeting must be given to shareholders at least two weeks prior to the date of the general meeting of shareholders. However, pursuant to the Korean Commercial Code and our Articles of Incorporation, with respect to holders of less than 1% of the total number of our issued and outstanding shares which are entitled to vote, notice may be given by placing at least two public notices at least two weeks in advance of the meeting in at least two daily newspapers published in Seoul or by placing a public notice in the electrical disclosure system of the Financial Supervisory Service or the Korea Exchange, at least two weeks in advance of the meeting. Currently, for giving such notice, we use an electronic disclosure system available for access at a website maintained by the Financial Supervisory Service (known as the Data Analysis, Retrieval and Transfer System, or DART). Shareholders not on the shareholders register as of the record date are not entitled to receive notice of the general meeting of shareholders or attend or vote at such meeting. Holders of the enfranchised preferred shares on the shareholders register as of the record date are entitled to receive notice of, and to attend and vote at, the general meetings. Otherwise, holders of non-voting preferred shares are not entitled to receive notice of general meetings of shareholders or vote at such meetings but may attend such meetings.

The general meeting of shareholders is held in Naju, Jeollanam-do.

Register of Shareholders and Record Dates

Our transfer agent, Kookmin Bank, maintains the register of our shareholders at its office in Seoul, Korea. It registers transfers of our shares on the register of shareholders upon presentation of the share certificates.

The record date for annual dividends is December 31. For the purpose of determining the holders of shares entitled to annual dividends, the register of shareholders may be closed from January 1 to January 31 of each year. Further, the Korean Commercial Code and our Articles of Incorporation permit us at least two weeks public notice to set a record date and/or close the register of shareholders for not more than three months for the purpose of determining the shareholders entitled to certain rights pertaining to our shares. The trading of our shares and the delivery of certificates in respect of them may continue while the register of shareholders is closed.

Annual Report

At least one week prior to the annual general meeting of shareholders, our annual report and audited consolidated financial statements must be made available for inspection at our principal office and at all branch offices. Copies of annual reports, the audited non-consolidated financial statements and any resolutions adopted at the general meeting of shareholders will be available to our shareholders.

Under the Financial Investment Services and Capital Markets Act, we must file with the Financial Services Commission and the Korea Exchange an annual report within 90 days after the end of our fiscal year, a half-year report within 45 days after the end of the first six months of our fiscal year and quarterly reports within 45 days after the end of the first three months and nine months of our fiscal year. Following our adoption of IFRS starting in January 1, 2011 pursuant to regulatory requirements for listed companies in Korea, we are required to file half-year and quarterly reports containing interim financial statements and notes thereto on a consolidated basis as well as on a separate basis.

Limitation on Shareholdings

No person other than the Government, our employee stock ownership association and persons who obtain an approval from the Financial Services Commission may hold for its account more than 3% of our total issued and outstanding shares. In calculating shareholdings for this purpose, shares held by your spouse and your certain relatives or by your certain affiliates (such spouses, relatives and affiliates are together referred to as Affiliated Holders) are deemed to be held by you. If you hold our shares in violation of this 3% limit, you are not entitled to exercise the voting rights or preemptive rights of our shares in excess of such 3% limit and the Financial Services Commission may order you to take necessary corrective action. In addition, the KEPCO Act currently requires that the Government, directly or through Korea Development Bank, own not less than 51% of our capital. For other restrictions on shareholdings, see Item 9. The Offer and Listing.

Change of Control

The KEPCO Act requires that the Government, directly or pursuant to the Korea Development Bank Act, through Korea Development Bank, own not less than 51% of our capital.

Disclosure of Share Ownership

Under the Financial Investment Services and Capital Markets Act, any person whose direct or beneficial ownership of a listed company s shares with voting rights, equity-related debt securities including convertible bonds, bonds with warrants, exchangeable bonds, certificates representing the rights to subscribe for common shares, derivatives-linked securities and depository receipts of the aforementioned securities (collectively referred to as Equity Securities), together with the Equity Securities directly or beneficially owned by certain related persons or by any person acting in concert with the person, accounts for 5% or more of our total outstanding Equity Securities is required to report the status and purpose (in terms of whether the purpose of shareholding is to participate in the management of the issuer) of the holdings and the material contents of the agreements relating to the Equity Securities and other matters prescribed by the Presidential Decree under the Financial Investment Services and Capital Markets Act to the Financial Services Commission of Korea and the Korea Exchange within five business days after reaching the 5% ownership interest threshold.

In addition, any change (i) in the purpose of the shareholding or in the ownership, (ii) the major terms and conditions of agreements relating to Equity Securities owned (such as trust agreements and collateral agreements) to the extent the number of relevant Equity Securities is 1% or more of the total outstanding Equity Securities, or (iii) the type of ownership (direct ownership or holding) to the extent the number of relevant Equity Securities is 1% or more of the total outstanding Equity Securities, must be reported to the Financial Services Commission of Korea and the Korea Exchange within five business days from the date of such change (or by the tenth day of the month following the month in which the change occurs, in the case of a person with no intent to seek management control). Notwithstanding the foregoing, certain professional investors designated by the Financial Services Commission may report such matters to the Financial Services Commission and the Korea Exchange by the tenth day of the month immediately following the end of the quarter in which such 5.0% ownership interest is reached or the change occurs.

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When filing a report to the Financial Services Commission and the Korea Exchange in accordance with the reporting requirements described above, a copy of such report must be sent to the relevant listed company. Violation of these reporting requirements may subject a person to sanctions such as prohibition on the exercise of voting rights with respect to the Equity Securities for which the reporting requirement was violated or fines or imprisonment. Furthermore, the Financial Services Commission may order the disposal of the Equity Securities for which the reporting requirement was violated or may impose administrative fine.

A person reporting to the Financial Services Commission and the Korea Exchange that his purpose of holding the Equity Securities is to participate in the management of the listed company is prohibited from acquiring additional Equity Securities of the listed company and exercising voting rights during the period commencing from the date on which the event triggering the reporting requirements occurs to the fifth day from the date on which the report is made.

Item 10.C. Material Contracts

None.

Item 10.D. Exchange Controls

General

The Foreign Exchange Transaction Act and the Presidential Decree and regulations under that Act and Decree, or collectively the Foreign Exchange Transaction Laws, regulate investment in Korean securities by non-residents and issuance of securities outside Korea by Korean companies. Non-residents may invest in Korean securities pursuant to the Foreign Exchange Transaction Laws. The Financial Services Commission has also adopted, pursuant to its authority under the Financial Investment Services and Capital Markets Act, regulations that regulate investment by foreigners in Korean securities and issuance of securities outside Korea by Korean companies.

Subject to certain limitations, the Ministry of Economy and Finance has the authority to take the following actions under the Foreign Exchange Transaction Laws: (i) if the Government deems it necessary on account of war, armed conflict, natural disaster or grave, sudden and significant changes in domestic or foreign economic circumstances or similar events or circumstances, the Ministry of Economy and Finance may temporarily suspend performance under any or all foreign exchange transactions, in whole or in part, to which the Foreign Exchange Transaction Laws apply (including suspension of payment and receipt of foreign exchange) or impose an obligation to deposit, safe-keep or sell any instruments of payment to the Bank of Korea or certain other governmental agencies or financial institutions, or effective from July 18, 2017, impose an obligation on resident creditors to collect and recover debts owed by non-resident debtors,, and (ii) if the Government concludes that the international balance of payments and international financial markets are experiencing or are likely to experience significant disruption or that the movement of capital between Korea and other countries are likely to adversely affect the Korean Won, exchange rates or other macroeconomic policies, the Ministry of Economy and Finance may take action to require any person who intends to effect or effects a capital transaction to deposit all or a portion of the instruments of payment acquired in such transactions with the Bank of Korea or certain other governmental agencies or financial institutions.

Government Review of Issuances of Debt Securities and ADSs and Report for Payments

In order for us to issue debt securities of any series outside of the Republic, we are required to file a report with our designated foreign exchange bank or the Ministry of Economy and Finance on the issuance of such debt securities, depending on the issuance amount. The Ministry of Economy and Finance may at its discretion direct us to take measures as necessary to avoid undue exchange rate fluctuations before it accepts such report. Furthermore, in order for us to make payments of principal of or interest on the debt securities of any series and other amounts as provided in an indenture and such debt securities, we are required to present relevant documents to the designated foreign exchange bank at the time of each actual payment. The purpose of such presentation is to ensure that the actual remittance is consistent with the terms of the transaction reported to our designated foreign exchange bank or the Ministry of Economy and Finance.

In order for us to offer for purchase shares of our common stock held in treasury in the form of ADSs or issue shares of our common stock represented by the ADSs, we are required to file a prior report of such offer or issuance with our designated foreign exchange bank or the Ministry of Economy and Finance, depending on the offering amount. The Ministry of Economy and Finance may at its discretion direct us to take measures as necessary to avoid undue exchange rate fluctuations before it accepts such report. No further Governmental approval is necessary for the initial offering and issuance of the ADSs.

In order for a depositary to acquire any existing shares of our common stock from holders of these shares of common stock (other than from us) for the purpose of issuance of depositary receipts representing these shares of common stock, the depositary would be required to obtain our consent for the number of shares to be deposited in any given proposed deposit which exceeds the difference between (1) the aggregate number of shares deposited by us or with our consent for the issuance of ADSs (including deposits in connection with the initial and all subsequent offerings of ADSs and stock dividends or other distributions related to these ADSs) and (2) the number of shares on deposit with the depositary at the time of such proposed deposit. We may not grant this consent for the deposit of shares of our common stock in the future, if our consent is required. Therefore, a holder of ADSs who surrenders ADSs and withdraws shares of our common stock may not be permitted subsequently to deposit such shares and obtain ADSs.

In addition, we are also required to notify the Ministry of Economy and Finance upon receipt of the full proceeds from the offering of ADSs. No additional Governmental approval is necessary for the offering and issuance of ADSs.

Reporting Requirements for Holders of Substantial Interests

Under the Financial Investment Services and Capital Markets Act, any person whose direct beneficial ownership of a listed company s Equity Securities, together with the Equity Securities beneficially owned by certain related persons or by any person acting in concert with such person, accounts for 5% or more of our total outstanding Equity Securities is required to report the status and purpose (namely, whether the purposes of the share ownership is to participate in the management of the issuer) of the holdings and the material contents of the agreements relating to the Equity Securities and other matters prescribed by the Presidential Decree under the Financial Investment Services and Capital Markets Act to the Financial Services Commission and the Korea Exchange within five business days after reaching the 5% ownership interest and any change in ownership interest subsequent to the report which equals or exceeds 1.0% of the total outstanding Equity Securities is required to be reported to the Financial Services Commission and the Korea Exchange within five business days from the date of the change.

In addition, any change (i) in the purpose of the shareholding or in the ownership, (ii) the major terms and conditions of agreements relating to Equity Securities owned (such as trust agreements and collateral agreements) to the extent the number of relevant Equity Securities is 1% or more of the total outstanding Equity Securities, or (iii) the type of ownership (direct ownership or holding) to the extent the number of relevant Equity Securities is 1% or more of the total outstanding Equity Securities, must be reported to the Financial Services Commission of Korea and the Korea Exchange within five business days from the date of such change (or by the tenth day of the month following the month in which the change occurs, in the case of a person with no intent to seek management control). Notwithstanding the foregoing, certain professional investors designated by the Financial Services Commission may report such matters to the Financial Services Commission and the Korea Exchange by the tenth day of the month immediately following the end of the quarter in which such 5.0% ownership interest is reached or the change occurs.

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When filing a report to the Financial Services Commission and the Korea Exchange in accordance with the reporting requirements described above, a copy of such report must be sent to the relevant listed company. Violation of these reporting requirements may subject a person to sanctions such as prohibition on the exercise of voting rights with respect to the Equity Securities for which the reporting requirement was violated or fines or imprisonment. Furthermore, the Financial Services Commission may order the disposal of the Equity Securities for which the reporting requirement was violated or may impose administrative fine.

A person reporting to the Financial Services Commission and the Korea Exchange that his purpose of holding the Equity Securities is to participate in the management of the listed company is prohibited from acquiring additional Equity Securities of the listed company and exercising voting rights during the period commencing from the date on which the event triggering the reporting requirements occurs to the fifth day from the date on which the report is made.

In addition to the reporting requirements described above, any person whose direct or beneficial ownership of our voting stock and/or depository receipts for our voting stock accounts for 10.0% or more of the total issued and outstanding voting stock, whom we refer to as a major shareholder, must file a report to the Securities and Futures Commission and to the Korea Exchange within five business days after the date on which the person reached such shareholding limit. In addition, such person must file a report to the Securities and Futures Commission and to the Korea Exchange regarding any subsequent change in his/her shareholding. Such report on subsequent change in shareholding must be filed within five business days of the occurrence of any such change. Violation of these reporting requirements may subject a person to criminal sanctions such as fines and imprisonment.

Restrictions Applicable to ADSs

No Governmental approval is necessary for the sale and purchase of ADSs in the secondary market outside Korea or for the withdrawal of shares of our common stock underlying ADSs and the delivery inside Korea of the withdrawn shares. However, a foreigner who intends to acquire shares must obtain an Investment Registration Card from the Financial Supervisory Service as described below. The acquisition of shares by a foreigner must be reported by the foreigner or his standing proxy in Korea immediately to the Governor of the Financial Supervisory Service.

Special Reporting Requirement for Companies Whose Securities Are Listed on Foreign Exchanges

Under the regulations of the Financial Services Commission and the Korea Exchange, (i) if a company listed on the Korea Exchange has submitted a public disclosure of material matters to a foreign financial investment supervisory authority pursuant to the laws of the foreign jurisdiction, then it must submit a copy of the public disclosure and a Korean translation thereof to the Financial Services Commission of Korea and the Korea Exchange, and (ii) if a company listed on the Korea Exchange is approved for listing on a foreign stock market or determined to be de-listed from the foreign stock market or actually listed on, or de-listed from, a foreign stock market, then it must submit a copy of any document, which it submitted to or received from the relevant foreign government, foreign financial investment supervisory authority or the foreign stock market, and a Korean translation thereof to the Financial Services Commission of Korea and the Korea Exchange.

Persons who have acquired shares of our common stock as a result of the withdrawal of shares of common stock underlying ADSs may exercise their preemptive rights for new shares, participate in free distributions and receive dividends on shares of our common stock without any further governmental approval.

Restrictions Applicable to Common Stock

Under the Foreign Exchange Transaction Laws and the Regulations on Financial Investment Business (together, the Investment Rules), foreigners are permitted to invest, subject to certain exceptions and

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procedural requirements, in all shares of Korean companies unless prohibited by specific laws. Foreign investors may trade shares listed on the Korea Exchange only through the Korea Exchange except for certain limited circumstances. These circumstances include, among others, (1) odd-lot trading of shares, (2) acquisition of shares by a foreign company as a result of a merger, (3) acquisition or disposal of shares in connection with a tender offer, (4) acquisition of shares by exercise of warrant, conversion right under convertible bonds, exchange right under exchangeable bonds or withdrawal right under depositary receipts issued outside of Korea by a Korean company, such shares being Converted Shares, (5) acquisition of shares through exercise of rights under securities issued outside of Korea, (6) acquisition of shares as a result of inheritance, donation, bequest or exercise of shareholders rights (including preemptive rights or rights to participate in free distributions and receive dividends), (7) over-the-counter transactions between foreigners of a class of shares for which a ceiling on aggregate acquisition by foreigners (as explained below) exists and has been reached or exceeded, (8) acquisition of shares by direct investment under the Foreign Investment Promotion Law, (9) acquisition and disposal of shares on an overseas stock exchange market, if such shares are simultaneously listed on the KRX KOSPI Market or the KRX KOSDAQ Market of the Korea Exchange and such overseas stock exchange, and (10) arm s length transactions between foreigners in the event all such foreigners belong to an investment group managed by the same person. For over-the-counter transactions of shares listed on the Korea Exchange outside the Korea Exchange between foreigners of a class of shares for which a ceiling on aggregate acquisition by foreigners exists and has been reached or exceeded, a financial investment company with a brokerage license in Korea must act as an intermediary. Odd-lot trading of shares listed on the Korea Exchange outside the Korea Exchange must involve a financial investment company with a dealing license in Korea as the other party. Foreign investors are prohibited from engaging in margin transactions with respect to shares subject to a ceiling on acquisition by foreigners.

The Investment Rules require a foreign investor who wishes to invest in or dispose of shares on the Korea Exchange (including Converted Shares) to register his/her identity with the Financial Supervisory Service prior to making any such investment or disposal unless he/she had previously registered. However, such registration requirement does not apply to foreign investors who acquire Converted Shares with the intention of selling them within three months from the date they were acquired. Upon registration, the Financial Supervisory Service will issue to the foreign investor an Investment Registration Card which must be presented each time the foreign investor opens a brokerage account with a financial investment company or financial institution in Korea. Foreigners eligible to obtain an Investment Registration Card include any foreign nationals who are individuals (with residence abroad for six months or more), foreign governments, foreign municipal authorities, foreign public institutions, international financial institutions or similar international organizations, corporations incorporated under foreign laws and any person in any additional category designated by the Decree of the Financial Services and Capital Markets Act. All Korean branches of a foreign corporation as a group are treated as a separate foreigner from the head office of the foreign corporation. However, a foreign branch of a Korean securities company, a foreign corporation or a depositary issuing depositary receipts may obtain one or more Investment Registration Cards in its name in certain circumstances as described in the relevant regulations.

Upon a foreign investor s purchase of shares through the Korea Exchange, no separate report by the investor is required because the Investment Registration Card system is designed to control and oversee foreign investment through a computer system. However, a foreign investor s acquisition or sale of shares outside the Korea Exchange (as discussed above) must be reported by the