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KEEI
Korea Energy Demand Outlook

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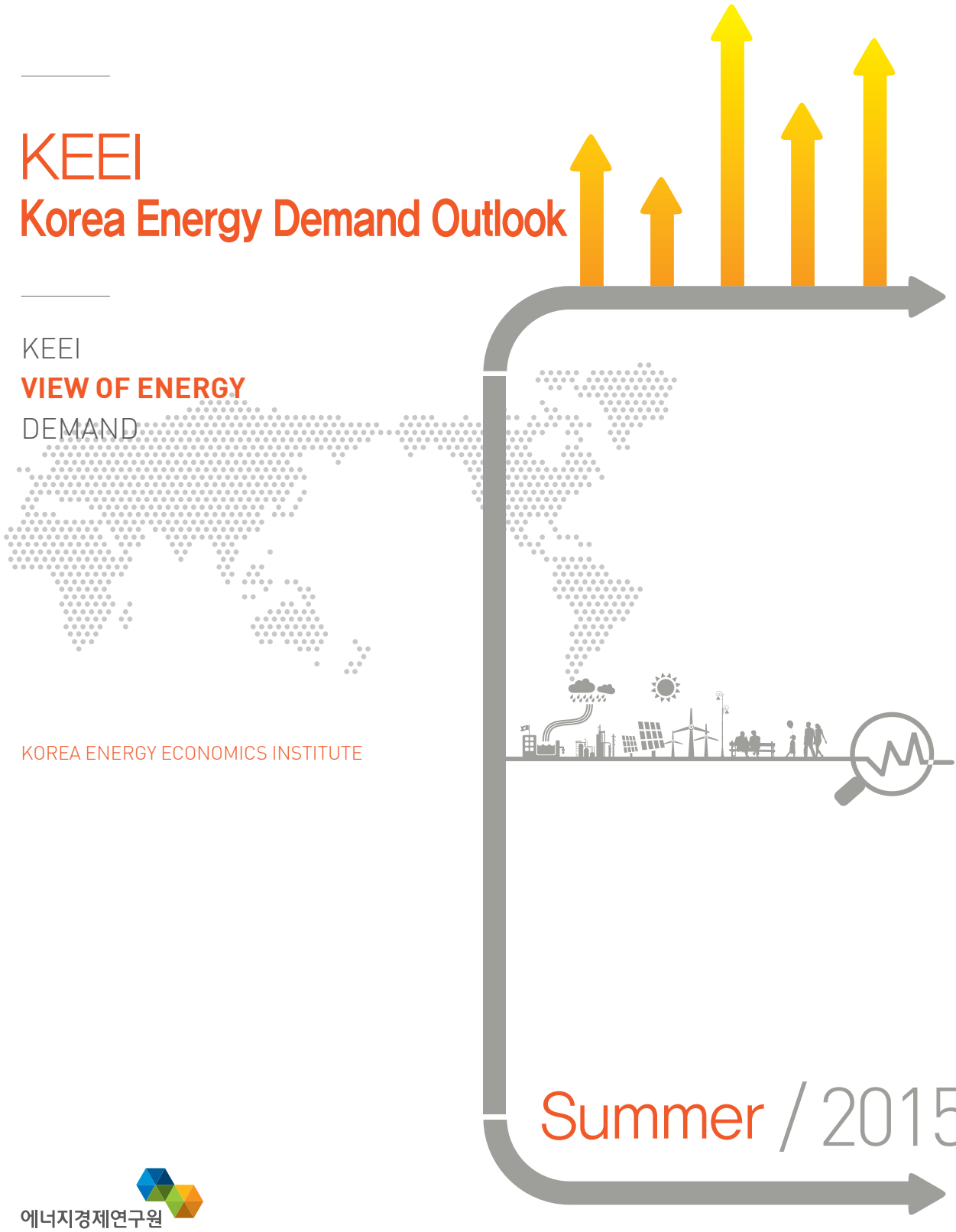

KOREA ENERGY ECONOMICS INSTITUTE

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에너지경제연구원
Korea Energy Economics Institute

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The 「KEEI Korea Energy Demand Outlook」 analyzes the international energy market and the supply and demand for energy in Korea, and makes short-term forecasts of energy demand.

This report quickly identifies recent changes in energy supply and demand and provides energy supply/demand forecast indexes and other information of great interest for formulation of government policy. It is intended to facilitate government efforts to set and adjust overall policy on energy supply and demand.

This report was written and edited by the Energy Demand and Supply Forecast Team under the Center for Energy Information and Statistics of KEEI.

KEEI Korea Energy Demand Outlook

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Summary

Energy Consumption Trends

- Total energy: The total amount of energy consumed in the first quarter of 2015 is estimated to be 74.9 million toe, 1.7 percent up from the first quarter of last year.
  - Notwithstanding the continued slump in the business cycle, the drop in the oil price and the colder weather have helped the energy demand to rise, finally escaping the zero-percent growth rut of the preceding two quarters.
    * The heating degree days grew by 6.1 percent from the first quarter of last year.

- Energy consumption by source (Quarter 1, 2015)
  - Oil (4.8% up): The fuel price in transportation sector rebounded largely because of the drop in the oil price.
  - Coals (3.1% up): The growth of the demand for coals to be used to generate electricity outweighed the decrease in the demand for bituminous coals for steel manufacturing.
  - LNG (6.3% down): The demand for LNG in both gas manufacturing and electricity generation dropped significantly.
  - Electricity (2.0% up): The growth in the demand was most prominent with respect to homes, commerce and public use.
  - Nuclear energy (2.8% up): The trend of growth in the demand for nuclear energy slowed down somewhat due to the cessation of some of the nuclear power plants.

- Energy consumption by sector (Quarter 1, 2015): Final quarterly energy consumption in Korea reached 57.1 toe, 1.2 percent up from the first quarter of last year, with the increase in residential/commercial/public energy consumption outweighing the general decrease in the volume of industrial activities nationwide.

- Industries (1.2% down): The amount of naphtha consumption increased, while the amount of bituminous coal consumption decreased.
- Transportation (8.0% up): The amount of oil consumption increased in all areas and modes of transportation, thanks to the drop in the oil price.
- Residential, commercial and public use (2.9% up): Increases in energy consumption were most prominent with respect to electricity and oil.

Energy Outlook

● Total energy: It is estimated that the total demand for energy throughout 2015 would amount to 289 million toe, 2.5 percent up from that of the previous year.

- While the energy consumption pattern will finally break away from the zero-percent growth rut that has continued since 2012, the pace of rise in energy consumption will still likely hover below the estimated economic growth rate.

  * Economic growth rates of Korea: 2.3% in 20121 → 3.0% in 2013 → 3.3% in 2014 → 3.0% in 2015 (est.)

  * Rate of growth in energy consumption: 0.7% in 2012 → 0.6% in 2013 → 0.6% in 2014 → 2.5% in 2015 (est.)

● Key energy indicators: Energy efficiency improved somewhat, along with the amount of energy consumption per capita.

- Notwithstanding the drop in the economic growth rate projections, the energy intensity (toe/KRW 1 million) would rise to 0.197 thanks to the increase in total energy consumption.
- Energy consumption per capita would also increase to 5.71 toe.

● Demand forecast by source in 2015

- Oil (4.0% up): The increase in demand will be most prominent in fuel for transportation, thanks to the drop in the oil price.

- Coals (2.9% up): The increase in demand would be led by electricity generation.
- LNG (3.5% down): The demand for LNG for both electricity generation and gas manufacturing would drop.
- Electricity (2.5% up): The drop in the demand for electricity in manufacturing → reflecting the slowdown in economic growth → will limit the rise in electricity consumption.
- Nuclear energy (5.7% up): The demand will increase thanks to the resumption of the operation of Nuclear Reactor 2 at the New Wolseong Plant (1,000MW in Quarter 3) and of some of the nuclear power plants.

● Demand forecast by sector in 2015: The final energy demand would increase by 1.9 percent from last year to 217.7 million toe thanks to the increasing demand in transportation and homes.

- Industries (1.0% up): Energy consumption would decrease somewhat in industries due to the slowdown in economic growth.
- Transportation (4.4% up): The rise in demand for transportation fuels would reach a new peak, since 2002, thanks to the continued drop in the oil price.
- Residential, commercial and public use (2.7% up): Thanks to the base effect and the drops in utility tariffs, the growth of the demand for urban gas and electricity would finally turn positive.

<Table 1> Rates of Increase in Energy Demand by Source, 2014 to 2015

(from 2014, %)

Category	2012	2013	2014p	2015e
Total energy	0.7	0.6	0.6	2.5
Oil	3.2	-0.3	-0.4	4.0
Coals	-2.1	1.1	2.9	2.9
LNG	8.1	4.7	-9.0	-3.5
Electricity	2.5	1.8	0.6	2.5
Nuclear energy	-2.8	-7.7	12.7	5.7

Note: “p” indicates projected values (tentatively measured), and “e” indicates estimates.

Characteristics and Implications

Characteristics

- The rate of increase in total energy demand for 2015 would drop by 1.0 percentage point than the last projections made (Volume 17, No. 1).
  - This is due to the drops in projections for the economic growth rate and the number of heating degree days, as well as to the decreasing energy demand in industries.
- The role of industries in the total increase in final energy demand will shrink significantly, with much of the new demand generated in transportation and residential/commercial/ public use.
  * Rate of increase in final energy demand: 1.1% in 2012 → 1.4% in 2013 → 1.2% in 2014 (projected) → 1.9% in 2015 (estimated).
  * Share of industries in final energy demand increase: 0.70%p in 2012 → 1.24%p in 2013 → 2.50%p in 2014 (projected) → 0.96%p in 2015 (estimated).
  * Share of transportation in final energy demand increase: 0.13%p in 2012 → 0.09%p in 2013 → -0.02%p in 2014 (projected) → 0.77%p in 2015 (estimated).
  * Share of residential/commercial/public use in final energy demand increase: 0.27%p in 2012 → 0.09%p in 2013 → -1.28%p in 2014 (projected) → 0.50%p in 2015 (estimated).
- Despite the Middle Eastern Respiratory Syndrome (MERS) outbreak in Korea, the rate of growth in transportation fuel demand would reach a new height since 2000.
  - The spread of the MERS and the likely increase in the oil price in the latter half of the year may put a brake on the abrupt increase in the demand for oil, but the rise would continue at a rapid pace.
- The share of oil in total energy consumption would increase marginally due to the lower oil price.
  - The share of oil has been decreasing over the last several years, except in 2007 and 2009, but would increase in 2015.

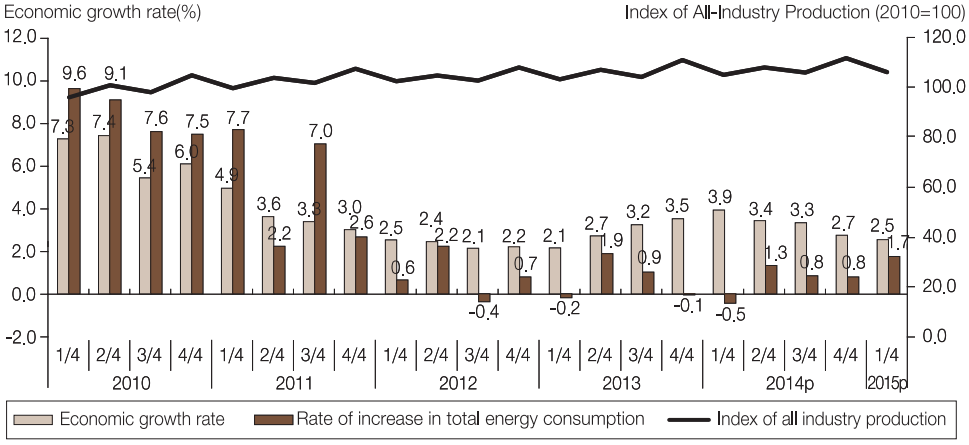
Policy implications

- A mid- to long-term plan is required with respect to the likely drop in the LNG demand.
  - Due to the increase in the number of base power generation facilities and the drop in the oil price, the LNG demand in Korea will keep falling, as it did in 2014, with respect to both power generation and urban gas.
  - As Korea imports LNG in accord with long-term contracts, the abrupt drop in the LNG demand will likely cause significant financial losses and confusion on the market.
- Notwithstanding the drop in the utility tariffs, the return to the average annual temperatures and the increase in the amount of additional reserve power would help ensure the stability of power supplies in the summertime.
  - The Ministry of Industries has decided to apply Phase-3 tariffs to households in Phase 4 of cumulative electricity consumption during this summer (from July to September).
  - If the average temperature in summer were to return to the usual level, this summer would feel cooler than the last, thus lowering the demand for air-conditioning.
  - The government also plans to increase the amount of reserve electricity to 7 million kilowatts or more in the summertime in anticipation of El Nino and other abnormal climate events.

1 Energy Consumption

- Total energy consumption in Korea in the first quarter of 2015 is tentatively tallied at 74.9 million toe, 1.7 percent up from the first quarter of last year.[1)]
  - Energy consumption has finally broken away from the zero-percent growth rut of the preceding two quarters, despite the economic slump, thanks to the drop in the oil price that has raised the oil demand and also to the colder weather during the winter time.
    * The heating degree days also grew by 6.1 percent in the first quarter of 2015.
  - Total energy consumption, excluding the consumption of raw-material energy (e.g., non-fuel oils and coals), grew by 2.3 percent in a year, finally showing a positive growth pattern since the third quarter of 2013.
    - The share of fuels in total energy consumption was 26.7 percent, continuing with the decline since the third quarter of last year, when the share amounted to 29.7 percent.

[Figure 1] Recent Economic and Energy Consumption Trends

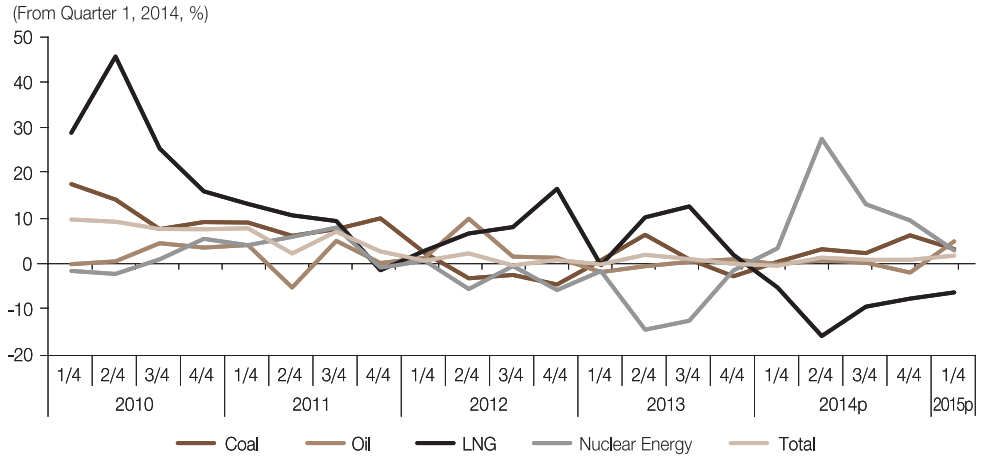


1) Once all the statistics are confirmed, the actual total energy consumption of this year's first quarter will likely go up even further when we take into account the rates of increase in final energy consumption (1.9 percent) and in electricity consumption (2.0 percent).

- Energy consumption by source in the first quarter of 2015
  - The lower oil price has raised the demand for both naphtha and transportation fuels by 4.8 percent from the first quarter of last year.
    - Naphtha consumption increased by 3.6 percent, thanks to the drop in the price, the rise in the prices of chemical products, and the expansion of NCC production facilities last year.
    - Oil consumption in industries increased by 2.5 percent due to growing naphtha consumption.
    - Oil consumption in transportation grew most abruptly, by 8.0 percent, thanks to the drop in the oil price that has continued since the latter half of last year.
    - Oil consumption in electricity generation took a dip by 11.2 percent due to the shutdown of Furnaces 1 through 3 at the Ulsan Thermal Power Plant last year.
  - Coal consumption increased by 3.1 percent, notwithstanding the decreasing demand in industries, thanks to the increased activity of power plants.
    - Consumption of bituminous coals dropped by 2.7 percent with the disappearance of the new facility effect in steel manufacturing, while it also dropped by 13.2 percent in cement manufacturing due to the base effect reflecting the abrupt growth of consumption last year.
    - In the meantime, bituminous coal consumption for power generation grew by 6.1 percent, thanks to the introduction of new facilities (Furnaces 5 and 6 at Yeongheung) and the overall increase in the use of coals at thermal power plants in general.
    - Anthracite consumption also increased by 8.5 percent due to the cold spell this year.
  - Liquefied natural gas (LNG) consumption decreased with respect to both power generation and gas manufacturing by 6.3 percent in total.
    - LNG consumption at power plants plummeted by 12.0 percent due to the expansion of the base power facilities and also to the stagnation in electricity consumption.
    - LNG consumption in urban gas manufacturing for industries also took a dip by 2.6 percent.
    - Urban gas consumption decreased by 6.4 percent due to the drop in industrial consumption.

- Notwithstanding the decrease in industrial electricity consumption, overall electricity consumption increased by 2.0 percent thanks to increase in residential, commercial and public use.
  - Industrial electricity consumption grew by a meager 1.1 percent due to the economic slump.
  - Residential, commercial and public electricity consumption grew by 2.9 percent due to the base effect and the increase in the heating degree days.
- Nuclear energy consumption grew by 2.8 percent only due to the cessation of Hanbit Reactor 3.[2)]
- The respective shares of sources in primary energy consumption are 36.8 percent for oil, 28.8 percent for coals, 19.5 percent for LNG and 11.1 percent for nuclear energy.

[Figure 2] Trends in Primary Energy Consumption by Source



2) The operation of this furnace was ground to a halt in October 2014 due to the defect in the steam generator, and was resumed in June 2015.

● Energy consumption trends in the first quarter of 2015

• Final energy consumption has managed to grow by 1.2 percent from the first quarter of last year, reaching 57.1 million toe in total, with the increase in residential/commercial/public use outweighing the general decline in the industrial demand.

• Industrial energy consumption dropped by 1.2 percent.

- The 3.6 percent increase in naphtha consumption was not enough to offset the 2.7 percent decrease in the consumption of bituminous coals as raw material for manufacturing. Consumption of fuels also took a dip by 3.2 percent.
- The respective rates of increase in industrial energy consumption by source are 2.5 percent for oil, -1.0 percent for coals, 1.1 percent for electricity, and -17.2 percent for urban gas.

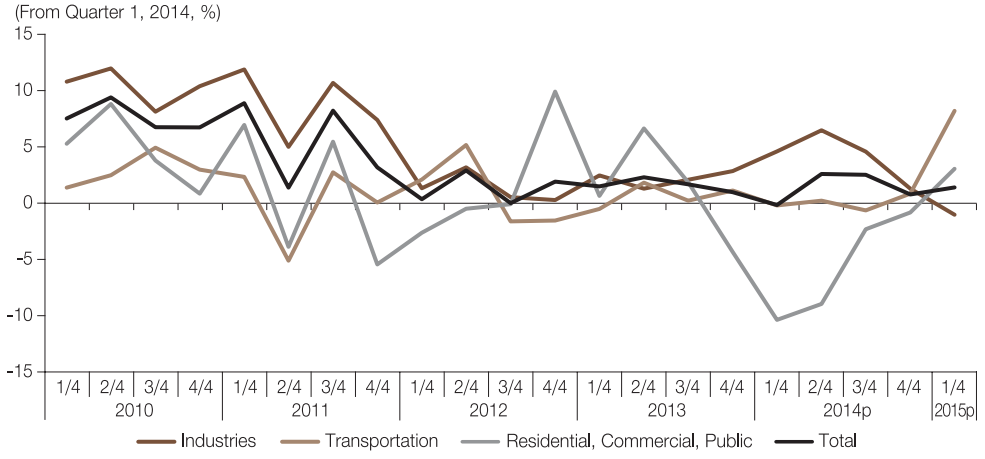
• Energy consumption increased by 8.0 percent in transportation due to the oil price drop.

- More specifically, the consumption of diesel, gasoline, LPG, aircraft fuel, and heavy oil increased by 7.2 percent, 7.2 percent, 2.6 percent, 11.1 percent and 21.5 percent, respectively.

• The increase in electricity and oil consumption raised total energy consumption by residential, commercial and public use by 2.9 percent.

- Urban gas consumption dropped a little, by 0.4 percent, but electricity and oil consumption grew by 2.9 percent and 16.6 percent, respectively.

[Figure 3] Trends in Final Energy Consumption by Sector

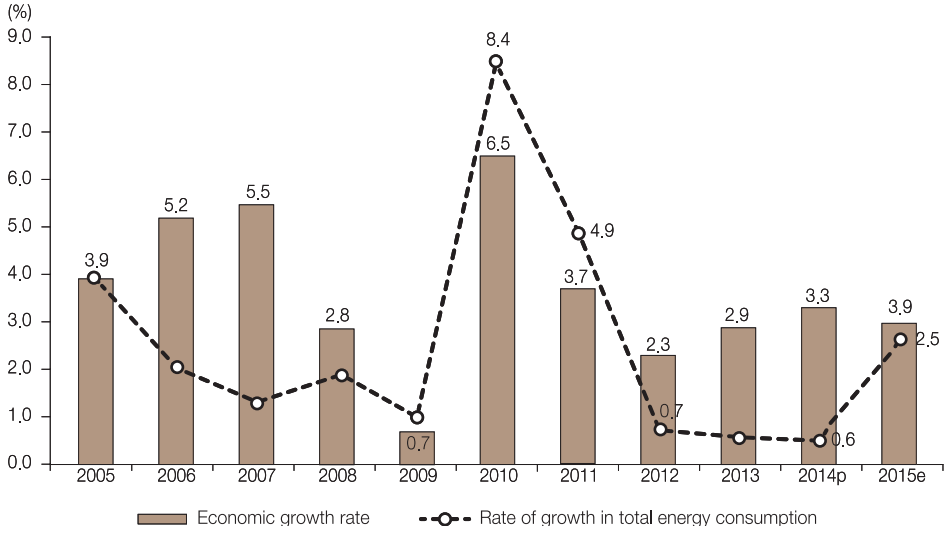


2 Energy Outlook

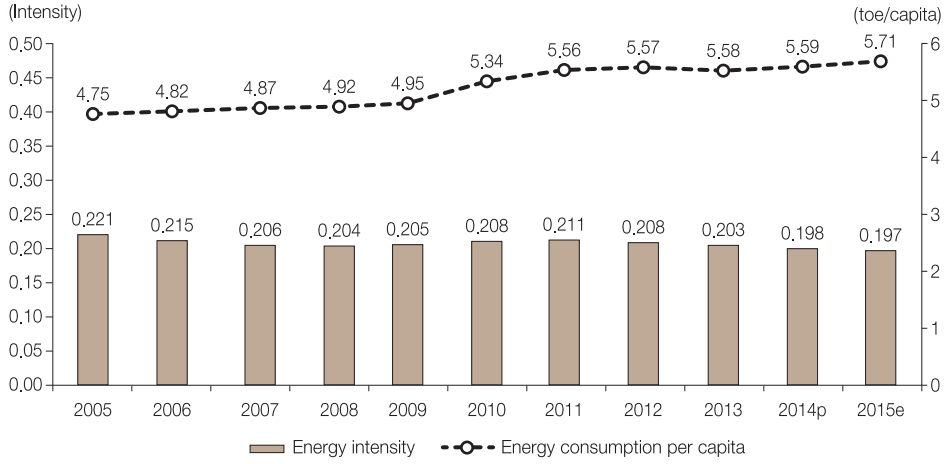
- Total energy demand in 2015 would amount to 289 million toe, 2.5 percent up from last year.
  - The zero-growth pattern that has continued since 2012 would finally be stopped, but overall energy demand would still hover below the projected economic growth rate.
    * Economic growth rates of Korea: 2.3% in 2012 → 3.0% in 2013 → 3.3% in 2014 → 3.0% in 2015 (est.)
    * Rate of growth in primary energy consumption: 0.7% in 2012 → 0.6% in 2013 → 0.6% in 2014 → 2.5% in 2015 (est.)
  - Coal consumption would continue to increase, as it did last year, with oil consumption also growing dramatically.
  - Once Nuclear Reactor 2 (1,000MW) at the Wolseong Nuclear Power Plant launched into operation, as scheduled, in the third quarter, nuclear energy capacity would rise to 21,716MW by the end of the year.

- Key energy indicators
  - Energy intensity (toe/KRW 1 million) in 2015 would continue to increase despite the drop in the projected economic growth rate.
    * Energy intensity (toe/KRW 1 million): 0.208 in 2012 → 0.203 in 2013 → 0.198 in 2014 → 0.197 in 2015 (est.).
  - Energy consumption per capita would also keep growing to 5.71 toe.
    - Given Korea's energy-heavy industrial structure, the country's energy consumption per capita would continue to hover above the OECD average.
      * Energy consumptions per capita in other countries (2013): OECD-wide = 4.18, United States = 6.90, France = 3.84, Germany = 3.81, Japan = 3.56, United Kingdom = 2.99.

[Figure 4] Economic Growth Rates and Rates of Growth in Total Energy Consumption



[Figure 5] Energy Intensity and Consumption per Capita Outlook



- Energy demand outlook by source for 2015
  - The rate of increase in oil demand would jump from -0.4 percent last year to 4.0 percent this year.
    - The continued drop in the oil price has significantly raised demand for oil in transportation.

- The stably low price of naphtha, a key ingredient for petrochemical products, and the rise in the prices of chemical products would also maintain the strength of the rise in the naphtha demand.

• The demand for coals would increase by 2.9 percent overall, notwithstanding the drop in demand in industries, due to the increase in the use of bituminous coals for power generation.

• The demand for LNG would decrease with respect to both power generation and gas manufacturing by 3.5 percent overall.

- The demand for urban gas would drop by 7.9 percent, despite the drop in the tariff rates and the steady increase in the number of households, due to the abrupt decrease in industrial demand.

• Electricity demand is expected to grow by 2.5 percent overall, thanks to the base effect and the return to the normal temperature level. Yet the drop in the industrial demand, due to the economic slump, would limit the pace at which the electricity demand could grow.

• The amount of nuclear energy generated would increase by 5.7 percent, thanks to the operation of the new Nuclear Reactor 2 at Wolseong (1,000MW) in the third quarter and also the resumption of Nuclear Reactor 1 at Wolseong[3] and of Nuclear Reactor 3 at Hanbit.[4]

• The respective shares of oil and nuclear energy in energy consumption would increase, while that of LNG would drop and that of coals would remain more or less stable.

- The share of oil dropped below 50 percent in 2002 and has been steadily declining ever since. In 2015, the low oil price would increase consumption by 0.6 percentage point to 37.8 percent.
- The share of nuclear energy would also rise to 12.1 percent if all the nuclear power plants begin/resume operations as planned.

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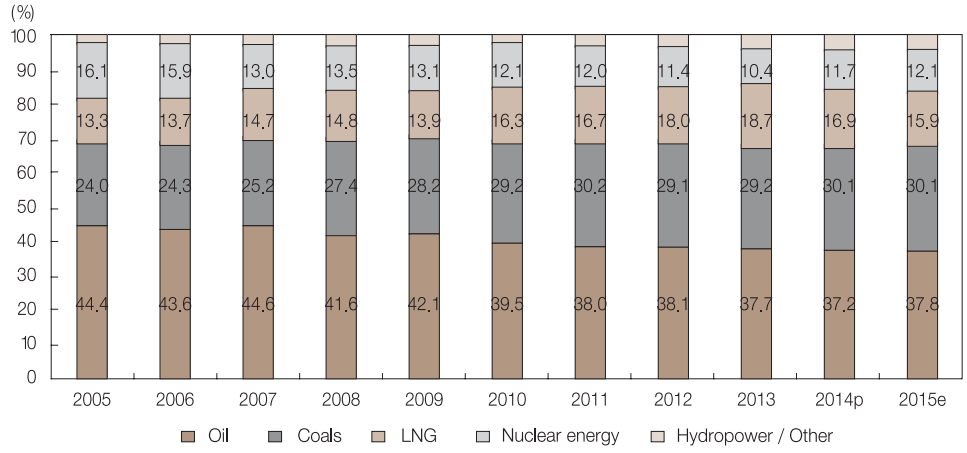
3) The reactor was shut down in November 2012 due to the failure to renew the permit on operation. With the design life of the reactor extended for 10 years in February 2015, the reactor will be re-launched into operation this June.

4) The reactor was shut down in October 2014 due to the defect of the steam generator. It was resumed in April 2015, but was again stopped in just four days due to problems with the reactor cooling pump. Its operation will be resumed in June.

- The share of LNG would decrease by 1.0 percentage point to 15.9 percent due to the continued decrease in the demand for natural gas in power generation.
- The share of coals would remain the same at 30.1 percent.

[Figure 6] Composition of Energy Consumption by Source



● Energy demand outlook by sector for 2015

- Final energy demand would increase by 1.9 percent to 217.7 million toe, thanks to the growing demand in transportation as well as in residential, commercial and public use.
- Energy demand in industries would grow only marginally by 1.0 percent or so due to the continued economic slump.
  - The abrupt decrease in the demand for bituminous coals as raw material for manufacturing would bring down the share of fuels used as raw material in industry-wide energy consumption from 7.3 percent last year to one percent or so this year.
  * Industrial use of raw-material energy: 1.7% in 2012 → 1.1% in 2013 → 7.3% in 2014 → 1.2% in 2015 (est.).
  * Bituminous coal consumption in steel manufacturing: -0.9% in 2012 → 1.8% in 2013 → 17.3% in 2014 → -3.8% in 2015 (est.).

- By contrast, industrial consumption of energy as fuels would increase this year.
  * Industrial consumption of fuels: 0.4% in 2012 → 3.2% in 2013 → -0.4% in 2014 → 0.9% in 2015 (est.).

• The low oil price would raise the demand for energy in transportation to a new height, since 2002, by 4.4 percent from last year.

- Notwithstanding the MERS outbreak, the low oil price would boost the demand for gasoline, diesel and aircraft fuels.
  * Demand for transportation gasoline: 3.2% in 2012 → 2.2% in 2013 → -0.5% in 2014 → 3.1% in 2015 (est.).
  * Demand for transportation diesel: 2.0% in 2012 → 5.1% in 2013 → 1.0% in 2014 → 5.2% in 2015 (est.).
  * Demand for aircraft fuel: 7.9% in 2012 → 0.3% in 2013 → 6.0% in 2014 → 8.3% in 2015 (est.).

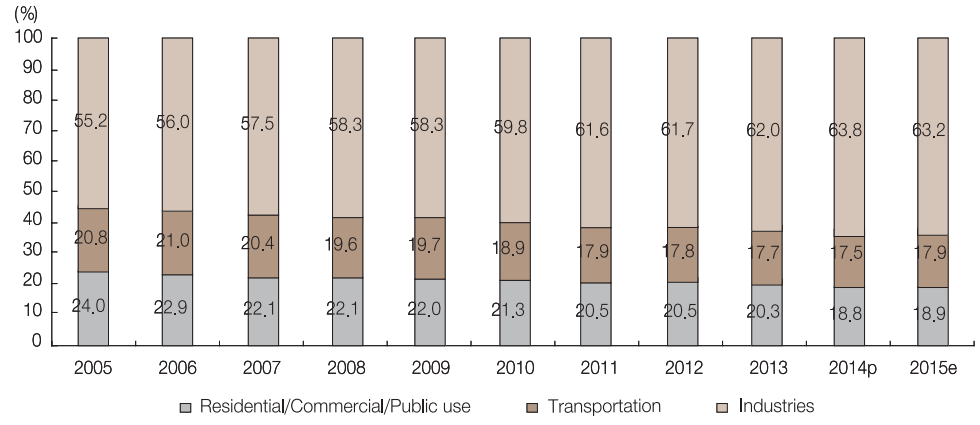
• The energy demand in residential, commercial and public use would increase by 2.7 percent from last year in total, thanks to the base effect, the increase in heating degree days, and the drops in the urban gas and electricity tariffs.

- The rates of increase in residential, commercial and public use of urban gas and electricity would rise from -12.8 percent and -2.3 percent in 2014 to 1.2 percent and 2.4 percent in 2015, respectively.

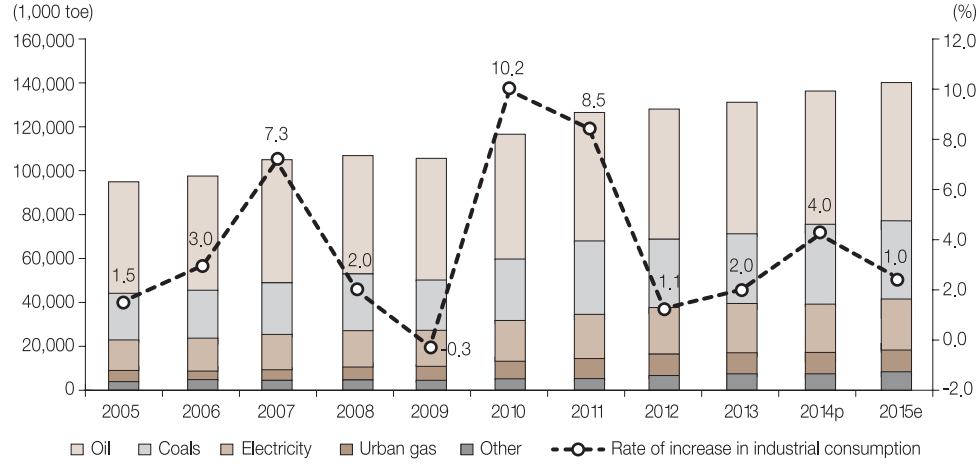
• Final energy consumption structure by sector.

- The share of industries in total energy consumption, which has been on steady increase over the last several years, would drop by 0.6 percentage point to 63.2 percent from 2014 to 2015 due to the decline in the projected economic growth rate.
- The share of transportation in total energy consumption, consistently declining from the 21.0 percent of 2006, would right slightly, by 0.4 percentage point, to 17.9 percent in 2015 thanks to the drop in the oil price.
- The share of residential, commercial and public use in total energy consumption, which has been on slow yet steady decline since 2005, would rise somewhat from 2014 to 2015, reaching 18.9 percent this year.

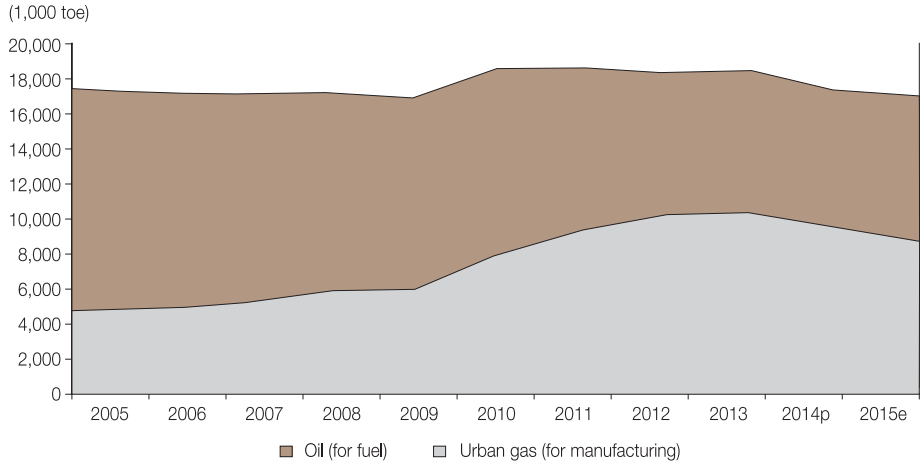
[Figure 7] Final Energy Consumption Structure by Sector



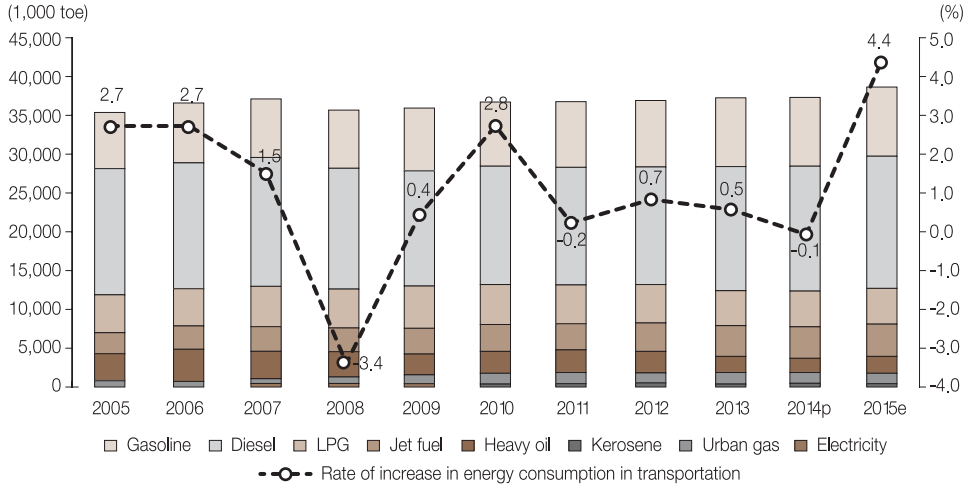
[Figure 8] Industrial Energy Consumption by Source



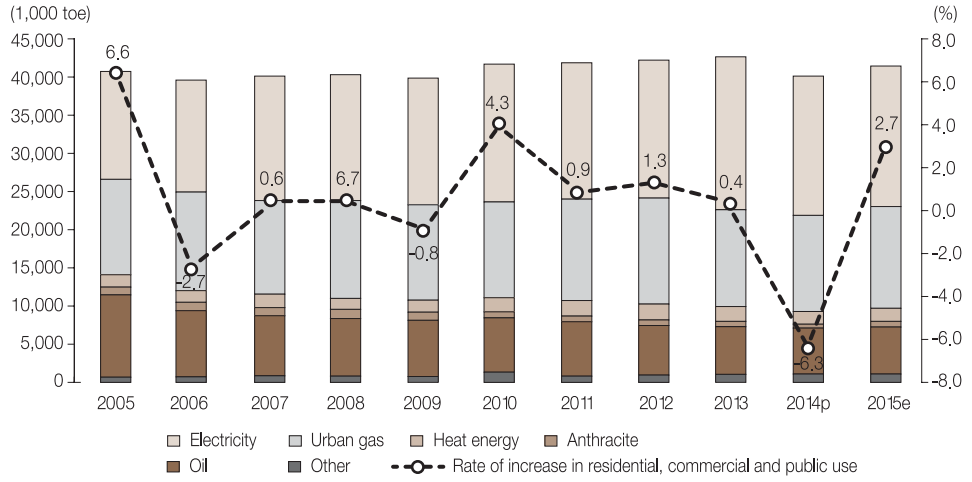
[Figure 9] Trends in Industrial Energy Consumption by Source



[Figure 10] Energy Consumption in Transportation by Source



[Figure 11] Energy Consumption in Residential, Commercial and Public Use by Source



<Table 2> Primary Energy Consumption and Outlook

Source/Year	2013	2014p					2015e			
	Annual	Q1	Q2	Q3	Q4	Annual	First half		Second half	Annual
							Q1p			
Coal (Million ton) *-Except those used as raw materials*	129.6 (1.1) *97.5 (0.9)*	33.0 (0.4) *23.8 (-4.9)*	32.1 (3.1) *22.6 (-3.0)*	33.9 (2.2) *24.6 (-1.6)*	34.4 (6.1) *24.9 (2.4)*	133.4 (2.9) *95.8 (-1.8)*	34.0 (3.1) *25.0 (5.4)*	67.9 (4.4) *49.7 (7.4)*	69.3 (1.5) *51.3 (3.7)*	137.2 (2.9) *101.0 (5.5)*
Oil (Million bbl) *-Except those not used as energy*	825.1 (-0.3) *406.6 (-1.4)*	205.0 (-0.2) *96.0 (-4.9)*	201.2 (0.6) *96.5 (-3.4)*	205.2 (0.1) *96.0 (-2.7)*	210.6 (-2.0) *101.9 (-4.8)*	822.1 (-0.4) *390.4 (-4.0)*	214.9 (4.8) *104.0 (8.3)*	421.5 (3.8) *203.1 (5.5)*	433.5 (4.3) *204.5 (3.3)*	855.0 (4.0) *407.5 (4.4)*
LNG (Million ton)	40.3 (4.7)	12.0 (-5.3)	7.3 (-15.9)	6.8 (-9.5)	10.4 (-7.7)	36.6 (-9.0)	11.3 (-6.3)	18.4 (-5.1)	17.0 (-1.8)	35.3 (-3.5)
Hydropower (TWh)	8.4 (9.7)	1.7 (-0.9)	1.9 (-14.1)	2.4 (-13.6)	1.9 (7.3)	7.8 (-6.8)	1.6 (-6.5)	3.3 (-7.6)	4.2 (0.3)	7.6 (-3.4)
Nuclear power (TWh)	138.8 (-7.7)	38.3 (3.3)	39.6 (27.3)	39.8 (13.0)	38.7 (9.4)	156.4 (12.7)	39.4 (2.8)	81.1 (4.0)	84.3 (7.4)	165.4 (5.7)
Other (Million TOE)	9.0 (11.8)	2.4 (4.0)	2.4 (8.0)	2.4 (5.8)	2.6 (12.9)	9.7 (7.7)	2.5 (5.4)	5.0 (5.3)	5.2 (4.6)	10.2 (4.9)
Total energy (Million TOE)	280.3 (0.6)	73.7 (-0.5)	66.9 (1.3)	67.8 (0.8)	73.5 (0.8)	281.9 (0.6)	74.9 (1.7)	143.8 (2.3)	145.2 (2.7)	289.0 (2.5)
Total energy -Except those used as raw material	*205.7 (0.4)*	*53.7 (-3.4)*	*47.1 (-1.9)*	*47.7 (-1.3)*	*53.3 (-0.9)*	*201.8 (-1.9)*	*54.9 (2.3)*	*104.0 (3.1)*	*104.1 (3.0)*	*208.0 (3.1)*

<Table 3> Final Energy Consumption and Outlook

Source/Year	2013	2014p					2015e			
	Annual	Q1	Q2	Q3	Q4	Annual	First half		Second half	Annual
							1/4p			
Industries (Million TOE)	130.9	34.0	33.9	33.9	34.4	136.2	33.6	67.6	70.0	137.6
	(2.0)	(4.4)	(6.3)	(4.4)	(1.1)	(4.0)	(-1.2)	(-0.5)	(2.5)	(1.0)
-Except those used as raw materials	*56.3*	*14.0*	*14.1*	*13.8*	*14.2*	*56.1*	*13.5*	*27.7*	*28.9*	*56.6*
	(3.2)	*(-0.7)*	*(2.1)*	*(1.8)*	*(-4.4)*	*(-0.4)*	*(-3.2)*	*(-1.6)*	*(3.3)*	*(0.9)*
Transportation (Million TOE)	37.3	8.8	9.4	9.5	9.5	37.3	9.6	19.2	19.7	38.9
	(0.5)	(-0.4)	(0.0)	(-0.8)	(0.7)	(-0.1)	(8.0)	(5.2)	(3.6)	(4.4)
R/C/P (Million TOE)	42.8	13.5	8.0	7.3	11.3	40.1	13.9	22.3	18.9	41.2
	(0.4)	(-10.6)	(-9.2)	(-2.5)	(-1.0)	(-6.3)	(2.9)	(3.8)	(1.4)	(2.7)
Total (Million TOE)	211.1	56.4	51.2	50.8	55.2	213.6	57.1	109.1	108.6	217.7
	(1.4)	(-0.3)	(2.4)	(2.4)	(0.6)	(1.2)	(1.2)	(1.4)	(2.5)	(1.9)
Total -Except those used as raw material	136.5	36.4	31.5	30.6	35.0	133.5	37.0	69.2	67.5	136.7
	(1.6)	(-4.5)	(-1.6)	(-0.1)	(-2.0)	(-2.2)	(1.8)	(1.9)	(2.8)	(2.4)
Urban gas (billion ㎥)	24.7	8.1	4.4	3.5	6.1	22.1	7.6	12.0	9.5	21.5
	(3.7)	(-12.5)	(-13.8)	(-3.9)	(-7.8)	(-10.2)	(-6.4)	(-3.9)	(-1.1)	(-2.7)
Oil (million bbl)	799.1	199.6	198.1	202.9	208.5	809.1	210.1	413.9	429.2	843.1
	(0.3)	(0.6)	(2.3)	(2.3)	(-0.1)	(1.3)	(5.3)	(4.1)	(4.3)	(4.2)
-Except non-energy fuels	*380.5*	*90.6*	*93.3*	*93.7*	*99.8*	*377.4*	*99.2*	*195.4*	*200.2*	*395.6*
	(-0.1)	*(-3.7)*	*(-0.1)*	*(1.7)*	*(-1.0)*	*(-0.8)*	*(9.5)*	*(6.3)*	*(3.4)*	*(4.8)*
Electricity (TWh)	474.8	125.6	114.5	118.2	119.2	477.6	128.1	245.4	243.9	489.3
	(1.8)	(0.5)	(0.6)	(-0.3)	(1.6)	(0.6)	(2.0)	(2.2)	(2.7)	(2.5)
Coals (million tons)	49.5	13.2	13.9	13.3	14.4	54.9	13.0	26.4	27.0	53.4
	(2.3)	(9.3)	(17.0)	(7.8)	(9.3)	(10.8)	(-1.4)	(-2.7)	(-2.8)	(-2.7)
-Except those used as raw material	*17.5*	*4.0*	*4.4*	*4.0*	*4.9*	*17.3*	*4.1*	*8.2*	*9.0*	*17.2*
	(3.3)	*(-5.3)*	*(8.9)*	*(-4.2)*	*(-3.4)*	*(-1.2)*	*(1.7)*	*(-1.8)*	*(0.9)*	*(-0.4)*
Heat/other (1,000 toe)	9,577.6	2,780.8	2,257.5	2,137.2	2,760.1	9,935.6	2,935.3	5,314.3	5,064.0	10,378.3
	(7.9)	(-0.6)	(3.1)	(3.6)	(9.1)	(3.7)	(5.6)	(5.5)	(3.4)	(4.5)

3 Major Characteristics

- The rate of increase in total energy demand in 2015 would likely be lower than the last projection made (in Volume 17, No. 1) by 1.0 percentage point, dropping to 2.5 percent.
  - This is due to the drops in the projected economic growth rate and the heating degree days and also to the actual decrease in industrial energy consumption.
    - The continued decline in the growth of gross domestic product has brought down the projected economic growth rate of 2015 by 0.4 percentage point.
    - The rate of increase in the heating degree days, now including actually observed days in the months of March through May, has dropped by 3.0 percentage points.
    - The annual average international oil price (Dubai) has also increased by USD 5.1 per barrel.
    - Industrial energy demand in the first quarter of 2015 is lower by 1.2 percentage point than the one observed in the first quarter of last year due to the decreases in bituminous coal consumption (-2.7 percent) and also in industrial electricity consumption (1.1 percent).

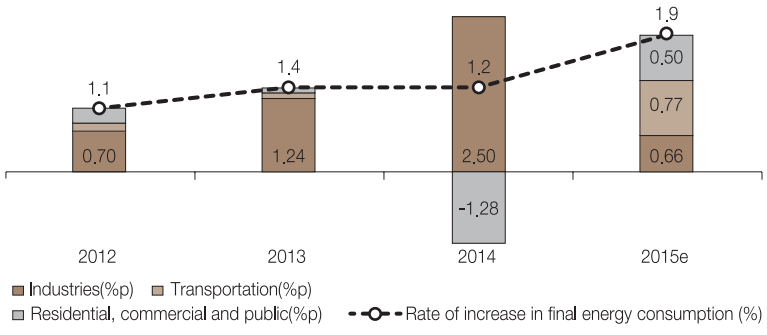
<Table 4> Changes in the Underlying Assumptions

Underlying assumptions		Projections for 2015		Differential
		Vol. 17, No. 1(Spring)	Vol. 17, No. 2(Summer)	
The main premise	Economic growth rate (%)	3.4	3.0	▼0.4p
	International oil price (USD/bbl)	55.1	60.2	△5.1
	Heating degree days (HDDs)	2,661	2,588	▼73
	Cool degree days (CDDs)	786	798	△12

- The share of industries in final energy demand would decrease drastically, while those of transportation and residential/commercial/public would rise.

- Industries, which have traditionally led the growth in final energy consumption, would not play as significant a role in 2015 due to the continued economic slump.
  * Rate of increase in share of industries in energy consumption: 0.70%p in 2012 → 1.24%p in 2013 → 2.50%p in 2014 → 0.66%p in 2015 (est.).
- The share of transportation, on the contrary, would increase dramatically notwithstanding the MERS outbreak and due to the low oil price.
  * Rate of increase in share of transportation in energy consumption: 0.13%p in 2012 → 0.09%p in 2013 → -0.02%p in 2014 → 0.77%p in 2015 (est.).
- The share of residential, commercial and public use in final energy consumption, which turned negative last year due to the mild weather, would turn positive this year.
  * Rate of increase in share of residential/commercial/public use in energy consumption: 0.27%p in 2012 → 0.09%p in 2013 → -1.28%p in 2014 → 0.50%p in 2015 (est.).

[Figure 12] Rate of Increase in Final Energy Consumption (%) and Respective Shares of the Sectors (%p)



- Despite the MERS outbreak, the rate of increase in the oil demand in transportation would reach a new height in 2015 since 2002.
  - The sudden drop in the international oil price is the main reason for the soaring demand for oil in transportation.
    - Oil consumption in transportation January through May this year increased by 7.0 percentage points from the previous year, showing the fastest pace of growth since 2000.

* The average yearly rate of increase in oil consumption in transportation from 2000 to 2014 was 1.3 percent.

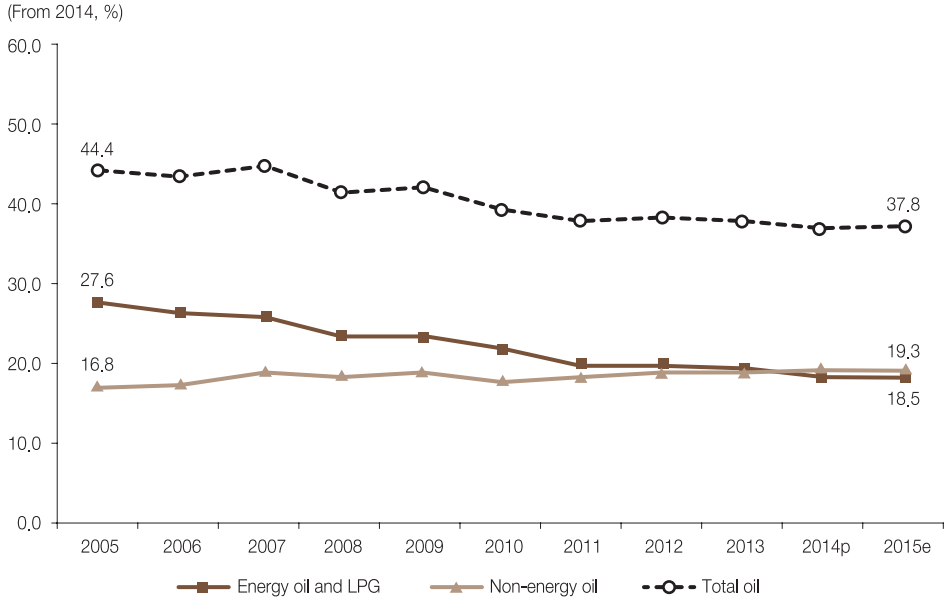
- The MERS outbreak and the new rise in the oil price in the latter half of the year would put a brake on the abrupt rise in demand for oil in transportation, but the upward trend would still remain strong.
  - Should the MERS continue in Korea for two months, in June and July, the annual demand for oil in transportation would drop by 0.5 to 0.6 percentage point due to the shrinkage in air traffic demand.[5)]
  - The demand for oil in transportation would continue to grow after the international oil price plummets to a new low in the first quarter of this year, and increase by four percent from last year, thus reaching a new height since the rate peaked at 5.6 percent in 2002.

    * The international oil price would likely keep rising until the last quarter of this year, reaching USD 65.30 per barrel, but even that price would be much lower than the yearly average of 2014, i.e., USD 96.6 per barrel.
  - However, the lasting impact of the MERS may limit Korea°Øs economic growth further by drastically reducing the number of international travelers, which, in turn, could stop the rise in the demand for oil in transportation.

- The share of oil in total energy consumption would increase slightly thanks to the low oil price.
  - The share of oil in the total primary energy consumption has been on steady decline from year to year, except in 2007 and 2009, but would rise by 0.6 percentage point to 3.78 percent in 2015 thanks to the low oil price.
    - The share of oil used as energy fuel (excluding non-energy oil, such as naphtha and asphalt, used for industrial purposes) would also increase by 0.3 percentage point to 18.5 percent.
    - The share of non-energy oil would increase by 0.2 percentage point to 19.3 percent.

5) KEEI, *Energy Supply and Demand Brief* (June 2015).

[Figure 13] Oil Dependent Trend and Outlook



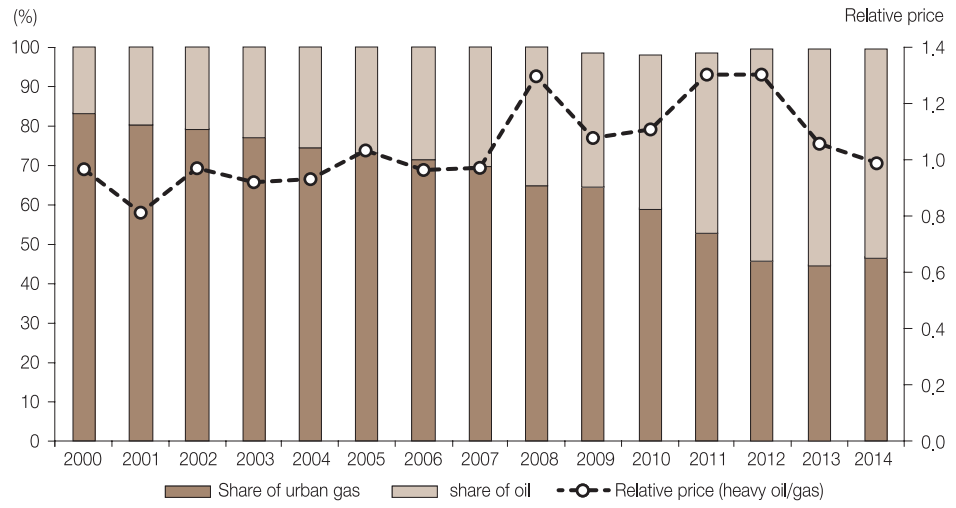
4 Policy Implications

- A mid- to long-term plan is required with respect to the likely drop in the LNG demand.
  - LNG consumption in Korea would continue to decrease with respect to both power generation and urban gas, as it did in 2014.
    - The recent decrease in LNG consumption results from a multiplicity of factors, including the expansion of the existing power plants, the slow growth in demand for electricity, and the drop in the oil price.
      * Rate of growth in LNG consumption: 8.1% in 2012 → 4.7% in 2013 → -9.0% in 2014 → 3.5% in 2015 (est.).
      * Rate of growth in LNG consumption in power generation: 9.8% in 2012 → 0.6% in 2013 → -10.5% in 2014 → -6.8% in 2015 (est.).
      * Rate of growth in LNG for urban gas: 7.1% in 2012 → 0.2% in 2013 → -7.2% in 2014 → -0.9% in 2015 (est.).
    - The continued drop in the oil price has prompted large manufacturing facilities, in possession of dual boiler systems, to revert back to oil from urban gas as their main fuel of choice.
    - Although the whole LNG tariffs were lowered three times in 2015 alone to reflect the drops in the raw material cost,[6] the significant relative price gap with oil products still persists.
  - As Korea imports LNG in accord with long-term contracts, the abrupt drop in the LNG demand will likely cause significant financial losses and confusion on the market.
    - As more large-scale power plants will come into being in the future and the international oil price is likely to remain low for the time being, the demand for LNG will continue to decline, unless a new market is pioneered for gas businesses and the tariff system is reformed.

6) Korea Gas Corporation lowered the wholesale tariffs by 5.9 percent, 10.1 percent, and 10.3 percent in January, March and May, respectively.

- In establishing its 12th Long-Term Natural Gas Supply and Demand Plan, the government must take into account the recent changes in the gas business environment.

[Figure 14] Respective Shares and Relative Prices of Urban Gas and Oil as Industrial Fuels



- Despite the government°Øs policy on lowering the electricity tariff for households in the summertime, power supplies would likely remain stable thanks to the drop in the average seasonal temperature and the increase in the additional reserve power.
  - The Ministry of Industry has decided to lower the cost of electricity for households in the summer months of July through September, applying the tariff for Phase 3 (201 to 300 kWh) to households in Phase 4 (301 to 400 kWh).
    - The base tariff on cumulative electricity consumption in Phase 4 was dropped from KRW 3,850/kWh to KRW 1,600/kWh, and the usage tariff was also dropped from KRW 280.6/kWh to KRW 187.9/kWh for the months of July through September.
    - Approximately 24.1 percent, or 5.21 million, of households in Korea fall into Phase 4 (based on statistics from July through September, 2014).
  - Should the summer temperature in Korea return to the usual level, this summer would be much cooler than the last and thereby help keep the demand for air-conditioning low and stable.

- Given the trend in average temperature over the last 10 years, the cooling degree days in July through September this year would drop by 2.1 percent from last year.

• The government also plans to increase reserve power to beyond seven million kW in anticipation of El Nino and other climate phenomena that could raise electricity demand.

- According to the Korea Meteorological Administration, the sea level temperature in the zones under El Nino supervision has recently risen by 1.3°ΔC from the average this year, showing a mid-level impact of El Nino. The Administration expects the impact to be on rise.
- It is not known how exactly El Nino would affect and change the average temperature, rainfall and other weather-related events in Korea.
- The Ministry of Industry has thus decided to increase the reserve power for this summer by 3.22 million kW.

  * The additional reserve power includes the 2.45 million kW registered on the resource trade market and the projected capacity 0.77 million kW of the new power plant facilities (Furnace 9 at Dangjin and the new plant at Gangdong-Hanam), as estimated on the basis of the trial operation results.

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