CHAPTER 9

Republic of Korea Country Report

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1. Background

The Republic of Korea (henceforth Korea) is in the southern half of the Korean Peninsula and shares a 238-kilometre border with North Korea. It occupies 100,188 square kilometres and includes about 3,000 mostly small, uninhabited islands. Korea is a mountainous country with lowlands accounting for only 30% of the total land area. The climate is temperate, with heavy rainfall in summer. As of 2019, Korea has a population of 51,709,097 million, over 90% of whom live in urban areas. Korea has recorded tremendous economic growth over the past half century, overcoming the Asian financial crisis in 1998 and the global economic crisis in 2008. However, in the aftermath of the global financial crisis of 2007–2008, growth has slowed down. Manufacturing, particularly electronic products, passenger vehicles, and petrochemicals, dominates the Korean economy.

Korea has no domestic oil resources and has produced only a small amount of anthracite coal, but imports most of its coal, which is bituminous coal. Korea must import nearly all its needed energy and is the fifth-largest oil importer and the second-largest importer of liquefied natural gas (LNG) in the world. The total primary energy supply in 2019 was 280.2 million tonnes of oil equivalent (Mtoe), increasing by 3.9% a year since 1990. Though oil and coal dominate the primary energy supply, nuclear power and LNG also supply a significant share of the country's primary energy. The strongest growth occurred in natural gas (10.5% per year), followed by others such as renewable energy (6.9% per year), coal (4.0% per year), and nuclear (3.6% per year). Oil has increased relatively slower at 2.6% per year.

Total final energy consumption in 2019 was 181.9 Mtoe, increasing at an average annual rate of 3.6% from that in 1990. The industry sector accounted for 25.9% of final energy consumption in 2019, followed by non-energy (29.0%) and transportation (20.1%). While consumption of coal has gradually decreased, natural gas in the final energy consumption rapidly grew at a rate of 12.7% per year between 1990 and 2019. With oil, though it has increased in volume, its share in the final energy consumption has continued to shrink.

In 2019, electric power generation in Korea amounted to 578.0-terawatt hour (TWh), with coal providing nearly half of the country's electricity, followed by natural gas at 25.3% and nuclear power also at 25.3%. Total electricity consumption grew at an average annual growth rate (AAGR) of 6.0% between 1990 and 2019. When broken down by fuel, coal increased at an annual rate of 9.5%, natural gas at 9.8%, and nuclear at 3.6% between 1990 and 2019. Over the same period, oil had a negative annual growth rate of -2.4% while hydro had -2.8%. Meanwhile, other energy sources such as new and renewable energy (NRE) rapidly grew at an annual rate of 42.3%.

Since the 1990s, the Government of Korea has established six Basic Plans for Rational Energy Use in a row, which are being revised every 5 years and contain various policy tools and programmes developed and implemented under the auspices of the Ministry of Trade, Industry, and Energy (MOTIE). The government announced several energy savings measures to encourage the public to conserve energy. As part of the measures, they launched voluntary energy conservation campaigns to reduce heating and fuel consumption. The government urged energy-intensive industries to enhance the energy efficiency of their products.

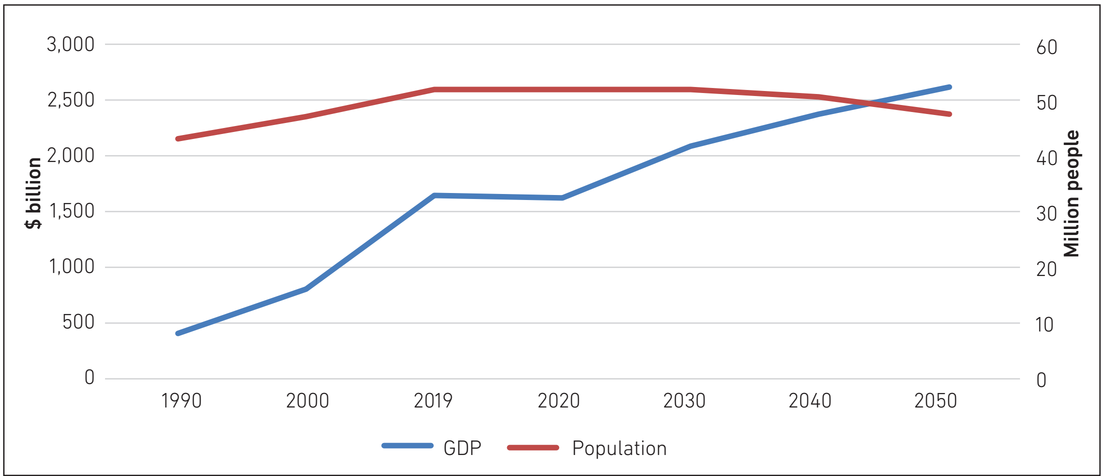
In addition, MOTIE and the Board of Audit and Inspection of Korea formed a task force to examine hundreds of public and private organisations to measure their progress in implementing voluntary energy saving plans.

'The Sixth Basic Plan for Rational Energy Use (2020–2024)' encompasses various key policy tools and programmes to attain the country's energy savings target. Amongst them are voluntary agreements, energy audits, energy service companies, appliance labelling and standards, fuel economy, and public transit and mode shifting. These policy tools will continue to play important roles in energy savings.

2. Modelling Assumptions

Korea's gross domestic product (GDP) grew at an average annual rate of 5% between 1990 and 2019. In this report, the country's GDP is assumed to grow at an AAGR of 1.5% from 2019 to 2050. Despite the recent global economic slowdown, the Korean economy is still in good shape, and its economic growth is expected to recover to 2.5% per year from 2020 to 2030, slowing down to 1.1% per year in 2030 to 2050.

Figure 9.1 Assumptions for GDP and Population, 1990–2050



GDP = gross domestic product.

Note: This figure uses 2010 US$.

Source: Author.

Korea is expected to continue to rely heavily on coal and nuclear energy for power generation to meet the baseload. Gas-fired power generation is projected to increase in 2019–2050, while oil-fired generation is projected to decline. Hydro power generation is projected to remain relatively stable. Also projected is a strong growth in electricity generation from wind power and solar photovoltaics, driven by renewable portfolio standards, which were launched in January 2012. A larger uptake of renewable energy is expected thanks to the recently announced RE 3020 and the Energy Transition policy.

Implementing energy efficiency improvement programmes in all energy sectors can help Korea achieve its energy-saving goals. In the industry sector, energy saving is expected from the expansion of voluntary agreements, the highly efficient equipment programme, and the development of alternative energy and improvements in efficient technologies. The transport sector aims to save energy by enhancing the efficiency of the logistics system, expanding public transport, and improving the fuel economy of vehicles. In the residential and commercial ('others') sector, the minimum energy efficiency standards programme is projected to induce huge savings in addition to 'e-Standby Korea 2010.'[1]

3. Outlook Results

3.1. Final Energy Consumption

Korea's final energy consumption grew 3.6% per year, from 64.9 Mtoe in 1990 to 181.9 Mtoe in 2019.[2] The non-energy sector had the highest growth rate during this period at 7.4% per year, followed by the transportation sector with 3.2%. Energy consumption in the residential/commercial/public ('others') sector grew at a relatively slow pace of 2.2% per year. Oil was the most consumed product, with a share of 67.3% in 1990, declining to 53.8% in 2019. The share of coal in the final energy consumption declined by 13.7 percentage points between 1990 and 2019, whereas the share of electricity nearly doubled, becoming the second-largest consumed product.

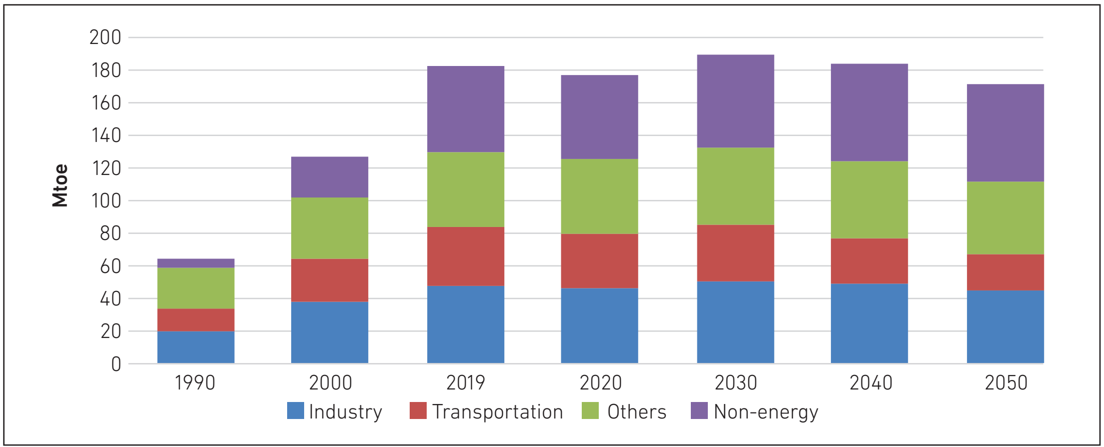
3.1.1. Business-As-Usual Scenario

With an assumption of low economic and population growth, final energy consumption in Korea is projected to reach 170.9 Mtoe in 2050, increasing at a negative average rate of -0.2% a year between 2019 and 2050 under the Business-As-Usual scenario (BAU). This is largely due to the negative growth in energy consumption in the transportation sector, which is projected to decrease at an AAGR of -1.7% between 2019 and 2050. The growth in final energy consumption is expected to be led by industry at 0.9% and non-energy at 0.8% until 2030. Then, all sectors except for the non-energy sector are projected to slow down, showing negative AAGRs. The non-energy sector will take the lead at an AAGR of 0.4% thereafter up to 2050. See Figure 9.2.

[1] The Korea Energy Agency introduced the 'E-Standby Korea' programme which urges the manufacturers to minimise standby power and select sleep mode during the standby. It is a voluntary agreement.

[2] Energy consumption is calculated based on the net calorific values as converted by The Institute of Energy Economics, Japan from original data submitted by the Republic of Korea.

Figure 9.2 **Final Energy Consumption by Sector, Business-as-Usual, 1990–2050**
(Mtoe)

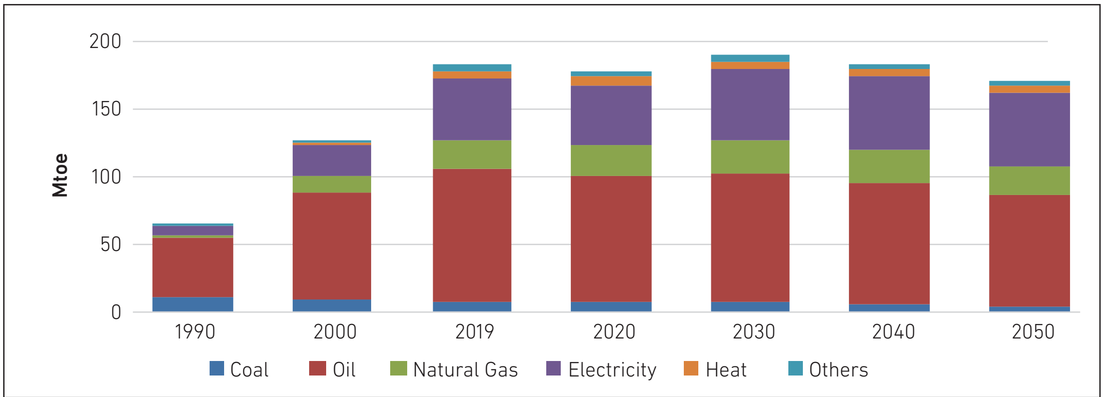


Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

Final energy consumption by energy type is expected to be patterned after energy consumption by sector as shown in the Figures 9-3 and 9-4. The AAGR shows -1.7% for coal, -0.6% for oil, -0.1% for natural gas, 0.6% for electricity, and -0.5% for heat between 2019 and 2050. Coal and oil consumptions are expected to decrease, showing a negative growth rate. Heat energy consumption is expected to follow the same pattern because of the expected decrease in population and the changing lifestyle towards using more electricity for heating. The case of oil is more telling because of the decreasing energy consumption in the transport sector caused by an increasing deployment of electrical vehicles. Other energy types, including NRE, in addition to natural gas, will increase as clean and green energy will considerably contribute to reduced CO_2 emissions.

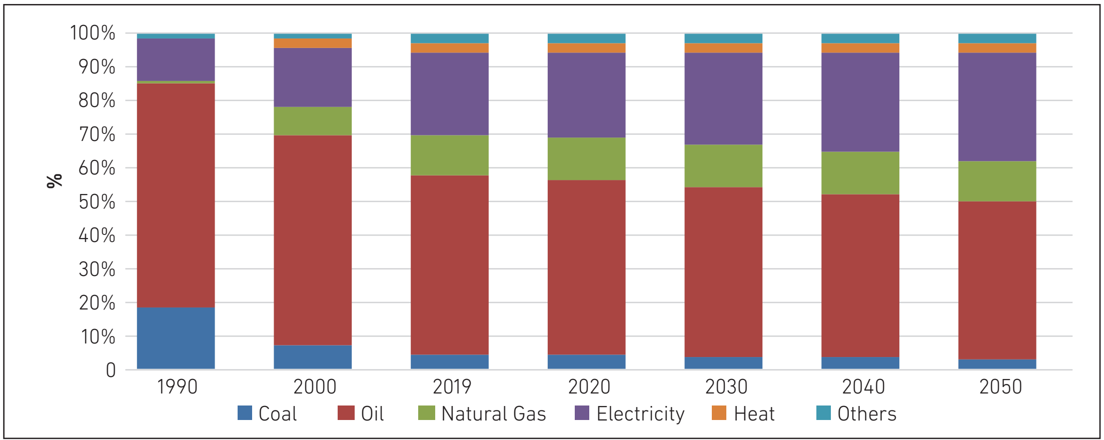
Figure 9.3 **Final Energy Consumption by Source, Business-as-Usual, 1990–2050**
(Mtoe)



Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

Figure 9.4 **Shares in the Final Energy Consumption by Source, Business-as-Usual 1990–2050**
(%)



Source: Author's calculation.

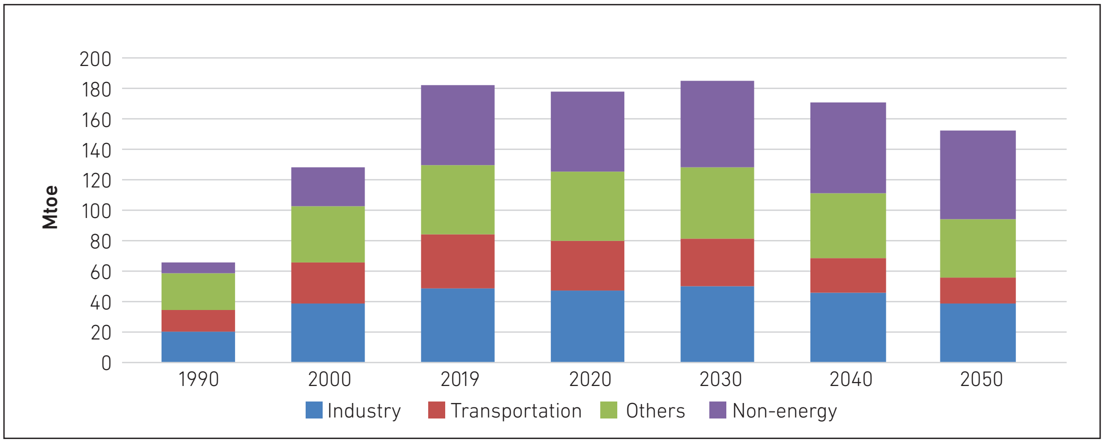
3.1.2. Alternative Policy Scenarios

This section discusses the alternative scenario developed based on the combination of policy options: (i) improved efficiency of final energy demand, (ii) more efficient thermal power generation, (iii) higher contribution of renewable energy to total supply, (iv) contribution of nuclear energy to total supply.

The total final energy demand in the alternative policy scenario (APS) is to be reduced to 152.6 Mtoe, decreased by 29.3 Mtoe or 16.1% from 183.2 Mtoe in 2019 at a negative AAGR of -0.6%. Figure 9.5 shows the final energy demand by sector in APS. The transportation sector shows the fastest decreasing rate at -2.6% per year, followed by the industry sector at -0.7% per year. The share of final energy demand by sector shows a structural change from 2019. The share of transportation is forecasted to decrease, while the share of industry and other sectors will slowly increase at first and decrease later. The share of non-energy sector will increase at a faster speed, reaching 39.2% in 2050.

Figure 9.5 Final Energy Consumption by Sector, Alternative Policy Scenario, 1990–2050

(Mtoe)

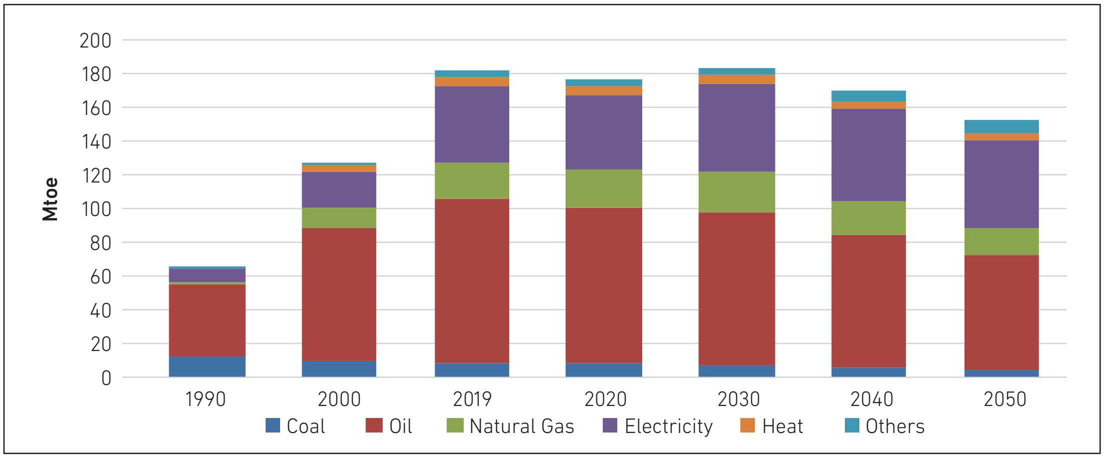


Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

Final energy demand by source is shown in Figure 9.6. Oil will continue to be a dominant energy, accounting for 45.4% of its share, followed by electricity, 34.7% and natural gas, 10.0%. Coal will be marginalised at a share of 2.1% as a minor energy source for industrial, residential, and commercial use.

Figure 9.6 Final Energy Consumption by Energy, Alternative Policy Scenario, 1990–2050

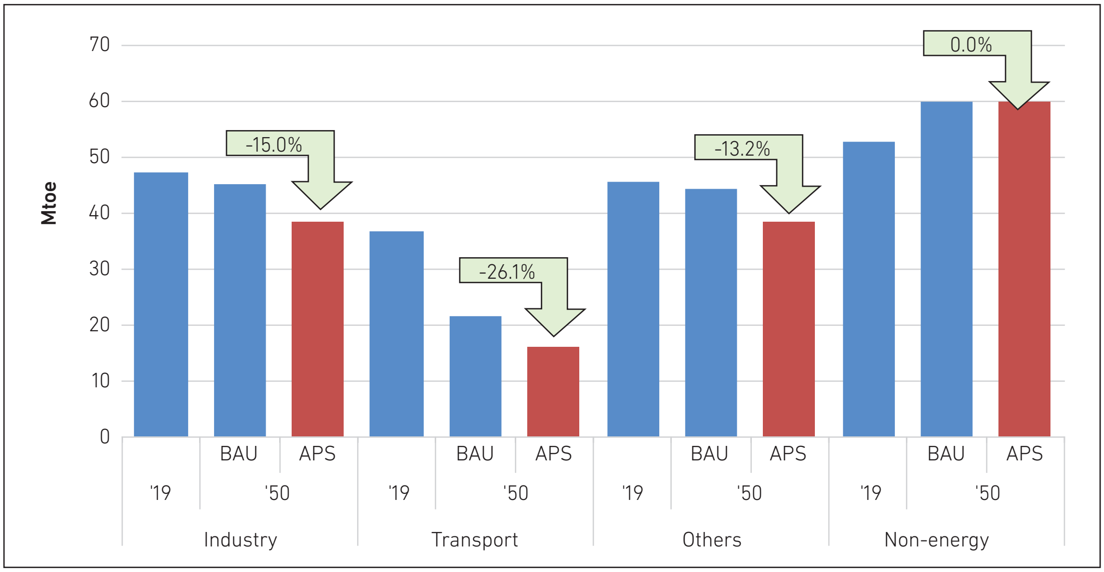


Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

Figure 9.7 shows the final energy consumption by sector in BAU vs APS in 2050. In BAU, energy demand is projected to decrease by 6.1% from 2019 to 2050 in which transportation sector will lead its negative growth. In APS, 18.3 Mtoe (10.7%) will be saved from BAU in 2050, most of which will come from transport and industry. Reduction rates will be -26.0% for transport sector, -15.0% for industry sector, and -13.2% for others sector, whereas almost no change will take place in the non-energy sector.

Figure 9.7 Final Energy Consumption by Sector, Business-as-Usual vs Alternative Policy Scenario, 2019 and 2050
(Mtoe)



APS = alternative policy scenario; BAU = business-as-usual.

Source: Author's calculation.

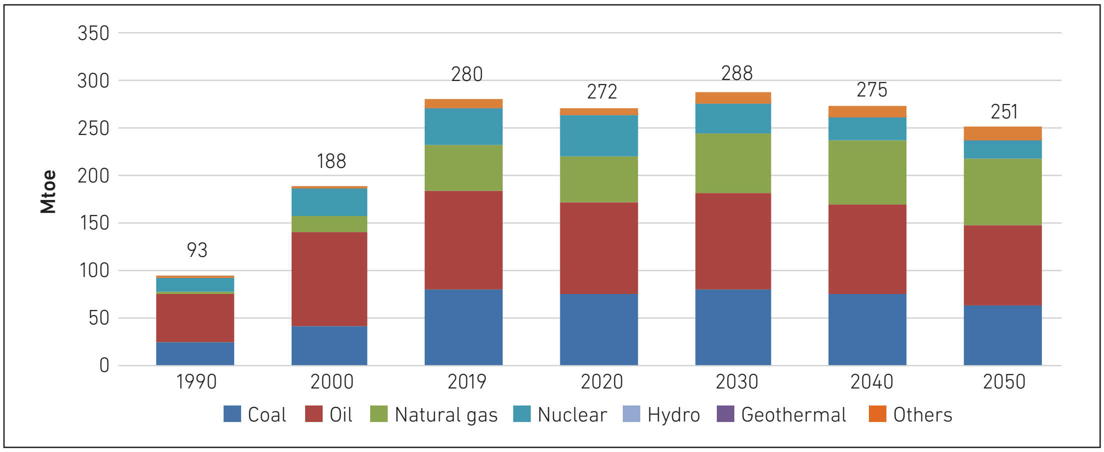
3.2. Primary Energy Demand

Primary energy demand in Korea increased at an AAGR of 4.2%, from 92.9 Mtoe in 1990 to 280.2 Mtoe in 2019. Amongst the major energy sources, natural gas grew the fastest at an average annual rate of 10.5%. The next was coal (4.0%), followed by nuclear (3.6%), and oil (2.6%). Other energy sources, mainly renewable energy such as solar, wind, biomass, and ocean energy, have rapidly grown at a rate of 8.7% over the same period. This shows that the government has been successfully implementing its 'Low Carbon Green Growth' and 'Energy New Industry' policies initiated by previous administrations.

3.2.1. Business-As-Usual Scenario

In BAU, primary energy demand in Korea is projected to decrease at an AAGR of -0.4%, from 280.2 Mtoe in 2019 to 251.2 Mtoe in 2050 as shown in the Figure 9.8. Consumption of all energy sources are projected to decrease except for natural gas and hydro. While consumption of nuclear shows the fastest decreasing rate of -2.4% per year, followed by coal (-0.8%), oil (-0.6%), and geothermal (-0.4%), over the period 2019–2050. Other energy sources, mainly renewable energy sources show a positive AAGR of 1.8%, wherein solar, wind, and ocean together show an AAGR of 4.5%.

Figure 9.8 Primary Energy Supply by Energy, Business-as-Usual, 1990–2050



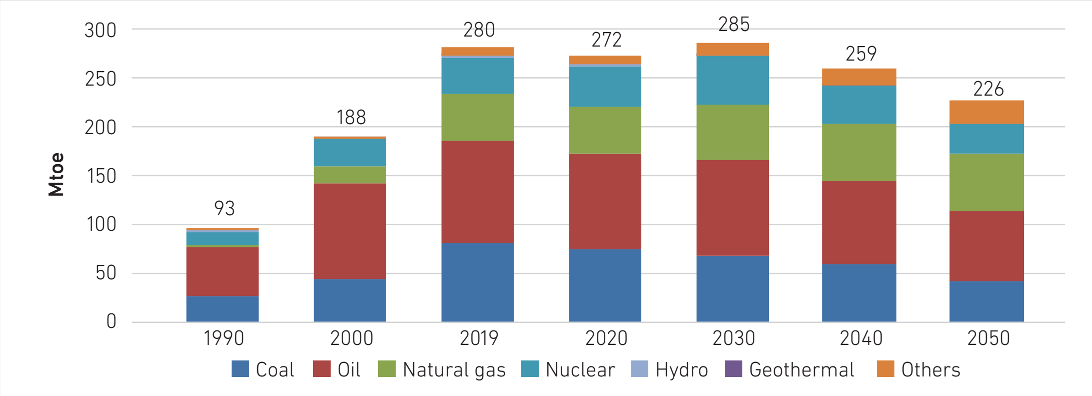
Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

3.2.2. Alternative Policy Scenario

In APS, primary energy supply is projected to decrease at an AAGR of -0.7% per year, from 280.2 Mtoe in 2019 to 226.1 Mtoe in 2050. Consumption of fossil fuels, such as coal, oil, and nuclear will gradually decrease in 2017–2050, whereas that of clean energy such as hydro and others (NRE) will increase by 0.8%, 3.4% per year, respectively, over the projection period (Figure 9.9). Aggressive implementation of energy efficiency and conservation measures on the demand side, along with a larger uptake of renewable energy on the supply side, will be the major contributors to reduced nuclear and fossil fuel consumption.

Figure 9.9 Total Primary Energy Supply, Alternative Policy Scenario, 2019–2050



Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

3.2.3. Projected Energy Savings

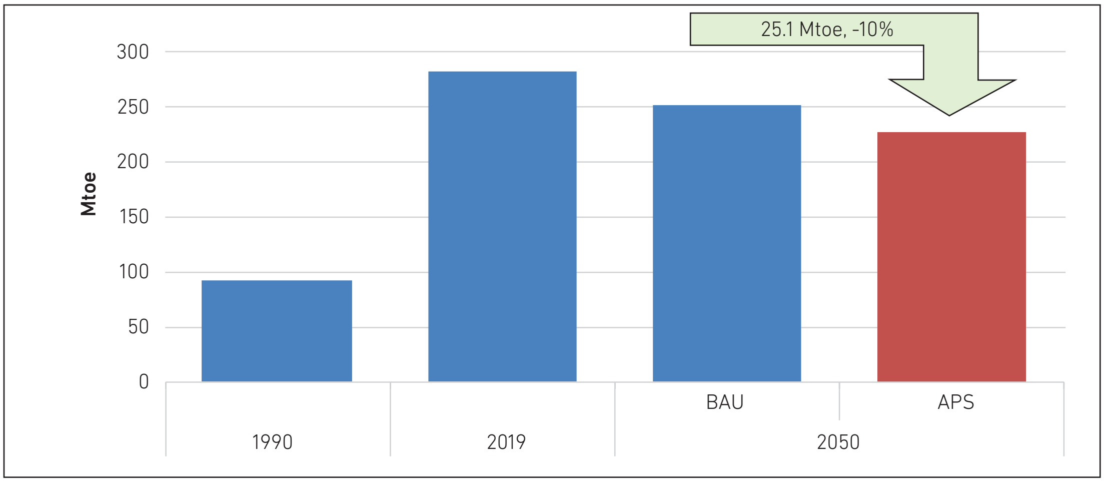
Major energy policy approaches to reduce energy demand in Korea are as follows:

1. Switch to demand-oriented energy policy and prioritise energy pricing and taxation reforms. Introduce market mechanisms that share information on the full cost of energy production and consumption to encourage rational energy use.
2. Accelerate the shift from energy-intensive industries to knowledge-based, service, and green industries that consume clean energies.
3. Apply energy efficiency standards and codes to product design, production process, and system design and construction (e.g. factories, buildings, plants). The government should develop and implement a cost-effective action plan with specific milestones and strategies to achieve these policy goals.

The above-mentioned energy savings targets, action plans, and policy tools results in a difference of 25.1 Mtoe (10%) between primary energy supply in BAU and the APS in 2050 (Figure 9.10).

Figure 9.10 Total Primary Energy Supply, Business-as-Usual and Alternative Policy Scenario, 2017 and 2050

(Mtoe)



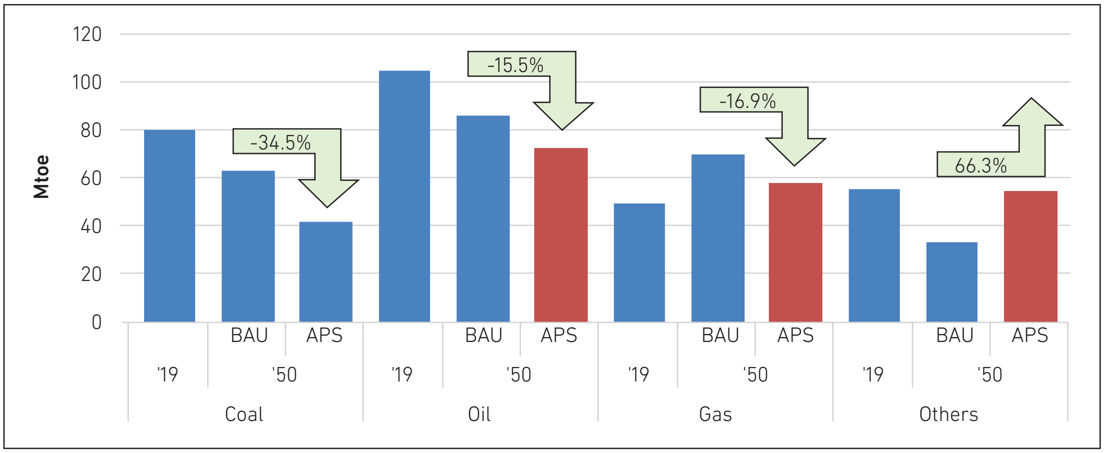
APS = alternative policy scenario; BAU = business-as-usual; Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

Figure 9.11 shows the energy saving potential by energy source. Amongst energy sources, coal has the largest reduction in energy demand (-34.5%), followed by natural gas (-16.9%) and oil (-15.5%). In contrast, other energy sources, such as nuclear and renewable energy, will increase by 66.3% compared to the BAU scenario. Renewable energy will be the primary driver of growth.

Figure 9.11 Primary Energy Supply by Source, Business-as-Usual vs. Alternative Policy Scenario, 2019 and 2050

(Mtoe)



APS = alternative policy scenario; BAU = business-as-usual; Mtoe = million tonnes of oil equivalent.

Source: Author's calculation.

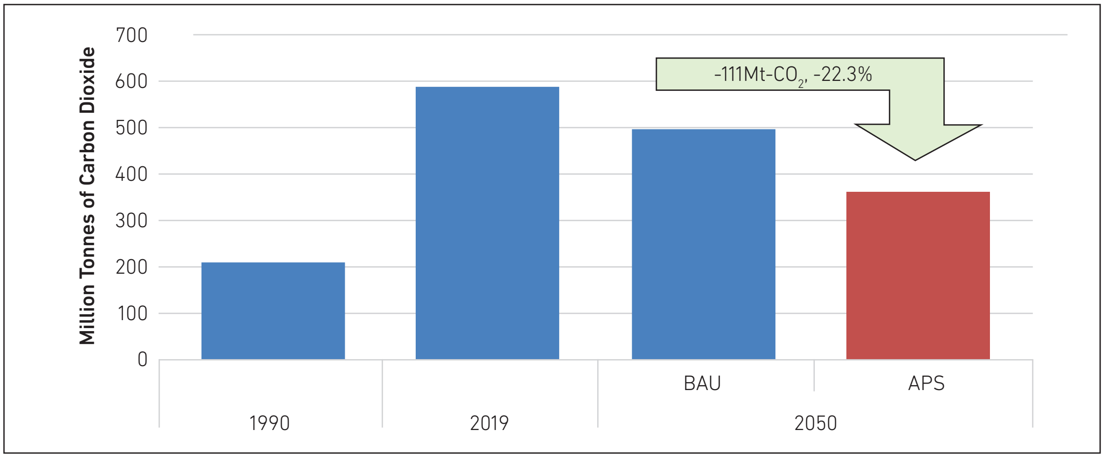
3.3. Carbon Dioxide Emissions from Energy Consumption

Carbon dioxide (CO_2) emissions from energy consumption are projected to decrease at an AAGR of -0.5%, from 586.7 million tonnes of CO_2 (Mt-C) in 2019 to 497.0 Mt-C in 2050 based on BAU. Such a growth rate is slower than that in primary energy supply. This indicates that Korea will use less carbon-intensive fuels—such as nuclear, natural gas, and renewable energy—and employing more energy-efficient green technologies.

In the APS, CO_2 emissions are projected to decline at an AAGR of -1.5% between 2019 and 2050. The difference in CO_2 emissions between BAU and the APS is 111 Mt-C or -22.3% (Figure 9.12). To attain such an ambitious target, the government must develop and implement cost-effective and consensus-based action plans to save energy and reduce CO_2 emissions.

Figure 9.12 Carbon Dioxide Emission from Energy Consumption, Business-as-Usual vs. Alternative Policy Scenario, 2019 and 2050

(Mt-C)



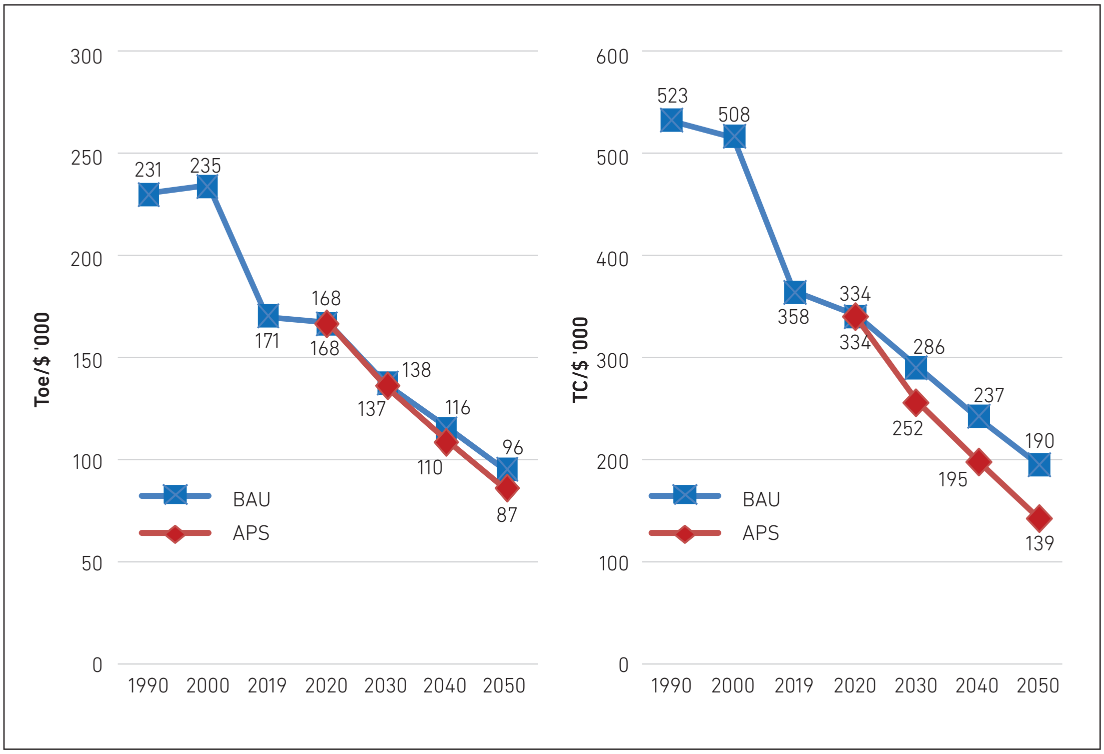
APS = alternative policy scenario; BAU = business-as-usual; Mt-C = million tonnes of carbon dioxide.

Source: Author's calculation.

3.4. Energy and Carbon Intensity

As a result of energy savings, the energy intensity of GDP is projected to improve (Figure 9.13). In BAU, energy consumption per unit of GDP (toe/million 2015 US$) is projected to be reduced from 171 to 96, showing a 43.9% improvement between 2019 and 2050. In the APS, it was accelerated by 49.1%. Energy intensity in the APS is 9.4% below that in BAU. This is due to a reduction in primary energy supply and the aggressive introduction of low-carbon energy sources and energy efficiency technologies. Carbon intensity, which refers to CO2 emissions per unit of GDP (measured in t-C/million 2015 US$), is a more important measure of progress than energy intensity and is projected to improve in both BAU and the APS. This is due to a reduction in primary energy supply and the aggressive introduction of low-carbon energy sources and energy efficiency technologies. The outlook shows that carbon intensity is expected to decrease from existing levels of 358 to 190 (43.1%) for BAU and 139 (58.4%) under the APS. Carbon intensity levels in the APS are 26.8% lower relative to those in BAU.

Figure 9.13 Energy and Carbon Intensities, 1990–2050



Toe = tonnes of oil equivalent; TC = tonnes of carbon dioxide.

Source: Author's calculation.

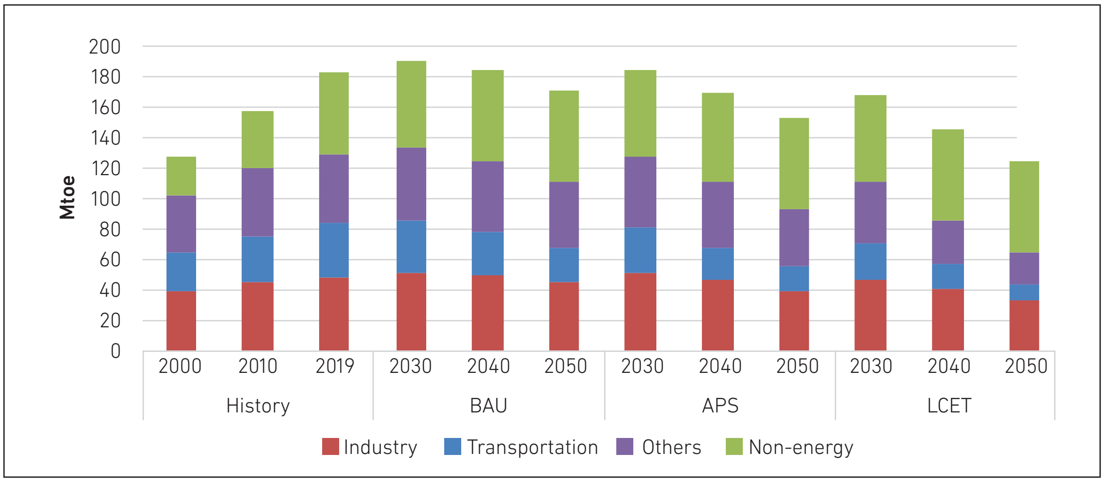
4. Low Carbon Energy Transition Scenario

This section delves into the Low Carbon Energy Transition (LCET) scenario, which has gained significant global momentum as countries embrace Energy Transition and Carbon Neutrality. With the government spearheading these initiatives through the implementation of the Energy Transition Policy and Carbon Neutral Strategy, and the launch of the Green New Deal, the LCET scenario provides a timely and effective approach to achieving these goals.

4.1. Final Energy Consumption

Final energy consumption in the LCET scenario is projected to decrease from 181.9 Mtoe in 2019 to 123.9 Mtoe in 2050 at an AAGR of -1.2%, which is significantly higher than that of the APS with -0.6%. Figures 9-14 and 9-15 compare final energy consumption between BAU, APS, and LCET scenarios. Figure 9.14 shows that final energy consumption will decrease faster compared to the APS due to reduction in energy consumption in industry and transport, while 'others' remain similar to the APS.

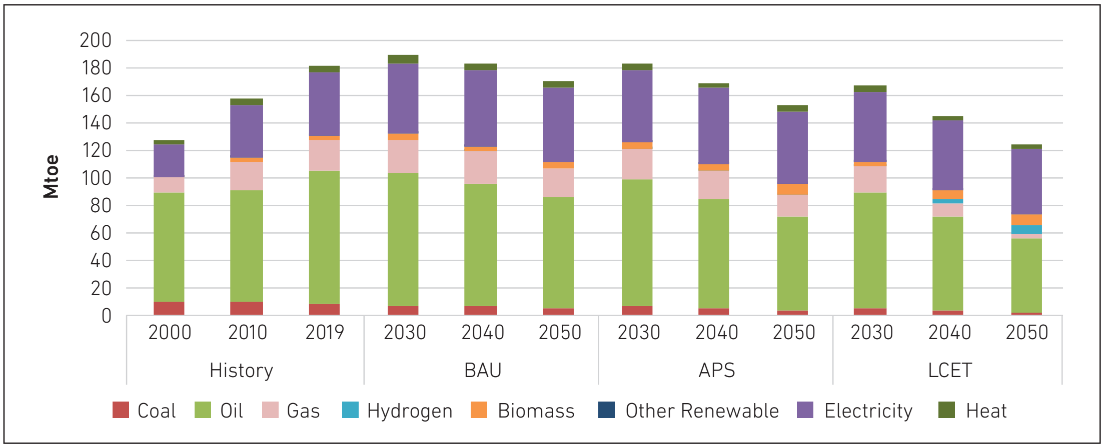
Figure 9.14 Final Energy Consumption by Sector, Business-as-Usual, Alternative Policy Scenario, Low Carbon Energy Transition, 2000–2050
(Mtoe)



APS = alternative policy scenario; BAU = business-as-usual; LCET = low carbon energy transition; Mtoe = million tonnes of oil equivalent.
Source: Author's calculation.

The difference in energy consumption by energy source between the APS and LCET scenario is due to a reduction in fossil fuel such as coal and natural gas. Another important factor is the use of hydrogen, which will be accelerated by the rapidly emerging hydrogen economy as a core element in a transition to a sustainable energy system in the future. According to the LCET scenario, a 5.6% share of hydrogen is projected for 2050 (Figure 9.15).

Figure 9.15 Final Energy Consumption by Source, Business-as-Usual, Alternative Policy Scenario, Low Carbon Energy Transition, 2000–2050
(Mtoe)

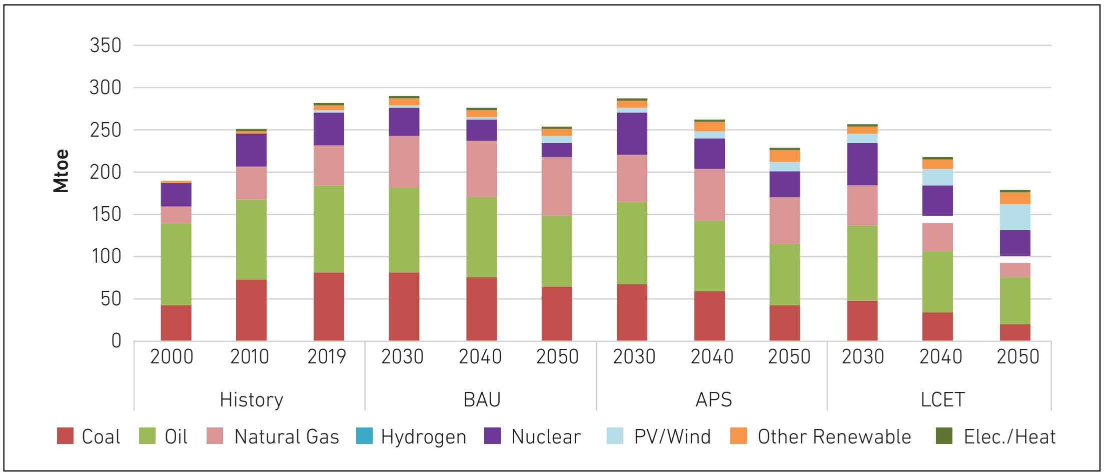


APS = alternative policy scenario; BAU = business-as-usual; LCET = low carbon energy transition; Mtoe = million tonnes of oil equivalent.
Source: Author's calculation.

4.2. Primary Energy Supply

Primary energy supply will decrease from 280.2 Mtoe in 2019 to 175.3 Mtoe in 2050 with a negative AAGR of -1.5%, higher than -0.7% in the APS (Figure 9.16). This difference is led by the reduction in the use of fossil fuels like coal, oil, and natural gases, and the increase in the use of solar photovoltaics (PVs) and wind. This shift has been driven by government policy on carbon-free and green energy adoption, as part of its Carbon Neutral Strategy for energy transition. In addition, the hydrogen economy is emerging as a key element of sustainable energy systems, as highlighted in the energy consumption data. As projected in the LCET scenario, hydrogen is expected to comprise about 4.9% of the primary energy supply.

Figure 9.16 Primary Energy Supply by Source, Business-as-Usual, Alternative Policy Scenario, Low Carbon Energy Transition, 2000–2050
(Mtoe)



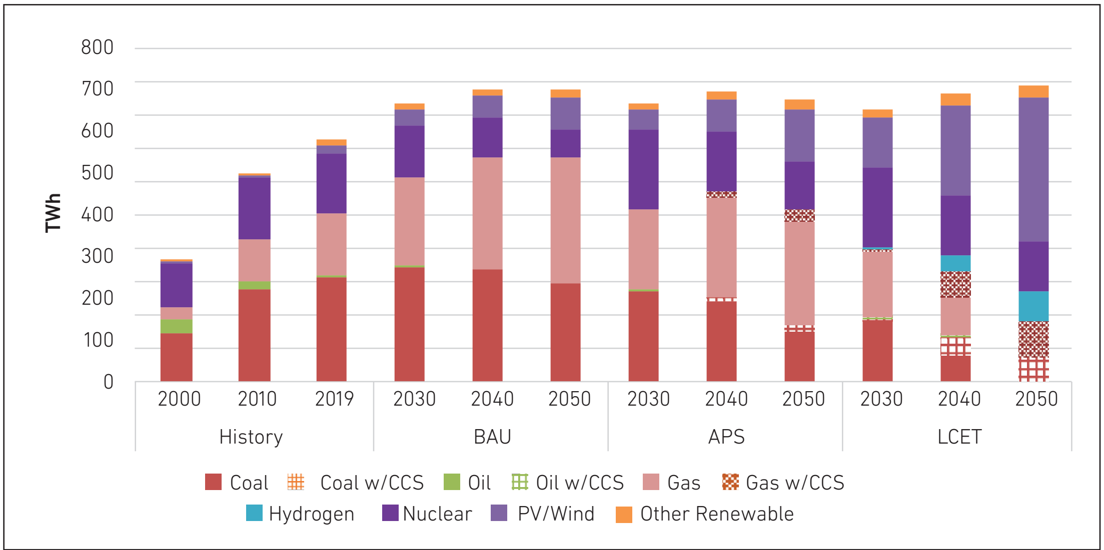
APS = alternative policy scenario; BAU = business-as-usual; LCET = low carbon energy transition; Mtoe = million tonnes of oil equivalent, PV = photovoltaic.
Source: Author's calculation.

4.3. Power Generation

As shown in Figure 9.17, electric power generation in the LCET scenario is projected to increase from 578,034 gigawatt hours (GWh) in 2019 to 708,280 GWh in 2050, which is not much different from 674,584 GWh in the APS, a difference of only 4.8%. However, fuel mix in the power generation show has a quite different story. In general, it is predicted that clean and carbon-free energy sources, such as solar PVs and wind, will experience a rapid increase in the LCET scenario. In contrast, traditional energy sources such as coal, oil, and gas will continue to serve as major energy sources in the APS. However, in the case of fossil fuels with carbon capture and storage (CCS) implementation, they will overwhelmingly dominate the LCET scenario. In the APS, approximately 10% of coal and gas is combusted with CCS. The fuel mix is expected to include hydrogen, making up approximately 10% of the total, but there will be no hydrogen introduced in the APS. Other fuels, including nuclear and other renewables, are expected to hold similar shares in the fuel mix.

Figure 9.17 Power Generation, Business-as-Usual, Alternative Policy Scenario, Low Carbon Energy Transition, 2000–2050

(TWh)



APS = alternative policy scenario; BAU = business-as-usual; CCS = carbon capture storage; LCET = low carbon energy transition; PV = photovoltaic; TWh = terawatt hour.

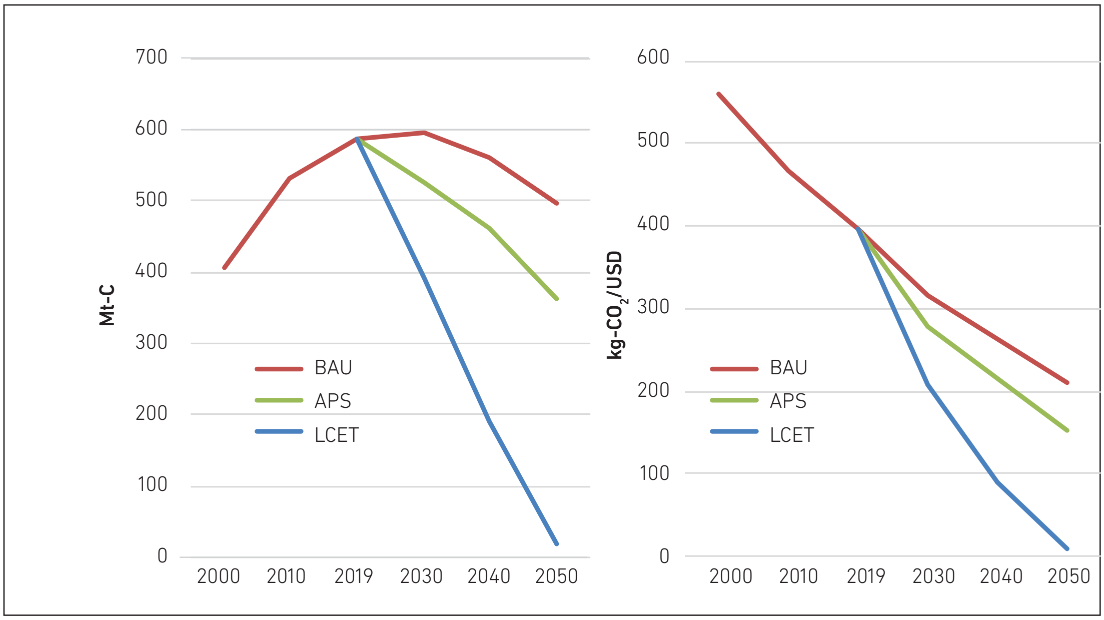
Source: Author's calculation.

4.4. Carbon Dioxide Reduction and Carbon Intensity

In the LCET scenario, CO_2 emissions are projected to decline at an AAGR of -10.5% from 586.7 Mt-C in 2019 and 18.8 Mt-C in 2050. The difference in CO_2 emissions between BAU and LCET scenarios is 96%, which shows the need for tremendous efforts to attain such an ambitious target. To address this challenge, it is critical for the Government of Korea to establish and enact widespread, cost-efficient, and collaborative strategies aimed at significantly reducing CO_2 emissions throughout the nation.

The projected reduction in CO_2 emissions will result in an improved carbon intensity of GDP, as depicted in Figure 9.18. Carbon intensity is also projected to improve in both BAU and the APS, mainly due to the reduction in primary energy supply in terms of energy intensity. This is achieved through the introduction of low-carbon energy sources and technologies and energy-efficient technologies. Accordingly, carbon intensity, as represented by CO_2 emissions per unit of GDP (t-C/million 2015 US$), is expected to decrease from 396 down to 210 in BAU, 153 in the APS, and 8 in the LCET scenario. This represents reductions of 47.0% for BAU, 61.4% for the APS, and 98.0% for the LCET scenario, with the latter exhibiting carbon intensity that is 96.2% lower than BAU and 98.0% lower than the APS.

Figure 9.18 Carbon Dioxide Reduction and Carbon Intensity, Business-as-Usual, Alternative Policy Scenario, Low Carbon Energy Transition, 2000–2050



APS = alternative policy scenario; BAU = business-as-usual; LCET = low carbon energy transition.

Source: Author's calculation.

5. Implications and Policy Recommendations

Due to an absence of affordable domestic energy resources, Korea imports most of its energy needs (93% in 2020) for economic growth. Thus, energy security has been a top priority on its policy agenda, with a focus on maintaining stable energy supply to sustain economic growth. However, at the turn of the 21st century, the government shifted its energy policy towards a more sustainable, efficient, and energy-saving approach, which comprehensively outlined in the First (2009), the Second (2014), and most recently, the Third (2019) Energy Basic Plan.

In the 1990s, while Korea experienced a rapid increase in energy consumption, its GDP was not growing as fast as it was driven by energy-intensive industries, such as the petrochemical, steel, and cement industries. Since 1997, the contribution of these industries to GDP has gradually declined, resulting in reduced energy intensity. However, the shift to a less energy-intensive industrial structure takes time, indicating that energy-intensive industries will prevail in the short to medium term. However, in the long term, Korea will need to transform into a less energy-intensive industrial structure.

The Second National Energy Basic Plan released in 2014 was the first full-scale energy basic plan with a workable target and an action plan. The policy approach outlined by the plan involved a complete transformation of the industrial structure, shifting it from a focus on supply to a focus on meeting demand. Its basic policy direction comprises six major agendas, with an emphasis on energy policy driven by demand as the top priority. Other five key agendas include constructing dispersed power sources, integrating environmental and safety objectives, strengthening energy security and stable energy supply, and implementing an energy policy supported by its people.

Another policy agenda prioritises the environment by aiming to reduce GHG emissions to address global climate change. The government announced an ambitious goal of decreasing GHG emissions by 37% from BAU (850.6 Mt-C) by 2030 across all economic sectors. Of the overall goal of 37%, domestic activities will meet 25.7%, while the remaining 11.3%, will be attained through carbon trading in the international market. It is a response to and a fulfilment of its international responsibility for the new climate regime established as a follow-up action to the Paris Agreement in December 2015.

In the past 30 years, the government has been mostly concerned with energy security, energy efficiency, and environmental preservation. To address the energy security challenge, the government has taken steps to encourage the import of foreign resources and promote the development of renewable energy sources. The improvement of energy efficiency has been addressed through programmes that receive support from a series of the Five-Year Basic Plan of Rational Energy Use. Offices of the Ministry of Environment have approached the environmental issue caused by consumption of fossil and nuclear energy. Now is the time for Korea to synergise its previous efforts in policy tools and programmes by coordinating with ministries clearly specified in the Third National Energy Basic Plan.

In 2017, the new government led by President Moon Jae-In proposed reforms to the current energy policy, announcing a new energy policy direction, 'Energy Transition', which has completely shaken up the existing national energy policy. Energy Transition rests on two major energy policy agendas: (i) gradual reduction of nuclear power plants and coal-fired plants ('de-nuclearisation' and 'de-coalisation' policies), and (ii) expansion of renewable energy with the share of renewable electricity raised up to 20% by 2030 (Renewable Energy 2030). These policy agendas will be reflected in subsequent energy plans: the 8th Electricity Demand and Supply Basic Plan (completed and announced) and the 3rd National Energy Master Plan (under way).

The basic spirit of the Energy Transition was fully reflected in the Third Energy Basic Plan, which establishes a national energy blueprint up to the year 2040. The Third National Energy Basic Plan builds on the idea of a sustainable energy system stipulated in the First and the Second Energy Basic Plans, while also focusing on the innovative transition of the overall energy system from supply side to demand side. In this context, the Third Energy Basic Plan sets the goal to achieve sustainable growth and enhance the quality of life through energy transition.

The Third Energy Basic Plan proposes two strategic goals. The first is the transition of energy supply, consumption, and industry. The second is to establish the foundation for energy transition. Under these two strategic goals, 5 basic policy directions are suggested: (i) Innovation in the Energy Consumption Structure, (ii) Transition towards a Safe and Green Energy Mix, (iii) Expansion of Distributed & Participatory Systems, (iv) Global Competitiveness of the Energy Industry, (v) Better Infrastructure and Market Systems for Energy Transition.

If successfully implemented, Energy Transition will result in a complete turnaround from traditional energy based on coal and nuclear power to a sustainable energy system based on renewable energy and gas-fired power generation. This change in energy mix does not signify the end of the nuclear industry in Korea. Recent polling suggests that the public is marginally in favour of continued investment in nuclear power. In 2017, five nuclear reactor units were being constructed. Keeping nuclear power in the energy mix, along with a larger uptake of renewable energy, will give Korea more options to meet its Paris Agreement targets, which were set by nationally determined contributions (NDC).

The impacts and implications of reform in the energy mix remain to be seen. Such reform calls for a vast amount of investment in rebuilding infrastructure, hardware, and software, along with an institutional arrangement. It also entails a change not only in the energy sector but also in the cultural, political, and social domains. Having successfully gone through energy transitions in the past, the government is highly confident to move forward with the current policy goals to transform into a less energy-intensive, greener economic structure and implement major policy agendas and their corresponding policy tools and programmes. Nationwide campaigns could transform the Korean economy to be less energy-intensive and greener. This would lead to reduced CO_2 emissions and position Korea as one of the global leading nations in terms of low-carbon green growth.