

Phillip Riley Research Series

The Future Is Renewable: Targets and Policies By Country

South Korea | May 2017



PHILLIP RILEY

Introduction

This Phillip Riley research series is an investigation into the renewable energy policies of Australia, the United States and various Asia Pacific nations. The reports look into the countries' renewable energy potential, climate change targets and the success of their policy to date. Each report focuses on the current and future use of renewable energy and takes into account the political, geographical and economic challenges unique to each nation.

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Author:

Sophie Matera

Targets and Policies By Country: South Korea

Located in East Asia, South Korea has had difficulties increasing their renewable energy production and generation. Stemming from a lack of resources, South Korea is a major importer of natural gas, oil and coal. Of the energy that is produced domestically, nuclear power plays a key role, with future plans to expand in this area. Despite a history of implementing reduction measures, greenhouse gas emissions in South Korea have been steadily rising. This rise in emissions has been complemented by a delay in the installation of renewable energy technologies, which currently only account for 2% of energy generation¹. The South Korean Government has committed to a 30% reduction in greenhouse gas emissions by 2020 and increasing the consumption of renewable energy to 11% by 2035². This is supported by a number of energy and environmental policies, including an emissions trading scheme, which was the first of its kind to be implemented in Asia. Despite the development of energy policies and trading schemes, the outcomes have not yet been reflected in South Korea's energy mix. However, hopefully, with the new policy and a diversification of the energy sector, a reduction in emissions can take place, helping to guide South Korea's long-term environmental development.

Oil-based products have long dominated South Korea's primary energy consumption, with this still being the case today. Despite oil accounting for the largest portion of South Korea's energy consumption, almost all of this supply is imported. Of the energy that is generated domestically, oil only accounts for 3% of this¹. South Korea receives the majority of their oil supply from the United Arab Emirates and the Russian Federation. Despite oil currently still accounting for the largest portion of South Korea's energy consumption, this amount has been declining as a result of the increase

¹ International Energy Agency, Korea - Energy System Overview, 2016, <https://www.iea.org/media/countries/Korea.pdf>

² Ministry of Trade, Industry and Energy, The Second Energy Master Plan 2013-2035, http://www.motie.go.kr/common/download.do?fid=bbs&bbs_cd_n=72&bbs_seq_n=209286&file_seq_n=2

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in natural gas, coal and nuclear energy. Currently, South Korea ranks among the world's top five importers of liquefied natural gas, coal and oil³. When compared to other energy types, South Korea generates the largest amount of coal domestically, accounting for 43% of energy generation¹. However, it is not economically viable to use this domestically produced resource as baseload supply. This is due to the low quality and limited quantity of coal within South Korea. As a result, South Korea imports majority of their coal supply from Australia and Indonesia.

Nuclear power also plays a significant role (30%) in South Korea's domestic energy generation¹. Concerns following the Japanese Fukushima disaster resulted in the use of nuclear power being scaled back. This was further supported following problems in South Korea surrounding false safety certifications of nuclear parts in 2012. Despite these concerns surrounding nuclear power, the Korean Government has unveiled plans to expand on this fuel type. South Korea hopes to continue to build a strong nuclear industry with high levels of availability and reliability. Currently, under the Second National Energy Master Plan, South Korea aims to become a nuclear power plant export powerhouse by 2020². In a report⁴ released by the International Energy Agency, it is stated that expanding nuclear energy is a logical policy. Given South Korea's lack of domestic resources and high demand for energy, nuclear power provides a means of reducing dependency on imports, providing affordable energy and reducing greenhouse gas emissions. As of 2014, South Korea had constructed three new nuclear power plants and announced plans for the development of further plants.

Renewable Energy within South Korea accounts for a small share of energy generated, with solar and hydropower contributing the largest amounts. In 2012, South Korea saw

³ International Gas Union, World LNG Report - 2015 Edition, http://www.igu.org/sites/default/files/node-page-field_file/IGU-World%20LNG%20Report-2015%20Edition.pdf

⁴ International Energy Agency, Energy Policies of IEA Countries: The Republic of Korea, 2012, https://www.iea.org/publications/freepublications/publication/Korea2012_free.pdf

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their Feed-in-Tariff⁵ scheme replaced by a Renewable Portfolio Standard⁶ (RPS). This RPS requires major electric utilities to gradually increase the proportion of renewable energy in their power generation to an average of 10% by 2024. The RPS encompasses solar and hydropower, amongst other renewable energy technologies. The outcome of the RPS is to increase the proportion of installed clean energy devices. This has been the case for solar photovoltaic with South Korea ranking number eleven of the top installers in the world, in 2015⁷. However, an equal level of growth has not been seen for hydropower. Hydroelectric power has limited potential in South Korea and this is due to high seasonal variations coupled with the majority of the rainfall occurring in summer. A report⁸ released by the U.S. Energy Information Administration states that robust growth in South Korea is expected of generation from renewable energy, excluding hydropower. Hopefully, through schemes such as the RPS and complementary policy, South Korea is successfully able to increase the proportion of renewable energy within their energy mix.

In 2014, South Korea saw an update to their National Energy Master Plan, which was originally introduced in 2009. The Second National Energy Master Plan⁹ (NEMP) outlines future policy direction focusing on improving sustainability, energy security and environmental protection. The approach of the second NEMP differs from the first as there has been a shift from regulation driven greenhouse gas reduction towards cost-effective and technologically driven reduction. The results of a survey undertaken in 2012 showed that more than 80% of companies within South Korea lacked methods to reduce emissions sufficiently. Therefore a key area of the NEMP focusses on

⁵ Korean Energy Management Corporation, Feed-in-tariffs, http://www.kemco.or.kr/new_eng/pg02/pg02040700.asp

⁶ Korean Energy Management Corporation, Renewable Portfolio Standards, http://www.kemco.or.kr/new_eng/pg02/pg02040705.asp

⁷ International Energy Agency, Snapshot of Global Photovoltaic Markets, 2015, [http://www.iea-pvps.org/fileadmin/dam/public/report/PICS/IEA-PVPS - A Snapshot of Global PV - 1992-2015 - Final 2_02.pdf](http://www.iea-pvps.org/fileadmin/dam/public/report/PICS/IEA-PVPS_-_A_Snapshot_of_Global_PV_-_1992-2015_-_Final_2_02.pdf)

⁸ U.S. Energy Information Administration, Country Analysis Brief: South Korea, 2017, https://www.eia.gov/beta/international/analysis_includes/countries_long/Korea_South/south_korea.pdf

⁹ Ministry of Trade, Industry and Energy, Korea Energy Master Plan 2013-2035, http://www.motie.go.kr/common/download.do?fid=bbs&bbs_cd_n=72&bbs_seq_n=209286&file_seq_n=2

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enhancing businesses' capability to address climate change. A method to achieve change in this area involves a transition from the current system, which is focused on large emitters and individual companies, towards a system which encourages cooperation between businesses to take place.

Another key area of the NEMP focuses on nuclear power. As previously stated, South Korea aims to become a nuclear power plant export powerhouse by 2020. In order to achieve this, and increase the overall generation and consumption of nuclear power, a reform of this industry and safety enhancement must take place. The NEMP states that South Korea aims to strengthen their nuclear power industry through the introduction of an open system and an improvement in the management and supervision of nuclear operators. On the back of recent events, safety is a very high priority of the Korean Government. This is to ensure continued public acceptance of nuclear power. Despite the updated NEMP being implemented in 2014, these changes to the South Korean energy sector are yet to be reflected in their energy mix. However, due to the majority of South Korea's energy being imported, this delay is expected. The NEMP is revised and re-implemented every five years over a period of twenty years. Hopefully through these continuous updates and revisions, a restructuring of the South Korean energy sector will take place, significantly increasing the generation of renewable energy.

The Korea Voluntary Emission Reduction program¹⁰ (KVER) has been in operation since 2005. The program involves the government paying for greenhouse gas emission reductions achieved by participating companies. In 2015, South Korea introduced a national Emissions Trading Scheme (ETS), which is an extension of the KVER program. The Korean ETS is the first of its kind to be implemented in Asia and is expected to be effective due to energy related tax already being high. The ETS covers approximately 525 of the country's largest emitters, which accounts for approximately 68% of

¹⁰Korean Energy Management Corporation, Korea Voluntary Emission Reduction program, http://www.kemco.or.kr/new_eng/pg02/pg02020201.asp

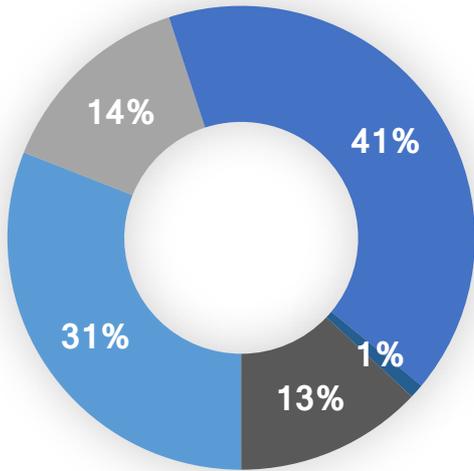
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domestic greenhouse gas emissions. The ETS is separated into three phases, with the second phase expected to begin in 2018. In the first two years of operation, trading under the ETS was limited, minimising the effectiveness of the scheme. However, recent efforts have been made to increase the supply of allowances in order to reduce pressure on market participation. Hopefully, as South Korea moves into phase two of the scheme, emissions will be successfully reduced. The scheme is expected to run until 2025, so it will be interesting to the changes in South Korea's energy mix, especially as a region with such a high dependency on imports.

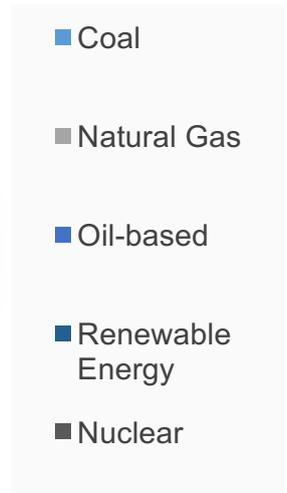
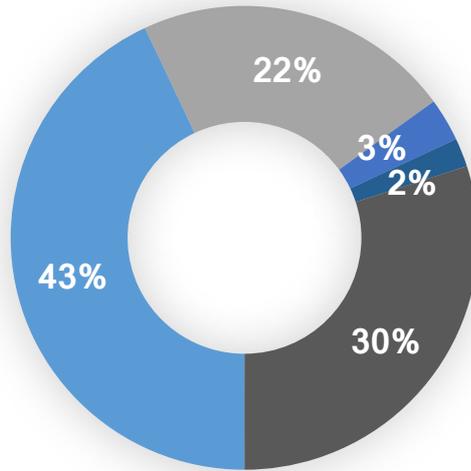
South Korea's limited resources has resulted in the delayed implementation of renewable energy within their energy mix. The clean energy policy has been in place for many years, however only recently has a shift towards reducing emissions started to take place. Despite this, the Climate Action Tracker¹¹ ranks South Korea as inadequate, stating that they are unlikely to achieve their emissions reduction target. Furthermore it is also stated that if other countries were to implement targets in a similar range to South Korea, the temperature of the earth would increase by more than 3-4 degrees Celsius. Despite the difficulties faced by South Korea, related to a lack of resources, and a large dependency on imported fossil fuels, the region has shown a high potential for change. A restructuring of the South Korean energy sector will allow for nuclear power to play an increased role and a reduction of emissions through the implementation of the ETS. Hopefully, South Korea is able to successfully diversify their energy sector, allowing them to achieve their clean energy targets.

¹¹<http://climateactiontracker.org/countries/southkorea.html>

Energy Consumption by Source, South Korea (2015)

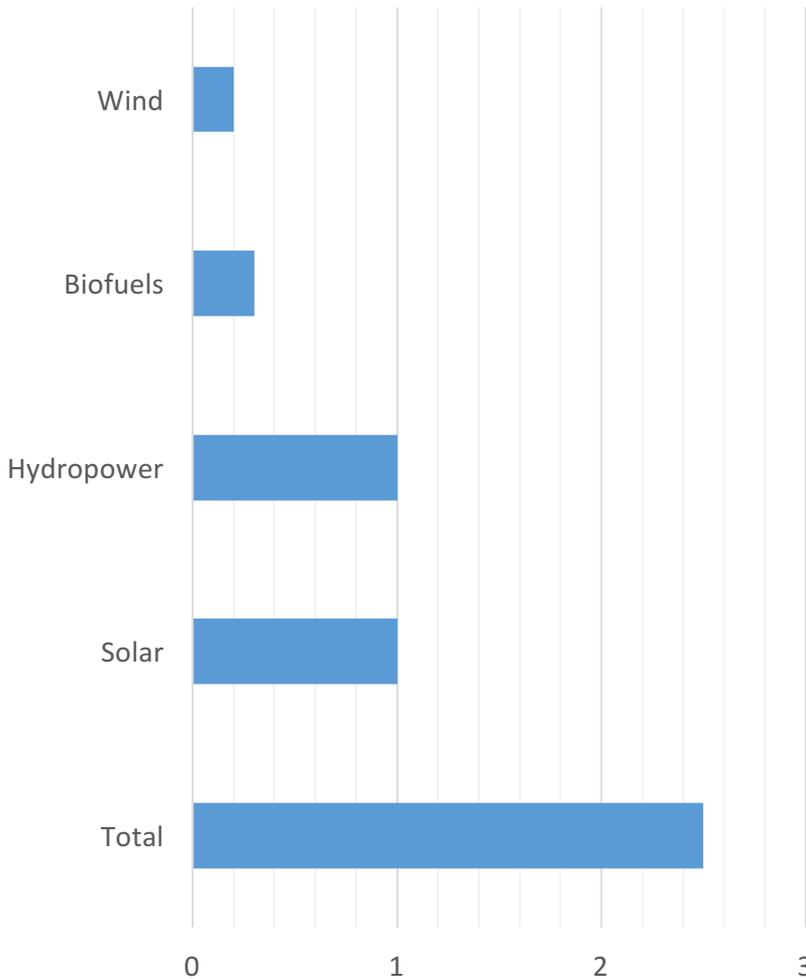


Energy Generation by Source, South Korea (2015)



<http://www.eia.gov/beta/international/analysis.cfm?iso=KOR>

Percentage of Renewable Energy Generation, South Korea (2015)



CO₂ Intensity of nations in the region

CO ₂ Emissions per capita (t CO ₂ / population)*	
1. Australia	15.81
2. South Korea	11.26
3. Taiwan	10.68
4. Japan	9.35
5. Singapore	8.29
6. Malaysia	7.37
7. China	6.66
8. Thailand	3.60
9. Indonesia	1.72
10. Philippines	0.97

Resource: <https://www.iea.org/media/countries/Korea.pdf>

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Further Resources

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