

‘Second Opinion’ on Korea Southern Power Co., Ltd.’s Green Bond Framework

27th September

Summary

Korea Southern Power Co., Ltd. (“KOSPO”), headquartered in Busan, Korea, is a power generation company, mainly operating coal-fired thermal power plants as well as combined cycle natural gas power plants. KOSPO has in place an ambition to increase its share of total new (include fuel cells) and renewable power generation from 2.4% in 2017 (rest is mainly coal and natural gas based) to 30% by 2030, which is in line with the Renewable Energy 3020 Implementation Plan announced by the government of the Republic of Korea. The target share of 30% new and renewable energy includes purchase of renewable energy credits (REC).

Initial allocation of proceeds will be for refinancing fuel cell plants that is constructed inside an existing power generation plant (Shin-Incheon Natural Gas Power Generation Plant), and a solar plant that is also constructed inside an existing power generation plant (Samchuk Thermal Power Plant). The purchase of REC that KOSPO will allocate proceeds to is from the wind and solar power. KOSPO confirms that all projects are required to undergo environmental impact assessments required by Korean law to identify possible negative impacts and potential mitigation strategies. The authorities track impact during project implementation and is responsible for identifying and intervening in poorly performing projects. KOSPO conducts no further review of environmental implications of projects.

KOSPO does not have any of its own specific policies on resilience planning and total GHG emission numbers for the company are not publicly available. The issuer no longer provides Sustainability Reports. CICERO encourages the issuer to measure and resume public reporting on key environmental indicators to better enable investors to track the issuer’s progress in its transformation from a fossil fuel intensive electricity producer to a more renewable one. External auditing of financial information is conducted four times per year which includes the management of proceeds. KOSPO will calculate and report actual emissions and avoided emissions from projects financed by green bonds once per year.

Based on the project category shadings, consideration of the issuer’s systematic sustainability work and the governance structure behind KOSPO’s green bond framework in terms of management and use of proceeds, we rate the framework CICERO Medium Green. Fuel cell technology is considered a bridging technology and therefore allocated a medium green shading. According to the issuer the fuel cell using LNG will reduce the CO₂ emission by 45% compare to LNG combustion. If the fuel would be replaced by hydrogen produced from renewables in the future, emissions will be eliminated. The issuer has no such concrete plans yet.



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Medium Green

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1 Introduction and background

As an independent, not-for-profit, research institute, CICERO Center for International Climate Research provides Second Opinions on institutions' framework and guidance for assessing and selecting eligible projects for green bond investments, while assessing the framework's ability of meeting the institutions' environmental objectives. The Second Opinion is based on documentation of rules and frameworks provided by the institutions themselves (the clients) and information gathered during meetings, teleconferences and e-mail correspondence with the client. CICERO encourages the client to make this Second Opinion publicly available. If any part of the Second Opinion is quoted, the full report must be made available.

CICERO is independent of the entity issuing the bond, its directors, senior management and advisers, and is remunerated in a way that prevents any conflicts of interests regarding the fee structure. CICERO has established the global Expert Network on Second Opinions (ENSO), a network of independent non-profit research institutions on climate change and other environmental issues, to broaden the technical expertise and regional experience for Second Opinions. CICERO works confidentially with other members in the network to enhance the links to climate and environmental science, building upon the CICERO model for Second Opinions. In addition to CICERO, ENSO members currently include Basque Center for Climate Change (BC3), International Institute for Sustainable Development (IISD), Stockholm Environment Institute (SEI), and Tsinghua University's Institute of Energy, Environment and Economy. A more detailed description of CICERO can be found at the end of this report.

CICERO's Second Opinions are normally restricted to an evaluation of the mechanisms or framework for selecting eligible projects at a general level. CICERO does not validate or certify the climate effects of single projects, and thus, has no conflict of interest concerning single projects. CICERO is neither responsible for how the framework or mechanisms are implemented and followed up by the institutions, nor the outcome of investments in eligible projects. Any amendments or updates to the framework require that CICERO undertake a new assessment.

This note provides a Second Opinion of Korea Southern Power Co., Ltd. (hereinafter "KOSPO") Green Bonds Framework and policies for considering the environmental impacts of their projects. The aim is to assess the KOSPO Green Bonds Framework as to its ability to support KOSPO's stated objective of promoting the transition to low-carbon and climate resilient growth.

CICERO assesses in this Second Opinion the likeliness that the issuer's categories of projects will meet expectations for a low-carbon and climate-resilient future. CICERO takes a long-term view on activities that support a low-carbon climate resilient society. In some cases, activities or technologies that reduce near-term emissions result in net emissions or prolonged use of high-emitting infrastructure in the long run. CICERO strives to avoid locking-in of emissions through careful infrastructure investments, and moving towards low- or zero-emitting infrastructure. Proceeds from green bonds may be used for financing, including refinancing, new or existing green projects as defined under the mechanisms or framework.

Expressing concerns with 'shades of green'

CICERO Second Opinions are graded dark green, medium green or light green, reflecting the climate and environmental ambitions of the bonds and the robustness of the governance structure of the Green Bond Framework. The grading is based on a broad qualitative assessment of each project type, according to what

extent it contributes to building a low-carbon and climate resilient society. The shading methodology also aims at providing transparency to investors when comparing green bond frameworks exposure to climate risks. A dark green project is less exposed to climate risks than a lighter green investment.

This Second Opinion will allocate a ‘shade of green’ to the green bond framework of KOSPO:

- **Dark green** for projects and solutions that are realizations today of the long-term vision of a low carbon and climate resilient future. Typically, this will entail zero emission solutions and governance structures that integrate environmental concerns into all activities.
- **Medium green** for projects and solutions that represent steps towards the long-term vision but are not quite there yet.
- **Light green** for projects and solutions that are environmentally friendly but do not by themselves represent or is part of the long-term vision (e.g. energy efficiency in fossil-based processes).
- **Brown** for projects that are irrelevant or in opposition to the long-term vision of a low carbon and climate resilient future.

The project types that will be financed by the green bond primarily define the overall grading. However, governance and transparency considerations are also important because they give an indication whether the institution that issues the green bond will be able to fulfil the climate and environmental ambitions of the investment framework. Investments in all shades of green projects are necessary in order to successfully implement the ambition of the Paris agreement. The overall shading reflects an ambition of having the majority of the project types well represented in the future portfolio, unless otherwise expressed by the issuer.

2 Brief Description of KOSPO's Green Bond Framework and rules and procedures for climate-related activities

Korea Southern Power Co., Ltd. ("KOSPO"), headquartered in Busan, Korea, is a power generation company, mainly operating coal-fired thermal power plants as well as combined cycle natural gas power plants and is owned by Korea Electric Power Corporation ("KEPCO"). KEPCO is not bound by KEPCO policies; both have standalone policies but adhere to the Government of Korea's sustainability targets.

In total, KOSPO contributes more than 10GW (10.7%) to the installed electric power capacity in Korea. More than 40% of KOSPO's installed capacity is based on coal and more than 50% is based on natural gas. KOSPO is not currently involved with investments in nuclear energy. KOSPO mainly operates in South Korea, but also conducts projects overseas. KOSPO is a participant in the UN Global Compact.

KOSPO plans to increase its share of total renewable power generation from 2.4% in 2017 to 30% by 2030 in line with the Renewable Energy 3020 Implementation Plan announced by the government of the Republic of Korea. KOSPO's Environmental as well as its Green Management Systems for construction and power generation are certified under the standards of KS I ISO 14001 and KS I 7001/7002, respectively.

The issuer's power installations are covered by the Korean Emission Trading System (ETS). The Republic of Korea launched its national carbon emission trading system on 1 January 2015. The ETS will play an essential role in meeting Korea's emission reduction target of 37% CO₂ by 2030 compared to a business as usual baseline (continuing the historic trend). The issuer does not have any specific policy on climate resilience such as flooding. Sustainability reporting was conducted in 2012 and 2014. There has not been an update since 2014.

Use of proceeds:

KOSPO's Green Bonds can be used to finance and to refinance projects falling under the category of new and renewable energy. The initial allocation of proceeds are expected to be used for the following approximate balance between project categories: 70% fuel cell, 15% solar, 15% purchase of renewable energy credits (REC). REC will be purchased from wind and solar. Generated proceeds will not be used internationally.

The issuer has explicitly excluded projects involving nuclear power generation, power generation from fossil fuel as a primary raw material as well as operation and maintenance of respective power plants. Investments related to gambling, firearm manufacturing and distribution and human rights violations are also ineligible under the framework.

Selection:

The selection process is a key governance factor to consider in our assessment. We typically look at how climate and environmental considerations are taken into account when evaluating whether projects can qualify for green bond funding. The broader the project categories, the more importance CICERO places on the governance process. Proceeds can be allocated to projects according to local laws and regulations as well as project eligibility criteria.

Screening of eligible projects under KOSPO's framework is based on relevant laws and regulations. According to Korean law projects must have conducted an Environmental Impact Assessment. These assessments consider potential impacts on the atmosphere, water condition, land condition, ecological environment, living environment, and social/economic environment. The authorities track the progress of all project; if a project is not developing as expected, the government will intervene to stop the project. Projects are selected by respective management departments responsible for a specific project category as well as the funds management department. They conduct assessments of possible projects according to the project eligibility criteria.

Businesses subjected to green bond funds are selected through the Investment Deliberation Committee and Board of Directors meeting. The Investment Deliberation Committee is composed of six members, three of which are from KOSPO and three are external professionals with expertise in environmental, social, and renewable energy fields. The selection is based on a scoring system. Each individual member allocates a score. The projects with the highest score will be funded.

Management of proceeds:

The issuer will use the company's internal accounting systems, the Enterprise Resource Planning (ERP) system, for managing and allocating the funds to selected projects complying with the eligibility criteria. The internal funds management department will use the ERP system to track green bond proceeds through separate documentation; proceeds will not be placed in a separate account. External auditing of financial information is conducted four times per year; the auditing institution has full access to the ERP system and will have a mandate to review the use of proceeds delivered by the green bond.

Any balance of issuance proceeds not allocated to eligible green assets will be used in accordance with KOSPO'S internal fund management regulations. The issuer specifies that unallocated proceeds could be cash, cashable assets or short-term financial instruments such as money market funds.

Transparency and Accountability:

Transparency, reporting, and verification of impacts are key to enable investors to follow the implementation of green bond programs. Procedures for reporting and disclosure of green bond investments are also vital to build confidence that green bonds are contributing towards a sustainable and climate-friendly future, both among investors and in society. KOSPO will provide annual "Investor Notices" of issued green bonds.

KOSPO will calculate and report actual emissions and avoided emissions once per year. KOSPO will use an online calculator provided by Korea Institute of Energy Research (<http://www.kier.re.kr/eng/>) to calculate emissions reduction, in the funded projects. For the reduction calculation, KIER uses statistical data built into the online tool; assumptions and methodology are not provided for the user.

KOSPO will disclose all financial and impact information through Investor Notices once a year at portfolio and the single investment level. The information will be made publicly available on their website, and will be managed by the Issuances Manager. The Investor Notices will contain the balance of unallocated capital, the total project expenditures and related project information as well as the cumulative amount of reduced emissions and other pollutants. In addition, the impact reporting will cover applicable performance metrics of renewable energy installations.

The table below lists the documents that formed the basis for this Second Opinion:

Document Number	Document Name	Description
1	KOSPO's Green Bond Framework 20.09.2018	This document comprises KOSPO's Green Bonds Framework and how the company intends to use proceeds, how it plans to evaluate and select eligible projects, manages the proceeds and reports to investors.
2	Environmental and Green Management System Certificates	Certificates according to KS I 14001 and KS I 7001/7002
3	2014 KOSPO Sustainability Report	The document lays out KOSPO's sustainability management performance data
4	2017 Sustainability Report Smart Energy Creator	The document lays out KEPCO's sustainability management performance data
5	Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy	Government policy covering promotion of technological development, use, and distribution of new and renewable energy.
6	New and Renewable Energy 3030 Diffusion Plan	
7	2030 National Greenhouse Gas Reduction Roadmap	Review of Korean Government roadmap for GHG reduction with details on air quality, energy policies, GHG reduction capability by sector, and reduction of particulate matter.
8	Project investment deliberation committee and Process	Review of members and process for project selection.
9	Environmental Impact Assessment outline	Review of process and considerations taken as part of government mandated Environmental Impact Assessment.
10	KOSPO Environmental Management System Certification	Certification from the Korea Productivity Center Quality Assurance for

Environmental Management System Certification - KS I ISO 14001 : 2009 and ISO 14001 : 2004 standards for generation and supply of electric power and construction of power plant. Valid Dec 14 2015 – Dec 13 2018.

Green Management System Certification - KS I 7001 : 2011 / KS I 7002 : 2011 standards for generation and supply of electric power and construction of power plant. Valid Dec 14 2015 – Dec 13 2018.

11	Quality / Environmental Management Manual	Review of environmental considerations for KOSPO in power production, supply, and facilities construction.
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Table 1. Documents reviewed

3 Assessment of KOSPO Green Bond framework and environmental policies

Overall, the KOSPO green bond framework provides a detailed and sound framework for climate-friendly investments.

The framework and procedures for KOSPO’s green bond investments are assessed and their strengths and weaknesses are discussed in this section. The strengths of an investment framework with respect to environmental impact are areas where it clearly supports low-carbon projects, whereas the weaknesses are typically areas that are unclear or too general. Pitfalls are also raised in this section to note areas where issuers should be aware of potential macro-level impacts of investment projects.

Overall shading

Based on the project category shadings detailed below, and consideration of the issuer’s systematic sustainability work and governance structure of KOSPO green bond framework in terms of management and use of proceeds, we rate the framework CICERO Medium green.

Eligible projects under the Green Bond Framework

At the basic level, the selection of eligible project categories is the primary mechanism to ensure that projects deliver environmental benefits. Through selection of project categories with clear environmental benefits, green bonds aim to provide certainty to investors that their investments deliver environmental returns as well as financial returns. The Green Bonds Principles (GBP) state that the “overall environmental profile” of a project should be assessed and that the selection process should be “well defined”.

Category	Eligible project types	Green Shading and some concerns
New and Renewable energy	<ul style="list-style-type: none"> • Generation of electricity through renewable energy resources <ul style="list-style-type: none"> ○ -Solar • Purchase of REC from wind and solar • Distributed and independent power & heat generation system <ul style="list-style-type: none"> ○ -Fuel cells(non-combustion) 	<p>Medium Green</p> <ul style="list-style-type: none"> ✓ The fuel cell project uses LNG as a fuel. The LNG could be replaced by less emission intensive hydrogen in the future. The issuer has no such concrete plans yet. ✓ For the fuel cell projects there might be some waste water issues and since LNG

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- is involved, there could be accidental emissions of methane. The issuer has informed that the hot water will be supplied to households directly as hot water or for heating purposes.
 - ✓ KOSPO confirms that all projects followed the legitimate environmental assessment to figure out the possible negative impacts and also have specific plan to mitigate.
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Table 2. Eligible project categories

Strengths

KOSPO has in place an ambition to increase its share of total new and renewable power generation from 2.4% in 2017 to 30% by 2030. In 2017, renewable electricity generation grew 6% and reached a quarter of global power output, thanks to the continued growth of solar PV and wind technologies. Despite these positive trends (especially with PV), additional efforts are needed in renewable power generation to meet the targets set out in the IEA's SDS. According to the IEA, the share of renewables in global electricity generation must reach 47% by 2030, up from 25% in 2017. KOSPO's ambition is in line with the Renewable Energy 3020 Implementation Plan announced by the government of the Republic of Korea. The target share of 30% new and renewable energy includes purchase of renewable energy credits (REC). The issuer has ISO certification for construction and power generation and environmental requirements for procurement.

Initial allocation of proceeds will be for two fuel cell plants that is located inside an existing power generation plant already constructed (Shin-Incheon Natural Gas Power Generation Plant) and the existing plant passed the environmental impact assessment and project approval process. The solar plant is also located inside the existing power generation plant already constructed (Samchuk Thermal Power Plant) and the existing plant conducted the environmental impact assessment and project approval process. Eligible for green bond proceeds are only REC projects from wind and solar. The initial allocation will be for a wind power plant which has conducted environmental impact assessment and project approval process.

It is a clear strength that external auditing of financial information is conducted four times per year which includes the management of proceeds. KOSPO will further calculate and report actual emissions and avoided emissions from all projects financed by green bonds once per year.

Weaknesses

KOSPO does not have any of its own specific policies on resilience and GHG emission numbers are not publicly available. The issuer no longer provides Sustainability Reports. CICERO encourages the issuer to measure and to resume publicly reporting on key environmental indicators to better enable investors to track the issuer's progress in transforming from a fossil-fuel based electricity producer to a more renewable one.

Pitfalls

KOSPO's screening and selection process does not include veto power for projects that do not meet a certain environmental standard. Projects are required to complete an Environmental Impact Assessment, but there is no threshold for impact past which the project is no longer considered eligible. The responsibility for monitoring of environmental impact lies with the government. This is not considered a concern for the projects currently identified for investment under this framework (solar, non-combustion fuel cell, and REC from solar and wind) but investors should be aware of this for potential future projects.

The fuel cell project uses LNG as energy source. Some green bond standards such as the ASEAN green bond standard excludes fossil fuel based electricity generation. According to the issuer the LNG used, could however be replaced by hydrogen produced by renewable sources or hydrogen created as byproduct in various chemical processes in the future. Anyhow according to the issuer LNG based fuel cell technology will reduce the CO₂ emission by 45% compared to normal LNG combustion. The excess hot water from the process will be supplied to other purposes, such as households as hot water directly or for heating.

Due to the complexity of how socio-economic activities impact the climate, a specific project is likely to have interactions with the broader community beyond the project borders. These interactions may or may not be climate-friendly, and thus need to be considered with regards to the net impact of climate-related investments. This fuel cell technology represents steps towards the long-term vision but are not quite there yet, and is therefore allocated a medium green shading. CICERO encourages the issuer to look into if the hydrogen could come from less emission intensive sources than LNG in the future.

Efficiency improvements may lead to rebound effects. When the cost of an activity is reduced there will be incentives to do more of the same activity. KOSPO should be aware of such effects and possibly avoid Green Bond funding of projects where the risk of rebound effects is particularly high.

Appendix: About CICERO

CICERO Center for International Climate Research is Norway's foremost institute for interdisciplinary climate research. We deliver new insight that helps solve the climate challenge and strengthen inter-national climate cooperation. We collaborate with top researchers from around the world and publish in recognized international journals, reports, books and periodicals. CICERO has garnered particular attention for its work on the effects of manmade emissions on the climate and the formulation of inter-national agreements and has played an active role in the UN's IPCC since 1995.

CICERO is internationally recognized as a leading provider of independent reviews of green bonds, since the market's inception in 2008. CICERO received a Green Bond Award from Climate Bonds Initiative for being the biggest second opinion provider in 2016 and from Environmental Finance for being the best external review provider (2017).

CICERO Second Opinions are graded dark green, medium green and light green to offer investors better insight in the environmental quality of green bonds. The shading, introduced in spring 2015, reflects the climate and environmental ambitions of the bonds in the light of the transition to a low-car-bon society.

CICERO works with both international and domestic issuers, drawing on the global expertise of the Expert Network on Second Opinions. Led by CICERO, ENSO is comprised of trusted research institutions and reputable experts on climate change and other environmental issues, including the Basque Center for Climate Change (BC3), the Stockholm Environment Institute, the Institute of Energy, Environment and Economy at Tsinghua University and the International Institute for Sustainable Development (IISD). ENSO operates independently from the financial sector and other stakeholders to preserve the unbiased nature and high quality of second opinions.

cicero.oslo.no/greenbonds

