Achieving Net-Zero with China, Japan, and South Korea's Overseas Energy Finance

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Cover image: Wind turbines and coal power plant at sunset. @Adobe Stock/Chrisrophe

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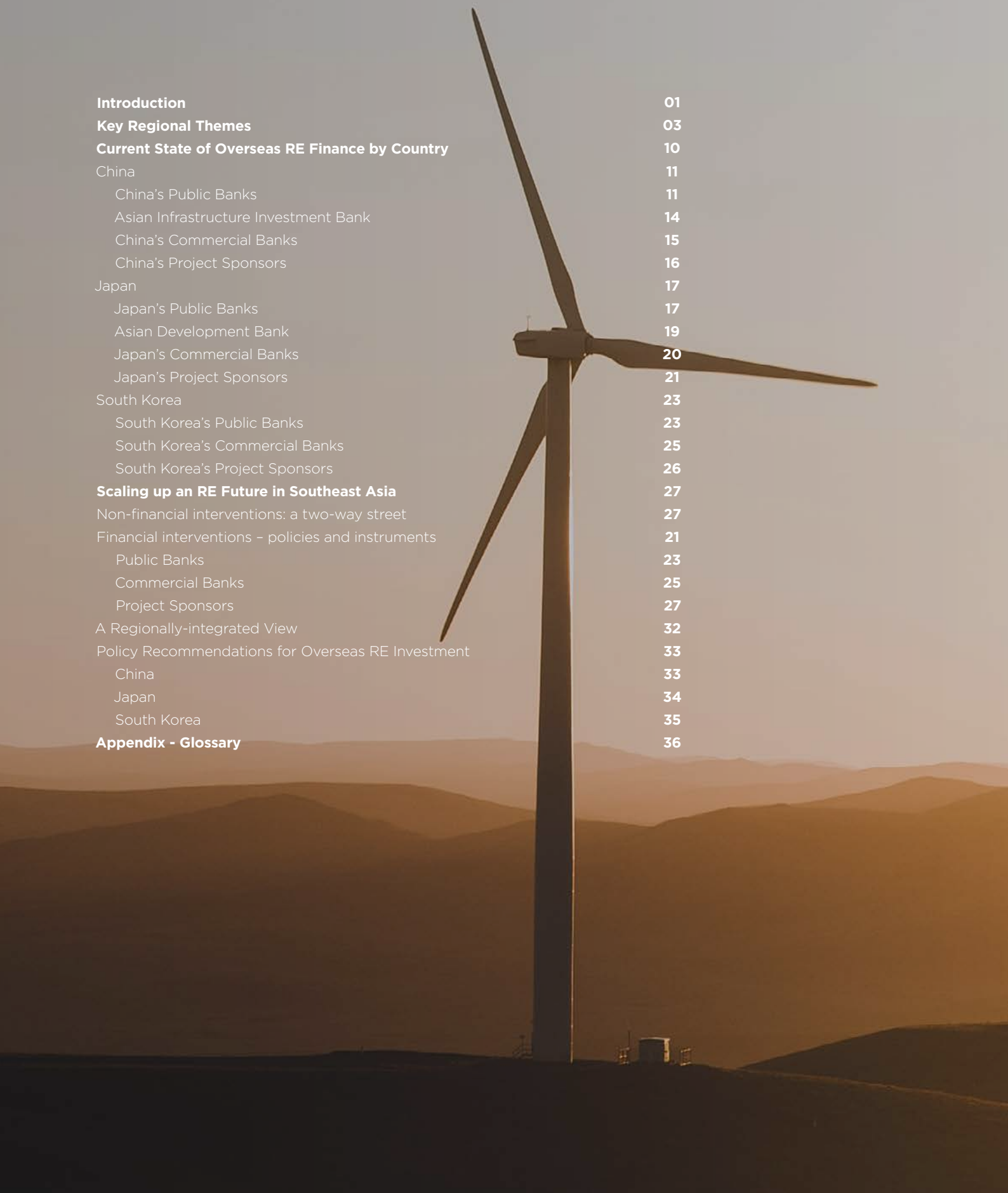

“By now it should be abundantly clear that further capital expenditures on coal can only go ahead if they are compatible with the 2 degrees Celsius limit”

Christiana Figueres, Former Executive Secretary of the United Nations Framework Convention on Climate Change

Brown coal power station
©Paul Langrock/Greenpeace

Introduction

Heads of state in China, Japan, and South Korea all recently announced net-zero carbon pledges by 2060, 2050, and 2050, respectively. While these announcements are positive news, there has been no discussion about overseas energy finance aligning with these ambitions. If overseas investment does not match with net-zero aspirations, these three countries will continue to fund the climate emergency as the largest financiers of fossil-fuel based power plants overseas.[1]

Each country here has well-established supply chains and financial mechanisms in place to build toxic coal-fired power plants in particular. But they also have the financial and industrial power to drive the growth of the renewable energy (RE) industry, particularly in solar and wind power. The results could be significant. In fact, we estimate moving to a net-zero pathway would actually increase the volume of overseas energy investment.

This report presents the current state of public and private finance for overseas RE projects from China, Japan, and South Korea. Along with individual analysis of each country, our recommendations focus on regional cooperation across East Asia and Southeast Asia (SEA) to achieve both the investing countries' net-zero pledges and the International Panel on Climate Change's (IPCC) target of a 1.5 degrees Celsius pathway.

We look at the top RE financiers and investors: public banks, commercial banks, and project sponsors, where each player has a unique responsibility and is mutually dependent. In this context, public finance institutions lead investment and political and commercial insurance, enabling a favorable environment by mitigating the risks that affect private investors. Commercial banks enable more flexible debt finance at more affordable costs to recipient countries. And project sponsors enable equity finance and technical expertise. Here, we place a higher emphasis on the role of public banks in East Asia, even though private finance makes up the majority of support for RE globally, because public finance paves the way for private finance by being first-movers into new markets and growing sectors like solar and wind.

We focus on Southeast Asia (SEA) as a case study. We previously highlighted the enormous strides being made in this region in our *2020 SEA Power Sector Scorecard*.[2] Here we extend this analysis to investment opportunities for China, Japan, and South Korea. Put simply, an alignment to net-zero ambition, a commitment to solar and wind in the region, along with the financing strength of the investing countries will largely decide the scale and speed of RE development in SEA. Our analysis is that a focus on solar and wind markets will create a USD $205 billion opportunity in the next ten years.

Finally, this report analyzes what China, Japan, and South Korea have to do to make this happen. We highlight strengths and opportunities for change and make recommendations suited to the different actors.

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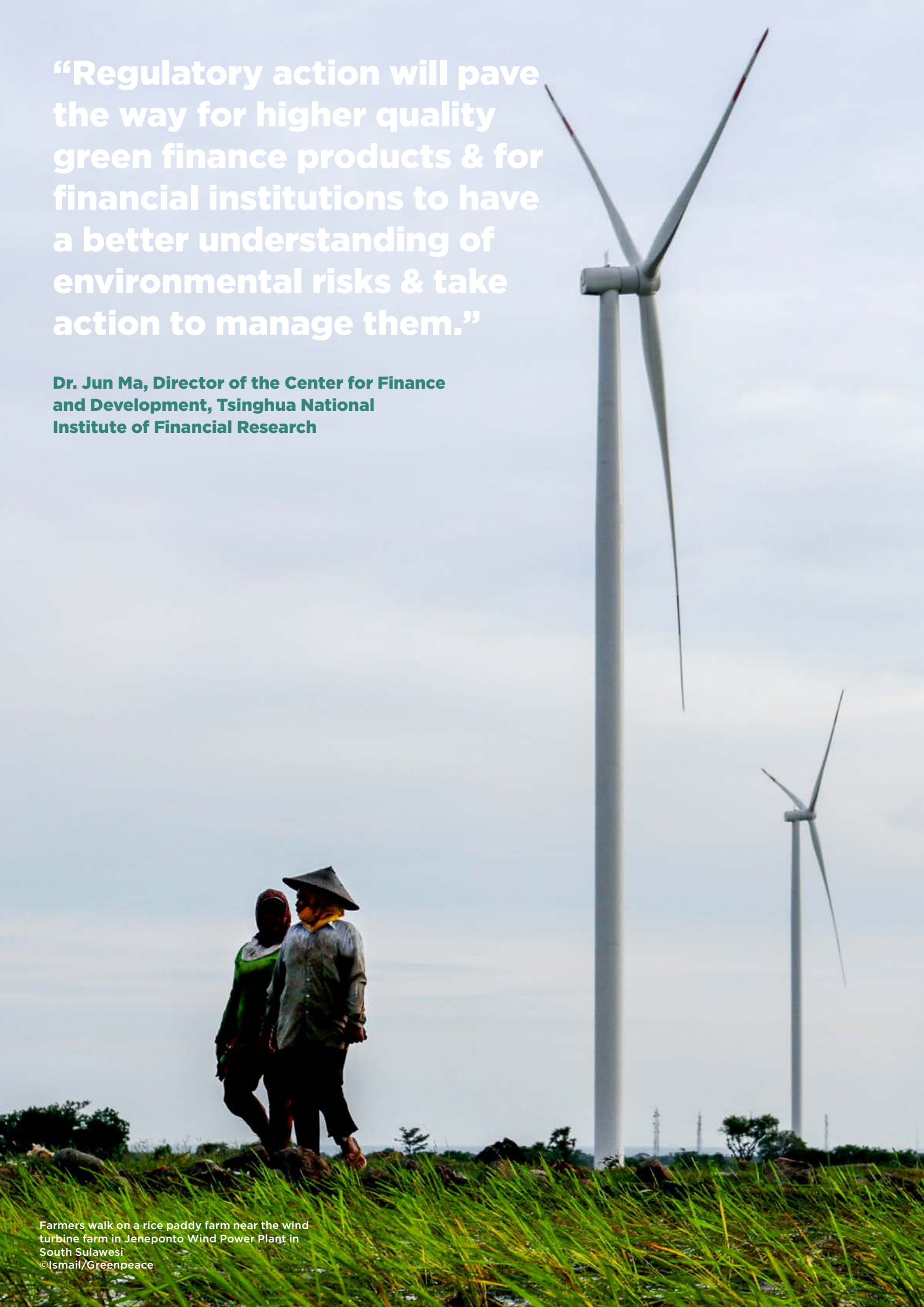
[1] Figueres, Christiana. Japan, China and South Korea Must End Support for Coal. Financial Times, 13 June 2019, www.ft.com/content/2a3a41e2-8db3-11e9-a1c1-51bf8f989972

[2] Southeast Asia Power Sector Scorecard. Greenpeace Southeast Asia, Sept. 2020, www.greenpeace.org/southeastasia/publication/44037/southeast-asia-power-sector-scorecard-assessing-the-progress-of-national-energy-transitions-against-a-1-5-degrees-pathway/.

“Regulatory action will pave the way for higher quality green finance products & for financial institutions to have a better understanding of environmental risks & take action to manage them.”

Dr. Jun Ma, Director of the Center for Finance and Development, Tsinghua National Institute of Financial Research



Farmers walk on a rice paddy farm near the wind turbine farm in Jeneponto Wind Power Plant in South Sulawesi
©Ismail/Greenpeace

Key Regional Themes

Driving towards net-zero

In Autumn of 2020, China, Japan, and South Korea declared net-zero ambitions for their respective countries with clear implications for how these countries envision the future of the energy sector. This was accompanied by detailed analysis and a clear renewable energy-driven agenda for China in particular, one which gradually phases out both coal and gas power.[3]

Energy sector change is driven by both policy and finance. Now that all three governments have established clear ambition, the challenge is for the financial institutions of East Asia to recognize the impact that changing domestic trends will have on overseas investment.

We expect the government mandates for overseas investment to align between at least Japan and South Korea in the next year, with China to follow. The exclusion policies put forward by Japanese commercial banks, loopholes and all, are likely to be mirrored in South Korea to fit the upcoming Green New Deal, and have already begun to do so after KB Financial Group (KBFG) announced in September 2020 that it would no longer finance coal plants at home or abroad.[4] [5] Clear signals from the Japan Bank for International Cooperation (JBIC)[6] declaring the end of overseas coal projects were then followed by announcements from Korea Electric Power Corporation (KEPCO), the largest South Korean utility and major sponsor of energy projects.[7] These announcements have already begun to pave the way for corporate action, such as for Samsung Group's financial units, which announced a pledge to halt investments into coal in November 2020.[8]

With newfound pressure to realize government net-zero ambitions, both public and private banks will need to commit to their single biggest opportunity -- overseas renewable energy finance. Climate leadership requires leadership in the financial sector.

Led by public finance

From 2009 to 2019, the major public banks from China, Japan, and South Korea invested USD $9.1 billion in solar and wind, but their investment in coal and gas reached USD $78.9 billion (over eight times as much) in the same period.[9] Public banks in China, Japan, and South Korea are some of the top public financiers of fossil fuels globally,[10] but there is a critical role in current systems for them to adapt expertise to support RE development, and incentivize the private sector and industry.

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[3] Xu, Muyu, and Shivani Singh. "China's Top Climate Think Tanks Push for More Cuts to Coal Use & Emissions." *Yahoo! Finance*, Reuters, 12 Oct. 2020, uk.finance.yahoo.com/news/chinas-top-climate-think-tanks-063544156.html.

[4] White, Edward. *South Korea Urged to Follow Japanese Lead on Coal Finance Ban*. Financial Times, 23 Aug. 2020, www.ft.com/content/e411a698-07af-46cc-a529-519ffa59ef81.

[5] Song, Young-chan. "KB Financial to End Coal Project Financing for Low-Carbon Economy." The Korea Economic Daily Global Edition, 28 Sept. 2020, www.kedglobal.com/newsView/ked202010100018.

[6] "International Coalition Welcomes JBIC's Signal to End Overseas Coal Finance." No Coal Japan, 24 Apr. 2020, www.nocoaljapan.org/jbic-signal-to-end-overseas-coal-finance/.

[7] Moon-hee, Choi. "KEPCO Declares Exit from Overseas Coal Power Plant Market." Business Korea, 29 Oct. 2020, www.businesskorea.co.kr/news/articleView.html?idxno=54060.

[8] Jung-a, Song. Samsung Financial Units Pledge to Halt Coal Investments. Financial Times, 12 Nov. 2020, www.ft.com/content/db1d7b39-2e19-45b5-aa8c-60d19338dbb7.

[9] These figures do not include infrastructure under development, construction or planning.

[10] Chen, Han. G20 Countries' Public Coal Financing Reaches Five-Year High. NRDC, 8 Feb. 2018, www.nrdc.org/experts/han-chen/g20-countries-public-coal-financing-reaches-five-year-high.

Energy investment from East Asia's major public banks (2009-2019, in USD billions)[11]

	Coal & Gas	Solar & Wind
JBIC	14.6	2.1
JICA	9.5	1.1
KEXIM	8.6	< 0.1
KDB	0.5	0.7
CDB	17.3	2.5
CHEXIM	18.8	1.2
CDB + CHEXIM Co-financing	9.6	1.5

Due to political risk and rising trade protectionism, public banks' risk mitigation for the private sector is becoming more and more crucial. Public banks need to develop overseas RE finance processes, including risk mitigation, at a speed and scale consistent with the International Panel on Climate Change's (IPCC) target of a 1.5 degrees Celsius pathway and their national policies.

Scale-up with private finance

Private finance represented 86% of total global RE investment from 2013 to 2018.[12] Private finance has been the key to driving the energy transition in many countries, including debt finance from commercial banks and equity investment from developers, industrials, and funds. Private finance demonstrates the flexibility and creativity to overcome existing obstacles in RE investment that prevent the sector from realizing its full potential.

China, Japan, and South Korea all need to scale up their private investment in RE in the developing world. Though these countries have a lot of differences in degree of private finance support for RE abroad, all three do show a preference for RE in developed countries. Fossil fuel investments are more indiscriminate.

Of the RE investment that China, Japan, and South Korea put into developing countries, a small portion of this has gone to Southeast Asia (SEA). SEA looks to East Asia for investment and cooperation in economic forums like ASEAN+3. Well-established financial institution branches and trade finance networks already connect East Asia and SEA. As financial institutions in Japan and South Korea increasingly commit to phase out coal finance, there is still a gap in the volume of investment needed to meet energy demand growth. A net-zero development scenario means much of this demand needs to be fueled by RE going forward.

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[11] Rounded to one decimal place, 1 Japanese Yen = 0.0096 USD, China's Global Energy Finance Database." Boston University, bu.edu/cgef/., JBIC, JICA & MOE Press releases, NRDC Consolidated Data, Bloomberg New Energy Finance + GP Internal Tracking,

[12] "Global Landscape of Renewable Energy Finance 2020." IRENA, Nov. 2020, www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Nov/IRENA_CPI_Global_finance_2020.pdf.

RE project sponsors in East Asia also include utilities, conglomerates, and engineering, procurement, and construction (EPC) companies, in addition to financial institutions. Similar to their commercial banks, China, Japan, and South Korea project sponsors rarely step into the SEA RE market. Project sponsors are the most flexible stakeholders and have the potential to act swiftly to meet the demand for electricity in SEA with RE support. We explore their role below.

Opportunity for an "influx" of RE in recipient countries

Southeast Asia as a region accounts for the largest block of coal-fired power plants (CFPPs) under planning or construction outside of mainland China with a theoretical 79 GW in the pipeline.[13] But the appetite for coal power is declining and a boom in RE is taking place.

Vietnam's solar capacity went from 106 MW in 2018 to 5.7 GW by the end of 2019 -- or 54% of SEA's total solar capacity -- by introducing a feed-in-tariff (FiT) program.[14] Moreover, Vietnam has recently announced it will not allow new-build CFPP projects between 2020 and 2030,[15] which is a milestone for climate leadership in the region. These types of changes may continue happening in the region, making investment in fossil fuels increasingly risky. RE investment in SEA has long been dismissed as risky, expensive, or "unbankable."[16] Recent market design and development of solar and wind power in Vietnam has exposed these views as out of date or out of touch.[17]

The Philippines has also announced a moratorium on new-build CFPPs.[18] In the words of the Philippines' Energy Undersecretary Felix William Fuentebella, "We need to prepare for the influx of RE [...] hence, the need for more flexibility."[19]

This analysis is not oriented around the cost, speed, or job creation of solar on the demand side. We have modelled this in our Southeast Asia Power Sector Scorecard in September 2020.[20] The key question here is whether the financial institutions of China, Japan, and South Korea are ready to finance this "influx" and stake a claim in the vast market opportunity of solar and wind development in SEA.

Moreover, as demand and supply for green project finance grows so does the green bond market, which public and private financiers from East Asia have consistently used to locate attractive prospects with high liquidity from investors.

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[13] CoalSwarm. Global Coal Finance Tracker | End Coal, endcoal.org/global-coal-plant-tracker/

[14] "Renewable Energy Statistics 2020." IRENA, Jul. 2020, https://www.irena.org/publications/2020/Jul/Renewable-energy-statistics-2020

[15] "Vietnam to Stop New Coal-Fired Thermal Power Projects in 2020-2030." The Saigon Times, 15 Aug. 2020, english.thesaigontimes.vn/78074/vietnam-to-stop-new-coal-fired-thermal-power-projects-in-2020-2030.html.

[16] Koh, Hannah. "'Half of Southeast Asia's Renewable Energy Projects Are Unbankable'." Eco, Eco-Business, 2 Nov. 2017, www.eco-business.com/news/half-of-southeast-asias-renewable-energy-projects-are-unbankable/?source=post_page.

[17] "ASEAN's Renewable Energy Challenges." The ASEAN Post, 9 Dec. 2019, theaseanpost.com/article/aseans-renewable-energy-challenges.

[18] Chavez, Leilani. "Philippines Declares No New Coal Plants - but Lets Approved Projects Through." Mongabay Environmental News, 5 Nov. 2020, news.mongabay.com/2020/11/philippines-declares-no-new-coal-plants-but-lets-approved-projects-through/.

[19] "Philippines: DOE issues ban on new coal plants." IEA Clean Coal Centre, 29 Oct. 2020, www.iea-coal.org/philippines-doe-issues-ban-on-new-coal-plants/.

[20] *Southeast Asia Power Sector Scorecard.* Greenpeace Southeast Asia, Sept. 2020, www.greenpeace.org/southeastasia/publication/44037/southeast-asia-power-sector-scorecard-assessing-the-progress-of-national-energy-transitions-against-a-1-5-degrees-pathway/.

Shifts in international standards and green bond markets are both key to these changes. International institutional investors and pension funds are exiting fossil fuels in droves, which is quickly becoming a financial sector norm.[21] Utilities are moving into green bonds and sustainable transition bonds, such as the recent issuance from Indonesia's Perusahaan Listrik Negara (PLN) to reduce the company's carbon footprint.[22] And green bond issuance now amounts to an estimated USD $1 trillion global portfolio this year, up from USD $257.7 billion in 2019.[23] [24]

Hydropower and geothermal, "the wrong RE"

China, Japan, and South Korea's RE project finance has concentrated in environmentally and socially damaging hydropower plants and expensive geothermal projects. These neglect serious issues in cost, public health, sustainable economic development, impact on livelihoods and ecosystems, and domestic energy security. But these slow-to-build engineering projects fit the financial and industrial muscle of China, Japan, and South Korea, which are historically well-equipped for these types of projects.

Like coal power, these projects are seeing shrinking demand year on year, such as Cambodia's decision to introduce a moratorium on new hydropower until 2030.[25]

With RE lower cost than coal in most of the world,[26] and in all major markets,[27] both cost curves and recipient country demand are paving the way for growth in solar and wind development.

Unsubsidized solar is now cheaper than unsubsidized coal and gas in Thailand, the Philippines, and Vietnam, according to Bloomberg New Energy Finance (BNEF), and is more expensive in Malaysia and Indonesia. These five together are the five largest national energy markets in SEA. Rapid decreases in costs for solar and wind are projected to continue as technological advances improve efficiency.[28]

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[21] "Financial Institutions Are Restricting Thermal Coal Funding." IEEFA, ieefa.org/finance-exiting-coal/.

[22] Harsono, Norman. "ADB, PLN to Pilot Issuance of Energy Transition Bonds in 2021." The Jakarta Post, 3 Nov. 2020, www.thejakartapost.com/news/2020/11/03/adb-pln-to-pilot-issuance-of-energy-transition-bonds-in-2021.html.

[23] Barbiroglio, Emanuela. "Green Bond Market Will Reach $1 Trillion With German New Issuance." Forbes, 2 Sept. 2020, www.forbes.com/sites/emanuelabarbiroglio/2020/09/02/green-bond-market-will-reach-1-trillion-with-german-new-issuance/?sh=16d80e6f2e97.

[24] Fatin, Leena. "Green Bond Highlights 2019: Behind the Headline Numbers." Climate Bonds Initiative, 6 Feb. 2020, www.climatebonds.net/2020/02/green-bond-highlights-2019-behind-headline-numbers-climate-bonds-market-analysis-record-year.

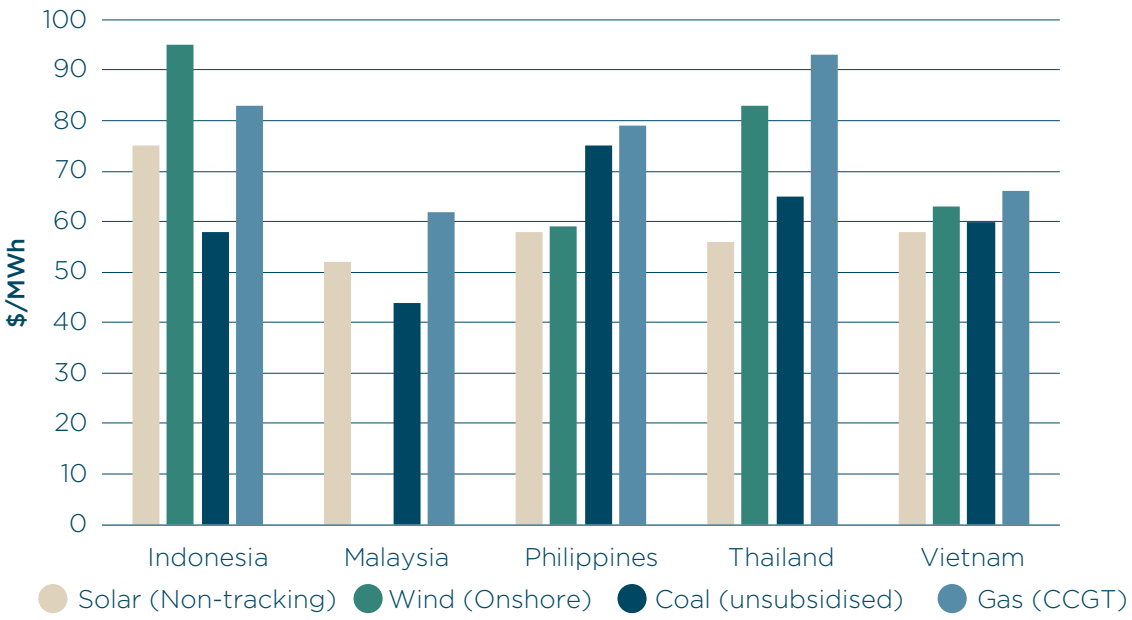
[25] Seng, Teak. "WWF Statement on Cambodian Government's Decision to Suspend Hydropower Dam Development on the Mekong River." WWF, 19 Mar. 2020, www.worldwildlife.org/press-releases/wwf-statement-on-cambodian-government-s-decision-to-suspend-hydropower-dam-development-on-the-mekong-river.

[26] Kretchmer, Harry. "Chart of the Day: Renewables Are Increasingly Cheaper than Coal." World Economic Forum, 23 June 2020, www.weforum.org/agenda/2020/06/renewable-energy-cheaper-coal/.

[27] Morton, Adam. "Wind and Solar Plants Will Soon Be Cheaper than Coal in All Big Markets around World, Analysis Finds." The Guardian, 12 Mar. 2020, www.theguardian.com/environment/2020/mar/12/wind-and-solar-plants-will-soon-be-cheaper-than-coal-in-all-big-markets-around-world-analysis-finds.

[28] "Future of Solar Photovoltaic: Deployment, Investment, Technology, Grid Integration and Socio-Economic Aspects." IRENA, Nov. 2019, irena.org/-/media/Files/IRENA/Agency/Publication/2019/Nov/IRENA_Future_of_Solar_PV_2019.pdf.

Levelized Cost of Electricity (LCOE) for different energy sources



Source: Bloomberg New Energy Finance (BNEF), 1H 2020

SEA's incredible potential for solar and wind is particular to this region and a critical comparative advantage and source of energy security.[29] This potential already translates into incredibly low costs of electricity. The lowest yet was USD $3.88/kWh in Cambodia's national park solar auction in 2019.[30]

A different ballgame for finance, but not industry

The majority of finance entering the SEA's solar PV market, even in places like Vietnam, originates in SEA itself rather than from China, Japan, and South Korea. BNEF data suggests that of a total of USD $29 billion in solar and wind finance in SEA, 72 percent comes from within the region itself, with only 28 percent of all investment coming from outside the region.[31]

This is likely to change as global energy financiers adopt streamlined risk management mechanisms and financial instruments for RE in the way that they historically have adopted solely for the fossil fuel industry.

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[29] IEA. "Southeast Asia Energy Outlook 2019 – Analysis." IEA, www.iea.org/reports/southeast-asia-energy-outlook-2019.

[30] "ADB-Supported Solar Project in Cambodia Achieves Lowest-Ever Tariff in ASEAN." Asian Development Bank, 25 Nov. 2019, www.adb.org/news/adb-supported-solar-project-cambodia-achieves-lowest-ever-tariff-asean.

[31] Bloomberg New Energy Finance Data

The industrial strength, engineering and technical expertise of China, Japan, and South Korea is considerable. Their financial institutions can partner with the largest solar and wind technology manufacturers in the world. Moreover, some of the biggest overseas RE projects are based on this comparative advantage, such as Argentina's 500 MW solar project financed by CHEXIM and built by Shanghai Electric Power Construction.[32] Here, the industrial strategy of the investing countries does not change. Rather financiers unlock solar and wind sectors in the same markets they have traditionally exported energy finance.

The lack of a sizable portfolio in RE does indeed point to an uncomfortable truth: RE finance is a different ballgame for banks and project sponsors. It requires new financial instruments, new policies, and a new institutional mindset to create "bankability" for projects that have fundamentally different features from traditional energy sources. And most of these new mechanisms need to be fit for developing countries.

RCEP: double-edged sword for the energy transition

The recent Regional Comprehensive Economic Partnership (RCEP) built the largest free-trade zone in the world, and brings unprecedented opportunities for China, Japan, and South Korea to invest in RE in Southeast Asia. The "Joint Leaders Statement of the 4th RCEP Summit" stated that the agreement will pursue a "sustainable post-pandemic economic recovery process."[33] Although RE investment is not specially emphasized in RCEP legal text, the agreement contains high-level opening commitments on financing that discuss removing barriers, maintaining stability, and increasing information transparency.[34]

RCEP contains favorable terms to remove financing barriers, but that could benefit both fossil fuels and renewables development without further agreements on climate risk control. There are a few risks of particular concern. RCEP has no binding measures to ensure companies protect the environment and enforce labor standards, but does limit governments' ability to regulate these areas. RCEP would increase trade in fossil fuels, aiming to reduce 90 percent of tariffs and import taxes and restrict export controls. goods produced with high carbon emissions will not be penalized. In fact, RCEP would enable governments to challenge each others' climate-friendly energy regulations as "barriers to trade."[35]

A regional green development framework should be the next step for RCEP to address these issues.

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[32] Koop, Fermin, and Lili Pike. "China Builds Latin America's Largest Solar Plant." Dialogo Chino, 22 Feb. 2019, dialogochino.net/en/climate-energy/23529-china-builds-latin-americas-largest-solar-plant/.

[33] "Joint Leaders' Statement on the Regional Comprehensive Economic Partnership (RCEP)." ASEAN, Nov. 2020, asean.org/storage/2020/11/RCEP-Summit-4-Joint-Leaders-Statement-Min-Dec-on-India.pdf.

[34] "Legal Text of the RCEP Agreement." Regional Comprehensive Economic Partnership Agreement, 15 Nov. 2020, rcepsec.org/legal-text/.

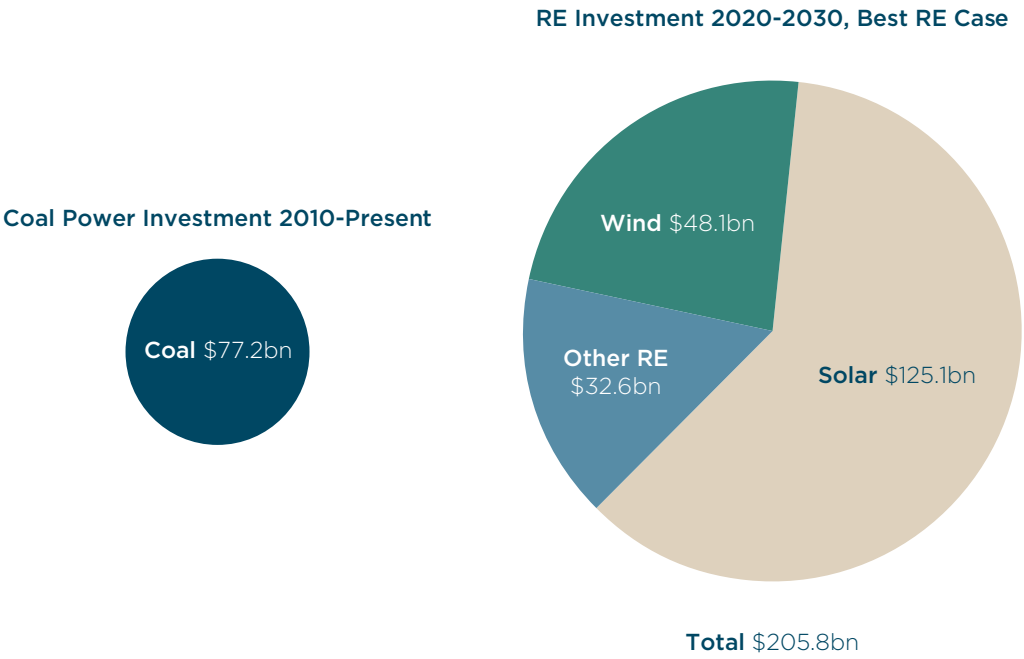
[35] Cossar-Gilbert, Sam. "5 Hidden Costs of the RCEP to People and Planet." The Diplomat, 12 Oct. 2017, thediplomat.com/2017/10/5-hidden-costs-of-the-rcep-to-people-and-planet/.

Capturing market share in SEA's RE boom

Public and private finance in China, Japan, and South Korea risks missing out on market opportunities in RE because they are unwilling to abandon fossil fuels. Banking is affected by political mandates, stagnation in demand, and moratoria on coal and hydropower, which altogether present upward trends for RE and downward trends for fossil fuels.

Our analysis suggests that the capital required to deliver political mandates for a net-zero pathway by 2030 is a *USD $205 billion opportunity* in Southeast Asia alone. This amounts to a market 2.6 times larger than the overseas coal finance market between 2010 and 2019. In this scenario, transitioning investment to an RE pathway will not lessen financial investment opportunity. Rather, future energy demand growth in developing countries will need to be met on the conditions of political mandates for net-zero, which presents a much larger potential market for RE energy and technology.

Estimated Coal Investment, Future Opportunity in Southeast Asia



Source: GEM, IES, GP Analysis 2020

The chart shows estimates for total investment in coal power in SEA between 2010 and 2020 (excluding plants currently under construction) and estimates for total investment in solar, wind, and other RE required to move onto a net-zero pathway by 2030. All figures represent total investment (debt and equity, public or private finance) necessary to build different types of projects, based on regional figures for capital costs (i.e. $/kW). A net-zero, RE-driven scenario has been modelled for each country in the SEA region on a pathway which prioritizes solar and wind and excludes fossil fuels in developing the power sector while still satisfying energy demand, demand peaks, and reserve margins.

In this context, we explore the current state of play for financial actors from the investing countries, in addition to ambition, policies, instruments, and new strategies from the financial institutions of China, Japan, and South Korea that would transform overseas renewable energy finance and take a significant stake in this market.

Current State of Overseas RE Finance by Country

Overview of Policies and Ambition

		China	Japan	South Korea
Government policy	Net-zero pledge	By 2060	By 2050	By 2050
	Policies to promote and support overseas RE investment	Yes	Yes	No
	Policies to phase out public finance for overseas coal	No	Yes	No
	Green bond market volume as of year-end 2019 (USD-equivalent)[36] [37] [38]	$56 billion	$17 billion	$10 billion
Public financing	Public financing rates	High	Low	Low
	Finance for solar and wind in developing countries	High	Low	Low
	Proven preference of supporting solar and wind over other RE sources	No	No	No
	Flexibility on the type of financing used to fit the RE market	No	Yes	Yes
	Top power sector type supported in overseas investment the past 10 years[39]	Coal	Coal	Coal
	Top RE energy type supported in overseas investment the past 10 years[40]	Hydro	Geothermal	Wind
Private financing	Activity of commercial banks in overseas RE financing	Low	High	Low
	Activity of private sector M&A (equity) in overseas RE	Low	High	Low

[36] "China Green Bond Market 2019 Research Report." Climate Bonds Initiative, 26 June 2020,

[37] "Japan - Green Finance State of the Market 2019." Climate Bonds Initiative, 4 May 2020, www.climatebonds.net/resources/reports/japan-green-finance-state-market-2019.

[38] "Climate Bonds Initiative Publishes Korea Climate Bond Market Report." Climate Bonds Initiative, 19 Mar. 2018, www.climatebonds.net/resources/press-releases/2018/03/climate-bonds-initiative-publishes-korea-climate-bond-market-report.

[39] "China's Global Energy Finance Database." Boston University, bu.edu/cgef/., JBIC, JICA & MOE Press releases, NRDC Consolidated Data, Bloomberg New Energy Finance + GP Internal Tracking,

[40] "China's Global Energy Finance Database." Boston University, bu.edu/cgef/., JBIC, JICA & MOE Press releases, NRDC Consolidated Data, Bloomberg New Energy Finance + GP Internal Tracking,

China

China's Belt and Road Initiative (BRI), initiated in 2013,focuses on infrastructure development in developing countries. China's own experience as a developing economy formulated its unique method in overseas financing activities. This "state-supported, market-driven" model involves a relatively high degree of state involvement in overseas investment projects, with public banks as the main financier to finance capital needs.[41]

The 2017 "Guidance on Promoting a Green Belt and Road"[42] and "Belt and Road Ecological and Environmental Cooperation Plan"[43] highlighted low-carbon development and green energy and emphasized that Chinese investment projects will be used to promote the Paris Agreement and 2030 Sustainable Development Goals. But China has not yet proposed specific investment targets to meet the goals.

The following section investigates the mechanisms adopted by Chinese public banks, commercial banks, and project sponsors to support overseas RE investment.

China's Public Banks

China joined the OECD Development Center in 2015. However, China's public finance institutions still blend aid finance and export credit rather than separating them according to the Organization for Economic Cooperation and Development's (OECD) Development Assistance Committee (DAC) criteria. This distinction elsewhere represents the core reference for evaluating development support.[44] The Export-Import Bank of China (CHEXIM), the main export credit agency (ECA), provides both aid finance and export credit. China Development Bank (CDB), on the other hand, operates more akin to a commercial bank in overseas investment projects.

CHEXIM is primarily an ECA that provides export loans and overseas investment loans. CHEXIM is also the sole distributor of concessional loans, including Chinese Government Concessional Loans[45] and Preferential Export Buyer's Credit.[46] CHEXIM launched its Green Credit Guidelines in 2015, committed to express service for clients in green, low-carbon, and recycling economies. Under this framework, energy-saving and environmental protection loans are specifically designed to support long-term green projects.[47] CHEXIM also uses tools such as guarantees and co-financing to mitigate risk and leverage capital from commercial banks and enterprises. But concessional loans in China, with interest ranging from 2% to 3%, are nowhere comparable to the low pricing of official development assistance (ODA) loans from regional peer, Japan International Cooperation Agency (JICA).[48]

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[41] Chen, M. Beyond Donation: China's Policy Banks and the Reshaping of Development Finance. St Comp Int Dev (2020). https://doi.org/10.1007/s12116-020-09310-9

[42] "Guidance on Promoting Green Belt and Road." Belt and Road Portal, May 2017, eng.yidaiyilu.gov.cn/zchj/qwfb/12479.htm.

[43] "The Belt and Road Ecological and Environmental Cooperation Plan." Belt and Road Portal, May 2017, eng.yidaiyilu.gov.cn/zchj/qwfb/13392.htm.

[44] "Better Criteria for Better Evaluation: Revised Evaluation Criteria Definitions and Principles for Use." OECD/DAC Network on Development Evaluation, search.oecd.org/dac/evaluation/revised-evaluation-criteria-dec-2019.pdf.

[45] Chinese Government Concessional Loan includes medium- and long-term low-interest loan in Chinese yuan. Loan funds are raised by China Exim Bank itself, and the government helps subsidize the interest margins. The Loan is operated by the Department of Foreign Assistance under the Ministry of Commerce and the Administration & Law Enforcement Department under the Ministry of Finance.

[46] Preferential Export Buyer's Credit aims to promote the economic and trade cooperation between China and key countries and regions. It is provided to foreign entities in the form of export buyer's credit with certain preferential terms, and is funded by China

[47] White Paper on Green Finance and Social Responsibility. The Export-Import Bank of China. http://www.eximbank.gov.cn/info/WhitePOGF/202001/P020200115377992690034.pdf.

[48] Chen, M. Beyond Donation: China's Policy Banks and the Reshaping of Development Finance. 2020. https://doi.org/10.1007/s12116-020-09310-9

CDB is a development bank focused primarily on the domestic market and it does most of its business at home. But the size of its overseas lending portfolio is still the largest among all financial institutions in China.[49] In the OECD-DAC standard, CDB's loans resemble Other Official Flow (OOF), with terms and conditions appearing commercial and costly. This is reflected in the self-reported average interest of 4.4% in its 2019 annual report, which is high compared to its peers in Japan and South Korea.[50]

For overseas project finance, CDB often applies ECA finance, specifically export buyer's credit and export seller's credit covered by insurance from the gatekeeper for overseas insurance, the China Export & Credit Insurance Corporation (Sinosure). Project finance loans, though still not at full maturity for CDB, have already been adopted in some projects, such as a Chilean wind project in 2012.[51] CDB is also the largest lender of green credit in China, was ranked 36th of the world's lead arranger and syndicated lenders for solar and wind investment.[52] Although CDB does not design specific financial instruments for the RE sector, it has developed a comprehensive system to facilitate support for green finance. This includes some support for RE. CDB began to issue overseas green bonds after the system was introduced in 2017.[53]

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[49] Chen, M. Beyond Donation: China's Policy Banks and the Reshaping of Development Finance. 2020. https://doi.org/10.1007/s12116-020-09310-9

[50] China Development Bank Annual Report 2019.

[51] Davidson, Ros. "Mainstream Links with Goldwind for Chilean Project." Windpower Monthly, 20 Feb. 2012, www.windpowermonthly.com/article/1117980/mainstream-links-goldwind-chilean-project.

[52] "Harmonizing Investment and Financing Standards towards Sustainable Development along the Belt and Road." UNDP, 6 Nov. 2019, www.cn.undp.org/content/china/en/home/library/south-south-cooperation/harmonizing-investment-and-financing-standards-.html.

[53] "China Development Bank." Climate Bonds Initiative, www.climatebonds.net/certification/china-development-bank.

Aerial view of windmill and Solar panel, photovoltaic, alternative electricity source - concept of sustainable resources on a sunny day, Bac Phong, Thuan Bac, Ninh Thuan, Vietnam

From 2009 to 2019, CHEXIM in all made seven loans totaling USD $1.2 billion to overseas solar and wind projects; 91.7 percent came after the introduction of the BRI and most went to low-income countries in Africa, Latin America and the Caribbean.[54] During the same period, CDB made seven loans totaling USD $2.5 billion allocated to overseas solar and wind projects, mostly located in upper-middle-income to high-income countries such as Italy and Bulgaria. Despite the high financing costs, China's public banks have government support via the BRI, which accelerated RE funding starting 2013. All solar and wind finance after 2013, however, went to developing countries. In some cases, CDB and CHEXIM have also co-financed projects, including a large solar park in Pakistan totaling USD $1.5 billion.[55]

	General finance instrument	Green finance instrument	Private sector support	10-year overseas wind & solar finance	Recipient location
CHEXIM	• Concessional loan • Export credit • Overseas investment loan	• Energy-saving and environmental protection loans	• Guarantee and co-finance with commercial banks	• USD$1.2 billion	• East and Sub-saharan Africa • Latin America and Caribbean
CDB	• ECA finance loan • Project finance loan	N/A	N/A	• USD $2.5 billion	• Europe • Latin America and Caribbean • South Asia
Co-finance	• Syndicated loan	N/A	N/A	• USD $1.5 billion	• South Asia

[54] "China's Global Energy Finance Database." Boston University, bu.edu/cgef/.

[55] "China's Global Energy Finance Database." Boston University, bu.edu/cgef/.

High voltage pole with power station
© Think Voltage

Asian Infrastructure Investment Bank

The Asian Infrastructure Investment Bank (AIIB) was launched by China in 2016 with international partners. China makes up around half of AIIB's voting rights, and almost all of the projects have been associated with countries along the BRI. AIIB has generated a great deal of attention for its emphasis on adopting international environmental standards. While there is no policy prohibiting the financing of coal power, the bank has not yet financed any coal power project and the bank's president claims it will not.[56]

As a newly established multilateral development bank (MDB), AIIB claims it will increase the share of green finance in its portfolio to 66 percent in the next few years.[57] But for RE projects, AIIB tends to co-finance with its peer MDBs and other development banks in minority shares. AIIB does have a "Strategy on Mobilizing Private Capital for Infrastructure,"[58] to fill in the financing gaps by leveraging the private sector in Asia, but this has not yet proven to be an adequate tool to scale up its RE sector support. Between its establishment in 2016 to year-end 2019, AIIB supported four solar and wind projects totaling approximately USD $300 million.[59] With this limited size and scale in RE and only verbal commitments to not finance coal, the AIIB's reputation is running ahead of reality.

	General instrument	Green finance instrument	Private sector support	Total wind & solar finance	Recipient location
AIIB	• Concessional loan	N/A	• Strategy on mobilizing private capital for infrastructure	• USD $300 million	• South Asia • North Africa • Central Asia

[56] Farand, Chloé. "Asian Multilateral Bank Promises to End Coal-Related Financing." Climate Home News, 14 Sept. 2020, www.climatechangenews.com/2020/09/11/asian-multilateral-bank-promises-end-coal-related-financing/.

[57] AIIB Annual Report 2018

[58] "Strategy on Mobilizing Private Capital for Infrastructure - Policies and Strategies." AIIB, www.aiib.org/en/policies-strategies/strategies/private-capital-infrastructure-strategy.html.

[59] AIIB Project Approvals. https://www.aiib.org/en/projects/approved/.

China's Commercial Banks

The largest commercial bank in the world, the Industrial and Commercial Bank of China (ICBC), is China's most active commercial bank in overseas lending and ranks 51st among global solar and wind lead arrangers and syndicated lenders according to Bloomberg New Energy Finance (BNEF). While most overseas RE projects from China are supported by public banks like CDB and CHEXIM, ICBC has led project finance itself in partnership with other major Chinese commercial banks in some overseas RE projects.[60] ICBC also frequently co-finances with MDBs and public banks for large solar and wind projects. ECA finance is still ICBC's main financing instrument for projects in developing countries. ICBC often enlists Sinosure to mitigate political risk.

Compared to commercial banks in Japan and South Korea, ICBC tends to diversify its RE financing more evenly between the developed and developing countries, but overall finances much less than Japanese commercial banks.[61] From ICBC's green bond report, as of December 2019, only an estimated USD $400 million went to overseas solar and wind assets. It should be noted, however, that several projects that are financed by ICBC do not appear to be released in its green bond report.

ICBC has at times pushed the sector to new limits, such as in 2018 when the bank acted as lead arranger for a USD 1.5 billion concentrated solar power plant in the United Arab Emirates, realizing the lowest levelized cost of electricity (LCOE) at the time for this technology at USD $7.30/kWh.[62] In another case in Pakistan in 2015, ICBC was the sole financier for a wind project through an ECA financing facility.[63]

The bank developed an environmental, social, and governance (ESG) evaluation system in 2018, which helped to dramatically increase overseas green bond issuance in 2019.[64] More recently in Vietnam, a 50 MW solar project was financed by ICBC together with the Export-Import Bank of Thailand, bringing together public and private finance for RE in the SEA region.[65] Until now, no specific commitment has been made from ICBC regarding growing its RE portfolio, or for reducing its existing exposure to coal and other fossil fuels.

	General instrument	Green finance commitment	Overseas wind & solar investment tracked from ESG Report	Recipient location
ICBC	• ECA finance loan • Project finance loan	N/A	• USD $400 million	• North Africa • South Asia • Europe • Southeast Asia

[60] "DEWA IV Solar IPP." ICBC, www.icbc.com.cn/ICBC/%E5%A4%96%E9%83%A8%E8%B0%83%E7%94%A8/%E4%B8%80%E5%B8%A6%E4%B8%80%E8%B7%AF%E6%9C%80%E4%BD%B3%E9%A1%B9%E7%9B%AE%E8%AF%84%E9%80%89/03.htm.

[61] "Green Finance." ICBC, www.icbc-ltd.com/ICBCLtd/Investor%20Relations/GreenFinance/.

[62] "DEWA IV Solar IPP." ICBC, www.icbc.com.cn/ICBC/%E5%A4%96%E9%83%A8%E8%B0%83%E7%94%A8/%E4%B8%80%E5%B8%A6%E4%B8%80%E8%B7%AF%E6%9C%80%E4%BD%B3%E9%A1%B9%E7%9B%AE%E8%AF%84%E9%80%89/03.htm.

[63] "ICBC Strongly Supports New Energy Development along 'One Belt and One Road.'" ICBC, 31 Mar. 2015, www.icbc.com.cn/icbc/en/newsupdates/icbc%20news/ICBCStronglySupportsNewEnergyDevelopmentalongOneBeltandOneRoad.htm.

[64] Choi, June, et al. "Green Banking in China – Emerging Trends." Climate Policy Initiative, 13 Aug. 2020, www.climatepolicyinitiative.org/publication/green-banking-in-china-emerging-trends/.

[65] Patrini, Michael. "EXIM Thailand, ICBC Thai and ICBC Hanoi's Project Financing of a Solar Farm in Vietnam." Global Legal Chronicle, 20 July 2020, www.globallegalchronicle.com/exim-thailand-icbc-thai-and-icbc-hanois-project-financing-of-a-solar-farm-in-vietnam/.

China's Project Sponsors

In its domestic market, China has been the top leader in solar and wind installations and manufacturing globally for the past decade. In 2019 alone, more than 25 GW of wind and 30 GW of solar power was installed, making China the world's largest solar and wind market. The strong domestic market, however, has contributed to some key industrial firms' reluctance to venture into the overseas market. They make adequate profits at lower risk at home.

To combat the lack of equity investment being made abroad, the Chinese government has established a batch of private equity funds, most of which are led by a bank parent company. Some of them have already successfully made solar and/or wind power investments, such as the Silk Road Fund (SRF; Central bank-led), the China-Central and Eastern Europe Investment Cooperation Fund (China-CEE Fund; CHEXIM-led) and the Sino-Central and Eastern Europe Fund (Sino-CEE Fund; ICBC-led).

Chinese utilities have been gradually building up their overseas RE assets at a slow pace, similar to Japanese utilities. Because of their high debt ratio and low risk tolerance, utilities usually prefer operating assets from developed country markets. This limits their ability to scale up for substantial RE investment. Chinese utilities are also mostly state-owned enterprises (SOEs) that require an extraordinarily long approval period from government supervisors. This makes it even more challenging for utilities to finalize deals for RE projects in a timely manner.

Chinese public banks and commercial banks still have not made a commitment to stop financing coal power plants. So, Chinese utilities may stick to poaching coal finance opportunities dropped by others, which is a current trend in coal finance globally. But this could change if Chinese policy makers and public banks send a signal to support overseas RE projects.

Chinese EPC firms and manufacturers have dominated the market of both EPC and equipment supply for RE in many developing countries with their strong domestic experience and pricing advantages. To strengthen their competitiveness in the RE market, they will go one step further and purchase development-stage projects to secure the EPC or equipment contracts later on. But their investment tends to be short-term once goals are realized projects are then sold off to long-term investors.

	Solar & wind M&A highlight	Expertise	Recipient location
Utilities	• China Huadian Corporation • State Power Investment Corporation • China Three Gorges Corporation • China Resources Power	• Project construction • Project operation	• Western Europe • Australia • West, Central, East Africa • Southeast Asia
Private equity firms	• Silk Road Fund • China-CEE Fund • Sino-CEE Fund	• Overseas deal sourcing (ODS)	• Central and Eastern Europe • South Asia • Middle East
EPC firms & manufactures	• Power Construction Corporation of China • ZTE Energy • Jinko Solar • Canadian Solar • Goldwind	• Project construction • Equipment	• South Asia • Australia • Latin America and Caribbean • Southeast Asia

Japan

In 2015, Prime Minister Shinzo Abe announced the "Partnership for Quality Infrastructure: Investment for Asia's Future" strategy stating that Japan would collaborate with the Asian Development Bank (ADB) to provide approximately USD $110 billion for "quality infrastructure investment" in Asia over the next five years. That year, Japan announced a new commitment, "Action for Cool Earth 2.0 (ACE 2.0)" at COP21 and pledged to provide approximately USD $12.5 billion in public and private climate finance to developing countries in 2020; private sector partnership is emphasized in both strategies to achieve this target. The following section examines Japan's overseas RE investment from public banks, commercial banks, and project sponsors, and analyzes their manner of investment to identify strengths and barriers.

Japan's Public Banks

The mandates of providing aid finance and export credit are allocated between JICA and JBIC, respectively, along OECD-DAC criteria. While both institutions support overseas infrastructure investment, they finance overseas projects in different manners. JICA focuses its investment in lower-income countries. JBIC focuses on high- and middle-income countries.

JICA finances overseas RE mainly through ODA loans with preferential terms and an especially low interest rates, as low as 0.1%.[66] In 2008, JICA introduced Climate Change Program Loans (CCPL), a scheme to facilitate the implementation of climate change policies through financial and technical assistance coming on the heels of the "Cool Earth 50" announcement. Since this scheme was announced, JICA has supported geothermal development in Indonesia with a plan to increase the capacity to 9500 MW by 2025. Two geothermal power plant projects have been commissioned in Indonesia since 2007 with a total investment of USD $307.7 million. With another seven geothermal projects commissioned worldwide, JICA has demonstrated a strong preference for geothermal technologies, despite being high cost, slow to commission, and ignoring the fact that there are more economically-viable forms of RE in solar and wind.

JICA has shown less interest in solar and wind projects. Between 2009 and 2019, JICA underwrote only five loans to solar and wind projects, totalling USD $1.1 billion. JICA, by nature of providing ODA financing, does most of its business with sovereign governments or large state utilities. It also develops private sector-supporting instruments including debt and equity finance to private firms under strict consideration. It is unclear whether or not JICA has used these instruments to support RE projects.

JBIC is the Japanese ECA, similar to CHEXIM's role in China, and supports overseas projects by export credit and overseas investment loans, with a lower interest rate than China and South Korea (LIBOR+59 bps for foreign currency loans).[67] In some cases, JBIC has issued credit lines to recipients' domestic banks with terms tied directly to Japanese export agreements, although this method is more popular for partner banks in developing countries.

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[66] "Zhongri Zhengduo Yinni Gaotie Zuizhongzhan Jinri Daxiang," Tengxun Caijing, http://finance.qq.com/cross/20150901/5OSn869v.html.

[67] JBIC Annual Report 2019

JBIC has regularly financed solar and wind projects to support the expansion of Japanese firms in the global RE market. From 2009 to 2019, JBIC underwrote loans totaling USD $2.1 billion to support overseas solar and wind projects.[68] The top three recipients of this RE financing are Canada, the United Kingdom, and the Netherlands.[69]

JBIC has experience enabling private bank finance through co-financing, which reduces and mitigates political risks, especially in developing countries. JBIC generally plays a project structuring coordinator role with recipient country governments and other international institutions.

Japan established the Joint Crediting Mechanism (JCM) in 2015. JCM is a fund-like institution that promotes leading low-carbon technologies in developing countries, allowing Japan to partially offset some of its own greenhouse gas (GHG) emissions. Through JCM, the Ministry of Environment of Japan could approve credits for projects with technologies that are still seen as too expensive. JCM has historically financed more energy efficiency projects, but 2017 to present has seen a significant increase in RE projects, particularly solar and biomass in SEA. JCM has tended to offer finance to RE projects that are 50MW of capacity or less, but this could change. A 120 MW solar project financed in 2019[70] and a 400 MW solar project are both being financed this year.[71]

	General finance instrument	Green finance instrument	Private sector support	10-year overseas wind & solar finance	Recipient location
JICA	• ODA loan	• Climate change program loan	• Private sector investment finance	• USD $1.1 billion	• North Africa • South Asia • East Asia
JBIC	• Export credit • Overseas investment loan • Credit lines	• GREEN Operation	• Guarantee and co-finance with commercial banks	• USD $2.1 billion	• Northern Europe • Middle East • South Asia • Latin America and Caribbean • South East Asia • North Africa
JCM	• Credit lines	N/A	N/A	N/A	• Southeast Asia

[68] This could be underestimated, many loans are made in credit lines that are excluded from the data, these loans are to support environmental projects such as waste water blended with wind and solar.

[69] JBIC press releases and Greenpeace internal tracking

[70] "400MW Solar Power Project in Rabigh Region: JCM The Joint Crediting Mechanism." Global Environment Centre Foundation (GEC), gec.jp/jcm/projects/20pro_sau_01/.

[71] "120MW Solar Power Project in Metehara, Oromia Region: JCM The Joint Crediting Mechanism." Global Environment Centre Foundation (GEC), gec.jp/jcm/projects/19pro_eth_01/.

Asian Development Bank

The ADB is a multilateral development bank (MDB), funded by public money. It focuses on large infrastructure projects in Asia, including RE projects. Japan is one of its founding members and one of the two largest shareholders.[72] ADB's financial instruments include concessional loans and grants, where loans are usually applied to large projects. In ADB's "Strategy 2030," the number of its committed operations supporting climate change mitigation and adaptation is projected to be 75% by 2030, with RE increasingly important in strategic planning.[73]

ADB states that it invested an average of USD $1.2 billion per year in RE from 2008 to 2018 and that solar and wind projects accounted for approximately 40%.[74] This share is still growing while investment in hydropower drops. ADB's public releases show that they approved 25 projects between 2009 to 2019 totalling USD $1.0 billion specifically targeted to solar or wind power generation.[75] An additional USD $3.0 billion[76] went to multi-sector projects that included some share of solar or wind power.[77]

Aside from its ordinary financing mechanisms as a bank, ADB also established a group of funds to leverage the private sector, promote specific technology or cooperate with specific countries.[78] The typical funds used by ADB to finance RE projects include the Leading Asia's Private Sector Infrastructure Fund (LEAP Fund), which does private sector support, and the ASEAN Catalytic Green Finance Facility,[79] which does clean energy.

	General finance instrument	Green finance instrument	Private sector support	10-year overseas wind & solar Finance	Recipient location
ADB	• Concessional loan • Grants	• ASEAN Catalytic Green Finance Facility	• Leading Asia's Private Sector Infrastructure Fund (LEAP Fund)	• USD $1.0 billion	• South Asia • East Asia • Central Asia

[72] "Shareholders." Asian Development Bank, www.adb.org/new/work-with-us/investors/credit-fundamentals/shareholders.

[73] "ADB Strategy 2030." Asian Development Bank, July 2018, www.adb.org/sites/default/files/institutional-document/435391/strategy-2030-main-document.pdf.

[74] "Review of the ADB Clean Energy Program." Asian Development Bank, Mar. 2020, www.adb.org/sites/default/files/institutional-document/576841/review-adb-clean-energy-program.pdf.

[75] ADB public releases + Greenpeace Internal Tracking

[76] ADB public releases +Greenpeace Internal Tracking

[77] ADB has a track record of financing flagship projects of RE technologies in recipient countries, including a wind power project in Sri Lanka (USD 200 million), Qinghai Delingha Concentrated Solar Thermal Power Project (USD 150 million), and a solar project in Thailand (USD 138 million).

[78] "Funds and Resources." Asian Development Bank, www.adb.org/what-we-do/funds.

[79] "ASEAN Catalytic Green Finance Facility." Asian Development Bank, Jan. 2020, www.adb.org/publications/asean-catalytic-green-finance-facility.

Japan's Commercial Banks

Japanese commercial banks have long been some of the most active lenders of RE globally,[80] but rarely invest in developing countries with lower credit ratings. This may be because of strong annuity yields in developed countries, which have the security of long-term Power Purchase Agreements (PPAs). The majority of these are from utility companies with high credit ratings.[81]

The three largest Japanese commercial banks -- Mitsubishi UFJ Financial Group (MUFG), Sumitomo Mitsui Financial Group (SMFG), and Mizuho Financial Group (MFG) -- are all ranked by Bloomberg New Energy Finance in the top ten RE lead arrangers and syndicated lenders.[82] But they demonstrate a strong preference for developed countries, where they are available to finance the projects without a need of a sovereign guarantee. The banks promote renewable energy mainly through project finance loans and ECA finance with the insurance of Nippon Export Investment Insurance (NEXI), and sometimes through credit lines to recipients' domestic banks to support a pool of RE projects. Two of the three largest commercial banks -- MUFG and MFG -- have set targets for environmental finance outflow by 2030 at USD $76.9 billion[83] and USD $115.38 billion,[84] respectively.

As of March 2020, MUFG allocated USD $1.7 billion from foreign currency green bond issuances to support solar and wind power plants in overseas countries, almost all in developed countries located in Europe, North America, and Australia.[85] As of March 2020, SMFG allocated USD $1.2 billion of green bonds proceeds to support solar and wind power plants abroad, again focused on developed countries.[86]

Leading Japanese commercial banks were named the world's biggest lenders for new coal plants in December 2019,[87] but these banks execute these deals at a large scale with the help of their long standing partners -- Japanese public banks, which typically provide 50 to 60 percent of total debt.[88] As Japanese commercial banks have done with coal, they need to cooperate with public finance institutions to leverage their additional expertise in order to scale up RE investment globally. A good example is MUFG's co-financing of a 350 MW solar power project in India.[89] The project is run in a public-private-partnership (PPP) model, in which JBIC co-financed the loan of the project alongside a consortium of other Japanese based equity and debt providers.

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[80] Bloomberg New Energy Finance Data

[81] Buckley, Tim, and Simon Nicholas. "Japan: Greater Energy Security Through Renewables." IEEFA, Mar. 2017, ieefa.org/wp-content/uploads/2017/03/Japan_-Greater-Energy-Security-Through-Renewables-_March-2017.pdf.

[82] "Leveraging Our Financing Function." Mitsubishi UFJ Financial Group, www.mufg.jp/english/csr/environment/business/index.html.

[83] "Responding to Global Warming and Climate Change-Based on TCFD Recommendations." Mitsubishi UFJ Financial Group, www.mufg.jp/english/csr/environment/tcfd/index.html.

[84] Mizuho Group ESG Data Book. 9 Sep. 2020. https://www.mizuhogroup.com/binaries/content/assets/pdf/mizuhoglobal/sustainability/overview/report/esg-data/esg_databook.pdf

[85] "Green, Social, and Sustainability Bonds." Mitsubishi UFJ Financial Group, www.mufg.jp/english/ir/fixed_income/greenbond/index.html.

[86] "SMBC Group Green Bond." Sumitomo Mitsui Financial Group, www.smfg.co.jp/english/sustainability/materiality/environment/procurement/.

[87] Takahashi, Ryusei. "Japan's Mega-Banks Named as World's Biggest Lenders for New Coal Plants." The Japan Times, 7 Dec. 2019, www.japantimes.co.jp/news/2019/12/07/national/report-names-japans-top-three-mega-banks-worlds-biggest-lenders-coal-plant-developers/.

[88] "Tanjung Jati B Coal-Fired Power Plant (Units 5 & 6)." The World Bank, 2017, ppi.worldbank.org/en/snapshots/project/tanjung-jati-b-coal-fired-power-plant-units-5--6-9026.

[89] "JBIC Provides First Project Finance for Solar Power Generation Project in IndiaSupporting Japanese Companies' Participation in Solar Power Generation Business." JBIC, 12 Sept. 2017, www.jbic.go.jp/en/information/press/press-2017/0912-57587.html.

A guarantee from JBIC seems to be a must for commercial banks in developing countries to finance RE projects through credit mechanisms, as seen recently in solar projects in Vietnam.[90]

In one project, MUFG acted as the lead arranger to provide a credit line to local Vietcom Bank with a mandate to specifically support solar power projects, and JBIC was a co-financier and provided a guarantee for MUFG's portion.

Japanese commercial banks have both the knowledge of RE finance and risk mitigation mechanisms in place with JBIC and NEXI collaboration. This expertise and support together constitute strong potential to operate in the developing country markets that the two have historically avoided.

	General finance instruments	Green finance commitment	Overseas wind & solar investment tracked from ESG bond reports	Recipient location
MUFG	• Project finance loan • ECA finance loan • Credit lines	• USD $76.9 billion by 2030	• USD $1.7 billion	• Europe • North America • Middle East • Latin America and Caribbean • South East Asia
SMFG	• Project finance loans • ECA finance • Credit lines	N/A	• USD 1.2 billion	• Europe • North America • Middle East • Latin America and Caribbean
MFG	• Project finance loan • ECA finance • Credit lines	• USD $115.4 billion by 2030	N/A	N/A

Japan's Project Sponsors

In its own domestic market Japan is the second largest installer of solar power in the world.[91] Over 10GW solar power plants were commissioned.[92] But the cost of solar power in Japan remains far higher than global standards,[93] and much more than the cost in China. The Japanese market has since seen the trend of solar PV installation slowing down -- around 7.5 GW for 2019.[94]

[90] "Credit Line for Vietcombank under GREEN Operations." JBIC, 12 Sept. 2017, www.jbic.go.jp/en/information/press/press-2019/0626-012288.html.

[91] "Renewable Energy Statistics 2020." IRENA, Jul. 2020, https://www.irena.org/publications/2020/Jul/Renewable-energy-statistics-2020

[92] IEA Photovoltaic Power Systems Programme, https://iea-pvps.org/.

[93] Kimura, Keiji. "Solar Power Generation Costs in Japan." Renewable Energy Institute, Oct. 2019, www.renewable-ei.org/pdfdownload/activities/Report_SolarPVCostJapan_EN.pdf.

[94] IEA Photovoltaic Power Systems Programme, https://iea-pvps.org/.

When the domestic market is in a phase of decline, Japanese private firms tend to venture overseas for expansion opportunities. Private firms have sought to gain market share in the rapidly developing solar markets, with notable M&A activities in India, Taiwan, and the U.S. Financial institutions, utility companies, and general trading houses have all sought to establish footholds in the global solar market via M&A ranging from acquisitions of commercial and industrial units of module manufacturers to equity stakes in solar plant sponsors.[95] There are three groups of project sponsors in Japan that have notable overseas track records of solar and wind equity investment: utilities, private equity firms, and sogo shoshas (general trading houses).[96] An example of this type of acquisition is Mitsubishi's purchase of a 20% stake in Ovo Energy in the UK in 2019.[97]

	Wind & solar M&A highlight	Expertise	Recipient locations
Utilities	• JERA • Kyushu Electric Power Co • Shikoku Electric Power Co	• Project construction • Project operation	• South Asia • East Asia
Private equity firms	• SoftBank • Japan Energy Fund	• Overseas deal sourcing (ODC) • Business innovation	• South Asia • North America • Middle East
Sogo shosha	• Mitsui & Co. • Sumitomo Corp • Mitsubishi Corp • Marubeni Corp	• Mixture expertise	• Europe • Middle East • Latin America and Caribbean

Utilities leverage their expertise from domestic project development experience in project construction and operation into overseas projects. Nevertheless, they often have very high debt ratios that limit expansion. Private equity firms meanwhile can scale up RE finance with their flexibility in capital structure and ability in overseas deal sourcing to mitigate risks. Their ability to integrate the most advanced technology and business model has shown potential to drive down the price of solar and wind power. Sogo shosha, with diversified business and global networks, have the expertise to access the RE sector. Sogo shosha usually demonstrate low risk tolerance but those with true RE experience bid frequently in the global RE market.

[95] Buckley, Tim, and Simon Nicholas. "Japan: Greater Energy Security Through Renewables." IEEFA, Mar. 2017, ieefa.org/wp-content/uploads/2017/03/Japan_-Greater-Energy-Security-Through-Renewables-_March-2017.pdf.

[96] *Sogo shosha* (総合商社, *sōgō shōsha*, or *general trading companies*) are Japanese companies that trade in a wide range of products and materials.

[97] "Mitsubishi Corp. Takes 20 Percent Stake in UK's OVO Energy." Reuters, 14 Feb. 2019, www.reuters.com/article/us-ovo-energy-mitsubishi-idUSKCN1Q31DE.

South Korea

In 2017, President Moon Jae-in declared the New Southern Policy (NSP) and announced the "Korea-ASEAN Future Community Initiative".[98] It is the first diplomatic initiative focused on ASEAN countries and India, with ambitious goals of reaching USD $200 billion in trade with ASEAN by 2020, or nearly USD $50 billion more than 2017. [99] In the current structure, there was very little focus on climate governance outside of enhancing cooperation in climate adaptation.

South Korea's Green New Deal, proposed in 2020, promised to develop domestic green industries amid an effort to more than triple RE capacity to 42.7GW by 2025, up from 12.7 GW in 2019.[100] More recently, the 2050 net-zero pledge announced in October solidified President Moon's broader policy. Regional pressure on South Korea increased with Japan's recent commitments to phase out overseas coal finance.[101]

South Korean public and private financial institutions are not active RE players when compared to China and Japan. But they are now at an inflection point to transfer their expertise to RE investment, not just for domestic needs but also to capture some market share in ASEAN countries.

Korea International Cooperation Agency (KOICA), Korea Environment Institute (KEI), Korea Environmental Industry & Technology Institute (KEITI), Korea Environment Corporation (KECO), and Green Technology Center (GTC) together established a Green ODA Partnership to promote global Green New Deal in September, following the central government's Green New Deal policy. And on November 27th, President Moon stressed that South Korea will increase its Green New Deal ODA and establish an "ASEAN-Republic of Korea Carbon Dialogue." There are still no concrete plans and it is still too early to judge whether these recent commitments will be delivered effectively.

South Korea's Public Banks

In 2006, South Korea joined the OECD's DAC, a decade after it joined the OECD. The Export-Import Bank of Korea (KEXIM) separates its aid finance from its export credit agencies to follow the OECD-DAC standards. This is split between the Economic Development Cooperation Fund (EDCF) and the Economic Development Promotion Facility (EDPF). Both EDCF and EDPF are under management of KEXIM. EDCF is the executor of the country's ODA finance for lower-middle and low income countries, and is accounted separately from KEXIM because of this purpose. In addition, the EDPF was founded in 2018 to fill in the gap of financing for unexplored but promising markets.[102] It is aimed at middle- and upper-middle income countries, however, rather than concessional loans for developing countries. KEXIM takes charge of ordinary export finance and overseas investment finance, like JBIC in Japan and CHEXIM in China.

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[98] Presidential Committee on New Southern Policy, 2018, nsp.go.kr/eng/policy/policy03Page.do.

[99] Yeo, Andrew. "South Korea's New Southern Policy and ASEAN-ROK Relations." The Diplomat, 28 July 2020, thediplomat.com/2020/07/south-koreas-new-southern-policy-and-asean-rok-relations/.

[100] Yo, Yoon-jung. "Solar and Wind Power Generation Capacity Will Be More than Tripled by 2025." MBC News, 16 July 2020, imnews.imbc.com/news/2020/econo/article/5844301_32647.html.

[101] Hicks, Robin. "Korea Development Bank Mulls End to Coal Financing." Eco Business, 21 Oct. 2020, www.eco-business.com/news/korea-development-bank-mulls-end-to-coal-financing/.

[102] EDCF supports large-scale infrastructure projects in developing countries with the funds that KEXIM has raised through international capital markets. EDCF covers the gap between capital market rates and export credit rates.

Korean Development Bank (KDB) is a public bank wholly-owned by the South Korean government, initially established to provide for domestic development. Like CDB, KDB has also provided support to Korean companies entering international markets. It began its overseas project finance business in 2003.

EDCF is the distributor of South Korean ODA loans with preferential terms, similar to JICA. The interest rate of the ODA loans is in a range of 0.01% to 2.5%.[103] Between 2009 and 2019, EDCF financed four solar projects in Central America, Southeast Asia, and East Africa.[104] [105], with a total investment of USD $125 million. Like JICA, EDCF is supporting the private sector through its private sector loan and equity participation. Moreover, EDCF has a guarantee program to mitigate political risks for private lenders. KEXIM, as an ECA, has shown less interest in RE finance, and has only invested in one wind project in Jordan in 2016 with a loan worth USD $29 million.[106] Existing private sector risk mitigation instruments from KEXIM are similar to JBIC and CHEXIM with guarantees and co-finance that build up a favorable environment for private investment.

KDB has recently made a concerted effort to increase its financing of RE projects, differentiating itself from KEXIM and EDCF. Nevertheless, KDB is still in the nascent stages and tends to co-finance with other development banks, MDBs, and commercial banks in most of its RE investments. From 2009 to 2019, KDB made solar and wind investments worth an estimated USD $660 million globally, with Canada, Chile, and Mexico as the top 3 recipients.[107]

	General finance instrument	Green finance instrument	Private sector support	10-year overseas wind & solar finance	Recipient location
EDCF	• ODA loan	N/A	• Private Sector Loan, Equity Participation and Guarantee Program	• USD $125 million	• East Africa • Central America • Southeast Asia
KEXIM (including EPDF)	• Export loan • Overseas investment loan	N/A	• Guarantee and co-finance with commercial banks	• USD $29 million	• Middle East
KDB	• Project finance loan • ECA finance loan	N/A	N/A	• USD $0.7 billion	• North America • Latin America and Caribbean • Australia • Middle East • East Asia

[103] EDCF Annual Report 2019

[104] "Korea to Fund Mozambique's Solar Plant Construction." Embassy of the Republic of Korea to Azerbaijan, 11 Dec. 2010, overseas.mofa.go.kr/az-en/brd/m_8253/view.do?seq=650456&srchFr=&srchTo=&srchWord=&srchTp=&multi_itm_seq=0&itm_seq_1=0&itm_seq_2=0&company_cd=&company_nm=&page=30.

[105] "EDCF 공식 블로그 : 네이버 블로그." EDCF Official Blog, 3 May 2019, m.blog.naver.com/PostView.nhn?blogId=edcfkorea.

[106] Bloomberg New Energy Finance & GP Tracking

[107] Bloomberg New Energy Finance & GP Tracking

South Korea's Commercial Banks

Compared to China and Japan, commercial banks in South Korea have far fewer overseas RE assets. This could be a result of the relatively smaller domestic RE market and their comparatively late participation in the overseas green bond market. But with domestic policy and global trends both pushing the world away from coal, commercial banks in South Korea have to accelerate their investment programs for overseas RE opportunities.

There are three banks that have made some progress: the banking subsidiaries of Hana Financial Group (HFG), Woori Financial Group (WFG), and KB Financial Group (KBFG). HFG began to issue overseas sustainability bonds in 2019, the proceeds from which have had approximately USD $256 million allocated to solar and wind projects, including offshore wind projects in the UK, a solar project in Australia, and a solar project in Vietnam.[108] WFG and KBFG have been active in the domestic market and have recently sought overseas RE market share in developed markets in South America, North America, and Japan. On top of this, KBFG has followed the lead of several Japanese commercial banks and recently announced they will no longer finance coal power projects at home or abroad.[109]

	General instrument	Green finance commitment	Overseas wind & solar investment tracked from ESG bond report	Recipient location
HFG	• Project finance loan • ECA finance loan	N/A	• USD $256 million	• Western Europe • Australia • Southeast Asia
Woori FG	• Project finance loan • ECA finance loan	N/A	N/A	• South America • East Asia • North America
KBFG	• Project finance loan • ECA finance loan	No financing for new coal-fired power plants	N/A	• East Asia • North America

[108] Hana Financial Group Sustainability Report 2019. https://www.hanafn.com:8002/eng/csr/sustainability/sustainabilityReport.do.

[109] Song, Young-chan. "KB Financial to End Coal Project Financing for Low-Carbon Economy." The Korea Economic Daily Global Edition, 28 Sept. 2020, www.kedglobal.com/newsView/ked202010100018.

South Korea's Project Sponsors

The South Korean domestic RE market is much smaller than China or Japan. The accumulated solar and wind installation just over 12GW at year-end 2019.[110] There are three groups of project sponsors in South Korea that have an overseas track record of solar and wind investment: utilities, private equity firms, and chaebol (large conglomerates).[111]

	Wind & solar	Expertise	Recipient location
Utilities	• KEPCO • Korea Western Power	• Project construction • Project operation • Overseas Deal Sourcing (ODS)	• North America • Southeast Asia • Middle East
Private equity firms	• KIAMO • KB Asset Management	• Overseas Deal Sourcing (ODS)	• Australia • Latin America and Caribbean
Chaebol	• Hanwha Group • Samsung C&T	• Mixture of expertise	• North America • Europe

Like Chinese private equity funds, South Korean funds are also bank-led and tend to hold minority stakes in solar and wind projects. KDB Infrastructure Investments Asset Management Company (KIAMCO), led by KDB, provided equity financing for two solar projects in Australia in partnership with Hanwha Group. KB Asset Management is led by KB Financial Group, the largest commercial bank in South Korea, and made a minority investment in a Chilean wind project. Hanwha Group, with its subsidiary of Hanwha Energy and Hanwha Q Cells, has experience in solar technology and project operation and has been active in overseas project purchase.

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[110] Yo, Yoon-jung. "Solar and Wind Power Generation Capacity Will Be More than Tripled by 2025." MBC News, 16 July 2020, imnews.imbc.com/news/2020/econo/article/5844301_32647.html.

[111] Chaebol are large South Korean industrial conglomerates run and controlled by an owner or family.

Wind turbines at sunrise.
©Unsplash/Katie Moum

Scaling up an RE Future in Southeast Asia

In this section, we examine some immediate concerns for financial institutions from China, Japan, and South Korea with material examples from SEA.

SEA is one of the most vulnerable regions to the impacts of climate change, according to the Global Climate Risk Index 2020, with four SEA countries in the top ten most vulnerable (Myanmar, the Philippines, Vietnam, and Thailand).[112] Coastal flooding and extreme weather events, among others, impact people across the region.

Overseas finance in energy infrastructure has been active in SEA since the 1990s, dominated by independent power projects (IPPs) for coal and hydropower. As we suggest above, given the context of the climate emergency and the need to develop RE at a speed and scale consistent with both the net-zero ambitions of China, Japan, and South Korea, and the Paris Agreement, we focus on "opening the floodgates" to solar and wind finance. That is, we take the expertise and financial prowess of the investing countries as a given, but seek to unblock barriers in RE so strong support for other energy sources can channel to solar and wind.

Non-financial interventions: a two-way street

The best example of the ability to unlock solar and wind financing in SEA is in Vietnam. Booming solar capacity growth over the last two years came after a market design phase which was notable for the introduction of new regulatory frameworks and policies, both of which were described as "unbankable" by market participants as recently as 2017.[113] This change required engagement by both investing and recipient countries to create appropriate PPAs, guarantees, and risk management mechanisms.

In this process, the roles played by organizations like the Japan Bankers Association were crucial.[114] They and others managed to move market design from projects that foreign banks would not support to a system fit for purpose.

While this is a non-financial intervention, public money and regional leadership from China, Japan, and South Korea are fundamental to potential solar and wind power growth in the region. Our analysis suggests that only Vietnam, the Philippines, and Malaysia have working policies and pricing in the region. As a result, only these three have competitive RE finance, as compared to fossil fuel finance.[115] The financing differentials in Indonesia, for example, can be as low as 0 bps for coal.[116] Meanwhile, BNEF shows financing for solar and wind ranges between 850 bps to 1200 bps.

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[112] "Global Climate Risk Index." GermanWatch, Dec. 2019, germanwatch.org/sites/germanwatch.org/files/20-2-01e Global Climate Risk Index 2020_14.pdf.

[113] Kenning, Tom. "Vietnam Solar PPA Is 'Non-Bankable'." PV Tech, 6 June 2017, www.pv-tech.org/news/international-banks-declare-vietnam-solar-ppa-non-bankable.

[114] Kenning, Tom. "Vietnam Solar PPA Is 'Non-Bankable'." PV Tech, 6 June 2017, www.pv-tech.org/news/international-banks-declare-vietnam-solar-ppa-non-bankable.

[115] *Southeast Asia Power Sector Scorecard.* Greenpeace Southeast Asia, Sept. 2020, www.greenpeace.org/southeastasia/publication/44037/southeast-asia-power-sector-scorecard-assessing-the-progress-of-national-energy-transitions-against-a-1-5-degrees-pathway/.

[116] "Signing of Japanese ODA Loan Agreements with the Republic of Indonesia." JICA Press Releases, 28 Mar. 2013, www.jica.go.jp/english/news/press/2012/130328_02.html.

The differences between countries in the region are worth underlining. Cambodia, Lao PDR, and Myanmar have the most basic financial challenges for new energy projects. These include high costs of financing, limited funding access, early stage domestic financial markets, limited technical knowledge of RE, and challenging permitting processes.[117]

Collaboration between national governments in SEA with the private sector (project developers, EPC firms, utilities, private equity funds, and commercial banks), with support from development financial institutions and international donors, is crucial in ensuring successful financing of RE projects there.

Financial institutions from China, Japan, and South Korea need to focus in the short-term (especially during the Covid-19 pandemic) on unblocking this crucial block in the development pipeline. This means skill sharing, capacity building with institutional stakeholders, and knowledge management in recipient country markets. Key topics include currency and political risk management, working PPAs, and grid connectivity.

The urgent next step to unblock market design is to tailor the bankability of large-scale solar and wind projects to local markets, such as Cambodia's solar PV auctions in contrast with Vietnam's Feed-in-Tariff (FiT) schemes. This includes the design of all manners of project characteristics, from sovereign guarantees to "take or pay" contracts, to curtailment policies that can level the playing field for RE while energy demand and the energy pipeline is still low -- a win-win for investing and recipient countries.

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[117] "Renewable Energy Financing in Cambodia, Lao PDR, and Myanmar." ASEAN, 16 Dec. 2019, agep.aseanenergy.org/renewable-energy-financing-in-cambodia-lao-pdr-and-myanmar/.

Brown Coal Power Station
©Adobe Stock/Ana Gram

Financial interventions – policies and instruments

China, Japan, and South Korea's public and private banks appear to still be coming to grips with solar and wind finance in SEA. There is an increasingly outdated perception of higher risk in RE, which leads to higher borrowing costs, shorter loan durations, and higher equity requirements from sponsors for these countries. While the landscape in SEA is changing fast, public and private banks are playing catch up in the RE sector.

The energy transition to RE in SEA requires new instruments and policies that could be pioneered and supported by China, Japan, and South Korea to help usher the region into a sustainable energy future and to demonstrate net-zero carbon commitments abroad. We explore possible avenues below.

Public Banks

- **Mobilizing and incentivizing private finance**

  Public finance plays an important role in creating an enabling environment for RE investment. Public funds release additional investment. Policy makers and public finance institutions have to work out how to make the best use of limited public funding sources to increase the overall capital for RE. Public funding is not expected to increase above its current share of 15% of total RE investment.[118] They must, however, seek to use their investments to open and develop new markets in regions needing RE infrastructure. This requires public finance institutions to pay attention to mitigating the risks and barriers affecting private finance aimed at scaling up RE investment in regions without developed markets.

- **New lending policies to make finance climate-proof**

  A transformation driven by net-zero policies extends beyond the transition from coal to RE at home or abroad. It requires policy for energy efficiency, decarbonizing the energy supply, innovations in batteries, storage, and new technology such as green hydrogen, and investment in grid development beyond the market design and development of solar and wind.

  Like the net-zero announcements themselves, each public bank needs not only to codify its exclusion of fossil fuels, but also underline its commitment to delivering net-zero ambitions. These holistic lending policies are not new (the EIB, for example.)[119] But the leadership required to deliver them in Asia is. At present, policies on coal finance are driven by national debate on climate rather than climate finance leadership by public banks.

- **Reshape the basics for large-scale RE**

  The core business of public finance is providing leadership of syndicates and private banks in energy projects. The basic proposition is providing credit lines, long term finance, and loan guarantees to commercial banks that are lending to RE projects. The scope and scale of this work in SEA needs to improve and better fit the regional systems and needs. There is no reason why this cannot be done by international syndicates or partnerships with regional private banks in SEA, as it was with coal power.

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[118] "Unlocking Renewable Energy Investment: The Role of Risk Mitigation and Structured Finance." IRENA, 2016, www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_Risk_Mitigation_and_Structured_Finance_2016.pdf.

[119] "EIB Draft Energy Lending Policy." European Investment Bank, 24 July 2019, www.eib.org/attachments/draft-energy-lending-policy-26-07-19-en.pdf.

In order to achieve the scale necessary to combat the climate crisis and make RE finance competitive with fossil fuel finance, banks need to reshape the financial tools that were originally made for coal- and gas-fired power. There is still a perception of high risk for large-scale RE, particularly now when the solar and wind markets are developing.

But the root of the issue is that financing large-scale solar and wind is different than financing fossil fuels. The point at which financial risk is highest and the way in which the deals are structured differ between the energy types, and this requires a change in the basics from the banks.

- **Maintain Foreign Direct Investment (FDI) support for small-scale projects**

  In many countries in SEA, the RE project pipeline is driven by FiTs in US dollars to attract overseas investment. Many banks and industrials from recipient countries have two challenges: access to initial grants and smaller concessional loans that fund the project development phase. Many banks are not willing to conduct the necessary due diligence on small-scale projects, but this process needs to be reworked for RE. In the energy industry, where banks that have historically funded fossil fuels are hesitant to take on the risk of large-scale solar and wind projects, concessions must be made for the industry to grow.

  Public banks' grants and concessional loans are an important source of capital to kick-off RE development. Proof of concept in RE has been promoted by banks like the ADB in the absence of developed frameworks for FDI. This has resulted in projects such as the first utility-scale solar plant in Indonesia and the first large-scale floating solar plant in Vietnam.[120]

- **Different capital, different labor**

  Solar and wind projects have no fuel costs and installations made with higher local content (e.g. solar panels from the region itself). The nature of construction of solar and wind in Vietnam and Malaysia is fundamentally different from coal power for China, Japan, and South Korea. ODF institutions (CHEXIM, JBIC, KEXIM) should reflect this in their requirements for both the content of domestic equipment and labor.

  This will remove one current block to scale and bankability. Recipient country developers, usually small- and medium-sized companies, still have difficulty accessing large-scale, low-cost finance to support the construction of projects. On-lending facilities (financial intermediary lending) from foreign public banks or MDBs to the local financial institutions are a key solution. While this method is not well-established in SEA, certain banks have done on-lending credit lines to other areas of the world, such as JBIC in Latin America and the Caribbean, Turkey, and India.[121] Another typical solution is turning the project over to sponsors and EPC contractors during the construction stage.

- **Internationalization of other markets**

  As the market becomes more internationalized, ECA institutions (Sinosure, NEXI, K-SURE) need to start to design standardized insurance products for all types of financiers and investors both in the domestic and overseas market.

[120] ADB Projects & Tenders. https://www.adb.org/projects/status/approved-1359.

[121] JBIC Press Releases. https://www.jbic.go.jp/en/information/press/.

Commercial Banks

- **Green bond schemes, refinancing, and repackaging**

  The major commercial banks in China, Japan, and South Korea have all obtained an abundance of long-term debt through the overseas green bond issuances and a large amount of that money has been allocated to overseas RE projects. But not in SEA so far. The investing countries have a vast opportunity in the SEA RE market, as previously mentioned, and leadership in the region is needed. As of now, the investing countries are missing the opportunities to enter a promising market.

  The first step should be to refinance operating RE projects, of which the risks have been largely absorbed. For example, Hana Financial Group in South Korea has already allocated a part of the proceeds raised from overseas green bond issuances to a solar project in Vietnam.[122] This represents a commercial entry point for the banks to build their capacity and expand their business in an unfamiliar market. And increasingly, utilities, industrials, and local banks in SEA will finance their energy transitions with more green bonds themselves, such as PLN in Indonesia.[123]
  It will be a fast-growing market purely for commercial reasons, and commercial banks of China, Japan, and South Korea will only benefit from tailoring future green bond issuances for the SEA RE market.

- **Non-recourse project finance**

  Various unaddressed risk factors are preventing foreign investors from getting non-recourse financing for RE projects in SEA. As a typical way for banks to finance greenfield RE projects, non-recourse project finance represents the most mature financing facility and reflects a market that is fully standardized and integrated. It is what could scale up RE development and further pave the way for securitization and accessing mainstream secondary-market investors. It could be too early to talk about non-recourse project finance from foreign commercial banks in SEA, but limited-recourse with partial guarantees from the sponsors and experienced banks is already an option.

Project Sponsors

- **Sharing expertise via joint ventures**

  Project sponsors have specific expertise and preference to select the RE projects that they deem the most valuable. The way this works is via bids on a project-by-project basis. If in these auctions, project sponsors cooperate with each other to share expertise and mitigate risk via the creation of a joint venture, the ability to maneuver large and long-term projects would become much more likely.

- **Equity plus innovation**

  It is not just about equity investment from project sponsors. Technology and business model innovation is key to keep competitiveness in the market, which will in turn reinforce the RE development trend and realize value-adding in a wider social welfare.

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[122] Hana Financial Group Sustainability Report 2019. https://www.hanafn.com:8002/eng/csr/sustainability/sustainabilityReport.do.

[123] Harsono, Norman. "ADB, PLN to Pilot Issuance of Energy Transition Bonds in 2021." The Jakarta Post, 3 Nov. 2020, www.thejakartapost.com/news/2020/11/03/adb-pln-to-pilot-issuance-of-energy-transition-bonds-in-2021.html.

A Regionally-integrated View

While regional integration will reach a new level after finalizing the RCEP, the investing countries are still more financially-integrated with global markets than regional,[124] which is reflected in overseas RE investments primarily into developed countries. Given the advantages of increasing regional financial integration to foster growth, reinforce economy, and increase security, the investing countries and SEA policymakers should consider establishing a clear pathway to realize the USD $205 billion regional investment opportunity that RE presents.

China tends to manage new project deals on its own in most overseas investment cases, but Japan and South Korea have demonstrated an ability and desire to work together in the energy sector in the past. There are several cases where Japanese and South Korean public banks and commercial banks co-financed coal power plants in SEA. But the current momentum of institutions exiting coal finance makes this partnership impractical in the long-term.

And it will not be a flight of fancy. RE industrials from China, Japan, and South Korea have all acted with their specific expertise in the global RE market in the last ten years, although still nowhere comparable with the coal power industry. But the nature of RE technology today gives the flexibility and possibility for a much wider collaboration -- is not just bilateral between recipients and financiers like coal power -- but where the components are integrated and China, Japan, and South Korea all have different closed technologies in order to realize maximum market and technological efficiency.

Solar and wind investment are ready for this integration. For example, designing a project finance deal with a combination of Japanese and South Korean co-financing a project and solar panels from China is not unthinkable. We believe that current barriers of RE development in SEA would be overcome with the effort of China, Japan, and South Korea either working individually or together setting their sights on becoming stronger players in the market. The type of progress needed for RE also requires recipient countries to establish policy and market systems that favor RE, the way many countries have with coal in the past. This integration will allow the RE sector in SEA to grow into a strong market with shared values, balanced interests, and a sound future.

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[124] Montanes, Ruth Llovet, and Sergio L Schmukler. "Financial Integration in East Asia and Pacific: Regional and Interregional Linkages." World Bank Research and Policy Briefs, 1 May 2018, documents1.worldbank.org/curated/en/597991525786594320/pdf/Financial-integration-in-East-Asia-and-Pacific-regional-and-interregional-linkages.pdf.

Wind turbines on the coast.
©Adobe Stock/Naka

Policy Recommendations for Overseas RE Investment

China, Japan, and South Korea have flagship programs and fluent international rhetoric for sustainable and low-carbon development, but they each appear far from stopping all finance for the overseas fossil fuel market. All three countries' financial institutions are lagging on overseas RE investment, particularly for solar and wind, so we cannot suggest winners and losers. However, here we explore what each country and its financial institutions and policymakers can do to bridge the gap between net-zero ambition and the reality on the ground for overseas energy finance in regions like SEA. This list of actions is clear and needs to be applied immediately in the context of the climate emergency.

China

- **Lower financing rates at public banks for RE**

  The key area where China lags behind Japan and South Korea is that its public banks have high lending rates generally. The high rates are the result of multiple reasons. First, the countries that China is lending to often have higher political and financial risks. Second, Chinese financial institutions receive government capital with higher rates than Japan and South Korea. Third, few alternative financing methods are available in some countries, so Chinese lending becomes the only choice. But the high-rate also makes China's overseas support often unsustainable for some countries.

- **Open up overseas markets for domestic commercial banks**

  China's domestic RE market provides many opportunities for local banks and companies and allows them to deliver on domestic policy priorities and energy demand growth. This results in the overseas market being a lower priority for many players.

  ICBC is the main Chinese commercial bank that lends to overseas RE, and its efforts alone are not enough to realize the market opportunity. Additional commercial banks supporting RE abroad would allow China to tap into the opportunity we describe above. ICBC has proven capacity and interest in co-financing with other Chinese financial institutions, and should lead and enable additional commercial bank financing abroad.

- **Expand beyond ECA financing for RE investment**

  Banks in China tend to prefer ECA finance, but this type of finance is not suited to RE project financing where a shareholder's guarantee is currently a necessary element of the credit review process. In this context, project finance loans are the most credible solution. RE investment has
  to move beyond traditional, unscalable policies and instruments.

- **Continue prioritizing developing countries, particularly with solar and wind**

  China positions itself to support developing countries, where it has little competition from its regional neighbors who prioritize RE investment in developed countries with strong sovereign credit ratings. It is these countries that have limited capital for energy sector investment but should be looking to avoid toxic coal power and leapfrog gas to a long-term sustainable energy system.

Japan

- **Get out of non-solar and wind mega projects**

  While Japanese public banks could use their favorable financing rates for quality RE growth abroad, public banks have the highest concentration of RE investment in geothermal and hydropower rather than focusing on solar and wind technology. These are expensive mega projects which frequently reward the investing countries more than the recipient -- they remain expensive and are slow to commission. In any green and just recovery from Covid-19, solar and wind must take precedence; delivering more jobs at a quicker pace and have established themselves as the top choices for RE in SEA. We see Japanese financial institutions as stuck in old and dirty technology.

- **Increase support for developing country solar and wind growth**

  Japan's support for RE focuses almost exclusively in developed countries. This is shortsighted. Japan has the opportunity to be a leader to its neighbors in developing countries and capture market share from both its regional peers and the global market. In SEA specifically, the International Energy Agency (IEA) estimates that overall energy demand will grow by 60% between 2018 and 2040 while the region's economy will more than double in size.[125] Energy demands such as these cannot be met by fossil fuels within a 1.5 degrees pathway -- Japanese finance must expand its support into developing countries and make solar and wind power the priority.

- **Translate existing coal value chains into RE**

  The existence of active commercial banks allows increasing competition, support, and expertise growth in the industry. Part of the reason why fossil fuel investment globally is at overcapacity today is because institutions have become experienced and comfortable with the risks after thirty years of fossil fuel power projects. But Japan has demonstrated that it is prepared to invest time and energy into market design and development in RE, evidenced by its commitment to module design technology and its position as the second largest cumulative domestic installer of solar globally as of year-end 2019.[126] Its technical and financial expertise can unblock solar and wind tariffs, auctions, and PPAs at speed and means Japan is well-positioned to create best practices in RE for both investing and recipient countries.

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[125] *Southeast Asia Power Sector Scorecard.* Greenpeace Southeast Asia, Sept. 2020, www.greenpeace.org/southeastasia/publication/44037/southeast-asia-power-sector-scorecard-assessing-the-progress-of-national-energy-transitions-against-a-1-5-degrees-pathway/.

[126] "Renewable Energy Statistics 2020." IRENA, Jul. 2020, https://www.irena.org/publications/2020/Jul/Renewable-energy-statistics-2020

South Korea

- **Make a clear overseas strategy or set of guidelines to support RE financing**

  South Korea's inexperience and lack of state policy to support overseas RE is the root cause of its small overseas RE financing market share. There are no overseas strategies or guidelines to support its public banks or commercial banks in order to increase support for RE. South Korea's large corporations that have historically supported fossil fuels abroad do not appear to be switching over to support RE anytime soon despite catastrophic financial performance since the financial crisis - such as the case with Doosan Heavy Industries & Construction's bailouts. Along with this general lack of policy or corporate support, South Korean public banks are not heavily involved in the overseas RE sector in any meaningful way, which discourages the private sector from getting involved. As previously mentioned, public banks play a key role in mobilizing private finance, so a more forward-thinking policy approach for increased public finance into RE could be significant.

- **Create specific financing facilities to increase public bank support for overseas RE**

  Financing facilities available for energy investment today primarily cater to large infrastructure projects such as coal- and gas-fired power plants. Public investment funds like those in China should be created with an exclusive focus on solar and wind. There is a more fundamental challenge to South Korea to catch up with international standards on financial instruments and lending policies for RE. Financial instruments must be designed to unlock the barriers that make RE less bankable in South Korea. Without these changes, South Korea will continue to be the laggard in the region and forego the growing RE market share overseas to its neighbors.

- **Increase support for commercial banks to go abroad**

  Several Japanese commercial banks and China's ICBC have increased their support for RE abroad, but South Korean banks are still focusing too highly on the domestic market alone. Only a small handful of South Korean banks have ventured into the RE market overseas, and these investments remain small comparatively. South Korea has the capability to revert its focus away from coal by leveraging its experienced banks and industry that have domestic expertise on RE, coupled with its experience investing in energy markets abroad. The government needs to incentivize commercial banks to venture into new markets, particularly after it pushes public banks to lead the way. Without this, South Korean industry and finance will fall further behind China and Japan in the region and forego profits from the growing global trend of solar and wind, as they increasingly become the world's lowest cost energy source.

Appendix - Glossary

AIIB	Asian Infrastructure Investment Bank
ACE 2.0	Action for Cool Earth 2.0
ADB	Asian Development Bank
BAU	Business as Usual
BNEF	Bloomberg New Energy Finance
CDB	China Development Bank
CFPP	Coal-fired Power Plant
CHEXIM	The Export-Import Bank of China
China-CEE Fund	China-Central and Eastern Europe Investment Cooperation Fund
DAC	Development Assistance Committee
ECA	Export Credit Agency
EPC	Engineering, Procurement, and Construction
ESG	Environmental, Social, and Governance
FiT	Feed-in-Tariff
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GW	Gigawatt
HFG	Hana Financial Group
ICBC	Industrial and Commercial Bank of China
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
JBIC	Japan Bank for International Cooperation
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
JPY	Japanese Yen
KBFG	KB Financial Group
KDB	Korean Development Bank

KEPCO	Korea Electric Power Corporation
KEXIM	The Export-Import Bank of Korea
LCOE	Levelized Cost of Energy
LIBOR	London Interbank Offer Rate
MDB	Multilateral Development Bank
MFG	Mizuho Financial Group
MUFG	Mitsubishi UFJ Financial Group
MW	Megawatt
NEXI	Nippon Export Investment Insurance
ODA	Overseas Development Assistance
OECD	Organization for Economic Cooperation and Development
OOF	Other Official Flow
PDP	Power Development Plan
PLN	Perusahaan Listrik Negara
PPA	Power Purchase Agreement
RCEP	Regional Comprehensive Economic Partnership
RE	Renewable Energy (includes all RE technologies)
SDG	Sustainable Development Goal
SEA	Southeast Asia
Sino-CEE Fund	Sino-Central and Eastern Europe Fund
Sinosure	China Export & Credit Insurance Corporation
SMFG	Sumitomo Mitsui Financial Group
SOE	State-Owned Enterprise
USD	US Dollar
WFG	Woori Financial Group

Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

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