FAIR FINANCE ASIA

A FUTURE WITHOUT COAL

Banking on Asia's just energy transition

About this report

This report, commissioned by Fair Finance Asia, analyzes how financial institutions operating in Asia can contribute to a just energy transition.

About Fair Finance Asia

Fair Finance Asia (FFA) is a regional network of civil society organizations (CSOs) committed to ensuring that financial institutions operating in Asia respect and uphold the rights and social and environmental well-being of local communities.

About Profundo

Through research and advice, Profundo aims to make a practical contribution to a sustainable world and social justice. Quality comes first, aiming at the needs of clients. Thematically focused on commodity chains, the financial sector and corporate social responsibility. More information on Profundo can be found at www.profundo.nl.

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Coal accounts for 74% of all electricity produced in India, 66% in China, 59% in Indonesia, 52% in the Philippines, 47% in Vietnam and between 1% and 45% in the other eight Asian countries covered in this study.

Continued use of thermal coal is the number one cause of global temperature rise. It is responsible for nearly half of carbon dioxide emissions worldwide and 72% of greenhouse gas (GHG) emissions from the energy sector. A new report by the Intergovernmental Panel on Climate Change (IPCC) released in August 2021 issued a "code red" for the world, warning that without deep and immediate cuts to carbon pollution, the 1.5°C goal of the Paris Agreement "will quickly fall out of reach." [1]

A vision of a different energy future is urgently needed. Yet, across Asia, coal consumption has doubled in the last decade. Coal accounts for 74% of all electricity produced in India, 66% in China, 59% in Indonesia, 52% in the Philippines, 47% in Vietnam and between 1% and 45% in the other eight Asian countries covered in this study. Together, these 13 countries[i] are developing coal-fired power projects with a total capacity of 432 GW which, when complete, will increase their coal-fired power capacity by 30%.

SOCIAL AND ENVIRONMENTAL IMPACTS OF COAL

Coal is a major contributor to climate change, causing higher temperatures, droughts, floods and extreme weather patterns.

For the majority of Asia's population, these have serious consequences for housing, livelihoods, health and food security. Coal combustion also causes significant air pollution from the release of nitrogen oxides, sulfur dioxide, particulate matter and heavy metals, while coal mining and combustion cause water pollution and consume large volumes of water.

[i] FFA countries: Cambodia, India, Indonesia, Japan, Pakistan, Philippines, Thailand and Vietnam. Non-FFA countries: Bangladesh, China, Malaysia, Singapore and South Korea.

The air pollutants emitted by coal-fired power plants are harmful to human health and a major cause of respiratory and cardiovascular disease. The contamination of water, air and soil by coal combustion threatens the food security of vulnerable communities due to adverse impacts on crop productivity, fish and life in rivers and biodiversity. Land grabbing by coal companies has led to rural communities and Indigenous peoples losing agricultural and traditional lands. Coal mine workers labor in dangerous working conditions for low wages, and poor health and safety standards have resulted in high rates of death and injury.

POLICIES TO LIMIT THE USE AND IMPACT OF COAL IN ASIA

To meet their obligations under the Paris Agreement, many Asian countries are taking steps to limit the negative climate impacts of coal. Indonesia, Pakistan, Philippines, Singapore and South Korea have all introduced policies to stop new coal-fired power plant projects. The adoption of carbon capture and storage (CCS) technology to improve the efficiency of coal-fired power plants has become a policy focus in China, Japan and South Korea. Several countries have also committed to introduce a carbon tax, including India, Japan, Singapore, South Korea and Vietnam.

However, these policies are not sufficient to phase out coal and achieve the Paris Agreement commitments. Although fewer coal-fired power plants are being constructed, those already in operation and under development will continue to operate for the next 35 to 40 years. Meanwhile, some Asian countries are switching away from coal to other fossil fuels (such as natural gas) that will continue to emit GHGs. Efforts to make coal-fired power plants more efficient will have very little impact on reducing GHG emissions, and new market mechanisms like carbon taxes and incentives to stop investments in coal will not be fully effective in turning the tide.

COAL FINANCING IN ASIA

Continued growth in Asia's coal sector is largely due to available funding coming from banks and investors. In the past five years (2016–2020), banks operating in Asia have provided USD 683 billion in loans and underwriting services to companies active in coal mining and coal-fired power in Asia. Annual credit flows to coal peaked in 2018 and have since showed a modest decline (-16% in 2020). Most loans and underwriting services were provided to coal companies active in China, followed by coal companies in Indonesia, Japan and India. Chinese banks accounted for two-thirds of the loans, followed by banks from Japan, India and South Korea. Banks from outside the region (United Kingdom, United States, France and other countries) made only a minor contribution to total loans and underwriting services.

In June 2021, investors held USD 70.4 billion in bonds and shares issued by companies active in coal mining and coal-fired power in Asia, 86% of which were in the form of shares. The value of the shares of Asian coal companies owned by institutional investors peaked at the end of 2017 and declined by 28% by mid-2021. A comparison of baseline investments and actual investment value (i.e. whether the portfolio composition had stayed the same) shows that approximately USD 10 billion more investments were made in the peak period of 2017–2019. The difference between baseline and actual investments since the fourth quarter of 2020 is smaller, but still indicates an overall increase in fossil fuel investments.

Most investments are currently made in the shares and bonds of coal companies in India, followed by companies in China, Japan and Malaysia. Investors from the US accounted for 20% of total bonds and shareholdings, and investors from Japan, China and India also held significant stakes. The biggest investors in the Asian coal sector are Japan's Government Pension Investment Fund, India's Life Insurance Corporation, US asset managers BlackRock and Vanguard and Malaysian investors Khazanah Nasional, PNB and EPF.

TOWARDS A JUST ENERGY TRANSITION

The enormous impacts of coal on climate change, the environment and society must be urgently addressed. However, simply replacing coal with renewable energy is not a straightforward solution to the social and environmental injustices of the global energy system. Instead, Asian civil society movements are calling for a "just energy transition" based on the following principles:

No financing for new coal projects for electricity generation and phasing out existing coal-based power generation;

Development of a time-bound transition away from other fossil fuels for electricity generation;

Active investment in renewable energy generation;

Long-term planning and strategies to mitigate the adverse environmental and social impacts of renewables;

Respect for land rights and Free, Prior and Informed Consent (FPIC), and clear policies for community participation, gender sensitivity and consultation with civil society organizations (CSOs) in large energy projects;

Protection of the rights of workers and mainstreaming of Human Rights Due Diligence (HRDD) during the energy transition;

Safeguarding the health, livelihoods, culture and heritage of communities impacted by the continued use of fossil fuels;

Active and meaningful engagement and participation of women in the energy transition; and

Investments in access to electricity for all.

Realizing a just transition in Asia will require financial institutions to play a pivotal role, but success will also largely depend on governments promoting and regulating a shift from fossil fuels to renewable energy in a manner that safeguards the environment and respects human rights.

RISKS AND OPPORTUNITIES OF THE ENERGY TRANSITION

There are strong monetary arguments for financial institutions in Asia and around the world to transition from coal to renewables. Divesting from coal would not only allow them to avoid the mounting financial risks of coal, but also capitalize on the financial returns offered by increasingly profitable renewable energy investments.

Opportunities

This transition to renewable energy is inevitable. Between 2016 and 2020, renewables outpaced coal in four important areas: revenue growth, EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization) growth, return on capital employed (ROCE) and value growth. Under the International Energy Agency's (IEA) 1.5ºC scenario, policy responses by governments, shifts in the supply chain and changing attitudes of financiers will all tilt in favor of renewable-related assets.

Risks

Investors in coal-related assets might see a strong decline in the value of their shares and a significant devaluation of their bond values. Banks might lose 76% of their loan value. Meanwhile, shareholders of renewable-related assets could benefit from value growth and debt with a much lower default risk than the debt of coal-related companies.

ROLE OF THE FINANCIAL SECTOR IN THE ENERGY TRANSITION

The financial sector has a crucial role to play in a just energy transition in Asia. Despite commendable efforts to promote sustainable finance at the global level (NGFS and SBN), the regional level (ASEAN+3) and in various Asian countries (China, Singapore, Malaysia, Indonesia and Vietnam), financial institutions in Asia continue to finance coal on a large scale and are relatively less interested in renewable energy financing. There are three main reasons for this:

1	The absence of a financial regulatory framework to incentivize Asian financial institutions to finance the transition. Both banks and regulators focus on short-term risks and do not fully appreciate how environmental, social and governance (ESG) risks can become financial risks.
2	Large energy companies in Asia are not developing large renewable energy projects, and financial institutions are not interested in financing smaller renewable energy projects by start-ups and small and medium-sized enterprises (SMEs).
3	Asian governments are not investing in electricity transport infrastructure, which would make it easier for renewable energy projects to develop and attract financing.

However, a shift is underway, prompted primarily by the commitments of three countries – China, Japan and South Korea – to achieve net-zero GHG emission plans. Financial institutions are expected to follow suit, and banks in Taiwan and Vietnam have begun to show more interest in financing renewables. China has also committed to stop financing coal projects overseas.

Financial regulators and central banks have a major role to play in catalyzing these developments and motivating banks to finance the transition from coal to renewable energy. This can be done by structuring debt relief from foreign creditors; bringing banks together and reaching consensus on where to invest; and focusing central bank asset purchases on green bonds.

RECOMMENDATIONS

Based on the findings of this study, Fair Finance Asia (FFA) has developed the following recommendations for financial institutions, Asian governments and CSOs. These recommendations are intended to motivate key actors and leaders to facilitate and finance the shift from coal and other fossil fuels to renewable energy, and ensure a just transition.

Recommendations for CSOs

- CSOs should engage with financial institutions and governments through all available avenues of influence to ensure they implement the recommendations listed here.
- CSOs should actively engage in the key processes of financial institutions, such as providing evidence-based inputs during annual general meetings and opportunities to comment on the policies of financial institutions.
- CSOs should engage with multilateral financial institutions (MFIs) to influence their environmental and social policies, as MFIs have the potential to shape both country-level policies and those of national financial institutions.
- CSOs should build their capacity to track how new climate monitoring tools are used in the financial sector and to respond to claims made by financial institutions about their alignment with the Paris Agreement.
- CSOs should concentrate on monitoring the climate impacts of sectors responsible for the bulk of global GHG emissions (fossil fuels, agriculture and forestry). A focus on measurable, non-Paris-aligned corporate activities rather than (financed) GHG emissions would be more efficient, easier to communicate and allow CSOs to influence financial institutions more effectively.
- Global civil society must work together to track the cross-border financing of key sectors (fossil fuels, agriculture and forestry) and create platforms for sharing data, knowledge and experiences across the region to uphold the duty of care of financial institutions, for instance, through litigation.
- CSOs should raise more awareness of issues related to a just and sustainable energy transition and educate citizens and consumers about their individual responsibilities.
- CSOs should build their capacity to monitor the policies of financial institutions that affect lending and investment decisions, as the capacity to monitor government regulations and businesses, including financial institutions, is key to meeting timelines and targets for a just transition. The Fair Finance Guide International Methodology (FFGI methodology) is a comprehensive and rigorous assessment tool that CSOs can use.

Recommendations for Financial Institutions

- Financial institutions should have a clear and detailed strategy to address the climate impacts of the activities and companies they finance and invest in. Financed companies need to be aligned with a 1.5°C scenario based on science-based targets that cover Scope 3 emissions. The climate impact of financial institutions needs to be reduced to zero by 2050 at the latest and halved by 2030 at the latest.
- Leaders of financial institutions should make urgent strategic changes to ensure their loans and underwriting services directly support climate mitigation, environmental resilience and respect for human rights and labor rights in Asia.
- During the lending process, financial institutions should actively engage with potential borrowers to request and obtain all necessary information on the potential negative impacts of their activities on sustainability, and make financing agreements conditional on averting or addressing negative impacts swiftly.
- Financial institutions should ensure their climate strategy is reported transparently and the verification and monitoring of their climate impacts are credible. They should also contribute to the development of climate monitoring tools to support more reliable and robust reporting in the financial sector with greater sector coverage and alignment with a 1.5ºC scenario.
- Since it is not yet mandatory for financial institutions to disclose and audit their GHG emissions, they should voluntarily make their financing, investment portfolios and climate impact assessments more transparent. This would allow auditors, researchers, CSOs, media and other stakeholders to monitor and independently assess the Paris alignment of financial institutions.
- Financial institutions should develop their climate change strategies into sectoral policies and strategies, especially for high-impact sectors like fossil fuel, including the coal industry. Financial institutions should stop funding coal as soon as possible and actively seek opportunities to expand renewable energy generation in Asia.
- Financial institutions should recognize that the transition from coal and other fossil fuels to renewables in Asia needs to be a just transition. Financial institutions should therefore commit to the following principles and demand that the companies they finance and invest in do the same:

  - End financing for new coal projects for electricity generation and adopt a phased approach to move away from existing coal-based power generation.
  - Ensure that coal is not replaced by other fossil fuels, such as natural gas, and that other fossil fuels are phased out from electricity generation on a publicly disclosed timeline.
  - Invest actively in renewable energy generation.
  - Engage in long-term planning for the transition and ensure strategies are in place to mitigate any adverse environmental and social impacts of renewables.
  - Ensure that land rights and Free, Prior and Informed Consent (FPIC) are respected, and there are clear policies to mainstream community participation, gender sensitivity and CSO consultations in the development of large energy projects.
  - Protect the rights of workers at project sites and mainstream Human Rights Due Diligence (HRDD) as part of the process.
  - Safeguard the health and livelihoods of workers and the culture and heritage of communities.
  - Ensure the active and meaningful participation of women in the energy transition.
  - Invest in access to electricity for all.

Recommendations for Asian Governments and the ASEAN

- Governments need to meet their commitments to the Paris Agreement and the Sustainable Development Goals (SDGs) by developing a strategy for a rapid and just transition of their energy sectors away from fossil fuels and towards renewable energy sources. This transition should be done in a just way, ensuring that workers in the sector are fully supported to shift into alternative decent employment and receive universal social protections.
- Governments of high-income countries need to honor and deliver on their climate finance pledge of USD 100 billion for vulnerable countries.
- Governments should create a level playing field for banks in the form of mandatory regulatory or legally binding minimum requirements to avoid free riders. These need to strengthen banks' ESG risk and impact assessment methods while also defining and promoting lending for socially and environmentally sustainable activities, and phasing out lending that is not aligned with the Paris climate goals and the SDGs. These include mandatory and audited carbon emissions disclosures by companies and the financial institutions that finance them based on the Greenhouse Gas (GHG) Protocol and existing climate-monitoring tools for financial institutions.
- In line with their commitment to make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development" (Paris Agreement, Article 2.1(c)), governments should establish a financial regulatory framework to incentivize Asian financial institutions to become Paris-aligned and finance a rapid and just transition of their energy sectors away from fossil fuels towards renewable energy sources. This can be achieved, in part, by developing an ambitious energy transition plan; creating a fiscal space by structuring debt relief from foreign creditors; bringing banks together to create consensus on where to invest; and focusing asset purchases on green bonds.
- Governments should invest in infrastructure to transport electricity across their countries. This could make it easier for smaller and start-up companies to invest in renewable energy generation, and it would also increase access to electricity for local communities.
- Governments should put sufficient regulations in place to ensure that all companies, in the energy sector and beyond, live up to the expectations of the United Nations Guiding Principles on Business and Human Rights (UNGPs). These regulations need to be implemented and monitored properly to ensure that companies respect human rights and provide access to remedy.
- A carbon tax can be a useful policy instrument to promote the transition from fossil fuels to renewables. For a carbon tax to be effective, governments should:
  - Be transparent about revenues and expenditures;
  - Ensure that the tax influences polluting behavior effectively; and
  - Reinvest revenues in improving access to renewable energy for local communities.
- Governments should include climate change in school and university curricula and ensure that academic and professional training on the energy transition is made available.
- Governments should finance research on what a just energy transition means and how it can be achieved in the Asian context.
- Governments should promote and provide financial support for community-led renewable energy projects.
- Governments should provide inclusive and fair compensation schemes for communities negatively impacted by (renewable) energy projects.
- Governments should stimulate renewable innovations that benefit communities, such as solar farming projects.
- Governments should ensure alternative sources of income for communities that depend on coal mining for their livelihoods, and for workers in the coal value chain, through sustainable development, retraining and investments in other sectors.

ABBREVIATIONS

AIPP	Asia Indigenous Peoples Pact	**JBIC**	Japan Bank for International Cooperation
ASEAN	Association of Southeast Asian Nations	**JICA**	Japan International Cooperation Agency
CAGR	Compounded Average Growth Rate	**kWh**	Kilowatt hour
CCS	Carbon Capture and Storage	**LNG**	Liquefied Natural Gas
CSO	Civil Society Organization	**Mt**	Metric tonnes
DCF	Discounted Cash Flow	**MW**	Megawatt
DSSI	Debt Service Suspension Initiative	**NDC**	Nationally Determined Contribution to the Paris Agreement
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization	**NGFS**	Network of Central Banks and Supervisors for Greening the Financial System
ESG	Environmental, Social and Governance	**NGO**	Non-Governmental Organization
ETS	Emission Trading Scheme	**OTEC**	Ocean Thermal Energy Conversion
EU	European Union	**PACTA**	Paris Agreement Capital Transition Assessment
FFA	Fair Finance Asia	**PCAF**	Partnership for Carbon Accounting Financials
FPIC	Free, Prior and Informed Consent	**PPA**	Power Purchase Agreement
GCEL	Global Coal Exit List	**RO(A)CE**	Return on (Average) Capital Employed
GDP	Gross Domestic Product	**SBTi**	Science Based Targets initiative
GHG	Greenhouse Gas	**SDG**	Sustainable Development Goal
gsce	Grams of Standard Coal Equivalent	**SFSG**	G20 Sustainable Finance Study Group
GW	Gigawatt	**tCO2eq**	Tonnes of CO2 Equivalent
HRDD	Human Rights Due Diligence	**UN**	United Nations
IEA	International Energy Agency	**UNEP**	United Nations Environment Programme
IPP	Independent Power Producer	**UNFCCC**	United Nations Framework Convention on Climate Change
IPCC	Intergovernmental Panel on Climate Change	**UNGPs**	United Nations Guiding Principles on Business and Human Rights

Introduction

The Intergovernmental Panel on Climate Change (IPCC) warns that the world has less than 10 years to drastically reduce global greenhouse gas (GHG) emissions and avoid a catastrophic climate breakdown. At the end of 2020, the United Nations Environment Programme (UNEP) concluded that "to follow a 1.5°C-consistent pathway, the world will need to decrease fossil fuel production by roughly 6% per year between 2020 and 2030".[2] A rapid phaseout of coal-fired electricity production, which accounts for the highest GHG emissions per kilowatt hour (kWh), is crucial. Additionally, coal mining and coal-fired electricity generation are causing significant environmental pollution with serious impacts on human health.

In Asia, where there is heavy reliance on coal as an energy source, a new vision of an energy future is urgently needed. However, this will remain a challenge as long as most stakeholders cannot imagine a future for low- and middle-income countries (LMICs) without fossil fuels. Financial institutions that fund Asia's energy sectors have an important role to play in developing and implementing this vision by reorienting financing to renewable energy innovations, setting clear objectives and implementing time-bound strategies to exit from fossil fuels.

For Asia's big banks and investors, investments in thermal coal mining and coal-fired electricity generation have continued to be profitable. Banks have pumped billions of dollars into coal-fired power plants across Asia in recent years. However, as the impacts of climate change become more pronounced and recognized by more stakeholders – and the costs of renewable energy rapidly decline – some banks are slowly phasing out of coal.

It is not just CSOs that are demanding a phaseout of lending and servicing of coal projects – regulators and investors are also pushing for it. Resistance to fossil fuels will only continue, increasing the risk of coal investments becoming stranded assets, while investments in renewable energy are becoming steadily more attractive.

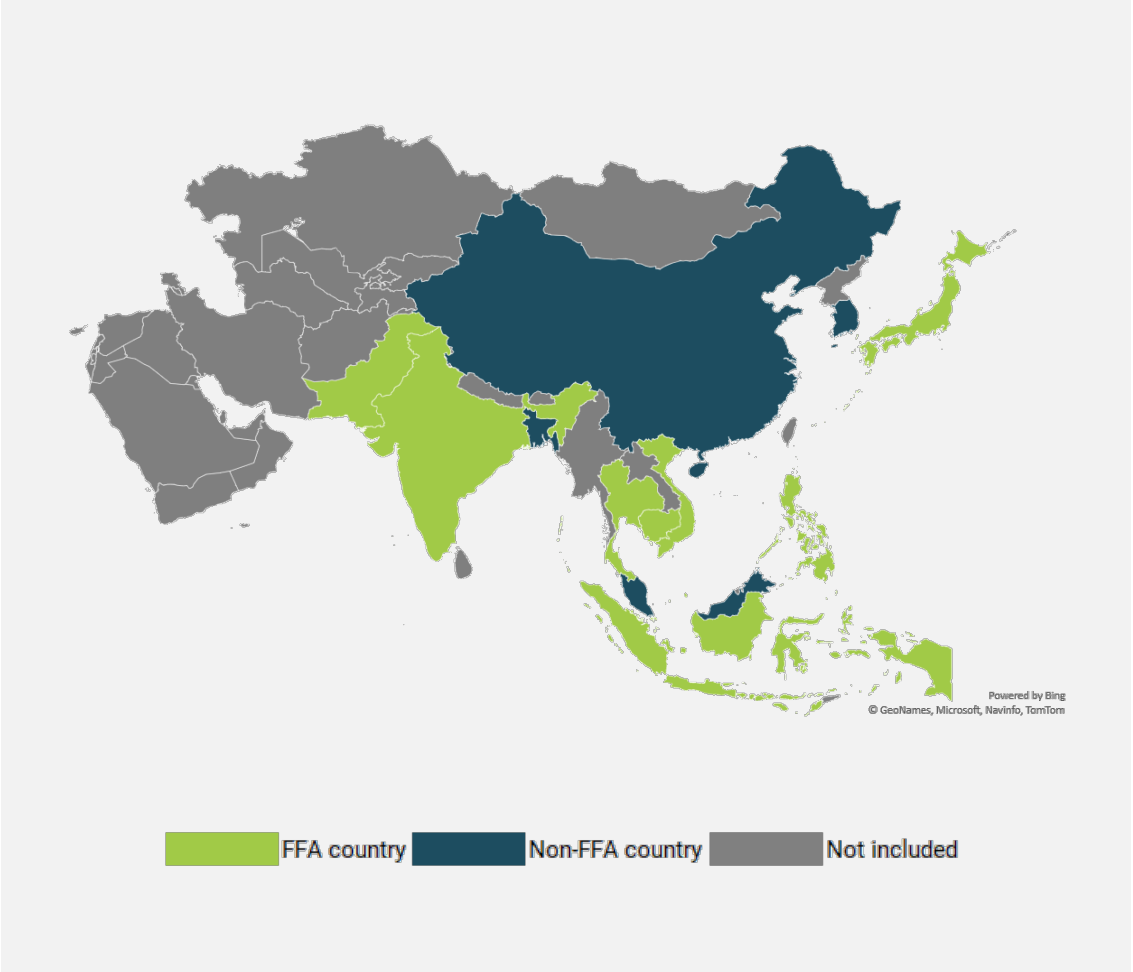
The net-zero commitments of some Asian countries, and the phaseout of new coal projects by Asian banks such as MUFG (Japan) and RCBC (Philippines), are hopeful signs. It is critical that more Asian financial institutions develop a time-bound exit strategy from lending and investments in the coal sector. This would not only be an important step towards limiting global climate change, but also essential for local communities whose health and human rights are seriously affected by coal mining and coal-fired electricity operations.

Fair Finance Asia commissioned this research to Profundo to assess the role of financial institutions in the coal sector as well as the just transition in the 13 Asian countries selected for this study. The aims of this study are to sound the alarm for Asian financial institutions to divest out of coal urgently, to enhance understanding of the risks and opportunities of an energy future without coal, and to spur regulators and governments to implement policies that promote a socially and environmentally just transition to renewable energy.

1 Methodology: An Overview

This multidisciplinary study used a variety of methods to analyze and address coal financing in the context of the energy transition in Asia, including financial research, scenario analyses, literature and policy reviews and informant interviews. This brief overview of the methodology outlines the central research questions of this study and the methodologies used to answer those questions. For more details on the methodology, see Annex 1.

Figure 1 Geographic Scope of Study



1.1 LITERATURE REVIEW

This study builds on sound research of coal financing and a just energy transition. An in-depth literature review was conducted to answer research questions central to the following: the impacts of coal in Asia, coal policies in the selected countries, requirements for a just energy transition in Asia and the role of the financial sector in facilitating this transition. The full list of literature and documents reviewed is included in the References section of this report.

1.2 INFORMANT INTERVIEWS

To capture the various visions of a just energy transition, the role of the financial sector and key recommendations for financial institutions and policymakers, interviews were conducted with a range of CSOs and representatives of financial institutions and the private sector. Informants were from both industrialized Asian nations and emerging economies with a broad geographical spread. They are quoted anonymously throughout the report. Information gathered from these interviewees has been analyzed to identify local insights into the impacts of coal and a just energy transition, the role of financial institutions in the transition and key regional and national policy developments.

1.3 FINANCIAL RESEARCH

This part of the research analyzed trends in thermal coal financing in Asia from January 2016, when the Paris Agreement went into effect, to December 2020. It specifically analyzed financing received by all companies on the Global Coal Exit List (GCEL) active in the 13 focus countries. The research used financial databases as well as company disclosures and media archives. To create a clearer picture of actual financing flows to coal mining and coal-fired power in the focus countries, segment adjusters and geographic adjusters were calculated when financing could not be attributed to a specific country and/or activity.

1.4 SCENARIO ANALYSIS

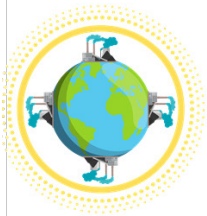
A scenario analysis was developed that built on earlier studies by scientific organizations, investment banks and independent research institutes. The analysis compared the financial performance and risks of companies engaged in coal mining and coal-fired power with those of companies engaged in renewable energy. Based on these scenario analyses, we compared the risks and opportunities for financial institutions to continue financing coal mining and coal-fired power with switching their financing to renewable energy.

For further details on the methodology, please see Annex 1.

2 Coal in Asia: Impacts and Policies

Asia is highly exposed to the impacts of climate change, mainly because of the use of coal and other fossil fuels as energy sources. Higher temperatures, droughts, floods and extreme weather patterns will have severe economic and social impacts across the region. Coal mining and burning coal are also linked to serious health, human rights and labor rights issues at the local level. It is therefore vital that Asia transition away from reliance on coal as an energy source. This chapter discusses the state of coal-fired power in Asia, the social and environmental impacts of coal and the policy measures being introduced to phase out coal.

2.1 COAL-FIRED POWER IN ASIA



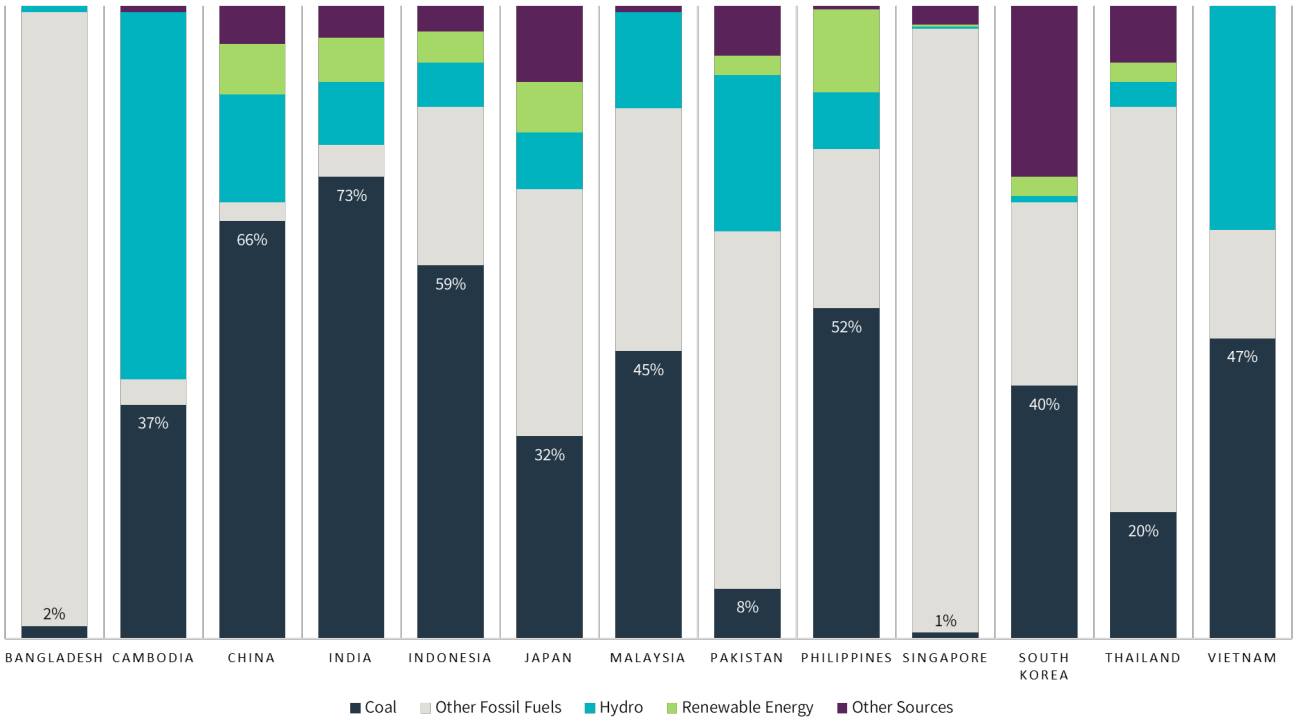
Although global coal demand declined by 1.8% in 2019 after two years of growth, coal-fired power generation remains the number one source of power generation in the world, accounting for 36% in 2019. [3]

While coal's share of the global energy mix is shrinking, in large part due to a sharp fall in coal consumption in European countries, the Asia Pacific region is still heavily dependent on electricity generated by coal combustion. In fact, coal-fired power in Southeast Asia is on the rise, and consumption has doubled in the past decade.[4]

In 2019, demand for coal in Southeast Asia amounted to 332 metric tonnes (Mt), most of which came from Indonesia (42%) and Vietnam (27%).[5] The COVID-19 pandemic led to a temporary drop in coal demand, but a rebound is expected in 2021 as economies recover, particularly driven by growth in industrial consumption and the power sector.[6] Asia is the fastest-growing region globally with annual gross domestic product (GDP) growth at 4.6%,[7] well above the global average of 2.3% in 2019.[8] When the COVID-19 pandemic pushed the global economy into recession, the region performed better than others, with a decline of -1.3% in 2020. The region has since bounced back to pre-COVID levels of recorded economic growth at 7.3% in April 2021, well above the global average of 6%.[9]

This strong economic growth drives demand for a reliable and abundant electricity supply, fueling the popularity of coal due to its affordable price and sizable supply. Should countries in Southeast Asia maintain their current fossil fuel consumption policies and ambitions, the International Energy Agency (IEA) projected in 2019 that coal demand would increase significantly and become the primary source of energy in the region by 2040.[10] In many countries in Asia, coal-fired power is the main source of energy for electricity, accounting for 74% of all electricity produced in India, 66% in China, 59% in Indonesia, 52% in the Philippines and 47% in Vietnam (see Figure 2). Other Asian countries also rely on coal as a source of energy for their electricity, but demand is low in Singapore, Bangladesh and Pakistan, where coal accounted for only 1%, 2% and 8% of total electricity produced, respectively, in 2018 (see Figure 2).

Figure 2 Power generation in Asian countries by source (% of electricity produced)



Note: Data is for 2018 and 2019.

Source: IEA (n.d.), "Data and statistics". Available at: https://www.iea.org/data-and-statistics/data-tables (accessed July 30, 2021).

Coal will likely continue to be a dominant source of electricity given that many Asian countries are still pursuing new coal-fired power plant projects. The 13 countries in this study are currently developing coal-fired power plant projects with a total capacity of 432 GW, with 264 GW in the pre-construction phase and 168 GW already under construction (see Table 1). When complete, the coal-fired power capacity of these countries will have increased by 30%.

China leads in coal development with a total capacity expansion of 246 GW, followed by India, Indonesia and Vietnam, which are actively developing coal-fired power plants with a total capacity of 65 GW, 32 GW and 28 GW, respectively (see Table 1). Bangladesh will see the most growth as the capacity of small coal-fired power plants is projected to increase more than 18-fold once 22 GW of new coal-fired power plants are in operation.

While these figures indicate continued interest in coal, there has been a recent trend in canceling new coal-fired power projects or at least putting some proposed projects on hold. In Table 1, projects are indicated as "put on hold" if there was no project development activity in the last two years. The projects are marked as "canceled" if the responsible companies or governments have announced that they canceled the projects, if projects have disappeared from company documents or the government's energy plans or if there has been no project development activity for four years. In the 12 countries in Table 1, projects with a total generating capacity of 1,422 GW have been canceled or put on hold in recent years. These projects would have doubled current coal-fired power capacity (1,447 GW). The most prominent are Malaysia and Thailand, where almost all projects have been canceled or put on hold, while India has canceled or put on hold many more coal-fired power projects than are being planned.

Table 1 Status of coal-fired power plant projects in selected countries in Asia, 2021

Country	Operating (MW)	Put on hold or canceled (MW)	Put on hold or canceled (% of operating)	Under development (MW)	Under development (% of operating)
Bangladesh	1,185	16,005	1,351%	21,704	1,832%
Cambodia	655	4,880	745%	1,765	269%
China	1,042,947	648,497	62%	246,864	24%
India	229,247	601,567	262%	65,923	29%
Indonesia	33,966	35,820	105%	32,949	97%
Japan	47,872	9,565	20%	9,818	21%
Malaysia	13,529	2,100	16%	0	0%
Pakistan	5,090	24,030	472%	7,448	146%
Philippines	10,289	12,568	122%	8,626	84%
South Korea	36,380	7,500	21%	7,260	20%
Thailand	5,933	11,726	198%	655	11%
Vietnam	20,317	48,465	239%	28,700	141%
Total	1,447,410	1,422,723	98%	431,712	30%

Note: No data was available for Singapore

Source: Global Energy Monitor, Sierra Club, CREA, Climate Risk Horizons, GreenID and, Ekosfer (2021), Boom and bust 2021: Tracking the global coal plant pipeline, pp. 21–23.

Despite the high number of coal-fired power projects in Asia that have been canceled or put on hold, the overall trend still points towards expansion (around 30%) of current coal-fired power capacity. This stands in sharp contrast to efforts needed to limit global warming specified in the 2015 Paris Agreement and exacerbates other negative environmental and social impacts. The following sections highlight the role of coal-fired power in climate change and environmental degradation, as well as its socio-economic impacts. This is followed by an overview of policies being implemented in Asian countries to phase out coal or reduce emissions caused by coal-fired power generation.

2.2 IMPACTS OF COAL ON THE CLIMATE AND ENVIRONMENT IN ASIA

The impacts of coal on the environment are devastating and play a key role in the climate crisis. These have been widely documented, and there is broad consensus that eradicating the use of coal-fired power for energy generation is one of the most crucial strategies to limit global warming. In fact, coal is the single-largest source of global temperature increase: the IEA estimates that CO_2 emissions caused by coal combustion are responsible for more than

0.3°C of the 1°C increase in global average temperature above pre-industrial levels.[11] Despite commitments from some countries to phase out coal, coal-fired power is still the single-largest contributor to annual growth in global GHG emissions, causing 30% of global CO_2 emissions in 2018.[12]

In addition to coal's undeniable role in global warming, the continued use of coal as an energy source has a multitude of adverse environmental impacts in regions where coal is mined and coal-fired plants are operating.

A study of air pollution in Southeast Asia found that fossil fuels are responsible for 82% of low-visibility days (i.e., when haze in the air limits visibility to under 10 km), and the burning of coal is a major source of nitrogen oxides, sulfur dioxide, particulate matter and heavy metals in the air, polluting the air, water and soils.[13] A subsequent study found that replacing coal with natural gas (also a fossil fuel and an undesirable solution) would reduce sulfur dioxide air pollution by 25%, highlighting the immense contribution of coal to the degradation of air quality in Asia.[14] In addition, the chemicals released into the air by the burning of coal have a variety of other significant impacts on the ecosystems, including the acidification of rain due to sulfur dioxide and nitrogen emissions that, in turn, acidifies soils and damages forests, surface water and the health of fish and amphibians.[15]

It is not just coal combustion that contributes to air and water pollution, but also the mining and processing of coal. Coal mining relies on heavy machinery that run on fossil fuels, and mining activities stir up coal dust, posing risks to air quality in local areas. The processing of coal relies on chemical washing that contaminates billions of liters of water with heavy metals and chemicals, and the transportation of coal from mines to processing facilities and power plants relies on diesel-fueled trucks and shipments, which also contribute significantly to local air pollution.[16]

In addition to air pollution, coal mining results in acid mine drainage, which is what happens when water is contaminated with heavy metals, runs off into local waterways and raises acidity levels. This water pollution poses significant harm to the flora and fauna that live in and depend on water sources. Coal mining and coal-fired power plants also use large amounts of water, which depletes water sources and causes thermal pollution through heated wastewater. According to IEA estimates, coal consumes 22% of total water used for energy generation purposes, making it the most water-intense fossil fuel.[17]

2.3 SOCIAL IMPACTS OF COAL IN ASIA

The impacts of coal-fired power on climate change and the environment also have severe consequences for society.

According to the United Nations (UN), rights to life, health, food, water and sanitation, a healthy environment, an adequate standard of living, housing, property, self-determination, development and culture and justice and equity are all at risk if the world fails to adequately mitigate global warming.

These impacts are particularly severe for vulnerable populations, those who are socially, economically, culturally, politically or institutionally marginalized based on their gender, age, disability, cultural or ethnic background, as well as Indigenous peoples.[18]

Coal mines and coal-fired power plants have direct adverse impacts on nearby communities. The release of sulfur dioxide, nitrogen and fine particulate matter into the air increases the risk of respiratory and cardiovascular disease. These types of air pollutants are the most harmful to human health worldwide and are estimated to cause an estimated 19,880 excess deaths per year in Southeast Asia due to coal combustion, mainly from ischemic heart disease and stroke.[19] This number is expected to increase to 69,660 excess deaths per year by 2030.[20] Vulnerable groups, such as low-income families, are most likely to experience health risks from air pollution.[21]

In 2017, a report by the Fair Finance India coalition highlighted how impoverished communities in the Angul district of Odisha are affected by high rates of lung diseases from the fly ash generated by two nearby coal-fired power plants, causing villagers to live in perpetual fear for their health.[22]

The pollution of air, water and soil caused by coal also has an impact on the food security of rural communities. Farmers in Bangladesh have reported lower crop productivity due to coal mining in the Dinajpur district,[23] and in Indonesia, around 1.7 million tonnes of rice are lost every year because communities around coal mines have no choice but to use acidic mine drainage water for irrigation.[24] In India, communities on the Kutch coastline have seen fish populations decline because of hot wastewater from a coal power plant released into a mangrove forest that serves as a breeding ground for fish.[25]

The coal power industry also has a poor reputation respecting the human rights of communities, Indigenous peoples and workers affected by their operations. A 2019 study by the Asia Indigenous Peoples Pact (AIPP) highlights how extractive industries, including coal mining, pose significant risks to the rights of Indigenous peoples, who are at risk of losing their lands, livelihoods and identities when mines develop operations on their traditional lands without meaningful consultation and participation.[26] This is not only the experience of Indigenous peoples – rural communities are also often forcibly relocated from the lands on which they depend for subsistence without adequate consultation or compensation from coal mines. According to Fair Finance India, none of the nearly 700 coal mines in India can demonstrate a fair process of consulting and gaining consent from communities in the regions where the mines operate.[27]

Poor working conditions in mines, limited regulation and inspections of workplace health and safety, low wages and precarious social conditions also pose severe risks for coal workers in Asia. In India, coal mining is recognized as one of the most hazardous occupations with the highest fatal accident rate of all mining sectors: for every 10 million tonnes of coal produced, one person is fatally injured at work. In 2018, India produced 672.7 million tonnes of coal, and in that year alone 70 workers were killed and 207 workers were seriously injured.[28]

These are just some of the ways in which communities across Asia are adversely impacted by coal mining and coal-fired power plants. However, the consequences are even more far reaching, complex and interdependent, particularly if the world fails to mitigate global warming by continuing to use coal-fired power, and the impacts are more severe for vulnerable and marginalized groups already suffering disproportionately from the climate crisis.

2.4 COAL POLICIES IN ASIA

Growing recognition that coal-fired power is an undesirable source of electricity has prompted countries in Asia to introduce policies that reduce the use of coal or at least mitigate the worst impacts. Between 2010 and 2020, 13 countries in Asia canceled 1,319 GW coal-fired power plant projects,[29] and Indonesia, Pakistan, Philippines, Singapore and South

Korea have introduced policies to terminate new coal-fired power plant projects (see Table 2). In some countries, improving the efficiency of coal-fired power plants by adopting carbon capture and storage (CCS) technology has become a policy focus, particularly in China, Japan and South Korea. Several countries, including India, Japan, Singapore, South Korea and Vietnam, are also introducing market mechanism policies in the form of a carbon tax. This would make coal-fired power generation relatively more expensive than renewable energy. A concise overview of coal policies in the 13 focus countries is presented in Table 2.

Table 2 Coal policies in selected countries in Asia (2021)

Country	Terminating new coal-fired power plants	Stimulating efficient technology (CCS)	Introducing a carbon tax
Bangladesh	No, but canceled 10 projects	No	No
Cambodia	No	No	No
China	No	Yes	No
India	No	No	Yes
Indonesia	Yes, from 2023	No, but will start a pilot project in Gundih	No, but proposal is on the table
Japan	No	Yes	Yes
Malaysia	No, but all projects are canceled	No	No
Pakistan	Yes	No	No
Philippines	Yes	No	No
Singapore	Yes	No	Yes
South Korea	Yes	Yes	Yes
Thailand	No	No	No
Vietnam	No	No	Yes, from 2022

Sources: See the sources mentioned in the following country sections.

In general, these three policy directions are not sufficient to satisfy the Paris Agreement commitment to limit global warming to well below 2ºC, and preferably to 1.5ºC, for the following reasons:

- The policy of terminating new coal-fired power projects generally does not affect projects already approved or under construction. Since these coal-fired plants will operate for 35 to 40 years, carbon emissions will continue well beyond 2050.[30] Although early retirement could be imposed to ensure these power plants are no longer operational after 2050, power companies will likely demand high compensation because they have calculated their return on investment (ROI) based on the full life cycles of the power plants.[31]

- Improving the efficiency of coal-fired power plants will have only a limited effect on reducing carbon emissions and other polluting emissions. Research has found that coal-fired power plants with CCS will lead to an increase in freshwater consumption, a higher risk of explosions and toxicity hazards due to a rise in carbon monoxide emissions.[32]
- The effectiveness of a carbon tax to reduce GHG emissions has been scrutinized, as it may provide a justification for polluters to continue releasing carbon emissions in return for tax payments, rather than significantly reducing emissions. In addition, where business communities have a strong influence on policymakers, corporations may lobby to keep the carbon tax rate low enough to prevent significant financial impacts.[33] Moreover, the companies may pass the cost on to customers, which would disproportionately push the costs of the climate crisis onto consumers rather than polluters.

The coal-related policies of the countries in this study are discussed in more detail in the following sub-sections.

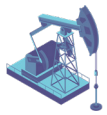
2.4.1 BANGLADESH

Bangladesh committed to reduce GHG emissions by 5% from current levels by 2030 in the power, transport and industry sectors based on existing resources.

Bangladesh is highly dependent on fossil fuels for power generation. In 2018, coal accounted for 1.9% of total electricity and liquefied natural gas (LNG) for 75.6%. [34] In the Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2020, Bangladesh committed to reduce GHG emissions by 5% from current levels by 2030 in the power, transport and industry sectors based on existing resources. There will be an additional 15% reduction by 2030 if the country receives international support for finance, investment, technology and capacity building.[35]

Reducing reliance on coal-fired power is not part of the government's policies to achieve the GHG emission reduction targets. However, 10 proposed coal-fired power plant projects were canceled recently,[36] prompted by the rising cost of imported coal and the reluctance of overseas investors to continue financing coal-fired power plants.[37]

2.4.2 CAMBODIA



Fossil fuels still dominate Cambodia's electricity sector, accounting for 37.4% of total electricity produced in 2018.[38]

Cambodia does not have a definitive policy to reduce dependency on coal or any policy to phase out coal,[39] nor have market mechanism policies been implemented, such as carbon taxes or coal taxes. New coal-fired power plant projects are still being constructed in Cambodia. Projects with a total capacity of 1,065 MW are currently in the pre-construction phase and projects with a capacity of 700 MW are already under construction.[40]

2.4.3 CHINA

China has been the world's biggest carbon emitter for 20 years and was responsible for 28% of global GHG emissions in the past decade, much higher than any other country average.

China is home to more than half of all global coal-fired power plants.[41] In 2018, coal accounted for 66.4% of total electricity produced in the country.[42] China has been the world's biggest carbon emitter for 20 years and was responsible for 28% of global GHG emissions in the past decade, much higher than any other country average.[43] This has put China at the center of global climate change discussions. It was therefore a major breakthrough when President Xi Jinping announced in September 2020 that China had set a target to be carbon neutral by 2060.[44] However, this ambitious target can only be achieved by reducing China's reliance on coal-fired power generation.

In its Nationally Determined Contributions (NDCs) submission to the UNFCCC in 2016, China committed to reducing coal use for electricity generation by increasing non-fossil fuel energy sources to 20% by 2030.[45] In addition, in the 13th Five-Year Plan (2016–2020), China committed to use cleaner technology in new coal-fired power plants to reduce the amount of coal needed per kilowatt hour to 310 gsce/kWh (grams of standard coal equivalent) for existing power plants and 300 gsce/kWh for newly built power plants by 2020.[46] This is only a minor improvement to the average coal consumption (331 gsce/kWh) of coal-fired power plants in China over the past 60 years.[47]

In 2020, China pledged to cut its "carbon intensity" (amount of CO_2 emissions) target by 2060. Economic interests are often an obstacle to reducing use by 13.2%, compared to 2016 when the NDC was first submitted.[48]

China has developed all forms of renewable energy, including solar and wind,[49] and is the largest manufacturer of solar panels in the world, accounting for 80% of the global market.[50]

However, China cannot build renewable energy facilities quickly enough to meet the sharp growth in demand that is expected for electricity.[51] The existing grid is also inadequate to transmit renewable energy efficiently from western China where most of the country's renewable energy is produced (76% of solar, 68% of hydro, and 52% wind in 2016)[52] to areas with high demand for electricity.[53] Policymakers in China therefore view coal as a reliable energy source due to an abundant and inexpensive domestic supply.[54]

All these factors led China to commission coal-fired power plants with a total capacity of 38.4 GW in 2020 alone. This is three times more than the rest of the world commissioned in 2020.[55] China also approved 73.5 GW of new coal-fired power plant proposals in 2020, **or** 85% of global proposals (87.4 GW).[56] In total, China has 246.9 GW of coal-fired power plants under development (88.1 GW under construction and 158.7 GW proposed for construction)[57] – an increase of 21% compared to 2019 (205 GW).[58]

In addition to the coal-fired power plants under construction, Chinese financial institutions also play a significant role in financing coal-fired power plants overseas. China is currently financing more than 70% of coal-fired power plants built anywhere in the world today.[59]

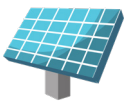
Given that it leads the world in wind and solar technology,[60] China has the opportunity to end reliance on coal and shift to renewable energy. The country has built renewable technology by providing a variety of incentives, from competitive loans from state-owned banks to developing solar industrial parks to support solar panel productions, to establishing the necessary industry ecosystem.[61] Loan subsidies have also been offered to foreign companies that want to open new plants in China, as long as they agree to share their innovative technologies with Chinese partners.[62]

China is the co-chair of the G20 Sustainable Finance Study Group (SFSG), which aims to mobilize sustainable finance and drive the policy change needed to align the financial system with the Paris Agreement targets.[63] This appointment is important given China's role as a global pioneer in financing renewable energy projects. Between 2000 and 2019, China provided foreign direct investment to build 106.2 GW of power generation projects around the world, 38.8% of which were for renewable energy, including hydropower and solar, wind and geothermal energy.[64]

Investment in wind, solar and hydropower also accounted for up to 57% or about USD 11 billion of China's Belt and Road Initiative energy investments in 2020.[65] Furthermore, China Development Bank (CDB) is planning USD 78 billion in renewable energy investments over the next five years.[66] This fund is intended to finance onshore and offshore wind, solar, hydrogen and hydropower projects.[67]

2.4.4 INDIA

Coal-fired power provided almost two-thirds of total electricity generated in India in 2018.[68] India will continue to rely on coal to meet future electricity needs, given that 36 GW of coal-fired power projects are currently under construction and 29 GW in pre-construction.[69] However, India has been trying to reduce dependence on coal, and canceled 564 GW of coal-fired power projects between 2010 and 2020.[70]



The country is also rapidly expanding renewable energy development, which accounted for 24.5% of installed capacity as of January 2021.[71]

In the NDC document submitted in 2016 to the UNFCCC, India committed to increase the share of non-fossil fuel energy to 40% of total electricity and to reduce carbon emissions by 33% to 35% by 2030.[72] India does not yet have a policy to halt the development of new coal-fired power plants, but has adopted three market-based policies to reduce dependence on fossil fuels:

- A tax on coal of INR 50 per tonne was introduced in 2010 and increased to INR 400 in 2016. This so-called "coal cess" was replaced in 2017 by a "GST compensation cess", and the funds from this tax were used to cover the revenue losses incurred from shifting to the new indirect tax regime.[73]
- Renewable energy certificates (REC) have been introduced, which aim to set targets for the use of renewable energy across all energy distribution companies.
- Perform-Achieve-Trade (PAT) is a scheme that aims to reduce energy consumption per unit output in eight energy-intensive sectors and industries: thermal power, aluminum, cement, fertilizers, iron and steel, pulp and paper, textile and chlor-alkali.[74]

2.4.5 INDONESIA

Coal policies in Indonesia are contradictory. In its NDC document submitted to the UNFCCC, Indonesia committed to increase the use of renewable energy to 23% by 2025 and 31% by 2050. To achieve this target, coal-fired power must decrease from 60% of all electricity generated in 2020[75] to 30% by 2025 and 25% by 2050.[76] In May 2021, the state-owned power company Perusahaan Listrik Negara (PLN) announced there would be no new coal-fired power plants planned after 2023. In June 2021, the PLN added that it will retire coal-fired power plants with a capacity of 1.1 GW by 2030 and another 49 GW by 2055.

This policy of reducing reliance on coal-fired power contradicts the level of development expected in Indonesia in the coming decades. Since 2015, the country has been working to add 117 new coal-fired power plants with a capacity of 35.0 GW to the electricity grid. Apart from these projects, Indonesia also has a project to add 7.0 GW of power generation, most of which will come from coal. These two major projects will be completed in 2023 and operations will continue for decades, generating carbon emissions.[77]

Unless these power plants are retired early, Indonesia will still be using coal-fired power in 2060 or 2065.[78]

Early retirement is controversial and will be costly considering these power plants are built by independent power producers (IPPs) that have calculated their ROI based on 35 to 40 years of operations.[79]

2.4.6 JAPAN

Coal-fired power plants in Japan currently account for 32% of the country's total electricity generation.[80]

In the draft Strategic Energy Plan released on 21 July 2021, Japan committed to reduce coal in the energy mix to 19% by fiscal year 2030–2031.[81] Meanwhile, LNG accounted for 37% of electricity, which the country has committed to reduce to around 20% by 2030.[82] Japan has no formal policy to stop building new coal-fired power plants, but no new coal-fired power plants are currently under development.[83]

As an energy source for electricity generation, Japan aims to shift away from coal to gas by importing LNG from the Middle East. In an interview, informant O criticized this as a short-term measure that does not offer a long-term solution. First, because LNG is a fossil fuel that produces high carbon emissions. Second, unlike renewable energy investment costs that continue to decline, LNG prices are increasing. Therefore, the policy interferes with energy security in the long term.

Japanese financial institutions play an important role in financing coal-fired power plant projects outside Japan, particularly in Asia.

Two institutions, the Japan Bank for International Cooperation (JBIC) and the Japan International Cooperation Agency (JICA), have a long history of financing coal-fired power plants overseas. However, the JBIC has announced it will no longer finance coal-fired power projects, and the last project was signed in December 2020 in Vietnam.[84]

Meanwhile, JICA currently has commitments to fund two coal-fired power projects in Indonesia and Bangladesh. A coalition of NGOs has urged the Japanese Government to cancel these two projects.[85] Informants interviewed for this study agreed that the government is insisting that the decision to cancel the projects rests with the recipient countries. Meanwhile, the recipient countries are waiting for Japan to cancel the projects. These two projects would be relatively easy to cancel because no loan agreements have been signed. There is only a commitment from the Japanese Government to the governments of Indonesia and Bangladesh to build coal-fired power plants.

2.4.7 MALAYSIA

In its NDC submitted to the UNFCCC, Malaysia aims to achieve a 45% reduction in GHG emissions per unit of GDP by 2030, using 2005 as a base level.[86]

However, this target seems difficult to achieve considering that fossil fuels accounted for 82.8% of total electricity generation in 2017 and, coal for 44.2%.[87]

The Malaysian Government does not yet have a definitive policy to phase out fossil fuels and replace them with renewable energy. While Malaysia does not have any coal-fired power projects in development, its policy of reducing dependency on coal by shifting to LNG will still contribute to carbon emissions. According to an informant, Malaysia does not have a market mechanism policy, such as a coal tax or carbon tax, to reduce fossil fuel use while increasing the share of renewable energy. The policy to phase out coal should be easy to implement given that state-owned Tenaga National Berhad has a monopoly over Malaysia's electricity system.

2.4.8 PAKISTAN

In the Alternative and Renewable Energy Policy document released by the Government of Pakistan in 2019, the country committed to increasing the proportion of alternative and renewable energy to 20% of total electricity by 2025 and 30% by 2030.[88] This target rose sharply in December 2020 when Prime Minister Imran Khan announced plans to increase the share of renewable energy to 60% by 2030.[89]

This target requires significant reduction of fossil fuel use for electricity, which still stands at 64%, with coal-fired power plants providing 19% of power generation.[90]

To achieve this goal, the Government of Pakistan announced in December 2020 that it would not approve any new coal-fired power plant projects.[91] However, the statement was not accompanied by information on existing plants and projects currently under construction.

This gap is striking because Pakistan still has coal-fired power projects under construction with a total capacity of 7.5 GW which, once operational, will produce carbon emissions for decades.[92]

2.4.9 PHILIPPINES

In its NDC document submitted to the UNFCCC, the Philippines committed to decreasing GHG emissions by 75% by 2030.

However, only 2.7% of the target is unconditional, which the government has committed to using the country's own resources. Another 75% is conditional.[93] This means that the government will meet the target only if the country gets international support, especially with financing.

The Philippines is still heavily dependent on fossil fuel in the electricity sector, with coal accounting for 53% of total electricity. In November 2020, the Philippine energy department announced a ban on new coal-fired power plants but allowed ongoing projects to continue.[94]

2.4.10 SINGAPORE

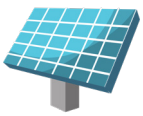
Compared to other countries in Asia, the proportion of coal used in Singapore is very small, accounting for only 1% of total electricity generation. However, Singapore's electricity generation still relies on fossil fuels, with 90% of total electricity coming from LNG.[95]

Singapore is committed to reducing GHG emissions by 36% by 2030 compared to 2005 levels.

To achieve this target, Singapore implemented a carbon tax on January 1, 2019, the first country in Southeast Asia to implement this tax. Currently, the carbon tax rate is set at SGD 5/tCO2e for 2019–2023.[96] In addition, Singapore has implemented a grant scheme to help companies improve energy efficiency.[97]

2.4.11 SOUTH KOREA

South Korea depends heavily on fossil fuel energy, which accounts for 85% of total primary energy supply (TPES), mostly from imported fuels. Between 2008 and 2018, coal accounted for 44% of energy sources used for electricity generation. South Korea is currently the fourth-largest coal importer in the world.[98]



In South Korea's update to the NDC document submitted to the UNFCCC at the end of 2020, the country committed to reducing GHG emissions by 37% by 2030 while increasing renewable energy to 20% by 2040.[99]

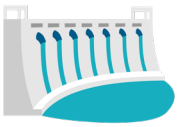
To achieve these targets, the Korean Government has stopped developing new domestic coal-fired power plant projects. As of June 2021, South Korea also halted state-backed financing of coal-fired power plants overseas.[100] South Korea has a market mechanism policy in the form of a tax on coal consumption, but this tax is quite low and unlikely to influence consumer behavior.[101]

2.4.12 THAILAND

In its NDC document submitted to the UNFCCC, Thailand committed to reducing GHG emissions by 20% by 2030, but the government has stated that this goal could increase to 25% by 2030 with international support.[102]

Fossil fuels are still the dominant form of electricity generation in Thailand, with coal-fired power accounting for 20% of total electricity.[103] Compared to many other Asian countries, Thailand has only modest expansion plans for coal-fired power generation (655 MW). Despite using a high proportion of coal for electricity, the Thai Government does not have a policy in place to impose targets or a timeline to phase out coal. In addition, market mechanism policies, such as a carbon tax or coal tax, have not been implemented.

2.4.13 VIETNAM



Vietnam submitted an update to its NDC to the UNFCCC at the end of 2020. In this document, the Government of Vietnam committed to reducing GHG emissions by 9% by 2030.

This reduction could reach 27% by 2030 if international support is provided. This target has received criticism from several parties because the baseline used to measure GHG emission reductions was increased from 62.7 million tonnes of CO2 equivalent (tCO2eq) to 83.9 million tCO2eq. This means that Vietnam can achieve its GHG emission targets without introducing any new policies. This unambitious target is justified by the fact that Vietnam has experienced rapid economic growth at an average of 6% to 7% per year, which requires a large electricity sector.[104]

Coal-fired power still dominates Vietnam's electricity sector, accounting for 47.4% of total electricity generation in 2018.[105] The share of coal-fired power in Vietnam is likely to continue to expand considering an additional 6.8 GW is under construction and 21.8 GW is in the pre-construction phase.[106] The government does not yet have a firm policy on phasing out coal, but the Vietnamese National Assembly passed a revised law on environmental protection that includes a carbon tax that will go into effect on January 1, 2022.[107]

Coal Financing Trends in Asia

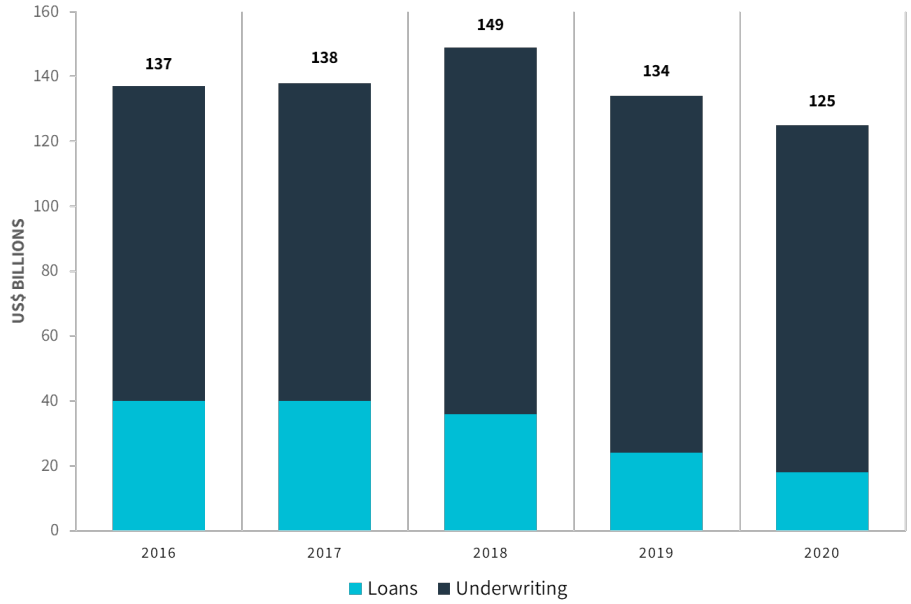
This chapter examines financing of the coal sector in Asia over the past five years by analyzing loans, underwriting services and investments in companies active in coal mining and coal-fired power. Coal financing trends, countries of origin and destinations are also analyzed, and the main banks and investors are listed for individual countries and Asia as a whole.

2.5 GENERAL ANALYSIS OF COAL FINANCING IN ASIA

2.5.1 Creditor analysis

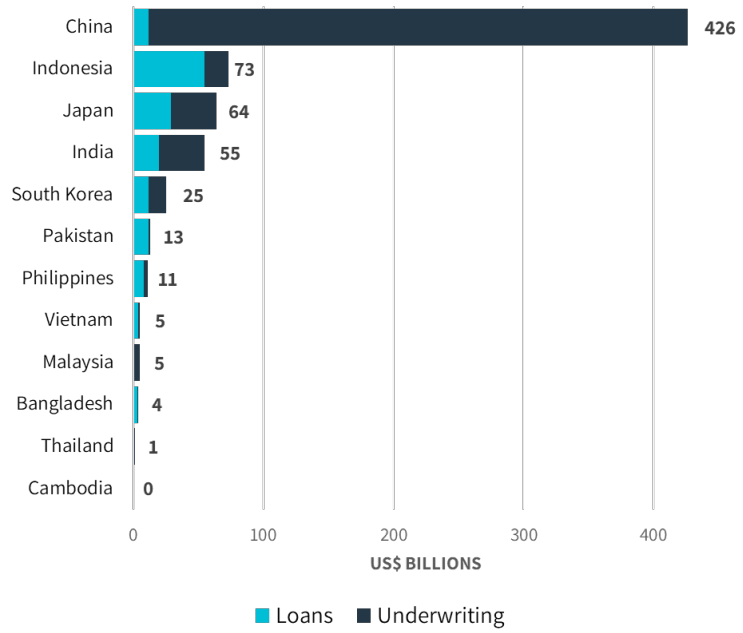
From early 2016 to the end of 2020, banks and other financial institutions provided USD 683 billion in loans and underwriting services to companies engaged in coal mining and coal-fired power in the 13 countries featured in this report. Figure 3 shows that annual coal credit fluctuated between USD 125 billion and 149 billion. Coal-attributable credit flows peaked in 2018 and have shown a declining trend since.

Figure 3 Annual coal-attributable loans and underwriting (2016–2020, USD billions)



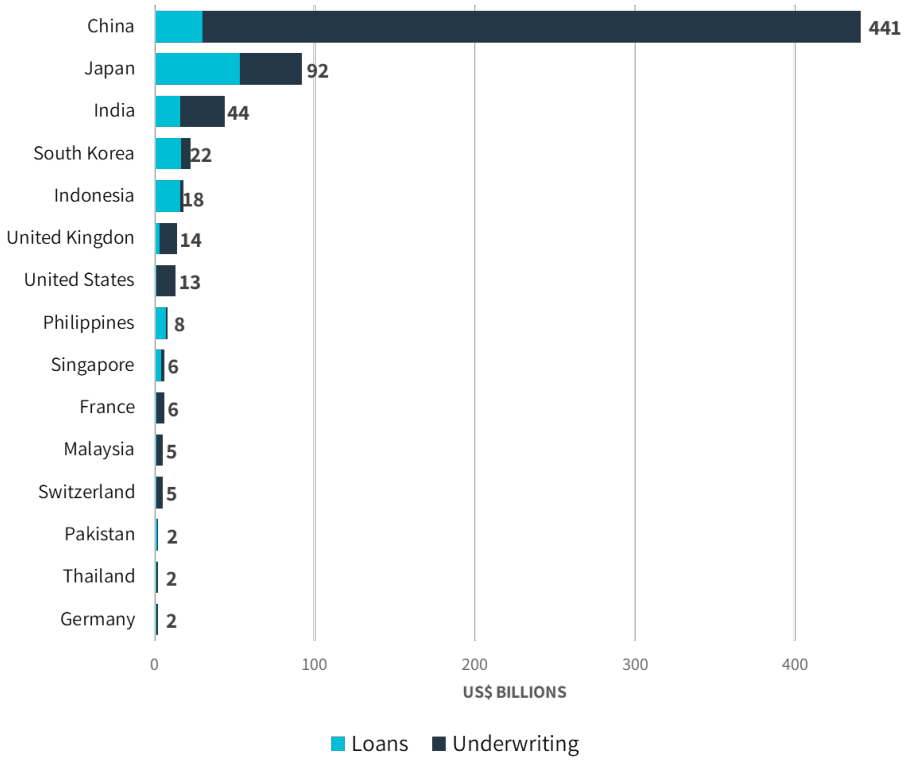
Most of the loans and underwriting services during this period were provided to coal companies active in China (USD 426 billion), followed by companies engaged in coal in Indonesia (USD 73 billion), Japan (USD 64 billion) and India (USD 55 billion) (see Figure 4).

Figure 4 Coal-attributable loans and underwriting per destination country (2016–2020, USD billions)



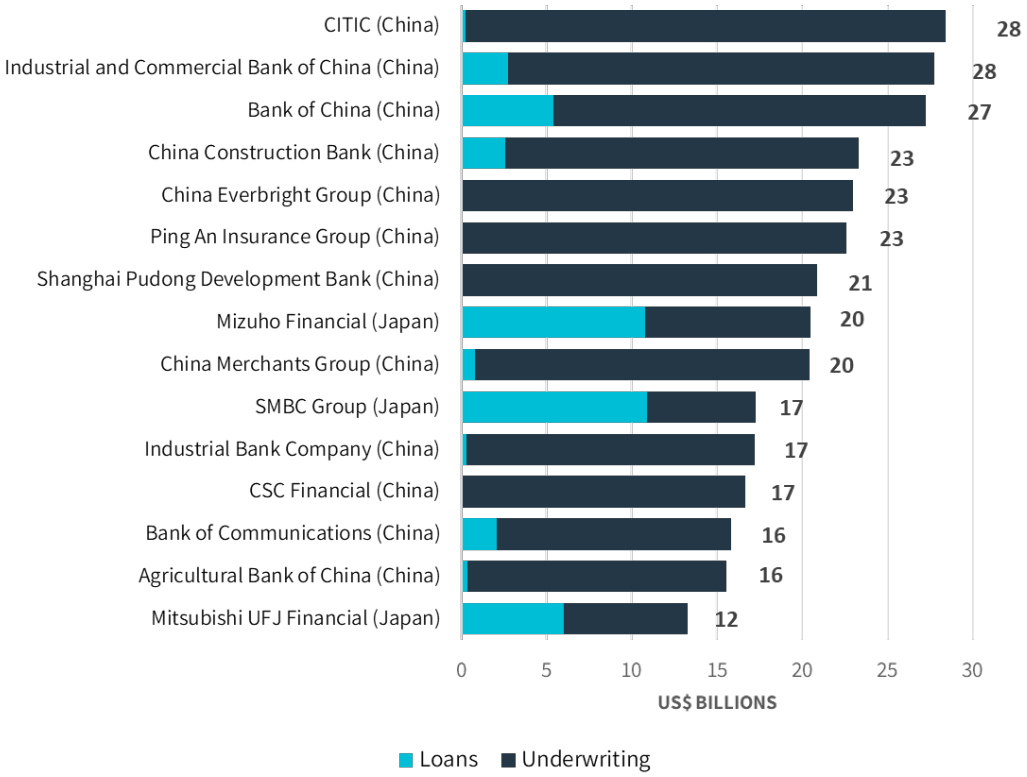
Financial institutions from 15 countries accounted for 99% of all creditors. Figure 5 shows that the vast majority of loans and underwriting services provided to companies engaged in coal were from financial institutions in China (USD 441 billion), followed by financial institutions from Japan (USD 92 billion) and India (USD 44 billion).

Figure 5 Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The top 15 creditors include the three largest Japanese banks, as well as 13 Chinese financial institutions (see Figure 6). These 15 creditors accounted for 45% (USD 310 billion) of all identified coal-attributable loans and underwriting services. The largest creditor was China's CITIC (USD 28.4 billion) followed by Chinese peer ICBC (USD 27.8 billion).

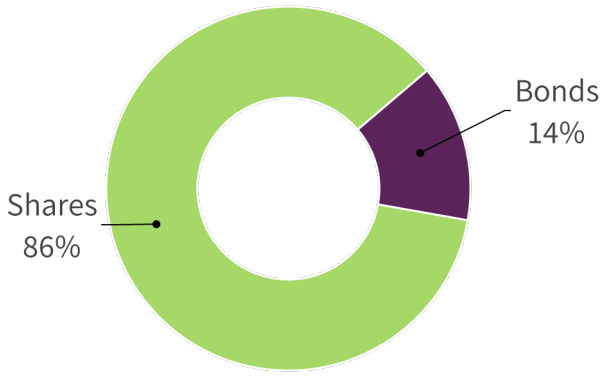
Figure 6 Top 15 Asian coal creditors (2016–2020, USD billions)



2.5.2 Investor Analysis

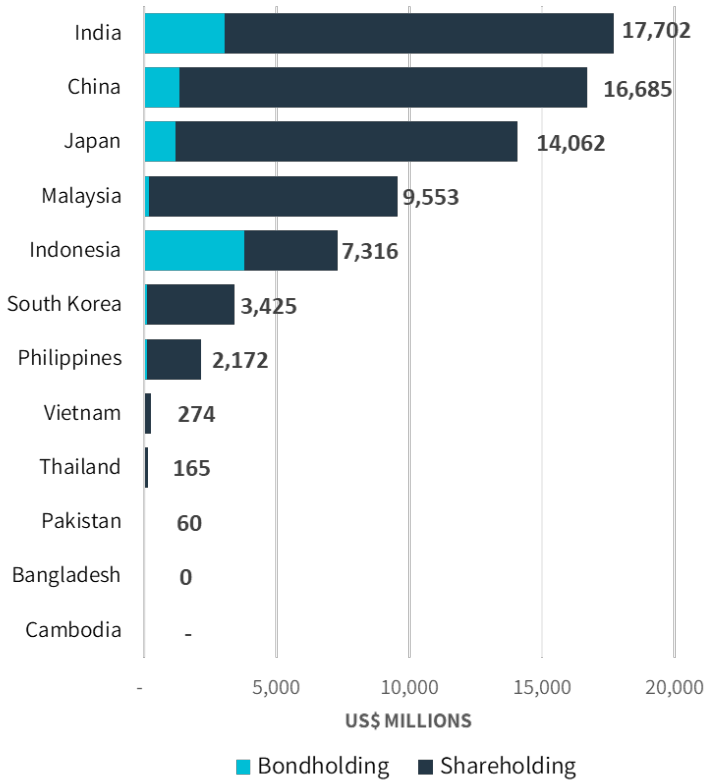
As of the most recent filings in June 2021, investors held USD 70.4 billion in coal-attributable bonds and shares issued by companies active in thermal coal in Asia. Figure 7 shows that 14% (USD 9.8 billion) of these investments were in the form of bonds and 86% (USD 60.5 billion) in shares.

Figure 7 Investments by finance type (June 2021)



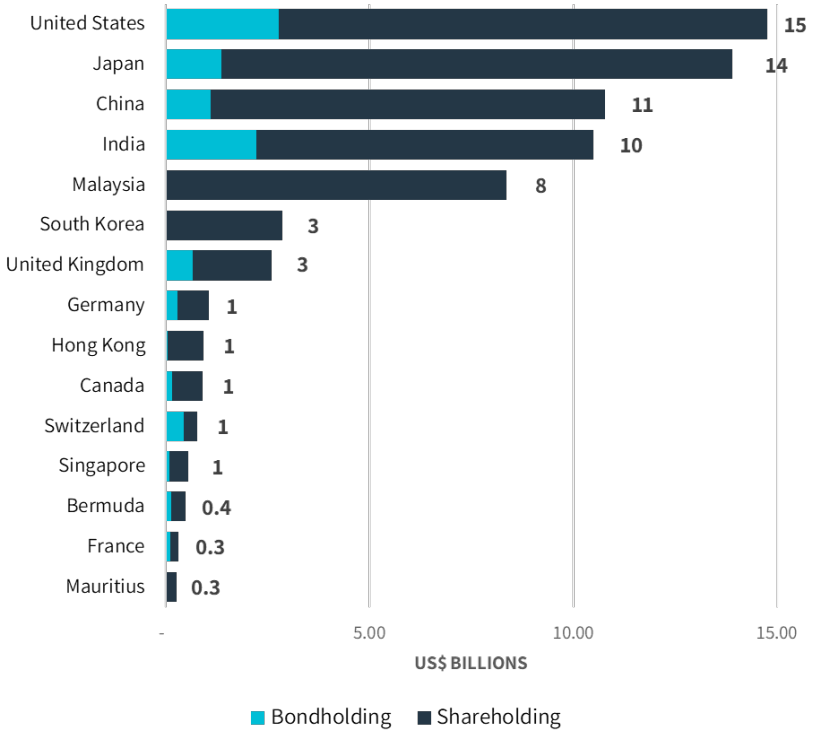
Companies engaged in thermal coal in India received the highest-value investments in their bonds and shares (USD 17.7 billion). Figure 8 shows they were followed by companies active in China (USD 16.7 billion) and Japan (USD 14.1 billion).

Figure 8 Coal-attributable bond- and shareholdings by destination country (June 2021, USD millions)



Investors from 10 countries accounted for 98% (USD 69.1 billion) of all identified coal-attributable investments in Asia (see Figure 9). Financial institutions from the US held the highest value coal-attributable bond- and shareholdings (USD 15 billion), followed by financial institutions from Japan (USD 14 billion) and China (USD 11 billion).

Figure 9 Coal-attributable bond- and shareholdings by investor country (June 2021, USD billions)



The top 15 investors accounted for 48% (USD 34 billion) of all identified coal-attributable investments in bonds and shares in Asia (see Figure 10). The Japanese Government Pension Investment Fund held the highest value of coal-attributable bonds and shares (USD 4.9 billion), followed by the Life Insurance Corporation of India (USD 3.8 billion) and US asset manager BlackRock (USD 3.3 billion).

Figure 10 Top 15 Asian coal investors (June 2021, USD billions)

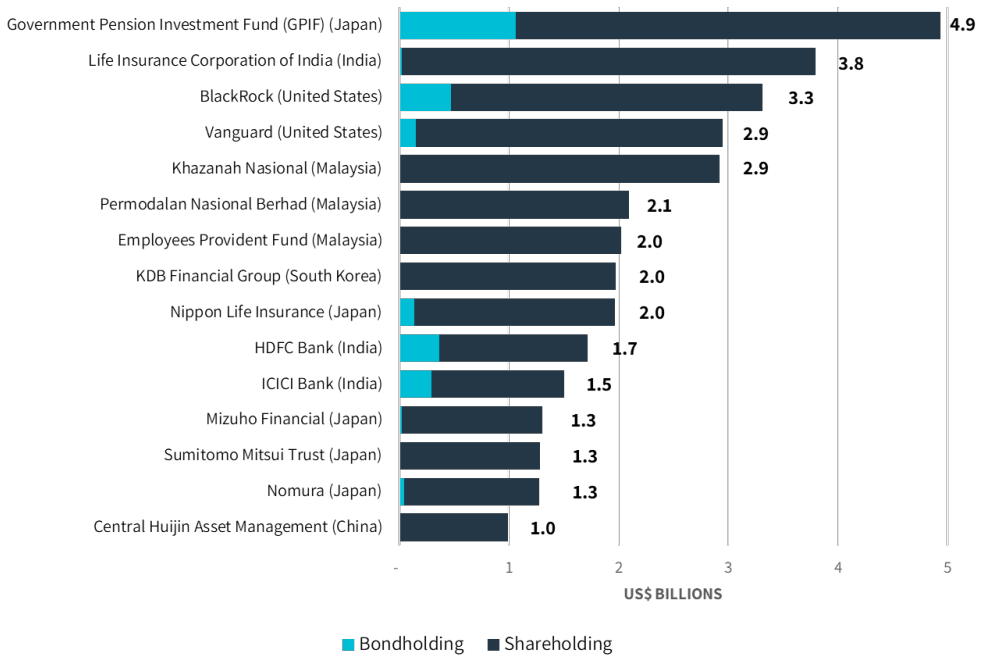
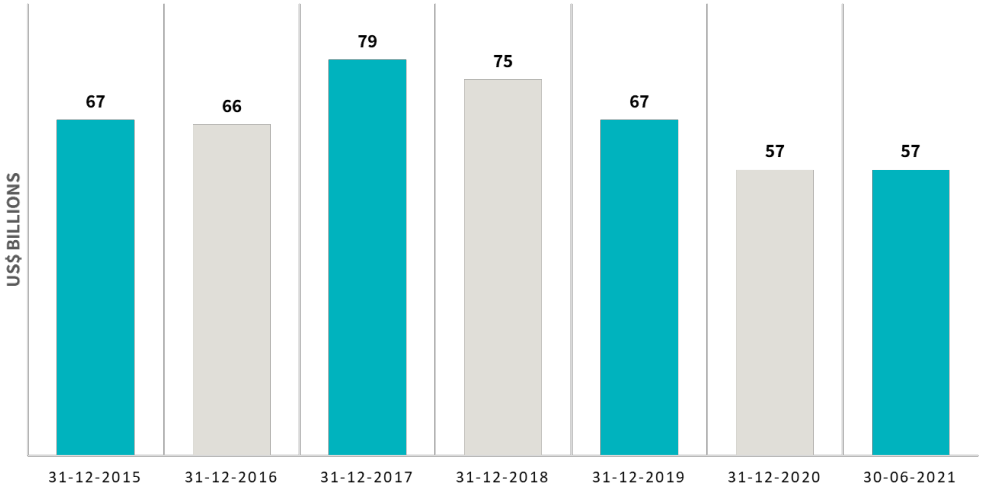


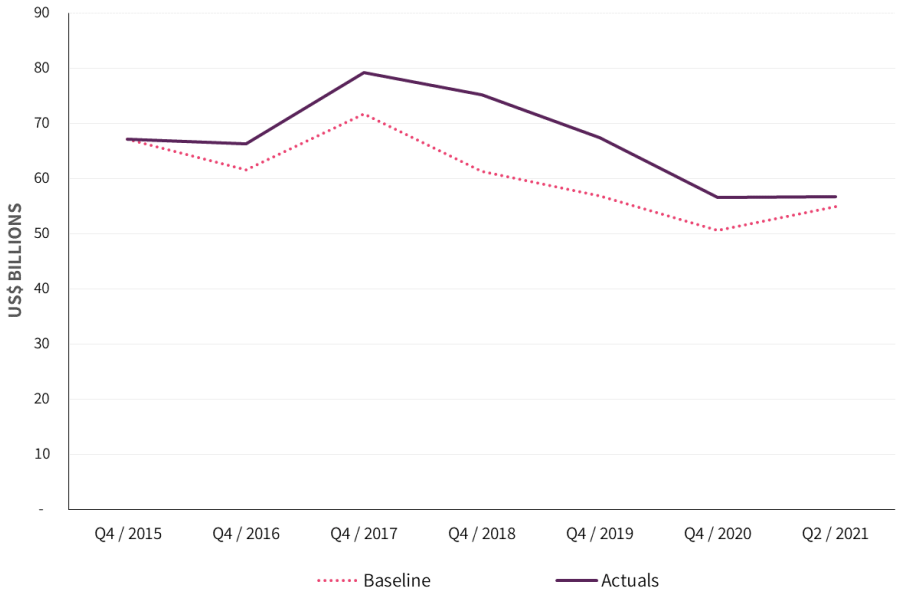
Figure 11 shows the fluctuations of coal-attributable shareholdings between the fourth quarter of 2015 and the second quarter of 2021. Values fluctuated between USD 57 billion in 2021 and USD 79 billion in the last quarter of 2017. After a peak in the fourth quarter of 2017 there seems to be a declining trend. This could indicate a decrease in share value and/or gradual divestment from the coal sector.

Figure 11 Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)



A closer look at actual portfolio developments shows that coal-attributable investments in Asia increased between the fourth quarter of 2015 and the second quarter of 2021 (see Figure 12). The largest difference between baseline and actuals was between Q4 2017 and Q4 2019. Nevertheless, there was still a difference between the baseline and actuals in the most recent periods covered by this study, indicating that financial institutions have invested more in coal than at the start of the research period.

Figure 12 Coal-attributable shareholdings, baseline vs actuals (Q4 2015–Q2 2021, USD billions)

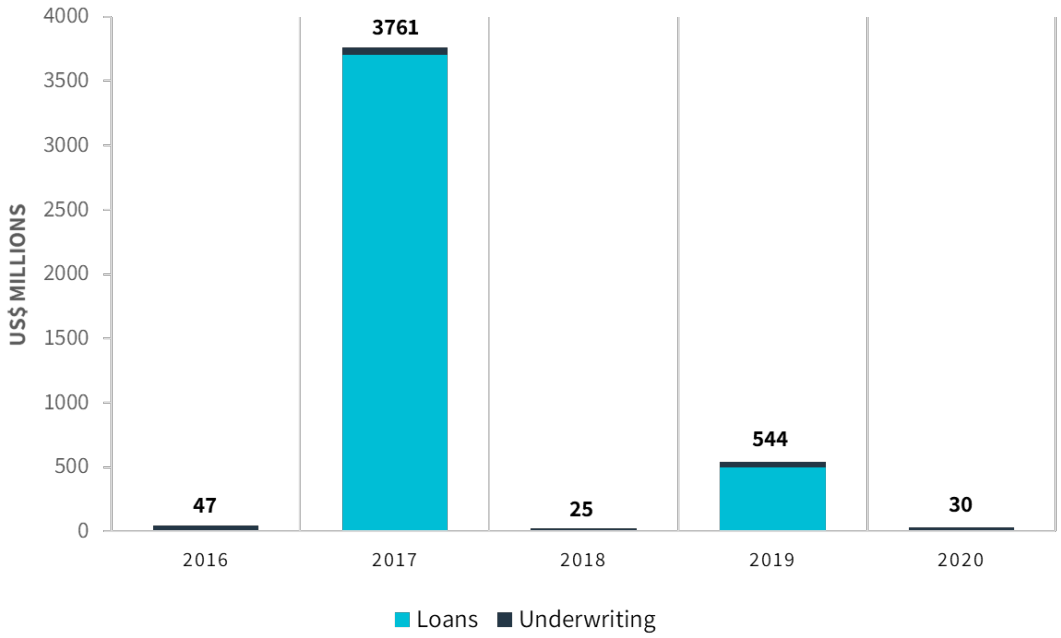


2.6 Bangladesh

2.6.1 Creditor Analysis

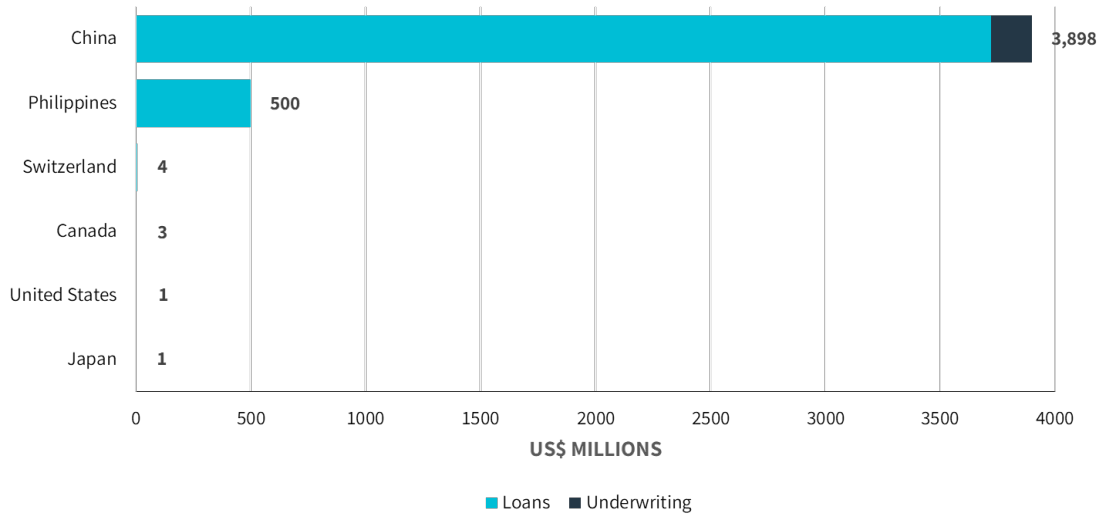
Between 2016 and 2020, financial institutions provided USD 4.4 billion in loans and underwriting to companies engaged in thermal coal in Bangladesh. Figure 13 shows the annual coal-attributable loans and underwriting services in Bangladesh, and a peak in 2017 when two power plants were financed: Banskhali Upazila Coal-Fired Power Plant (1,320 MW) and Payra Thermal Power Plant (1,320 MW).

Figure 13 Bangladesh: Annual coal-attributable loans and underwriting (2016–2020, USD millions)



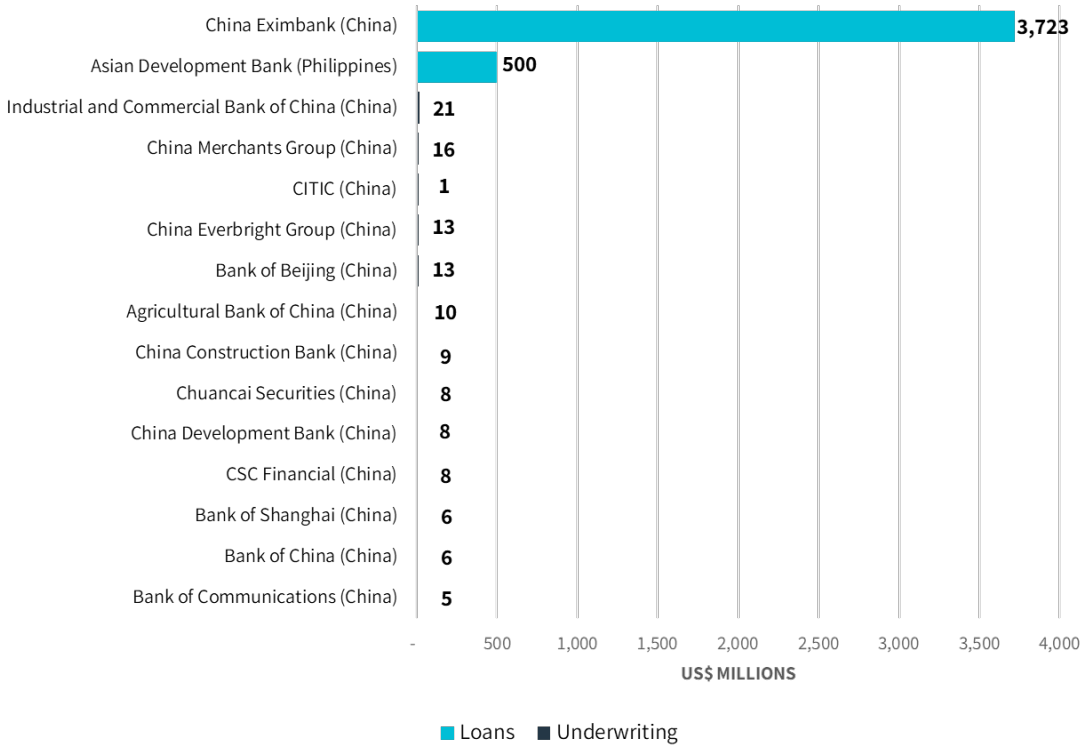
Creditors from six countries account for almost all coal-attributable loans and underwriting services to companies engaged in coal in Bangladesh. Chinese financial institutions provided the highest amount of credit (USD 3.9 billion), primarily due to financing the two coal-fired power plants in 2017 (see Figure 14).

Figure 14 Bangladesh: Coal-attributable loans and underwriting per creditor country (2016–2020, USD millions)



Bangladesh's economy is dependent on foreign investments across key sectors. Figure 15 shows that the largest coal creditor was China Eximbank (USD 3.7 billion), which financed the two coal-fired power plants in 2017, followed by the Asian Development Bank (ADB) (USD 500 million). Most investors in Bangladesh are regional investors.

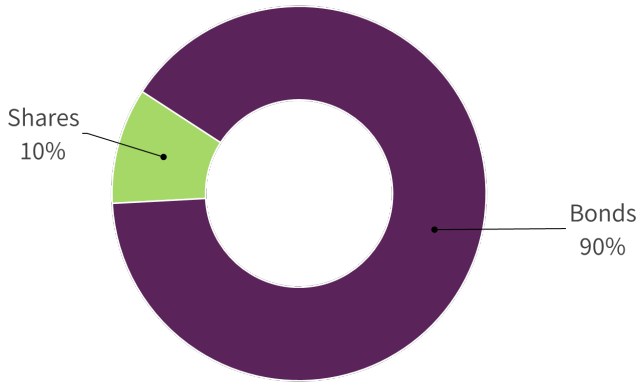
Figure 15 Bangladesh: Top 15 coal creditors (2016–2020, USD millions)



2.6.2 Investor Analysis

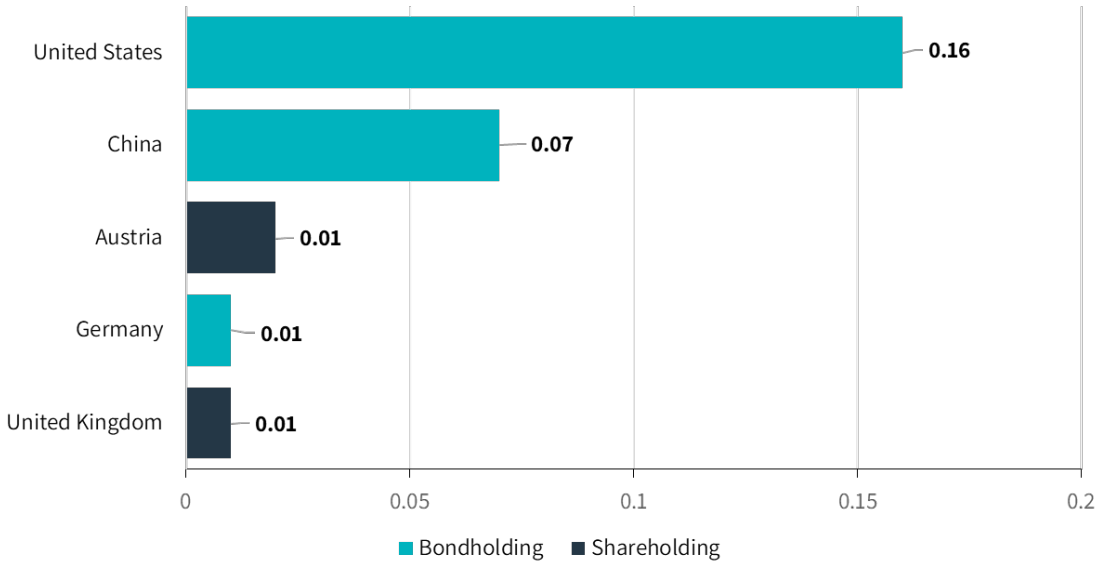
As of most recent filings in June 2021, investors held USD 264,000 in coal-attributable bonds and shares issued by companies active in Bangladesh. Figure 16 shows that 90% of these investments were in bonds and 10% in shares.

Figure 16 Bangladesh: Investments by finance type (June 2021)



Financial institutions from five countries accounted for 97% of identified investments in thermal coal in Bangladesh. As Figure 17 shows, investors from the US were the largest investors (USD 160,000) followed by investors from China (USD 70,000) and Austria (USD 10,000).

Figure 17 Bangladesh: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The five largest investors held 88% (USD 232,000) of coal-attributable investments identified in Bangladesh. US-based asset manager BlackRock held bonds worth USD 160,000 (see Figure 18).

Figure 18 Bangladesh: Top 15 coal investors (June 2021, USD millions)

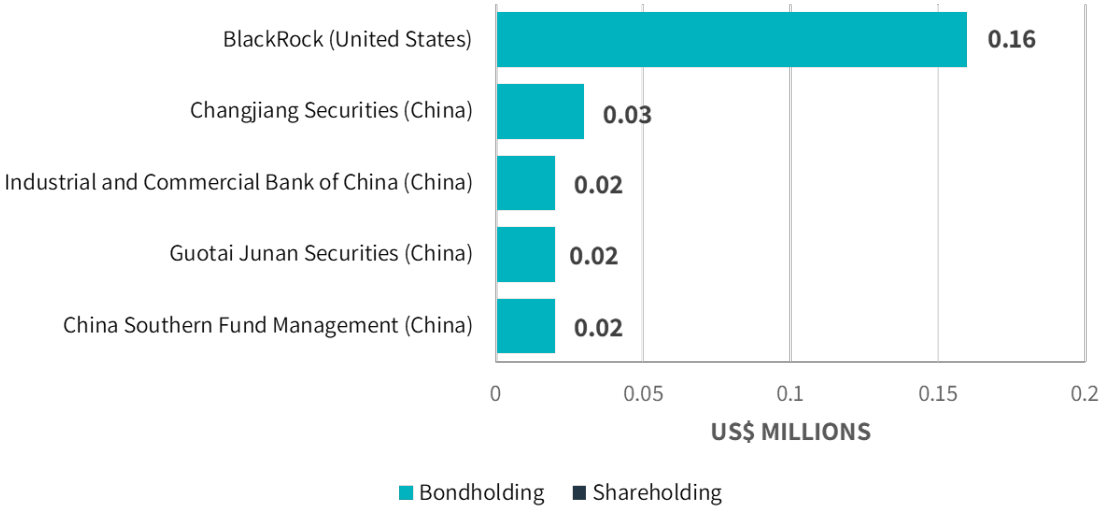
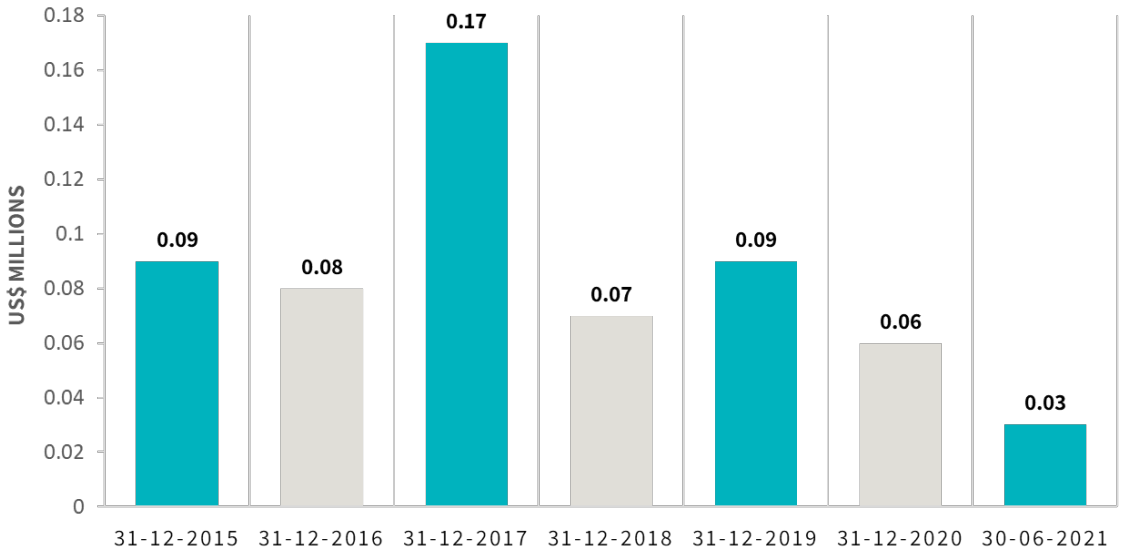


Figure 19 shows the annual fluctuations in the value of coal-attributable shareholdings of companies active in Bangladesh. Values fluctuated between USD 170,000 in the final quarter of 2017 to USD 30,000 in the second quarter of 2021. There appears to have been a downward trend since the fourth quarter of 2017.

Figure 19 Bangladesh: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD millions)

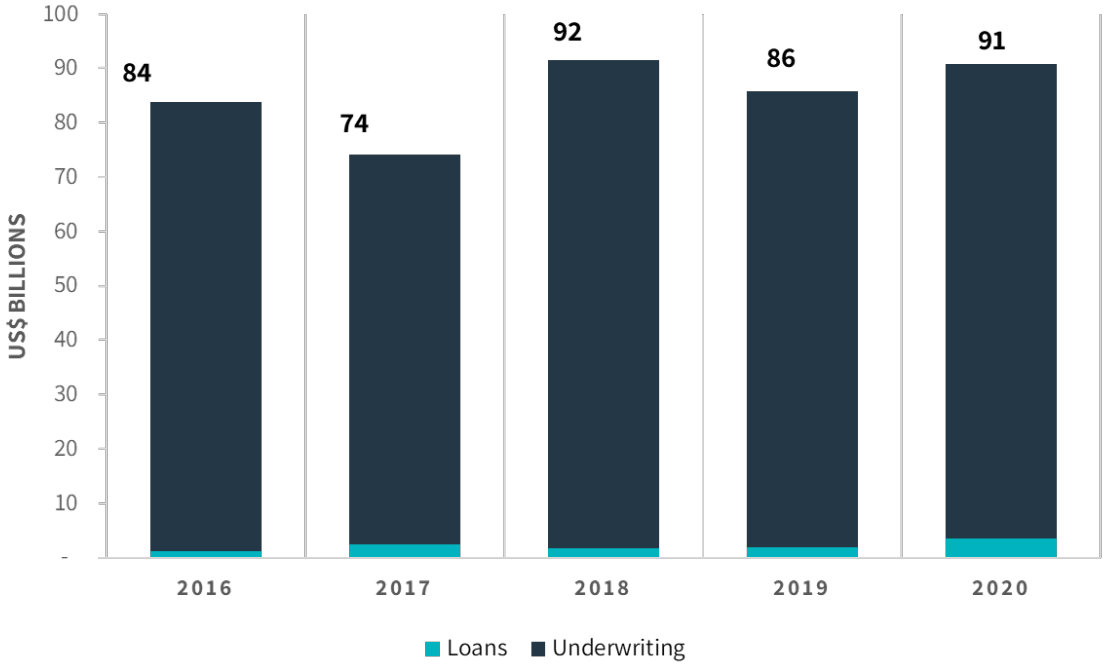


2.7 China

2.7.1 Creditor Analysis

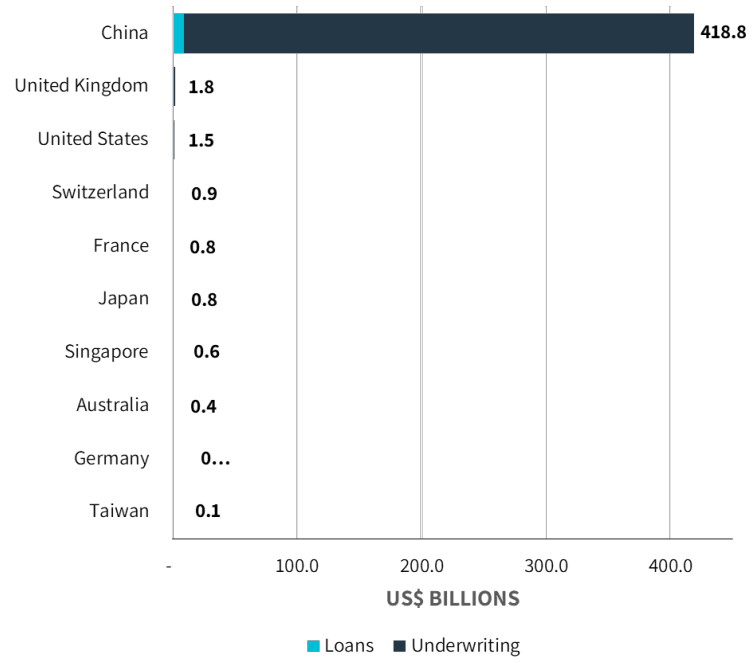
From 2016–2020, financial institutions provided USD 426 billion in loans and underwriting services to Chinese thermal coal activities. Figure 20 presents annual Chinese coal credit trends. It shows a dip in 2017 when USD 74 billion was provided in coal-attributable credit, followed by a peak in 2018. Since then, annual coal credit in China has remained above USD 85 billion.

Figure 20 China: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



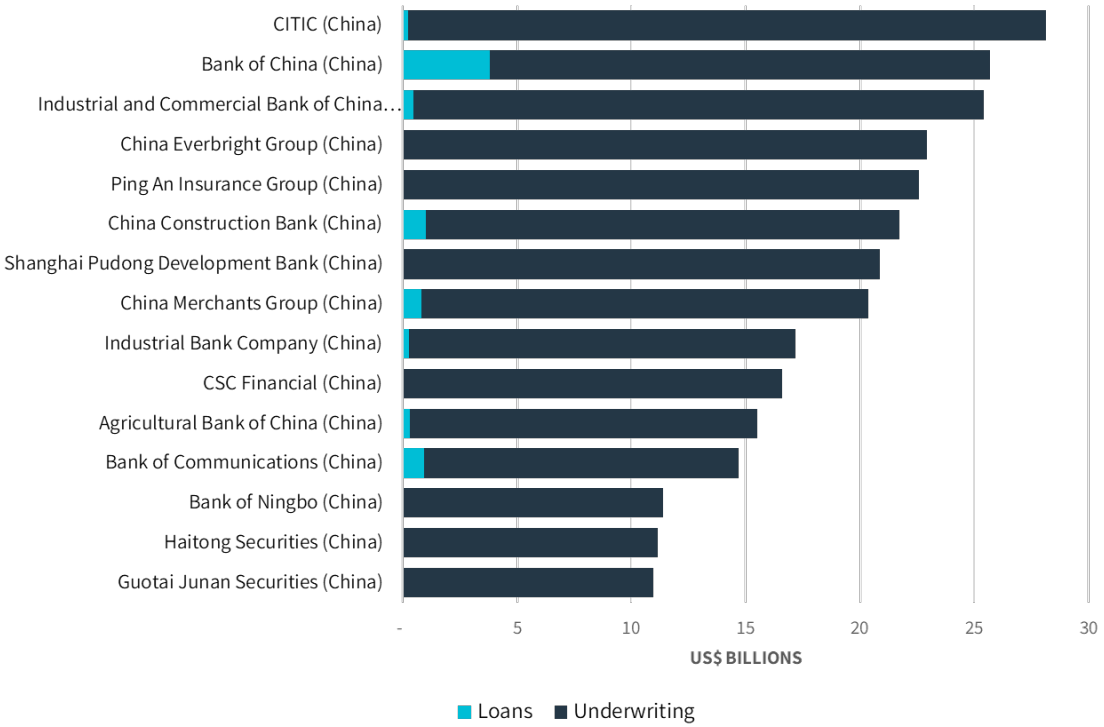
Financial institutions from 10 countries account for almost 100% of all coal-attributable loans and underwriting to companies engaged in coal in China. As Figure 21 shows, 98% of coal credit in China was provided by domestic financial institutions.

Figure 21 China: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The 15 largest creditors accounted for 67% of all identified coal-attributable credit. CITIC was the largest coal creditor, providing USD 28 billion between 2016 and 2020, followed by Bank of China (USD 26 billion) and Industrial and Commercial Bank of China (ICBC) (USD 25 billion) (see Figure 22).

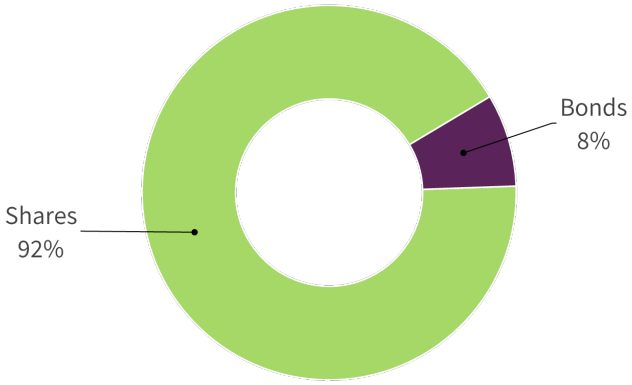
Figure 22 China: Top 15 coal creditors (2016–2020, USD billions)



2.7.2 Investor Analysis

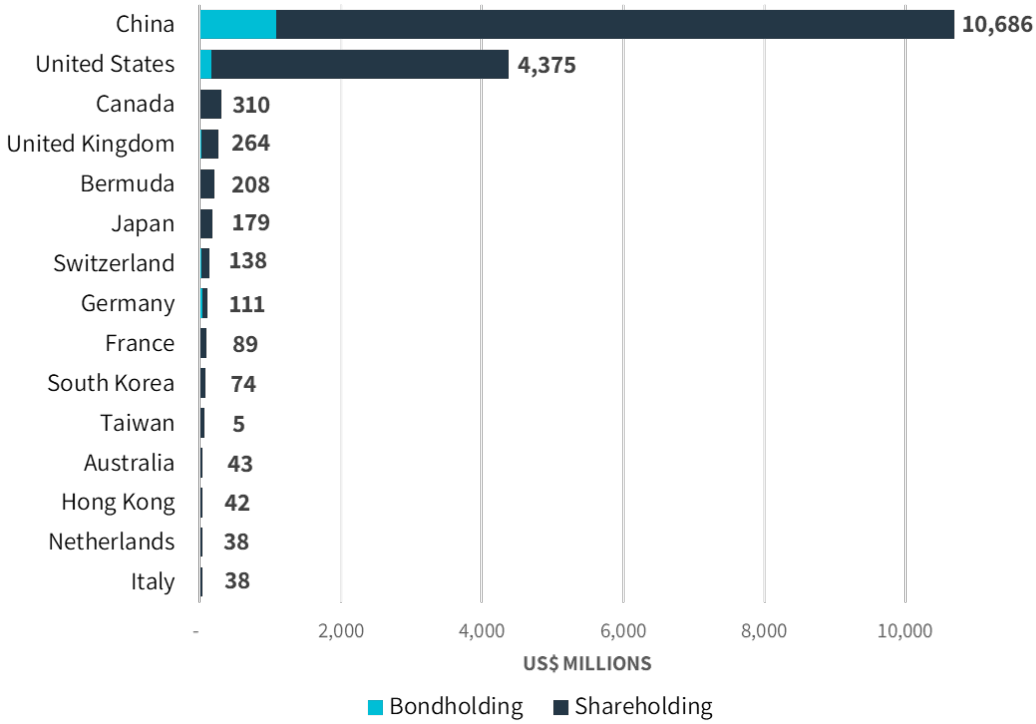
As of most recent filings in June 2021, investors held USD 16.7 billion in coal-attributable bonds and shares. Figure 23 shows that 8% (USD 1.4 billion) of these investments were in bonds and 92% (USD 15.3 billion) in shares.

Figure 23 China: Investments by finance type (June 2021)



Investors from 15 countries accounted for 100% of investments (see Figure 24). Investors from China accounted for 64% (USD 10.7 billion) followed by investors from the US (26%, USD 4.4 billion).

Figure 24 China: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The 15 largest coal investors in China accounted for 57% (USD 9.5 billion) of all identified coal-attributable bond- and shareholdings (see Figure 25). The largest investor was US asset manager BlackRock (USD 1.3 billion) followed by US peer Vanguard (USD 1.0 billion) and Central Huijin Asset Management (USD 986 million).

Figure 25 China: Top 15 coal investors (June 2021, USD millions)

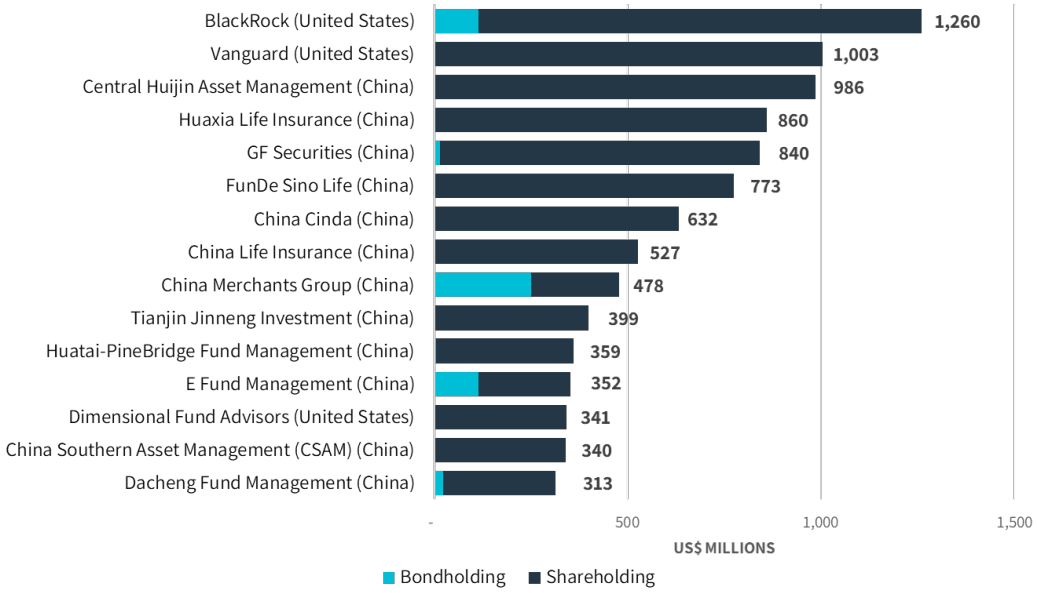
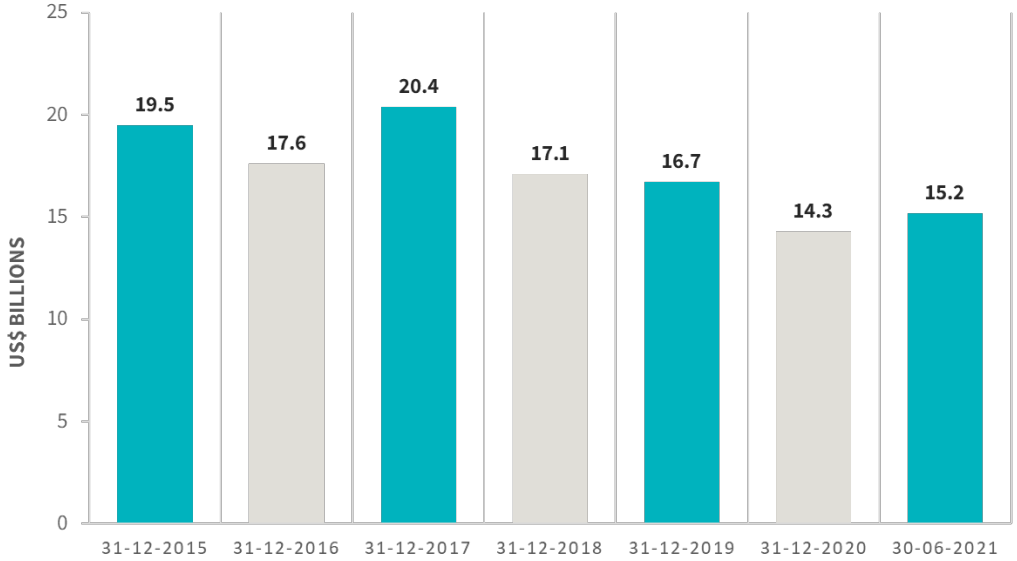


Figure 26 shows the annual fluctuations in coal-attributable shareholding values between the final quarter of 2015 and the second quarter of 2021. Following a peak of USD 20.4 billion in the fourth quarter of 2017, there appears (despite fluctuations) to have been a gradual downward trend in coal-attributable shareholdings. However, the slight increase in value in the second quarter of 2021 may indicate a new upward trend and could be attributed to an economic recovery post-pandemic package.

Figure 26 China: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)



2.8 Cambodia

2.8.1 Creditor Analysis

From 2016–2020, financial institutions provided USD 6 million in loans and underwriting services to companies engaged in thermal coal in Cambodia. The full amount was provided in 2020 and relates to a loan provided by HSBC for Malaysian Leader Energy.

2.8.2 Investor Analysis

No investments in bonds and shares by companies engaged in thermal coal in Cambodia were identified.

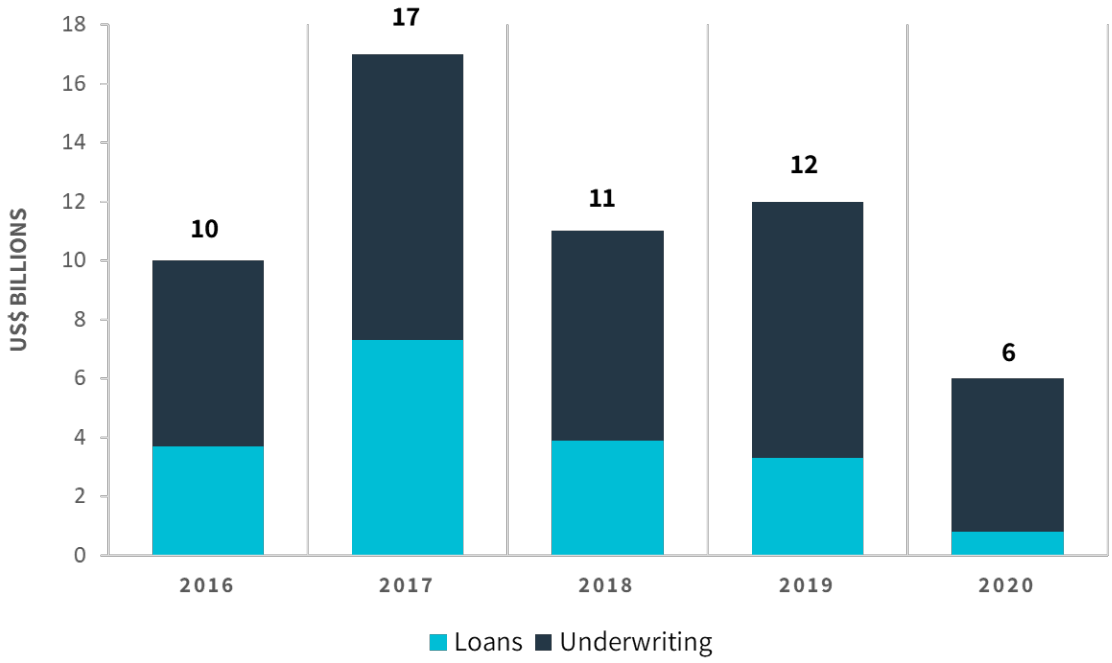
There are only a small number of companies active in coal-mining and coal-fired power in Cambodia. The government has recently pushed to increase the generating capacity of the country's power plant fleet, particularly through coal. However, this is not yet reflected in the financing figures. Many of the plants are still in the planning and development phases, others are being (partly) financed by bilateral financing not identified during the course of the research. No investments in bonds and shares issued by companies active in coal-mining and coal-fired power were identified, as none of the selected companies had issued bonds or shares.

2.9 India

2.9.1 Creditor Analysis

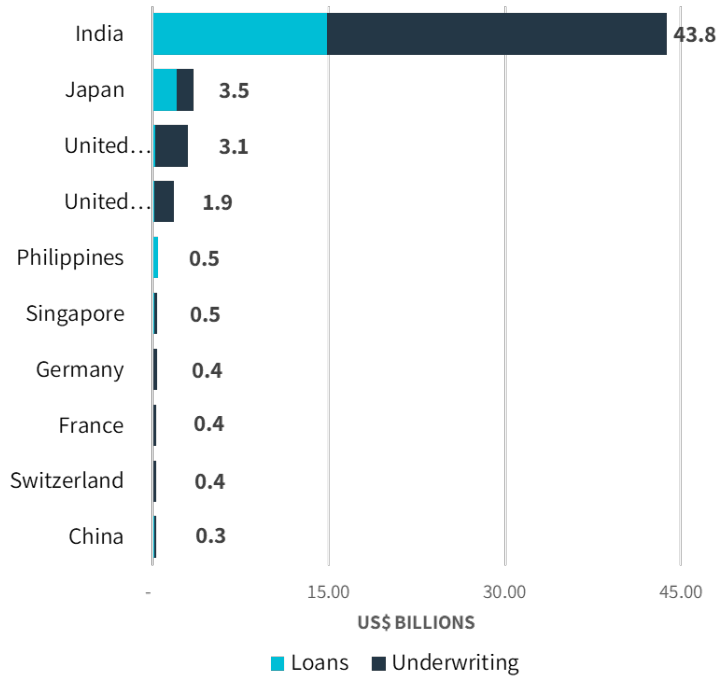
Financial institutions provided USD 55 billion in coal-attributable loans and underwriting services to companies engaged in coal in India. Figure 27 shows annual coal credit trends in India. There appears to have been a peak in 2017 followed by a gradual declining trend. 2020 had the lowest value in the period of study.

Figure 27 India: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



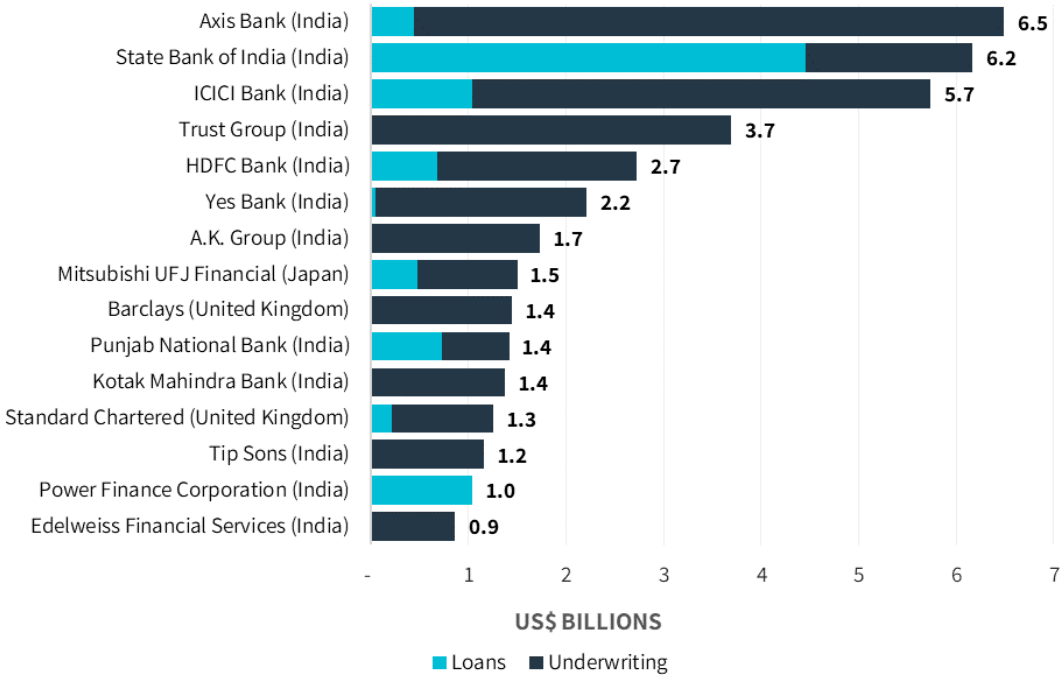
Financial institutions from 10 countries accounted for 99% (USD 54.6 billion) of identified coal credit in India (see Figure 28). Financial institutions from India provided 79% (USD 43.8 billion) of credit, followed by financial institutions from Japan (USD 3.5 billion) and the UK (USD 3.1 billion).

Figure 28 India: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The 15 largest creditors provided 70% (USD 38.8 billion) of identified coal-attributable loans and underwriting services to companies engaged in thermal coal in India (see Figure 29). The top five creditors were all financial institutions from India. Axis Bank was the largest coal creditor in India (USD 6.5 billion) followed by State Bank of India (USD 6.2 billion) and ICICI Bank (USD 5.7 billion).

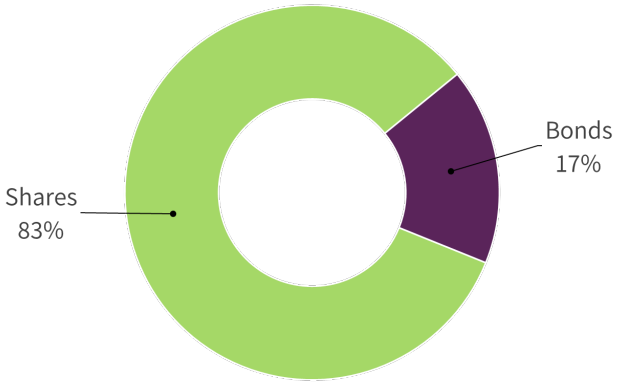
Figure 29 India: Top 15 coal creditors (2016–2020, USD millions)



2.9.2 Investor Analysis

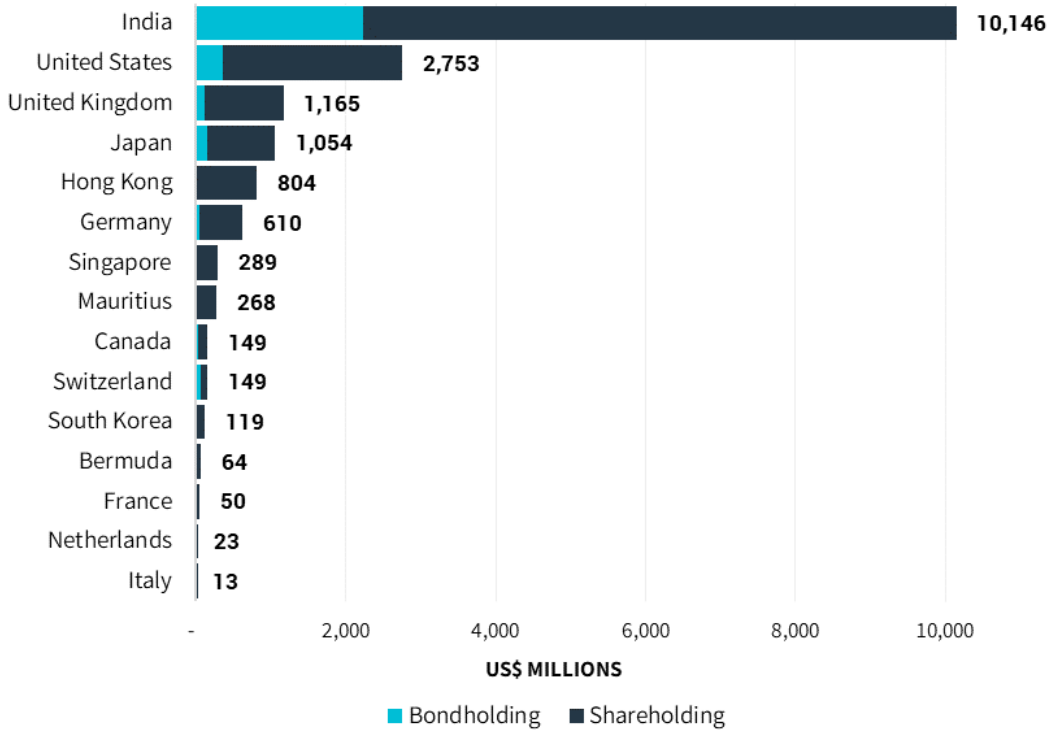
As of most recent filings in June 2021, investors held USD 17.7 billion in coal-attributable bonds and shares of companies active in thermal coal in India. Figure 30 shows that 83% (USD 14.6 billion) of these investments were in shares and 17% (USD 3.1 billion) in bonds.

Figure 30 India: Investments by finance type (June 2021)



Financial institutions from 15 countries accounted for all the identified investments. As Figure 31 shows, financial institutions from India held 57% (USD 10.1 billion) of investments followed by financial institutions from the US (USD 2.8 billion) and the UK (USD 1.1 billion).

Figure 31 India: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The top 15 coal investors in India accounted for 75% (USD 13.3 billion) of all identified coal-attributable investments. Figure 32 shows the largest investor was the Life Insurance Corporation of India (USD 3.8 billion) followed by HDFC Bank (USD 1.7 billion) and ICICI Bank (USD 1.5 billion).

Figure 32 India: Top 15 coal investors (June 2021, USD millions)

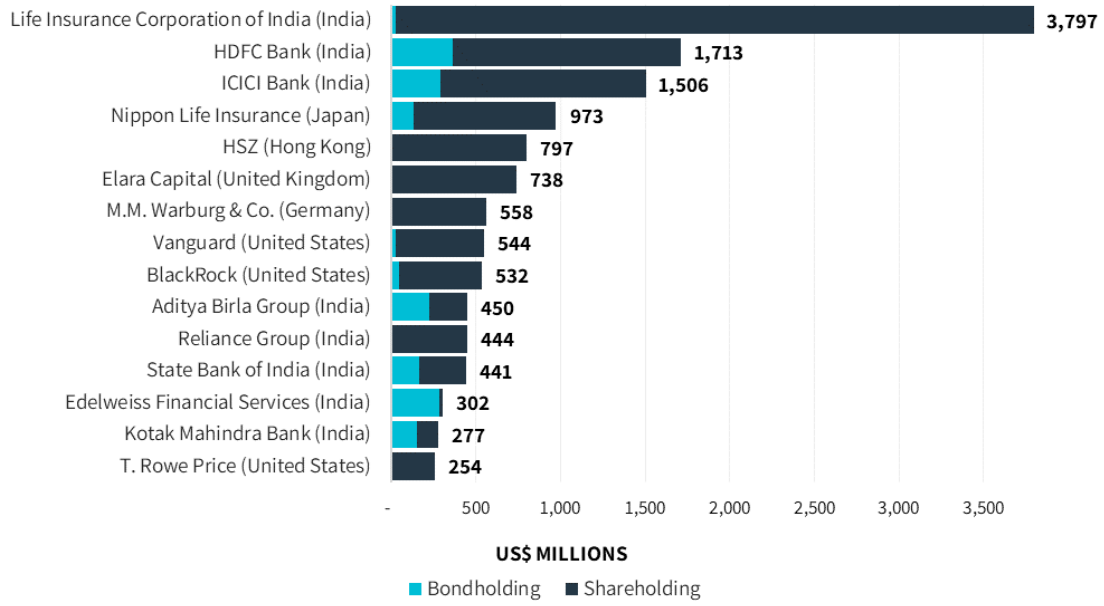
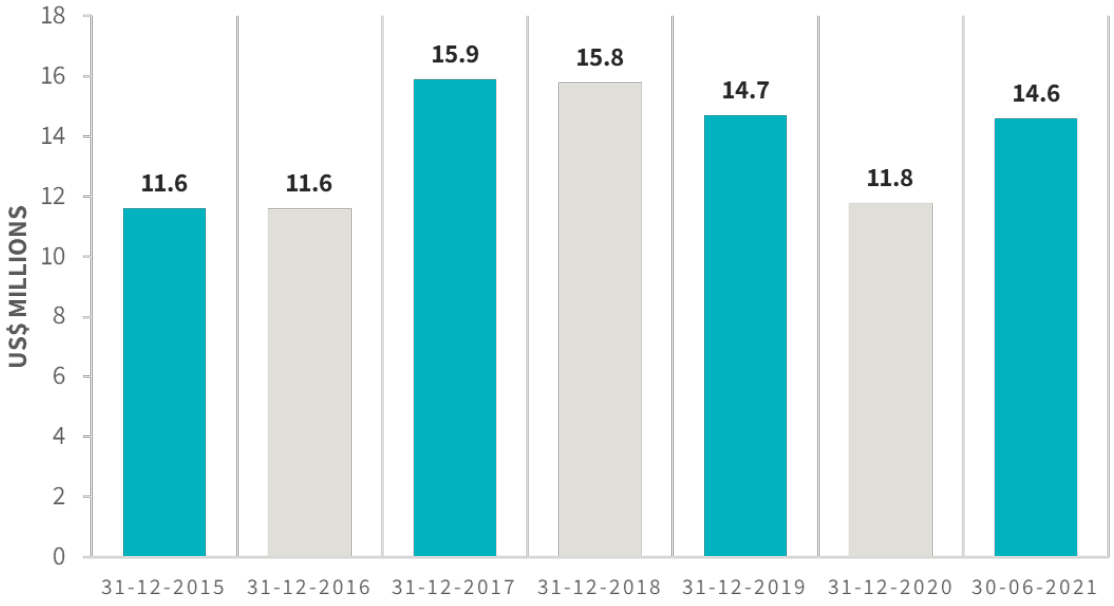


Figure 33 shows the annual fluctuations in coal-attributable shareholdings between the fourth quarter of 2015 and the second quarter of 2021. It shows that 2017 and 2018 were peak years with a decline in 2020, perhaps due to the COVID-19 pandemic. In 2021, India's coal-attributable shareholdings appeared to be picking up again.

Figure 33 India: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)

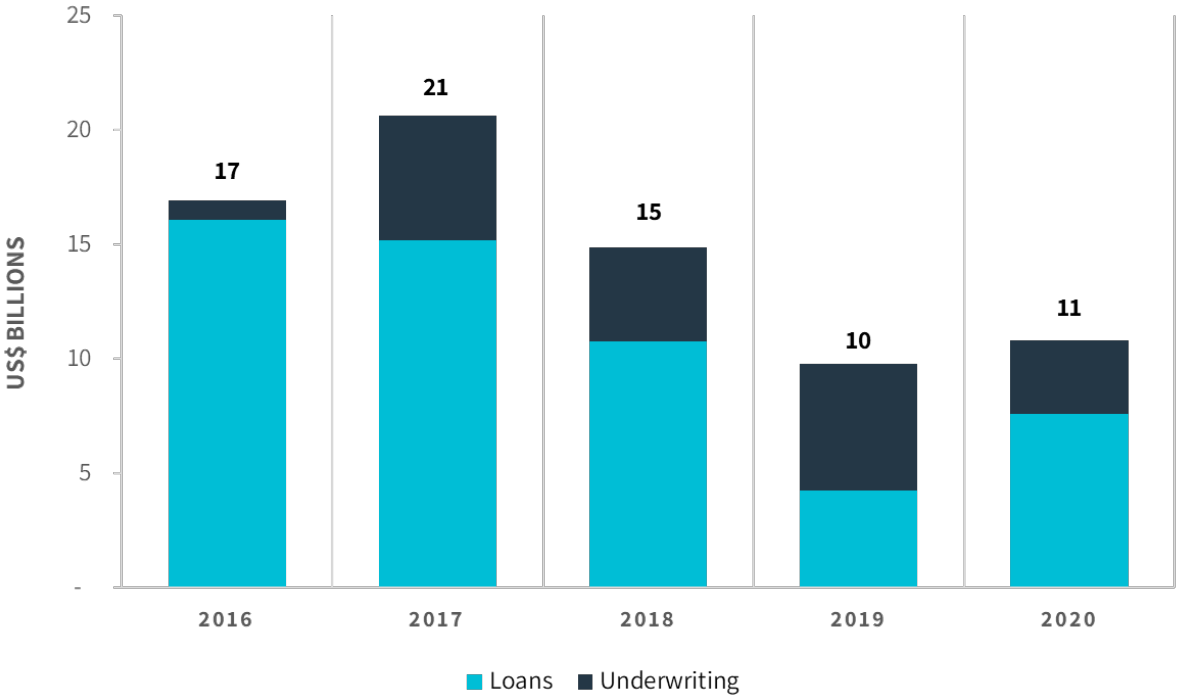


2.10 Indonesia

2.10.1 Creditor Analysis

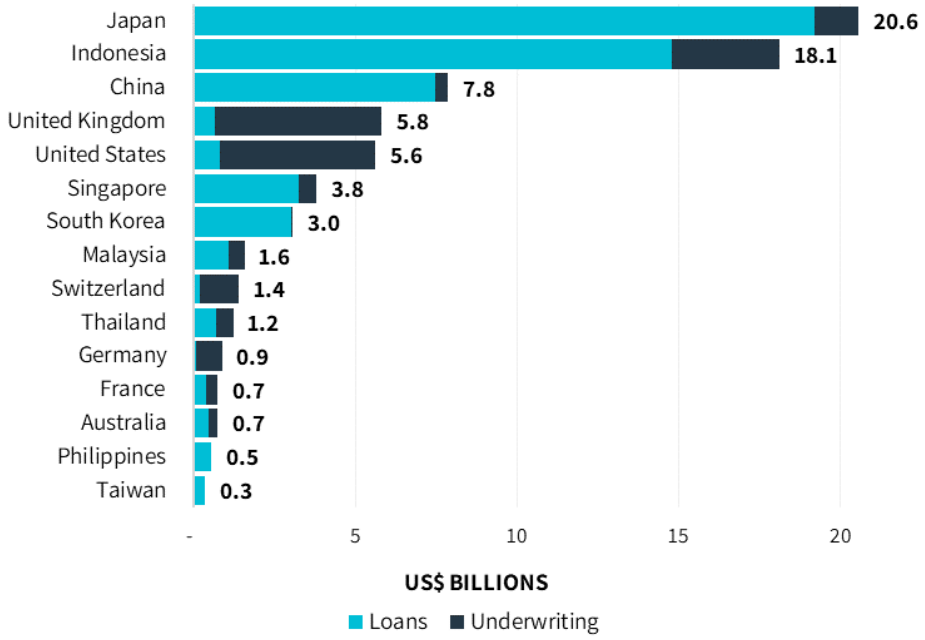
Financial institutions provided USD 73 billion in coal-attributable loans and underwriting services to companies engaged in coal in Indonesia. Figure 34 shows that, after a peak in 2017, there appeared to be a gradual decline in coal credit until 2019 when it picked up again slightly in 2020.

Figure 34 Indonesia: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



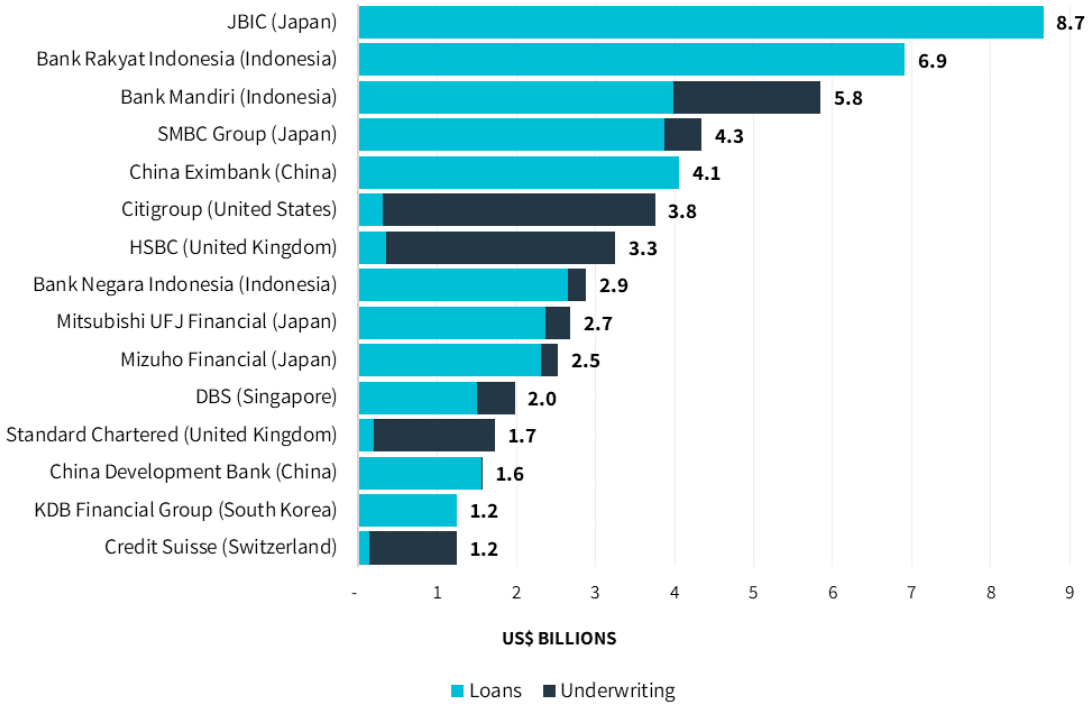
Financial institutions from 15 countries accounted for 99% of all identified coal credit in Indonesia (see Figure 35). Japanese financial institutions provided the most coal-attributable credit (USD 20.6 billion), followed by financial institutions from Indonesia itself (USD 18.1 billion) and China (USD 7.8 billion).

Figure 35 Indonesia: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The top 15 coal creditors provided 72% (USD 52.7 billion) of identified coal credit in Indonesia. The largest provider of coal-attributable loans and underwriting services to companies engaged in coal was Japan's JBIC (USD 8.7 billion) followed by Indonesian banks Bank Rakyat Indonesia (USD 6.9 billion) and Bank Mandiri (USD 5.8 billion) (see Figure 36).

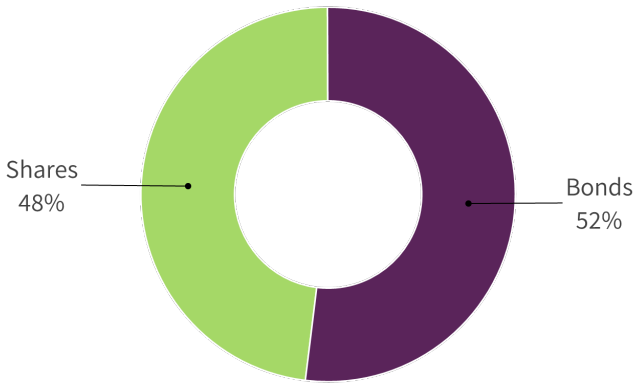
Figure 36 Indonesia: Top 15 coal creditors (2016–2020, USD millions)



2.10.2 Investor Analysis

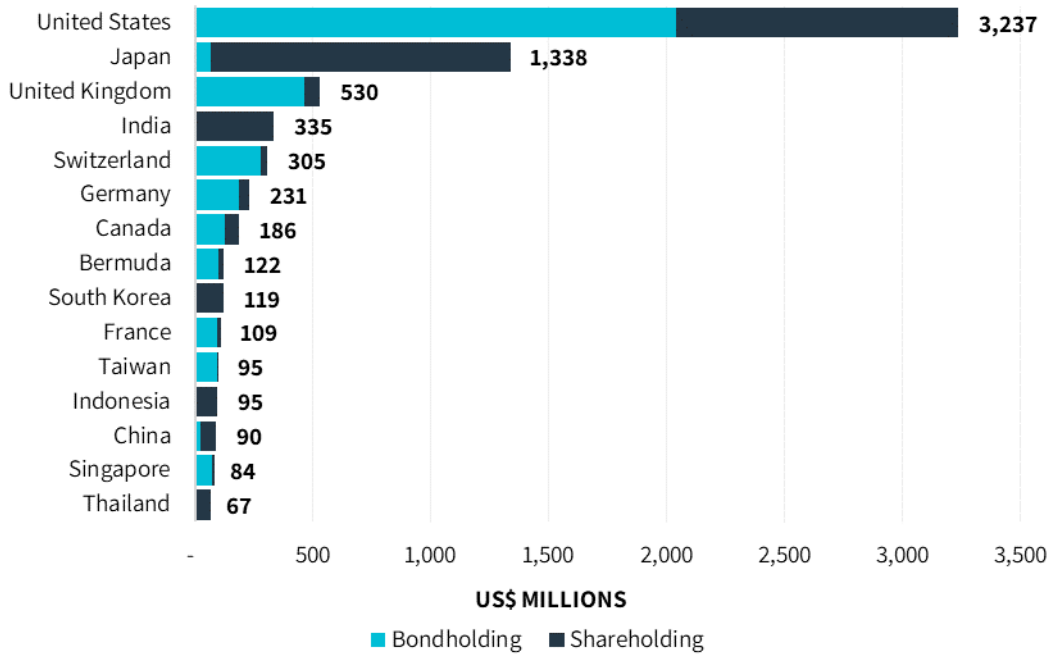
Financial institutions held USD 7.3 billion in coal-attributable bonds and shares of companies engaged in coal in Indonesia. As Figure 37 shows, 48% (USD 3.5 billion) of these investments were in the form of shares and the remaining 52% (USD 3.8 billion) were bonds.

Figure 37 Indonesia: Investments by finance type (June 2021)



Investors from 15 countries accounted for 95% (USD 6.9 billion) of identified coal investments in Indonesia. Figure 38 shows that financial institutions from the US were the largest investors, holding USD 3.2 billion in coal-attributable bonds and shares of companies active in coal. US financial institutions were followed by financial institutions from Japan (USD 1.3 billion) and the UK (USD 530 million).

Figure 38 Indonesia: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The top 15 coal investors accounted for 47% (USD 3.5 billion) of coal-attributable bonds and shares in Indonesia. The largest investor was US asset manager BlackRock (USD 446 million) followed by the Japanese Government Pension Investment Fund (USD 443 million) and US JPMorgan Chase (USD 371 million) (see Figure 39).

Figure 39 Indonesia: Top 15 coal investors (June 2021, USD millions)

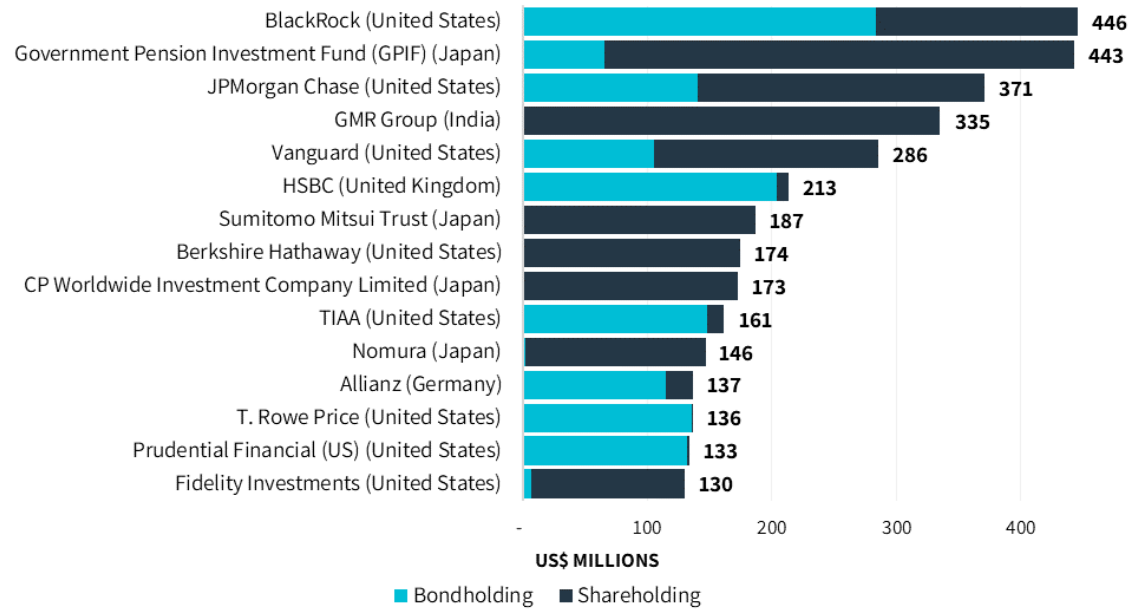
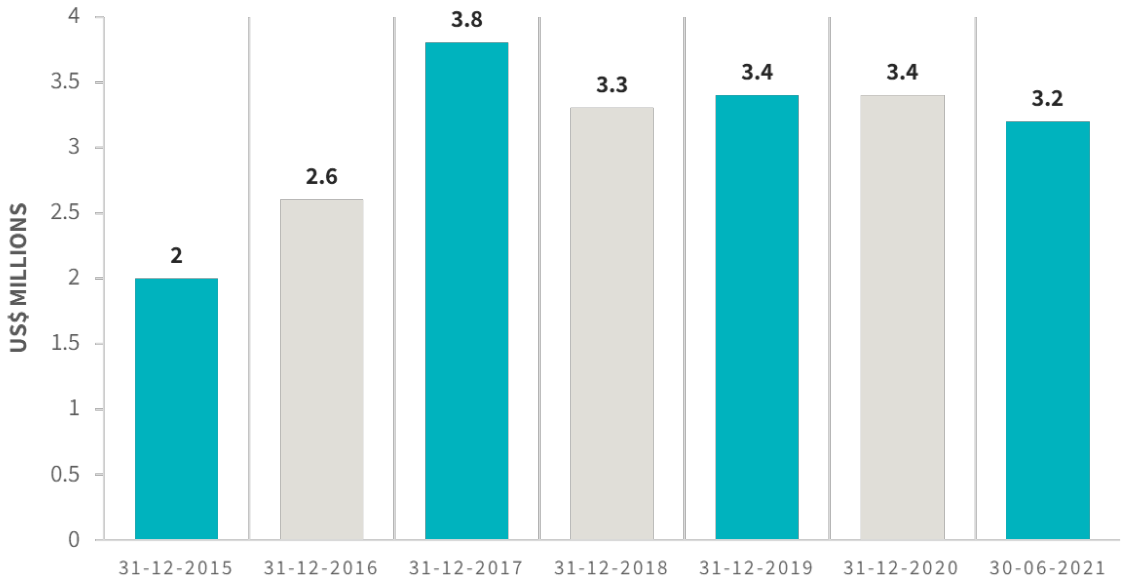


Figure 40 shows the annual fluctuations in shareholdings of companies active in coal in Indonesia. Values rose from the fourth quarter of 2015 to the fourth quarter of 2017 and then declined slightly, fluctuating by approximately USD 0.1 billion since.

Figure 40 Indonesia: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)

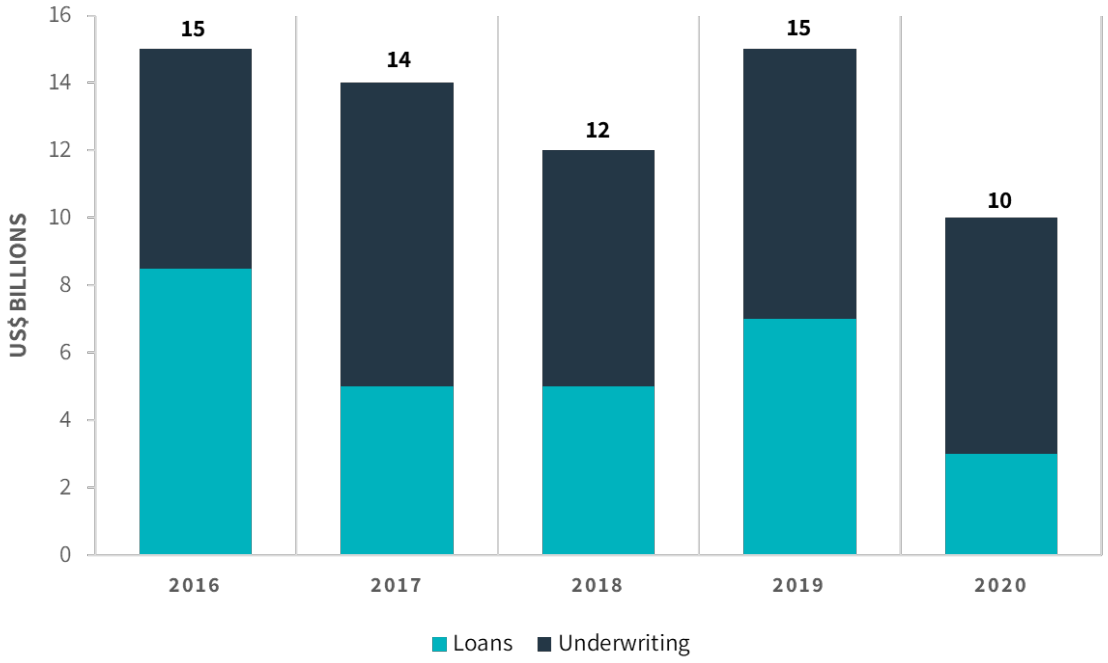


2.11 Japan

2.11.1 Creditor Analysis

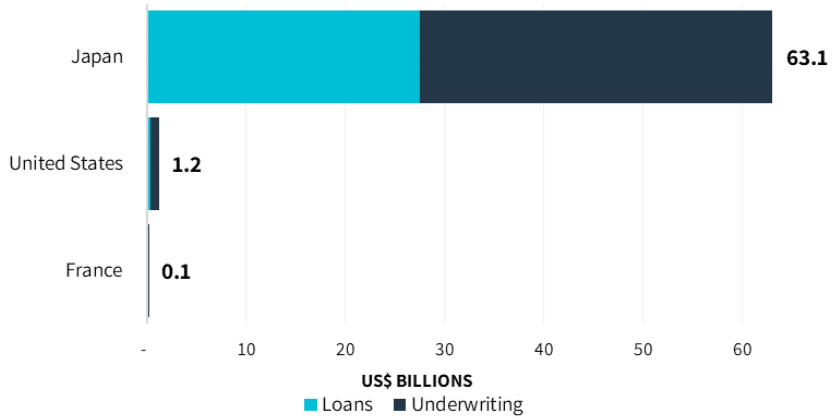
From 2016 to 2020, financial institutions provided USD 64 billion in coal-attributable loans and underwriting services to companies active in coal in Japan. Figure 41 shows that coal credit flows fluctuated between USD 15 billion and USD 12 billion between 2016 and 2019. In 2020, there appeared to be a slight decline.

Figure 41 Japan: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



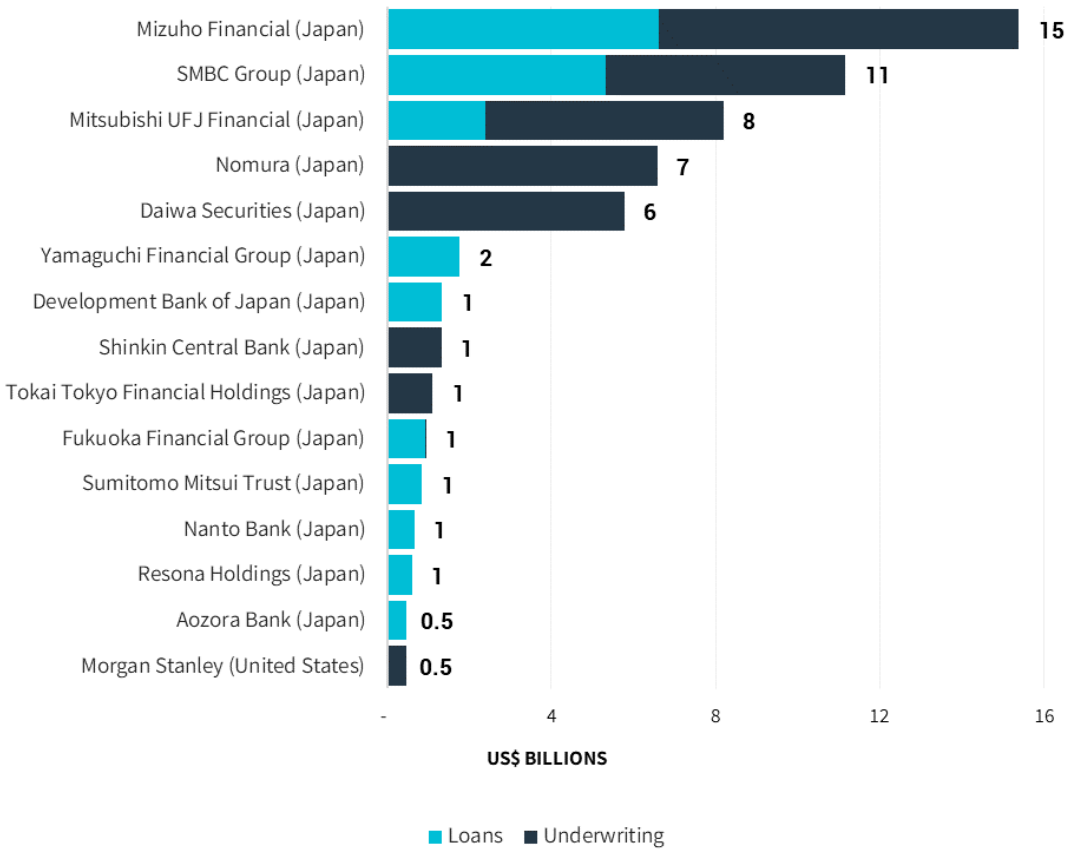
Financial institutions from three countries provided almost 100% of coal credit in Japan, with Japanese financial institutions providing 98% (USD 63.1 billion) of identified coal credit (see Figure 42).

Figure 42 Japan: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The top 15 coal creditors provided 88% (USD 57 billion) of identified coal credit flows. Figure 43 shows that 14 of the 15 largest coal creditors were Japanese financial institutions. The largest among them was Mizuho Financial (USD 15 billion) followed by SMBC Group (USD 11 billion) and Mitsubishi UFJ Financial (USD 8 billion).

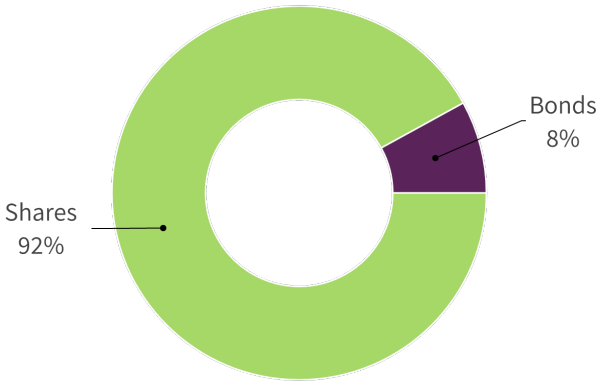
Figure 43 Japan: Top 15 coal creditors (2016–2020, USD millions)



2.11.2 Investor Analysis

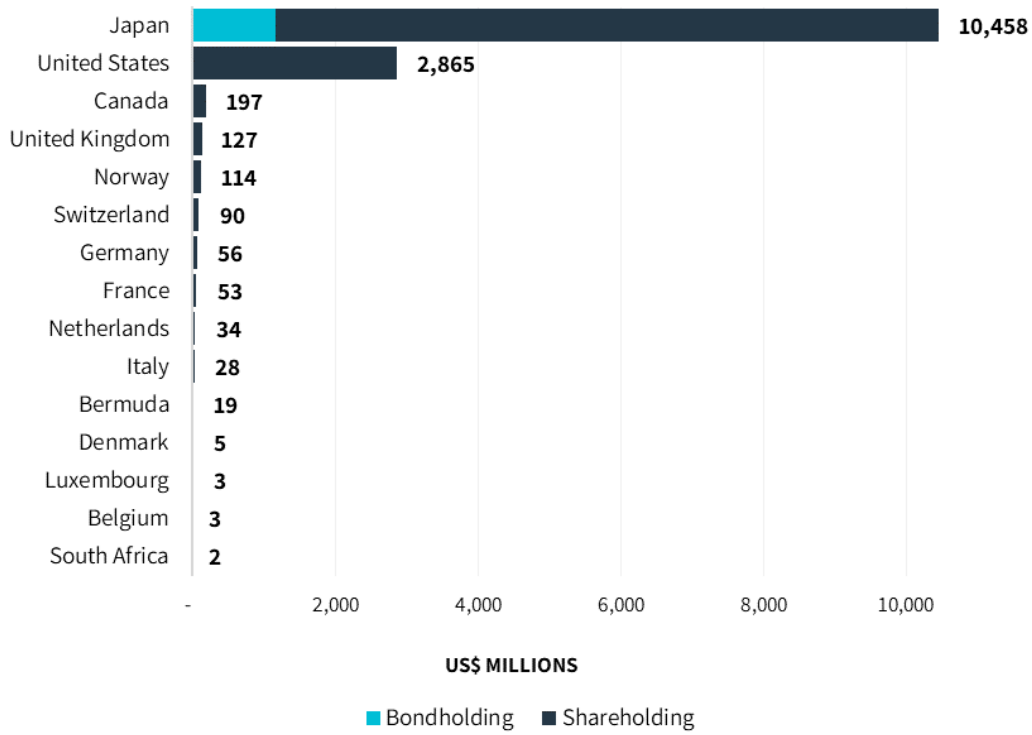
As of most recent filings in June 2021, financial institutions held USD 14.1 billion in coal-attributable bonds and shares of companies active in thermal coal in Japan. Figure 44 shows that 92% (USD 12.9 billion) of these investments were in shares and the remaining 8% (USD 1.2 billion) in bonds.

Figure 44 Japan: Investments by finance type (June 2021)



Financial institutions from 15 countries held all identified coal-attributable bonds and shares. Japanese financial institutions held 74% (USD 10.5 billion) of these investments followed by financial institutions from the US (USD 2.9 billion) (see Figure 45).

Figure 45 Japan: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The 15 largest investors accounted for 83% (USD 11.7 billion) of identified coal-attributable investments in Japan. Figure 46 shows the largest investor was the Japanese Government Pension Investment Fund (USD 3.5 billion) followed by Mizuho Financial (USD 1.2 billion) and Nomura (USD 1.1 billion).

Figure 46 Japan: Top 15 coal investors (June 2021, USD millions)

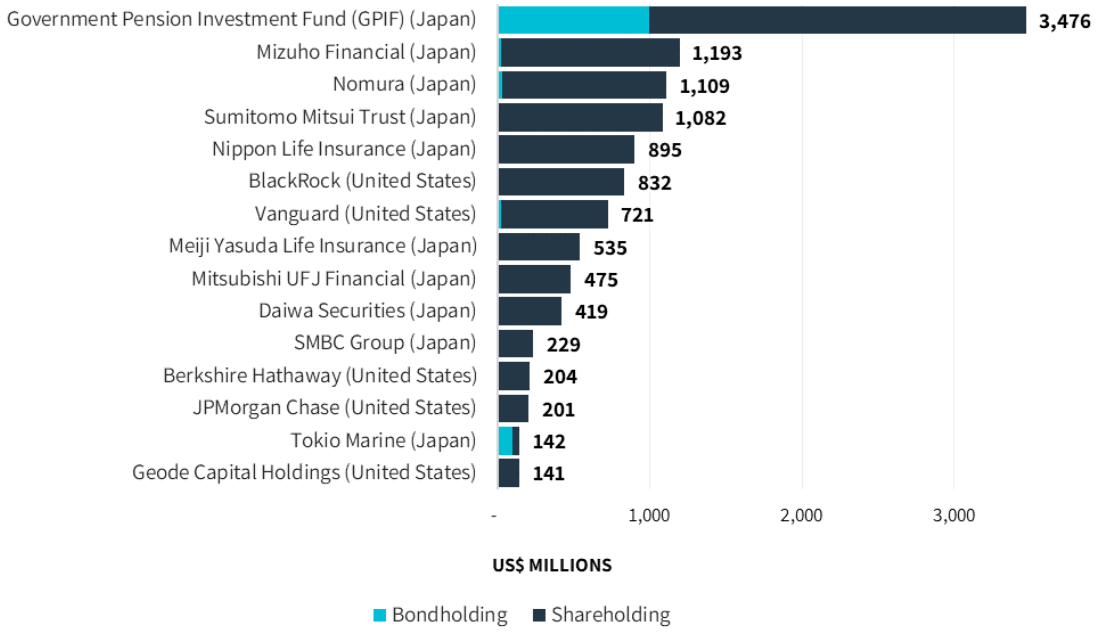
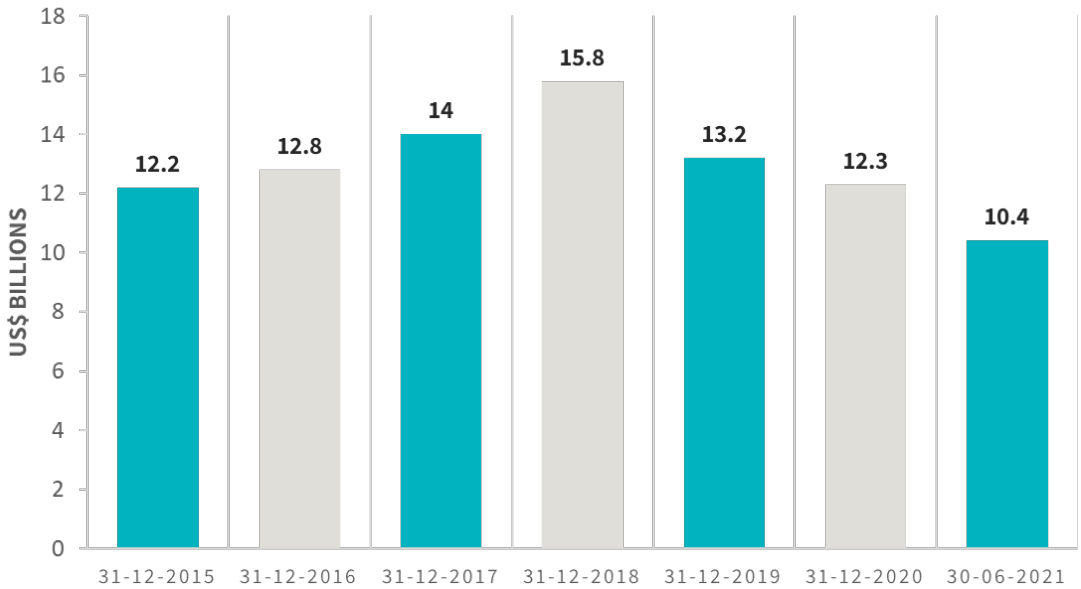


Figure 47 shows the annual fluctuations in shareholdings of companies active in coal in Japan. After rising from the fourth quarter of 2015 to the fourth quarter of 2018, values have gradually declined.

Figure 47 Japan: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)



2.12 Malaysia

2.12.1 Creditor Analysis

Financial institutions provided USD 4.6 billion in loans and underwriting services to companies engaged in coal in Malaysia between 2016 and 2020. Figure 48 shows the significant fluctuations in annual coal credit flows in Malaysia, from a high of USD 1.5 billion in 2018 to a low of USD 296 million in 2019.

Figure 48 Malaysia: Annual coal-attributable loans and underwriting (2016–2020, USD billions)

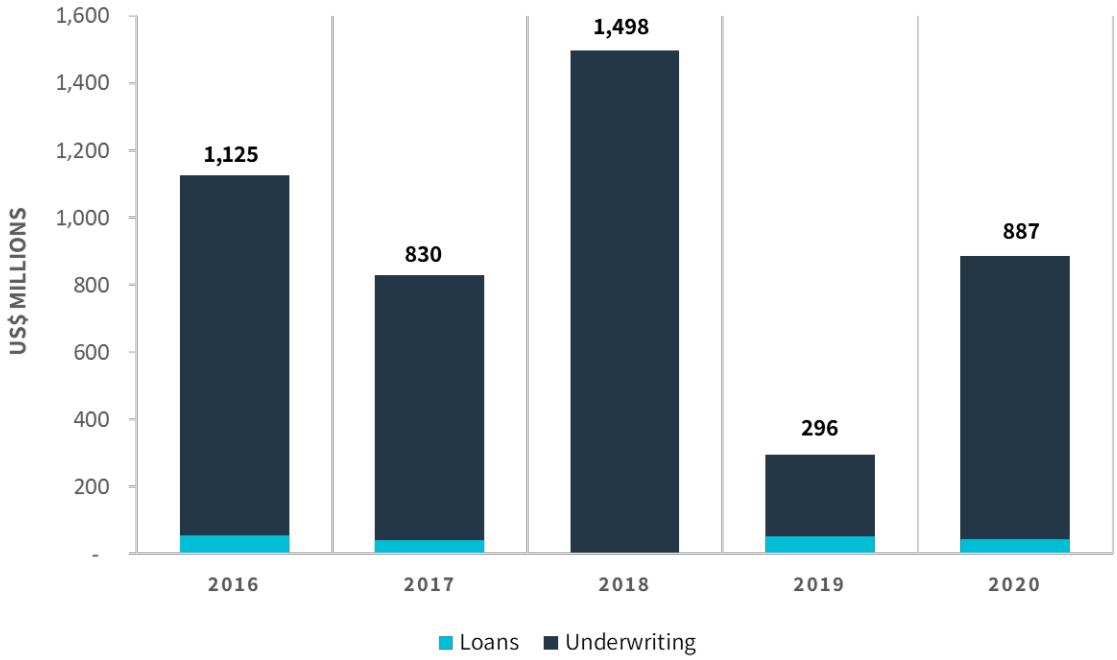
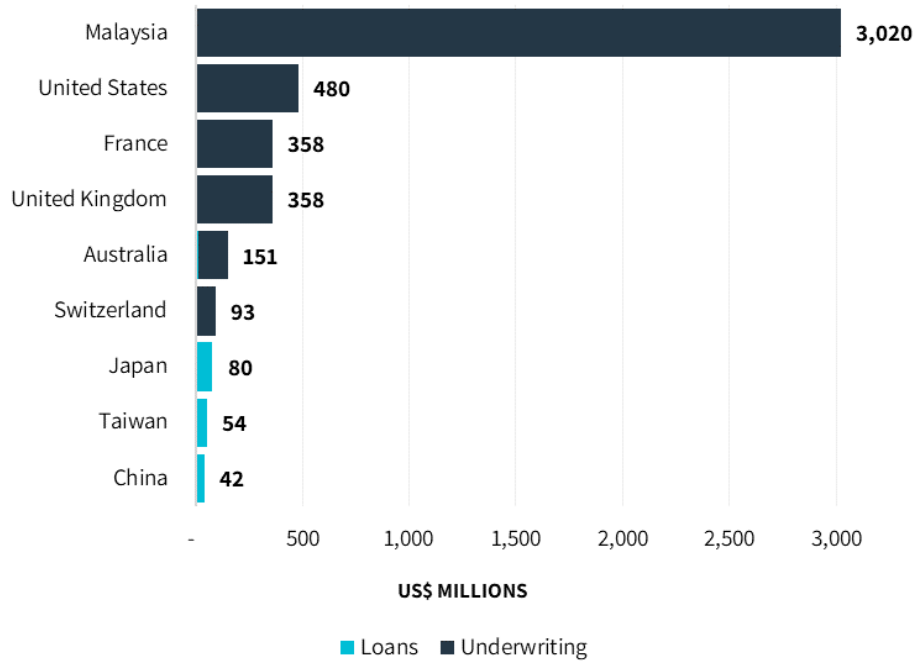


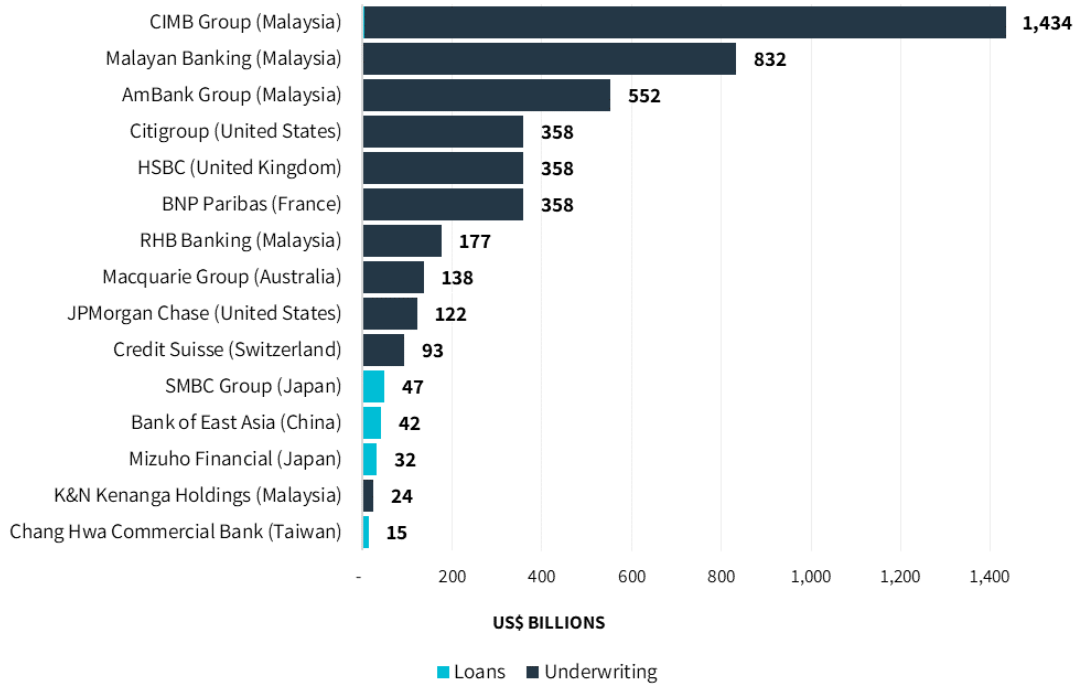
Figure 49 shows that nine countries provided almost 100% of all identified coal-attributable loans and underwriting services to companies in Malaysia. Financial institutions from Malaysia provided 65% (USD 3 billion) of identified coal credit followed by financial institutions from the US (USD 480 million) and France (USD 358 million).

Figure 49 Malaysia: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The 15 largest creditors provided 99% (USD 4.6 billion) of identified coal credit (see Figure 50). The top three creditors were all Malaysian banks. CIMB Group provided the most coal-attributable credit (USD 1.4 billion) followed by Malayan Banking/Maybank (USD 832 million) and AmBank Group (USD 552 million).

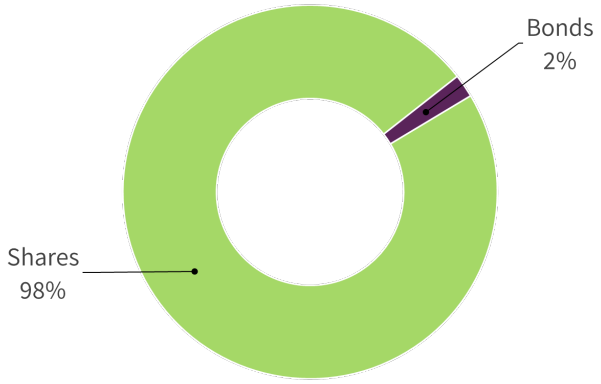
Figure 50 Malaysia: Top 15 coal creditors (2016–2020, USD millions)



2.12.2 Investor Analysis

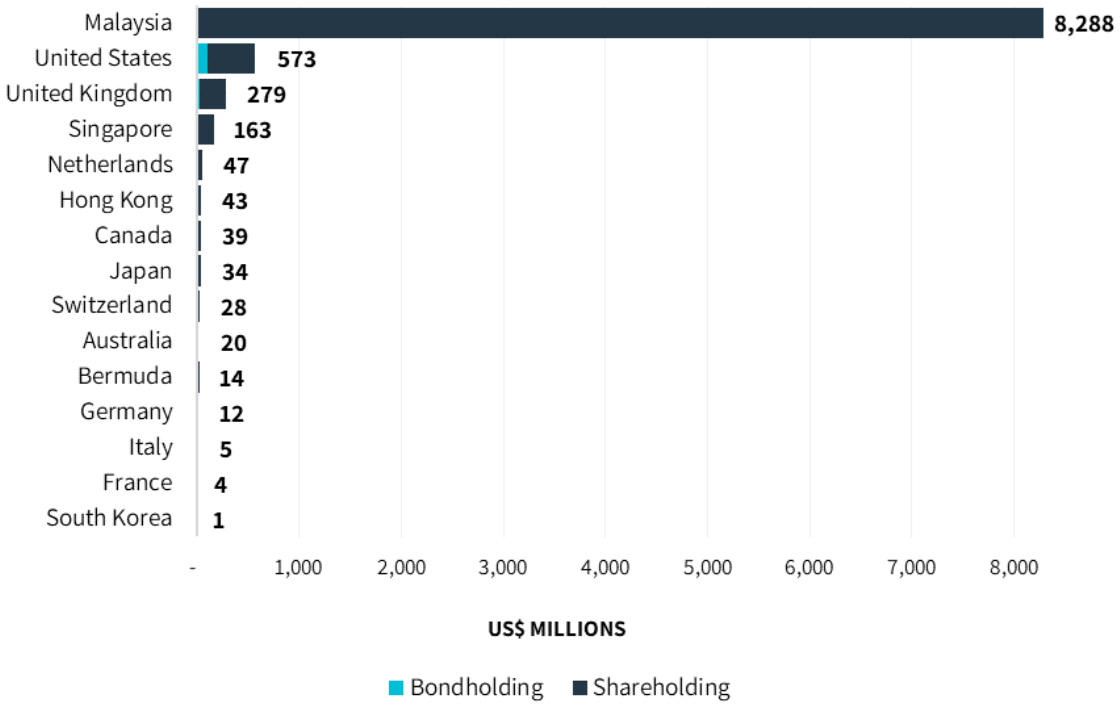
Financial institutions held USD 9.6 billion in coal-attributable bonds and shares of companies engaged in thermal coal in Malaysia. Figure 51 shows that 98% (USD 9.4 billion) was in shares and 2% (USD 185 million) in bonds.

Figure 51 Malaysia: Investments by finance type (June 2021)



Financial institutions from 15 countries held 100% of identified coal investments (see Figure 52). Malaysian financial institutions held 87% (USD 8.3 billion) followed by financial institutions from the US (USD 573 million) and the UK (USD 279 million).

Figure 52 Malaysia: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The 15 largest investors held 94% (USD 9 billion) of identified Malaysian coal investments. As Figure 53 shows, the top five investors were all Malaysian financial institutions. The largest investor was Khazanah Nasional (USD 2.9 billion) followed by Permodalan Nasional Berhad (PNB) (USD 2.1 billion) and Employees Provident Fund (EPF) (USD 2.0 billion).

Figure 53 Malaysia: Top 15 coal investors (June 2021 most recent filings, USD millions)

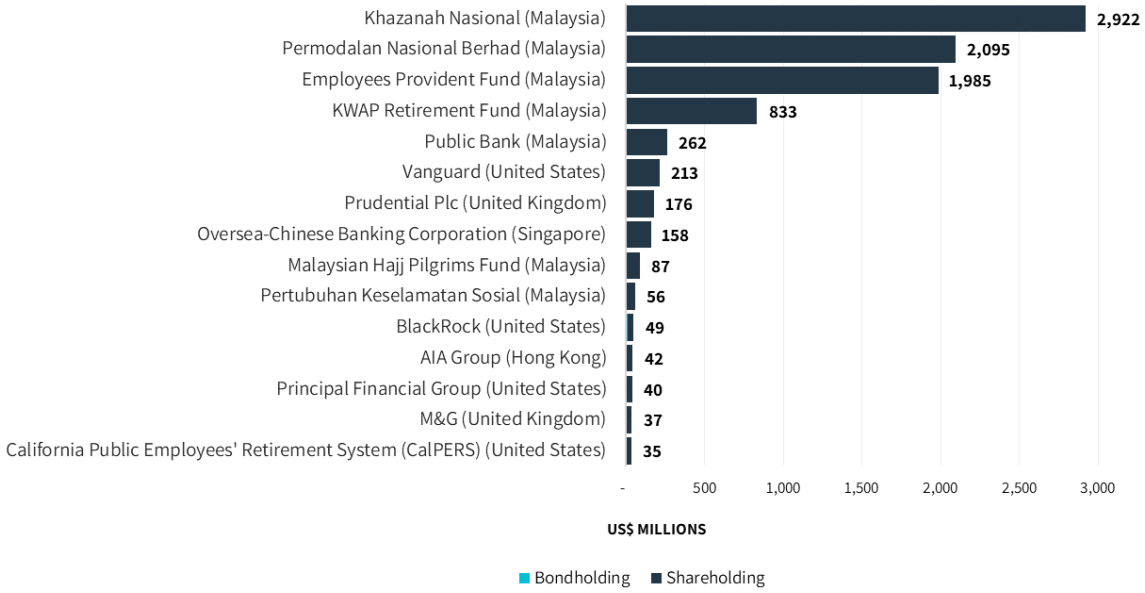
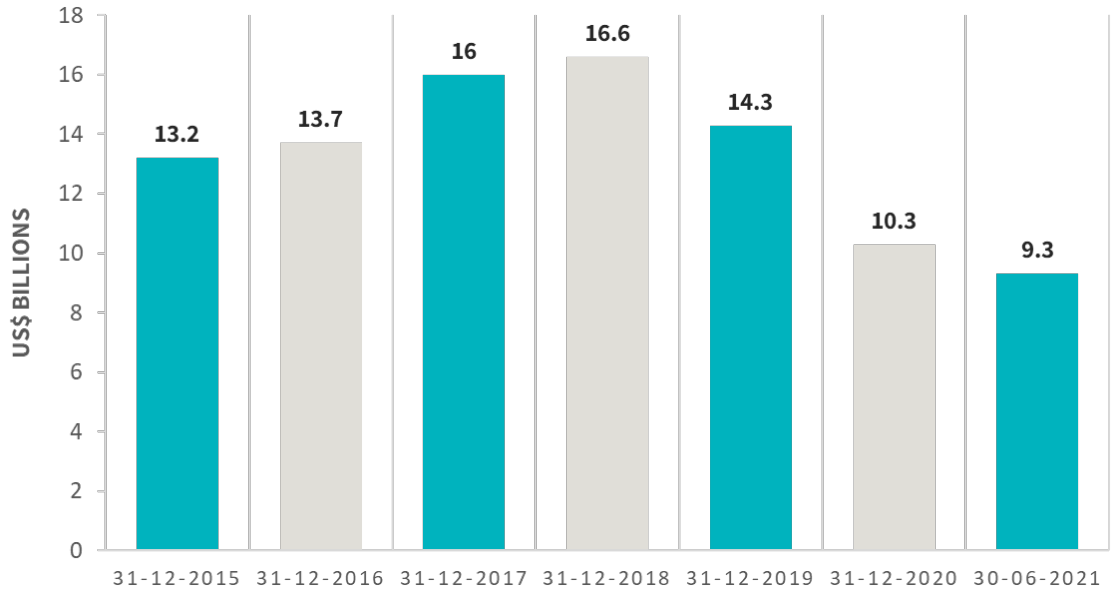


Figure 54 shows annual fluctuations in shareholdings of companies active in coal in Malaysia. The value of shares rose from the fourth quarter of 2015 to the fourth quarter of 2018, but has declined steadily since then.

Figure 54 Malaysia: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)



2.13 Pakistan

2.13.1 Creditor Analysis

From 2016 to 2020, financial institutions provided USD 13 billion in coal-attributable loans and underwriting services to companies active in thermal coal in Pakistan. Figure 55 shows significant fluctuations during this period. The peaks in 2016 and 2018 were years in which financing was attracted for large power plants.

Figure 55 Pakistan: Annual coal-attributable loans and underwriting (2016–2020, USD billions)

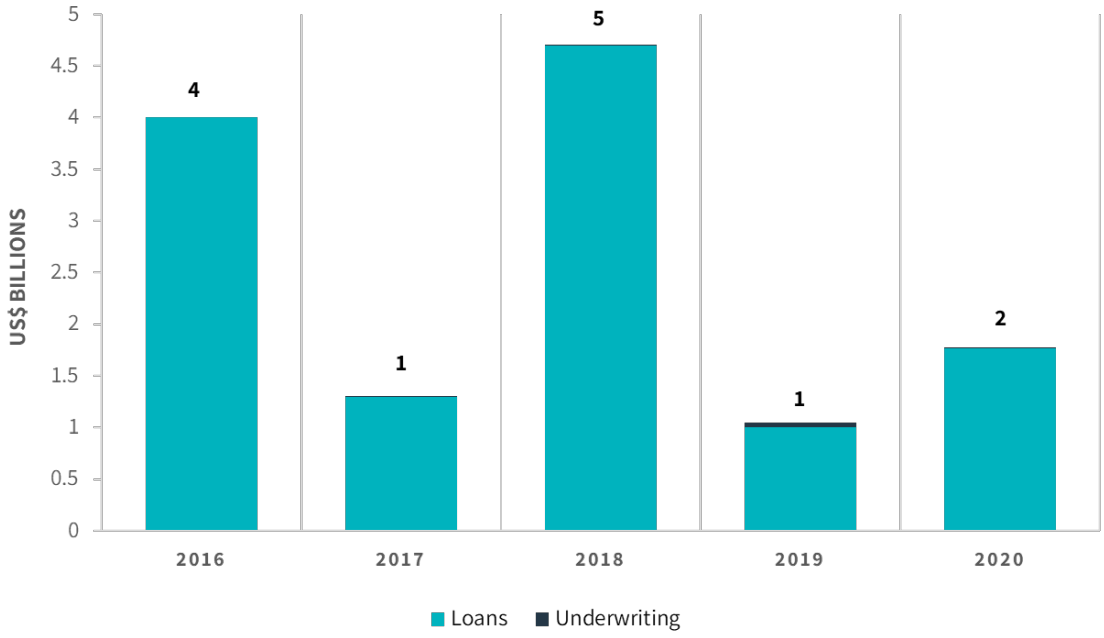


Figure 56 shows that financial institutions from six countries provided all identified coal credit in Pakistan. Financial institutions from China provided the most coal-attributable credit (USD 8.9 billion), followed by financial institutions from Pakistan itself (USD 2.5 billion) and Switzerland (USD 1 billion).

Figure 56 Pakistan: Coal-attributable loans and underwriting, per creditor country (2016–2020, USD billions)

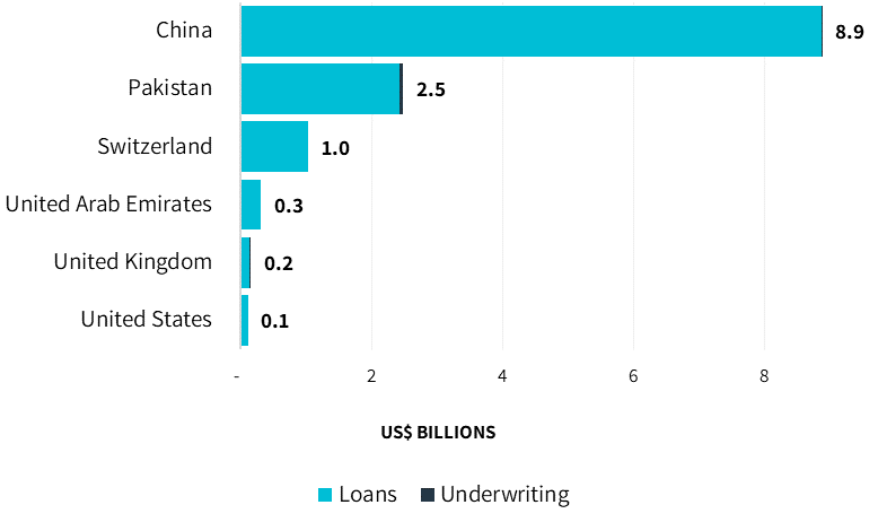
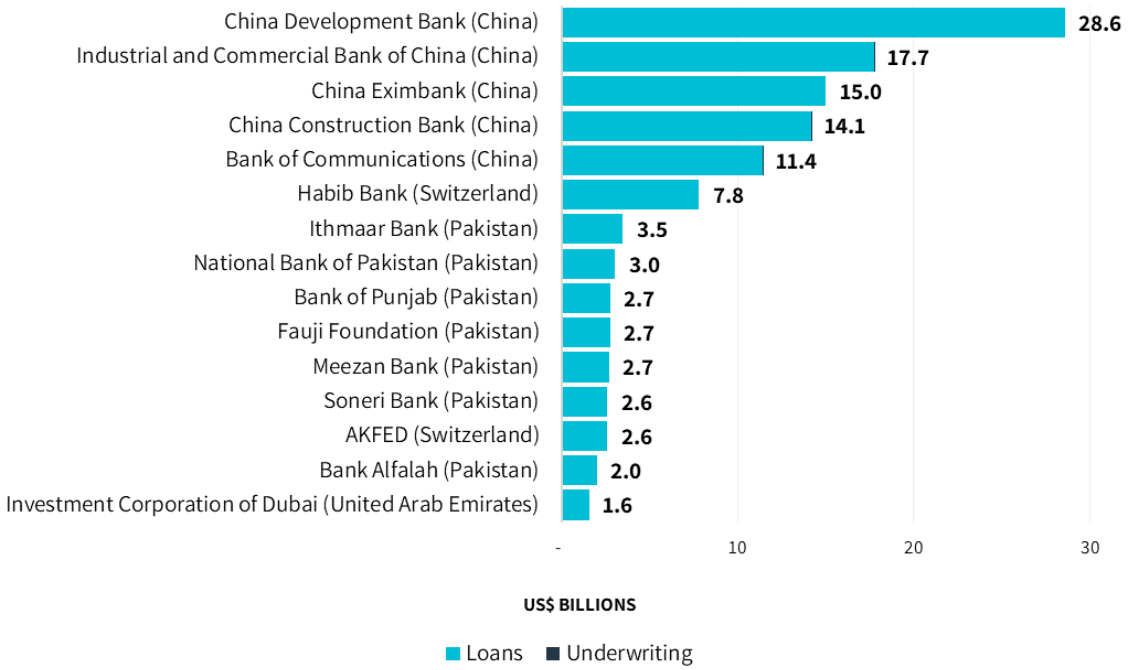


Figure 57 shows that the top 15 creditors provided 91% (USD 11.8 billion) of identified coal credit to companies engaged in coal in Pakistan. The top five creditors were all Chinese financial institutions.

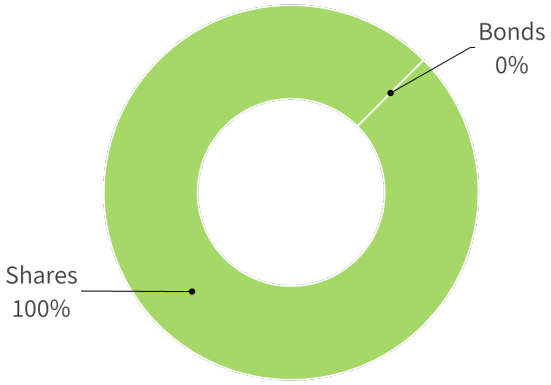
Figure 57 Pakistan: Top 15 coal creditors (2016–2020, USD millions)



2.13.2 Investor Analysis

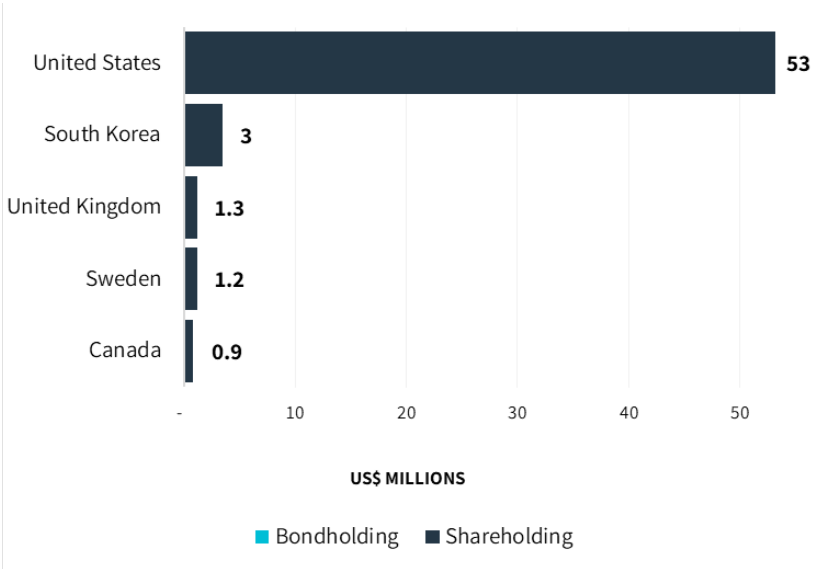
As of most recent filings in June 2021, financial institutions held USD 60 million in coal-attributable bonds and shares of companies engaged in thermal coal in Pakistan. As Figure 58 shows, all these investments were in the form of shares.

Figure 58 Pakistan: Investments by finance type (June 2021)



Financial institutions from five countries held all identified coal-attributable investments in Pakistan (see Figure 59). Financial institutions from the US were the largest investors, holding USD 53 million in bonds and shares, followed by financial institutions from South Korea (USD 3 billion) and the UK (USD 1.3 billion).

Figure 59 Pakistan: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



Ten investors accounted for 97% of shareholdings (see Figure 60). The largest coal investor in Pakistan was US asset manager Vanguard (USD 32 million) followed by US peer BlackRock (USD 14 million) and South Korea's Mirae Asset Financial Group (USD 3 million).

Figure 60 Pakistan: Top 10 coal investors (June 2021, USD millions)

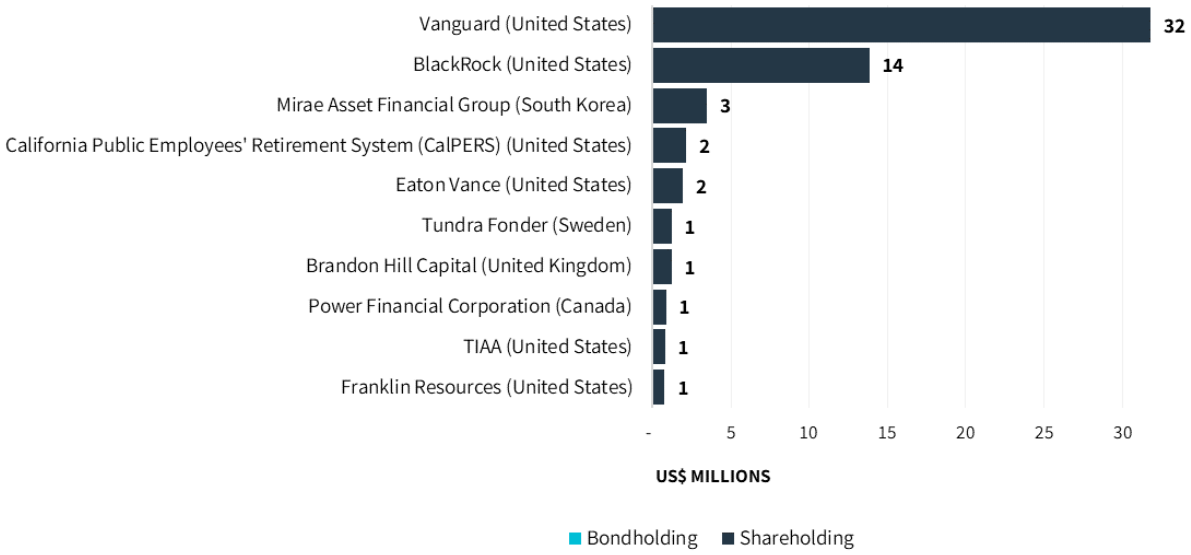
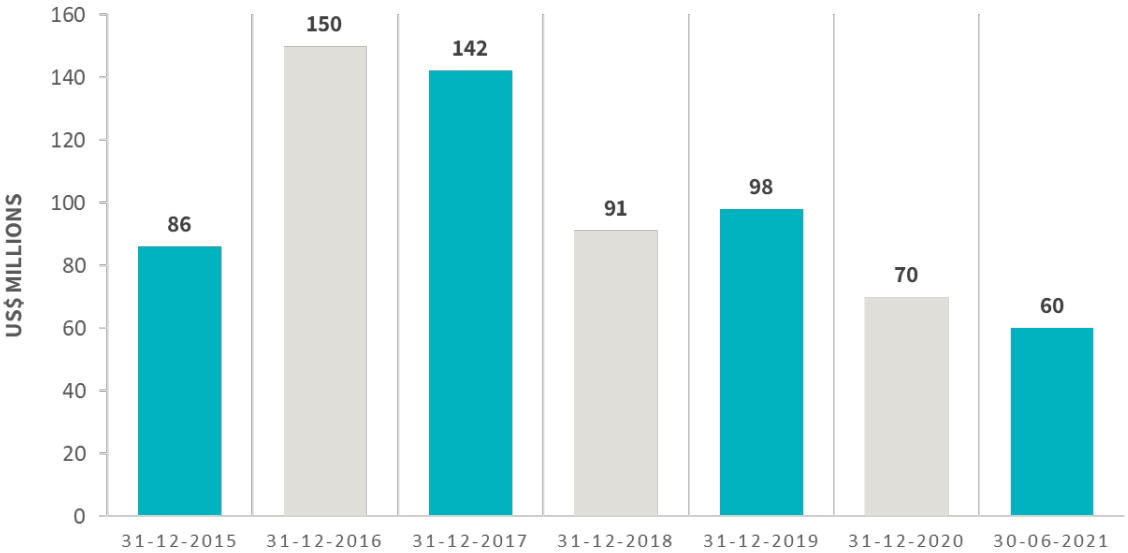


Figure 61 shows the annual fluctuations in shareholdings of companies active in coal in Pakistan. Values peaked in the fourth quarter of 2016 and have gradually declined since.

Figure 61 Pakistan: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)

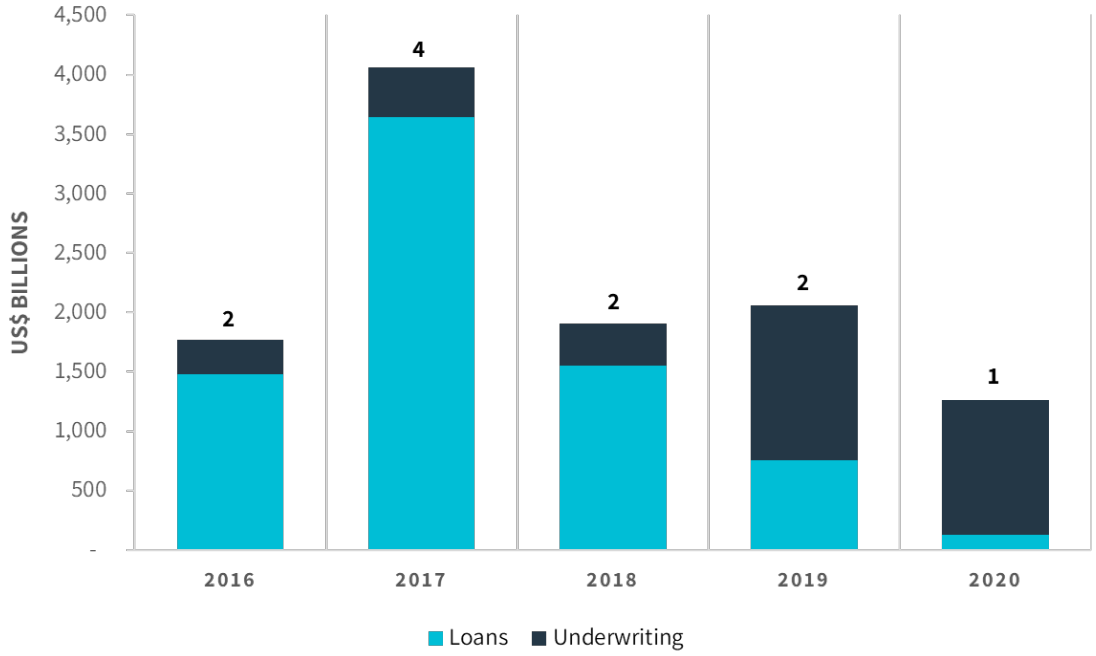


2.14 Philippines

2.14.1 Creditor Analysis

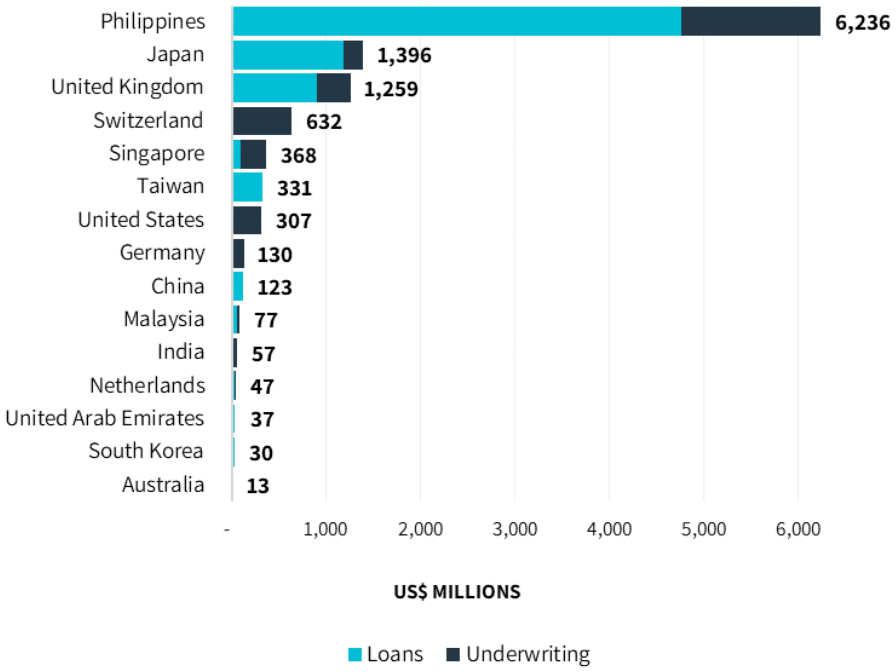
From 2016 to 2020, financial institutions provided USD 11 billion in coal-attributable loans and underwriting services to companies engaged in thermal coal in the Philippines. Figure 62 shows that annual coal credit flows in the Philippines peaked in 2017, which relates to the financing of the Bataan Coal-Fired Power Plant.

Figure 62 Philippines: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



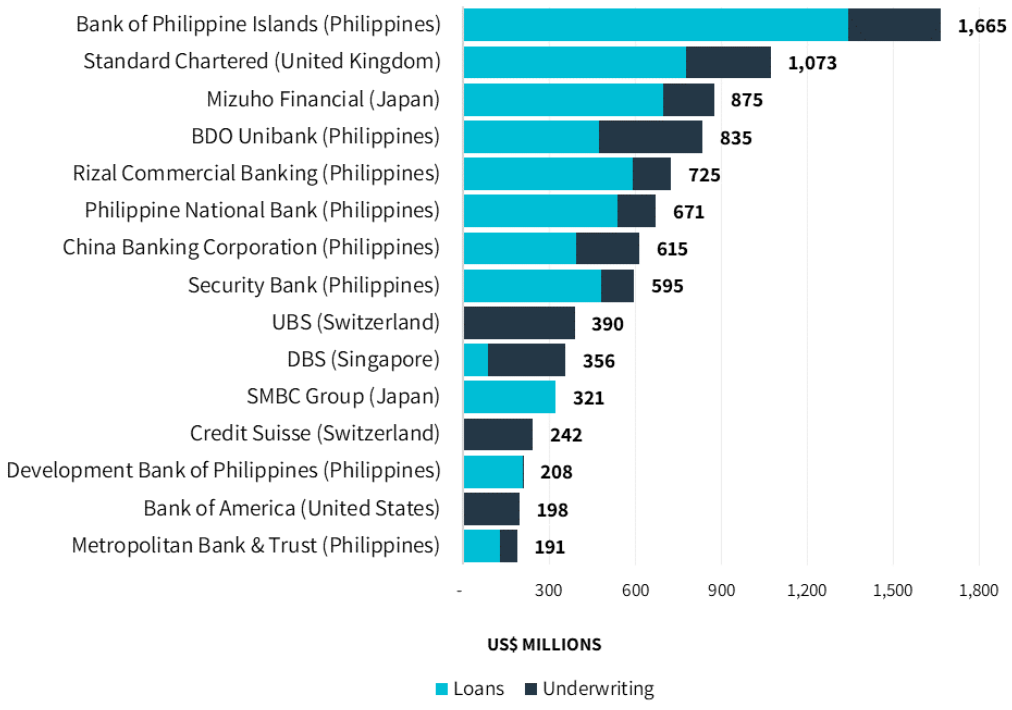
As Figure 63 shows, financial institutions from 15 countries provided almost 100% (USD 11 billion) of identified coal credit in the Philippines. Domestic financial institutions provided the most credit (USD 6.2 billion) followed by financial institutions from Japan (USD 1.4 billion) and the UK (USD 1.3 billion).

Figure 63 Philippines: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The 15 largest coal creditors in the Philippines accounted for 81% (USD 9 billion) of identified coal credit to the selected companies (see Figure 64). The largest creditor was the Bank of the Philippine Islands (USD 1.7 billion) followed by UK Standard Chartered (USD 1.1 billion) and Japan's Mizuho Financial (USD 875 million).

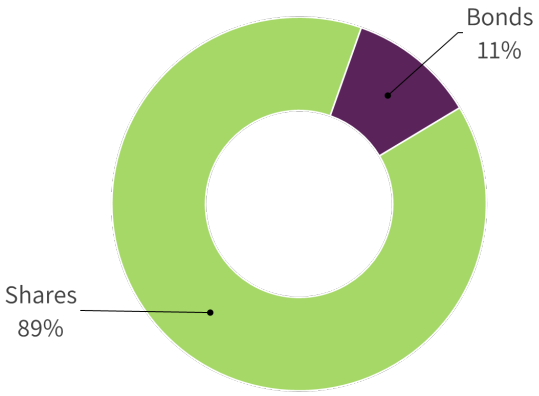
Figure 64 Philippines: Top 15 coal creditors (2016–2020, USD millions)



2.14.2 Investor Analysis

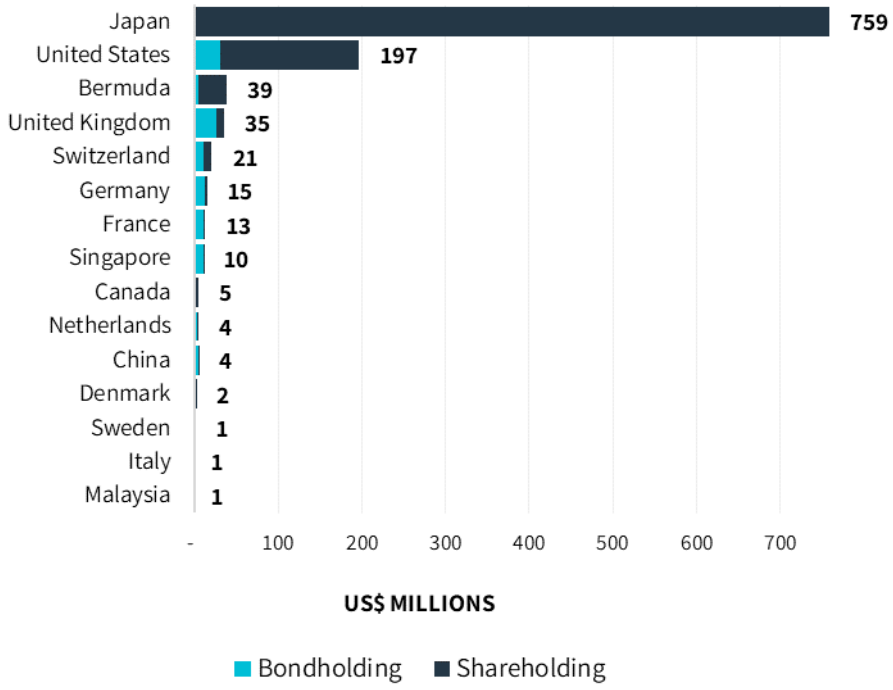
As of most recent filings in June 2021, financial institutions held USD 1.1 billion in coal-attributable bonds and shares of companies active in thermal coal in the Philippines. Figure 65 shows that 89% (USD 990 million) of these investments were shares and the remaining 11% (USD 121 million) were bonds.

Figure 65 Philippines: Investments by finance type (June 2021)



Investors from 15 countries accounted for all identified coal investments (see Figure 66). Financial institutions from Japan were by far the largest investors (USD 759 million) followed by investors from the US (USD 197 million) and Bermuda (USD 39 million).

Figure 66 Philippines: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The 15 largest investors accounted for 92% (USD 1 billion) of identified investments. Figure 67 shows that the largest investors Japan's Government Pension Investment Fund (USD 756 million) followed by US asset managers BlackRock (USD 53 million) and Vanguard (USD 44 million).

Figure 67 Philippines: Top 15 coal investors (June 2021, USD millions)

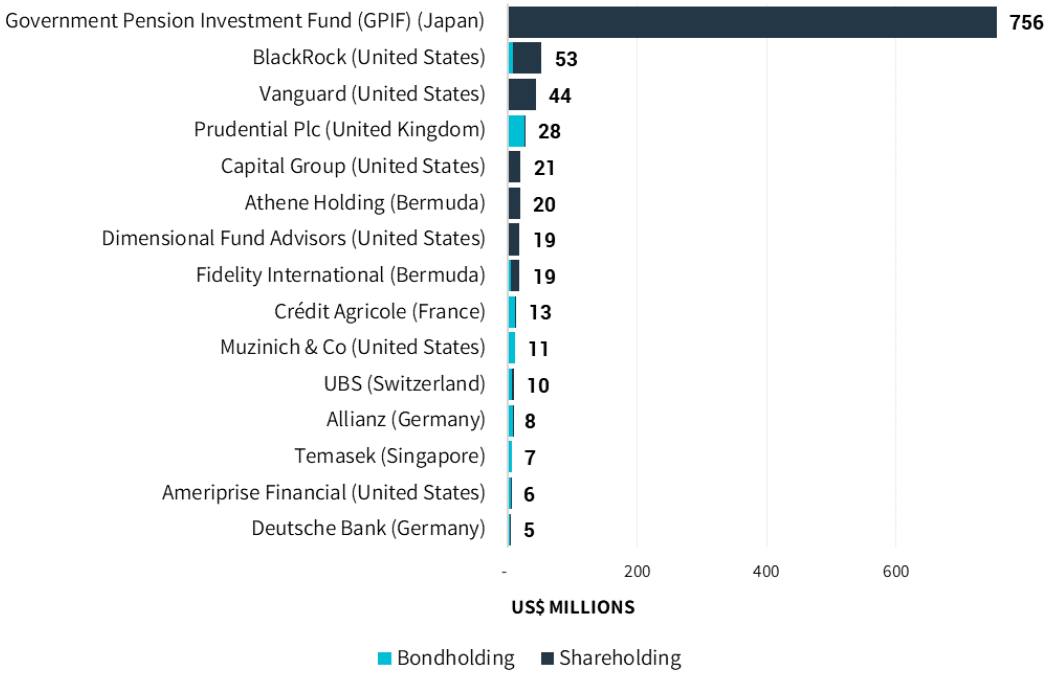
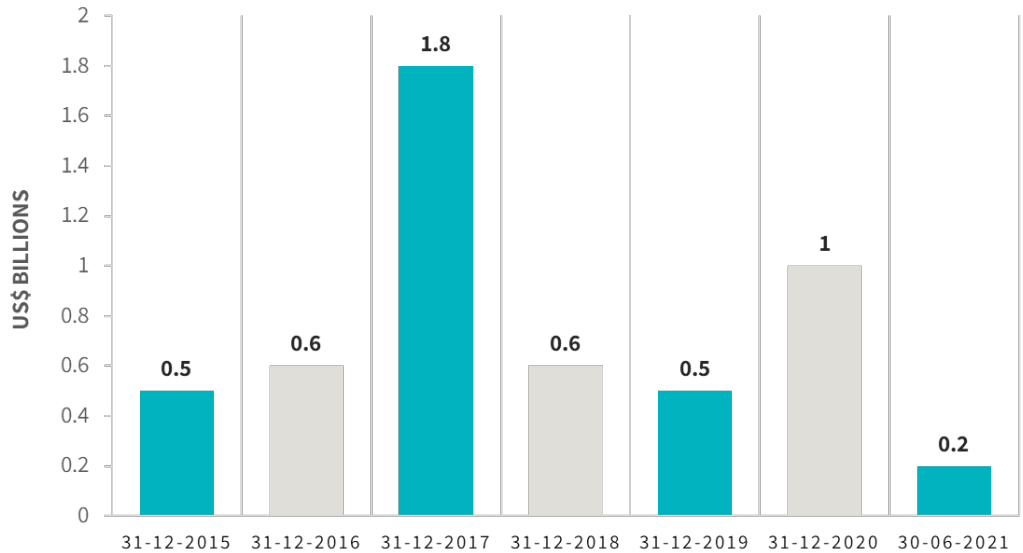


Figure 68 shows the annual fluctuations in shareholdings of companies active in coal in the Philippines. After peaking in the fourth quarter of 2017, values have generally fluctuated between USD 0.5 billion and USD 0.6 billion.

Figure 68 Philippines: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)

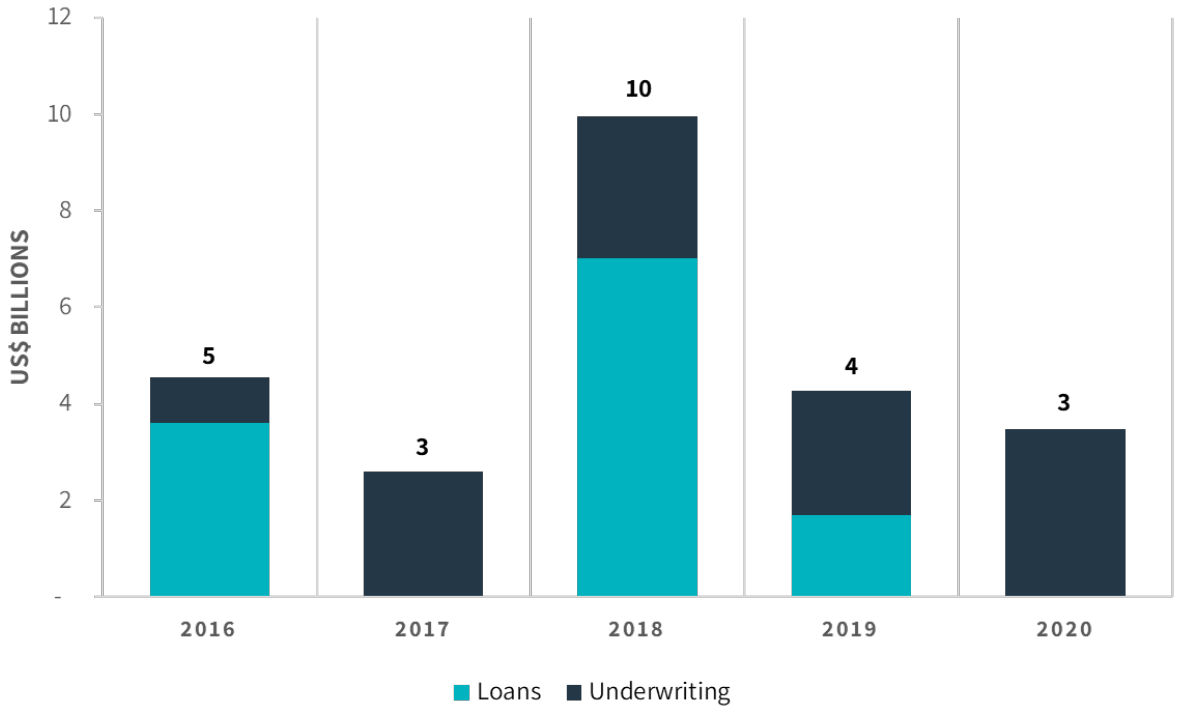


2.15 South Korea

2.15.1 Creditor analysis

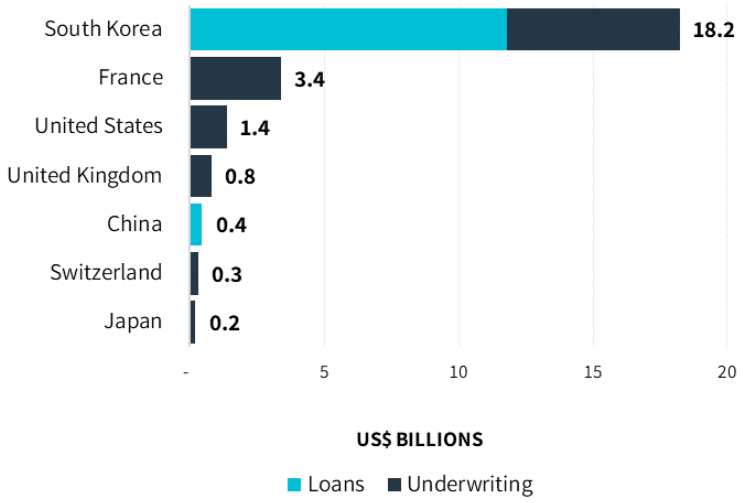
From 2016 to 2020, financial institutions provided USD 25 billion in coal-attributable loans and underwriting services to companies engaged in coal in South Korea. Figure 69 shows that annual coal credit flows in South Korea generally fluctuated between USD 3 billion and USD 5 billion.

Figure 69 South Korea: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



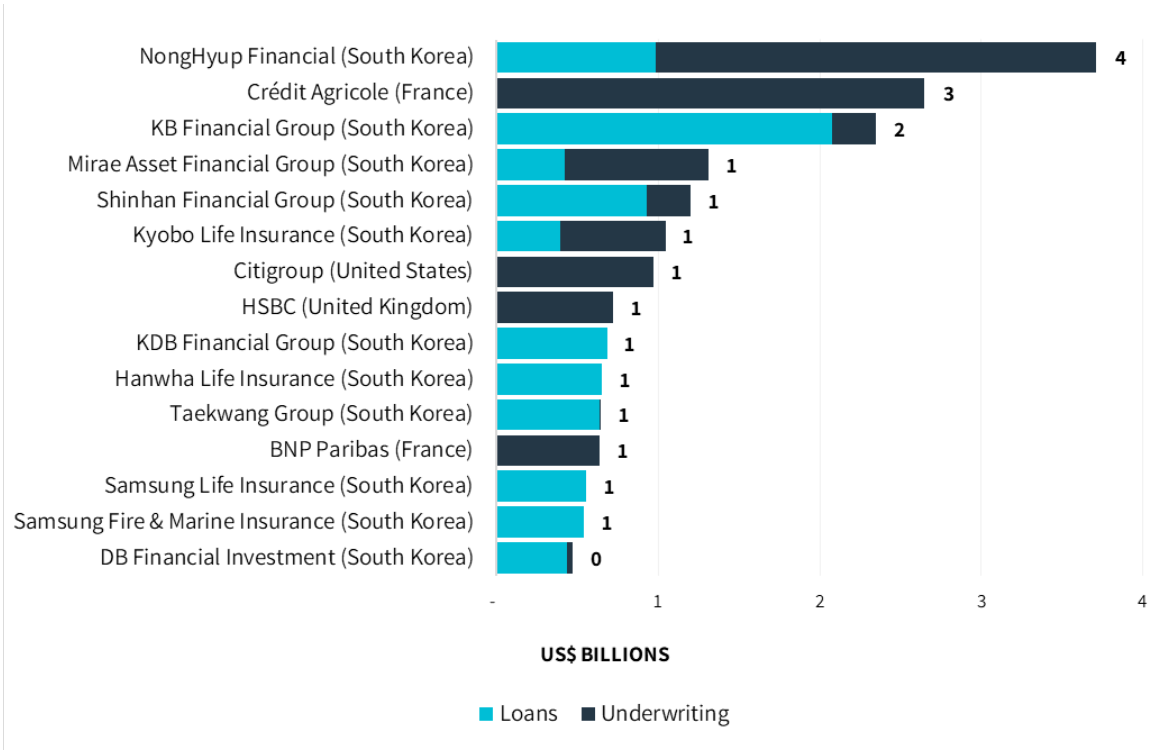
Financial institutions from seven countries provided almost all coal credit in South Korea. Figure 70 shows that domestic financial institutions provided the most of coal-attributable loans and underwriting services (USD 18.2 billion), followed by financial institutions from France (USD 3.4 billion) and the US (USD 1.4 billion).

Figure 70 South Korea: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The top 15 coal creditors provided 73% (USD 18 billion) of identified coal credit (see Figure 71). The largest creditor was NongHyup Financial (USD 3.7 billion) followed by France's Crédit Agricole (USD 2.6 billion) and South Korea's KB Financial Group (USD 2.3 billion).

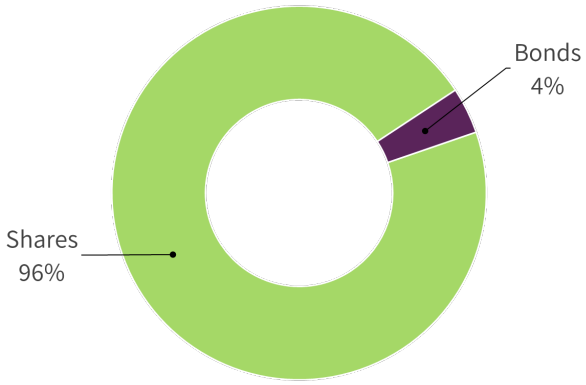
Figure 71 South Korea: Top 15 coal creditors (2016–2020, USD millions)



2.15.2 Investor Analysis

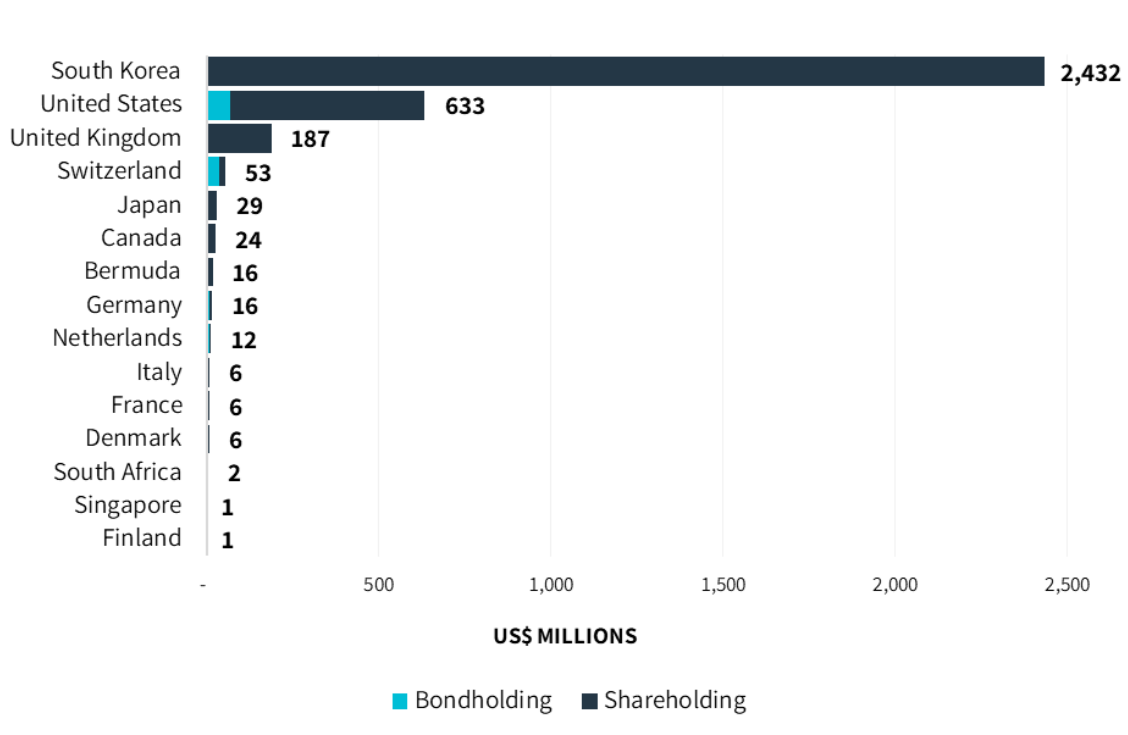
As of most recent filings in June 2021, financial institutions held USD 3.4 billion in coal-attributable bonds and shares of companies engaged in coal in South Korea. Figure 72 shows that 96% (USD 3.3 billion) of these investments were in the form of shares while the remaining 4% (USD 134 million) were bonds.

Figure 72 South Korea: Investments by finance type (June 2021)



Financial institutions from 15 countries held 100% of identified coal investments in South Korea. South Korean financial institutions held 71% (USD 2.4 billion) of these investments (see Figure 73) followed by financial institutions from the US (USD 633 million) and the UK (USD 187 million).

Figure 73 South Korea: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The 15 largest investors accounted for 84% (USD 2.9 billion) of identified coal-attributable investments in South Korea (see Figure 74). Two of the top three investors were South Korean. The largest was KDB Financial Group (USD 1.8 billion) followed by the National Pension Service (USD 524 million) and UK asset manager Silchester International Investors (USD 119 million).

Figure 74 South Korea: Top 15 coal investors (June 2021, USD millions)

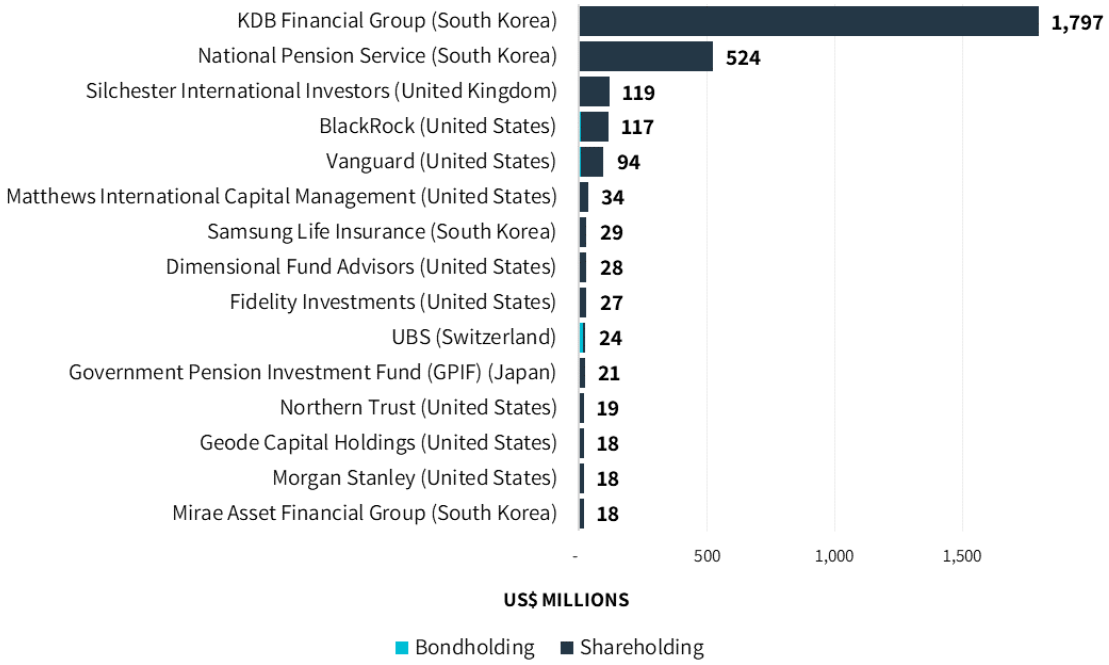
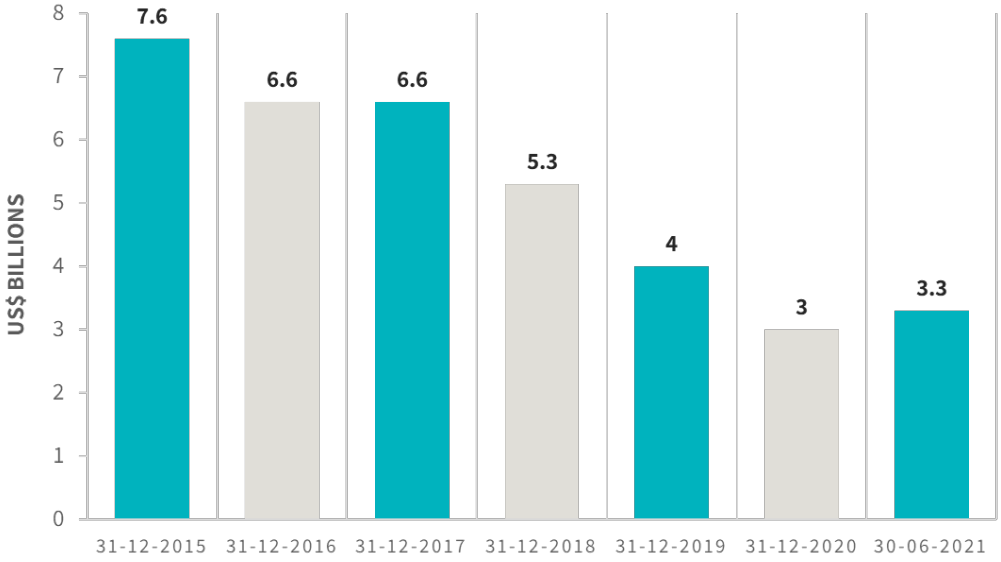


Figure 75 shows the annual fluctuations in shareholdings of companies active in coal in South Korea. After peaking in the fourth quarter of 2015, values have gradually declined.

Figure 75 South Korea: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)

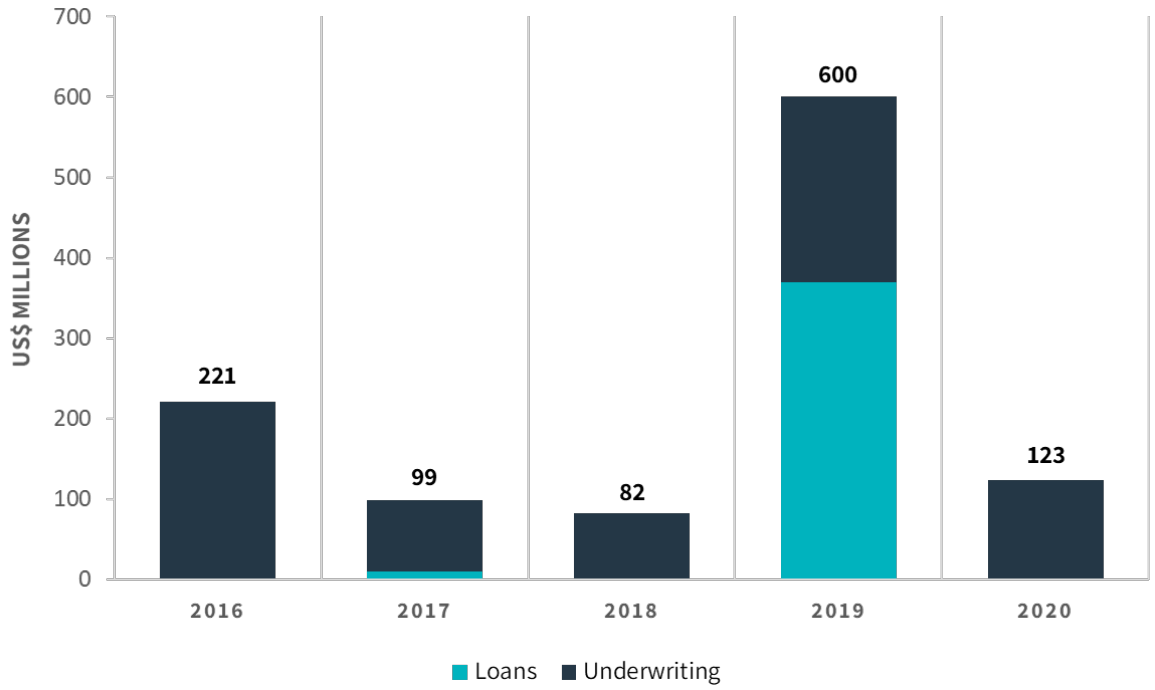


2.16 Thailand

2.16.1 Creditor Analysis

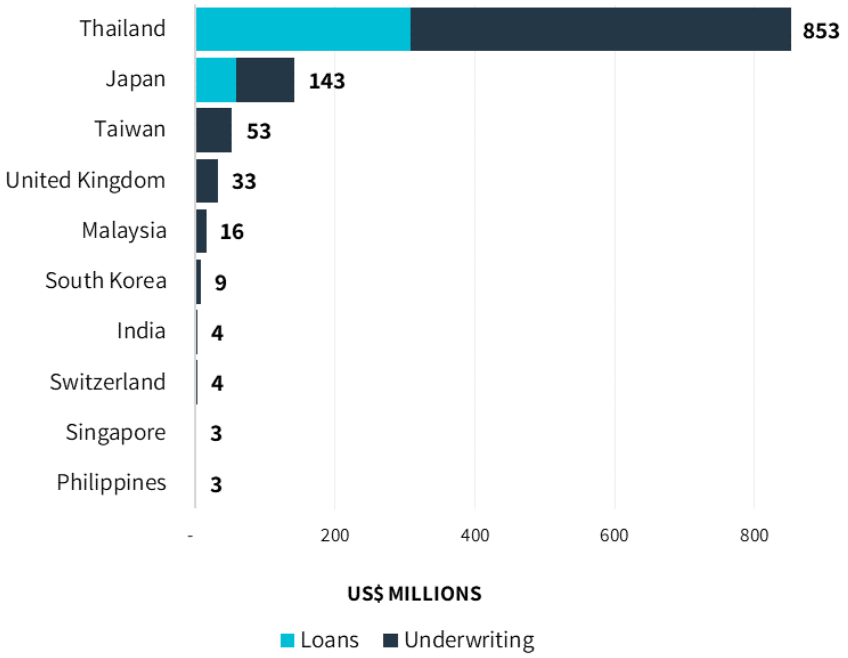
From 2016 to 2020, financial institutions provided USD 1.1 billion in coal-attributable loans and underwriting services to companies engaged in coal in Thailand. Figure 76 shows the annual coal credit flows to these companies in Thailand, including a peak in 2019 that was related to Global Power Synergy's acquisition of GLOW in March of that year.

Figure 76 Thailand: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



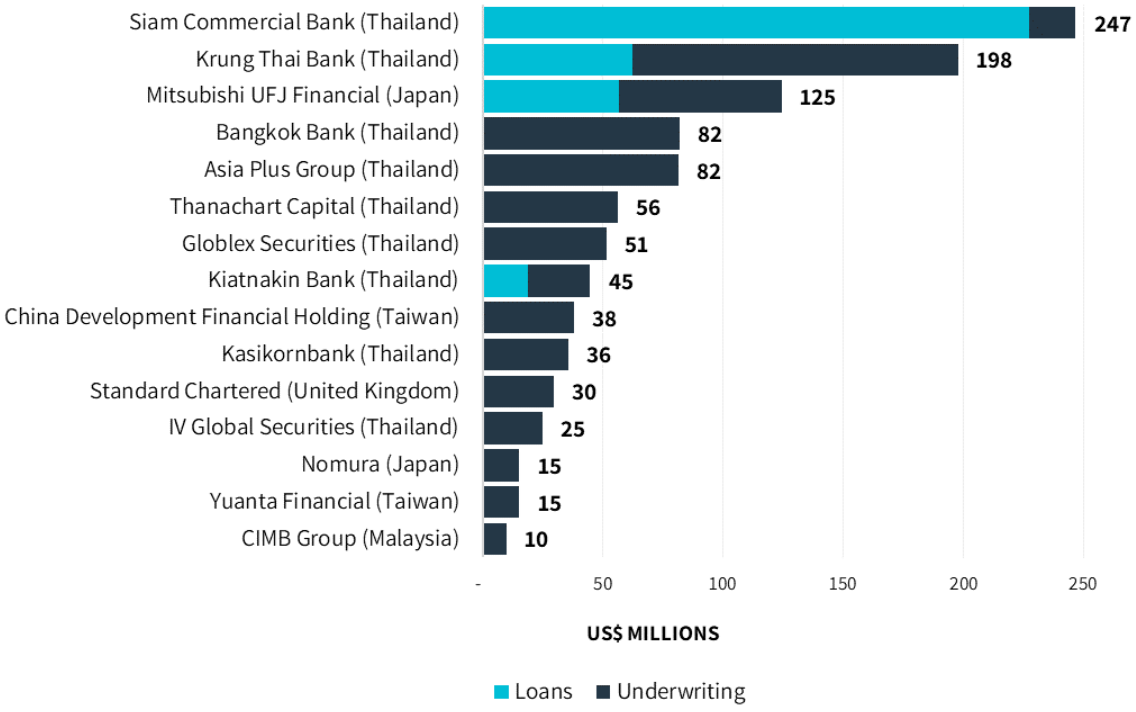
Financial institutions from 10 countries provided all coal-attributable credit to the selected companies in Thailand (see Figure 77). Domestic financial institutions were the largest providers of coal credit (USD 853 million) followed by financial institutions from Japan (USD 143 million) and Taiwan (USD 53 million).

Figure 77 Thailand: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The top 15 creditors provided 94% (USD 1.01 billion) of identified coal credit in Thailand. Figure 78 shows that the largest creditor was Siam Commercial Bank (USD 247 million) followed by Krung Thai Bank (USD 198 million) and Mitsubishi UFJ Financial (USD 125 million).

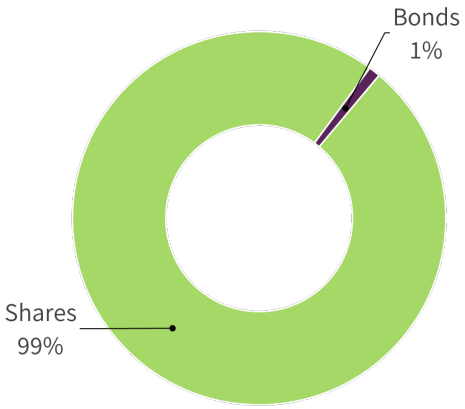
Figure 78 Thailand: Top 15 coal creditors (2016–2020, USD millions)



2.16.2 Investor Analysis

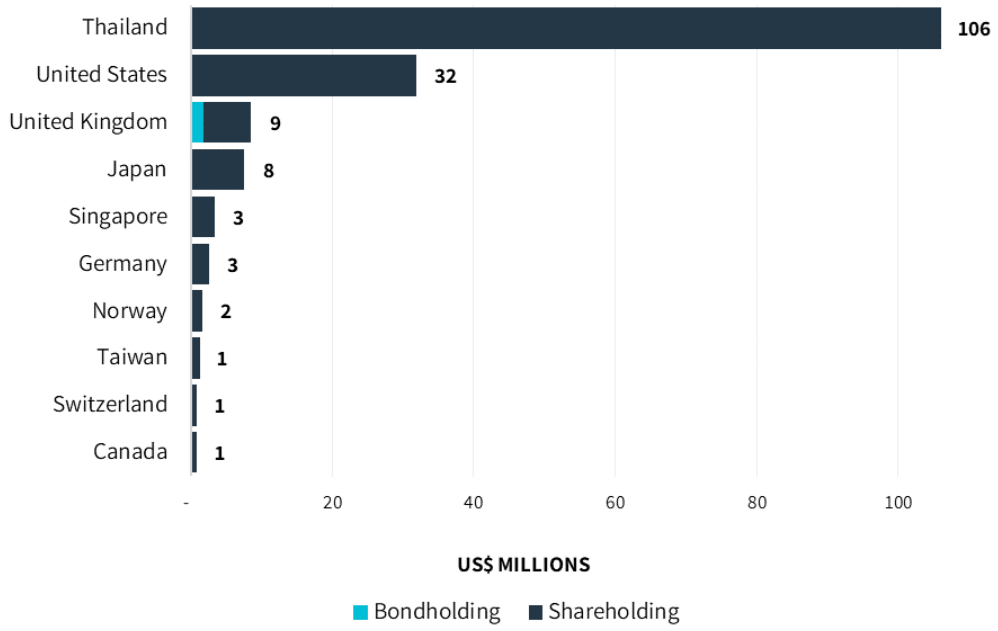
As of most recent filings in June 2021, financial institutions held USD 165 million in coal-attributable bonds and shares of companies active in coal in Thailand. Figure 79 shows that 99% (USD 164 million) of these investments were in the form of shares while the remaining 1% (USD 2 million) were bonds.

Figure 79 Thailand: Investments by finance type (June 2021)



Financial institutions from 10 countries held 99% (USD 165 million) of identified Thai coal investments. Figure 80 shows that Thai financial institutions were the largest investors, holding USD 106 million, followed by investors from the US (USD 32 million) and the UK (USD 9 million).

Figure 80 Thailand: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The top 15 investors held 89% (USD 148 million) of identified coal-attributable bonds and shares. The largest investor was Thailand's Bangkok Bank (USD 50 million) followed by the Thai Social Security Office (USD 33 million) and US asset manager State Street (USD 13 million) (see Figure 81).

Figure 81 Thailand: Top 15 coal investors (June 2021, USD millions)

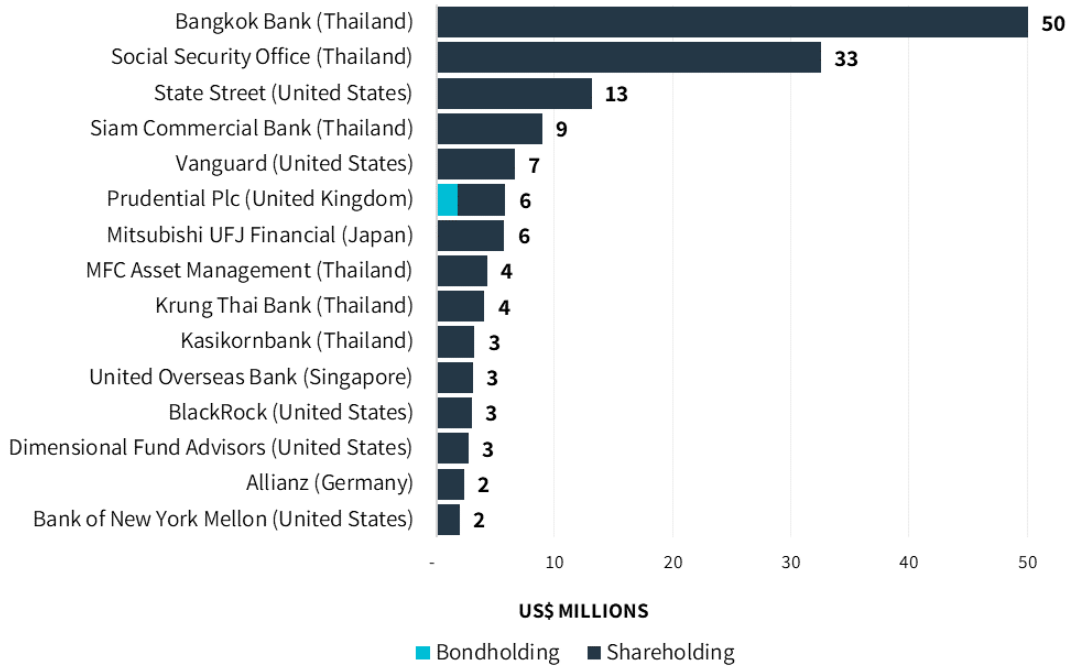
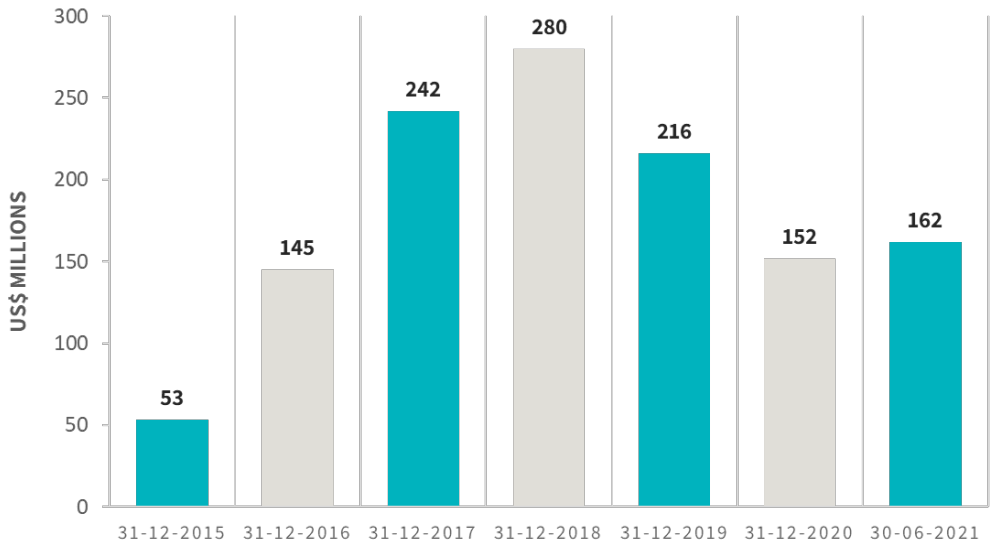


Figure 82 shows the annual fluctuations in shareholdings of companies active in coal in Thailand. Values rose from the fourth quarter of 2015 to the fourth quarter of 2018. Although they have gradually declined since, values appeared to pick up again in the second quarter of 2021.

Figure 82 Thailand: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)

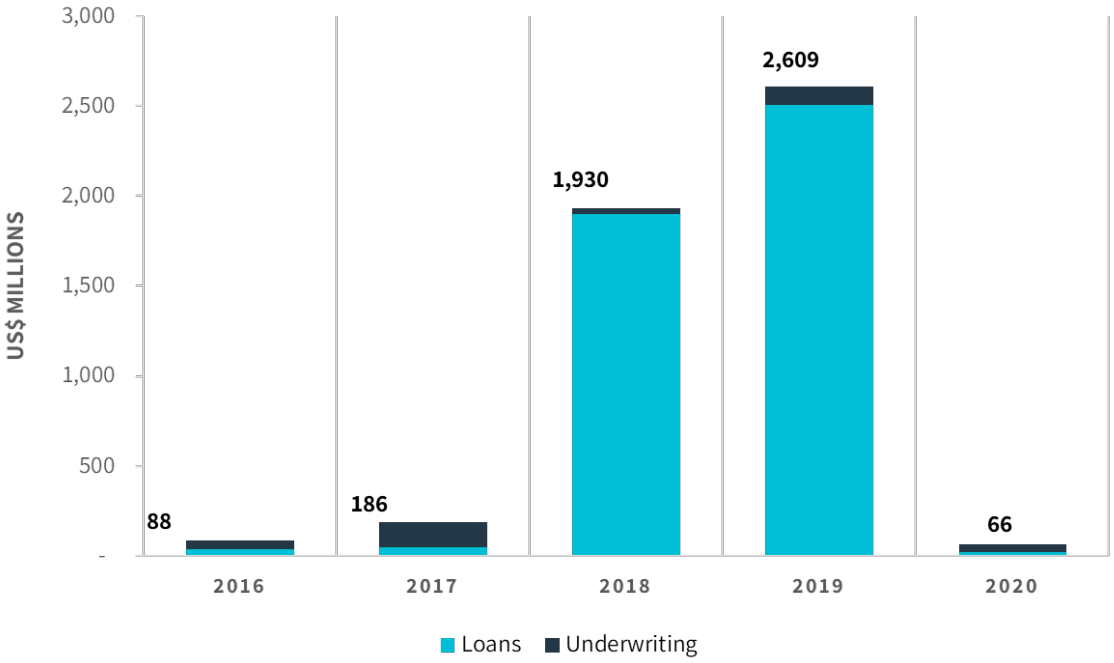


2.17 Vietnam

2.17.1 Creditor Analysis

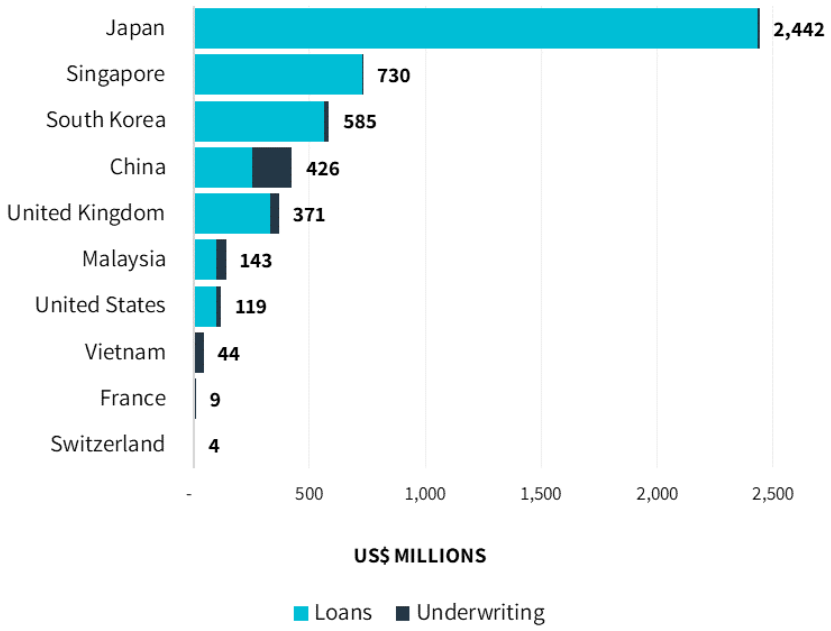
From 2016 to 2020, financial institutions provided USD 4.9 billion in coal-attributable loans and underwriting services to companies engaged in coal in Vietnam. Figure 83 shows annual coal credit trends in Vietnam, including peaks related to the financing of Nghi Son 2 Power in 2018 and Mong Duong 2 Coal-Fired Power Plant and Van Phong Power in 2019.

Figure 83 Vietnam: Annual coal-attributable loans and underwriting (2016–2020, USD billions)



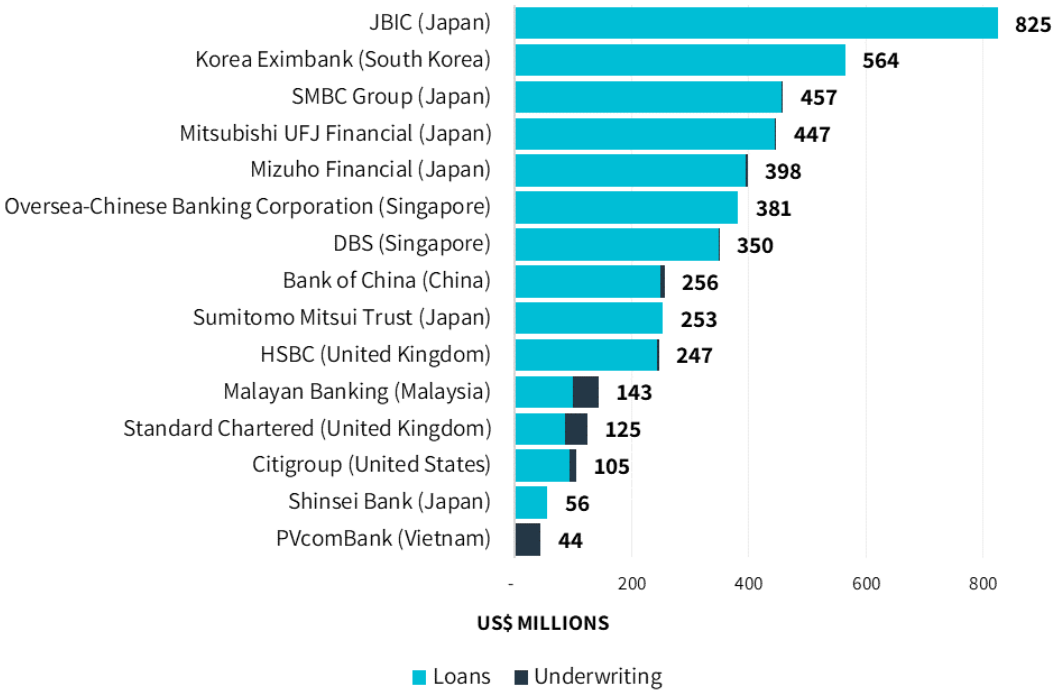
Financial institutions from 10 countries provided all identified coal credit to the selected companies in Vietnam. Figure 84 shows that the largest creditors were Japanese financial institutions (USD 2.4 billion) followed by financial institutions from Singapore (USD 730 million) and South Korea (USD 585 million).

Figure 84 Vietnam: Coal-attributable loans and underwriting per creditor country (2016–2020, USD billions)



The 15 largest creditors accounted for 95% (USD 4.6 billion) of identified coal credit in Vietnam. Figure 85 shows that the largest coal creditor was JBIC (USD 825 million) followed by Korea Eximbank (USD 564 million) and Japan's SMBC Group (USD 457 million).

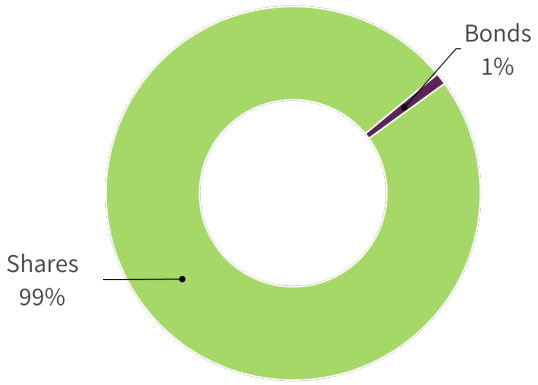
Figure 85 Vietnam: Top 15 coal creditors (2016–2020, USD millions)



2.17.2 Investor Analysis

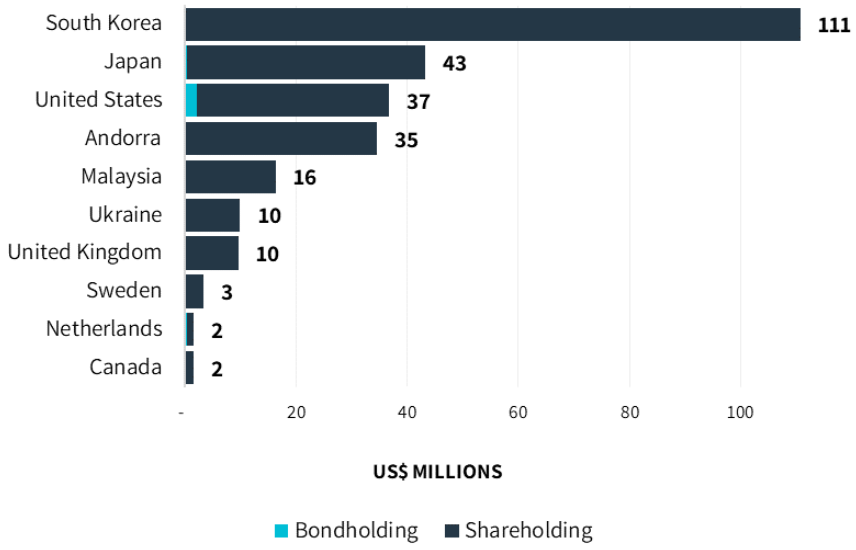
As of most recent filings in June 2021, financial institutions held USD 274 million in coal-attributable bonds and shares of companies engaged in coal in Vietnam. Figure 86 shows that 99% (USD 271 million) of these investments were in the form of shares while the remaining 1% (USD 4 million) were bonds.

Figure 86 Vietnam: Investments by finance type (June 2021)



Financial institutions from 10 countries accounted for 98% (USD 268 million) of identified coal investments in Vietnam. As Figure 87 shows, financial institutions from South Korea were the largest investors (USD 111 million) followed by investors from Japan (USD 43 million) and the US (USD 37 million).

Figure 87 Vietnam: Coal-attributable bond- and shareholdings by investor country (June 2021, USD millions)



The 15 top investors held 82% (USD 225 million) of identified coal-attributable bonds and shares. Figure 88 shows that KDB Financial Group was the largest investor (USD 87 million) followed by Andorra's Andbank (USD 35 million) and the National Pension Service of South Korea (USD 19 million).

Figure 88 Vietnam: Top 15 coal investors (June 2021, USD millions)

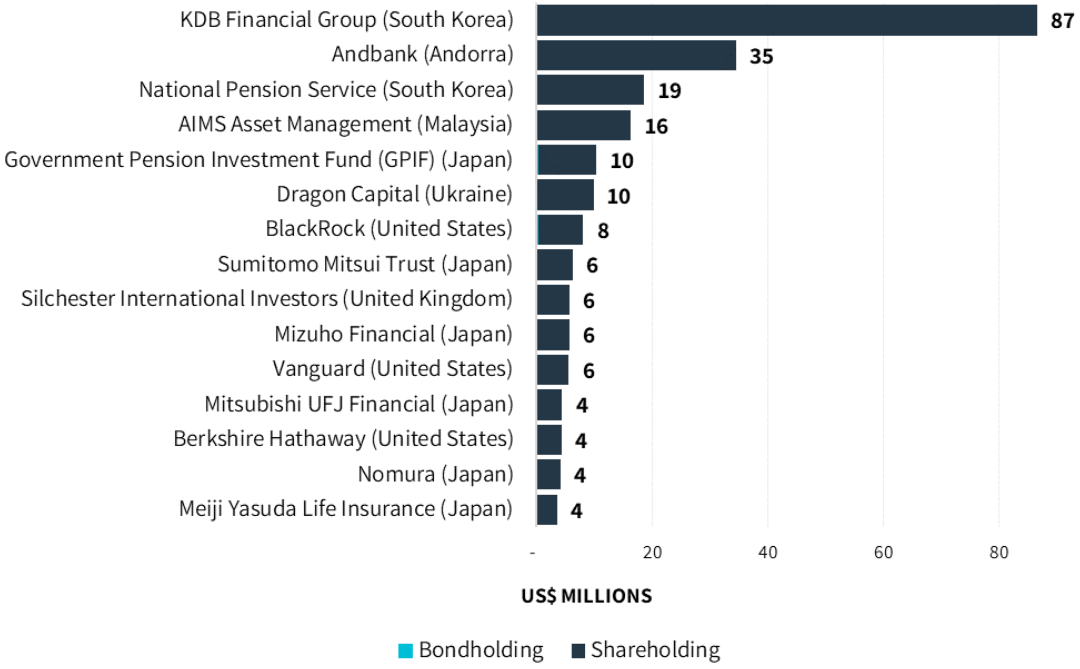
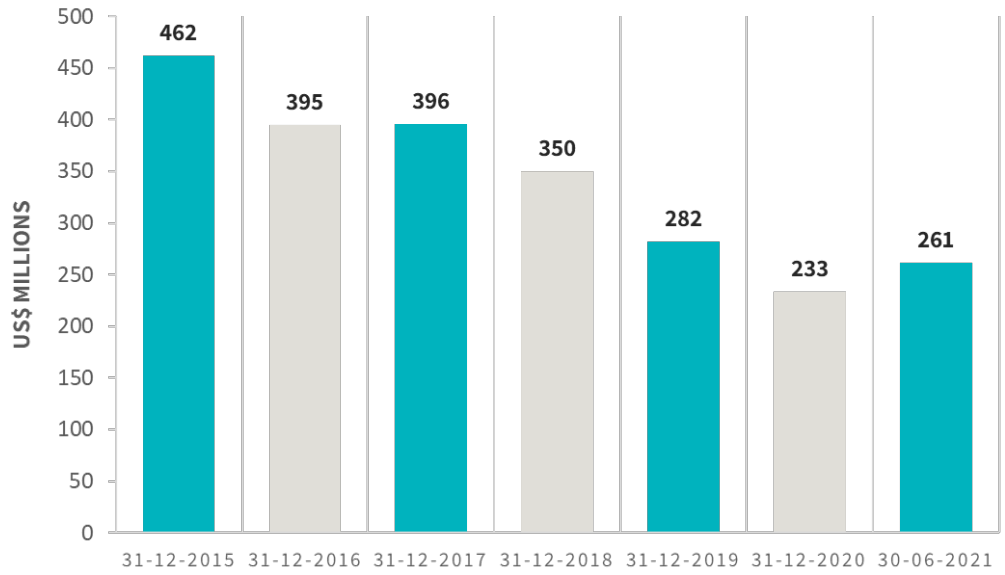


Figure 89 shows the annual fluctuations in shareholdings of companies active in coal in Vietnam. After peaking in the fourth quarter of 2015, values have gradually declined. However, they appeared to pick up again in the second quarter of 2021.

Figure 89 Vietnam: Annual fluctuations in coal-attributable shareholdings (Q4 2015–Q2 2021, USD billions)



3 Requirements for a Just Energy Transition in Asia

Phasing out coal as fast as possible is crucial to mitigate global warming, but it poses certain environmental and social risks. Coal-related jobs will be lost, alternative energy sources will also have negative social and environmental impacts and affordable energy will not necessarily be accessible to all. Based on interviews with civil society leaders from across Asia, this chapter defines the key requirements and guiding policies for realizing a just, sustainable and fair energy transition.

3.1 WHAT DOES A JUST ENERGY TRANSITION IN ASIA MEAN?

A transition away from coal and other fossil fuels is the most salient strategy to limit global warming to well below the Paris Agreement target of 2˚C. However, simply replacing fossil fuels with renewable energy does not erase the environmental and social risks associated with the global consumption of energy. The transition itself brings the risk of inadvertent impacts on workers, natural ecosystems and vulnerable communities.

The term "just transition" was coined by the labor movement in the US in the 1980s to highlight the need to retain jobs and protect the rights of workers when closing down coal mines and coal-fired power plants.[108] Today, "just transition" has expanded to encompass the "fair and equitable process of moving towards a post-carbon society"[109] and describes an advocacy strategy to address the "legacy of exploitation, ecocide and environmental, energy, climate and economic injustice."[110]

There is a growing global civil society movement calling for a just energy transition. Advocates stress that addressing the environmental and human rights impacts of the transition is not just an opportunity for justice in a low-carbon future, but an absolute *necessity*. Informant I from India emphasized that the just transition is not just about energy. Rather, it requires a complete overhaul of the socio-economic system and consumption patterns. If we fail to take a holistic approach with justice at the center of the transition, they said, "we will make the same mistakes as we did with fossil fuels"

The need to understand the energy transition holistically was raised in nearly all interviews with civil society actors from across Asia (see section 3.2 in Annex 1 for a list of interviewees). In the words of informant H,

> **"The whole system has to change. We cannot simply replace fossil fuels with the same amount of renewable energy.**

Civil society leaders point to the need to address the historic and contemporary injustices in global energy consumption and production from a post-colonial perspective. This includes understanding that solutions must be attentive to the needs of vulnerable communities and

take their unique local context into account. Informant L pointed out that the climate solutions pushed by high-income countries may have negative impacts on low- and middle-income countries (LMICs) that are bearing the brunt of climate change: "Regarding climate change and climate solutions, we might be looking at it in a different way. Certain Western organizations are seeing it from a fossil fuel angle, but they promote renewables that may be harmful for us. We are not only looking at it from a climate change angle, but also the environmental and social aspects. It's not just about moving to renewable energy, but it needs to be a just transition. […] Bringing solutions from the Global North's perspective is not going to be really helpful from the Global South perspective."

This chapter focuses on the environmental and social risks associated with the transition away from coal and outlines the (potential) negative impacts that need to be addressed to realize a just transition. Based on a literature review and in-depth interviews with civil society leaders across the region, the following key requirements for a just energy transition were identified:

An end to financing for new coal projects for electricity generation and a phased shift away from existing coal-based power generation;

Ensuring that coal is not replaced with other fossil fuels, such as natural gas, and that other fossil fuels are phased out from electricity generation on a publicly disclosed timeline;

Mitigating the inadvertent adverse environmental and social impacts of renewables;

Ensuring that land rights and Free, Prior and Informed Consent (FPIC) are respected;

Respecting the human rights, health, livelihoods, culture and heritage of communities, mainstreaming Human Rights Due Diligence (HRDD) and providing access to remedy;

Ensuring the active and meaningful participation of women in the energy transition; and

Investing in access to electricity for all and investing actively in renewable energy generation.

3.1.1 A Time-Bound Transition Away from Coal for Electricity Generation

In interviews with civil society representatives, several stressed that a key component of a just energy transition in Asia would be clear government policy to halt the construction of coal-fired power plants, to cancel approved and under-construction projects and to plan for the early retirement of coal-fired power plants currently in operation.

This call to halt the use of coal recently gained support from two prominent international bodies. In May 2021, the IEA released a long-awaited roadmap to limit global temperature increase to 1.5ºC and achieve net-zero carbon by 2050. One way to achieve this target, according to the Paris-based organization, is "no additional new final investment decision should be taken for new unabated coal plants, the least efficient coal plants are phased-out by 2030, and the remaining coal plants still in use by 2040 are retrofitted."[111] The same message was repeated at the G7 Environment Ministers meeting held in May 2021, where G7 member countries stated, "We stress that international investments in unabated coal must stop now."[112]

This commitment is considered both a milestone in ending the combustion of coal for electricity production and a necessary part of achieving the Paris Agreement target. However, it still leaves the door slightly open for coal. Both statements use the term "unabated coal", which refers to the use of coal without a technology to mitigate CO_2 emissions, such as CCS.[113] CCS is a process that captures and stores carbon dioxide, for instance, in empty gas fields, before it is released into the atmosphere.[114] Since the G7 commitment only applies to unabated coal, it is unclear whether coal-fired power plants that use CCS technology to reduce CO_2 emissions will continue to be built and financed by G7 countries.[115]

Given that other countries will feel pressure to follow the lead of the G7, having a clear action plan is critical to ensure meaningful commitments and timelines. It is not clear whether a coal-fired power plant with CCS technology will help to meet Paris-aligned emission targets. CCS technology may reduce carbon emissions, but they will still be produced and the technology has other, more significant negative environmental impacts than unabated coal-fired power plants. Research has found an increase in freshwater consumption and an increased risk of explosions at coal-fired power plants that use CCS technology. These plants also have a greater toxicity hazard due to higher carbon monoxide emissions.[116]

Given the focus of the IEA and G7 on phasing out unabated coal (instead of all coal), it is doubtful there will be a global halt to investments in coal-fired power plants and coal mining. In Asia, where most coal-fired power production takes place, not all countries have completely committed to stop investing in new coal-fired power plants. Even in Japan, one of the G7 member countries, the government insists there is no need to introduce a new policy to end coal because existing policies are in line with the G7 agreement.[117]

This statement is incorrect, according to informant O: "Japan does not have plans to build new coal-fired power plants, but there is also no policy to stop investing in coal-fired power plants. Therefore, coal-fired power plants may still be built in the future." In addition, as this informant states, "Japan still continues to develop a number of coal-fired power plant projects which were already under construction and which will be operating beyond 2050."

Without an explicit policy to halt investments in coal, it is possible that Japan would revert to using coal to fuel economic growth in the short term, particularly to recover from the COVID-19 pandemic. This is already happening in China. According to informant N, before the pandemic, China had a rather progressive policy to reduce reliance on coal and increase the use of renewable energy. However, when COVID-19 caused an economic recession, China turned back to coal to support economic growth. As a result, there was more construction of coal-fired power plants in China in 2020 than in 2019.[118]

3.1.2 Ensure that Coal is not Replaced with Other Fossil Fuels

For many countries committed to shifting from coal to renewable energy, natural gas (LNG) is widely considered a "fuel bridge" in this transition. Several countries in Asia have adopted policies that replace coal with LNG, including Vietnam[119] and Bangladesh. In the latest draft of Vietnam's long-term energy plan 2021–2030 (PDP8) published in February 2021, one of the policies to reduce coal involves increasing the use of LNG in electricity.[120] A similar policy was implemented in Bangladesh where nine proposed coal power plant projects were canceled, but the government has signaled that they will be replaced with 13 LNG projects currently under construction.[121]

Scientists have debated the use of natural gas as a fuel bridge in the transition from coal to renewable energy. In the short term, LNG has the potential to reduce carbon emissions compared to coal power plants.[122] LNG used in stationary combustion processes in power generation, manufacturing industries and construction emits 56,100 kg of CO_2 per terajoule (TJ). LNG also produces half the amount of CO_2 produced by a coal-fired power plant when used in a combined cycle gas turbine (CCGT).[123]

The perceived benefits of LNG-fired power plants are based on an assumption that natural gas is energy efficient while coal-fired power plants are inefficient. However, the potential for leakage and the release of methane, a potent GHG, can make LNG power plants inefficient.[124]

If the leakage rate is high and the power plant is inefficient, there is no short-term advantage to shifting from coal to LNG. Also, while LNG may have lower carbon emissions than coal, it is still a fossil fuel and will hinder the achievement of a net-zero carbon target in the long term.

Shifting from coal to LNG, an expensive proposition, may also indirectly crowd out investment in renewable energy.[125] This is a major risk in Asia where most countries are still categorized as low or middle income and have limited investment capabilities. Constructing LNG power plants also makes continued investment in other fossil fuels more likely since it strengthens fossil fuel infrastructure.[126] According to informant N, the policy shift from coal to natural gas is not profitable in the long term because investments in LNG infrastructure are more expensive than investments in renewable energy, which continues to become more affordable. Given this development, investments in LNG are at risk of becoming stranded assets.[127]

Moving from coal to natural gas also has the potential to disrupt energy security, particularly for countries that import it. Japan is a prime example of how dependence on LNG can make the electricity system vulnerable.[128] LNG accounts for 40% of Japan's total electricity.[129] In January 2021, the country experienced a tight supply of natural gas for power plants because of competition with buyers from northern Asian countries.[130] High demand from Asia has caused LNG prices to continue to rise,[131] making it an expensive fuel for power generation.

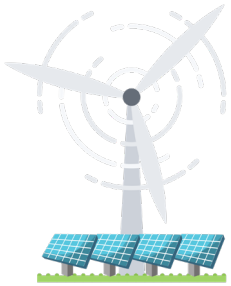
Meanwhile, high demand and falling investment costs for new renewable energy could disrupt traditional energy trajectories. Approximately 770 million people in emerging markets in Asia do not have access to electricity, and demand is growing. Emerging markets currently account for 88% of growth in electricity demand, 39% of which is in China, 20% in India and 11% in ASEAN countries. According to a report by Carbon Tracker, emerging markets in Asia could leapfrog directly from coal to renewable energy, avoiding the shift to natural gas and other fossil fuels.[132]

3.1.3 Address the Inadvertent Environmental Impacts of Some Renewables

Renewable energy sources may be the way forward, but they can also have adverse environmental and social impacts. For example, large-scale dams emit large volumes of GHGs when the flooded biomass behind the dam starts to decay.[133] Micro-hydropower systems have been introduced as a less destructive alternative,[134] but the impacts on river habitats, surrounding ecosystems and other bodies of water must still be monitored periodically.

A similar approach should be considered to monitor the impacts of geothermal power, ocean thermal energy conversion (OTEC) and wave power on biodiversity.[135] CSOs have urged governments to conduct research and development into using geothermal energy in ways that do not disturb the environment.[136]

Another renewable energy source is the generation of electricity from biomass and waste. The deforestation and harmful monoculture plantations associated with biofuel, as well as the air pollution and GHG emissions caused by the burning of biomass, makes it an inefficient solution that will contribute to, rather than reduce, climate emissions and global warming.[137] The burning of urban waste has a similar impact in terms of emissions, the release of toxic pollutants and the potential adverse impacts of reducing and recycling waste. According to informant L, the latter is a particular risk for LMICs that face waste-dumping from wealthy countries, which diminishes the zero-waste and circular economy efforts that provide a sustainable, much longer-term solution.



For these reasons, wind and solar are widely considered the most feasible and responsible forms of renewable energy.

A holistic approach is needed for solar energy, which has large material requirements including cement, steel, glass and minerals such as aluminum, cadmium, copper, gallium, indium, iron, lead, nickel, silica, silver, tellurium, tin and zinc. Similarly, large-scale wind farms that require vast areas of land (or water in the case of offshore wind farms), can cause noise pollution and interfere with habitats and biodiversity, with the blades posing a particular danger to birds.[138]

The renewable energy sector has immense potential for job creation and, when implemented effectively, can have better environmental and social outcomes. Evidence shows that employment in wind power supported 1.2 million jobs worldwide in 2020, 21% of which were held by women.[139] In terms of alternative fuels like biodiesel, jobs worldwide expanded to 2.5 million.[140] Biofuels are generated through feedstock from palm oil, soybeans or corn, grown primarily in South Asia and Latin America. Given that these are labor-intensive supply chains, Malaysia, Philippines and Thailand have all expanded production.[141]

Therefore, just transition strategies should consider the long-term environmental and climate impacts of renewables as this enables better planning and the ability to mitigate inadvertent negative impacts.

3.1.4 Ensure That Land Rights and Free, Prior and Informed Consent are respected

Renewable energy generation on wind farms and solar parks requires large plots of land that are frequently taken from Indigenous and pastoral communities. These lands tend not to have buildings, and rural and Indigenous communities often do not have protected claims to these lands. [142] It is crucial to ensure that renewable energy projects respect the rights of communities and Indigenous peoples, and that environmental impacts are considered from the outset. This requires gaining Free, Prior and Informed Consent (FPIC) from stakeholders before a project is initiated. According to informant G, land and consultation rights are central to a just transition in Vietnam. Here, there is a focus on not repeating the past wrongs of fossil fuel projects, which did not include communities in decision making and provided little compensation for the loss of their lands and livelihoods.

In interviews, civil society actors from across Asia pointed to this lack of consultation and raised concerns that many renewable energy projects are funded and implemented by the same financial institutions and companies behind the environmental destruction and rights violations of fossil fuel energy projects.

Buy-in from communities is essential to the long-term sustainability and viability of the energy transition, and when renewable energy projects fail to secure it, they not only face reputational damage but also pushback from communities and public officials. They may even lose their social license to operate.

To mitigate these risks, it is imperative that renewable energy companies and funders seek FPIC from communities, acquire land through a just process, provide adequate compensation and minimize the adverse impacts on communities and the environment. This can only be achieved through open and accessible consultation, a crucial step that is often overlooked. For example, informant H described the experience with solar panel projects in Japan: "Solar panels are quite negatively perceived by people that live near them. […] In most cases, foreign investors came and cut the trees and put solar panels, and they don't explain to local people what's happening. […] They just put up the renewable energy projects without consultations and consideration to local people and the environment. That needs to change."

Even when FPIC consultations are conducted with communities, and companies have reasonable compensation schemes in place, not everyone in the community is necessarily heard or compensated equally. Informant I pointed out that, in India,

> **Vulnerable groups such as women, Indigenous peoples and the members of the Dalit caste, often suffer the most severe impacts but are not included in consultations on energy projects. Women are often not consulted about the sale of their lands and do not share in the profits, and Indigenous communities risk losing access to their traditional lands and forests on which they depend for food and medicine.**

Growing demand for minerals to manufacture solar panels, wind turbines and batteries, such as cadmium, cobalt, gallium and lithium, is also putting pressure on local ecosystems and communities. The World Bank estimates that the production of graphite, lithium and cobalt, known as "transition minerals" because they are used in renewable energy technologies, will need to increase by 450% by 2050 to keep up with demand.[143] These extractive industries are vested in carbon-intensive technologies, deforestation, land grabbing and putting the livelihoods and health of workers and communities at risk. According to the Transition Minerals Tracker of the Business & Human Rights Resource Centre, the 103 biggest companies involved in the mining of transition minerals have had 276 allegations of human rights abuses since 2010, most of which relate to impacts on communities, such as health impacts, violations of the right to peaceful protest and Indigenous rights, land grabbing, failure to obtain FPIC and environmental impacts, such as soil degradation and water pollution.[144]

It is therefore necessary to look at the entire value chain of renewables to ensure environmental and social impacts are addressed holistically.

3.1.5 Protect the Rights of Workers

The just transition movement in industrialized countries has traditionally focused on the rights of workers and mining communities, with labor unions at the heart of the discussion. When transitioning from coal-fired power plants or mines, it is important to consider the rights and needs of workers and communities that depend on coal for employment. Alternative sources of income need to be made available, which may require investments in compensation schemes, promoting local businesses and alternative sectors or providing retraining opportunities.

> **Very few universities in the Philippines offer courses on the energy transition and, as a result, graduate engineers, future politicians and public planners who are ill-informed about renewables.**

Civil society actors across Asia emphasize that it is important to train the workforce to ensure they have the technical capabilities to manage solar and wind projects. As informant J explained, "Very few universities in the Philippines offer courses on the energy transition and, as a result, graduate engineers, future politicians and public planners who are ill-informed about renewables."

Rather than seeing the renewables sector as a threat to the workforce, various respondents emphasized the opportunities it could offer to upskill workers and provide better working conditions. However, opportunities for a more inclusive and safe working environment depend heavily on the policies of renewable energy companies and the ability and willingness of governments to regulate labor rights in this industry. This is especially true with transition mineral mining where there have been reported cases of occupational health and safety violations and worker rights issues.[145] A recent study of workers in the rare earth elements recycling industry has brought to light the exposure of workers to hazardous substances and the risk of ignitions and explosions.[146]

To realize a just transition, it is crucial that the rights of workers in every part of the supply chain are safeguarded and that workers who are at risk of losing their livelihoods due to a phase out of coal have access to alternative sources of income and employment.

3.1.6 Safeguard The Health and Livelihoods of Communities

The environmental impacts of renewables are also strongly linked to the health and livelihoods of communities in the vicinity of power generation plants. The land conflicts described in the previous section have a direct impact on rural livelihoods since solar and wind farms are often developed on lands used for agriculture, or in forests that provide crucial access to food and medicine for local communities and Indigenous peoples.

> **Solar power is usually built on agricultural land, so farmers and rural communities may face impacts of solar power development. That is why we say that solar power needs to be developed in collaboration with agricultural activities.**

Informant G emphasized the importance of respecting rural livelihoods when implementing solar power projects and remembering that their food security is tied to agricultural production. "Solar power is usually built on agricultural land, so farmers and rural communities may face impacts of solar power development. That is why we say that solar power needs to be developed in collaboration with agricultural activities. We promote a duo-use agri-solar model. We are piloting a duo-use model which combines solar power installed on roofs, under which farmers can still plant cucumbers. We compared the production of cucumber under solar and without, and we see that production is actually better. I think agri-solar can be applied to different areas where agriculture is present. Agriculture can also use solar power to provide directly power to the activity."

When implemented correctly, solar power does not necessarily pose a threat to farming communities and food production. Rather, it can provide opportunities for innovation, higher productivity and increased access to electricity.

In various countries, offshore wind farms face opposition from the fishing industry due to the potential impacts on fish stocks and fishable areas. However, since fishing is not allowed near offshore wind farms, they may offer an opportunity to establish marine protected areas (MPAs) where fish can recuperate and fish stocks can be regenerated. According to informant K, it is crucial to get these industries on board because "almost every government policy tries to maintain competitiveness on an international stage, and there is a focus on how to protect industries, with a side effort to sort out energy needs."

Communities in the vicinity of renewable energy projects must also deal with aesthetic impacts on the landscape. These are important concerns, since the social, cultural and economic value of land and well-being of individuals are closely linked to their direct environment and aesthetics. This is particularly evident when forests and other ecosystems are destroyed to make way for solar and wind projects. According to informant L, these aesthetic concerns should be addressed to overcome public opposition and ensure that communities are on board with the development of renewable energy projects.

3.1.7 Ensure That Women Participate Actively and Meaningfully In The Energy Transition

Gender inequality puts women most at risk of suffering the negative impacts of renewable energy projects. Informant I pointed out that in India, women are often the most severely affected by energy projects but are often not included in consultations. They advocated for a gender just transition that considers the disproportionate impacts on women:

> **We need to consider the gender impact of the energy transition, and the gendered impacts on local community. It is important to see women not just as beneficiaries, but change agents reclaiming their rights. [...] We need to look at the participation of women at the local governance level, so that they can speak for themselves and whether the money is used for the value of women.**

One example is large-scale renewable energy projects that typically require large amounts of land and often lead to conflicts over land ownership and land use.[147] Although women have the right to use land, land ownership among women is limited because of the social norms that favor males as inheritors of land. Since most land compensation for renewable projects is based on ownership, women are often unable to claim compensation. Even when FPIC consultations are conducted with communities, and companies have reasonable compensation schemes in place, women may not be compensated equally.

It is important to ensure that women participate in determining compensation and benefits for communities. This can be done by conducting a gender audit to make sure the compensation is spent fairly in the community. In the words of informant I, "it opens up the issue whether the money has been spent on the development of women and if they have participated in decision-making. We particularly focus on local governance at the village level, where we look at what is the participation of women at this local governance so that they can speak for themselves and whether the money is used for the value of women."

Shifting to renewable energy may also bring employment opportunities for women. Informant I pointed out that

> **if we campaign globally, maybe it is possible that we see more women join the renewable workforce and build their capacity, and this could build the inclusive work foundations that we have not seen in the fossil fuel industry. Because for women, [the fossil fuel industry] is an unsafe work environment. This transition is an opportunity to overcome the injustices of fossil fuels.**

Although women have employment opportunities in renewable energy, these opportunities are limited by inadequate purchasing power and lower social status. Gender gaps in the sector remain, with women concentrated in the lowest paid positions. To strengthen the role of women in renewable energy employment, governments need to introduce progressive policies to address these gaps.[148]

3.1.8 Invest in Access to Electricity for All

According to the IEA, almost 1.2 billion people in LMICs in Asia have gained access to electricity since 2000, and 96% of the region had access to electricity in 2019 compared to just 67% in 2000. While this is a tremendous improvement, access to electricity in rural areas is still significantly lower (see Table 3).[149]

Table 3 Access to electricity in developing Asia (2019)

Country	Urban	Rural	Population without access (millions)	Country	Urban	Rural	Population without access (millions)
Bangladesh	93%	77%	28	Myanmar	76%	39%	27
Brunei	>99%	>99%	<1	Nepal	94%	93%	2
Cambodia	>99%	67%	4	Pakistan	91%	72%	45
China	>99%	>99%	<1	Philippines	>99%	93%	4
India	>99%	>99%	6	Singapore	>99%	n/a	<1
Indonesia	>99%	99%	2	Sri Lanka	>99%	>99%	<1
Laos	98%	93%	<1	Thailand	>99%	>99%	<1
Malaysia	>99%	>99%	<1	Vietnam	>99%	99%	<1
Mongolia	99%	73%	<1				

Source: International Energy Agency (2020), *Electricity Access Database*.

Even though access to electricity rates in Asia have increased significantly in the past two decades, millions of people still do not have adequate and stable household access to electricity. This is a significant barrier to overcoming poverty and hampers sustainable development. Informant J raised a concern that the methodology used to measure access to electricity overestimates the number of people connected, particularly in remote and rural areas that may be connected to the grid at the village level but not at the household level.

The reliability of the electricity supply is also a major concern. South Asia has more frequent power outages than any other region in the world, and structural shortages lead countries to plan for scheduled blackouts, or load shedding, in areas with lower demand to compensate

for shortages.[150] The increasing frequency of extreme weather events due to climate change, such as floods, storms and heavy rainfall, puts further stress on the electricity network and may cause more frequent blackouts in the future, particularly in rural areas. These blackouts have severe economic consequences, such as lost revenues for companies, social and health impacts due to disruptions to education and health systems, and safety on the streets and in hazardous workplaces, such as mines. They can also exacerbate existing inequalities due to the disproportionate impacts on impoverished communities.[151]

Civil society actors from across the region stressed that access to electricity is one of the major concerns for a just transition in Asia. Not only do injustices need to be addressed in the production of energy, but also inequalities in the consumption of energy. Informant L emphasized that those who have contributed least to climate change, including those who still do not have access to electricity, are the ones suffering the most from its consequences. For the same reasons, informant I stressed that access to energy should be a human right:

> **We are not really addressing the overconsumption of energy and that this whole consumption is inequitable and unjust. That is not being considered. If you go to rural areas, they have no access to energy, but in urban areas there is overconsumption. We need to promote access to energy for all. [...] We cannot just turn energy into a commodity like fossil fuel. Everyone should have the right to energy.**

Informant J emphasized that access to electricity is a central concern for a just transition in the Philippines. They argued that the energy transition is an important opportunity to increase access to electricity since renewable technologies, such as solar and wind power, can be easily deployed in rural areas to provide direct access. However, financing is a major challenge.

> **Financing will be a major challenge for [renewable energy projects in rural areas] because many banks look at small projects or micro-grid projects as not bankable. Necessary, but not bankable.**

A potential solution is a renewable energy fund managed at the national level to subsidize microgrid and rooftop solar projects at the local level.

3.2 GOVERNMENT POLICIES TO STIMULATE A JUST ENERGY TRANSITION

Governments in Asia have a key role to play in promoting and regulating an energy transition that protects the environment and human rights. The following sections describe the various policies that governments could adopt to ensure a just energy transition.

3.2.1 Make Power Plant Licenses Conditional on NDC And SDG Commitments

The countries included in this research have committed to achieving the Paris Agreement targets. Every country in Asia has submitted an NDC in which they describe what will be done

to reduce global warming to below 2ºC.[152] These countries have also adopted the Sustainable Development Goals (SDGs), a universal call to end poverty, safeguard the environment and ensure that everyone enjoys peace and prosperity by 2030.[153]

One of the clearest gaps is the permit-granting process for new fossil fuel-based power plant projects, which often does not consider NDC and SDG commitments.

Unfortunately, there are policy gaps in achieving the Paris Agreement targets.[154] One of the clearest gaps is the permit-granting process for new fossil fuel-based power plant projects, which often does not consider NDC and SDG commitments.

Since new coal-fired power plants will still be producing carbon emissions after 2050, it will be difficult for countries to meet their Paris Agreement commitments. To achieve a just energy transition, governments in Asian countries should assess whether new power plant projects contribute to their NDC and SDG commitments before granting a license.

3.2.2 When Implementing a Carbon Tax, Make It Effective

Carbon taxes are emerging as a simple, transparent and cost-effective solution to tackling climate change because they change investment and consumption behaviors.[155] By making carbon-emitting energy more expensive, carbon-free energy (renewables) becomes relatively cheaper. When the proceeds of a carbon tax are used to subsidize renewable energy, the effect is magnified.

In 2019, Singapore became the first country in Southeast Asia to implement a carbon tax.[156] Other countries have followed and Vietnam's carbon tax will take effect on January 1, 2022.[157] Indonesia has also taken steps to implement a carbon tax via its revised tax law (a priority to be passed in 2021), although it was motivated by the need to generate additional state revenue[158] after tax revenues fell dramatically during the economic crisis caused by COVID-19.[159]

There is extensive literature on carbon pricing modeling in the US, and the emerging results of this study align with their findings. A study of 32 carbon tax scenarios in the US shows that a carbon tax leads to lower carbon emissions, especially in the electricity sector, in part by reducing the use of coal.[160] Across all models, core carbon price scenarios lead to significant reductions in CO_2 emissions, with the vast majority occurring in the electricity sector and disproportionately through reductions in the use of coal.

However, research in Mexico has found that costs are often passed on to consumers rather than taxing businesses that are polluting the environment. It is therefore important to factor carbon pricing into business operations, and proper regulation needs to be in place to monitor it.

Based on these findings, four conditions are necessary to ensure a carbon tax is effective at reducing GHG emissions:

The purpose of the carbon tax must be to reduce carbon emissions. Some carbon taxes are motivated by a government seeking to bolster state revenue due to a recession, such as in Indonesia. Being motivated to reduce carbon emissions is important to ensure the tax will still be applied after economic conditions improve.

The carbon tax must be high.[161]

The income from a carbon tax should be used to accelerate investments in renewable energy (a recommendation of informant M). Using carbon tax revenues for other purposes than the energy transition will not achieve the expected target.

A carbon tax could be combined with measures to reduce impacts on vulnerable populations, such as improving access to renewable energy for poor communities.

3.2.3 Integrate The Just Energy Transition in School and University Curricula

In many countries, addressing the threat of climate change through a just energy transition has not yet been integrated in school and university curricula. According to informant J, in the Philippines, very few engineering schools at prestigious universities offer renewable energy programmes. The absence of climate change information and learning materials leaves graduates who are beginning to work professionally in their respective fields with a limited understanding of climate change and a just energy transition.

For example, graduates of economics, finance and business who work in financial institutions have a limited understanding of whether their investment and financing policies directly affect the environment and communities. As a result, financial institutions continue to provide loans and investments to companies that violate human rights and damage the environment.[162] According to informant J, graduates of engineering schools that only offer programs in the intricacies of fossil fuel will go on to work in fossil fuel companies without comprehensive knowledge of a just energy transition.

By providing education about climate change from an early age, students will be more aware of the severity of climate change and how to work towards a fair and sustainable energy transition.

It is therefore important to integrate options to address climate change through a just energy transition in the curricula of primary schools, secondary schools and universities. By providing education about climate change from an early age, students will be more aware of the

severity of climate change and how to work towards a fair and sustainable energy transition. Ultimately, professionals could implement this knowledge in their work. For example, bankers and investment managers may be advised to not provide loans and investments that could harm the environment or violate human rights, and they may develop insights into how their investments and financing could contribute to a just transition.

3.2.4 Support Community-Based Renewable Energy

The electricity sector has long been driven by technology, with the advantages of scale benefiting large producers while consumers play only a minor role. Large producers in various Asian countries became even more dominant when a monopoly over the electricity infrastructure was granted to state-owned companies. Even in countries with free markets, continuous mergers have led to a small number of large companies dominating the sector.

Private interests in this highly monopolized and centralized sector may not represent the needs of communities, particularly when energy projects in rural or impoverished areas are not considered profitable. When electricity is treated as a product that generates profits rather than as a basic right, it can be too expensive and out of reach for many vulnerable groups. Large-scale electricity projects are often opposed by local communities as they do not tend to reap the benefits, and are not invited to participate in the planning, construction and operation of the projects.[163]

New technological developments have made it possible to develop community-based renewable energy projects that involve communities in the development process.

Renewable energy generation provides a crucial opportunity for community-based energy since microgrids do not require large and complex infrastructure. Renewable energy projects may also be an opportunity to provide access to electricity in LMICs in Asia where 155 million people still did not have access to electricity in 2019.[164] These kinds of projects are well-suited to providing electricity in remote areas, including remote islands,[165] which large companies usually consider unprofitable.

However, small-scale projects such as these face funding challenges. According to informant J, "most banks do not consider these projects feasible and believe that project leaders are poor people who do not have access to collateral and represent a significant credit default risk." This can be addressed by strong government regulations

on access to electricity that recognize electricity as a basic right, and by facilitating community-led projects. National, regional and international development banks can all play a role in financing small-scale renewable energy projects.

Community-based renewable energy does not necessarily create a just energy transition, however. Inequality in LMICs extends from the national to the community level, including small-scale rural communities in remote areas.[166] Small groups in the community usually dominate the development process, and understanding these power relations is important to ensure that a community-based energy transition does not perpetuate existing inequalities.

At least three important conditions must be met to ensure that community-based renewable energy does not perpetuate or exacerbate social, economic or political inequalities:

Projects need to disrupt the mainstream model of energy project planning by decentralizing it and placing the community at the center, ensuring that their voices are heard in the decision-making process.

Mapping unequal power relations in the community is important to ensure that the project benefits most of the community, not just a small powerful group.

Research should include multidisciplinary studies in the post-colonial context, for example, studies related to decolonial and subaltern studies that consider energy justice discourse and theory from the perspective of LMICs.[167]

3.2.5 Ensure That Energy Companies Respect Human Rights

The 2011 UN Guiding Principles on Business and Human Rights (UNGPs) establish that companies should respect human rights. The responsibility to respect human rights is a global standard of conduct for all companies wherever they operate. It exists independently of states' abilities and/or willingness to fulfil their own human rights obligations and does not diminish those obligations. Furthermore, this responsibility is over and above compliance with national laws and regulations protecting human rights.

The responsibility to respect human rights requires that companies:[168]

Avoid causing or contributing to adverse human rights impacts through their own activities, and address such impacts when they occur.

Seek to prevent or mitigate adverse human rights impacts that are directly linked to their operations, products or services by their business relationships, even if they have n ot contributed to those impacts.

According to Principle 15 of the UNGPs, companies should have in place:

A policy commitment to meet their responsibility to respect human rights;

A human rights due-diligence process to identify, prevent, mitigate and account for how they address their impacts on human rights; and

Processes to enable the remediation of any adverse human rights impacts.

Meanwhile, governments should put sufficient regulations in place to ensure that all companies, in the energy sector and beyond, live up to the expectations of the UNGPs. These regulations need to be implemented and monitored properly to ensure that companies respect human rights and provide access to remedy.

3.2.6 Compensate Communities that Suffer the Impacts of the Energy Transition

Section 4.1 discussed the process of transitioning to renewable energy, which can have a negative impact on certain segments of society. These include workers in fossil fuel production and transformation, Indigenous and rural communities whose land rights are threatened by large renewable energy projects, vulnerable groups who do not have access to electricity and those living with the various environmental impacts of the energy transition. Clearly it is best to prevent these impacts, but if they are already being felt, a compensation scheme for communities should be implemented.

Compensation can be paid during the planning phase to ensure local communities reap the benefits of an energy project.[169] This is a common practice in high-income countries, such as the Netherlands, the UK and Germany. This type of compensation and benefits scheme is sometimes debated because it appears to provide bribes to communities to ensure renewable energy projects are approved.[170]

Whether or not this is justified, a compensation and benefits scheme at least ensure that the local community is not a disadvantaged party.

The community should be consulted to determine the best form of compensation and benefits and to ensure they meet their needs and expectations. The provision of compensation and benefits must also consider social, economic and political inequalities in the community.[171] This helps to ensure that compensation and benefits schemes are enjoyed by the majority of community members and not just those with higher social status.

3.2.7 Finance Research on A Just Energy Transition

To accelerate the leap from fossil fuels to renewable energy, robust research funding is needed to examine both the innovation and commercialization of renewable energy technology. Although there is a common perception that private companies create renewable energy technology innovations, it is actually the state, using taxpayers' money, that plays the most significant role, either through direct state subsidies or investments by state-owned or state-controlled companies and banks. These public investors seek to invest in risky technology that has not been commercialized whereas private investors usually choose to invest in more mature, proven technologies.[172] The technology developed by public investors is then developed further by companies and commercialized.

One example is the development of solar and wind technology, which began in the 1970s in response to the energy crises caused by oil shortages and rising oil prices. Germany, Denmark and the US actively invested in early wind and solar energy research and development projects. Even today, a major share of the companies producing wind turbines and other alternative energy technologies come from these countries.

Years later, the Chinese government made large-scale investments and opened the market to support domestic companies producing renewable energy equipment. After the state

conducted high-risk preliminary research, private companies conducted additional research and commercialized the technologies.[173] The prominent role of state funding in the preliminary research phase has led to a debate on profit sharing because companies enjoy most of the profits and pay a low tax rate.[174]

Unfortunately, strong government support for research of renewable energy technologies has not been accompanied by research funding to explore a just energy transition. Cooperating with universities to provide research grants in different fields of study may help to advance research on this issue. It is hoped that useful research findings will emerge from a variety of disciplines to define and provide recommendations on how to achieve a just energy transition.

Renewable energy companies themselves should play a role in financing research of a just energy transition. Given that the technologies they have commercialized were initially developed with strong public support, these companies now have a moral debt to society.

They are obliged to ensure that renewable energy projects do not have negative impacts on surrounding communities and those working in the global value chain of renewable energy technology. Renewable energy companies might develop research funding schemes in collaboration with universities, or companies may develop their own research agendas to explore options for a just energy transition.

Until now, research related to a just energy transition has been limited, with much of it focused on the impacts on workers in the fossil fuel sector in high-income countries.[175] This focus on workers is widespread and important, but other aspects also deserve attention. To create a more comprehensive and holistic understanding, the first research task should be defining a just energy transition. This definition would be important to ensure that all aspects of achieving a just transition are considered, not only environmental aspects, but also social impacts. The transition must also be guided by fairness, equity and global justice, which includes but is not limited to gender, ethnicity, income and LMIC contexts.[176]

Research is also important to prevent governments from developing renewable energy policies that do not take the impacts on society into account. For example, in early 2021, the US Government awarded a USD 30 million grant to Lynas, an Australian rare earth company, to open a mine in Texas. The motivation was to reduce dependence on rare earth production from China, currently the world's largest producer.[177]

Informant L pointed out that the same policy will be employed in Indonesia to further exploit the development of rare earth elements. While these rare earth minerals have become important components in renewable energy technology, the mines have had negative environmental and social impacts.

3.2.8 Combine Small-Scale Solar Energy with Agriculture

Renewable energy has the potential to be developed in rural areas dominated by the agriculture sector. Researchers have developed an agri-voltaic system that allows land to be used for the production of both food and energy, addressing two basic needs at once.[178] The combination of small-scale solar energy and farming will ensure that communities that depend on agriculture have access to electricity, even in remote areas. It also prevents land

grabbing, one of the risks of renewable energy projects, and allows communities to gain access to electricity without sacrificing land previously used for agriculture. One study found that this system could be developed successfully in hot and arid western India.[179]

The combination of small-scale solar panels and agriculture can also be employed in fish farming, as seen with aquaculture centers in Sleman, Indonesia. This government-initiated project provided farmer groups with solar panels that were used to supply electricity to aerate fish ponds. The government also provides funding to universities to teach the skills and knowledge farmers need to operate the solar panels.[180] This knowledge is important to ensure solar panels are maintained and operate long term. Community involvement also creates a sense of belonging and helps prevent solar panels from being damaged by vandalism or theft.

Solar energy technology may also be a source of energy for smart farming. This concept is known as the Photovoltaic Agricultural Internet of Things (PAIoT), a system approach that integrates agricultural production with renewable energy power generation and control through the IoT platform.[181] For example, solar panels can be used to power water pumping systems that irrigate agricultural land. Solar-powered water pumps have several advantages, including no fuel costs, and lower cost, longer-term investment than a diesel engine.[182]

3.2.9 Provide Alternative Sources of Income in Local Mining Areas

Discussions of coal-fired power plants cannot be separated from coal mining, which is a significant economic sector in Asia. Global coal production increased by 1.5% in 2019, largely driven by the rise in coal production in Asia Pacific, which accounted for 73% of global production in 2019. China, the largest coal producer globally, accounted for 46% of global coal production in 2019.[183] The closure of coal-fired power plants will lead to the closure of coal mines, which will have a significant impact on workers and surrounding communities.

Informant N described how, for years, coal mining companies in Asia have "stolen from workers" by providing low wages that do not match the risks they face and undervalue the health and safety of workers. Coal mining has also damaged the environment and destroyed the livelihoods of communities around the mines.[184] Despite these negative experiences, the impacts of mine closures on workers and surrounding communities could be even worse.

There has been widespread research on the closure of coal mines, especially in high-income countries such as the US, UK and Germany, which have pursued policies to close coal mines since the 1950s.[185] The closure of coal mines in these countries has had a major impact on workers and communities.

There is not much publicly available research on mine closures in Asia because mining is still pursued as an important source of revenue for mining companies and the state. In addition, given the heavy reliance of the electricity sector on coal, Asian countries do not yet have plans to close mines. When mines are closed in Asia, it is usually because they have run out of reserves and companies have moved to other areas with coal resources.

Coal mine closures in Asia would not necessarily have a sweeping negative impact on local communities. Communities around the mines might feel some relief after suffering the negative social and environmental impacts of mining without reaping significant economic benefits.[186] These communities, which largely depended on agriculture before mines opened in their area, have had to cope with environmental damage to their homes, farms and communities.[187] Even after a mine closes, weak regulations for mining companies often leave communities to deal with clean-up and land remediation and reclamation. For example, in Indonesia, many children have died from falling into abandoned mine pits.[188]

Mine closures do lead to higher local unemployment, however. To prevent mass unemployment, informant L recommended that governments and mining companies take proactive steps to create policies that ensure workers can secure other jobs after a mine is closed.

The renewable energy sector will create new jobs in Asia. In 2019 there were an estimated 11.5 million direct and indirect jobs in renewable energy globally.[189]

Most future jobs in the sector will be in Asia, which accounted for 63% in 2019.[190] Although workers in the fossil fuel sector may shift to this sector,[191] the skills of mining workers are often not transferrable to renewable energy jobs and these workers tend not to live in areas where these jobs are being created. One strategy is for governments to upgrade workers' skills, not only to fill jobs in the renewable energy sector, but in other sectors as well.

In Asia, mines are typically located in rural areas where the local population depends on agriculture. However, governments still grant permits to mining companies because they are perceived to generate more state revenue than agriculture. When mining companies enter these areas, homes and livelihoods are destroyed and communities are left unable to farm their land. When a mine is closed, there is an opportunity for agriculture to be developed again.[192]

Mining companies should be required, as part of the mining license, to restore closed mines so that the land may again be used as agricultural land. Governments must also change their perception that mining is more profitable than agriculture.[193] Although agriculture may contribute less direct revenue through taxes, the sector provides farmers and their communities with food and plays an important role in national food security. From a macro-economic perspective, the contribution of agriculture to economic development is therefore crucial.

3.3 THE ROLE OF THE FINANCIAL SECTOR IN A JUST ENERGY TRANSITION

The financial sector has a crucial role to play in a just energy transition in Asia. Despite commendable efforts, finance has yet to unlock its full potential. This section provides a snapshot of the state of sustainable finance initiatives in Asia and discusses the role of the financial sector in stepping up the transition.

3.3.1 The State of Sustainable Finance Initiatives

All ASEAN Member States (AMS) have ratified the Paris Agreement, committing to develop and meet their NDCs. According to the UN Environment Inquiry and the Development Bank of Singapore, achieving the NDCs would require an investment of USD 3 trillion between 2016 and 2030 in ASEAN countries.[194] While governments can take the lead in catalyzing these investments, the OECD estimates that public financing alone will not be sufficient to achieve ASEAN's climate goals.[195]

Against this background, green financing opportunities could create a win-win scenario for the financial sector,[196] and several regional sustainable finance initiatives have emerged in response.

These initiatives are in addition to existing ones such as the World Bank's Sustainable Banking Network,[197] and the Network for Greening the Financial System (NGFS), which brings together 95 central banks and financial supervisors.[198]

In addition to these international initiatives, many countries in Asia have started to develop green finance initiatives, including China's Framework for Greening the Financial System, Singapore's Green Finance Action Plan, the Malaysian Sustainable Finance Initiative (MSFI) and actions by Bank Negara Malaysia, Indonesia's Sustainable Finance Regulation and Vietnam's Directive on Promoting Green Credit Growth and Environmental and Social Risk Management, among others.[199]

Along with the national authorities of ASEAN+3 (ASEAN plus China, Japan and South Korea), the ADB introduced a technical assistance program in March 2020 to create the necessary ecosystems for green local currency bonds for infrastructure development in ASEAN+3.[200]

While these initiatives is laudable, there was consensus among the informants interviewed for this study that the shift from financing coal to renewable energy projects has been slow. The following sections explore the reasons for this and discuss what is needed to accelerate a just transition in Asia, as well as the role of the financial sector in this process.

3.3.2 A Slow Shift from Coal Financing to Renewables

In interviews, informants expressed a common view of why the shift from coal to renewables in Asia has been slow: the absence of a regulatory framework. Without such a framework, financial institutions do not have an incentive to finance the transition, and supervisors prioritize financial stability over avoiding climate risks. Informant C pointed to banks' lengthy risk assessments as a major hurdle. "For example, a loan could be given with a two-year maturity, but the project can be climate damaging for 15 years […] one reason why the regulators are not demanding more from the financial sector is that these sectors will suffer. If one country moves faster than the others, then there [will not] be a level playing field and there will be free riders benefitting from this in terms of competition."

When explaining the lack of a sufficient regulatory framework, informant E pointed out that political and social pressure on financial institutions to stop financing coal is still in an early stage: "Bankers still need to be told that today's ESG risks will in the end be financial risks." Financial institutions have been slow to change, and even best-in-class ESG-focused banks have not fully changed their mindset. Informant F estimated that investors of new coal plants in China, India, Vietnam, Indonesia and Japan would see their values decline by around USD 150 billion.

While a strong regulatory framework could have a positive influence on the shift from coal to renewables, another factor is how a country's installed electricity generation capacity base is positioned for change. As informant A explained, "we generally are not seeing energy or petrochemical teams turning into renewables teams. Renewables deals are much smaller in scale and much higher in risk, so they use much younger bankers for it." If influencers such as established corporates are not taking up renewable energy projects, it is very unlikely that less established ones will. Sparking the interest of corporates, providing good credit or a bankable Power Purchase Agreement (PPA) will be necessary. From this perspective, it is notable that "in many instances, finance is not leading the transition, finance is following."

Informant C agreed that the most innovative and probably the most green and sustainable projects are small: "The real problem is that there is much more money that wants to go green than there are projects, companies or industries that go green. This is relevant mostly for investors but also to some extent for the banks as well, especially when [the] big masses of money only seek big projects, not the smaller ones."

Informant C agreed that the most innovative and probably the most green and sustainable projects are small:

> **The real problem is that there is much more money that wants to go green than there are projects, companies or industries that go green. This is relevant mostly for investors but also to some extent for the banks as well, especially when [the] big masses of money only seek big projects, not the smaller ones.**

According to informant A, a preference for larger projects is rooted in banks' unwillingness to lend to SMEs, a painful lesson of the Asian Financial Crisis that has led banks to impose prudential risk limits, especially Indonesia's central bank, but also in the Philippines. "Philippine banks have a similar level of risk aversion as Indonesia, but the difference is that the largest conglomerates of Philippines, which control some of the banks, increase their exposure to renewables and as they decrease coal, which will likely lead to banks following suit."

3.3.3 Directing Financial Flows from Coal to Renewable Energy Projects

Despite a slow start, some informants pointed out that Asia's financial sector is taking more steps to speed the transition. According to informant A, banks are conducting business as usual by basing many of their loans on sovereign guarantees for PPAs and significant export credit support. While this is the banks' core activity, "what has been quite striking is the extent to which, climate-focused campaigners have actually, with the help of investors and the trends that are beginning to effect at the international level, managed to bring this process largely to a halt."

In the words of informant D:

> **Asia was a laggard in the shift from coal to renewables for a long time, but in the last 6 to 12 months this changed. The three main countries, China, Japan and South Korea, committed to net-zero plans and their financial institutions will follow suit. The evidence is that IEEFA is tracking [financial institutions] announcing policies against coal investments, the share of Asian [financial institutions] in global announcements went up to 40% in the last 12 months compared to 20% on last 3 years average. Whereas the global number of new announcements increased by 60% y/y.**

Likewise, informant B pointed to the great strides in transparency that have been made recently in China, where exact percentages of loans with fossil fuel exposure are now being provided. This is an unprecedented development that suggests the efforts of campaigners to pressure European ESG investors have also pushed the boundaries to some extent in the international banking space.

Meanwhile, banks in Japan, Korea, Vietnam and Taiwan have been directed to finance large-scale domestic renewable projects and this is now underway, especially in Taiwan, which has pivoted to offshore wind energy. According to informant A, this was achieved through unique financial conditions that made the shift attractive to investors: "Although it wasn't significant in terms of scale, the Vietnamese solar deal is a nice surprise. In which the PPA [was made] bankable and Vietnamese banks stepped up to finance it."

3.3.4 The Role of Regulators and Supervisors, including Central Banks

Informants agreed that regulators and supervisors, including central banks, have a major role to play in catalyzing the transition from coal to renewable energy. Informant C suggested that:

Structuring debt relief for LMICs in Asia could be a starting point in financing the energy transition. The focus of this strategy should be debt from foreign private creditors, especially bond holders. Legislation therefore needs to change in countries where creditors are headquartered (particularly the US and UK).

The same informant warned that "many of these institutions see green financing (bonds, loans etc.) as a whole new business so they want developing countries to continue to tap into the market for sustainable projects, but that still means debt without resolving the existing debt. […] As an example, the Debt Service Suspension Initiative (DSSI) has also called on private creditors to participate but in practice the conditions set forth, including suspending their right to issue sovereign bonds, scared low-income countries off. Thus, none of the lowest-income countries asked for debt relief from private creditors."

Similarly, informant A highlighted the need for multilateral institutions to stimulate government investments in the electricity grid, which could make it easier for smaller and start-up companies to invest in renewable energy generation capacity. For example, "IMF article 4 reviews could include much more focus on climate risk-related issues." In this context, pools of subsidized funding could go to financing a green grid, lowering the curtailment risk. However, grid investment is currently lacking in Asia, which is a barrier for renewables.

Financial institution leaders have spurred modest changes. As informant D pointed out, "the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) has been influential on many examples such as Malaysia where the Central Bank enabled the move in CIMB and then other banks followed […] In Asia, it is common for regulators to first form a consensus around issues (among [financial institutions] in this case) without imposing outright requirements. This was also the case in Japan where a consensus on environmental policies of banks was formed and then banks started to move without regulation."

In terms of weighing risks, some informants believe that the ESG impact of assets is a way for regulators to use their leverage to step up the transition. In the words of informant E, "also for central banks that do asset purchases (Japan) they could be restricted (or give higher priority) to green bonds."

In this context, it is also necessary to legislate mandatory reporting to prevent banks from making excuses or claiming they did not know the impact of their financing decisions on the climate.

4 Risks and Opportunities of the Energy Transition

The transition to renewable energy is inevitable, and there are strong financial arguments for financial institutions in Asia – and around the world – to shift their portfolios away from coal and towards renewable energy. This transition would allow financial institutions to avoid the serious and growing financial risks of coal and maximize the financial returns of a more prosperous renewable energy future.

The first part of this chapter analyzes trends in revenues, profits and the financial performance of coal-related assets between 2016 and 2020. These trends are then compared with the figures of renewable-related companies to show the differences in the business cases for coal and renewable energy. In the second part of the chapter, two futures are envisioned: one based on a 1.5°C scenario and another based on business as usual.

4.1 SELECTION OF COAL- AND RENEWABLE ENERGY-RELATED COMPANIES FOR COMPARISON

A financial performance analysis was conducted on publicly traded coal and renewable energy-related companies active in relevant markets for FFA. The only exception was Perusahaan Listrik Negara (PLN) in Indonesia, which although it is a non-listed state-owned company, it is a bond issuer with publicly available data. Coal companies were selected from the GCEL and aimed to provide the best possible representation of FFA countries. Where possible, one coal mining and one coal power company was selected from each country. The list of renewable companies from the same countries were screened on Refinitiv Eikon based on country of incorporation and TRBC activity name. One renewable energy equipment and one renewable power company was selected for each country where possible. Table 4 contains the complete list of selected companies.

Table 4 Companies selected for the financial performance analysis

Company name	Country	Sector	Sub-sector
China National Coal Group (ChinaCoal)	China	Coal	Coal Mining
China Resources Power Holdings	China	Coal	Coal Power
NTPC	India	Coal	Coal Power
Coal India	India	Coal	Coal Mining
Perusahaan Listrik Negara (PLN)	Indonesia	Coal	Coal Power
Adaro Energy	Indonesia	Coal	Coal Mining
Chubu Electric Power	Japan	Coal	Coal Power
Nippon Coke & Engineering	Japan	Coal	Coal Mining
Tenaga Nasional Berhad	Malaysia	Coal	Coal Power

Malakoff Corporation	Malaysia	Coal	Coal Power
Hub Power Company	Pakistan	Coal	Coal Power
Lucky Cement	Pakistan	Coal	Coal Power
Sembcorp Industries	Singapore	Coal	Coal Power
Golden Energy and Resources Ltd	Singapore	Coal	Coal Mining
Korea Electric Power (KEPCO)	South Korea	Coal	Coal Power
Electricity Generating Public Company Limited	Thailand	Coal	Coal Power
Banpu	Thailand	Coal	Coal Mining
Vietnam Oil and Gas Group (PetroVietnam)	Vietnam	Coal	Coal Power
Vinacomin Viet Bac Mining	Vietnam	Coal	Coal Mining
Semirara Mining and Power	Philippines	Coal	Coal Mining
Aboitiz Power	Philippines	Coal	Coal Power
`China Three Gorges New Energy Group*	China	Renewable	Renewable Power
Trina Solar	China	Renewable	Renewable Equipment
Adani Green Energy	India	Renewable	Renewable Power
Suzlon Energy	India	Renewable	Renewable Equipment
Sky Energy Indonesia	Indonesia	Renewable	Renewable Equipment
Terregra Asia Energy	Indonesia	Renewable	Renewable Power
GPP Resources	Malaysia	Renewable	Renewable Equipment
Bion	Malaysia	Renewable	Renewable Power
Dawood Lawrencepur	Pakistan	Renewable	Renewable Power
Maxeon Solar Technologies	Singapore	Renewable	Renewable Equipment
SIMEC Atlantis Energy	Singapore	Renewable	Renewable Equipment
Doosan Fuel Cell	South Korea	Renewable	Renewable Equipment
Shinsung E&G	South Korea	Renewable	Renewable Equipment
BCPG	Thailand	Renewable	Renewable Power
Sermsang Power Corporation	Thailand	Renewable	Renewable Power
Gia Lai Electricity	Vietnam	Renewable	Renewable Power
Indochine Import Export Investment Industrial	Vietnam	Renewable	Renewable Equipment

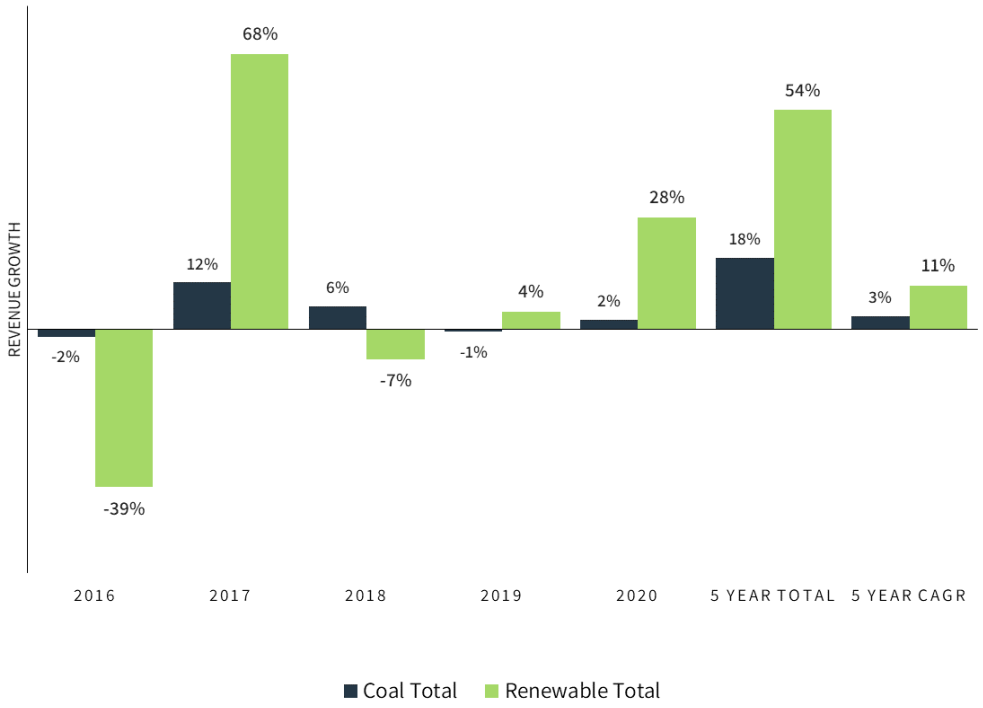
Source: Profundo, Refinitiv Eikon (viewed in July 2021)

* Note: CTGNE is a listed subsidiary of China Three Gorges Corporation (CTG) – a company known for the construction of the controversial Three Gorges Dam. CTGNE itself is only engaged in solar and wind power production and not controversial large-scale hydropower. As a key industry player, CTGNE has therefore been included in the analysis.

4.2 REVENUE GROWTH PERFORMANCE 2016–2020: RENEWABLES OUTPACED COAL

To provide a standard basis for comparison, all revenue data in the analysis are expressed in USD. All calculations were made using revenue-based weightings to account for the differences in company sizes. Between 2016 and 2020, the revenue growth performance of selected renewable energy-related companies was more than triple that of coal companies. As shown in Figure 90, renewable energy companies recorded a five-year total growth of 54% and a five-year compound annual growth rate of 11% while coal companies posted 18% and 3%, respectively.

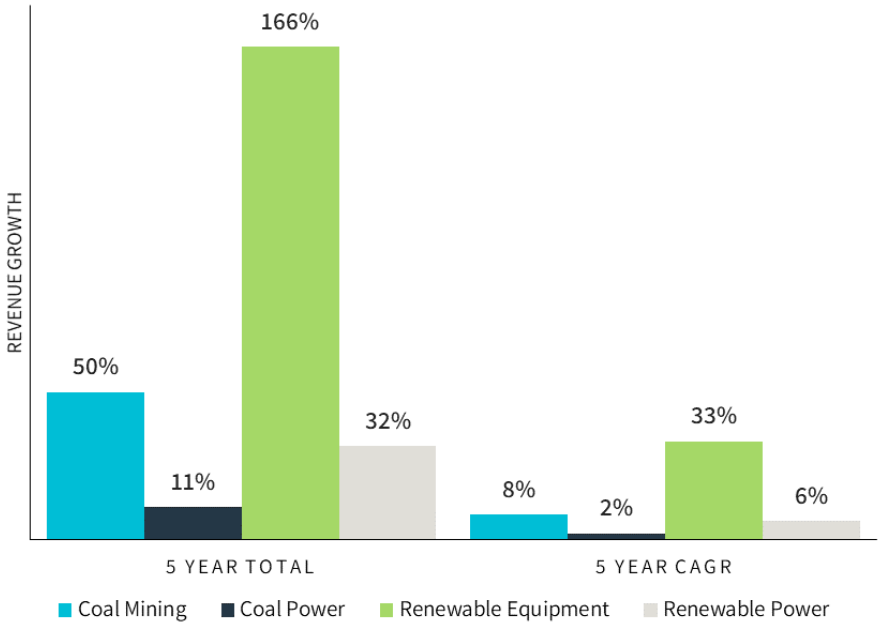
Figure 90 Historical revenue growth performance



Source: Refinitiv Eikon (viewed in July 2021), 2017 and 2018 coal total growth calculations exclude TNB, renewable total growth figures calculated with revenue weighted adjustment, for renewable energy companies average of annual growth rates used for CAGR

Figure 91 shows the revenue growth performance of the four sub-sectors. Renewable energy equipment companies recorded the highest growth with 33% CAGR in the five-year analysis period, followed by coal mining companies with 8%, renewable energy companies with 6% and coal power producers at just 2% CAGR.

Figure 91 Revenue growth performance of sub-sectors



Source: Refinitiv Eikon (viewed in July 2021), 2017 and 2018 coal total growth calculations exclude TNB, renewable sub-sectors' growth figures calculated with revenue weighted adjustment, for renewable energy average of annual growth rates used for CAGR

Overall, the data shows superior revenue growth performance by renewable energy companies. It is worth noting that the much smaller size of the renewable energy sector (USD 9 billion in total revenues versus USD 195 billion in coal in 2020) accounts in part for the higher growth figures. Considering that the share of renewable energy in the total energy generation mix is predicted to keep expanding, the higher growth performance of the sector is set to continue for the foreseeable future.

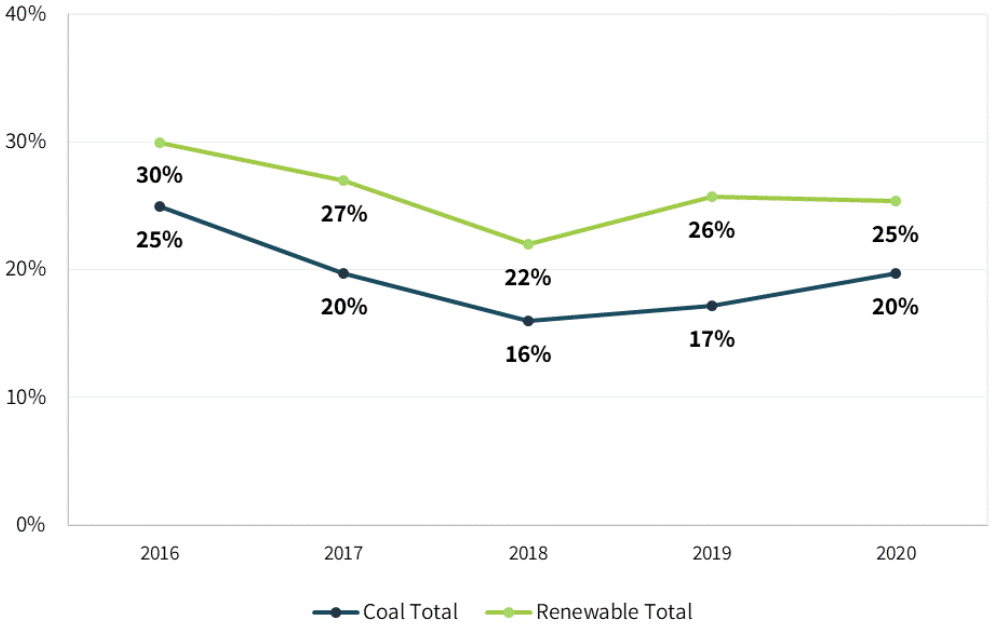
4.3 PROFITABILITY PERFORMANCE, 2016–2020

The profitability of coal and renewable energy companies was analyzed using five layers of metrics: gross profit margins, operating margins, EBITDA margins, net profit margins and ROCE. All profitability metrics were weighted by company revenue (a so-called weighted average), except for ROCE where capital employed was used instead.

4.3.1 Gross Profit Margins: Renewables Were Consistently Higher Than Coal

Between 2016 and 2020, the gross margins of coal and renewable energy companies followed a similar pattern, with profitability declining for two years until 2018 and then steadily increasing during 2019 and 2020 (see Figure 92). On average, renewable companies earned 6% higher gross margins in the last five years.

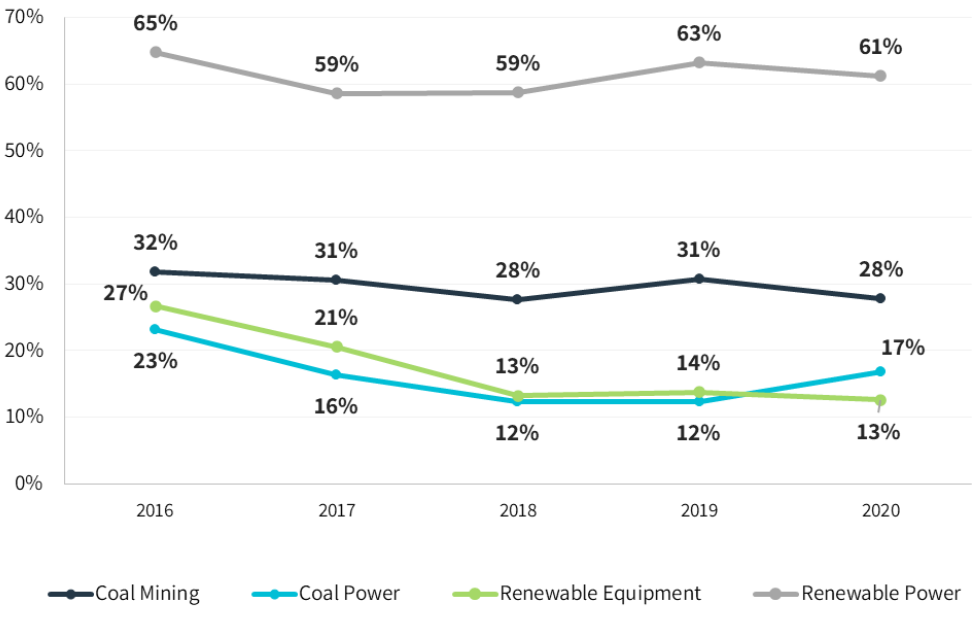
Figure 92 Historical development of gross profit margins



Source: Refinitiv Eikon (viewed in July 2021)

Across all profitability metrics analyses, coal mining and coal power sub-sectors recorded relatively smaller differences. However, the difference was much larger for the renewable energy equipment and power sub-sectors, with renewable power companies recording considerably higher profits than equipment companies (Figure 93). For a better comparison of financial performance, results of the sub-sectors are provided in detail for every profitability metric.

Figure 93 Development of gross profit margins in sub-sectors



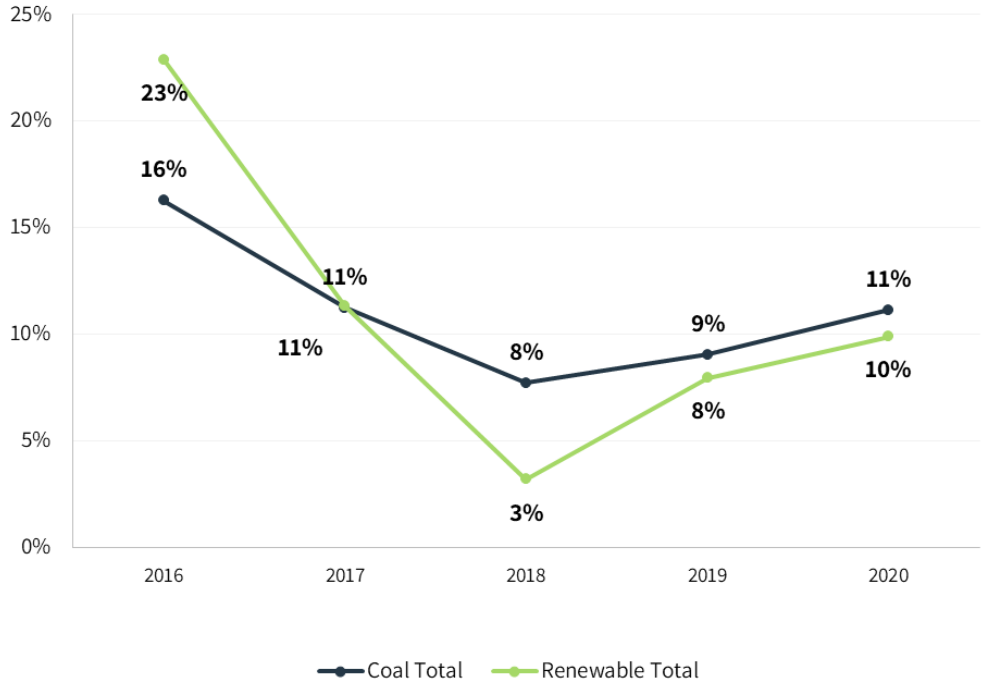
Source: Refinitiv Eikon (viewed in July 2021)

Among the sub-sectors, renewable power companies had the highest gross profitability at 61% over a five-year average, while coal mining had an average gross margin of 30%. Coal power and renewable equipment sub-sectors had the lowest gross margins at 17% on average.

4.3.2 Operating Margins: Renewables Were More Volatile Than Coal

Operating margins were more volatile during the analysis period, especially for renewable energy companies. One of the main reasons is that some companies in the list of renewables were formed more recently (or newly listed on stock exchanges) and are therefore not included in the weighting for the first years of the analysis. Overall, operating margins paint a similar picture, with profitability dipping during 2018 and increasing in 2019 and 2020 for both coal and renewable energy companies (Figure 94).

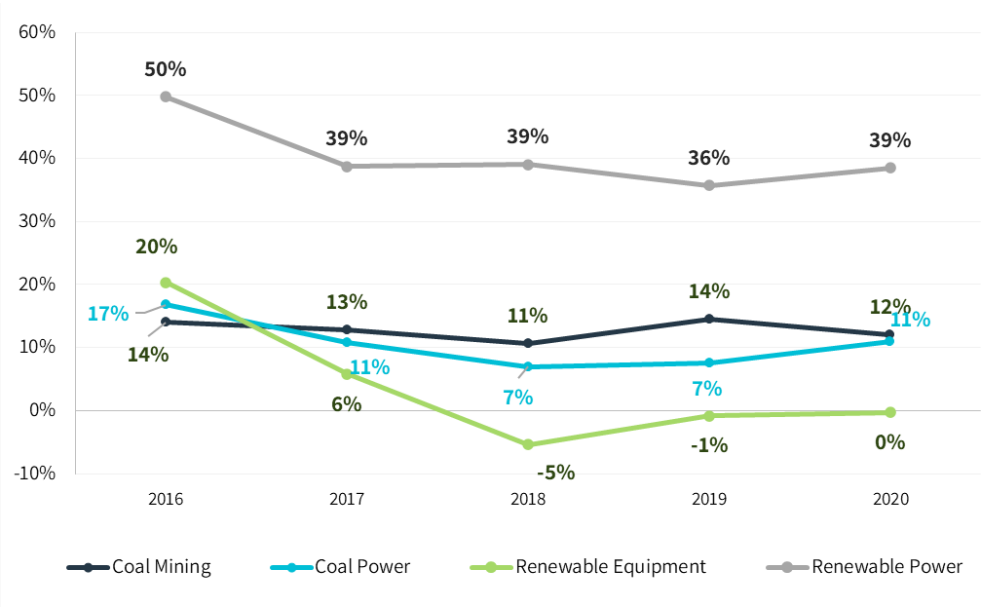
Figure 94 Historical development of operating margins



Source: Refinitiv Eikon (viewed in July 2021)

Among the sub-sectors, renewable power companies had the highest operating margins with a five-year average of 40%, while coal mining and coal power had average operating margins of 13% and 11%, respectively. Renewable equipment had the lowest operating margins at 4% on average.

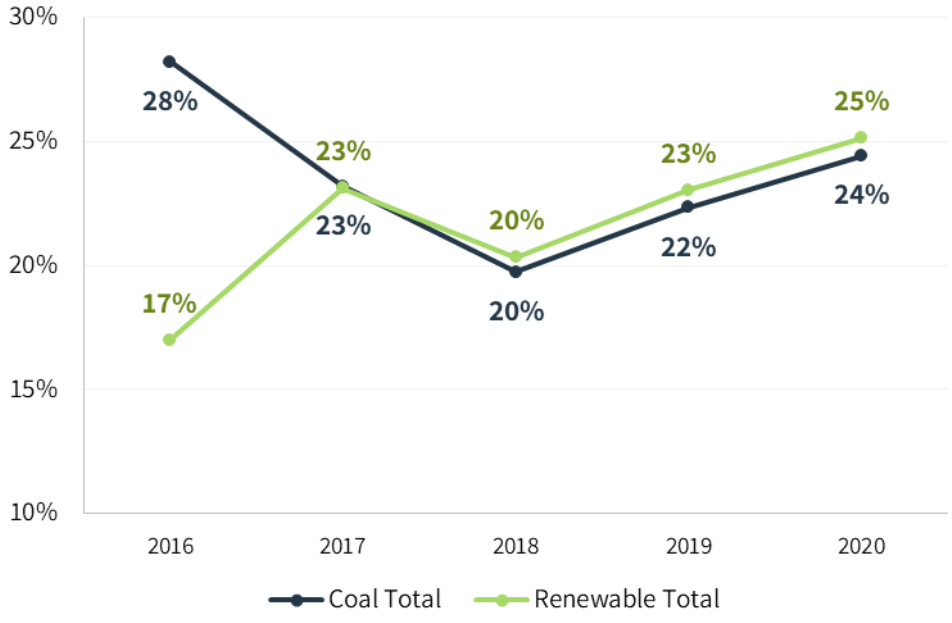
Figure 95 Development of operating margins in sub-sectors



Source: Refinitiv Eikon (viewed in July 2021)

4.3.3 EBITDA Margins: Renewables Showed More Improvement Than Coal

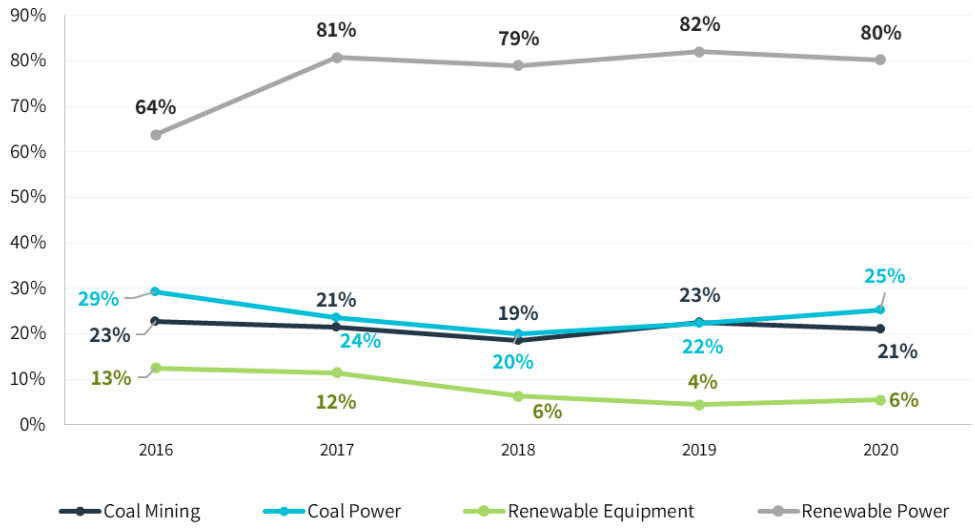
Figure 96 Historical development of EBITDA margins



Source: Refinitiv Eikon (viewed in July 2021)

While the EBITDA margin developments in the total sector-level results are almost identical (Figure 96), differences between renewable sub-sectors are a different scenario (Figure 97). While renewable power companies recorded 80% average EBITDA margins, equipment providers earned only 8%, much lower than coal companies at 23%, on average.

Figure 97 Development of EBITDA margins in sub-sectors

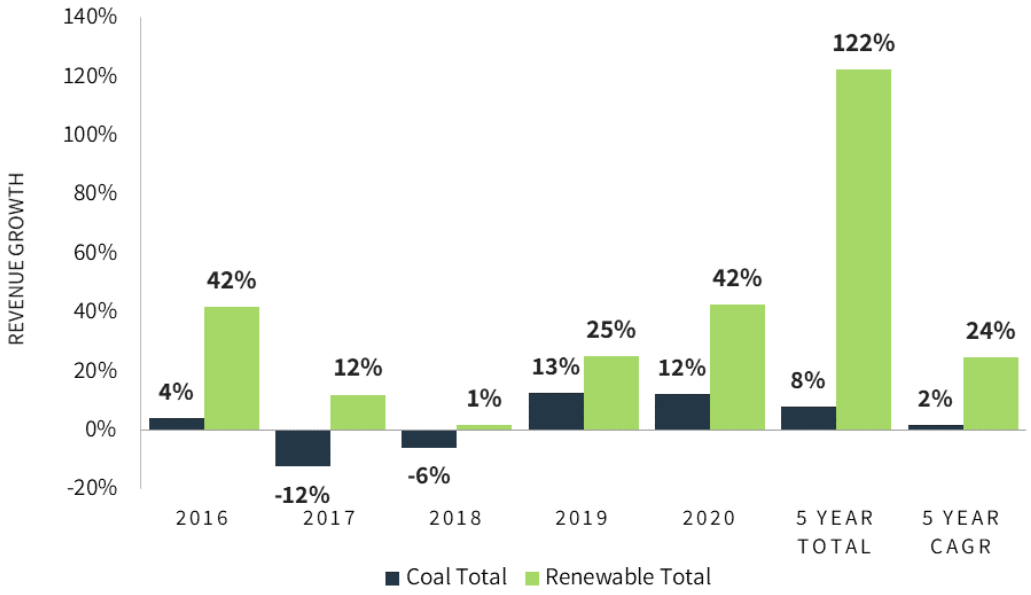


Source: Refinitiv Eikon (viewed in July 2021)

4.3.4 EBITDA Growth: Renewables Significantly Outpaced Coal

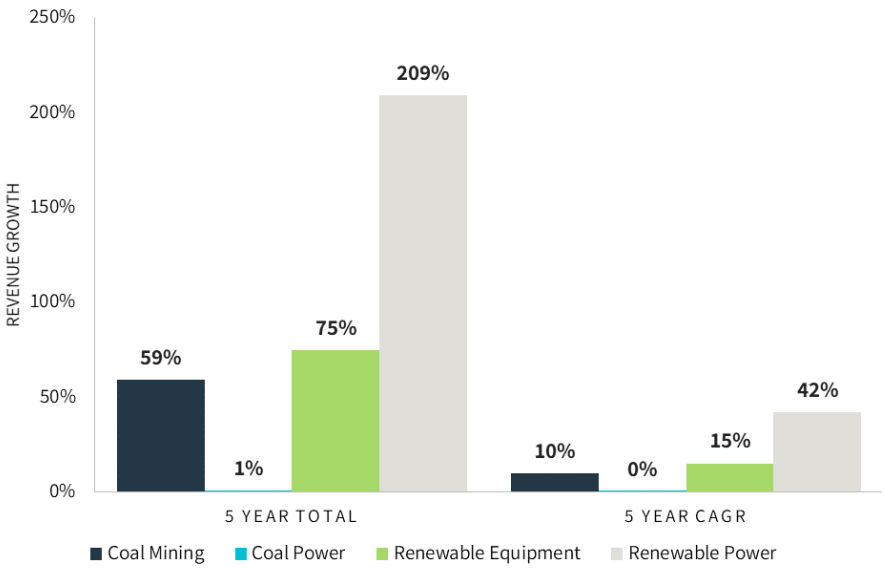
Representing the development of operating cash flow, growth in absolute EBITDA figures shows an increase (or decrease) in a company's cash-generating capabilities. Figure 98 shows that renewable energy companies significantly outperformed coal companies in EBITDA growth, recording 24% CAGR between 2016 and 2020 compared to just 2% for coal companies. In the sub-sectors, coal companies were the worst performing, with no growth over the five-year period while renewable energy companies recorded 209% total EBITDA growth (Figure 99).

Figure 98 Historical EBITDA growth performance



Source: Refinitiv Eikon (viewed in July 2021), renewable total growth figures calculated with revenue weighted adjustment, for renewable energy companies average of annual growth rates used for CAGR

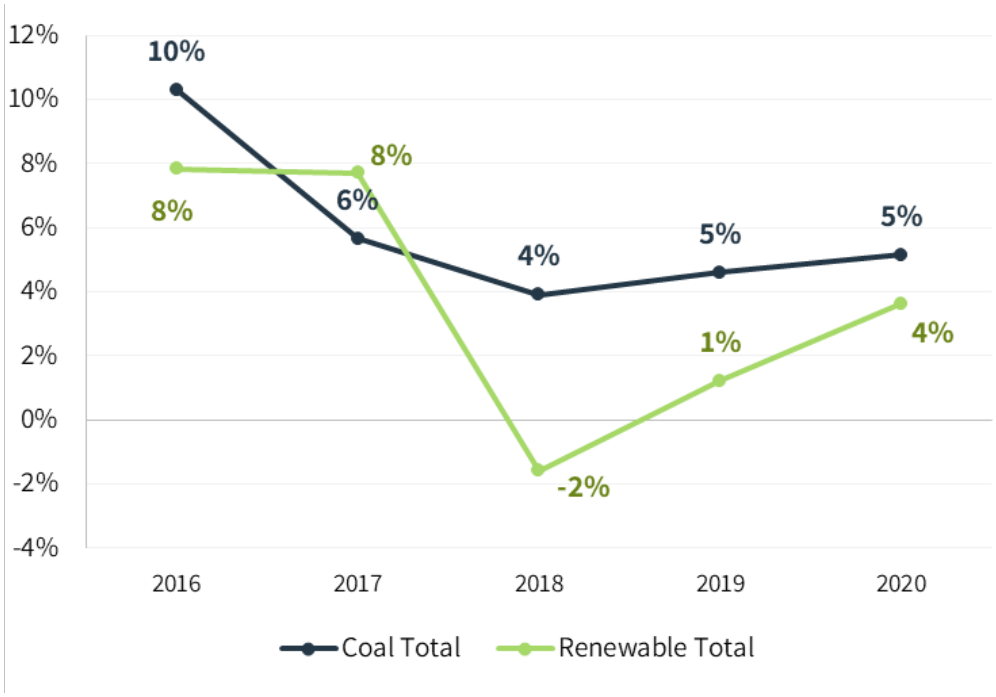
Figure 99 EBITDA growth performance of sub-sectors



Source: Refinitiv Eikon (viewed in July 2021), renewable sub-sectors' growth figures calculated with revenue weighted adjustment; for renewable energy, an average of annual growth rates was used for CAGR.

4.3.5 Net Profit Margins: Renewables Were More Volatile Than Coal

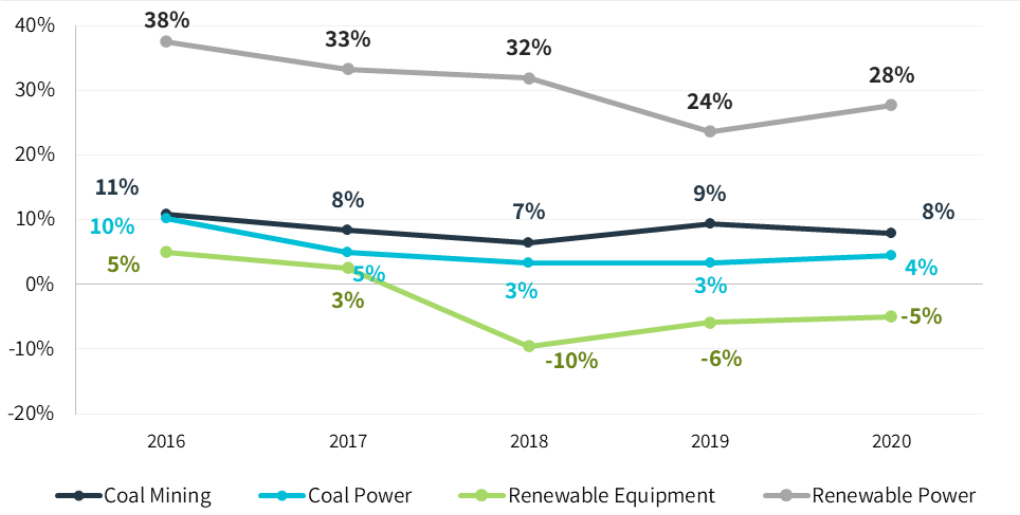
Figure 100 Historical development of net profit margins



Source: Refinitiv Eikon (viewed in July 2021)

Net profit margins for coal-related companies were largely stable, around 5% on average between 2017 and 2020 compared to 10% in 2016 (Figure 100). Among the sub-sectors of renewable energy companies, renewable power generators earned a high 31% net profit margin on average, while renewable equipment providers have recorded losses for the last three years (Figure 101).

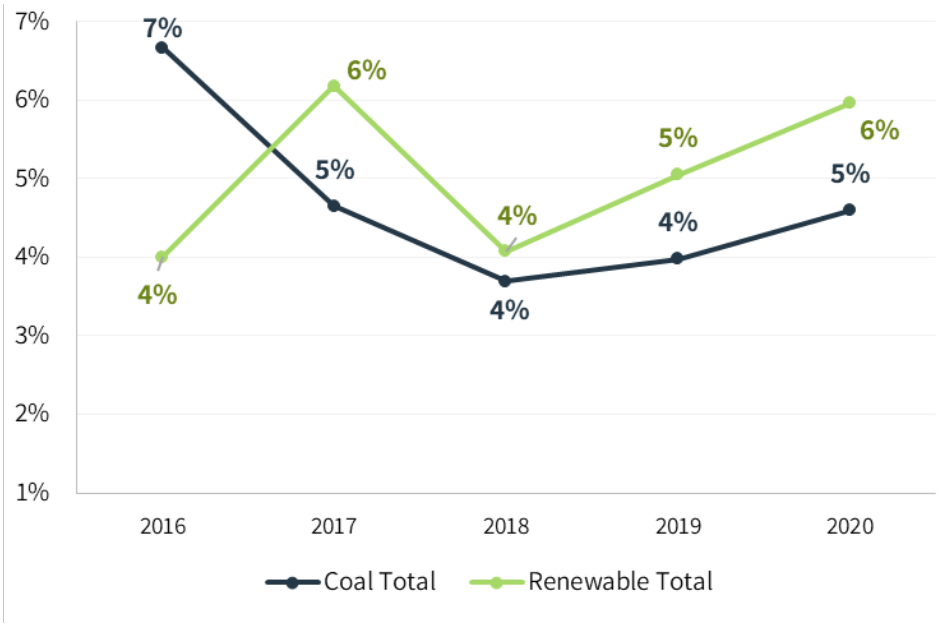
Figure 101 Development of net profit margins of sub-sectors



Source: Refinitiv Eikon (viewed in July 2021)

4.3.6 ROCE: Renewables Gradually Improved Compared to Coal

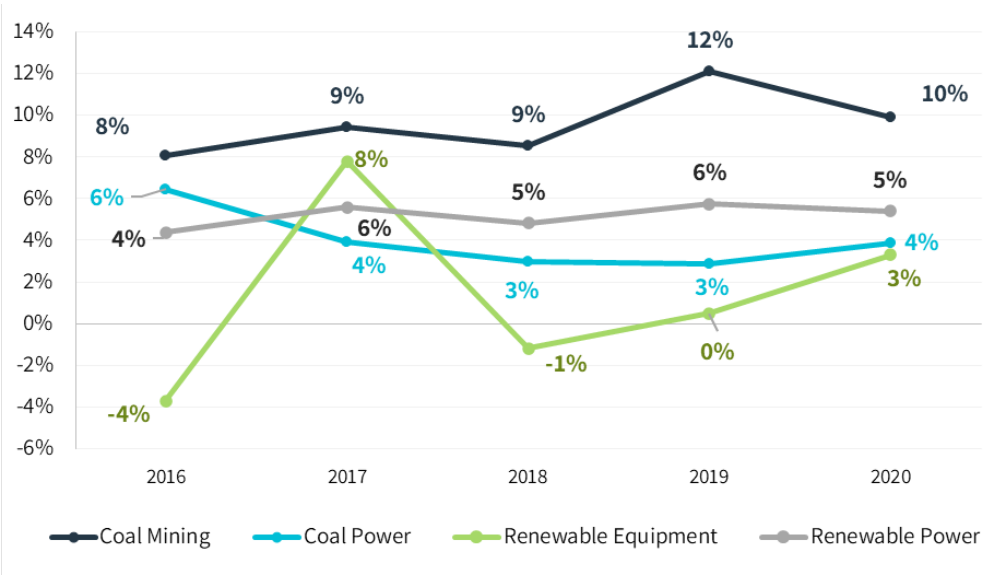
Figure 102 Historical development of ROCE



Source: Refinitiv Eikon (viewed in July 2021)

The ROCE metric is calculated as the ratio of operating profit (EBIT) over long-term liabilities and equity (capital employed). This ratio shows how effectively a company uses the capital it receives. Results for the main coal and renewable sectors were similar at 5% on average over five years (Figure 102). The only sub-sector with relatively higher volatility in ROCE was renewable energy equipment companies (Figure 103).

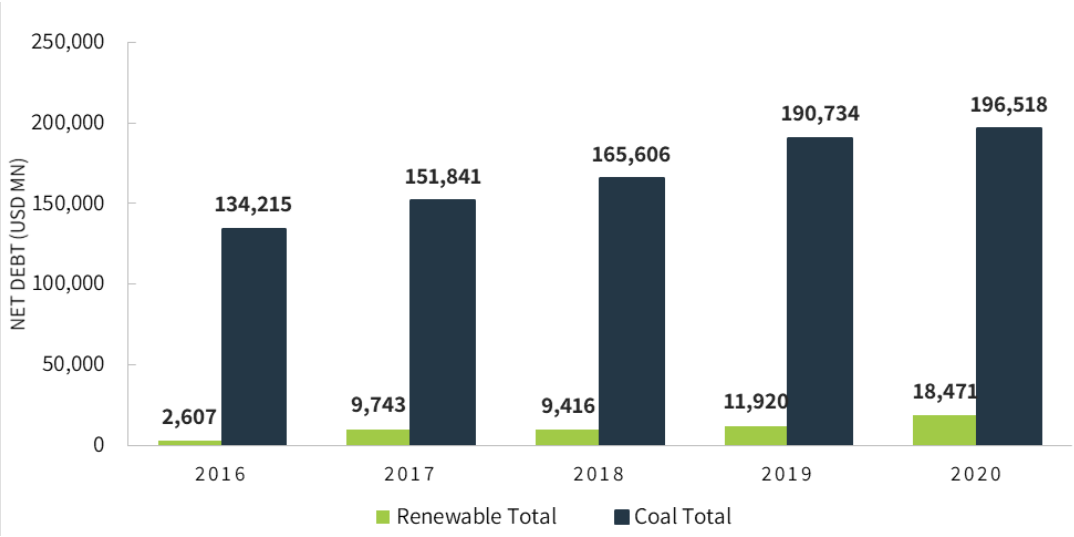
Figure 103 Development of ROCE in sub-sectors



Source: Refinitiv Eikon (viewed in July 2021)

4.4 DEBT AND RATIOS: ABSOLUTE DEBT WAS HIGHER FOR COAL, BUT LOWER IN RELATIVE TERMS

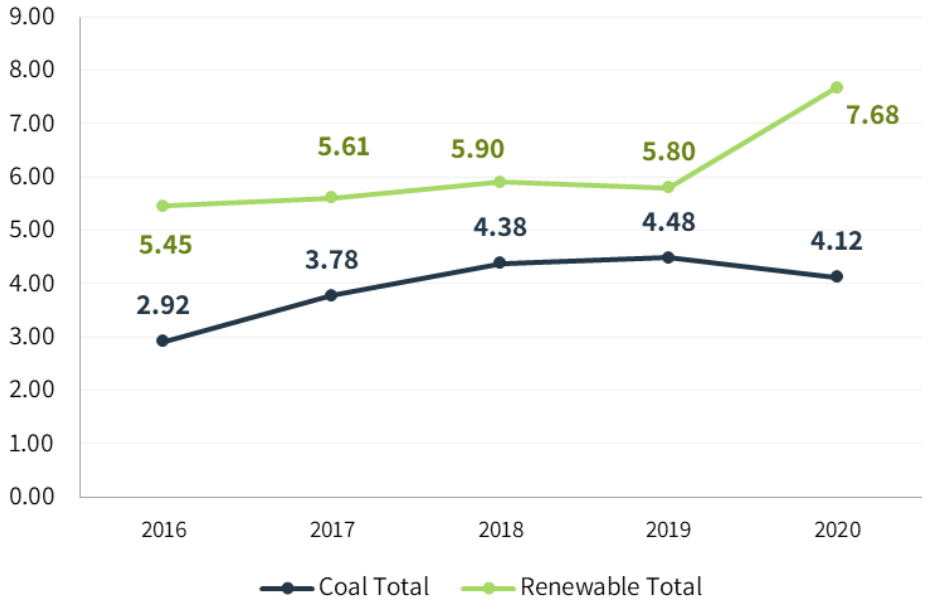
Figure 104 Development of net debt



Source: Refinitiv Eikon (viewed in July 2021)

The indebtedness of selected companies trended upwards between 2016 and 2020 (Figure 104) as the net debt/EBITDA ratio increased from 5.5 times to 7.7 times for renewables and from 2.9 times to 4.1 times for coal companies (Figure 105).

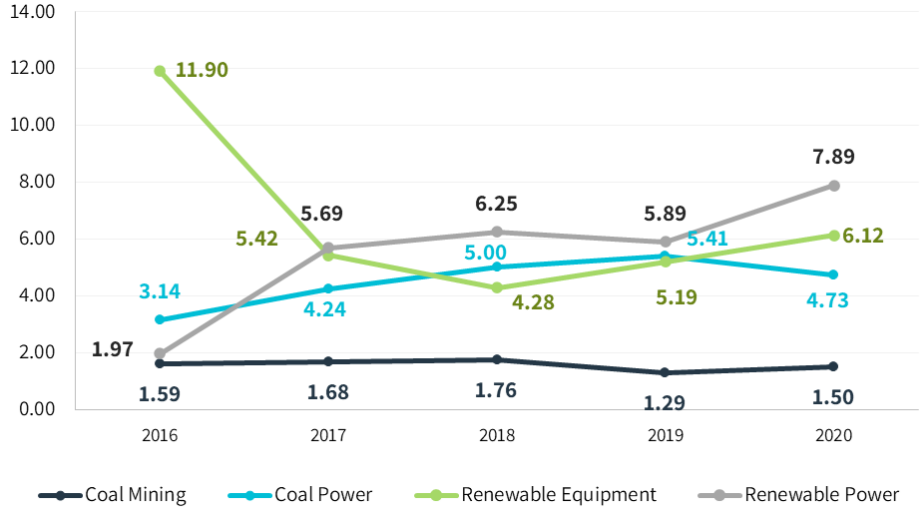
Figure 105 Historical development of net debt/EBITDA



Source: Refinitiv Eikon (viewed in July 2021)

Results from the sub-sectors show a more stable and lower net debt for coal mining companies (Figure 106) at around 1.5 times EBITDA. Debt was higher for coal power companies at 4.8 times, for renewable equipment at 5.3 times and for renewable power at 6.4 times, on average.

Figure 106 Net debt/EBITDA in sub-sectors

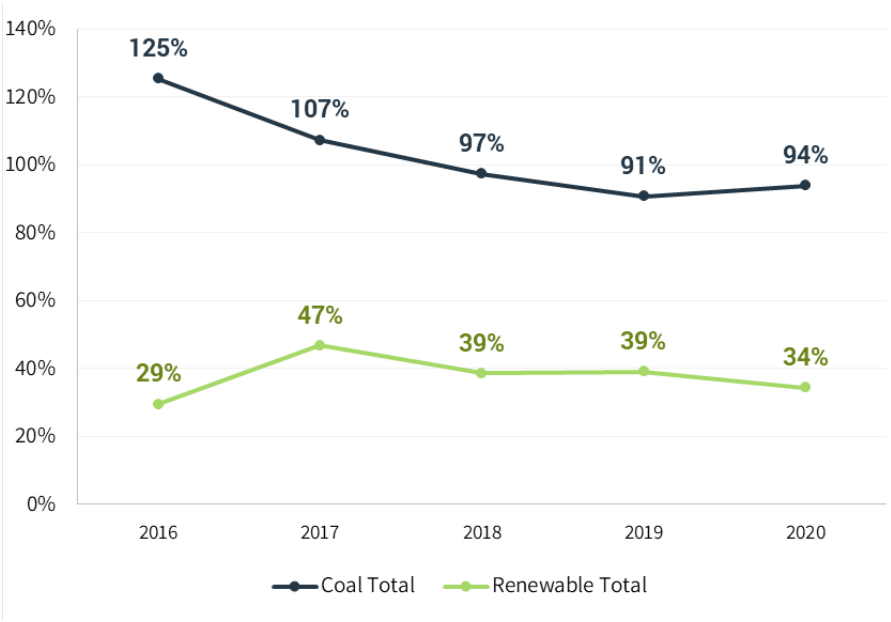


Source: Refinitiv Eikon (viewed in July 2021)

4.4.1 Debt Service Ratio: Still Better Coverage for Coal, But Declining

The debt service ratio is calculated as the operating cash profit (i.e., EBITDA) divided by the total interest and principal debt repayments for the same period. Figure 107 suggests that, on average, coal companies generated enough EBITDA to cover 100% of their financial costs while for renewables the ratio was 38% on average.

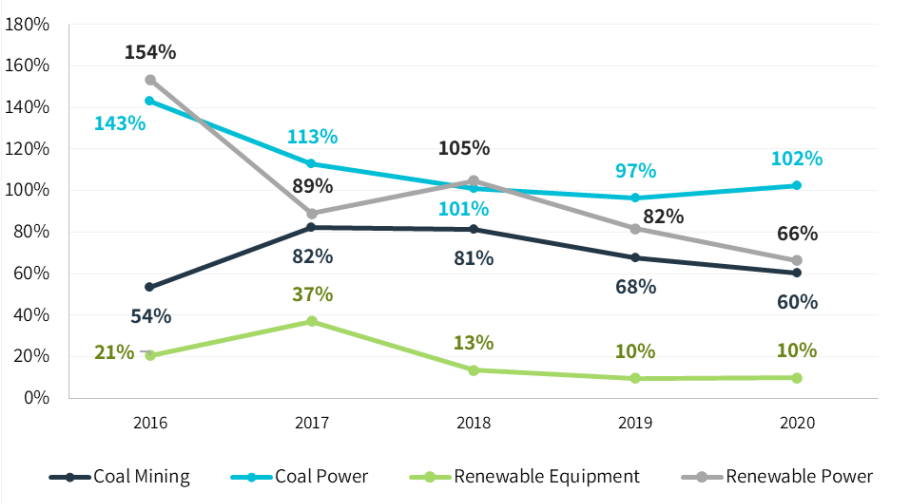
Figure 107 Historical development of EBITDA/debt service



Source: Refinitiv Eikon (viewed in July 2021)

Again, results from the sub-sectors show that renewable energy equipment companies pulled the total renewable sector results down as the average debt service for equipment companies stood at 18% compared to 100% for renewable power companies (Figure 108).

Figure 108 Development of EBITDA/debt service in sub-sectors

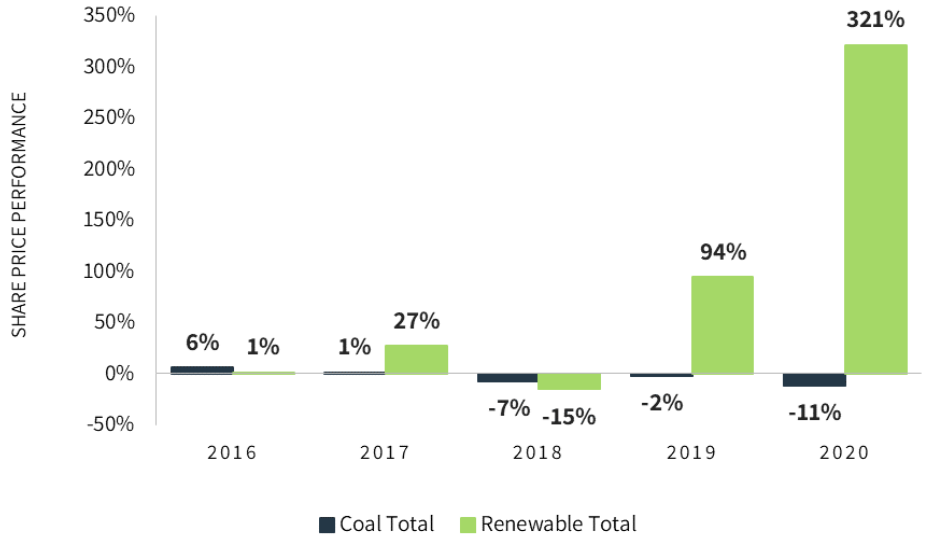


Source: Refinitiv Eikon (viewed in July 2021)

4.4.2 Market Valuation Development: Renewables Strongly Outperformed Coal

The share price performance, an indicator of future expectations of a company or sector, clearly shows renewable energy stocks outperforming coal stocks (Figure 109). Performance results were calculated using the annual total stock returns (share price movement plus dividends) of individual stocks, weighted based on market capitalization.

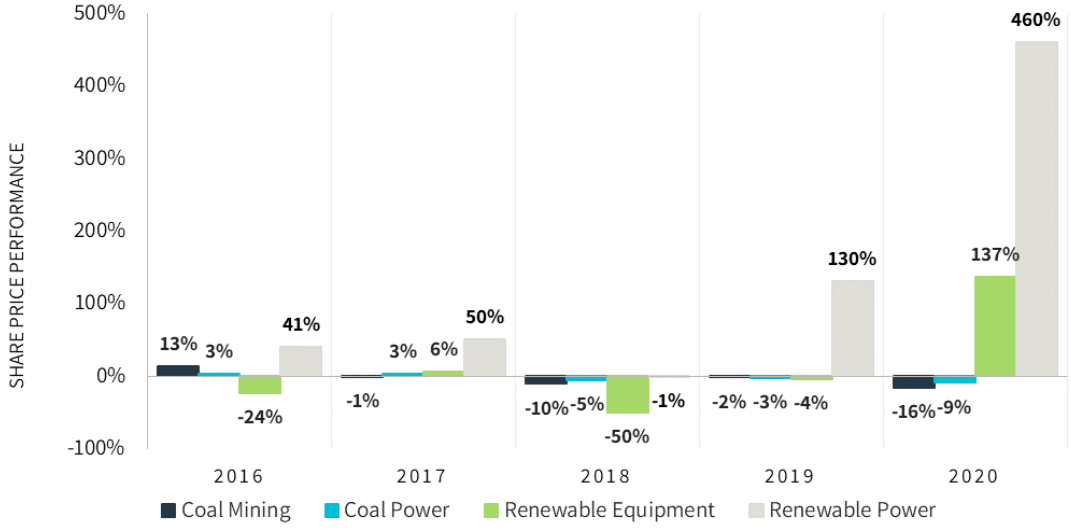
Figure 109 Historical share price performance



Source: Refinitiv Eikon (viewed in July 2021), all annual share price performances are weighted based on market capitalization

For the sub-sectors, renewable power companies outperformed all others throughout the analysis period (Figure 110) while renewable energy equipment stocks underperformed coal companies until 2020.

Figure 110 Share price performance of sub-sectors



Source: Refinitiv Eikon (viewed in July 2021), all annual share price performances are weighted based on market capitalization

4.4.3 Conclusion: Renewables Increasingly Outperformed Coal

Our analysis of trends between 2016 and 2020 reached the following conclusions:

Revenue growth	Renewables outpaced coal (11% CAGR vs 3%).
Gross profit margins	Renewables were consistently higher than coal.
Operating margins	Renewables were more volatile than coal.
EBITDA margin	Renewables improved more than coal.
Absolute EBITDA growth	Renewables significantly outpaced coal (24% CAGR vs 2%).
Net profit margins	Renewables were more volatile than coal, but nearly the same level.
ROCE	Renewables gradually improved compared to coal, and in 2017–2020 improved slightly more than coal.
Debt and ratios	Coal had higher absolute debt, but it was lower in relative terms. The debt service ratio of coal was still better, but gradually deteriorated.
Market valuation	Renewables strongly outperformed coal.

Between 2016 and 2020, renewables outpaced coal in revenue growth, EBITDA growth, ROCE and value growth. The question is whether this will continue.

4.5 ANALYSIS OF RISKS AND OPPORTUNITIES IN A 1.5ºC SCENARIO

From 2016 to 2020, the selected renewable companies financially outperformed the selected coal-related companies (see Table 4). This part of the chapter analyzes a 1.5ºC scenario based on net-zero emissions by 2050 for both coal- and renewable-related companies. South Korea, Japan and Hong Kong have committed to net zero by 2050 and China by 2060. It is anticipated that other countries in Asia will follow suit.

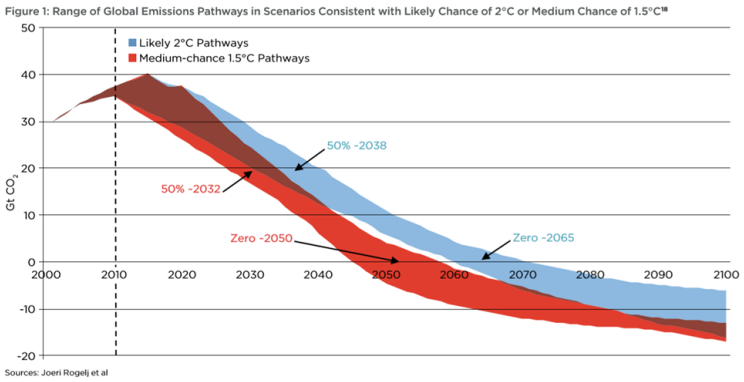
This analysis includes:

- Stranded assets;
- Differences in interest rates for coal- and renewable-related financing;
- Reputation risk and its value; and
- Market growth of renewables.

4.6 THE 1.5ºC SCENARIO: A NEW WORLD WITH AN INEVITABLE POLICY RESPONSE

At the Paris climate conference in 2015 (Conference of the Parties, or COP21), governments agreed to limit global temperature increase to well below 2ºC and to pursue efforts to limit temperature rise to 1.5ºC compared to pre-industrial levels (Figure 111).

Figure 111 Zero emissions pathways for 1.5ºC and 2ºC



Source: Oil Change International[201]

More than 80% of known oil reserves need to remain in the ground. According to a 2015 study in Nature, an estimated one-third of oil reserves, half of gas reserves and more than 80% of known coal reserves should remain untouched to meet global temperature targets under the Paris Agreement.[202] Since coal has much higher emissions than oil and gas, coal companies will be much more affected.

NDCs will lead to national governments requiring all relevant industries to reduce emissions. The fossil fuel sector will be affected from two sides. First, the industry will need to reduce emissions in both its processes (Scope 1 and 2) and supply chain (Scope 3). Second, the fossil fuel industry will be confronted with declining demand and supply-side regulation.

The turnover and earnings of fossil fuel industries will be affected. Declining demand for fossil fuels will impact volume while global supply adjustments might negatively impact the price of fossil fuels. It is important for countries to shift from fossil fuels to renewables in tandem with increasing the supply of renewables. Otherwise, supply might exceed demand if countries that depend on fossil fuel are slow to make adjustments. Therefore, both volumes and prices could be impacted negatively in a 1.5ºC scenario. The impact would be greater than in a 2ºC scenario and, of course, much greater than in a business-as-usual (BAU) scenario. Coal companies would likely be more affected than oil and gas companies since demand for coal as a heating and electricity source would first be replaced by natural gas. UNEP states[203] that *"between 2020 and 2030, global coal, oil, and gas production would have to decline annually by 11%, 4%, and 3%, respectively, to be consistent with a 1.5ºC pathway."*

Due to Paris 2015 commitments, countries and companies will face a material challenge to reduce emissions by 2030. Stronger regulation, particularly in the EU, is around the corner. Targets for the 2015 Paris agreements on climate change have been set to reduce GHG emissions and achieve zero emissions. Regions and countries have defined their own NDCs, and the EU has already raised the bar by committing to reduce GHG emissions by 55% by 2030 and be climate neutral by 2050.[204] South Korea, Japan and Hong Kong have all committed to net-zero emissions by 2050 and China by 2060.

Countries will be confronted with questions on their progress – from civil society through court cases and from political parties, new international climate conferences and growing public pressure as extreme weather events become more frequent and severe. Therefore, there is a high chance that countries will need to introduce policy responses to curb emissions, perhaps by 2025. The Principles for Responsible Investment (PRI) network calls this the Inevitable Policy Response (IPR),[205] the consequence of which is that many countries, and the companies active in these countries, will need to adjust more than anticipated.

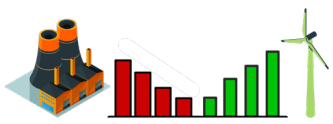
4.7 STRANDED ASSETS: MATERIAL IN COAL AND FUELED BY TRANSITION

In recent years, fossil fuel producers have written down their assets by billions of dollars. This was accelerated during the COVID-19 pandemic. At the start of the pandemic, oil and gas producers Shell and BP announced they would write down their assets by USD 22 billion and USD 17.5 billion, respectively. Both companies said the accounting moves were a response not only to the coronavirus-driven recession, but also to global efforts to tackle climate change. BP admitted it may never develop some of its prospective projects.[206] A write-down or impairment is generally triggered by lower fossil fuel prices and a belief that demand will not be as high as the company had previously assumed. At the end of 2020, Shell had raised its non-cash impairment charge to USD 28.1 billion.[207]

With coal, South32 has warned of a USD 728 million pre-tax impairment charge for coal operations for financial year 2021, following a review of the asset's carrying value.[208] Sembcorp Industries, which is active in China's coal power plant supply chain, faced a USD 212 million impairment.[209] In 2020, Peabody had to announce a USD 1.4 billion write-down on coal assets.[210] In 2019, Endesa (Spain) announced a EUR 1.4 billion impairment on a coal import plant.[211]

Stranded assets will affect the balance sheets and results of coal-related companies. Carbon Tracker Initiative (CTI) has calculated how the investment plans of many fossil fuel companies could be affected by various scenarios, from 1.6ºC to 1.8ºC to BAU. These to-be-developed mines/fields are already partially valued in the balance sheet item property, plant and equipment (PPE) or in intangible assets. Exploration costs (costs invested to find fossil fuel before it is extracted), which are relatively high, are capitalized in PPE or intangible assets. This means that the costs of a "successful" search are not booked directly as costs in the profit & loss (P&L) account but rather on the balance sheet.

These assets are then depreciated annually in line with production from the mine/field. However, some of the to-be-developed mines/fields will not come into production in a 1.5ºC scenario, and that portion of PPE/intangible assets will need to be written off as a stranded asset. These mines/fields also impact the future income stream and profit of reserves and, therefore, the discounted cash flows (DCF). Consequently, the ability to pay back and refinance debt will be affected, as well as the equity value.



In 2021, the CTI released a study concluding that 27% of global coal plants would be unprofitable as renewables become more cost competitive.[212]

According to the CTI, progress in cutting coal generation further this decade to limit global temperature rise depends almost entirely on developments in the regulated markets of Asia, especially China, India and the ASEAN nations, which account for around 75% of global coal capacity and 80% of new projects. Based on current pollution regulation and climate policies,

66% of coal capacity will be unprofitable in 2040. In a beyond 2ºC scenario (very similar to a 1.5ºC scenario), the CTI estimates that USD 220 billion of operating coal assets would be stranded compared to a BAU scenario. The CTI calculates negative Net Present Values (NPV) for 100% of coal power plant projects in Japan and Vietnam, 89% in Indonesia and 93% in India. This might lead to stranding of assets. In China, a negative NPV does not always lead to stranded assets due to financial aid from government.

Rising carbon costs accelerate the transition and stranding of assets. Renewables will make strong gains from changing market conditions, subsidies and rising carbon costs.

While many investment decisions are still made without consideration for rising carbon costs, a 1.5ºC policy scenario will include rising carbon costs to 2050. Coal-related activities will be particularly affected due to their high carbon intensity. Rising carbon costs will not hurt renewable-related activities. Turnover of these companies will benefit from rising demand for renewable energy and likely more subsidy support regulation. Moreover, as mentioned in the previous paragraph, the cost price of renewable technologies is declining.

The IEA is projecting that renewable power capacity will expand by 50% between 2019 and 2024, led by solar photovoltaic (PV). Falling costs and more effective policies are driving a significant upward revision in the forecast for renewable capacity deployment. China will be strong in solar PV market growth, Japan will remain a strong market and India and Korea will drive capacity growth in Asia.

Total biofuel output is forecast to increase 25% by 2024. In 2018, production grew at its fastest pace in five years, propelled by a surge in Brazil's ethanol output. Overall, Asia accounts for half of the growth, as ambitious biofuel mandates to reinforce energy security have boosted demand for agricultural commodities and improved air quality.[213] It should be noted that biofuels could come at a high cost for local communities, as land rights and food security could be threatened by expanding palm oil and sugar cane plantations.

Allied Market Research projects a 6.1% CAGR in the global renewable energy market from 2018 to 2025, from USD 928 billion to USD 1.5 trillion. Growth will be strong in Asia, (particularly China and India) due to population growth, industrialization and favorable policies for renewable energy.[214]

The financial impact of stranded assets and transition to renewables in a 1.5ºC environment will be felt in revenues, cash flow, market capitalization and debt service capacity. In Table 5, the stranded asset risk estimated by the CTI[215] is a starting point. For KEPCO (South Korea) and NTPC (India), the respective USD 38 billion and USD 23 billion stranded asset risk in a 1.5ºC scenario are 322% and 183% of the average 2020 market capitalization value, respectively. To calculate a stranded asset number for the entire group (the CTI does not provide data for the other selected companies in Table 4), the revenue value of the two companies is used. Given that these two companies generate 35% of the revenues of the selected group, the stranded assets for the entire selection group (coal-related) are estimated at USD 175 billion.

Table 5 Stranded asset estimates

USD billion	Korea Electric Power Corporation (KEPCO)	NTPC (India)	Sub-total	Total group
% of South Korean investment in India's power generation	93%	25%		
Analyzed existing coal capacity (GW)	35.02	48.46		
% of total capacity	46%	79%		
Stranded asset risk (USD billion)	38.4	23.38	61.78	175.88
% of market capitalization	322%	183%		
Market value in 2020	11.9	12.8		
Revenue as % of total group	27.7%	7.4%	35.1%	100.0%

Source: Profundo, Carbon Tracker Initiative (CTI), Eikon

4.8 RISING FINANCING COSTS FOR COAL VERSUS RENEWABLES: A GLOBAL RISK, NOT ONLY FOR THE EU

Global financiers and regulators are increasingly aware of the risk of their fossil fuel investments. Divestments and engagement are becoming more common. Banks, investors, central banks and other regulatory authorities are becoming more vocal and critical about fossil fuel investments. A growing number of institutions are required to estimate the physical risk of climate change on their assets, as well as their transition risk. This occurs in the context of recommendations by the Taskforce on Climate-related Financial Disclosures (TCFD) and regulations in the EU, Switzerland, Hong Kong and US. Financiers are also facing reputational risk as their links to the fossil fuel industry become more transparent.[216]

One example of change is Aviva Investors. This institutional investor contacted 30 of the largest oil, gas and coal companies and indicated they would divest if they did not start setting credible net-zero transition plans. Aviva might divest from both stocks and bonds. Bonds have become an important financing instrument in recent years[217] due in part to their high yield for private investors.

Since early March 2020, European investors and asset managers have been feeling the pressure of the Sustainable Financing Disclosure Regulation (SFDR),[218] which is having a material impact on institutional investors like pension funds. As the sustainability impact of their investments becomes more transparent, their portfolios are subjected to greater scrutiny.

Furthermore, financiers and investors are becoming increasingly convinced by academic research that companies that have chosen to adopt low-emission strategies and pathways are showing better financial performance than those that have not.[219]

Finally, institutional investors are not only changing their investment portfolios, but also their voting behavior at annual general meetings of shareholders.

The EU Green Deal and the EU Taxonomy on sustainable finance will affect the global financing sector and have already led to changes in Asia. It is not only European financial institutions and government entities that will be affected; the EU Taxonomy will also have a ripple effect on sustainable investments in the financial sector in the US and Asia. Regardless of regulatory applicability, non-EU funds may face pressure from EU-based or other ESG-minded investors to disclose the percentage of investments aligned with the EU Taxonomy and, ultimately, to allocate capital to these investments.[220] Other markets, including Canada, Japan, Malaysia, Singapore, ASEAN Member States and the UK, among others, are in different stages of consultation and evaluation to establish their own taxonomies.[221]

China, the People's Bank of China (PBOC) and other Chinese regulators are working on harmonizing taxonomy/regulation to define sustainable financing.[222] The PBOC, China's central bank, has revealed that it is cooperating with the EU to align the two markets' green investment taxonomies, and aims to implement a jointly recognized classification system.[223]

European banks have stated that they welcome efforts to align the EU Taxonomy with existing international standards and frameworks routinely used by banks, including the OECD Guidelines on Multinational Enterprises, the UNGPs and the IFC Performance Standards.[224]

Coal exit lists, climate commitments by financiers and the EU Taxonomy on sustainable finance are all prompting coal-related companies around the world to confront financing risks and higher interest rates. Greater global regulation will likely have a material impact on money flows within certain regions (the EU via its Green Deal regulations) and between regions (increasing number of consultation processes). Additional regulation will require large (EU) companies and financial institutions to classify their activities and investments in line with the EU Taxonomy. A growing number of financial institutions will stop financing fossil fuel-related activities and begin to off-load coal-related assets. This will raise interest rates and the cost of capital for coal companies. The financial risk estimate in Table 6 assumes a 200-basis point interest rate increase applied to the net debt of selected coal-related companies (see Figure 104).

At the same time, the renewable sector will be increasingly supported by government policies and benefit from lower financing costs. While the debt service ratios of coal companies will deteriorate further, those of renewable companies will improve.

Both the investment industry and banks are eager to invest in sustainable activities and are facing growing pressure from their clients. Banks might also be incentivized by lower capital buffer requirements as central banks and supervisors adapt.

Table 6 Financial risk estimate

USD million	Coal-related	Renewable-related
Net debt	196,518	18,471
Change in financing costs (+200bps)	3,930	
Change in financing costs (-200bps)		-369

Source: Profundo, Carbon Tracker Initiative (CTI), Eikon

4.9 REPUTATION RISKS INCREASED FOR COAL WHILE RENEWABLES BENEFITED

The reputations of fossil fuel companies might decline, which could be material as a percentage of their market capitalization. Fossil fuel companies have been grappling with declining reputations as the climate change conversation has intensified. Reputation value has many elements, including financing risk and risk of declining markets. However, a company's reputation as an employer can also have a negative impact on its value, as can an attitude that consistently underestimates the effects of its business on the climate and biodiversity.

Reputation value can be affected strongly (-29%) by poor execution, while good execution might add 20% to a company's value. A 2018 study by Pentland Analytics and AON focused on reputation risk in the cyber age.[225] The research looked at the development of the reputation premium, which is defined as the difference between market capitalization and net asset value (including intangibles like goodwill). The study included 125 events between 2008 and 2018, and their impact on share price in each of those years. These events included mass fatality events, poor governance and business practices, product and service failures, cyberattacks, accounting irregularities and marketing and communication blunders. On average, 5% of shareholder value was lost in the year following the event, and a major part in the first five trading days after the event. A company's equity beta (measure of volatility) was 9% higher than the previous year, which had a direct impact on the company's cost of capital. A DCF model showed a 9% increase in equity beta would impact the cost of capital by three percentage points, which could reduce enterprise value by 3%.

The 5% loss in shareholder value, however, masks a significant difference between "winners" and "losers". Approximately half of the companies dealing with a reputation event experienced an initial value dip, but then watched their value continue to grow. The other half saw a faster decline in their value. The study found that the main differences between these two groups were:

- Crisis communications, which must be instant and global to spur a recovery in value; and
- Active social responsibility, which is critical to a response that creates value.

The gap between winners and losers was significant and continued to widen over the first year. After one year, the winners gained 20% in value while the losers lost nearly 30%. Researchers compared the data from the 2018 study with data from an earlier study conducted in 2000. The impact on shareholder value in 2018 was much greater for both winners and losers (see Table 7). The wider gap in 2018 could stem from the greater connectivity seen today with social media.

Table 7 Reputation risk in the cyber age: impact on shareholder value after one year

Value impact	Average	Winners	Losers
Group 2018	-5%	20%	-29%
Group 2000	-4%	10%	-17%
Group total	-5%	15%	-23%
Impact on beta:			
Group total	9%	6%	12%

Source: Profundo Equity Research

Another finding was that equity beta increased from 2000 to 2018 for both winners (+6%) and losers (+12%), although the losers saw a much bigger increase. Over the long term, this has a much greater impact on market capitalization. A 12% impact on the beta has a -4% impact on enterprise value. The winners, who were also hurt by a reputation event, faced a 6% increase of the beta and a -2% impact on their enterprise value. No definitive explanation was given for why the winners gained more from reputation events in 2018 than in 2000. However, one reason could be that they had better marketing strategies in place and may have even used social media to show how they reacted positively to damaging events.

Coal shareholders feel the loss of reputation value. Coal-related companies face a clear reputation risk as long as they continue to invest in the same core activities and forego the opportunity to invest proactively in renewable-related activities. This could lead to an estimated USD 27.3 billion in reputation value loss (Table 8). This loss will be felt by shareholders, but the impact on bonds and loans will be relatively limited. Meanwhile, renewable-related companies and shares might benefit from a reputation gain worth USD 3.9 billion.

Conclusion: Shareholders of coal-related companies that exit from coal and move into renewables might benefit from a nearly 70% higher reputation value than companies that stick with a stubborn coal strategy. While a passive strategy with continued coal investments might reduce a company's reputation value by 29%, a proactive transition strategy to renewable energy might lead to a 20% reputation gain. The upside of an index of 71 (-29%) to 120 (+20%) is a massive 69%.

Table 8 Reputation risk estimate

USD million	Coal-related	Renewable-related
Market value	94,034	19,502
Reputation risk -29%	-27,270	
Reputation opportunity +20%		3,900

Source: Profundo, Carbon Tracker Initiative (CTI), Eikon

4.10 THE TOTAL FINANCIAL IMPACT OF A 1.5ºC SCENARIO

The choice between financing coal-related companies or renewable energy sector companies will have an impact on the profits and balance sheets of banks and the value of investment funds.

In a 1.5ºC scenario, the equity value of coal-related assets might vanish, hurting investors. Net debt might need to be written down by three-quarters, which would negatively impact the loans of banks and bonds owned by investors.

The conclusions reached in section 4.4.3 take on a new dimension under a 1.5ºC scenario. While the same trends might continue under a BAU scenario, a 1.5ºC scenario with a) stranded assets, b) higher financing costs and c) risk to reputation value, will accelerate the negative impact on coal-related assets. Renewables will benefit even more.

Expected trends in 2021–2030 and to 2050:

Revenue growth	Renewables will continue to outpace coal and this trend might become even more pronounced. ✳ 2016–2020 trend: Renewables outpaced coal with a CAGR of 11% vs 3%.
Gross profit margins	Renewables might outperform coal by much more. ✳ 2016–2020 trend: Renewables were consistently higher than coal.
Operating margins	Coal margins will decline in coming years. ✳ 2016–2020 trend: Renewables were more volatile than coal.
EBITDA margin	Renewables will become the winners. ✳ 2016–2020 trend: Renewables improved compared to coal.
Absolute EBITDA growth	Coal-related EBITDA growth will likely continue to become negative. ✳ 2016–2020 trend: Renewables significantly outpaced coal with a CAGR of 24% vs 2%.
Net profit margins	Renewables might become more profitable while coal margins might become negative. ✳ 2016–2020 trend: Renewables were more volatile than coal but were at nearly the same level.
Return on capital employed (ROCE)	Return on capital employed (ROCE): Renewables will gradually improve and might become consistently higher than coal. ✳ 2017–2020 trend: Renewables were slightly higher than coal.
Debt and debt service	This will become more problematic for coal. Due to stranded assets and higher financing costs, coal-related debt might need to be restructured as debt service ratios become problematic with declining revenues and EBITDA. The debt service ratio of coal is still better than renewables, but it is gradually deteriorating. ✳ 2016–2020 trend: Coal had higher absolute debt but lower debt in relative terms.
Market valuation	Renewables will likely continue to strongly outperform coal due to much stronger revenue, EBITDA growth and net profit growth, as well as lower financing costs and reputation gains.

These outcomes are based on the total financial impact of stranded assets, financing costs and reputation value changes. In a 1.5ºC scenario, the total financial risk of coal-related assets is 258% of market value (basis 2020), which means that not only can a company's total equity value be lost, but a large part of net debt (76%) would need to be written down (Table 9).

This contrasts with renewables, which offer a brighter future for financiers. Note that the 39% gain in market value only represents the DCF value of lower financing costs and reputation value gain, and does not include strong market growth. Market growth dynamics might generate CAGR of at least 10% per year.

Table 9 Summary of the financial impacts of a 1.5ºC scenario

USD million	Coal-related	Renewable-related
Stranded asset risk	-175,880	
Financing risk – DCF value	-39,304	3,694
Reputation risk	-27,270	3,900
Total risk/opportunity	-242,453	7,595
Market value	94,034	19,502
Net debt	196,518	18,471
Enterprise value	290,552	37,974
Total risk/opportunity as a percentage of:		
Market value	-258%	39%
Enterprise value	-83%	20%
Debt at risk	-76%	0%

Source: Profundo, Eikon; DCF of annual financing costs based on 7% WACC (weighted average cost of capital) rate, leading to a multiple of 10 times the financing risk calculated earlier.

A 1.5ºC scenario could have the following impacts on coal-related financing and financiers:

Lower value shareholdings and even a complete reduction to zero: Institutional investors will be most affected as banks often hold no shares.

Debt might need to be restructured, leading to lower bond and loan values: This is due to a higher risk of default on debt payments. Lower bond values will affect institutional investors, while lower loan values will hurt banks.

Meanwhile, financiers of renewables-related activities might face:

Higher value shareholdings: Institutional investors will be the main beneficiaries, as banks often hold no shares.

Lower debt interest rates: The value of existing bonds in renewables companies will increase, while new bonds from renewable-related companies and new loans to the industry will have lower interest rates. Risks of default will decline.

4.11 CONCLUSIONS: THE IMPACT OF A 1.5ºC SCENARIO ON COAL FINANCING

In a 1.5ºC scenario, investors in coal-related assets might see a significant decline in the value of their shareholdings and a major write-down of their bond values. Banks might see loan values written down by three-quarters. Meanwhile, shareholdings in renewable-related assets might benefit from value growth and have a much lower default risk than the debt of coal-related companies.

5 Recommendations

The energy transition in Asia from coal to renewables is imperative and inevitable. Finance has an important role to play in catalyzing the transition. Based on the findings of this study, we have developed a set of recommendations for financial institutions, Asian governments and CSOs to motivate the financial sector to facilitate and finance the energy transition and ensure it is a just transition.

5.1 Recommendations for CSOs

- CSOs should engage with financial institutions and governments through all available avenues of influence to ensure they implement the recommendations listed here.
- CSOs should actively engage in the key processes of financial institutions, such as providing evidence-based inputs at annual general meetings and taking advantage of opportunities to comment on policies of financial institutions.
- CSOs should engage with multilateral financial institutions (MFIs) to influence their environmental and social policies, as MFIs have the potential to shape both country-level policies and those of national financial institutions.
- CSOs should build their capacity to track how new climate monitoring tools are being used in the financial sector and to respond to claims made by financial institutions about their Paris alignment.
- CSOs should concentrate on monitoring the climate impacts of sectors responsible for the bulk of global GHG emissions (fossil fuels, agriculture and forestry). A focus on measurable, non-Paris-aligned corporate activities rather than (financed) GHG emissions would be more efficient, easier to communicate and allow CSOs to influence financial institutions more effectively.
- Global civil society must work together to track the cross-border financing of key sectors (fossil fuels, agriculture and forestry) and create platforms for sharing data, knowledge and experiences across the region to uphold the duty of care of financial institutions, for instance, through litigations.
- CSOs should raise more awareness of issues related to the just and sustainable energy transition and educate citizens and consumers about their individual responsibilities.
- CSOs should build their capacity to monitor the policies of financial institutions that affect lending and investment decisions, as the capacity to monitor government regulations and businesses, including financial institutions, is key to meeting timelines and targets for a just transition. The Fair Finance Guide International Methodology (FFGI methodology) is a comprehensive and rigorous assessment tool that CSOs can use.

The capacity to monitor government regulations and businesses, including financial institutions, is key to meeting timelines and targets for a just transition. Although there are regulatory tools that businesses use for reporting climate risk, such as TCFD and PACTA (see Annex 2 for details), they do not always include qualitative, non-financial disclosures. To achieve a just and sustainable transition, it is imperative to look at climate and social risks in tandem.

CSOs have developed and tested tools to make public and private financial institutions more transparent and accountable. The Fair Finance Guide Methodology (FFG methodology) is a comprehensive and rigorous assessment tool that benchmarks financial institutions' approach to sustainability across 23 themes, including climate change, gender equality, human rights and transparency and accountability. CSOs can use the tool for monitoring, but it can also be used by financial institutions to monitor the companies they lend to or invest in and understand ESG materiality, especially in the context of social risks.[i] The data generated by the FFG methodology supports constructive, fact-based dialogue between Fair Finance Asia coalitions and key actors in the financial sector, which in turn contributes to more responsible and sustainable financial policies and practices.

5.2 Recommendations for financial institutions

- Financial institutions should have a clear and detailed strategy to address the climate impacts of the activities and companies they finance and invest in. Financed companies need to be aligned with a 1.5°C scenario based on science-based targets that cover Scope 3 emissions. The climate impact of financial institutions needs to be reduced to zero by 2050 at the latest and halved by 2030 at the latest.

- Leaders of financial institutions should make urgent strategic changes to ensure their loans and underwriting services directly support climate mitigation, environmental resilience and respect for human rights and labor rights in Asia.

- During the lending process, financial institutions should actively engage with potential borrowers to request and obtain all necessary information on the potential negative impacts of their activities on sustainability, and make financing agreements conditional on averting or addressing negative impacts swiftly.

- Financial institutions should ensure their climate strategy is reported transparently and the verification and monitoring of their climate impacts are credible. They should also contribute to the development of climate monitoring tools to support more reliable and robust reporting in the financial sector with greater sector coverage and alignment with a 1.5ºC scenario.

- Since it is not yet mandatory for financial institutions to disclose and audit their GHG emissions, they should voluntarily make their financing, investment portfolios and climate impact assessments more transparent. This would allow auditors, researchers, CSOs, media and other stakeholders to monitor and independently assess the Paris alignment of financial institutions.

- Financial institutions should develop their climate change strategies into sectoral policies and strategies, especially for high-impact sectors like fossil fuel, including the coal industry. Financial institutions should stop funding coal as soon as possible and actively seek opportunities to expand renewable energy generation in Asia.

- Financial institutions should recognize that the transition from coal and other fossil fuels to renewables in Asia needs to be a just transition. Financial institutions should therefore commit to the following principles and demand that the companies they finance and invest in do the same:

	End financing for new coal projects for electricity generation and adopt a phased approach to move away from existing coal-based power generation.
	Ensure that coal is not replaced by other fossil fuels, such as natural gas, and that other fossil fuels are phased out from electricity generation on a publicly disclosed timeline.
	Invest actively in renewable energy generation.
	Engage in long-term planning for the transition and ensure strategies are in place to mitigate any adverse environmental and social impacts of renewables.
	Ensure that land rights and FPIC are respected and there are clear policies to mainstream community participation, gender sensitivity and CSO consultations in the development of large energy projects.
	Protect the rights of workers at project sites and mainstream HRDD as part of the process.
	Safeguard the health and livelihoods of workers and the culture and heritage of communities.
	Ensure the active and meaningful participation of women in the energy transition.
	Invest in access to electricity for all.

5.3 Recommendations for Asian governments and the ASEAN

- Governments need to meet their commitments to the Paris Agreement and the SDGs by developing a strategy for a rapid and just transition of their energy sectors away from fossil fuels and towards renewable energy sources. This transition should be done in a just way, ensuring that workers in the sector are fully supported to shift into alternative decent employment and receive universal social protections.
- Governments of high-income countries need to honor and deliver on their climate finance pledge of USD 100 billion for vulnerable countries.

- Governments should create a level playing field for banks in the form of mandatory regulatory or legally binding minimum requirements to avoid free riders. These need to strengthen banks' ESG risk and impact assessment methods while also defining and promoting lending for socially and environmentally sustainable activities, and phasing out lending that is not aligned with the Paris climate goals and the SDGs. These include mandatory and audited carbon emissions disclosures by companies and the financial institutions that finance them based on the Greenhouse Gas (GHG) Protocol and existing climate-monitoring tools for financial institutions.

- In line with their commitment to make *"finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development"* (Paris Agreement, Article 2.1(c)), governments should establish a financial regulatory framework to incentivize Asian financial institutions to become Paris-aligned and finance a rapid and just transition of their energy sectors away from fossil fuels towards renewable energy sources. This can be achieved, in part, by developing an ambitious energy transition plan; creating a fiscal space by structuring debt relief from foreign creditors; bringing banks together to create consensus on where to invest; and focusing asset purchases on green bonds.

- Governments should invest in infrastructure to transport electricity across their countries. This could make it easier for smaller and start-up companies to invest in renewable energy generation, and it would also increase access to electricity for local communities.

- Governments should put sufficient regulations in place to make sure that all companies, in the energy sector and beyond, live up to the expectations of the UNGPs. These regulations need to be implemented and monitored properly to ensure that companies respect human rights and provide access to remedy.

- A carbon tax can be a useful policy instrument for promoting the transition from fossil fuels to renewables. For a carbon tax to be effective, governments should:

    - be transparent about revenues and expenditures;

    - ensure that the tax influences polluting behavior effectively; and

    - reinvest revenues in improving access to renewable energy for local communities.

- Governments should include climate change in school and university curricula and ensure that academic and professional training on the energy transition is made available.

- Governments should promote and provide financial support for community-led renewable energy projects.

- Governments should provide inclusive and fair compensation schemes for communities negatively impacted by (renewable) energy projects.

- Governments should finance research on what a just energy transition means and how it can be achieved in the Asian context.

- Governments should stimulate renewable innovations that benefit communities, such as solar farming projects.

- Governments should ensure alternative sources of income for communities that depend on coal mining for their livelihoods, and for workers in the coal value chain, through sustainable development, retraining and investments in other sectors.

Annex 1

Methodology

This multidisciplinary study used a variety of methods to analyze and address coal financing in the context of the energy transition in Asia, including financial research, scenario analyses, literature and policy reviews and informant interviews. Here, we outline the central research questions of this study and the methodologies used to answer them.

1. Research questions

A range of research questions were addressed in relation to coal financing and a just and sustainable energy transition in Asia (Table 10).

Table 10 Research questions addressed in this report

Research questions		Chapter
1	What are the critical social and environmental impacts of coal mining and coal-fired power which necessitate a just and sustainable energy transition in Asia?	0
2	What are the trends in thermal coal financing in Asia in the period since the Paris Climate Agreement, from January 2016 to December 2020? Has the Covid crisis had any impact on these financing trends?	0
3	Which Asian financial institutions are active in financing thermal coal in Asia?	
4	What role do non-Asian financial institutions play in financing thermal coal in Asia?	
5	What are the necessary steps which can realistically be taken in the coming years to ensure a just and sustainable energy transition in Asia?	3
6	What are the risks and opportunities for financial institutions to continue financing coal mining and coal-fired power?	4
7	What are the risks and opportunities for financial institutions to shift their financing to renewable energy?	
8	What roles could the main Asian banks play in ensuring a just and sustainable energy transition in Asia?	3
9	What steps are currently being taken, and by which stakeholders, to shift financing to renewable energy in Asia?	
10	What are the obstacles and potential remedies to further shift financing to renewable energy in Asia?	
11	What roles could other actors in the financial sector in Asia (e.g. non-Asian financial institutions, development finance institutions and regulators) play in supporting a just and sustainable energy transition in Asia?	
12	What are the strengths and weaknesses of existing tools to monitor the climate alignment of the financing and investment portfolios of financial institutions?	Annex 2
13	How can civil society monitor and interpret the financing and investments of financial institutions in the energy sector to assess the effectiveness of net-zero strategies and commitments being developed by Asian financial institutions and countries?	

2. Research scope

This study focused on 13 countries in Asia. These include the eight countries where a Fair Finance Asia coalition is currently active, as well as seven other countries that are key to the energy transition in Asia:

- Bangladesh
- Cambodia
- China
- India
- Indonesia
- Japan
- Malaysia
- Pakistan
- Philippines
- Singapore
- South Korea
- Thailand
- Vietnam

3. Research approaches

3.1. Literature review

This study builds on sound research that has been conducted on coal financing and a just energy transition. An in-depth literature review was conducted to answer research questions central to chapters 2, 4, 6 and Annex 2. The types of documents included in the literature reviews included:

- Government publications;
- Reports and studies by NGOs/CSOs;
- Academic articles and journals;
- Research by independent institutes;
- Reports and data by multilateral organizations;
- News articles; and
- Websites of organizations and initiatives.

These documents also include resources recommended by the FFA coalition and by informants. The full list of literature and documents reviewed is included in the References section of this report.

3.2. Informant interviews

To provide a coherent overview of the visions of a just energy transition, the role of the financial sector and key recommendations for financial institutions and policymakers, interviews were conducted with a range of CSOs and representatives of financial institutions and the private sector. The informants were from both industrialized Asian nations and emerging economies across the region. They are quoted anonymously throughout the report. Information provided by the interviewees has been analyzed to identify local insights on the impacts of coal and a just energy transition, the role of financial institutions in the transition and key regional and national policy developments.

The interviews were conducted in a semi-structured format using a list of questions prepared in advance. The following questions were asked to representatives of CSOs:

1. What are the main issues and priorities that your organization is working on in the context of coal mining and coal-fired power plants?
2. What are currently the main policies in your country in relation to coal-fired power?
3. What is your organization's vision of an energy transition by 2030? By 2050?
4. What obstacles and opportunities do you see in realizing this vision?
5. Do you foresee any adverse environmental and social impacts resulting from the shift away from coal and other fossil fuels to renewable energy sources? (e.g., increased demand for certain minerals, pollution caused by infrastructure overhaul, land conflicts related to wind/solar power, working conditions)
6. Which communities will be most likely affected by these impacts and in what ways?
7. How can these impacts be prevented or mitigated?
8. What role do you see for the following stakeholder groups to catalyze this transition?

- Governments;
- Financial institutions;
- Development finance institutions; and
- Civil society organizations.

9. Do you have any additional comments or information that could be relevant to our study?

Interviewees included representatives from the following organizations:

- 350.org – Japan
- Campaign for Public Policy on Mineral Resources (PPM) – Thailand
- Carbon Tracker – United Kingdom
- Center for Energy, Ecology, and Development (CEED) – Philippines
- Centre for Environmental Justice (CEJ) at Friends of the Earth – Sri Lanka
- Climate Action Network Southeast Asia (CANSEA) – Malaysia
- E3G – Japan
- Friends of the Earth – Japan
- Global Energy Monitor – United States
- GreenID – Vietnam
- Greenpeace – Japan
- Institute for Energy Economics and Financial Analysis (IEEFA) – United States
- Japan Center for a Sustainable Environment and Society (JACSES) – Japan
- NN Investment Partners – Netherlands
- SOMO – Netherlands

3.3. Financial research

This part of the research analyzed trends in thermal coal financing in Asia from January 2016, when the Paris Agreement went into effect, to December 2020. It specifically analyzed financing received by all companies on the GCEL active in the 13 focus countries. The GCEL is a powerful information tool that makes all companies operating in the thermal coal value chain visible to the financial sector. It includes companies engaged in coal mining and coal-fired power. The GCEL offers reliable and transparent data that financial institutions can use to phase out coal-based business from their portfolios, and it has been influential in shaping new policies on coal.[226]

The research used financial databases (Refinitiv, Bloomberg, TradeFinanceAnalytics), project finance database IJGlobal, as well as company publications, company registry data and media archives to identify loans and underwriting services provided to the selected companies.

Data was retrieved on investments in the bonds and shares of the companies using Thomson EMAXX, Refinitiv and Bloomberg. Bond-holding data was retrieved for the most recent available holdings at the time of research (July 2021), as historical data was not available. Shareholding data was retrieved for every reporting quarter from December 2015 to June 2021. Data for the Japanese Government Pension Investment Fund (GPIF) was collected manually for the period March 2016 to March 2021. Since the GPIF reports on an annual basis, all historical shareholding trends were based on end of fourth quarter figures for the period 2015 to 2020. GPIF data from March 2021 was considered representative of the previous December since figures had not yet been published.

It is often not precisely clear how financing will be used. Credit is often provided for general corporate purposes or for working capital and debt refinancing. Of course, financing can also be attracted for specific projects or acquisition. The companies included in the research are active in coal mining and/or coal-fired power in more than one country, and many may be active in more than one sector. Therefore, the financing they attract cannot be directly attributable to coal mining and/or coal-fired power in a particular country.

To create a clearer picture of actual financing flows to coal mining and coal-fired power in the focus countries, segment adjusters and geographic adjusters were calculated when financing could not be attributed to a specific country and/or activity.

Segment adjusters

Segment adjusters were developed for all companies and for every year financing was identified. That is, the proportion of each company's business activities related to coal mining and/or coal-fired power was calculated for the year in which a financial relationship was identified.

The segment adjusters were not applied to project finance. When project finance was identified, the purpose of the financing was examined to determine whether it fell within the scope of this research, how to attribute it to either coal mining or coal-fired power generation or whether it was related to coal at all. When there was insufficient detail, project finance was combined with segment adjusters. When the financing was used in multiple ways, including for project finance, the deal was treated as financing for general corporate purposes and segment adjusters were applied.

Segment adjusters were developed using segment reporting in annual reports to the fullest extent possible. This was complemented by additional information from company publications and websites, as well as estimates, where necessary. The following financial indicators were used in order of preference:

- Segment capital expenditures/additions to non-current assets;
- Segment liabilities;
- Segment assets;
- Segment revenues; and
- Segment profit/loss.

For electric utility companies, the coal-fired power proportion of total attributable installed capacity was also used.

Where financing was identified at the subsidiary level, segment activities were identified using company publications. Where financing was identified for a financing vehicle, the group-level adjuster was applied.

Geographic adjusters

Geographic adjusters were developed for all companies and for every year financing was identified to adjust for activities in multiple countries. A similar approach was used to calculate geographic adjusters as segment adjusters.

The geographic adjusters were not applied to project finance. When project finance was identified, its location was investigated to determine whether it fell within the scope of this research and how to attribute it to a specific focus country. When there was insufficient detail, project finance was treated with the geographic adjuster. When the financing was used in multiple ways, the deal was treated as financing for general corporate purposes and the geographic adjuster was applied.

Where financing was identified at the subsidiary level, the location of the activities was identified using company publications. Where financing was identified for a financing vehicle, the group-level adjuster was applied.

Geographic adjusters were developed using segment, geographic and general reporting in annual reports to the fullest extent possible. This was complemented by additional information from company publications and websites, as well as estimates, where necessary. Geographic adjusters were applied to segment adjusters.

The following financial indicators were used in order of preference to calculate geographic adjusters:

- Geographic capital expenditures/additions to non-current assets;
- Geographic liabilities;
- Geographic assets;
- Geographic revenues; and
- Geographic profit/loss.

For electric utility companies, the coal-fired power proportion of total attributable installed capacity in each focus country was also used.

The combined segment and geographic adjusters were applied to each financial relationship identified. This allowed an in-depth and accurate assessment of financial flows to the thermal coal value chain in Asia.

Limitations

There were several limitations to the financial flows research. First, although every effort was made to retrieve and consolidate data from various sources, there are still likely to be gaps in the figures. The financial databases used for the research contain primarily syndicated credit and project finance. As a result, bilateral credit flows between a bank and a company are not fully covered by the data. The gap is likely not very large for the fossil fuels sector as a whole, as it is a capital-intensive industry that primarily attracts the syndicated credit and project finance covered by the financial databases. However, some companies may attract more bilateral credit and some financial institutions may not be very active in providing syndicated credit.

Another limitation relates to segment and geographic adjusters. These are applied to estimate the value of financing potentially being used to finance fossil fuels in the selected countries. However, precisely how the companies put this capital to use cannot be determined through the sources used. Only the companies can provide this information.

3.4. Scenario analysis

A scenario analysis was developed that built on earlier studies by scientific organizations, investment banks and independent research institutes. The analysis compared the financial performance and risks of companies engaged in coal mining and coal-fired power with those of companies engaged in renewable energy.

Coal financing performance

With a focus on stock-listed coal mining and coal-fired power companies for which financial indicators were readily available, the research analyzed their financial performance for the period January 2016 to December 2020. Indicators included revenues, cost of goods sold, net profit margins, debt ratio, interest coverage ratio, debt service coverage ratio, operating cash flow ratio, operating margins and return on assets, among others. The research tracked differences between companies headquartered in Asia, and further differentiated between companies active in coal mining and those active in coal-fired power.

Based on this historical analysis, forward-looking scenarios were developed that aim to model the impacts of stronger climate change policies on the coal sector. Coal-fired power plants run the risk of becoming stranded assets, and as the demand for thermal coal declines, coal mines will gradually follow suit. These stranded assets and faster depreciation of assets will have a significant impact on the book values of thermal coal companies, their free cash flow and ability to service debts and generate profits.

Developing coal-fired power plants will not be profitable in the long term. Research by Carbon Tracker found that 92% of proposed or under-construction coal-fired power plants will cost more to build than the potential revenue generated in the future. As many as 80% of these projects are in five countries in Asia: China, India, Indonesia, Vietnam and Japan. There are a total of 620 plants with a total capacity of more than 300 GW. By 2026, most coal-fired plants will also cost more to operate than building new renewable energy projects. This scenario assumes that renewable energy investment costs will decrease while coal investment costs will rise due to higher interest rates brought on by investor reluctance to finance coal.[227]

Based on this data and an evaluation of national and regional decarbonization commitments, a 1.5ºC scenario was developed to estimate the future financial performance of companies engaged in coal mining and coal-fired power.

Renewable energy financing performance

Profundo developed a list of key stock-listed companies involved in renewable energy production, renewable energy project development and equipment (e.g. solar panels, wind turbines) manufacturers in the Asian region. The research analyzed their financial performance between January 2016 and December 2020. Indicators included revenues, cost of goods sold, net profit margins, debt ratio, interest coverage ratio, debt service coverage ratio, operating cash flow ratio, operating margins and return on assets, among others. The research tracked differences between companies headquartered in different focus countries.

Building on this data and an evaluation of national and regional decarbonization commitments, a 1.5ºC scenario was developed to estimate the future financial performance of companies involved in renewable energy production, renewable energy project development and equipment (e.g., solar panels, wind turbines) manufacturers in Asia.

The research also forecast how the market for renewable energy financing might develop in the coming decades. Since high investment years are still to come, these predictions are important for future income streams for banks.

Based on these scenario analyses, we compared the risks and opportunities for financial institutions to continue financing coal mining and coal-fired power, and to switch their financing to renewable energy.

Limitations

It is important to note there were significant differences in company sizes, both within analysis groups (i.e., coal power, renewable equipment) and between the coal and renewable company totals. For example, the total revenues of selected coal companies were USD 195 billion in 2020 compared to just USD 9 billion for renewable companies. There were therefore limitations to comparing the revenue and operating profit growth figures of coal and renewable companies since the small size of renewable companies contributed to higher growth figures.

Annex 2

Monitoring the climate impacts of financial institutions

Financial institutions need monitoring tools to measure the climate risks and impacts associated with their financing and investment portfolios. Financial regulators, media and CSOs also need tools to verify whether financial institutions are on track to transition away from coal and align their portfolios with a 1.5ºC scenario. Here, we explore the strengths and weaknesses of existing climate monitoring tools for the financial sector and discuss how civil society can monitor and interpret the financing and investments of financial institutions in the energy sector.

1. From measuring climate risks to measuring climate alignment

Before delving into climate monitoring tools for the financial sector, it is useful to identify what financial institutions are required to monitor. Interestingly, many financial institutions have recently shifted their focus away from monitoring climate-related risks to their own financial health and how they can help limit the impacts of climate change on society. The latter has always been the focus of civil society, but until four years ago the financial sector was still preoccupied with their own interests.

In June 2017, the TCFD, established by the Financial Stability Board (FSB), formulated recommendations for how financial institutions and other businesses should monitor the potential impacts of climate change on their financial well-being. The recommendations of the TCFD were very important in raising awareness in the international business and financial community on the importance of having a climate change policy and reporting on it.[228]

The TCFD made general recommendations to all businesses, as well as specific recommendations for certain types of businesses, including banks. On the topic of "Metrics and Targets Disclosure", the TCFD recommended that all businesses: [229]

- Disclose the metrics used to assess climate-related risks and opportunities in line with its strategy and risk management process;
- Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions, and the related risks; and
- Describe the targets used to manage climate-related risks and opportunities and performance against the targets.

For banks, the TCFD recommended:[230]

Providing the metrics used to assess the impact of (transition and physical) climate-related risks on lending and other financial intermediary business activities in the short, medium and long term. These metrics may relate to credit exposure, equity and debt holdings or trading positions by:

- Industry;
- Geography;
- Credit quality (e.g., investment grade or non-investment grade, internal rating system;
- Average tenor; and
- Providing the amount and percentage of carbon-related assets relative to total assets, as well as the amount of lending and other financing connected with climate-related opportunities.

The TCFD recommendations have had a major impact worldwide. More and more businesses are developing a better understanding of the risks related to climate change and have started to report annually based on the TCFD recommendations. However, there has been criticism of the TCFD recommendations.

The focus of the recommendations is on managing the ongoing risks of climate change to businesses, including financial institutions and the financial system. This is not surprising for a taskforce established by the FSB. While the recommendations may have opened the eyes of many businesses and regulators to the importance of climate change, they do not address the role of businesses and financiers in causing and exacerbating climate change. Civil society has been asking for public and regulatory acknowledgment of this for years.

While the TCFD was asking banks to report on how "climate-related risks" could affect their activities, civil society increasingly began to ask banks to report on the "Paris alignment" of their lending and investing portfolios. This was clearly voiced in the *Principles for Paris-aligned Financial Institutions* released in September 2020 in which a broad civil society coalition recommended the following climate-related goals for banks:[231]

- Financed companies need to be aligned with a 1.5°C scenario;
- No financing of companies involved in new fossil fuel exploration, extraction or infrastructure;
- Rapidly phase out all financing for coal companies;
- No financing of companies involved in the degradation or loss of natural forests or other natural ecosystems; and
- Reduce the bank's climate impact to zero by 2050 at the latest and halve its impact by 2030 at the latest.

The call for Paris alignment has resonated in the financial sector in the last few years, and has complemented or even surpassed attention to the TCFD's climate-related risks. In December 2018, five European banks stated in the Katowice Commitment: "We believe banks have an important role to play in scaling and accelerating the transition toward a climate-resilient world."[232] The Center for Climate-Aligned Finance in New York, established in July 2020, has started to collaborate with four major American banks on climate alignment: "Climate alignment is cementing itself as the gold standard for the financial sector, but we need to acknowledge the difficulty of putting the global economy on track to net zero on an urgent timeline."[233] In April 2021, the Partnership for Carbon Accounting Financials published the Strategic Framework for Paris Alignment, stating: "More and more financial institutions (FIs) are committing to align their portfolio with the Paris Agreement and setting net-zero emission targets."[234]

This shift from climate-related risks to Paris alignment is also having an impact on the climate metrics that financial institutions use. In June 2021, Dutch investor Robeco argued: "In 2017, the Taskforce for Climate-related Financial Disclosure recommended carbon intensity as the leading metric for investors. This was in line with TCFD's focus on climate risks. However, in 2021 the focus has shifted to investors' responsibility and their contribution to the Paris Agreement. In line with that shift, recent legislation and market standards converge in recommending carbon footprint as the leading metric." The carbon footprint is defined by Robeco as: "Total emissions for a portfolio, normalized by the market value of the portfolio (expressed in tons CO2e/EUR invested). Emissions are allocated to an investor based on their share of a company's total capital."[235]

While this is not the only possible conclusion, Robeco has highlighted the importance of assessing which indicators are most suitable for financial institutions to measure their climate alignment. The following sections discuss climate monitoring tools for financial institutions in more detail.

2. Monitoring the climate impacts of companies

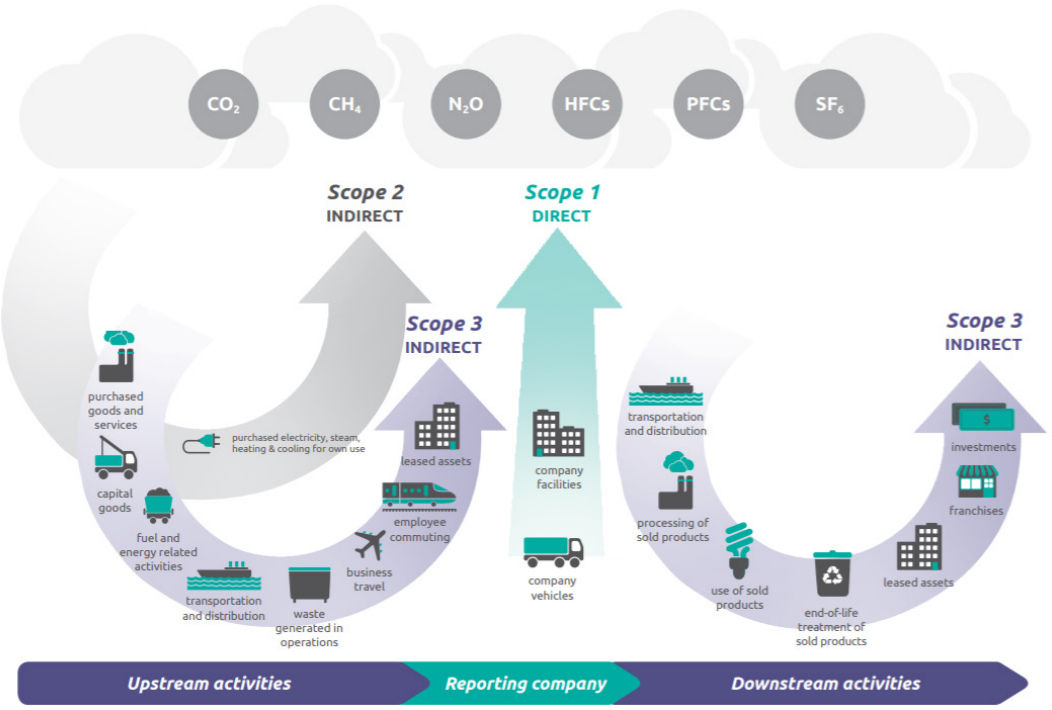
For financial institutions, climate monitoring primarily involves monitoring the climate impacts of the companies in their portfolios. After all, the GHG emissions of their own offices and business activities are not very significant. Since their most significant climate impact is the companies they finance and invest in, the quality of monitoring depends on how well the GHG emissions of these companies are tracked, either by the companies themselves or by external auditors.

The gold standard for measuring and managing corporate GHG emissions is the GHG Protocol, developed in 2001 by the World Business Council for Sustainable Development (WBCSD), an organization of more than 200 leading businesses, and the World Resources Institute (WRI), a research organization. The *GHG Protocol Corporate Reporting and Accounting Standard* recommends that companies measure and manage three "scopes" of GHG emissions, such as CO_2 and CH_4 (methane):[236]

- Scope 1: direct GHG emissions of the company;
- Scope 2: indirect GHG emissions of the energy that the company uses; and
- Scope 3: indirect GHG emissions of buyers and suppliers upstream and downstream in the value chain.

Figure 112 illustrates the emissions covered by each of the three scopes in the GHG Protocol.

Figure 112 Overview of the GHG Protocol accounting and reporting standard



Source: WRI and WBCSD (April 2013), "Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard". Available at: https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf

Combined, a company's Scope 1, Scope 2 and Scope 3 emissions represent the total GHG emissions related to its activities. That does not mean that the company is solely responsible for all these emissions. The company has control over its direct emissions (Scope 1) and less control over its indirect emissions (Scope 2 and 3). However, since the company has a certain level of influence over its indirect emissions, it is important to report them. A complete GHG inventory therefore includes Scope 1, Scope 2 and Scope 3.

The GHG Protocol allows for some double counting of emissions by different companies, which means the total emissions reported by all companies would be higher than the global total. However, double counting is restricted to the Scope 3 emissions of different companies. Since Scope 1, Scope 2 and Scope 3 are mutually exclusive for the reporting company, there is no double counting of emissions. Two or more companies also cannot account for the same Scope 1 or Scope 2 emissions. In certain cases, two or more companies may account for the same emission within Scope 3. For example, the Scope 1 emissions of a power generator are the Scope 2 emissions of an electrical appliance user, which are, in turn, the Scope 3 emissions of both the appliance manufacturer and the appliance retailer. Each of these four companies has different and often mutually exclusive opportunities to reduce emissions, making it important that they report on them properly.[237]

More and more companies are using the GHG Protocol to report on their GHG emissions, and since 2000, the adoption of the Protocol has been stimulated by the Carbon Disclosure Project (CDP).[238] On behalf of a large coalition of international investors that want to gain insight into the climate impacts of their investee companies, the CDP asks thousands of companies around the world to report on their GHG emissions on an annual basis. The number of companies and the quality of their reporting has increased over the years, and although there were initially significant differences in how companies reported their Scope 3 emissions, this has improved. This is due in part to the various guidance published by organizations behind the GHG Protocol to calculate GHG emissions, especially Scope 3.[239]

Today, banks, investors and other interested parties can obtain data from the CDP on the GHG emissions of many major companies in the world. Other GHG data providers are Bloomberg, ISS Ethix, MSCI, Sustainalytics, Thomson Reuters and Trucost. These providers enter the GHG data reported by companies in their databases, often after making corrections to improve comparability, and calculating estimates for companies that do not disclose their emissions. The number of companies covered by the data providers vary: for reported emissions data, between 1,800 and 4,000 companies worldwide, and for estimated emissions data between another 5,000 and 20,000 companies.[240]

It is important to note that these data providers use different methodologies and interpretations of the GHG Protocol to correct and estimate corporate GHG emissions. A recent study by the University of Hamburg compared the emissions data of the same companies provided by the main data providers and found that "data on direct emissions are more consistent than data on indirect emissions, and they are especially inconsistent for Scope 3." This holds true for data reported by the companies themselves since data providers consider it necessary to adjust the reported data, and they all do this in different ways. This is even more true for the emission estimates of data providers for companies that do not report their emissions themselves: "third-party estimations are less consistent as compared to data stemming directly from corporate reports."[241]

Another group of researchers from the University of Augsburg in Germany came to an even sharper conclusion in a similar research project: "As we evaluate the forward-looking carbon scores from several popular data providers, we find no evidence that these scores predict future changes in emissions. Further, we find that data on estimated emissions are at least 2.4 times less effective than reported data in identifying the worst emitters and provide little information to identify green companies in brown sectors. Our results debunk the belief that third-party estimated emissions are a satisfactory substitute for company-reported emissions and call for mandatory and audited carbon emissions disclosure."[242]

A lack of mandatory and audited carbon emissions disclosure can have a major influence on which data provider a financial institution purchases GHG emissions data from. The next section looks at the tools that have been developed for financial institutions to monitor their climate impact themselves.

3. Climate monitoring tools for financial institutions

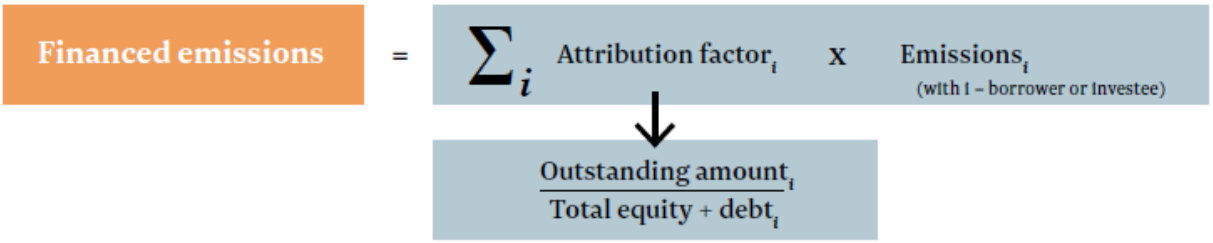
There are currently two main climate monitoring tools for financial institutions: the PCAF and PACTA. These tools are increasingly used by banks and investors around the world, and this section will discuss and compare both. We will also look at the Science Based Targets Initiative (SBTi), which although not a monitoring tool, plays a crucial complementary role in climate target setting.

3.1.1. Partnership for Carbon Accounting Financials (PCAF)

The Partnership for Carbon Accounting Financials (PCAF) was established in 2015 by a small group of Dutch banks and investors. Together with consultants, they developed the PCAF methodology, which is quite closely aligned with the GHG Protocol.[243] Today, 145 banks and investors from Europe, North and South America, Africa and Asia (Bangladesh, India, Japan, Malaysia, Mongolia, Nepal, South Korea and Taiwan) use the PCAF methodology.[244]

The basic principle of the methodology is that banks and investors finance all kinds of assets: companies, projects, homes, cars, real estate and others. All these assets generate GHG emissions, which means that banks and investors should account for these emissions as Scope 3 emissions in their own GHG reporting. Some of the emissions generated by these assets are therefore attributed to the banks and investors financing the assets. This is calculated based on an attribution factor, as shown in Figure 113.

Figure 113 General approach of the PCAF to calculating financed emissions



Source: PCAF (November 2020), "The Global GHG Accounting and Reporting Standard for the Financial Industry": Available at: https://www.carbonaccountingfinancials.com/files/downloads/PCAF-Global-GHG-Standard.pdf

For different types of financial institutions and different types of financial services, the "outstanding amount" might read as the "outstanding part of a loan", "market value of an investment in shares", etc. These amounts are divided by the company value, its total equity and debt to attribute a share of the company's emissions to the bank or investor.[245] The PCAF methodology also provides specific guidance on six different asset classes (see Figure 114).

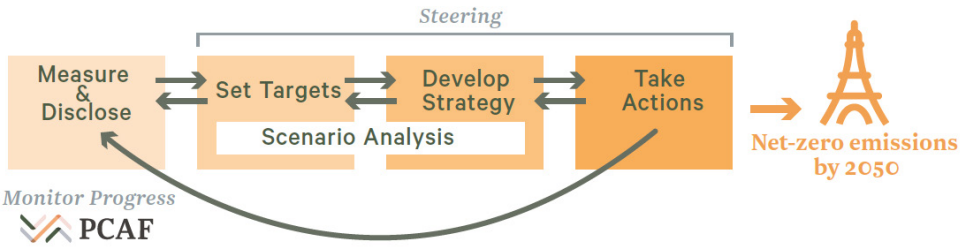
Figure 114 Asset classes covered by the PCAF methodology

Source: PCAF (November 2020), "The Global GHG Accounting and Reporting Standard for the Financial Industry". Available at: https://www.carbonaccountingfinancials.com/files/downloads/PCAF-Global-GHG-Standard.pdf

The PCAF Global GHG Accounting and Reporting Standard for the Financial Industry (the Standard) is now being implemented in five regions: Africa, Asia Pacific, Europe, Latin America and North America. Each region has an implementation team with a clear governance structure. The lessons learned through the regional implementation will inform the refinement of the Standard.[246]

The PCAF offers more than a climate monitoring tool. The *Strategic Framework for Paris Alignment*, published by the PCAF in April 2021, clearly explains the technical elements of Paris alignment for financial institutions, defines terminology used in the Paris alignment process and maps initiatives, projects, methods and tools to identify potential synergies for financial institutions (Figure 115). [247]

Figure 115 PCAF Strategic Framework for Paris Alignment



Source: PCAF (April 2021), "Strategic Framework for Paris Alignment". Available at: https://www.carbonaccountingfinancials.com/files/2021-04/strategic-framework-for-paris-alignment.pdf?515d2dd9f1

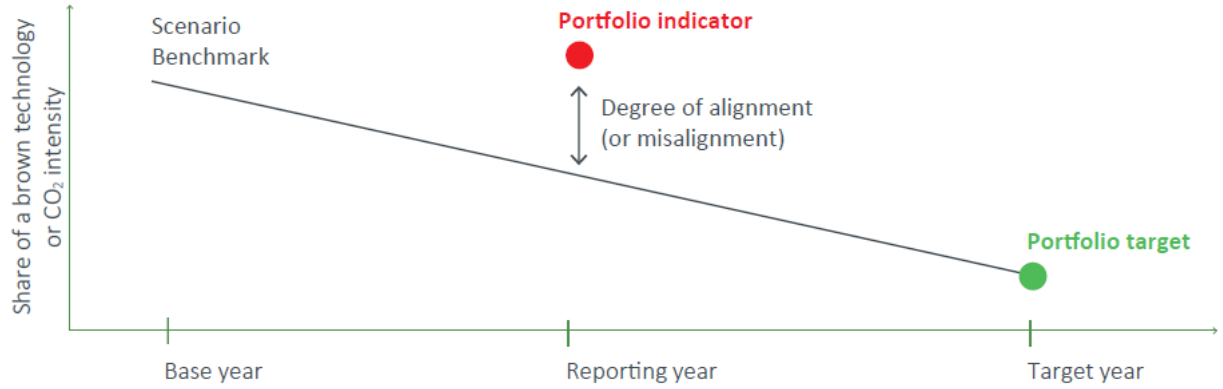
Because it is closely aligned with the GHG Protocol, the PCAF methodology deals with the same corporate GHG data consistency issues discussed in section 2. For "Listed equity and corporate bonds" and "Business loans and unlisted equity", the PCAF methodology depends heavily on GHG emissions data provided by GHG data providers.

3.1.2. Paris Agreement Capital Transition Assessment (PACTA)

The Paris Agreement Capital Transition Assessment (PACTA) was developed by the French think-tank 2° Investing Initiative, with backing from the PRI, a global organization that brings together responsible investors. PACTA takes a different approach than the PCAF. Instead of calculating which GHG emissions can be attributed to banks or investors, it develops climate scenarios for different economic sectors. These scenarios identify which technologies, products and activities companies should invest in, and the pace at which they should invest, to ensure they make a proportionate contribution to the Paris Agreement.

For all companies in these sectors, PACTA aggregates global, forward-looking, asset-level data (such as the production plans of a manufacturing plant over the next five years) up to the parent company level, to assess whether they are on track to achieve the goals of the Paris Agreement. Some are, but most are not. Depending on the combination of companies active in a certain sector, which is included in the portfolio of a bank or investor, PACTA can conclude whether the portfolio is following a Paris-aligned scenario for this sector (Figure 116). Based on this assessment, the bank or investor can then decide to engage more heavily with companies in a certain sector, or switch investments to other companies in the same sector that are more Paris-aligned.

Figure 116 Scenario comparison with the PACTA methodology



Source: Katowice Banks (September 2020), "Credit Portfolio Alignment - An application of the PACTA methodology by Katowice Banks in partnership with the 2 Degrees Investing Initiative". Available at: https://2degrees-investing.org/wp-content/uploads/2020/09/Katowice-Banks-2020-Credit-Portfolio-Alignment.pdf

PACTA was originally developed for investors and has been used by more than 3,000 investors since 2018. The toolkit *PACTA for Banks* was launched in September 2020, which provides a granular view of the Paris alignment of corporate loan books by sector and related technologies. It has now been tested by 17 leading global banks from Europe and North and South America.[248]

The Katowice Banks, a group of five major European banks that have committed to align their portfolios with the Paris Agreement, are already applying the PACTA methodology. In a recent publication,[249] they share insights and lessons to assist and inspire other banks, including how they have used the PACTA methodology and the aspects that have been most useful.

PACTA cannot be used to assess the Paris alignment of a complete credit or investment portfolio, as it focuses on major GHG-emitting sectors: power, coal mining, oil and gas upstream sectors, auto manufacturing, cement, steel and aviation, with the shipping industry to be added soon. Collectively, these sectors account for about 75% of global GHG emissions, according to PACTA.[250]

The scenarios and targets for these sectors are sometimes set in terms of the share of a brown or green technology in the company's activities (e.g., the share of electric cars in the total production volume of a car producer or the share of renewable energy in the portfolio of an electricity producer), which can be assessed objectively based on company disclosures and market data. Some scenarios use carbon intensity as the main indicator (e.g., for steel production), but this refers only to Scope 1 emissions linked to a certain production technology. Carbon intensity figures are documented transparently in scientific literature.

3.1.3. Science Based Targets initiative (SBTi)

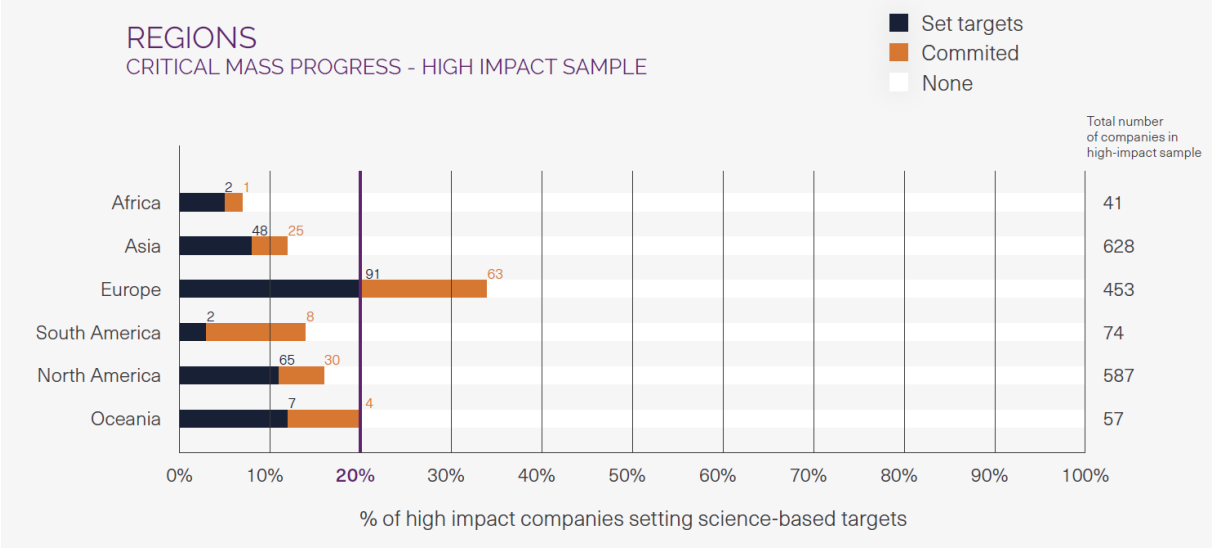
Measuring climate impacts, whether by companies or financial institutions, is only effective if they know which target they want to meet (i.e., which climate impact to reduce). Globally, these targets are defined by the Paris Agreement, but how do they translate into targets for individual companies? This depends, in part, on the amount of GHGs they emit, their relative importance in the market and their technological options to reduce emissions.

The SBTi helps companies gain clarity on this by setting science-based emission reduction targets in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement.[251] The SBTi is a collaborative partnership of the CDP, the United Nations

Global Compact (the UN initiative to support responsible business conduct), the WRI, and the World Wide Fund for Nature (WWF).[252]

Because the Paris Agreement does not prescribe how to meet climate targets, the SBTi can help companies align with a "below 2ºC scenario" or with a "1.5ºC scenario". In its *2020 Progress Report*, the SBTi concluded that 346 companies (19%) out of a global sample of 1,840 "high impact companies" have adopted, or are working on adopting, science-based targets (see 0). The company sample was based on their potential contribution to climate mitigation, determined by a combination of their GHG emissions and market capitalization.[253]

Figure 117 Share of high-impact companies adopting science-based climate targets per global region (January 2021)



Source: SBTi (January 2021), "From Ambition to Impact: How Companies Are Reducing Emissions at Scale with Science-Based Targets. Available at: https://sciencebasedtargets.org/resources/files/SBTiProgressReport2020.pdf

The SBTi has developed different target-setting methodologies and guidance for different economic sectors. In April 2021 it published a pilot version of its *Financial Sector Science-Based Targets Guidance*, which offers three approaches to target setting: [254]

- Sectoral Decarbonization Approach (SDA): Emissions-based physical intensity targets for real estate, power generation, cement, pulp and paper, transport, iron and steel.
- SBTi Portfolio Coverage Approach: Engagement to let investees set science-based targets to put the financial institution on a path to 100% portfolio coverage by 2040.
- Temperature Rating Approach: Determining the current temperature rating of portfolios and engaging with portfolio companies to set ambitious targets.

3.1.4. Assessment of climate monitoring tools

This section briefly analyzes the strengths and weaknesses of climate monitoring tools for financial institutions. This assessment draws on a critical comparison published by the UK NGO ShareAction in April 2021.[255] The following aspects are relevant:

- Sector scope: The PCAF covers all economic sectors in which financial institutions invest or to which they provide financing. In comparison, the scope of PACTA is more limited: it covers only seven (soon eight) economic sectors. Although PACTA claims that these sectors account for 75% of global GHG emissions, important GHG-emitting sectors such as agriculture and construction are missing.

- Financing scope: The PCAF and PACTA cover the main types of financing and investments, including general corporate loans, project finance, equity investments and bond investments. However, as ShareAction notes, *"The scope of financing activities remains incomplete and underestimates transition risks. SBTi and PACTA dismiss important non-balance sheet items in banks' portfolios: capital markets underwriting and the undrawn portion of loans."*[256]
- Indicators and targets: The PCAF simply tracks the emissions linked to a financial institution's investments and financing. These emissions are primarily the result of past corporate investment decisions, not the efforts of portfolio companies to become Paris-aligned in the future. The PCAF therefore does not assist financial institutions with realistic target setting; the SBTi should be used instead. PACTA has the advantage of more forward-looking indicators (mainly based on capital expenditure on green and brown technologies), and it also integrates targets for Paris alignment for specific sectors.
- While both PACTA and the SBTi claim that their target-setting is based on science, ShareAction concludes that neither currently *"include or recommend including a climate scenario that is compatible with a reliable 1.5°C outcome"* and that *"all of these methodologies rely on inevitable simplifications and assumptions".*[257] It is *"often assumed that climate scenarios will indeed take us to their stated temperature outcome, overlooking their odds of success and disproportionate reliance on negative emissions technologies. This has important implications for the level of ambition and type of action taken by banks."* This calls for a precautionary approach to portfolio alignment and transparency about the assumptions made to arrive at certain targets.[258]
- Reliability: The PACTA methodology is clearly more reliable than the PCAF methodology for the sectors it covers. This is because it is based on indicators (capital expenditure, carbon intensity of technologies) that are subject to normal accounting rules or scientific verification. The PCAF, on the other hand, depends on reported and estimated GHG emissions data from many data providers which, as discussed in section 2, are not very consistent.
- The reliability of Paris-alignment methodologies is undermined by the fact that they allow for some offsetting between high-carbon and low-carbon activities, despite all the problems associated with carbon offsetting. They also do not differentiate between carbon-intensive assets – a barrel of oil sourced from the Arctic Circle or the Canadian oil sands is considered equivalent to any other barrel of oil even though it has a greater impact from an ESG perspective.[259]
- Another reliability issue is that PCAF uses GHG emissions data for all types of financing and investments. This invites users to calculate one overall emissions figure for a financial institution's activities, or at least for its total corporate loan portfolio. This risks drawing the wrong conclusions since loan amounts are shifted between sectors and would make overall portfolio figures incomparable over time. It would be preferable to have separate emissions figures for the different sectors in which the financial institution finances or invests.
- Publicly available assessments: Both PACTA and the PCAF will soon be used by more banks, including in Asia. However, not enough experience has been accumulated to definitively say whether they have improved the comparability of financial institutions' climate alignment.
- Usability by third parties: Both tools were initially designed to be used by financial institutions to assess the climate alignment of their own portfolios. However, CSOs would also like to use the tools to validate these assessments and assess the climate alignment of financial institutions that have not done so themselves. For some institutional investors, especially some pension funds, this would be feasible as they publish their full portfolio (names of companies and invested amounts per company) online every year.

- Banks around the world do not do this despite strong pressure from civil society to be more transparent. Research organizations such as Profundo can analyze different public and commercial data sources to get a reasonable overview of the companies that banks are exposed to, especially through syndicated bank loans and underwriting syndicates. However, compiling these overviews for the full global portfolio of an international bank is time consuming and never complete since many bilateral bank loans (between one bank and a company) are missing. This makes it nearly impossible for CSOs to use these methodologies to assess the climate alignment of banks from the outside.

This overview of the strengths and weaknesses of the different tools does not reveal a clear winner. PACTA is the more robust and forward-looking methodology, but it has limited sector coverage and is not yet used by many banks. The PCAF has a simpler methodology, but it depends on not-very-reliable GHG emissions data and external target setting. Its sector coverage is much broader, however, and has been adopted by many more banks. Both methodologies have significant flaws that need to be remedied with refinements, including alignment of target setting with a credible 1.5ºC scenario, such as the IPCC 1.5ºC scenario published in March 2020.[260] From the perspective of civil society, both methodologies share one major shortcoming: they can only be used by banks and not external watchdogs that do not have access to their full portfolios.

To address this last shortcoming in particular, section 0 discusses alternative approaches for CSOs to monitor the climate impacts and Paris alignment of banks.

4. Monitoring the climate impacts of financial institutions: the role of CSOs

This section discusses how CSOs can assess the Paris alignment of Asian financial institutions by monitoring and interpreting their financing and investments. To understand how CSOs define Paris alignment, we refer to the five main recommendations in the *Principles for Paris-aligned Financial Institutions* released in September 2020:[261]

- Financed companies need to be aligned with a 1.5°C scenario;
- No financing of companies involved in new fossil fuel exploration, extraction or infrastructure;
- Rapidly phase out all financing for coal companies;
- No financing of companies involved in degradation or loss of natural forests or other natural ecosystems; and
- Reduce the financial institution's climate impact to zero by 2050 at the latest and halve its impact by 2030 at the latest.

The first and last recommendation define high-level ambitions, or even principles, to which banks and other financial institutions should adhere. They deal with all financing of the financial institution, across sectors and across the globe, and CSOs should stress these two recommendations to financial institutions. However, even if financial institutions implement these recommendations, it is virtually impossible for CSOs to measure them. There are two main reasons for this:

- Financial institutions finance a huge number of companies around the world. GHG emissions data are only available for a small number (max. 20,000) and are not consistent or reliable (see section 2), let alone clarify what it means for all these companies to become aligned with a 1.5º scenario. Enormous effort is still needed from companies themselves, their financiers, consultants and others to define what Paris alignment means. Until then, it is not possible for CSOs to measure how financial institutions are implementing this principle across the board.

- Measuring the full climate impact of a financial institution, across all sectors and countries in which the financial institution is active, requires robust and reliable methodologies and transparency on the part of financial institutions with their complete portfolios. Given that existing methodologies have many flaws (see section 3), and banks around the world are not willing to share their portfolios with CSOs, it is not possible for CSOs to conduct a reliable assessment of a financial institution's climate impact across all sectors.

These two recommendations are very difficult to monitor, but the *Principles for Paris-aligned Financial Institutions* includes three more recommendations with a more limited, sectoral scope. Measuring whether financial institutions live up to these recommendations is more feasible for CSOs, and focusing on concrete sectoral guidelines might have a greater impact than advocating for change across their entire portfolios. For instance, after analyzing climate monitoring tools for financial institutions, ShareAction concluded: *"Robust sectoral policies and decarbonization expectations for clients are more effective than methodologies to prevent the financing of Paris-misaligned activities and drive ambitious corporate change on climate and biodiversity."*[262]

Two of the main recommendations of the *Principles for Paris-aligned Financial Institutions* call for robust sectoral policies and decarbonization expectations for clients in the energy sector:

- No financing of companies involved in new fossil fuel exploration, extraction or infrastructure; and
- Rapidly phase out all financing for coal companies.

It is relatively feasible for CSOs to monitor whether financial institutions live up to these more concrete sectoral recommendations by regularly repeating the type of research conducted for this report – the involvement of Asian financial institutions in financing the coal sector – and by expanding this research to cover the entire fossil fuel sector. This has the following advantages:

- The fossil fuel sector (including the coal sector) is dominated by relatively few large companies. Monitoring the activities of these companies requires a lot of resources, but much less than monitoring all the companies in which financial institutions invest. To a large extent, this monitoring is already being done by the GCEL,[263] which covers all companies active in the coal sector worldwide, as well as by various NGO reports on the oil and gas sector.
- The indicators used in these two recommendations are based on corporate activities (coal, fossil fuel exploration, extraction or infrastructure) rather than on GHG emissions. How companies rank against these indicators can be established relatively easy and objectively, in contrast to assessing their GHG emissions (Scope 1, 2 and 3, see section 2). The GCEL and a possible *Goal Oil and Gas Exit List* could be expanded to clearly indicate which companies are rapidly phasing out coal and avoiding new investments in fossil fuel exploration, extraction or infrastructure, and which companies are not.
- The fossil fuel sector (including the coal sector) is, to a significant extent, financed by syndicated bank loans and by issuing shares and bonds to investors. This makes it quite possible to assess which financial institutions are involved in financing this sector and to hold them accountable.
- Focusing CSO monitoring on a financial institution's financing of the fossil fuel sector requires much less resources and is much more reliable than trying to assess the financial institution's overall climate impact. This means that the monitoring itself would not take too many resources away from campaigning, engaging and lobbying.

A similar approach could be followed with the last recommendation of the *Principles for Paris-aligned Financial Institutions*, which deals with the agriculture and forestry sectors: *"No financing of companies involved in degradation or loss of natural forests or other natural ecosystems."* Unlike the two recommendations for the fossil fuel sector, monitoring this recommendation is somewhat more difficult for two reasons:

- Relatively more of the relevant companies are financed privately and through bilateral bank loans, which are less transparent forms of financing.
- It is relatively easy to establish whether companies are investing in new fossil fuel exploration, extraction or infrastructure, as this is reported by companies themselves. However, it is more difficult to assess whether companies are involved in the degradation or loss of forests and other natural ecosystems, since this is hardly ever reported by the companies themselves.

Despite these challenges, a lot of work has already been done to monitor this recommendation. The Forests & Finance coalition track the involvement of financial institutions in forest-risk commodity sectors (palm oil, beef, soy, timber, pulp and paper and rubber), analyzing their policies and collecting case studies.[264] With more resources, this initiative could become an effective monitoring tool.

Once these two approaches are fully developed and effective, CSOs could expand their monitoring efforts to the financing of other sectors with a significant climate impact, such as the transport sector (including the automotive industry and the aviation sector), the steel industry or the construction sector (including the cement industry). Like what is being done with the *Principles for Paris-aligned Financial Institutions* for the fossil fuel, agriculture and forestry sectors, CSOs could define concrete steps for companies in these sectors. CSOs could then monitor the extent to which financial institutions support these essential steps in their financing and investment decisions.

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