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UPDATE ON INTERNATIONAL FINANCE FOR COAL-FIRED POWER PLANTS

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PREFACE

This report has been produced by the IEA Clean Coal Centre and is based on a survey and analysis of published literature, and on information gathered in discussions with interested organisations and individuals. Their assistance is gratefully acknowledged. It should be understood that the views expressed in this report are our own, and are not necessarily shared by those who supplied the information, nor by our member organisations.

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The overall objective of the IEA Clean Coal Centre is to continue to provide our members, the IEA Working Party on Fossil Fuels and other interested parties with independent information and analysis on all coal-related trends compatible with the UN Sustainable Development Goals. We consider all aspects of coal production, transport, processing and utilisation, within the rationale for balancing security of supply, affordability and environmental issues. These include efficiency improvements, lowering greenhouse and non-greenhouse gas emissions, reducing water stress, financial resourcing, market issues, technology development and deployment, ensuring poverty alleviation through universal access to electricity, sustainability, and social licence to operate. Our operating framework is designed to identify and publicise the best practice in every aspect of the coal production and utilisation chain, so helping to significantly reduce any unwanted impacts on health, the environment and climate, to ensure the wellbeing of societies worldwide.

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ABSTRACT

This report is an update of a review previously published in 2017 by the IEA Clean Coal Centre (IEACCC) entitled 'International finance for coal-fired power plants' (Baruya, 2017). The report verifies, updates and expands on the findings presented in 2017. The 2017 report was based on data aggregated in 2014, taking into account lags in data collection and verification. The 2019 version updates the original report with the addition of data from 2015-17.

The purpose of the report is to provide information on the recent financing trends by source and geography. The analysis concludes that financing levels have fallen from US$152 billion to US$139 billion (-9%). However, the annual changes over the period have been erratic, and financing for coal mines has increased whereas financing for coal-fired power plants has decreased. There is insufficient evidence to suggest a further shift from the Western banks to Asian institutions – financing patterns of Western banks vary between different banks and a clear trend cannot be inferred from the span of data examined. Finally, the report highlights gaps in data on the sources of finance. This gap is particularly significant for coal mining and requires further analysis and explanation.

ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
BCLP	Bryan Cave Leighton Paisner
BNEF	Bloomberg New Energy Finance
CCGT	combined cycle gas turbine
CCS	carbon capture and storage
EBRD	European Bank for Reconstruction and Development
ECA	export credit agencies
EHS	environment, health and safety
EIA	Energy Information Administration, USA
EIB	European Investment Bank
EPC	engineering, procurement and construction
ESG	environment, social and governance
ESKOM	Electricity Supply Commission, South Africa
EXIM	Export and Import Bank of China
GHG	greenhouse gases
GPIF	Government Pension Investment Fund of Japan
HELE	high efficiency low emission
IADB	Inter-American Development Bank
ICBC	Industrial and Commercial Bank of China
IDB	Islamic Development Bank
IEACCC	IEA Clean Coal Centre
IEA	International Energy Agency
IFC	International Finance Corporation
IPP	independent power producers
JBIC	Japanese Bank for International Cooperation
JPMC	JP Morgan Chase
KEXIM	Korean Export-Import Bank
LCOE	levelised cost of electricity
MIGA	Multilateral Investment Guarantee Agency
MTR	mountaintop removal
NGO	non-governmental organisation
NRDC	Natural Resources Defense Council, USA
OEM	original equipment manufacturer
PFI	public financial institutions
PPA	power purchase agreement
RAN	Rainforest Action Network
RES	renewable energy storage
SPV	special purpose vehicle

TCFD	Task Force on Climate-related Financial Disclosures
TNB	Tenaga Nasional Berhad, Malaysia
UAE	United Arab Emirates
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WBG	World Bank Group
WEI	World Energy Investment
WEPP	World Electric Power Plants
MW	megawatt
FT	Financial Times
NYT	New York Times

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Peer-review comments were invited on a draft final version of the report. The authors would like to express their gratitude to all peer-reviewers for their inputs, and in particular Simon Bennett from the IEA Secretariat. Peer reviewers primarily focussed their comments on data sources, data gaps, data consistency and cross comparability. The authors acknowledge that data consistency and cross comparability is a limitation of this study and other similar studies which base their findings primarily on secondary information from different sources. Many of these challenges are highlighted in Section 4.1.3, and are noted throughout the report. The final version has been updated to address many of the comments received. In particular, further explicit emphasis is made of the need to regard the information provided as a high-level estimate for constructing views on broad trends, rather than being a definitive source of firm estimates of year-on-year financing and investment in the coal sector. Based on comments received, the authors also propose that any future efforts to assess coal financing must review and address fundamental accounting and recording challenges with the data in order to establish a more robust methodology through which to assess financing levels and trends in the sector.

It is also important to note that the analysis presented herein was largely conducted during the first quarter of 2019. Since that time, new positions have emerged regarding, for example, coal phase out in Germany, Japanese government views on coal lending, and the African Development Bank's view on financing coal projects, which may not correspond with information provided herein.

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EXECUTIVE SUMMARY

There are two contrasting narratives emerging on the future of coal:

- Coal is in decline due to policy, legal, regulatory and market pressures on its use because of climate change concerns augmented by the increasing competitiveness of renewables; and
- Coal is forecast to continue to play a significant role in meeting global energy needs.

This study analyses financing flows to coal-fired power plants and coal mining between 2014 and 2017 within the context of these broader discussions. The data suggests there has been a short-term fall in financing for coal-fired power plants but an increase in financing for coal mines. In the longer term, the year on year building blocks behind this finding are inconsistent, making it hard to draw conclusions on coal's long-term future.

Financing trends in the coal sector between 2014-17 are summarised in the table; the constituent parts of which are detailed in length in the full report. The main findings are outlined below.

DETAILED SOURCES OF INVESTMENT US$ MILLIONS (BARUYA, 2017, NRDC, 2018, RAN, 2018, IEA, 2016, 2017, 2018c)					
Financing source	2014	2015	2016	2017	Change between 2014 and 2017
Multilateral commitments (coal-fired power plants)	250	No new direct lending for coal-fired power plants identified by the government.			
Multilateral commitments (mining)	–	–	–	–	–
PFI commitments (coal-fired power plants)	8,800	5,351	7,715	13,924	+58%
PFI commitments (mining)	–	–	24	–	NA
Financing from top 20 banks (coal-fired power plants)	18,598	27,951	29,699	28,431	+53%
Financing from top 20 banks (mining)	16,279	22,053	13,699	14,259	-12%
Other financing (coal-fired power plants)	47,352	44,698	42,586	17,645	-63%
Other financing (mining)	60,721	45,947	55,007	64,741	+7%
Total investment (coal-fired power plants)	75,000	78,000	80,000	60,000	-20%
Total investment (mining)	77,000	68,000	68,730	79,000	+3%
Total investment	152,000	146,000	148,730	139,000	-9%

Overall financing has fallen between 2014 and 2017 by approximately 9%. This decline is mainly due to the almost 20% fall in investment in coal-fired power plants. Conversely investment in mining has risen by 3%, exclusively from 'other financing'.

'Other financing' is a significant proportion of overall finance. It indicates the variation in estimates. 'Other finance' is estimated to constitute approximately 60% of total investments in the sector. It applies to about 82% of overall financing for coal mining and 29% of overall financing for coal-fired power plants. 'Other finance' is the residual between the sum of the bottom-up financing categories where data are available and top-down estimates of total investment in the sector made by the IEA. This residual may include lending by the smaller banks, private equity, self-financing by the companies, and equity injections from governments to state-owned enterprises. The recording and aggregating of the data by the sources may exacerbate these differences; for example, some estimates include mining developments (eg, ports and rail).

Financing from the top 20 banks increased between 2014 and 2017, but. year-to-year changes have been erratic, particularly for coal mining.

The key findings are:

- Almost 63% of total financing comes from the largest Asian Banks.
- Lending from the top Western Banks for coal-fired power plants increased by 32% but less was allocated to coal mining.
- Lending from the top Asian Banks rose slightly between 2014-17 but peaked in 2015.

Funding of coal investments through Public financial institutions (PFIs) has increased and is likely to continue. PFIs, including export credit agencies, increased their lending between 2014 and 2017. China, Japan and South Korea are the main financers behind this expansion. The largest beneficiaries are Indonesia, Vietnam and Bangladesh. South Africa and Morocco have also benefited. PFI financing is considered enabling as it supports commercial banks and original equipment manufacturers to reduce their risk exposure and therefore to leverage additional financing for coal sector investments.

Funding from multilateral banks is now negligible, but there is renewed interest in lending to coal projects. Direct financing from multilateral banks is currently negligible, however some of their policies are ambiguous. The African Development Bank is a notable exception and has taken a more facilitative stance on coal sector investments. Newer multilaterals, such as the Asian Infrastructure Investment Bank and the Islamic Development Bank with different shareholders, may have a greater appetite to finance coal projects. They could fill gaps resulting from the retreat of traditional multilateral banks.

Are the observed changes in investment patterns cyclical or structural? Investment in the coal sector is driven by supply-side and demand-side factors. Constraints on the availability of finance for such investments will be just one of the drivers for change. A key question is whether the apparent changes in financing are structural (eg, commercial drivers affecting relative costs of coal and other energy sources such as renewable energy), or cyclical (eg, slowing down of China's economy), regulatory or policy (such as carbon taxes or incentives for renewable energy) or voluntary and corporate social responsibility concerns (banks cognisant of public concern over investment in coal and wary of losing investment funds). This report is not intended to answer this question but, instead, is intended to help provide data on investment trends that may help answer this and related questions. The span of data used herein is short and the uncertainties over some of the data are significant and therefore no long-term trends can be clearly identified. Long-term tracking of investment flows will be required to properly identify trends and more in-depth analysis is needed to help understand uncertainties in the data.

1 INTRODUCTION

This report is an update of a review previously published in 2017 by the IEA Clean Coal Centre (IEACCC) titled 'International finance for coal-fired power plants' (Baruya, 2017). This report verifies, updates and expands on the findings presented in 2017.

The 2017 report was based on data aggregated in 2014, taking into account lags in data collection and verification. The 2019 version updates the original with the addition of data from 2015-17. Furthermore, the report attempts to expand on existing areas of analysis to answer the following questions:

- Has the moratorium on lending to coal sector projects by multilateral lending agencies continued?
- Have Western banks continued to decrease their exposure to coal investments?
- Has support for the financing of coal-fired power plants and coal mines changed significantly since 2014?
- Has financing of coal-fired power plants and coal mines from Asian banks increased?
- How are private sector investors in coal mining and coal-fired power plants reacting to the changing policy and regulatory developments in the sector?

The report attempts to answer these questions within the context of the broader environment of power generation (alternatives to coal), the cyclical nature of commodity markets (the business cycle in the coal markets), and the changing regulatory environment (development of new policies and regulations on climate change and coal project development). As mentioned earlier, the analysis is based on additional financing data available for 2015-17 and more recent developments in 2018 and 2019. The report has six chapters which discuss coal demand and financing. Chapters 2 and 3 provide an overview of two alternative perspectives on the future of coal and the evidence that supports these views. Chapter 4 provides background on the principles of coal financing; more detailed explanations are available in the 2017 IEACCC report. Chapter 5 analyses financing trends over the period 2015-17 – wherever possible, efforts have been made to provide a comparison of information across time and geography for the key financing sources. Finally, Chapter 6 provides conclusions.

The report is presented as follows:

- **Is coal in decline?:** Chapter 2 reviews the emerging narrative that coal consumption is declining and that the trend is here to stay. Over the past three years there have been numerous studies, articles and opinion pieces that have promoted an apparent 'consensus' that coal is in structural decline. The 'consensus' is based on policy and regulatory decisions, some evidence of corresponding commercial decision-making from the private sector and evidence of the financial headwinds faced by companies with exposure to coal assets. In this chapter we explain the prominent developments and events which support such a narrative.

- **The future of coal:** Chapter 3 presents an alternative perspective which challenges the proposition advanced in Chapter 2. In this view, coal is forecast to continue playing a significant role in the global energy mix and this chapter explores the reasons why coal may persist as a dominant source of energy for the foreseeable future. This section reviews the reasons why countries are likely to continue investing in coal, the geographical demand for coal, and suggests that clean coal technology offers investors the opportunity to hedge against regulatory disruption.
- **The financing environment for coal projects:** Chapter 4 explores the types of finance available in the coal sector, the institutions and actors providing the financing, and the borrowers who develop coal projects. Furthermore, the chapter discusses the context in which investments in coal have taken place – the discussion is important for readers who may wish to form a view on whether the observable changes are driven by structural or cyclical pressure on lenders, developers and investors.
- **Financing trends for coal projects**: Chapter 5 provides an analysis of financing trends in the coal sector. It reviews financing by investor type; that is by multilaterals, top Western and Asian banks, public financial institutions, and a residual 'other' financing category.
- **Financing trends:** Chapter 6 presents conclusions that can be drawn from the data provided. In this chapter we recap the limitations of the report, the interesting insights one can infer and suggest further areas of research needed to support more conclusive findings on the demand and supply of financing for coal sector projects.

2 IS COAL IN DECLINE?

Chapter 2 outlines the development of an emerging narrative that coal is in decline. Over the past three years there have been numerous studies, articles and opinion pieces suggesting that coal consumption is declining or will decline imminently. This view is typically based on a combination of policy, regulatory and commercial developments which have the cumulative effect of increasing the relative cost of coal and increasing uncertainty for companies and investors with exposure to coal assets.

2.1 THE WORLD HAS CHANGED SINCE 2014

2.1.1 Changing coal consumptions forecasts

2014 information suggested that coal had a vital and growing role in our global energy future

In 2017, the IEACCC noted that several multilateral agencies, including the World Bank and the European Investment Bank, imposed constraints on the financing of new coal-fired power plants unless there were 'rare and exceptional circumstances' (Baruya, 2017). The report highlighted similar trends across other Western state-owned financing institutions and a mixed uptake of similar policies in the wider financial community. The analysis was based on information available in 2014 which suggested continued and increasing investment in coal reflecting coal demand forecasts of the time. The report concluded that while 'various multilateral development banks and export credit agencies announced a retreat from coal funding, other banks and institutions, predominantly Asian, are readily available to fill the gap'.

In 2019 there is a general view that coal demand is unlikely to increase substantively

Figure 1 illustrates the changing forecasts in 2013 and 2017 and alludes to structural shifts in expected coal consumption patterns. The projections suggest that coal demand in 2019 is unlikely to see the dramatic and continued increases envisioned in 2014.

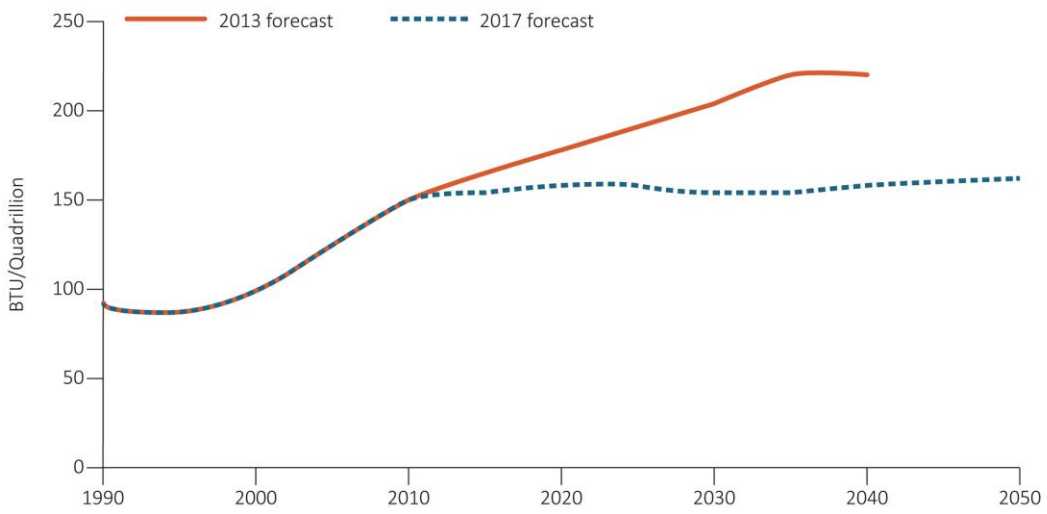

Figure 1 Projections of coal demand in 2013 and 2017 based on EIA 'reference case' (FT, 2017)

According to the narrative, the change in demand projections between 2013 and 2017 reflects the changing policy environment and commercial rationale for consuming and investing in coal. Figure 2 illustrates the role that Bloomberg New Energy Finance (BNEF) expects coal to play in the power generation mix by 2050 – BNEF's view is based primarily on declining prices for renewable technology with energy storage. BNEF tends to be a strong proponent of renewable energy; however, its analysis is well respected within the industry and reflects sentiments which are likely to drive investor decision making in a given direction.

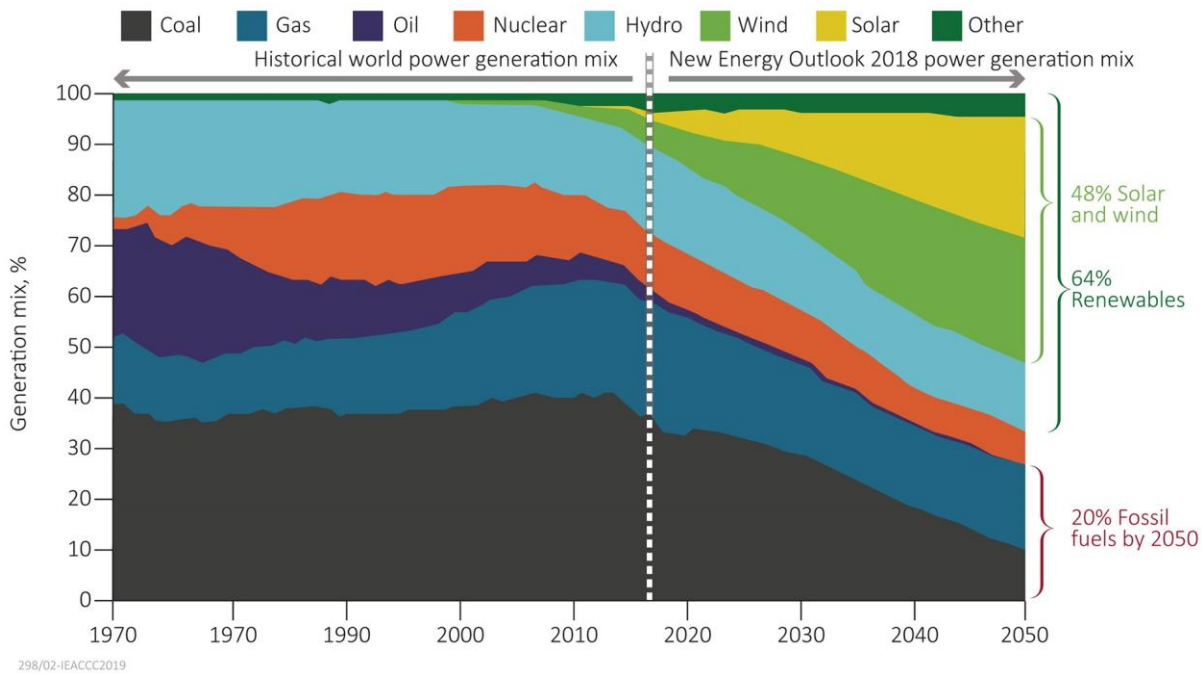

Figure 2 The role of coal as a percentage of the global power generation mix (BNEF, 2018)

2.1.2 Recent developments supporting the changing forecasts

The changed view is the result of various supply- and demand-side interventions which have fostered the perception of decline

The coal sector is facing several pressures including, but not limited to, moratoria and grassroots movements to prevent coal development, policies to curtail lending for the coal sector adopted by multilateral and corporate institutions (including investment funds), environmental concerns regarding smog in Asia, and predictions regarding the commercial competitiveness of coal assets and their susceptibility to disruptive forces. Critically, as reported by the Global Energy Monitor in Shearer and others (2019b), there has been a decline in coal development activity since 2015:

- a 39% drop in new construction starts from 2017, and an 84% drop since 2015;
- a 20% drop in newly commissioned coal power capacity from 2017, and a 53% drop from 2015; and
- a 24% drop in pre-construction activity from 2017, and a 69% drop from 2015.

The combined effect of a changing policy, regulatory and economic environment, and short-term market responses has coalesced to precipitate a prevailing narrative in many parts of the world that coal is in decline.

2.2 REGULATORY AND ECONOMIC PRESSURE ON COAL

2.2.1 Policy developments

The adoption of the 2015 Paris Agreement endorsed further concerted global efforts to combat climate change

The adoption of the Paris Agreement by 194 countries in 2015 indicated the political desire for a globally coordinated approach to tackling climate change. The ultimate goal signed up to by all Parties is to limit global mean temperature increase to less than 2°C above pre-industrial levels and to achieve a balance between anthropogenic emissions of greenhouse gases (GHGs) and GHG removal by sinks to achieve 'net zero emissions' by the second half of this century. Achieving net zero emissions implies significant reductions in fossil fuel use over the next 50 years unless there is a significant increase in the use of biological and geological sequestration to sustain the GHG balance. The Agreement precipitated a wave of national and corporate declarations to limit the development of fossil fuel projects, primarily focused on coal, to expand investment in renewable power and to encourage the incorporation of climate risk in investment decision-making. Furthermore, the Agreement provides a global framework to co-ordinate climate mitigation actions and a possible basis for the future regulation and pricing of carbon emissions (and possibly carbon removal by sinks).

Moratoria and grassroots actions have slowed the development of key projects and are forcing governments to make policy commitments limiting the use of coal

Despite the prevailing tendency of climate policy to focus on penalising emitters of GHGs, known as demand-side measures, coal has also been subject to an increasingly active set of supply-side actions to 'keep it in the ground', a common refrain of climate change activists. Governments and financiers are under increasing pressure to stop supporting, developing and lending to coal projects. These efforts are taking place at national and project-specific levels driven primarily by environmental and climate change concerns. Three recent examples show the grassroots opposition to further investment in the coal sector: the opposition to the development of Gloucester Resource's Rocky Hill project (Griffiths, 2019), the Adani Carmichael mine in Australia (Thomas, 2019) and the expansion of RWE's Hambach mine in Germany (DW, 2018). All three projects have resulted in environmental campaigns against the developers, the supply chain supporting the developers, and the government(s) that provided permits and approvals. In the case of Gloucester, the Rocky Hill project was prevented by a judicial ruling that cited an increase in GHG emissions as one of the reasons for the decision. Neither the Adani nor RWE project has been halted, but pressure on government, developers and suppliers has led to a slowdown in project development and operation. In the case of Adani the capacity of the planned mine has been significantly reduced, there is greater scrutiny on the permitting process and a

far lower possibility of government supported financing for the facilitating infrastructure, primarily a rail link (Smee, 2018).

Governments of developed countries are facing increased pressure to phase-out or limit their reliance on the more environmentally damaging forms of coal

Grassroots movements and international commitments have encouraged some governments to introduce a moratorium on coal development and develop plans to transition away from coal. Twelve countries in Europe have announced their commitments to phase-out coal including the United Kingdom, France and Italy (*see* Table 1) (Bixel, 2019). Others, like Germany, have agreed to the concept in principle but are having an intense political dialogue on the exact date of the phase-out. Importantly the commitment to coal phase-out is not universal – even within the EU – with several countries such as Poland resisting the phase-out efforts. Furthermore, key countries like China and the USA have not engaged in discussions around a phase-out date making this a largely European project rather than a global one.

TABLE 1 EUROPEAN COAL PHASE-OUT (REITZ, 2018; BIXEL, 2019)

Country	Date	Installed coal generation, GW	Member of Powering Past Coal Alliance
Austria	2025	0.6	Yes
Belgium	Phased out	Coal free since 2016	Yes
Denmark	2030	2.8	Yes
Finland	2029	2.1	Yes
France	2021	3.2	Yes
Ireland	2025	0.9	Yes
Italy	2025	8.6	Yes
Netherlands	2025	5.1	Yes
Portugal	2030	2.0	Yes
Slovakia	2023	0.7	No
Sweden	2022	0.1	Yes
United Kingdom	2025	15.0	Yes

In parallel, some governments are committing to phasing out the most polluting coal technologies. The Powering Past Coal Alliance (GCS, 2018) is a group of governments (over 30 national governments, various sub-national governments and companies) who have committed to transition from unabated coal power generation. There is considerable overlap between countries who have committed to the coal phase-out and the Alliance members. It should be noted that for some Alliance members coal consumption is already very low (*see* Table 2), therefore, the move is symbolic but unlikely to reduce global carbon consumption significantly (Plumer and Popovich, 2017).

TABLE 2 TOP COAL CONSUMERS IN POWERING PAST COAL ALLIANCE COMPARED TO INDIA AND CHINA (EIA, 2016)	
Country	Demand, quintillion joules
Mexico	0.52
Canada	0.75
Italy	0.49
United Kingdom	1.03
India	16.32
China	94.89

Developing countries are facing their own constraints in developing coal projects including the challenges of accessing finance and opposition due to local environmental impacts

Developing countries face their own challenges when developing coal power plants. One challenge is decreased funding options as some investors have a reduced interest in coal; a reduction in competition is also likely to be accompanied by a higher cost of capital. Furthermore, localised environmental effects such as smog and air pollution are increasing pressure to limit the development and operation of coal-fired power plants. Smog is an extremely problematic localised hazard; in January 2018 smog and air pollution forced the Chinese government to impose special emission restrictions in Northern China (Stanway, 2018). The regulations are notable for the number of industries they cover, and concerns about air pollution have resulted in Chinese provincial commitments to reduce the role of coal in the provinces long term energy mix.

Economies are trying to transition and diversify away from coal to achieve low carbon growth

Most energy forecasts, such as the BP Energy Outlook (2019) and EIA's Annual Energy Outlook (2019), expect that electricity demand will rise in the mid to long term. The rate and extent of the rise will be based on assumptions of policy adoption, population growth and expected economic activity. The Paris Agreement's bottom-up driven 'pledge' process encourages countries to propose ambitious targets for diversifying their energy mix away from fossil fuels, and to diversify their economies away from fossil fuel production towards other 'greener' jobs. Some of the claims are specified in the Nationally Determined Contributions (NDCs) in which countries outline their long-term climate change related goals; these goals are extremely ambitious and it remains to be seen whether countries such as Columbia and Saudi Arabia can meet the targets set in their NDCs. Nonetheless, the development of NDCs has facilitated a dialogue around compensating countries for enforced economic diversification – or 'response measures' – in the UNFCCC process. Frameworks such as the Silesia Declaration for a Just Transition, made in December 2018 at the Katowice Climate Conference (COP 24), call for a socially sustainable transition to a low carbon economy and encourage countries to move towards lower emission economic models. Whilst the policy objectives are mainly aspirational, they provide a statement of intent which countries can use for future planning.

2.2.2 Commercial developments

Companies are under increasing pressure to develop environmentally-friendly policies and provide greater disclosure of the environmental effect of their activities

Interest from consumers, shareholders, investors and the government on the climate-related implications of different commercial activities is increasing pressure for greater disclosure and consistent reporting by corporations. The desire for more information has resulted in the application of legal and regulatory requirements in different jurisdictions (primarily developed countries). Changes to requirements range from specific laws, such as Article 173 of the 2015 French energy transition law, to the revised application of existing rules and regulations to include or improve reporting on climate risks, as is currently being discussed by the Financial Conduct Authority in the UK. Recognising that climate concerns are interlinked with environmental and business concerns, the Financial Stability Board in the UK has formed the Task Force on Climate-related Financial Disclosures (TCFD). The TCFD recommended the standard of disclosures that will help government policy makers, corporations, lenders, insurers and investors assess and price risks and opportunities from a climate change perspective – the aim being to drive capital towards low-carbon rather than high-carbon investment practices (TCFD, 2019).

The commercial rationale to invest in coal is unclear

Policy-makers and utilities are increasingly aware that coal may no longer offer the best value for money to consumers. The levelised cost of electricity (LCOE) from different generation sources, which is the price of a unit of electricity produced over the lifetime of the generating source, has changed significantly over the past 10 years and new coal investments do not appear to be as attractive as alternative sources by this measure. Lazard conducts an annual analysis of LCOE from different generation sources (*see* Figure 3). The LCOE calculated by Lazard (2018) is based on a 12% internal rate of return for the generator. The analysis suggests:

- The LCOE from all sources of generation except for nuclear power generation has fallen, therefore coal is more competitive than it was historically.
- The LCOE from coal has fallen by a total of 9% compared to other technologies, which is the lowest percentage decrease in LCOE. At present values, the LCOE from coal is higher than the LCOE from combined cycle gas power plants (CCGT).

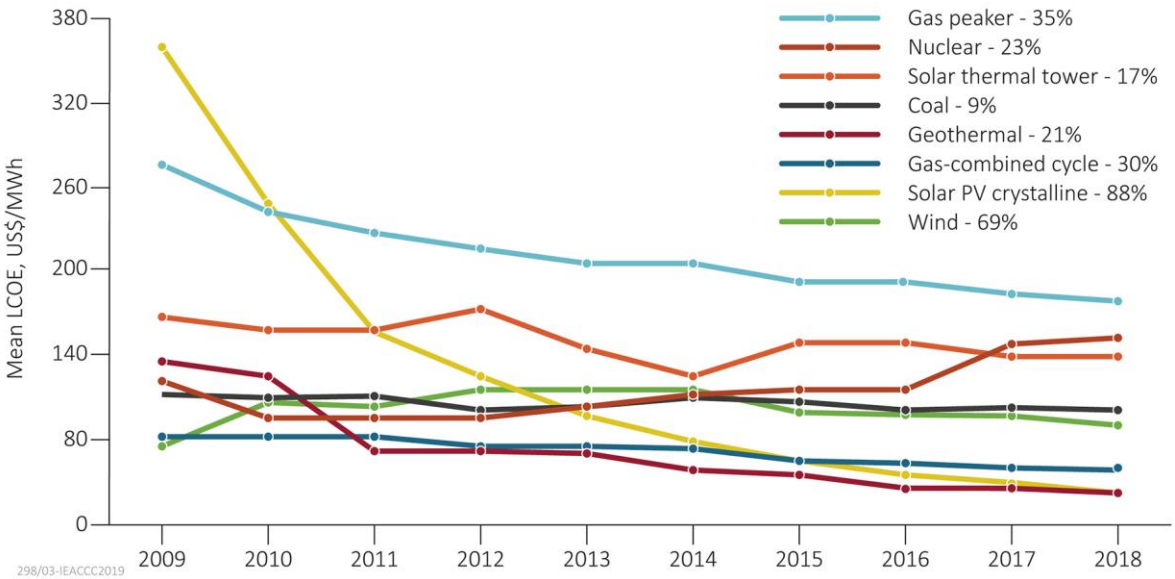

Figure 3 LCOE over time (Lazard, 2018)

Critically, the LCOE from coal is sensitive to fuel prices which are determined by market forces; at a certain price coal may be more competitive than a gas power plant, as it is in many parts of South East Asia where the enabling infrastructure for gas transmission and distribution may be less developed.

Overcapacity and changing markets in several high coal usage economies

Analysis of coal-fired power plant utilisation suggests that India and China are under-utilising their coal-fired power plants, with quoted capacity factors of, respectively, 57% and 48% (Woods, 2019; Hart, 2017). These figures are lower than typical capacity factors for coal-fired power plants operating in baseload mode (taking account of scheduled time for maintenance and repair). Low capacity factors suggest surplus capacity in the existing fleets of these countries, indicating that capital investments into new coal-fired power plants may not be required if usage of the existing fleet can be optimised. Furthermore, market development initiatives in India (Singh, 2019) and China (Bloomberg, 2019) are likely to expose coal-fired power plants to market pressures where they have to compete with renewables and alternative thermal energy sources; these changes are likely to bring added uncertainty to markets where traditionally long term, high utilisation rate, power purchase agreements (PPA) provided security against future commercial disruption.

Decision-makers are conscious of potential disruption which could leave coal investments stranded

Policy-makers, utilities and investors are conscious that future changes in regulation and/or a fall in the price of alternatives may cause assets to become stranded, meaning that the assets would no longer have the value envisioned at the time of investment. There are four possible scenarios under which coal investments could be stranded:

- Faster than expected renewable energy uptake including storage developments which directly challenge the dominance of coal.
- Improvements in the coal alternatives such as a significant reduction in the price of gas which may be caused by cost-effective solutions for shale gas extraction in China, South Africa or Argentina.
- Co-ordinated and comprehensive regulation such as the implementation of carbon pricing measures – this is highly problematic in environments where the government has not offered guaranteed revenue streams.
- Weak global demand for power caused by lower than expected global growth or changing global consumption patterns.

These issues are a cause of concern for investors if governments have not guaranteed revenues to the developers or utilities. Even if these revenues are guaranteed, such as in the form of a PPA, policy makers authorising these PPAs need to manage the added uncertainty that coal assets may no longer offer the best value for future consumers.

3 THE FUTURE OF COAL

This chapter provides an alternative perspective to the one described in Chapter 2. In this view of the future coal demand is not declining but rather plateauing and coal's role in the global energy mix is secure. There are several reasons why countries are still investing in coal and the chapter concludes by suggesting that coal investments are likely to grow in Eastern Europe, Asia and Southern Africa.

3.1 COAL CONSUMPTION DOES NOT SEEM TO BE IN DECLINE

Coal consumption has remained reasonably steady and has plateaued over the past four years

A more dispassionate assessment of coal demand suggests that coal is not in decline but is rather plateauing. A plateau would indicate continued investment into the foreseeable future to meet sustained levels of demand. A more in-depth analysis of historical coal trends (Figure 4) suggests that the plateau has developed due to falling demand in developed countries and China offset by rising demand in other developing nations. Overall trends are likely to be determined by whether continuing falls in demand from developed countries can be offset by rising demand from Asia.

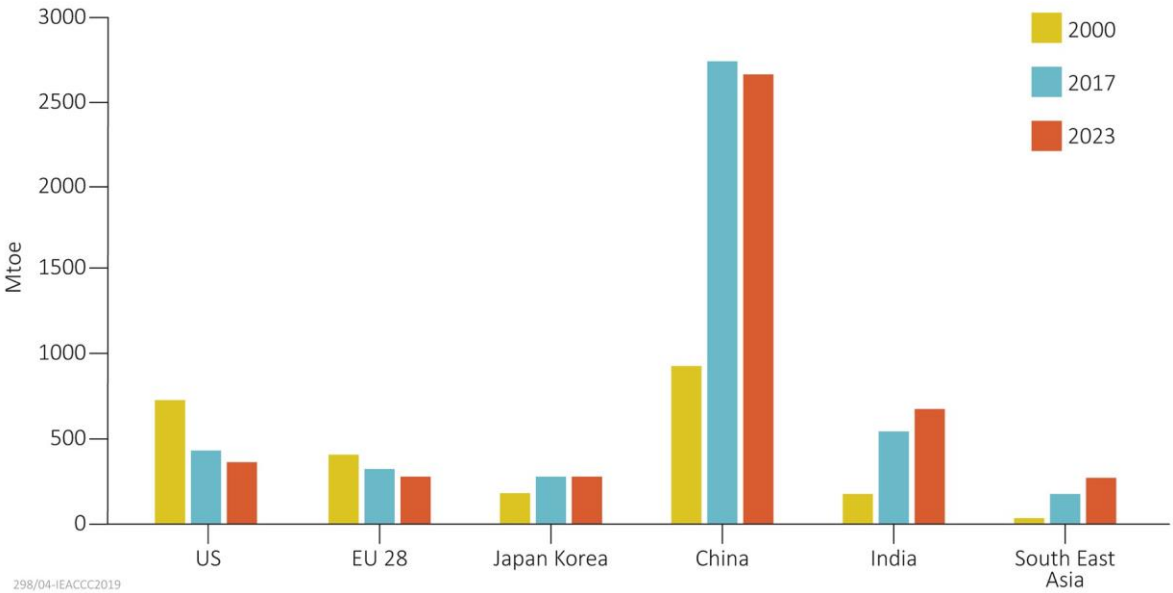

Figure 4 Forecast coal demand in select countries and regions in 2000, 2017 and 2023 (IEA, 2018a)

The BNEF forecast on the future of coal predicts a significant reduction in the role of coal in the global power generation mix (*see* Figure 2 in Section 2.1.1). However, other projections including the IEA's New Policies Scenario, expect coal's role in the energy generation mix to plateau (Figure 5). The New Policies Scenario incorporates expectations regarding the adoption of new policies in line with the commitments made by various governments, including the NDCs under the Paris Agreement.

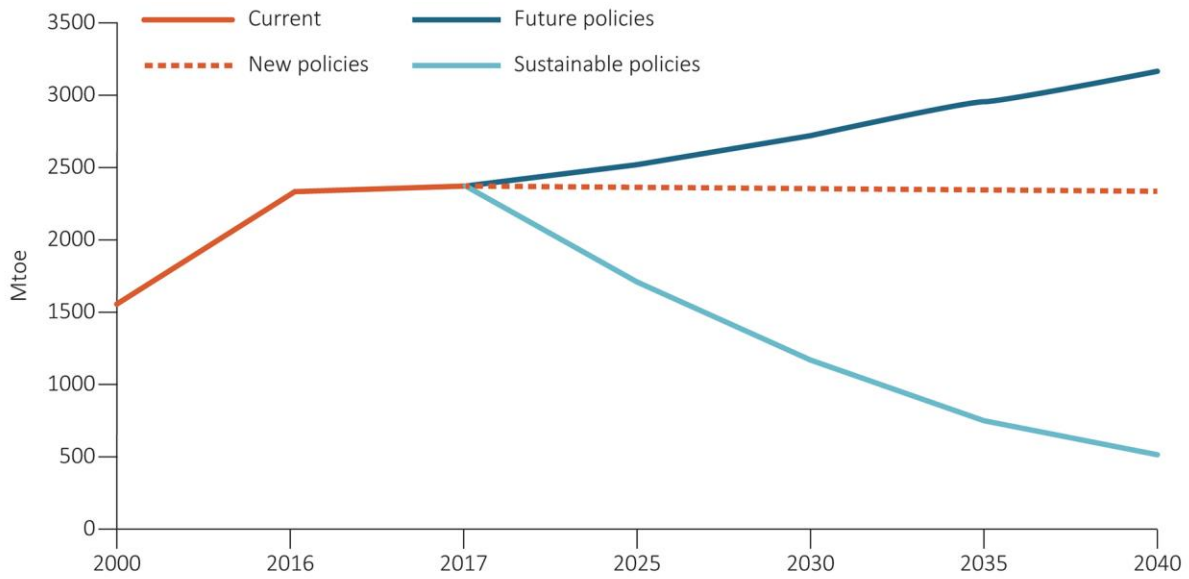

Figure 5 IEA power generation energy mix projections for coal (IEA, 2018b)

3.2 WHY COUNTRIES STILL INVEST IN COAL

The technical and commercial reasons why coal projects still appear attractive

Countries invest in a diverse range of energy sources to ensure energy security of supply. One aspect of power planning is balancing between firm sources, such as coal, gas and hydro, and variable resources, like solar and wind. Solar and wind without energy storage are not available for despatch to meet demand, and while there has been significant growth in storage technology it is not yet commercially competitive against gas- and coal-fired power plants (baseload and tracking power plants). The BNEF forecast suggests that by 2050 renewables with storage will significantly reduce the role that coal plays in the power generation mix, but the prediction relies on expectations of technological growth and price reductions in storage technology compatible with renewables.

Countries with gas infrastructure typically favour gas as a balancing source of generation but for countries without this infrastructure coal may be more cost-effective. Analysis from Wood Mackenzie in 2017 suggests that coal will provide a cheaper source of generation than gas (CCGT) and battery technology in South East Asia until 2035 (Pokharel, 2017). Furthermore, several countries in South East Asia have indigenous coal reserves which they would prefer to use rather than importing liquified natural gas from other countries.

It is cheaper to run existing coal investments than invest in new renewables

Most debates on the comparison of renewables with coal focus on new investments and therefore on the LCOE. In situations where the coal investment has already been made, the marginal cost of running the existing coal fleet is likely to be lower than the cost of new renewables (Baldwin, 2017). Therefore, countries like China and India with a relatively new coal fleet, which still has many years before

retirement, may have few commercial incentives to minimise fleet usage before investing in newer solutions which have a lower LCOE (what may be loosely termed as 'carbon lock-in' effect). The idea that these countries may voluntarily retire plants early without compensation seems improbable even under growing pressure to constrain global GHG emissions.

Governments recognise that the coal sector offers socio-economic benefits to communities

Various governments are proponents of coal because of the economic contributions made by the coal industry as a source of employment generation and tax receipts. Poland (PT, 2019) and South Africa (ACI, 2016) are examples of countries which have communities and cities built around the coal industry – countries like this will find it hard to phase-out coal and will need to balance significant social costs against environmental ones. Driven by the same rationale, the USA has also implemented policies to support coal mining and coal usage in its energy generation mix (Milman, 2018).

Coal offers security of energy supply and benefits the national balance-of-payments

Countries like Pakistan, India and China have significant coal fields—which means that they have a locally available, secure source of fuel. Coupled with significant coal-fired power plant capacity in these countries, power generation is less reliant and susceptible to movements in international commodity markets, particularly gas markets. Furthermore, for countries with a trade deficit, using domestic coal may be more attractive for macro-economic reasons (Khan, 2018).

3.3 THERE IS CONTINUED PRIVATE SECTOR INTEREST IN COAL ASSETS

Private equity transactions suggest that companies continue to acquire existing coal assets

This study is focused on investments that increase the extraction or use of coal. An alternative way of assessing private sector interest is to identify the acquisition or exchange of existing coal sector assets. In the case of mines, these assets may not be fully developed and could just be licenses to mine coal in a particular area. The acquisition of these assets by private equity firms indicates that private investors take a view that these assets will generate positive returns in the future. Identifying finance from private equity firms can be difficult because the investors are typically small, dispersed, and tend to maintain strict confidentiality on their investments.

The US law firm Bryan Cave Leighton Paisner (BCLP) suggest that there is significant volatility in the market for private equity transactions in the coal sector, with equity investment on an annual basis often hinging on one large investment, as was the case in 2018 (Figure 6). The overall size of private equity acquisitions in the coal sector means that it only represents a small part of overall financing. Figure 6 illustrates the volatility in private equity investments in the coal sector. In 2018 there was a spike in private equity because of one deal – the US$1.2 billion investment by EMR Capital Advisors to buy a stake in Rio Tinto Group's Kestrel coal operation.

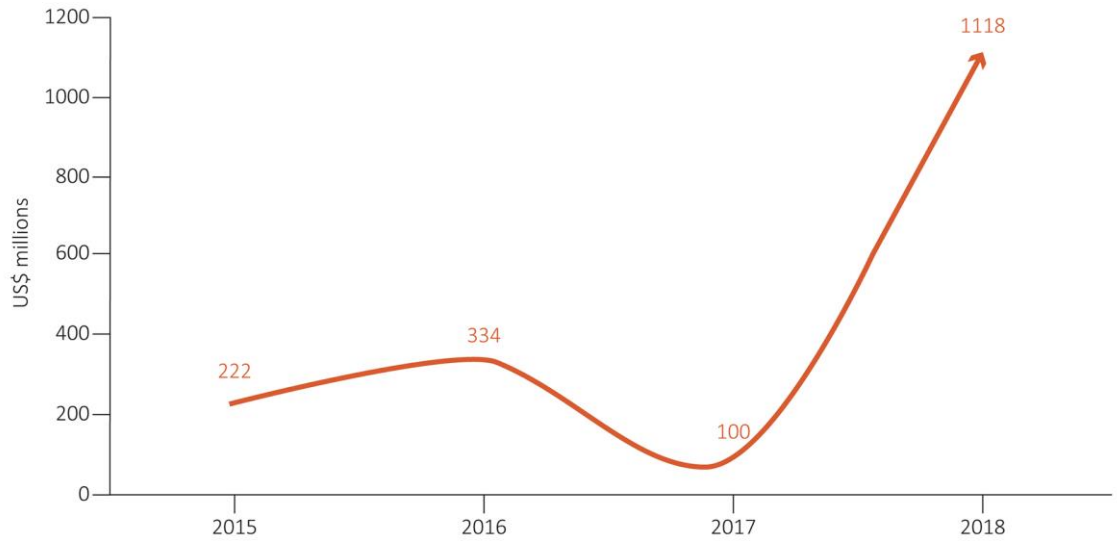

Figure 6 Private equity transactions in coal over the years (BCLP, 2018)

Acquisition of coal assets by private equity firms suggests that these investors perceive these assets to have significant return generation potential. Private equity investors investing in infrastructure assets typically expect to see investments returns between 10% and 20% per year (Blanc-Brude, 2017).

3.4 THE CHANGING FUTURE OF COAL

3.4.1 Geographical cleavages in coal investment

Investments in coal are likely to persist in Eastern Europe, Southern Africa and Asia

Regional trends and attitudes towards coal are summarised in Table 3. Investments in Asia and parts of Eastern Europe are expected to continue and grow, with declines in the developed world.

TABLE 3	REGIONAL TRENDS AND ATTITUDES TOWARDS COAL
India	Coal constitutes over 57% of India's installed power generation capacity (CEA, 2018). Current power sector expansion plans envision installed coal capacity to increase but the proportion of electricity supplied by coal to reduce as a proportion of the overall electricity mix.
China	Coal is an important part of China's energy strategy and is the largest source of energy for electricity generation in the country (West, 2017). However, since 2013, coal's share of the energy mix has diminished. The reduction is largely due to the Action for Air Pollution Control which limits coal use in polluted areas, and partly due to the reduction in costs of alternative sources of power generation.
European Union	In the EU, 14 states are members of the aforementioned Powering Past Coal Alliance. Furthermore, the EU has enacted various schemes, policy directions and legal initiatives that limit the operation of certain types of coal-fired power stations. Examples of policy interventions include the Industrial Emissions Directive and the EU's GHG emissions trading scheme. Central and Eastern European states are more likely to continue with coal as a significant component of their energy mix. Germany and Poland are the EU's largest consumers of coal for power generation. Germany has firmly committed to phasing out coal with an indicative date of 2038 (the date was proposed by the government appointed recommendation panel and is subject to confirmation by the government) (Wacket, 2019); however, Poland expects coal to feature heavily in its future energy generation mix for some time to come.

TABLE 3 – CONTINUED	
Japan, South Korea and Taiwan	Coal constitutes more than 30% of the total electricity generation mix of these three countries. The all expect increases in installed capacity but aim to decrease the proportion of coal in the overall energy mix by 2030. A phase-out of nuclear electricity generation (post-Fukushima) provides a challenge to this ambition given that nuclear power has previously provided approximately 30% of Japan's electricity supply and continues to provide 30% of South Korea's and 15% of Taiwan's electricity supply (World Nuclear, 2019a,b). Japan has recently indicated that it may not support new coal development but is rather considering options for a hydrogen-based fuel strategy, which can be produced from coal at source.
Other Asia	There are generally no significant policies to limit or diminish the role of coal in other countries in the region – countries typically focus on the security of supply and low-cost electricity. Malaysia, Indonesia, Vietnam, Philippines, Bangladesh and Pakistan all expect coal generation to feature prominently in their energy mix.
Africa	Coal and hydro provide most of Southern Africa's electricity supply mix – Box 1 provides evidence to suggest that investors and miners view that coal will continue to play a key role in Southern Africa's electricity supply. New investments may face increasing competition from other technologies (primarily solar). Coal does not feature heavily in East nor West Africa, though Nigeria, Kenya and Tanzania, for example, have continued to periodically discuss the potential to develop new coal mines with associated mine mouth power plants.
USA	Coal currently contributes around 27% of the US electricity generation mix. However, policy and commercial indicators suggest a trend towards gas and renewables – this is particularly important as the existing fleet of coal power plants retires. The US government's policy position on coal has recently changed to become neutral on coal-fired power generation, but the underlying economics, particularly with the prevalence of cheap shale gas, mean that upon retirement the existing fleet of coal-fired power plants will likely be replaced by alternative solutions (Campbell, 2018).
Australia	Demand for Australian coal is growing due to interest from Asian markets. It is unclear how sustainable this demand is and depends on trends affecting power generation in the region (Smee, 2019). Local pressures to decrease reliance on coal and improve environmental standards are a significant concern for new greenfield projects, such as the Carmichael (Adani) and Gloucester mine.

BOX 1 COAL IS LIKELY TO CONTINUE PLAYING A DOMINANT ROLE IN SOUTH AFRICA

South Africa's use of coal in its energy generation mix is seen as problematic by many environmental groups. However, according to the assistant general manager at Glencore's iMpunzi mine outside Johannesburg, the greater concern is 'economic development, and employment' (Sanderson, 2018). South Africa highlights the difficulties many emerging economies face in transitioning away from coal. The government has ambitious plans to expand renewable generation. However South Africa's abundant reserves and Eskom's (the national utilities) long-term coal contracts mean that coal will continue to play a dominant role in the South African energy mix for some time to come.

3.4.2 An alternative pathway?

Clean coal offers a compromise solution which may reduce the risk of regulatory disruption; developments since 2014 suggest a move towards more efficient technologies

Coal will continue to play a role in the power generation mix under most foreseeable scenarios. The possibility of cheaper alternatives which threaten the commercial viability of coal in the longer term

means that developers, utilities and policymakers will 'price in the risk' in their decision-making. One response to the regulatory disruption is to embrace cleaner coal technologies, which are less likely to be affected by the demands of future domestic and international policy and regulatory requirements.

Information from Platts World Electric Power Plants Database (WEPP) suggests that project developers are already factoring this risk and possible mitigation into their decisions. Developers have increasingly focused on supercritical and ultrasupercritical technologies which are more efficient and use less coal for power generation than subcritical technology. Of the plants commissioned between 2014 and 2017:

- the proportion of installed subcritical capacity has fallen by approximately 15%; and
- the portion of ultrasupercritical installed units increased by more than 10%.

The trends reflect a move towards more efficient coal solutions. Despite waning interest over the past five years, there is renewed momentum behind carbon capture and storage (CCS) in response to the greater climate mitigation ambitions set down in the Paris Agreement. It is an open question as to whether the technology can achieve greater deployment than managed over the past decade, where only around 10 commercial scale plants have been deployed globally, with most of those linked to CO_2 demand for use in enhanced oil recovery.

4 THE FINANCING ENVIRONMENT FOR COAL PROJECTS

The principles for coal sector finance, the institutions and actors providing the finance, and the borrowers who invest in coal projects are explored in this chapter. It also provides the commercial context within which trends in the coal sector should be analysed; this context is necessary to develop an informed view on whether the observed changes are structural (resulting from increased regulatory pressures and the emergence of disruptive technologies) or circumstantial (as part of the typical cyclical nature of commodity-based businesses).

4.1 ACTORS AND PRINCIPLES OF COAL SECTOR FINANCING

4.1.1 Types of financing

Coal projects are financed through project finance or balance sheet financing

Projects are typically financed as project finance projects or balance sheet ones. The two distinct approaches have been explained in depth in various World Energy Investment (WEI) guides produced by the IEA (IEA, 2018c).

- **Project financing** involves external lenders sharing risks with the project developer. The project developer sets up a special purpose vehicle (SPV) which is the owner of the asset(s) in which the investor invests – the investor's recourse is typically limited to the SPV, that is the SPV's earnings and asset(s) but not the parent company nor developer that set-up the SPV.
- **Balance sheet financing** typically involves the project developer setting up a project as part of their portfolio of operations. Recourse for investors is against the developer, that is the parent company and their portfolio of operations, rather than just to the specific project. Lending to a firm may help to diversify an investor's risk, or increase it, depending on the comparative risk of the new project to the developer's existing portfolio of projects.

Balance sheet financing is significantly more important than project finance for coal sector projects

Project finance constituted a minor amount of the investment in thermal generation investments and an even smaller amount of financing for coal-fired power plants in 2017, as illustrated in Figure 7.

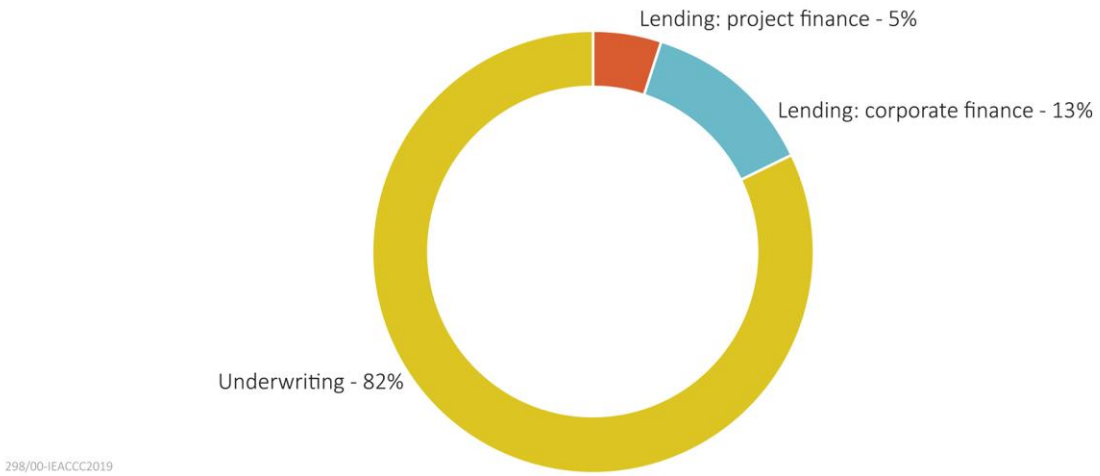

Figure 7 Financing techniques for coal-fired power plants 2014-17 for 120 developers (BankTrack, 2018b)

Balance sheet financing for coal sector projects, shown as 'underwriting' and 'corporate finance' in the figure, constitutes approximately 95% of overall financing. The IEA (IEA, 2018c) suggests that the trend towards greater balance sheet financing is indicative of:

- Less coal generation added in Western countries where projects would typically be built using project finance.
- Emerging markets like India and Indonesia have witnessed declining project finance flows for coal-fired power plants. The financing flows have declined disproportionally due to concerns over the creditworthiness of their utilities (off-takers) and general concerns over the financing available for coal projects.

Underwriting services from banks help companies raise capital so they can fund various projects on their balance sheet as part of their operations

To finance projects on their balance sheets companies either need to invest money from their own income or raise additional capital to invest in different projects. Investment from a company's revenues is harder to track and may be presented in their investor relations reports and declared as part of their audited accounts. When companies raise additional finance to invest in greenfield projects, they borrow money or issue company bonds or shares. Raising capital through shares and bonds requires a bank to underwrite the bond issuance and share offering. By underwriting these investments, the banks commit to financing the company at this level if external investors cannot be found. The company receives an influx of capital from the sale of shares and issuance of bonds which it then uses to finance capital investments in an asset, such as a coal-fired power plant or acquisitions of mineral rights.

A company may choose a balance sheet finance approach over a project finance approach

Achieving financial closure on project finance can be difficult and costly for a developer, particularly once it starts to incur substantial project development costs. Box 2 outlines the case of the Adani Group

which is attempting to develop the Carmichael coal mine in Australia. The project has transitioned from a project financing approach to a balance sheet approach due to the challenges of aligning different institutional partners and consolidating a financing plan for its investment.

BOX 2 THE CHALLENGES OF DECIDING ON A FINANCING APPROACH FOR THE ADANI CARMICHAEL COAL MINE

The Adani's Carmichael coal mine is one example of a flagship project finding it difficult to attract investment in the current climate of regulatory uncertainty and increasing pressure from environmental groups and aligned consumers and investors. Based in Queensland, Australia the mine would be developed by an Indian company (the Adani Group) with the output being primarily supplied to power generators in India (Treadgold, 2018).

The Adani Group initially attempted to raise AU$16.5 billion (or approximately US$11.6 billion) through project finance, but after facing challenges in raising the funding, the Group decided to invest AU$2 billion (or approximately US$1.4 billion) as a balance sheet project (Ludlow, 2018). The financing structure is not inherently clear, but various banks have ruled out funding the project including the Industrial and Commercial Bank of China (ICBC) and the Construction Bank of China (Westbrook, 2017), the four large infrastructure banks in Australia (Robertson, 2017) and corporate lenders including JP Morgan, Deutsche Bank and Morgan Stanley (Hepburn, 2017). The project has support from the government-owned State Bank of India, which has pledged to lend up to US$1 billion of financing should the Adani Group achieve the requisite approvals to develop the project (MoneyControl, 2015). The State Bank of India has not provided its rationale for lending to the Adani group; however, commentators have highlighted the requirement of Indian coal-fired power plants for high quality coal and the Adani conglomerate's close relationship with India's political establishment as an explanation for the loan (Stacey, 2017).

The Carmichael coal mine is an example of the challenges faced in securing project finance, the general investment environment for coal projects, and the willingness of state or state-backed institutions, for example the State Bank of India, to support the development of coal sector projects.

4.1.2 The actors

Key actors involved in the financing of coal projects include banks, public financial institutions and funds

Table 4 provides a summary of the key institutions involved in the financing of coal-fired power plants.

TABLE 4 SUMMARY OF THE SOURCES OF FINANCE FOR COAL-FIRED POWER PLANTS

Multilateral banks	Multilateral banks typically provide partial financing or guarantees for projects which would otherwise not have been financially viable. They also provide legitimacy, an expectation of standards on procurement and operation, stronger sovereign linkages to debtors, and thereby encourage the participation of other financial institutions. In this report, multilateral banks refer to the World Bank, Asian Development Bank (ADB), the African Development Bank (AfDB), the European Bank for Reconstruction and Development (EBRD), the Asian Infrastructure Investment Bank (AIIB) and the Islamic Development Bank.
International and domestic commercial banks	Banks play a leading role in providing the finance required to construct and operate coal-fired power plants. The requirement of international banks is dependent on how developed the local financial markets are, the size of the project, the risk of investment and the technology. Typically, international banks are more visible, operate to a higher environmental and social standard than local banks, and have access to greater resources. The analysis in this report distinguishes between Asian Banks, primarily those based in China and Japan, and Western Banks, these banks are headquartered in Europe, North America and Australia. Furthermore, for certain banks in India and China it is hard to determine whether banks classified as commercial are fully commercial when the government owns a majority and controlling stake in the company.

TABLE 4 - CONTINUED	
Public financial institutions	Public financial institutions (PFIs) are state or state-backed institutions that support the development of projects for policy objectives. PFIs are typically banks, export credit agencies or insurance agencies that support local equipment manufacturers or consumers by providing them with preferentially priced services.
State-owned banks	The state-owned bank(s) are PFIs of the country and may provide a limited amount of support for projects as part of a sovereign guarantee or another incentive to decrease the political and/or financial risk from the project. These banks may also work in tandem with ECAs to support the development of international projects.
Export credit agencies (ECAs)	ECAs are PFIs which engage bilaterally with other countries to facilitate project development and financing in support of their home government and companies based in their home country. These institutions are typically run by the governments of the original exporting manufacturer (OEM) to provide guarantees that minimise financial or political risk. Key ECAs include the Japan Bank for International Cooperation (JBIC), the Export and Import Bank of Korea (KEXIM), the Export and Import Bank of China (EXIM), the Export-Import Bank of the United States (Ex-Im Bank) and the World Bank's Multilateral Investment Guarantee Agency (MIGA). The role of ECAs varies from project to project and is typically enabling to encourage other commercial interests from the ECA's home country to participate by reducing risks; however, in some projects the ECA may be the largest or most significant lender.
Original equipment manufacturers (OEMs)	OEMs have an incentive to sell the equipment they manufacture. Given the capital costs involved in power plants the OEM may arrange long term financing solutions for their clients to 'Design-Build-Finance'. These OEM sponsored solutions are typically tied to long term servicing agreements and therefore encourage repeat custom. OEMs often have relationships with banks and ECAs, and they may lobby to provide their preferred solution from their local government and commercial partners.
Investment funds and institutional investors	Institutional investors buy shares and bonds in companies or particular projects and may have a particular asset exposure or risk profile. Investors include funds such as Vanguard, BlackRock, the Government Pension Investment Fund of Japan and Khazanah Nasional.

4.1.3 Key definitions

Financing is defined differently depending on the analysis and purpose of the financing

Financing is the flow of money from investors to the developer – however, the time at which it is recorded and how it is assessed varies across different sources. Information on financing is collected by financial databases, environmental groups and watchdogs. Unfortunately, the data are generally inconsistent because different organisations use different definitions to record, aggregate or publish this information. For example, an ECA may be more interested in the commitments it has made to the private sector or a counterpart government in a given year rather than annual disbursement of financial support.

Three definitions are prevalent in the literature on coal sector finance:

- **Finance at commissioning:** The financing achieved at the point of operation. This is the capital investment in the power plant or mine that becomes operational in the year or month in question. This approach has been used in the IEA WEI reports to record annual financing for coal-fired power plants and coal mines.

- **Finance at drawdown stage:** Financing from different banks in the form of loans, underwritten bonds, and project finance transactions. Financing is recorded after the project is judged as financially viable; therefore after financial closure, and before the commissioning date of the project, as the project incurs capital expenditures and accesses funds from financiers. This information is aggregated by various environmental groups such as BankTrack, Urgewald and the Rainforest Action Network (RAN) who monitor financing from banks and institutional investors to coal developers and miners.
- **Financial close:** The point at which the developer has legal agreements to guarantee the financing arrangement for the project under the agreed commercial conditions. The Natural Resources Defense Council (NRDC) monitors commitments from different PFIs and multilateral organisations at the point of financial closure – this is typically the earliest point at which commitments can be seen as 'firm'.

There is no 'right' answer for the appropriate definition which makes data aggregation and verification challenging

All three definitions are valid and measure different things for different purposes. Most secondary sources gather information for specific reasons, for example, to monitor the exposure of different banks to coal. Aggregating information across different sources leads to methodological challenges in measuring financing levels on an annualised basis using a consistent methodology.

The methodological challenges notwithstanding, data collection and reporting of investment in coal-fired power plants and mining is not standardised, and there is no one single source of information for the data collection. Various sources provide conflicting information, information is frequently updated, and verification is extremely challenging.

The analysis in this report relies on a variety of secondary data sources which have different methodologies and authors, and the information has not been verified by those authors with any primary sources. The data presented in the report is useful to draw insights on trends; however, the results need to be treated with some caution because of the potential inconsistencies and overlaps that may occur between different sources. The authors of this report have made attempts to reduce these inconsistencies as much as possible, although it is acknowledged that some errors may be present which have not been possible to measure or correct.

Is financing for coal mines different from financing for power plants?

Financing for coal mines is assessed as part of this report. Coal-fired power generation is the most significant driver of coal demand and therefore has a significant effect on the price of coal. Importantly:

- The installed capacity may require continued additional financing for coal mines to develop the coal supply required to run the current fleet of coal-fired power plants.
- Coal mining is typically seen as a more commercially viable opportunity requiring less government support than coal-fired power plants which require guarantees from a power

off-taker (typically a government owned entity such as state-owned power or transmission company). However, mining often requires the development of associated infrastructure such as transport links and energy supplies to the mine.

- There are international mining companies that are extremely well established and operate mines. The power sector is more diffuse and while there are a limited number of OEM contractors there is greater diversity in project developers.
- There are differences in the type of financing and sources of finance as we note later in in Chapter 5.

Trends from the past three years suggest a small decline in mining and power plant funding combined, with mining attracting more financing than power plants in 2017.

4.2 WHO NEEDS THE FINANCE?

4.2.1 Recipients of finance

The different types of companies that require financing

Investment is required by a range of companies looking to build or expand coal-fired power plants and mines. Companies vary in the scale of investment required, their approach to raising capital and the revenue base which is leveraged to service their debt obligations and compensate their investors (Table 5).

TABLE 5 POSSIBLE BORROWERS FOR PROJECT DEVELOPMENT	
Mining companies	There are various global mining companies that invest across the world to extract coal from the ground. Coal mining is typically capital intensive and requires investment to buy the land and acquire mineral rights. In some instances, investment may be needed to develop infrastructure on previously undeveloped land and provide compensation and resettlement of populations located at the site. Major coal mining companies include Coal India Ltd, which produced more than 500 Mt of coal in 2017 (Fernandes, 2017), the Shenhua Group and Peabody Energy. Mining companies may raise capital by issuing corporate bonds or shares to expand existing mines and/or develop new ones. Alternatively, these companies may also arrange short term and long term loans from banks.
Utilities	Various utilities own coal generating assets ranging from China's large state-owned utilities like the China Huaneng Group (with about 118 GW installed capacity) to Eskom in South Africa (39 GW installed capacity) and the Korea Electric Corporation (27 GW installed capacity) (CoalExit, 2018). Most utilities generate revenues by charging consumers for the provision of electricity – in some instances they are subsidised directly by the government. Utilities are typically the off-taker for independent power producers (IPPs) or in a vertically integrated model have their own generation capacity. A utility typically requires investment to build additional generation, transmission or distribution assets and will need to borrow money to finance these assets. Various power utilities are also vertically integrated with mining operations, for example, Germany's RWE also owns several lignite mines.
Developers	A developer typically builds and operates a power plant for the off-taker. The developer takes on the immediate capital and project development costs and expects to recover them over the lifetime of the asset. In most instances, the developer borrows from banks, ECAs or multilateral institutions and recovers the cost of financing, a risk premium and the capital cost from the utility or government.

State-owned enterprise or private developer? Does it matter?

When considering different approaches to raising capital it is useful to understand whether the recipient or investor is a state-owned actor or a private entity. In particular, it is important to consider the following factors:

- **Political influence:** The influence of the investor (bank) may be important to ensure prompt payments from the off-taker (utility). The exact nature of the relationship depends on the dynamic between state institutions, the involvement of foreign parties, and the nature of laws and regulations on debt and bankruptcy.
- **Access to capital:** A state-owned actor may have access to credit from state-owned finance institutions and development banks in a way that a private sector entity may not. Given the capital intensive nature of power projects, bankable state institutions are more likely to have access to cheaper and more plentiful sources of financing.
- **Credit risk:** In the case of a default, a commercial bank may feel that it has greater recourse over a private sector entity rather than a government one.

4.3 THE CONTEXT OF FINANCING IN THE COAL SECTOR

The coal sector is susceptible to cycles of boom and bust that are prevalent within the commodities sector in general. Growing demand and increased scarcity signalled by rising prices encourage investments in supply. Investment often leads to oversupply, decreased prices and therefore reduced investment as investors adapt to lower prices (DayTrading, 2017). As such, cyclical patterns between over- and under-investment feature heavily in annualised trends and may mask broader structural trends.

4.3.1 Recent events

There was a significant market shock in the coal sector 2012-2015 which resulted in a downturn

The period of this assessment (2014-17) comes at a confluence of various events that create a negative outlook for the coal sector. These events include the ratification of the Paris Agreement, growing activist, investor and consumer pressure on firms to be more aware of their environmental obligations, considerations about the changing commercial case for coal development, and changes in forecast demand. The last point is validated by a significant market shock to the coal sector during 2012-15, with oversupply in the coal market and declining demand, particularly in China, causing a slashing of prices and therefore a reduction in investment for future production. Critically over this period:

- coal companies experienced significant drops in their share values with some forced into bankruptcy (Ivanonva, 2018);
- the Paris Agreement was in the process of being negotiated, increasing the possibility of future regulatory risk; and

- natural gas prices were at a 10-year low and it was plausible that gas-fired power plants would displace coal ones even in countries importing liquified natural gas (Strumpf, 2012).

Narratives on coal decline typically view regulatory and policy changes as the cause and the decreased profitability and investment as the effect. However, towards the end of 2015, the coal market started to recover and renewed demand meant increased investor interest in potential investment opportunities (Gloystein, 2016).

4.3.2 Cyclical or structural challenges?

It is not clear if the market conditions are driven by structural factors or cyclical ones

It is unclear if the changes in the coal sector are cyclical or structural, or whether there is necessarily a clear distinction between both. Commodity investments are typically cyclical, they follow a pattern of boom and bust, and yearly investment figures over a short time period may mask structural changes in longer term investment trends over a 10 to 20 year period. Figure 8 provides an example of significant swings in capital investments that follow stock price returns. These swings are sometimes driven by demand and supply fundamentals, but equally may be driven by short term factors, for example oversupply or low demand due to smog restrictions or lower than expected economic growth.

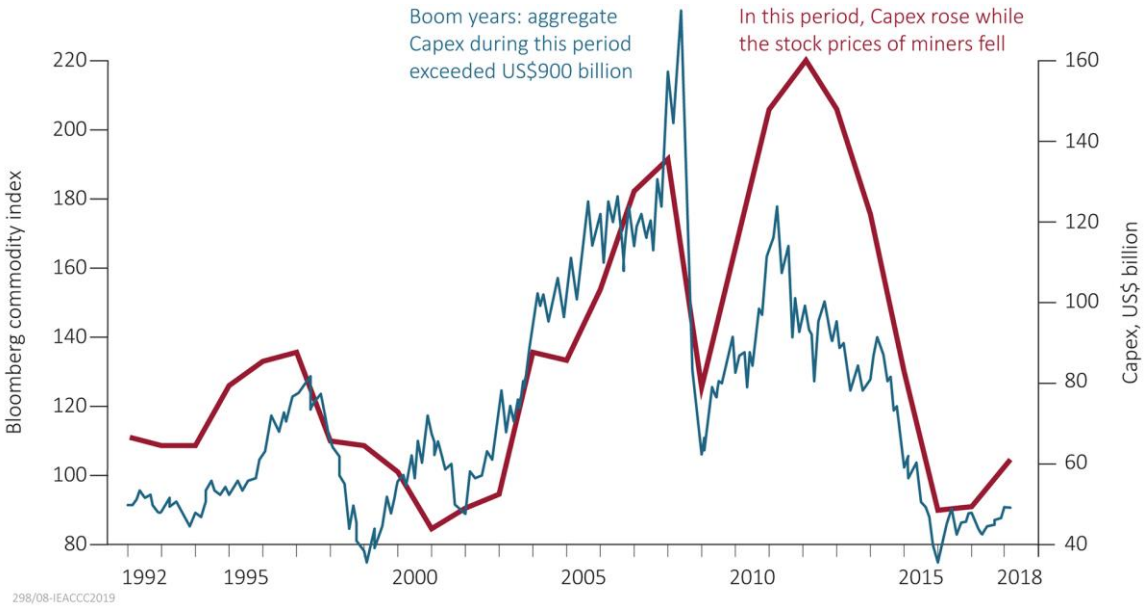

Figure 8 Global capital investment in mining tracked against the Bloomberg Commodity Index (Hume, 2018)

The narrative in Chapter 2 would suggest that the change is structural; however, on the other hand, as explored in Chapter 3 and later in Chapter 5 there is evidence to suggest that coal is not in decline. Increased demand from key coal consumers, for example, increased power generation requirements for faster developing economies which may prioritise cheaper power and increased electrification over environmental concerns, could trigger further new investment in coal production and power generation assets.

Answering whether the sector is in structural decline or whether recent annualised investments have followed the business cycle requires long term monitoring of financing flows

Arriving at a comprehensive answer to whether the decline is structural or cyclical requires a review of annualised investment flows over the long term. This level of information has not been uniformly available for this study. Therefore, we do not offer definitive conclusions in these respects and rather suggest the reader draws their conclusions based on the evidence presented to them.

5 FINANCING TRENDS IN THE POWER SECTOR

Headline figures suggest that investment in coal sector projects (coal mining and power plants) has slightly declined over the past three years (2015-17). However, if we consider the baseline to be 2014, financing for coal sector projects has risen. Multilateral funding was negligible in 2014 and remains so, with most winding down their existing commitments and fulfilling previous obligations. Funding from the top 20 banks has increased (2014-17); however, there has been a decline in the level of investment in mining. Furthermore, PFIs have emerged as a growing source of finance for coal sector projects. The data summarising these trends is presented in Table 6.

TABLE 6 DETAILED SOURCES OF INVESTMENT US$ MILLIONS (BARUYA, 2017, NRDC, 2018, RAN, 2018, IEA, 2016, 2017, 2018c)

Financing source	2014	2015	2016	2017	Change between 2014 and 2017
Multilateral commitments (coal-fired power plants)	250	No new direct lending for coal-fired power plants identified by the government.			
Multilateral commitments (mining)	–	–	–	–	–
PFI commitments (coal-fired power plants)	8,800	5,351	7,715	13,924	+58%
PFI commitments (mining)	–	–	24	–	NA
Financing from top 20 banks (coal-fired power plants)	18,598	27,951	29,699	28,431	+53%
Financing from top 20 banks (mining)	16,279	22,053	13,699	14,259	-12%
Other financing (coal-fired power plants)	47,352	44,698	42,586	17,645	-63%
Other financing (mining)	60,721	45,947	55,007	64,741	+7%
Total investment (coal-fired power plants)	75,000	78,000	80,000	60,000	-20%
Total investment (mining)	77,000	68,000	68,730	79,000	+3%
Total investment	152,000	146,000	148,730	139,000	-9%

The highlights from the table include:

- Total investment has fallen by approximately 9% led by declining investment in coal-fired power plants (approximately 20%) while investment in coal mining has marginally risen (approximately 3%).
- A significant amount of investment is classified as 'other financing', approximately US$80 billion dollars (in 2017). For coal-fired power plants this 'other financing' category is approximately 30% of the total investment in power plants and approximately 85% of the total investment in coal mining.
- Funding from commercial banks for coal-fired power plants has significantly increased between 2014 and 2017, but funding for coal mines has fallen.

To further expand on the headline data, the following sections analyse the different categories of financing by type through a critical review of the aggregated data, the source of the data and the nature of the financing source. The focus is on the following institutions:

- **Multilateral banks** with a view to assessing their relevance for ongoing investment in coal projects. There is no evidence of direct multilateral lending to coal sector projects between 2014 and 2017 – we review the different institutions, recap their policies and highlight any changes to their position since 2017. We update previous analysis by considering two 'newer' multilaterals who have shown a willingness to lend to coal projects, and discuss a traditional multilateral bank, the AfDB, considering investing in coal-fired power plants.
- **Commercial banks** investing in coal projects. This sub-chapter assesses the Asian and Western banks lending to coal developers (power plants and mines), the nature of these banks, the type of support they provide, the policies they have in place to restrict lending to coal projects and any changes in their behaviour. In this section we also assess the role of institutional investors who provide the underlying finance needed by banks to facilitate coal sector investments to buy bonds and shares associated with coal developers.
- **Public financial institutions** who are providing considerable and growing support to coal-fired power plants. These institutions will be increasingly required to support new projects if credit support from traditional sources like commercial banks reduces further in future. PFI's provide their own finance but also support the project by reducing risk and therefore making them more attractive to other financiers.
- **Other sources of financing** that could be providing finance for coal projects. 'Other financing' is calculated from the difference between bottom-up and top-down financing estimates provided by different analysts. The size of the difference may be attributable to methodological differences used by analysts as much as any omissions, underestimates over overestimates in the data collected by either. In this section we review the data, possible sources of this differences, and future areas of exploration to better understand these differences.

When assessing these sources of financing the aim is to determine whether the changes in financing patterns are the result of changes in structural or cyclical factors.

Table 6 above presents information across different financing categories in a time series. We explore the individual categories and trends in later sections of this chapter. However, it is important to note at a high level some of the challenges encountered in aggregating this information:

- There is no one source for this information and it is aggregated from different sources; therefore, the data collected varies depending on the purpose and intention of the aggregator – *see* Chapter 4 for a discussion on the different interpretations and measurements of financing.
- The time series data is not strictly comparable – Baruya (2017) used RAN (2015) to get aggregated data for lending from the top 20 commercial banks. However, the information differs

from RAN (2017) which also reports on the 2014 data. The differences in methodology are based on which recipients of financing are included in the statistic, how they are selected, and the adjustment factor used to discount their non-coal related businesses. Since we have used information from RAN (2018) for 2015-17 trends we also use RAN (2017) for the 2014 data since they employ a similar methodology.

5.1 THE RELEVANCE OF MULTILATERAL SOURCES OF FINANCE

In the 2017 report, it was highlighted that multilateral lending institutions such as the World Bank and the European Investment Bank were developing stringent conditions for financing coal. The report suggested that these institutions would play a less critical role in the development of coal projects, and developers and countries would rely on new sources of finance particularly from Asia.

5.1.1 Key findings

Headline figures suggest that multilateral finance institutions are playing an increasingly insignificant role in supporting coal projects

The updated figures in this report suggest that these commitments are being realised in practice, with negligible direct lending to coal projects from the traditional multilateral institutions over the study period. However, it is worth noting that two new multilateral banks, the Asian Infrastructure Investment Bank (AIIB) and the Islamic Development Bank (IDB) have indicated a willingness to lend to coal projects under certain circumstances; their policies remain opaque and circumstantial at present. The policies of key multilateral institutions are summarised in Table 7.

The World Bank position has remained consistent and the most expansive when restricting lending to coal

The World Bank position has not changed in constraining lending to coal sector projects. No investments have been recorded since the 2017 IEACCC report. The last project it assessed for direct support, a coal-fired power plant in Kosovo, is no longer under consideration for possible funding (Zuvela and Bytyci, 2018).

Regional development banks have not invested in coal for a while; however, the African Development Bank has recently shown a willingness to chart a different course

The African Development Bank (AfDB) and Asian Development Bank (ADB) have adopted different approaches to coal projects compared to the World Bank. At a policy level they do not restrict the development of coal but promote cleaner forms of coal technology where possible. Despite few policy restrictions, no large investments in coal sector projects have been agreed in recent years, and no new investments were made between 2014 and 2017 that could constitute significant commitments by either bank (AfDB, 2019; Rogers, 2018). The Inter-American Development Bank has a stated policy to consider funding for high efficiency, low emissions (HELE) coal projects but has no projects in the pipeline. In 2018 and 2019, the AfDB has shown an interest in engaging with member countries on the possibility of financing coal-fired power plants – the President of the AfDB has also stated that coal

has a role to play in the electrification of various countries in Africa (Okonkwo, 2018). Conversely, senior figures have recently indicated that the ADB is 'no place for dirty energy' (ADB, 2018).

The European Investment Bank and the European Bank for Reconstruction and Development have no foreseeable plans to develop coal projects. Both institutions require such projects to meet high environmental standards and include a carbon price or shadow carbon price that negatively affects internal financial appraisals of higher emitting investment opportunities.

The Asian Infrastructure Investment Bank (AIIB) has indicated an ongoing interest in investing in coal

The AIIB was set up by China and its 57 founding members include various countries in Asia including India, Pakistan, and South Korea. To develop major policies or change its strategic direction the AIIB requires the approval of 75% of its voting members. The high threshold gives many of the voting members of the bank significant leverage in determining policy, and significant veto power over a change in policies. China who initiated the AIIB and has provided the most capital (approximately 30%) has 26.6% of the voting rights in the organisation.

The AIIB has shown an appetite to support the financing of coal-fired power plants if 'they replace existing less efficient capacity or are essential to the reliability and integrity of the system' (AIIB, 2017a). Currently (May 2019), the AIIB is not directly lending to any coal projects and has stated that "there are no coal projects in our pipeline, and we will not consider any proposals if we are concerned about their environmental and reputational impact" (AIIB, 2017b), but the possibility of financing through intermediaries exists. Civil society organisations have noted that the AIIB has invested in a captive coal mine supporting a cement plant in Myanmar through an IFC fund (more details of intermediary financing and the IFC are available Box 3).

Is the Islamic Development Bank going to become a large coal investor?

The IDB does not have a stated policy on coal sector lending. It has approved investment for two coal projects in the recent past which suggests a willingness for further lending. The IDB is a co-financier of the Jamshoro Project in Pakistan (US$220 million), alongside the ADB, and the Safi Coal IPP in Morocco (US$84 million), with AIIB's intermediaries. However, these investments by IDB have been on existing projects and the Bank does not have a record of directly finding and supporting the development of new coal projects.

5.1.2 Multilateral banks' policies and observations

The official policies of various multilateral banks and our observations about their practices are summarised in Table 7.

TABLE 7 MULTILATERAL INSTITUTION POLICY POSITIONS AND SELECTED OBSERVATIONS ON COAL PROJECTS

Multilateral institution	Official policy	Observations about coal projects
The World Bank Group (WBG)	In 2013, the World Bank announced that it would no longer fund greenfield coal projects except under exceptional circumstances (WB, 2013).	There is little evidence to suggest that any projects have met the WB's criteria for direct lending. In September 2018 the WB reiterated its stance on coal sector finance when it refused to lend to the last coal-fired project it was considering in Kosovo (Mathiesen, 2018). Critics claim that WBG still facilitates the financing of coal projects through its subsidiaries and the IFC (*see below*). When referring directly to the WBG's subsidiaries, critics cite its loans to state-owned utilities and banks which indirectly subsidise procurement of coal-fired power plants or lending to coal mining and coal power companies. Others, such as the World Coal Association have also suggested that the blanket ban from the WB has encouraged countries to finance less efficient coal projects with funding from alternative sources (Woodroof, 2018).
Asian Development Bank	The 2009 energy policy of the ADB states that the Bank will support coal-fired power plants selectively if cleaner technologies are adopted and adequate mitigation measures are incorporated into project design. The Bank will now only support coal projects that use HELE technologies (ADB, 2009).	The ADB's Energy Chief remarked that support in the future is likely to be focused on gas-fired power plants and other cleaner sources of generation. More explicitly the Bank Chief stated that…'the last such instance [when the ADB approved a coal project] was five years ago in Pakistan, where we supported the Jamshoro supercritical coal-fired power plant, which prior to our investment was running on highly-polluting heavy fuel oil' (Zhai, 2018).
African Development Bank	The AfDB 2012 energy sector policy states that the Bank will only support coal investments when such finance is determined to have a strong development impact and is also environmentally responsible (AfDB, 2012).	Until 2019, there had been no tangible projects supported by the AfDB. Since 2017 there have been indications that the AfDB is considering lending to HELE coal projects (AfDB, 2017). The latest news account and speeches from AfDB officials suggest that the AfDB has a greater appetite to consider coal-fired power plants as part of its future investment portfolio. The AfDB is presently considering supporting the financing of a 350 MW coal power plant in Senegal (Du Venage, 2018) and the 1 GW Lamu coal plant in Kenya (Africa Investor, 2018).

TABLE 7 – CONTINUED		
Inter-American Development Bank (IADB)	IADB's 2009 guidelines on coal-fired power plants are that the Bank will only support plants that are designed to use HELE technologies. (IISD, 2009)	The IADB has not funded any recent coal sector projects and was ranked as 1 out of 6 multilaterals promoting climate finance (MDBs, 2018).
European Bank for Reconstruction and Development	The 2018 strategy suggests that EBRD has closed the 'door on financing of thermal coal mining and coal-fired electricity generation'. Instead the thrust of its energy policy is on the 'decarbonisation of energy systems' (Bennett, 2018).	EBRD published its updated strategy in December 2018, claiming that it was 'planning a no coal, no caveats policy' (Kyne, 2018). Officials at the Bank stated a willingness to lend to natural gas projects but stated their focus was on solar and renewables projects. Activist groups have welcomed this change in policy but have criticised intermediary lending from EBRD and EIB (as discussed further below).
European Investment Bank (EIB)	In 2013, EIB introduced an emissions performance standard which effectively means that the Bank is not able to lend to most coal-fired power plants (Brittlebank, 2013).	EIB's policy developed in 2013 has been challenged by activists and pressure groups who claim that the Bank provided €2 million or US$2.4 million to support coal mining. Furthermore, some groups have argued that the EBRD and EIB are supporting institutions which allow them to subsidise their coal-based activities (Roggenbuck, 2018).
Asian Infrastructure Investment Bank	In October 2016, the Bank published its Energy Strategy, and an Environmental and Social Framework document in February 2016 (AIIB, 2016). Neither document excludes or restricts coal sector investments.	There is conflicting information about the willingness of AIIB to back coal sector investments. Officials such as AIIB's vice-president Thierry de Longuemar has stated that the bank 'won't finance' coal-fired power plants (Wright, 2017).
Islamic Development Bank (IDB)	The IDB has no explicit stated policy on coal. Its policy published in December 2018 has only one mention of coal in reference to reserves held by member countries (IDB, 2018).	The IDB has shown a willingness to co-finance coal sector projects. It should be noted that these projects were co-financed alongside other multilateral institutions such as the AIIB intermediaries and the ADB.

What about multilateral funding from intermediaries?

International financial institutions often support developing countries by providing a line of credit for domestic financial institutions in the recipient countries which subsequently provide credit to local companies and projects. Environmental groups have accused the International Finance Corporation (IFC), a WBG member working directly with the private sector, of supporting the development of coal projects through intermediaries. The intermediaries are typically energy companies or local banks to which the IFC provides general financing services usually in the form of equity injections or loans. The IFC has responded to such criticism by strengthening the processes through which it collects and publishes its information and by instituting new policies on how to finance subsidiaries.

BOX 3 FINANCING THROUGH INTERMEDIARIES, THE FINANCING CHALLENGE FOR IFC

The IFC Emerging Markets Fund was set up by the IFC to channel investment into the private sector of select economies in Asia (IFC, 2016). The fund is approximately US$700 million and includes investments in the Shwe Taung Cement factory (which has recently expanded its coal mining operation) and the Summit Power Company in Bangladesh (which manages and operates a fleet of power stations including coal-fired power plants).

The IFC typically invests by buying an equity stake in a project or by investing in shares of a listed company; the approach does not typically provide IFC with any discretionary control on internal decision making within the supported firms. However, by providing development finance, often at subsidised rates, the IFC is able to wield some influence on the policy and direction of these organisations.

Activists have accused the IFC of subsidising coal developers (miners and power plants) by providing general loans, which can be channelled to specific coal investments or by subsidising the general operations of a company investing in coal projects. Under renewed pressure, the IFC has announced policy changes such as ringfencing 95% of its lending for specific initiatives and has instituted a requirement for financial intermediaries to disclose their total coal exposure (Le Houérou, 2018). Le Houérou, the CEO of IFC, emphasised that he wants to develop a green equity investment approach to work with financial intermediaries that formally commit upfront to reducing their coal investments over a defined period of time (Agrawal, 2018).

5.2 COMMERCIAL BANKS INVESTING IN COAL

The 2017 IEACCC report (Baruya, 2017) highlighted that 'commercial banks play a leading role in financing energy-related infrastructure'. This sub-chapter is divided into four sections: 5.2.1 and 5.2.2 looks at overall investment and how banks support coal projects; 5.2.3 assesses the geography of the banks supporting coal projects; 5.2.4 assesses the role of Western banks and how they have responded to policy changes; 5.2.5 assesses the role of Asian banks with a focus on Chinese ones; and, 5.2.6 focuses on the institutional investors who support these banks in financing coal projects.

5.2.1 Overview of financing

Lending from the top banks fell between 2015 and 2017; however, the trend suggests a plateau not a decline

Figure 9 Lending from the top 20 lenders in coal mining and coal power (RAN, 2018)

Figure 9 suggests that:

- Lending from Western banks experienced a jump between 2014 and 2015 and since then has plateaued until 2017 (though there has been a slight increase).
- Asian banks are financing more proportionally and in absolute terms than they were in 2014.
- 2015 experienced extremely high bank financing flows, but since then bank financing levels have been lower.

5.2.2 Type of financing

The nature of the financing support has not changed, and underwriting for shares and bonds is the most significant source of finance for developers

As outlined in Chapter 4, there are two approaches that are typically followed by banks and developers to fund coal projects: balance sheet finance or project finance. Banks can support the developer under both these approaches by either lending directly as a financial institution or by facilitating access to other investors, typically by underwriting bonds or project shares.

Underwriting involves an assessment of risk, a valuation for other investors by the bank, and often a commitment from the bank to buy the assets if other investors are unwilling to do so at the price the bank has underwritten; this may happen because the bank has failed to assess and price the risk realistically. Loans, on the other hand, can be short-, medium- or long-term and are made by banks to various companies including the SPV in the case of a project finance structured project. Box 4 provides a rationale as to why investors may prefer underwritten bonds and shared to project finance techniques.

BOX 4 UNDERWRITING OR LOANS, WHY CHOOSE ONE OVER THE OTHER?

Underwriting involves coal companies borrowing from the public (as represented by institutional investors) as opposed to banks. Companies use underwriting services to issue bonds and shares and gain access to a wider pool of capital at potentially better rates.

Bonds are similar to loans but are typically not linked to underlying interest rates and therefore lock in returns for investors and costs for the companies over a long-term period. Shares are another underwritten product and involve the investor buying a stake of the company – investors are therefore entitled to associated decision-making and profits depending on the type of shares bought. Most investors consider shares as riskier than bonds or loans since shareholders are typically paid last but consequently expect higher returns.

An analysis of loans and underwriting support to the top 120 coal developers between 2014 and 2017 (Figure 10) suggests that the vast majority of support provided by banks is through the provision of underwriting services. This may reflect the view that loans are becoming marginally scarcer as investors put pressure on banks to decrease lending. It is important to note that companies included in the top 120 coal developers often have diversified portfolios. Some of the largest developers are state utilities, such as the State Grid Corporation of China, which owns various asset types including coal-fired power plants.

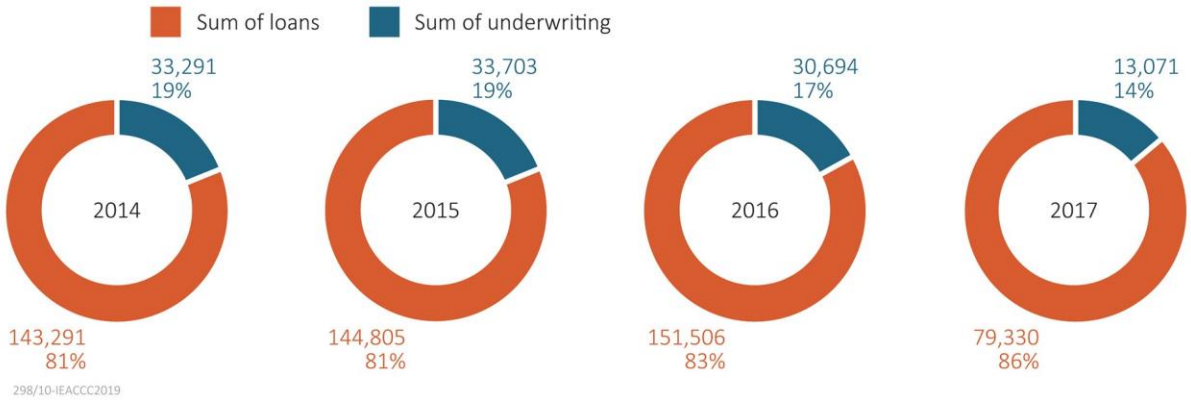

Figure 10 Proportion of financing through underwriting for coal plant development to mid-2017 (BankTrack, 2018b)

State-owned or state-supported banks continue to play a large role in the development of the coal sector, particularly in India and China

State-owned and state-supported banks continue to play a significant role in supporting investments in the coal sector by both providing underwriting services and loans. This support is prevalent in India and China where the most significant expansion of coal sector projects has taken place. In other countries, like Japan, France, Germany and the UK, state aid is more explicitly and clearly given through public financial institutions such as ECAs and state-owned banks, as discussed further in Section 5.3.

Box 4 and Box 5 provide two case studies from India and China respectively which explore the role of state-owned and state-directed banks in making coal sector projects viable. The two cases illustrate the difficulties in determining if these projects are commercially viable on a stand-alone basis or are only viable when considering the broader economic and policy benefits (as highlighted previously in Chapter 4).

BOX 4 STATE-OWNED BANKS PLAYED A KEY ROLE IN PROJECT FINANCIAL CLOSURE IN INDIA 2017

An India-based think-tank, the Centre of Financial Accountability, estimated that approximately US$9.35 billion was lent to 12 coal-fired power generation projects in 2017 by way of project finance in India. In their estimation, most of the funding was for existing projects with US$2.68 billion – around 30% – earmarked as new credit which was 'typically intended to fund new projects'. The majority of the overall funding, around US$4.5 billion, was allocated from banks in which the Indian government owns a majority stake (CFA, 2017).

BOX 5 HOW DO CHINESE STATE-OWNED/DIRECTED BANKS OPERATE WITH RESPECT TO COAL PROJECTS?

Chinese state-owned banks are partially driven by policy interests and partially by commercial ones. The country's economic system attempts to distinguish between these two competing goals by creating 'policy banks' including the Chinese Development Bank and the Chinese Export-Import Bank and 'commercial banks' which include some of the top lenders in infrastructure, such as ICBC and the Bank of China. However, these efforts are not typically exclusive, and public financial institutions are often supported by commercial lenders to help projects reach financial closure. The approach of lenders is best illustrated by their involvement in China's Belt and Road Initiative, a US$1 trillion plan that aims to form a route from Eurasia and Africa to China. It is estimated that Chinese public financial institutions and state-controlled banks have collectively committed to funding approximating to more than 100 GW of coal plants that are currently under development (Shearer and others, 2019a).

5.2.3 Geography of banks

Country of origin of the top 20 banks supporting coal project development

The Fossil Fuel Bank Cards produced by Rainforest Action Network (RAN) highlight lending from the top 20 banks through loans and underwriting services (RAN, 2018). The analysis highlights the type of banks and their lending to the top coal developers (mining firms and coal power plant developers). Our analysis of RAN's data suggests the banks financing investments in coal sector projects are primarily headquartered in China, Europe and North America (*see* Figure 11). Regional banks may also be important in financing individual projects but given their scale they do not typically feature on this list of top 20 banks. Examples of important regional banks are the four infrastructure banks in Australia, which are typically involved in any deal in their home country, or the large Singaporean banks that provide an alternative to Chinese and Japanese financing for coal sector projects in South East Asia. Analysis of the fuel cards produced by RAN suggest that 21 banks are the top financiers to coal mines and coal power plants, and many banks feature as top financiers for both. Moreover, the following observations can be made:

- China and Japan dominate lending from Asia, with China providing significantly more funding than Japan.
- The USA dominates lending from Western countries, with financing from the US approximately equivalent to lending from all other Western countries combined.

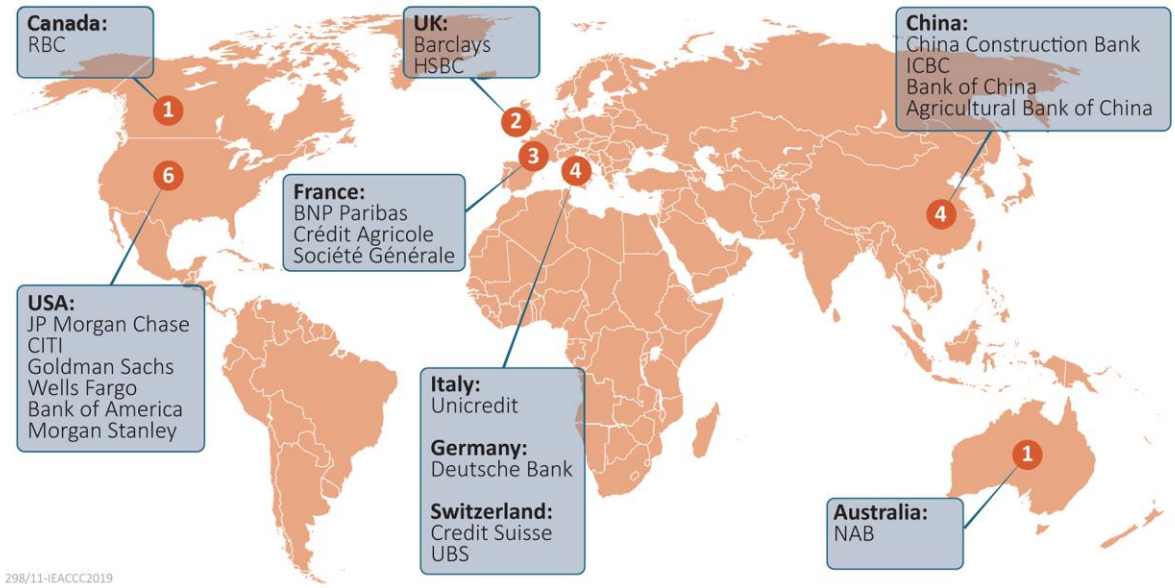

Figure 11 Top 21 Banks lending for coal projects by headquartered location (ECA)

5.2.4 Western banks

Funding from Western Banks has decreased, but there is insufficient information to infer a conclusive trend

Analysis of data collected by BankTrack suggests that funding from the top Western Banks varied significantly between 2014 and 2017 (*see* Figure 12).

Figure 12 Lending from top 20 Western banks for coal power plants and mines (RAN, 2017, 2018)

The numbers do not support a narrative of declining investment from Western Banks as suggested in Chapter 2. Interestingly, lending for coal-fired power plants has increased continuously, although lending to coal mining has been more uncertain. The limited number of data points (four years' worth) with alternating highs and lows in investment do not provide clear evidence to infer much of a pattern or trend, particularly given the cyclical nature of commodity markets.

The observable trend in lending by Western banks suggests that they are not directly responding to activist and regulatory pressure

While the data does not provide a conclusive trend, the figures from RAN (2017) and RAN (2018) challenge the narrative that the decline in coal is structural. The reality of financing in the coal sector appears more circumstantial with banks responding to demand for credit based on their commercial understanding of the business. Anecdotal evidence from some companies and executives at banks and institutional investors may dispute this but they may not reflect the views of the banks more generally. Box 6 outlines how Glencore, one of the largest coal mining companies in the world, is under pressure to limit its production of coal.

BOX 6 INVESTOR PRESSURE CHANGES COMPANY BEHAVIOUR AT GLENCORE

Glencore is a Swiss firm and the largest coal miner in Australia. The company faced increasing and concerted pressure from investors to limit the production of coal as part of its activities. Pressure was applied by the Climate Action 100+ initiative which is formed of global asset managers with US$32 trillion in assets. In 2019 Glencore committed to limit its future coal production to current levels. The constraint indicates that future investments will be limited to replacing existing production capacity (Stringer, 2019).

Western banks have committed to various policies, but what outcomes are these policies achieving?

The narrative of declining investment for coal has partially been driven by the policy announcements that banks have made to restrict their lending to this sector. These announcements are claimed to be

driven by concerns around climate change. The policies are voluntary, vary significantly from bank to bank and are not enforceable by external parties. Box 7 outlines a case study of two different banks between 2015 and 2018, mapping their policies and investment trends and charting out two very different outcomes over the time period.

BOX 7 THE TALE OF TWO BANKS, A COMPARISON OF THE POLICIES AND PRACTICES OF TWO WESTERN BANKS

Two US based banks, JP Morgan Chase (JPMC) and Morgan Stanley have adopted different policies to limit their financing of coal. JPMC has ended the financing of coal-fired power plants in high income countries, and committed to not providing coal asset financing where the proceeds will be used to develop new greenfield coal mines. Furthermore, over the long term JPMC has committed to reduce its credit exposure to companies that derive the majority of their revenue from coal extraction. Morgan Stanley has a similar policy on lending to developed countries and also included an assessment of low carbon alternatives when assessing projects in developing countries. Morgan Stanley also has a policy to prevent finance where it could support mountaintop removal mining (MS, 2015).

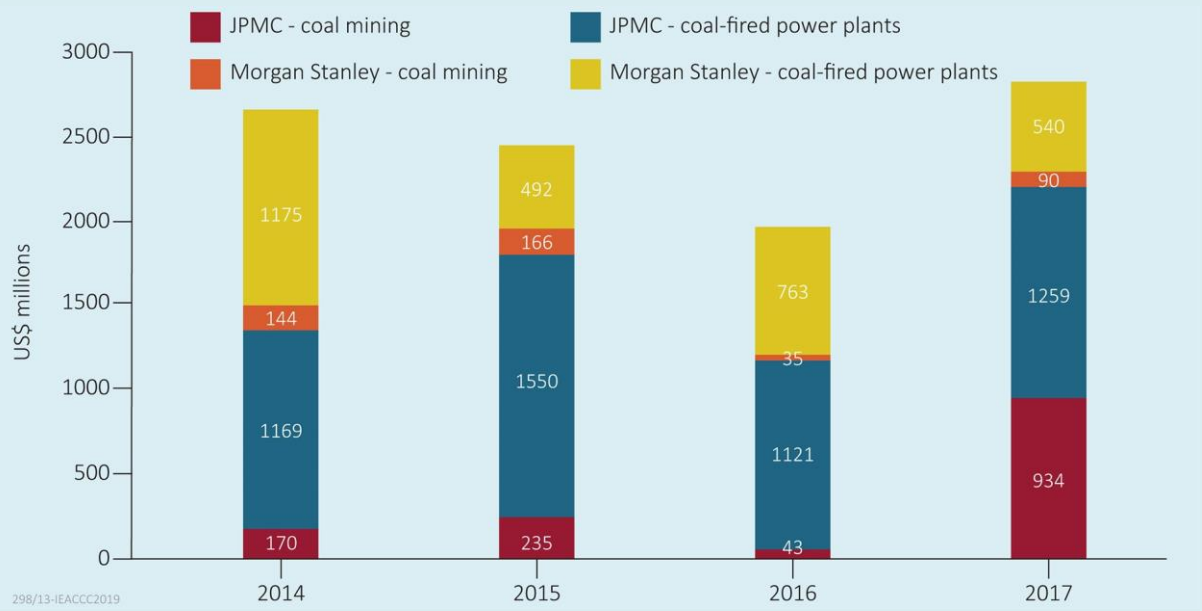

Figure 13 Financing split between JPMC and Morgan Stanley (RAN, 2018)

The reality of financing from JPMC and Morgan Stanley is very different. While the banks talk a similar talk, Morgan Stanley is seemingly a far more cautious financier of coal projects. Figure 13 illustrates that from 2014–17 Morgan Stanley's share of funding has declined (although it plateaued between 2015-17), while JPMC's financing has increased. The figure also indicates that trends are unlikely to be linear and long-term monitoring will be needed to understand long term decision-making. It is unclear whether these banks consider their policy announcements to be an indication of their position on coal financing in general or whether they are intended to constrain very specific activities. For JPMC it is hard to claim that these policies have reduced the Bank's exposure to the coal sector.

Various environmental groups, most notably BankTrack, publish announcements about the different policies adopted by banks and monitor their ongoing adherence to said policies (BankTrack, 2018a). It is important to note that these policies are not created equal in that some are more restrictive than others. For example, some prevent banks from investing in new coal projects or providing underwriting services to companies that are not committed to reducing their reliance on coal. Other policies are very narrow in scope and may focus on a specific issue such as mountaintop mining. Some analysts, including

Paul Argenti a Professor of Business Communication at Dartmouth's Tuck Business School (Flitter, 2018), have suggested that the narrative has been burnished by policy announcements and short-term responsiveness of banks to market forces rather than corporate social responsibility pressure.

5.2.5 Asian banks

Asian banks are providing more finance for coal-fired power plants and continue to support capital investment in coal mines. These banks face less activist, shareholder and political pressure to reduce their coal financing activities. The nature of support from Asian banks, support via underwriting rather than direct lending, the changing positions of some Asian banks, and the role of the largest banks, which are Chinese, are discussed below.

A small but perceptible decline in the financing of coal projects between 2015-2017 is apparent

Annualised lending from top Asian banks has risen slightly from 2014 to 2017, although it peaked in 2015 (*see* Figure 14). It is unclear what is driving this trend and whether it is just a response to market trends or a forced change in behaviours encouraged by external factors. There is no evidence to suggest that the large Asian banks are facing pressure from environmentalists in a way similar to Western banks. For example, none of these banks has a stated policy on coal financing. However, it is possible that concerns about smog in China have led to reduced financing from the top Asian banks – four of which constitute the largest banks for coal financing globally.

Among the top 20 banks, Asian banks are providing significantly more funding support and the majority of it is through underwriting investments

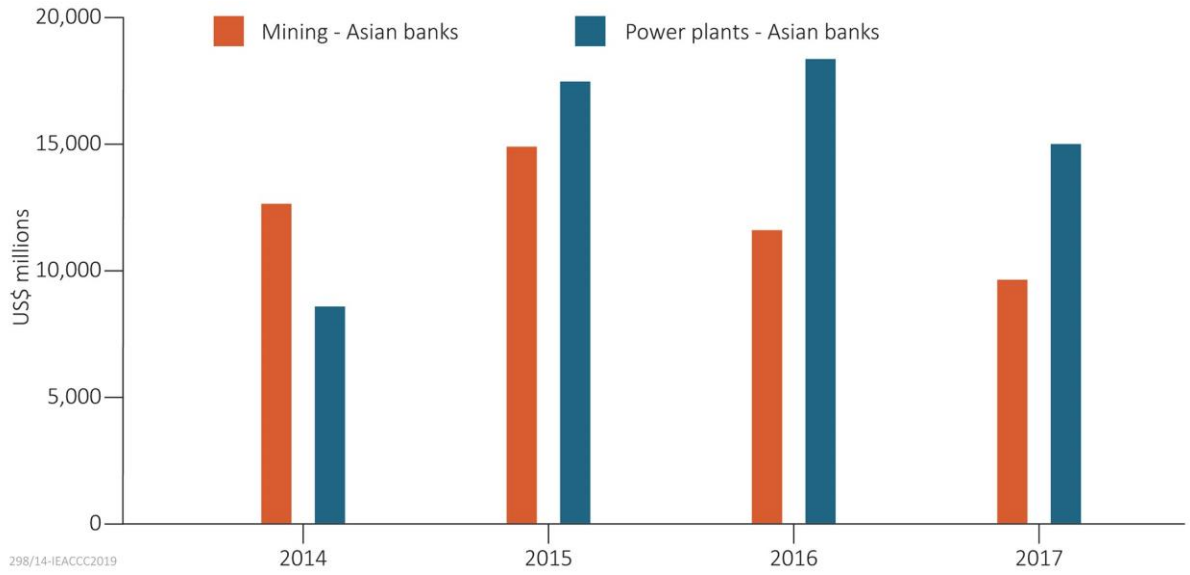

Figure 14 Lending from top 20 Asian banks for coal power plants and mines (RAN, 2017, 2018)

Figure 14 highlights the level of support provided for coal sector projects by leading Asian banks. The chart indicates that Asian banks are providing significantly more support than their Western counterparts. Most of the support provided by Asian banks is in underwriting bonds and shares for

project developers, who use the finance to then develop capital projects on their balance sheet. Chinese banks, in particular, provide the majority of their support by underwriting investments for coal developers and coal miners as illustrated in Figure 15.

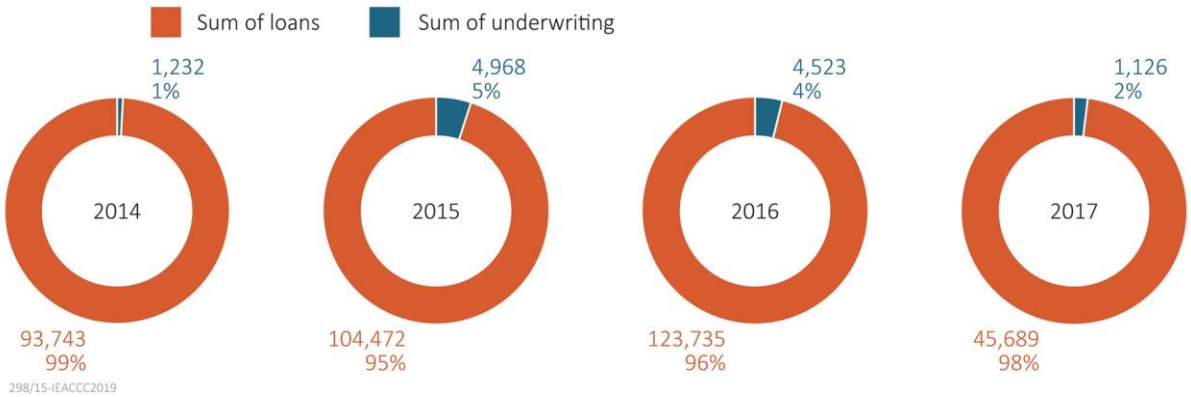

Figure 15 Underwriting and loan support from Chinese banks 2014–mid-2017 (BankTrack, 2018b)

The position of some Asian banks is evolving

Policy changes suggest that funding trends in Asia are changing with Dai-ichi Life of Japan and Sumitomo Mitsui Trust Bank limiting their financing of coal assets (IEEFA, 2019). The Overseas Chinese Banking Corporation and DBS, two Singapore-based banks, have also stated that they will not lend to new coal-fired power plants (Chanjaroen and Murtaugh, 2019). However, no bank from two key countries, India and China, has publicly committed to reducing investment in coal-fired power generation.

However, the largest players – the Chinese Banks – are viewed as the lenders of last resorts

The Institute for Energy Economics and Financial Analysis referred to China as 'the lender of last resort' for coal investments (Shearer and others, 2019a). The view is buttressed by the willingness of Chinese Banks to take on greater risks and support the development of assets in Pakistan, Bangladesh, Indonesia, South Africa and East Africa (Dawn, 2019), where other countries are less likely to invest in power generation assets. However, there are some indications that even Chinese lenders feel the headwinds from actions being taken against coal investment across multiple jurisdictions; ICBC and the Construction Bank of China rejected the opportunity to facilitate the financing of the Adani Carmichael coal mine in Australia indicating a reluctance to get involved in funding a controversial project (Westbrook, 2017) (*see* Box 2, Section 4.2 for more details on Adani's Carmichael coal mine). Conversely, some analysts have predicted that domestic restrictions on coal-fired power plants may result in increased international investments by Chinese companies (Tan, 2018).

5.2.6 Investors in coal projects

Underwriting is a major source of credit for coal sector developers, as described in Chapter 4, and the underlying products which are the shares and bonds underwritten by the banks are typically bought by institutional investors. This section assesses the investors, their incentives and the regulations and policies governing their behaviour. The analysis is based on data from Urgewald (Schröder-Therre,

2018), a German NGO tracking financing trends in the coal sector for the top 100 institutional investors who have holdings in the top 120 companies developing coal projects (Schücking, 2017).

Institutional investors include pension funds, investment managers and sovereign wealth funds and may have very different incentives

An assessment of the list of investors indicates several sovereign wealth funds, insurance companies, pension funds and asset management firms which have different objectives and approaches. The investors are likely to have different investing strategies, time horizons and sensitivities to environmental concerns.

There is a myth that the majority of investors are Chinese and Indian – this is not true for institutional investors

Given that most of the power plants that have become operational over the past three years have been in India and China there is a myth that these investors are primarily Indian and Chinese. Western investors hold the most significant holdings in coal assets as illustrated in Figure 16. The figure indicates that investors based in the West have been buying bonds and shares, underwritten by Asian and Western banks.

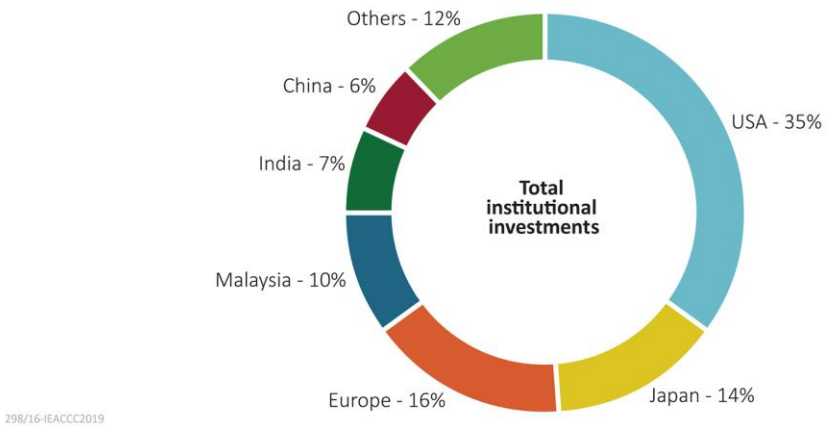

Figure 16 Institutional investor regional categorisation (BankTrack, 2018c)

Analysis from BankTrack suggests that in total, US investors account for 35% of the institutional investments in coal plant developers. European investors account for 16%, and Japanese investors account for 14%, while Chinese and Indian investors only account for respectively 6% and 7% of institutional investments in the bonds and shares of coal plant developers (BankTrack, 2018c).

Some investors are diversifying and reducing their exposure to coal

Some institutional investors have developed policies on coal investments and are divesting from coal. However, even those most ambitious in their divestment are divesting slowly or silently. As noted in Box 6, a group of equity investors worth US$32 trillion has been urging governments and businesses to adopt policies and measures aligned to the Paris Agreement goals. The group of investors divesting their asset entirely is smaller and investors range from nation states, like Ireland, to various university campuses in the US and Europe. Some investors are vocal and public about their agenda, others, aware of the regulatory risks and their long-term position, have started to quietly divest their assets. These

quiet divestors include some of the 10 largest asset owners globally who appear to have sold all direct holdings of thermal coal producers in the last two years. The list of quiet divestors includes the wealth funds of oil states such as Kuwait and Qatar and pension funds like IBM's Pension Fund and the Ontario Teachers' Pension Plan (Kirakosian, 2018).

Other institutional investors have increased their coal reserves reflecting continued demand for coal

The world's 15 largest institutional investors in coal, with a combined US$40 trillion in capital market assets, have increased holdings of thermal coal reserves in their funds by 14% since the Paris Agreement (excluding 6% for Peabody Energy and Arch Coal which were relisted after bankruptcy procedures). France's AXA, a major institutional investor which also has a policy on thermal coal, more than doubled its holdings of thermal coal within its US$350 billion portfolio of funds over this time. These developments suggest that while some companies are under pressure to divest their assets, others see opportunities.

One notable case of increasing exposure to coal assets involved the Norwegian government (*see* Box 8) where the Sovereign Wealth Fund has increased its exposure to coal assets despite a policy commitment to restrict coal exposure.

BOX 8 THE NORWEGIAN GOVERNMENT'S COAL POLICY AND THE SOVEREIGN WEALTH FUNDS EXPOSURE TO COAL RESERVES

In 2015 the Norwegian Parliament enacted legislation to reduce investments by the Sovereign Wealth Fund in companies that derive more than 30% of their revenue from coal. The move led to 10 companies being excluded from its investment portfolio and another 26 considered to be at risk (Fouche, 2017). Despite seeing significant initial fall in the coal reserves exposure between 2013 and 2015, exposure of the Fund started to increase in 2017 (Holter, 2019). The analysis from InfluenceMap (IM, 2017) highlighted that despite its intentions and legislation, the Norwegian Sovereign Wealth Fund increased its exposure to coal. The example provides insights that a change in preferences from investors does not directly affect financing, and it can take some time before preferences translate into changes in exposure.

Have these investors have been receiving expected market returns?

The decision by investors to hold and build their coal reserves is an indication of the perceived market value of these assets. According to the law firm BCLP, coal accounted for most of the private equity spending on mining and 'investors see value notwithstanding the political pressures' (Biesheuvel, 2019). The volatility in the market provides opportunities for investors; however, it also prompts concerns around the long term sustainability and returns from these investments (*see* Box 9 which suggests that institutional investors investing in coal in India have not seen market beating returns).

BOX 9 RETURNS FROM INVESTMENTS IN INDIAN COAL MINING AND COAL POWER COMPANIES

Analysis by equity research firm Equitorials (Greenpeace, 2018), shows that equity investments by 16 top institutional investors (Indian and international) in 8 major listed companies in the coal mining and coal power sector have underperformed the benchmark Bombay Stock Exchange Sensex by over 10% per year between December 2013 and October 2018. This would suggest that the stocks have been underperforming the general index. It should be noted that this does not mean that the equity investments are necessarily underperforming, just that they are underperforming compared to the stock exchange. The average rate of return for these investments was calculated as 0.5% per year.

5.3 PUBLIC FINANCE INSTITUTIONS

Public finance institutions (PFIs) are associated with governments that promote projects by providing government subsidised finance. The financing support may be in the form of loans, guarantees, project development finance and insurance support. PFIs include ECAs, state development banks and state insurance firms that encourage local and foreign investment in coal sector projects.

5.3.1 Overview

In actual terms PFI contributions are not very significant

The trend for public sector financing is likely to grow given the potential limitations of financing available in commercial markets and the ongoing regulatory uncertainty facing the sector. PFIs provide an opportunity to gain finance, typically at favourable rates, and to reduce the credit and regulatory risk by involving sovereign governments with an interest in seeing the successful conclusion of a project; this may reduce the political risk for the developer (particularly an international one who may otherwise have more limited recourse). PFIs can be particularly helpful when the off-taker is not creditworthy and there is significant credit risk.

5.3.2 Asian PFIs

PFIs in Asia have committed the most significant amount of money in recent years

The 2017 IEACCC report by Baruya (2017) explained how ECAs work and analysed different ECAs and development banks. In particular, Baruya noted the different incentive structures and commented on how the support was tied to EPC contracts from the same government. Table 8 documents the commitments made by China, Japan and South Korea between 2015 and 2017 for coal projects which achieved financial closure. Figure 17 splits these commitments by country across years and indicates that PFI support is increasing. These commitments vary in size and often provide leverage to mobilise additional finance from banks in the exporting country.

Further analysis of the headline statistics suggests that funding commitments between 2014 and 2017 have primarily been made by China, Japan and South Korea. India, Russia, South Africa and Italy have also provided some assistance through ECAs; however, the scale of support is significantly lower than the level of financing provided by the East Asian nations.

TABLE 8 FINANCIAL COMMITMENTS FROM ECA'S PER YEAR IN US$ MILLIONS (NRDC 2018; BARUYA, 2017)

	2014	2015	2016	2017
Public Financial Institutions	8,800	5,351	7,739	13,923

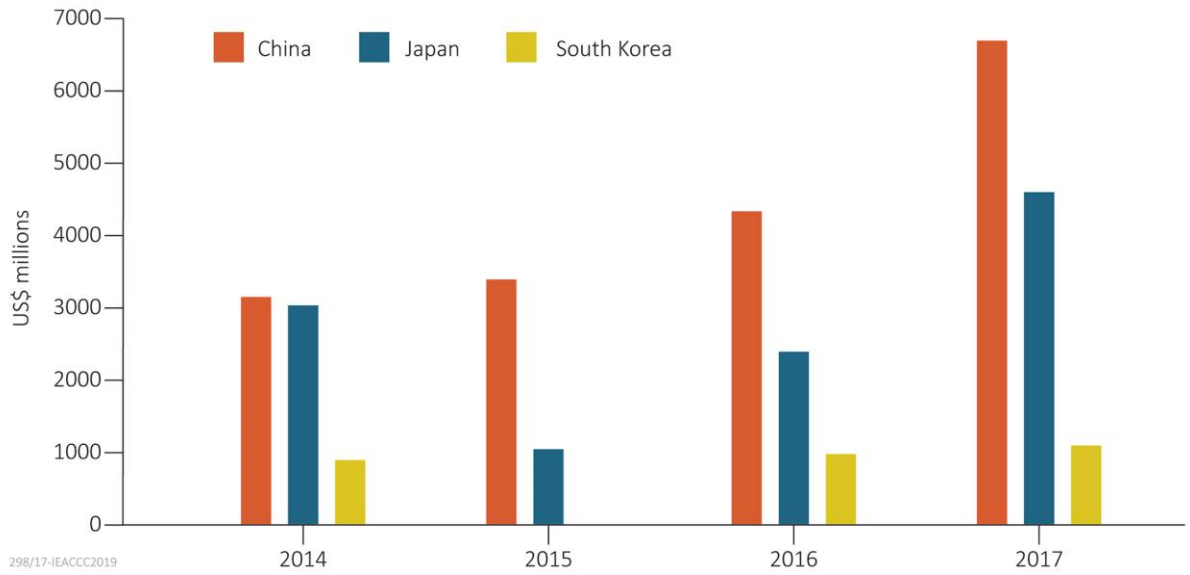

Figure 17 PFI spending from China, Japan and South Korea (NRDC, 2017)

Beneficiary countries are primarily based in Asia, but there is also some investment in Africa

An assessment of the recipients of PFI assistance suggests that the largest beneficiaries are in Asia, with some investment in Africa (*see* Table 9). A deeper analysis suggests that the vast majority of the support to the beneficiaries is for coal-fired power plants as opposed to coal mining investments.

TABLE 9 PFI SUPPORT RECEIVED AND GIVEN BY VARIOUS COUNTRIES (2014-17) (NRDC, 2018)

Country	US$ millions received	Countries	PFI support given, US$ million
Indonesia	13,871	China	17,505
Vietnam	7,069	Japan	11,054
Bangladesh	5,847	South Korea	2,992
Zimbabwe	2,083	India	1,687
Morocco	1,690	Italy	632
South Africa	1,500	South Africa	150

There are some indications that PFIs in Asia may limit their lending but this does not seem very likely

As with other financing institutions, PFIs, and ECAs in particular, have been under increasing pressure to constrain spending on coal. In 2015, the OECD introduced new rules to limit the role of ECAs in OECD member countries in promoting coal sector investments. However, the rules make exceptions for markets such as Indonesia, Cambodia, Laos, Myanmar, the Philippines, and South Asian and Central Asian countries because they are classified as low national electrification rate countries according to the IEA criteria, or are recognised as International Development Assistance (IDA)-eligible countries (Wood Mackenzie, 2018). The result of exemptions is that most OECD countries that provide ECA support are not constrained by the limitations of the agreement since most recipients meet the criteria of eligibility.

5.3.3 Public finance for Indonesian coal-fired power projects

Indonesia is the largest recipient of export credit financing

Between 2010 and 2017, twenty-one coal power projects in Indonesia with a combined capacity of 13.1 GW reached financial closure (Market Forces, 2017). Foreign ECAs were involved in 64% of the deals, provided 45% of the debt and foreign companies own 51% of the new power capacity. Japan, South Korea and China are the largest investors in this expansion. Funding for these projects was overwhelming from ECAs or state development banks within those countries, and commercial banks and EPC contractors provided additional layers of finance (*see* Figure 18 for a breakdown of funding for power plants in Indonesia). Two examples of these 21 Indonesian power plants are the Jawa-7 and Tanjung Jati 2000 MW coal-fired power plants, which were sponsored by Japanese and Chinese ECAs respectively.

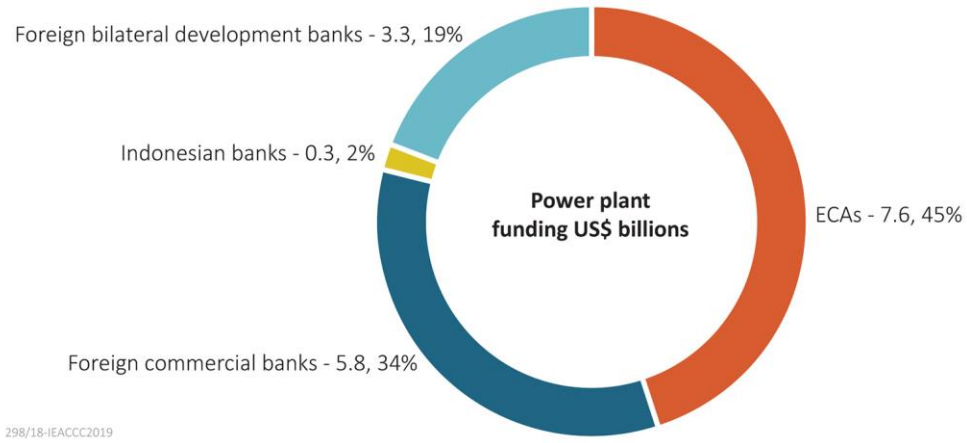

Figure 18 Funding breakdown of 21 coal projects in Indonesia (Market Forces, 2017)

The Batang coal-fired power plant and what it shows us about the way ECA's work

Batang coal-fired power plant is an ultrasupercritical coal-fired power plant with a capacity of 2000 MW (2 x 1000 MW) which aims to supply electricity to the 13 million people living in Central Java. The project forms part of a larger national plan to add 35,000 MW of power to Indonesia's grid.

The coal-fired power plant has been promoted by the SPV, Bhimasena Power Indonesia, a private joint venture between two of Japan's utilities: J-Power, and the power plant operator Itochu Corporation. Each organisation has a 34% and 32% equity stake in the SPV, with Adaro Energy, one of the largest coal companies in Indonesia, holding the balance of 34% of shares (EJAtlas, 2017). The power plant technology will be imported from Japan, hence the role of the JBIC, one of Japan's ECAs, as the main project sponsor (BankTrack, 2016), and Indonesian coal will be used for its operation.

The project structure (*see* Figure 19) highlights the typical arrangements for ECA supported investments in coal-fired power projects, namely:

- The host government and local companies maintain a minority stake in the final investment.
- The ECA and the host government offer significant guarantees to de-risk the investment for a private sector entity or state-owned enterprise (typically an organisation from the same country as the ECA).
- In the case of Indonesia, the use of Indonesia Infrastructure Guarantee Fund, Central Government guarantees and financing support from JBIC was used to reduce credit-default risk, political and force majeure risks (KPPIP, 2016).

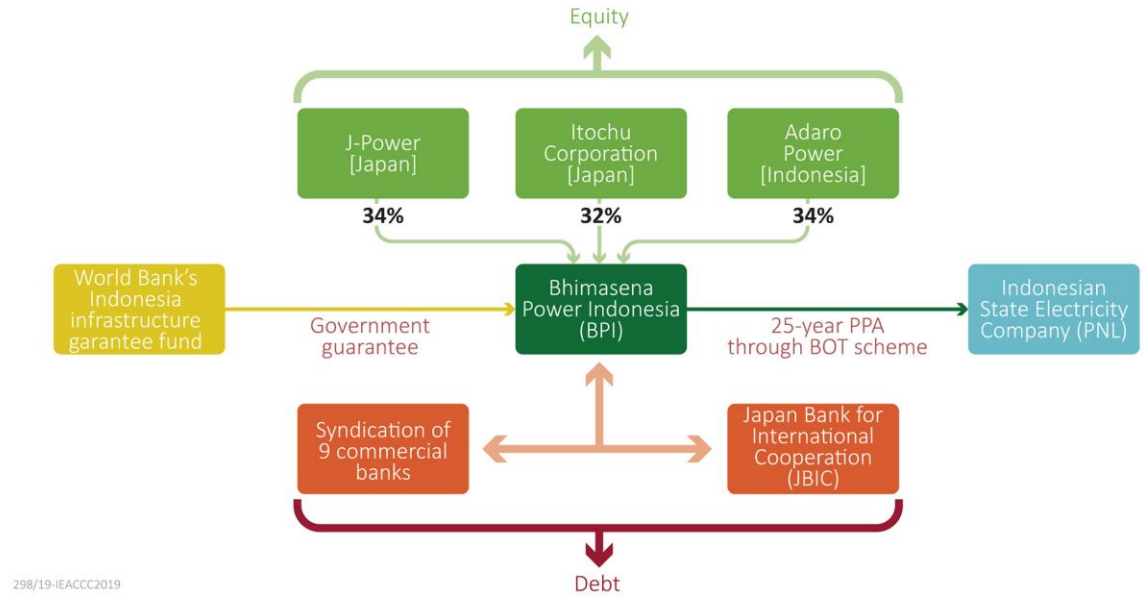

Figure 19 Batang coal-fired power plant financing structure (ECA)

5.4 OTHER FINANCING

A significant difference in capital financing estimates exists between top down estimates drawn from the IEA WEI (IEA 2016, 2017, 2018c) and the data about lending from the top 20 banks, multilaterals and PFIs that were aggregated from different sources. The difference has been captured in the analysis presented herein as 'other financing', which is calculated by subtracting the total investment figures provided by WEI from the bottom-up data for multilateral financing, PFI financing and bank financing from the top 20 banks. The numbers are all collected from different authors and based on different methodologies, as noted previously (Section 4.1.3), which hampers firm conclusions in respect of uncounted sources of finance.

In this section we attempt to understand and verify the nature of 'other financing' that is not recorded—or recorded differently—in bottom-up estimates. We note, however, that the difference between estimates could largely stem from methodological differences in the way data has been

collected and collated, rather than any significant errors between sources or gaps in understanding of finance sources (as described in Section 4.1.3). That said, most bottom-up sources focus solely on bank lending rather than balance sheet financing and private equity investment, and hence these sources are likely to make up at least some, or all, of the remaining balance.

The estimated 'other financing' may overestimate actual levels of 'other financing' particularly in the mining sector

IEA (2018c) estimates of total investment estimate for coal-fired power plants and coal mining may be at the upper end of estimates, at US$60 billion and US$79 billion respectively. WEI's methodology to calculate the total investment cost is based on their analysis of the capital costs of investments that become operational in a given year; where the capital cost is unknown an assumed localised overnight capital cost is used. The estimation for coal-fired power plants is in line with expectations of potential 'known unknown' sources of finance (for example, balance sheet finance; private equity; local banks) that could contribute around 30% of total financing of coal power plants around the world.

However, 'other financing' constitutes 80% of the financing in coal mining investments. One reason for the large difference could be the inclusion in IEA (2018c) of routine capital expenditure on existing coal mining assets by operators to maintain output levels (sustaining capital expenditure). Comparisons of IEA's WEI figures with the estimated US$60 billion from Deloitte and PricewaterhouseCoopers (PwC) suggests that WEI figure of US$79 billion for total mining capital expenditure in 2017 could be on the high side (Deloitte, 2018; PwC, 2018). Informal discussions with the IEA Secretariat indicated that the Agency's estimates include investment in transport infrastructure, and that a strict greenfield comparison would show the IEA's estimate to be below that of Deloitte's and PwC's estimates of total mining Capex.

The general situation described highlights the challenges of reconciling, verifying, comparing and aggregating different estimates to identify financing trends within the sector. Hence, it is important to remain mindful of data collection differences when attempting comparative analyses and drawing conclusions in respect of financing trends.

Estimates for bank financing for coal mining firms and coal power plant developers do not capture the full financing in this sector

Bank financing only captures the top 30 coal power plant developers and the top 27 of the largest coal mining firms by size. The approach excludes a significant number of firms that are not accounted for when the financing from banks is aggregated. This implies that the statistics do not capture:

- lending from the top 20 banks to smaller firms; and
- lending from other banks to the top coal mining firms and power plant developers.

The under-reporting in recent reports by RAN in the mining sector could be the result of new entrants in power plant and mine development which would require a review of the largest developers and their investment financing flows (PwC, 2017); new entrants are likely to invest more in the shorter term to establish their assets and resources.

Coal mining companies are self-financing capital investments or injecting their own equity by using their retained earnings

Mining companies tend to be diversified and an analysis of some of the top publicly-owned ones suggests that they have been self-financing capital investment. Mining requires frequent and continued capital investment to maintain existing operations, typically known as sustaining capital expenditure. This is a part of general operating costs and is typically priced into the company's business model and thus does not require additional capital injections through borrowing or capital raising.

An analysis of the level of financing that mining companies provide themselves would require a greater assessment of each of the large mining companies and their accounts. Our analysis is based on evidence from the 2018 accounts of BHP Billiton which suggests that it will invest approximately US$344–368 million in new capital for its Queensland coal mine (BHP, 2018) and US$90–95 million for its New South Wales Energy Coal Mine to sustain existing operating levels in 2019 (BHP, 2019). In Box 10, we discuss our findings from a review of Anglo American's accounting statements.

BOX 10 THE ANGLO AMERICAN EXPERIENCE OF INJECTING ITS OWN EQUITY TO FINANCE COAL DEVELOPMENT

Anglo American's 2018 accounts state that between 2019-20 sustaining capital is forecast at US$3.2 billion per year due to one-off increases in stay-in-business capital expenditure and to facilitate attractive life extension projects at their diamonds, thermal coal and metallurgical coal assets. This is in line with their long term expectations of sustaining capital investments (excluding growth projects), and they expect to maintain similar levels of sustaining capital into the future. Anglo American does not plan to issue new bonds, issue further shares, or draw on its loan facilities while financing this expenditure.

6 CONCLUSIONS

The time period is insufficient to draw robust conclusions concerning financing trends

Data has been presented showing the sources of finance of coal mines and power plants over a four-year period, 2014-17. There have been changes in the total level of investments and in the source of investment funds. These could be variations that would be expected in normal times with normal economic cycles, or they could be responses to various new factors such as policy and regulatory pressures from governments to reduce GHG emissions, technological changes driving down the costs of renewable energy, and pressure from the public and shareholders of investment institutions that have partially choked off the supply of finance from some sources. The span of data is too short to draw reliable conclusions that suggest, for example, that the pattern of coal-sector financing has permanently changed or that investors are finding it increasingly difficult to finance coal sector projects. Longer term monitoring of investments would be required to assess the robustness of claims that financing patterns are changing.

More analysis is needed on the 'other financing' category

This report identifies a significant category of unaccounted or 'other financing'. This is the residual between the sum of the bottom-up financing categories where data are available and top-down estimates of total investment in the sector made by the IEA. This residual may include lending by the smaller banks, private equity, self-financing by the companies, and equity injections from governments to state-owned enterprises. This apparent gap is quite large and it is greater for coal mining than for coal-fired power generation. It is possible that a large portion of the apparent gap is attributable to methodological accounting differences employed by different analysts. It has not been possible to clearly correlate the different datasets, and therefore the apparent gap should merely be considered as indicative that other sources of finance exist, rather than that a large and unaccountable amount of financing is flowing to coal projects. Possible ways that the financing of the gap could be calculated are discussed. Further research would provide more information on sources of finance and it would also help verify the accuracy of data on other sources of financing.

Questions that the data might one day be used to answer

The report provides data on investment financing trends that might be useful for policy-makers, financial institutions or NGOs. The limited span of data and difficulty in identifying trends from data of such short duration and the limited information on the 'other financing' category makes it difficult to spot trends from the observable data. Nevertheless, Chapters 2 to 4 consider answers to some questions that relate to the drivers for changes in coal sector investment.

There could be several reasons for changes in the pattern of financing of investment in coal from both supply-side and demand-side perspectives:

- structural (including commercial drivers affecting relative costs of coal and other energy sources such as renewables or shale gas);
- cyclical (for example a slowing down of China's economy or speeding up of the US economy);
- regulatory/policy (government policies to discourage the use of fossil fuels by imposing carbon taxes or incentivising renewable energy); and
- voluntary/corporate social responsibility concerns (banks cognisant of public concern over investment in coal and wary of losing investment funds).

Disentangling these drivers is difficult, and the effect of an isolated driver is almost impossible to estimate.

Banks have a changed appetite to financing coal investments but the response is not universal

Bank lending will be influenced by trends across all of these drivers but of particular interest may be the impact of public and shareholder concerns on the behaviour of Western banks and whether this leaves a gap that is filled by Asian banks. Box 6 in Section 5.2.4, for example, suggests that there is increasing pressure from shareholders and activists on Western banks to adopt policies on coal sector investments. However, these policies have had mixed effects on lenders and it is not clear what motivates the policies or how rigorously they are implemented. It seems that current policies offer sufficient latitude to financiers to expand their exposure to the coal sector if they wish.

Banks in Asia seem, at least partially, immune to the challenges faced by some Western Banks in financing coal projects. Given that Asian banks provide almost 63% of total financing for coal sector projects, it is apparent that there are clear limits to what can be achieved by unilateral action by Western financiers. That said, there is some circumstantial evidence suggesting that Asian investors respond to public and shareholder pressure as evidenced in the case of Adani's Carmichael mine project.

Multilateral and PFIs have the potential to be game changers in the development of new coal sector projects

Multilaterals have not been a significant source of finance over the past three years. However, the AIIB, AfDB and IDB have indicated a willingness to lend under certain circumstances and their policies remain opaque. Furthermore, support from PFIs is likely to continue particularly in Asia and Africa where low electrification and low income levels provide a rationale for the state to subsidise investment in cheap dispatchable technology.

There are significant commercial and localised environmental pressures on coal projects

Coal sector finance may ultimately shrink not because of pressure on banks to stop lending but because of technological changes such as renewable energy with storage, and localised environmental concerns which lead to limitations on how coal-fired power plants run, as is the case in China. These provide a significant layer of uncertainty over future coal investment.

Localised pressure on governments, particularly when it concerns some of the largest investors in coal (such as Indonesia and Bangladesh) and the risk for investors of stranded assets is a significant risk for coal sector lending and may also cause lenders to re-think investment in coal.

Financing costs of coal vs its alternatives

This study has not analysed the cost of capital for coal projects which would require analysis on a project-by-project basis, but generalisations may be made by technology, borrower or lender type. Analysis of the cost of capital would need to consider the cost of equity and the cost of debt. Based on the available information we could form a view that, because funding from multilaterals has decreased, then overall financing costs may increase. However, it is possible that PFIs offering financing on similar terms have replaced multilateral financing. We would propose that future iterations of this report look at different borrowers and lenders to provide insights into the costs of capital for coal as compared to other alternative sources of power generation.

Overall conclusion and further research

The lack of data points makes it hard to determine definite trends which either validate the perspective that 'coal is in terminal decline' or that the status quo has remained unchanged since 2014. The report has not been able to show that since 2014 there has been a conclusive geographical shift in the sources of financing toward Asia. Extending the span of data in future reports, and use of a consistent basis, will help in identifying trends at an aggregate level. Though the focus of this report has been on providing data on financing, other more country specific analysis should also be considered to analyse the underlying structural factors which may affect investment decision-making in countries likely to develop more coal projects. Further analysis of mining finance, and in particular analysis of their company accounts, would also help to explain the 'other financing' category highlighted in this report.

Although there has been a decrease in the level of financing available, financing for new coal projects is still accessible. Continued investment in coal sector projects indicates that there are commercially viable opportunities in the sector. Furthermore, the overall decrease in financing must be seen in the context of overall capital investment in the mining sector in recent years, which has been volatile, and the coal commodity cycle, which has gone through a period of contraction and recovery.

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