Introduction

This document will first provide a global overview of finance in the coal power and coal mining sectors, specifically looking at the importance of corporate and project finance, public (state) finance and private finance, and debt and equity finance. The document will then discuss some trends observed and conclude with more detail on specific countries: China, India, Indonesia, Turkey, Vietnam, Japan, Australia, South Africa, and the US.

The research was conducted through a literature review of major reports regarding coal finance from 2014 to 2017, from subscription sources and news articles. The research suggests the following:

- Coal may be on its last legs in some countries but there is an impetus for growth in emerging markets.
- While public (state) finance may make up a small proportion of coal power finance, it forms a critical part of these projects and unlocks commercial debt.
- Japan, Korea and China are in a race to build coal overseas and are seeking to push their coal plant technology.
- The continued importance of China as a market and as a lender to coal in contrast with our limited information about Chinese domestic finance.
- Corporate or balance sheet finance remains important.
- Coal bankruptcies may not spell the end of coal but may mean more consolidation and concentration in the market.
- More research is necessary to fill in the gaps about what is known about coal finance.

Global overview

1.1: Coal power companies

Urgewald and its partners have produced the Global Coal Exit List, which profiles over 770 companies "whose activities range from coal exploration and mining, coal trading and transport to coal power generation and manufacturing of coal plants."[1] This information provided by Urgewald was mapped in the following ways:

- top 120 coal utilities based on total capacity mapped by headquarters.

[1] "Global Coal Exit List" (November 2017), https://coalexit.org.

- top 120 coal utilities based on total potential expansion mapped by capacity compared with countries where this expansion is taking place as indicated by the Global Coal Plant Tracker.[2]

1.2: Coal mining companies

The Global Coal Exit List was also used to map the production in MMT of coal miners by company headquarters.

2.1: Ownership of coal power companies

The following is a chart of the top 20 shareholders of the 17 listed companies earmarked by the Global Coal Exit List as seeking to expand coal power.

	Investor	Type	Country	Amount (US$ bn)
1.	Government of India	State	India	$19.63
2.	Shanghai Electric Group	Private	China	$ 8.18
3.	Korea Development Bank	State	South Korea	$ 7.18
4.	CRH Power	Private	China	$ 5.87
5.	Khazanah Nasional Bhd	State	Malaysia	$ 5.60
6.	Life Insurance Corporation of India	State	India	$ 4.21
7.	Ministry of Strategy and Finance Korea	State	South Korea	$ 3.97
8.	Poland State Treasury	State	Poland	$ 3.52
9.	Lawrencium Mikado Holdings	Private	Hong Kong	$ 2.37
10.	Adani Gautam	Private	India	$ 2.26

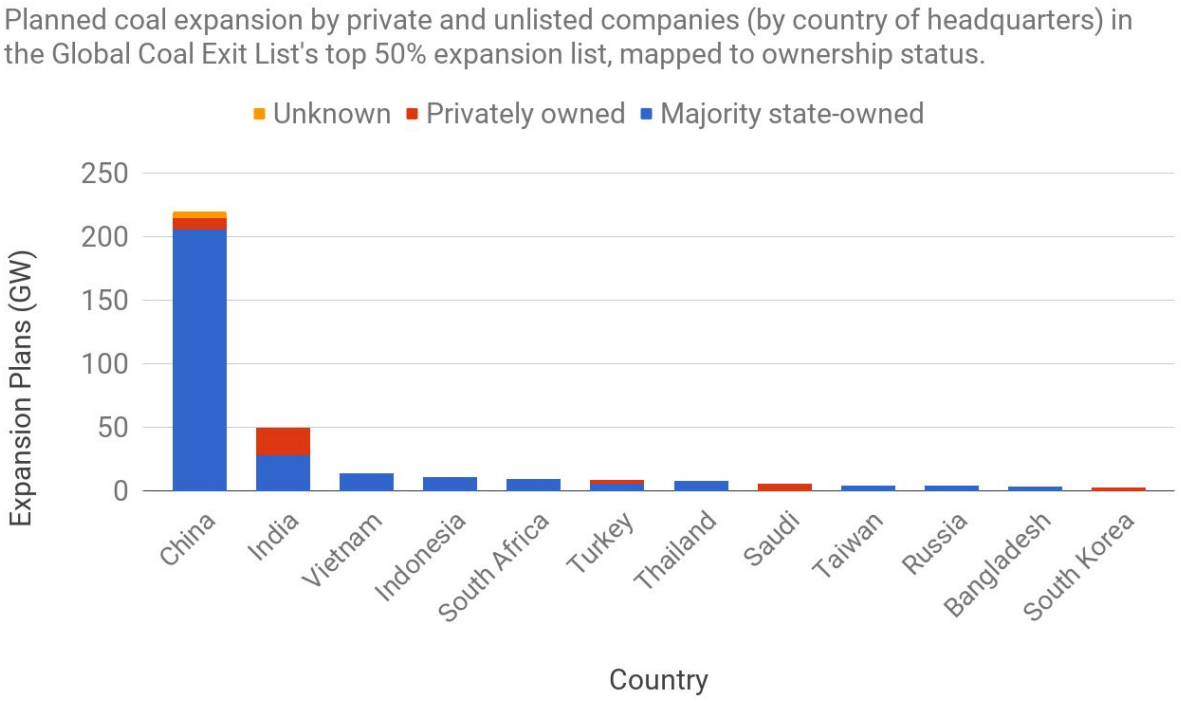
[2] Endcoal, “Coal Plants by Country”, (July 2017) https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf.

11.	OAK CLP	Private	Hong Kong	$ 2.22
12.	Employees Provident Fund	State	Malaysia	$ 2.22
13.	Vanguard Group	Private	USA	$ 2.10
14.	Government Pension Investment Fund Japan	State	Japan	$ 1.93
15.	Rosneftegaz	State	Russia	$ 1.78
16.	Lawrencium Holdings	Private	Hong Kong	$ 1.73
17.	Blackrock Fund Advisors	Private	USA	$ 1.53
18.	National Pension Service Korea	State	South Korea	$ 1.42
19.	INTER RAO Capital	State	Russia	$ 1.35
20.	Skim Amanah Saham Bumiputera	State	Malaysia	$ 1.32

[3]

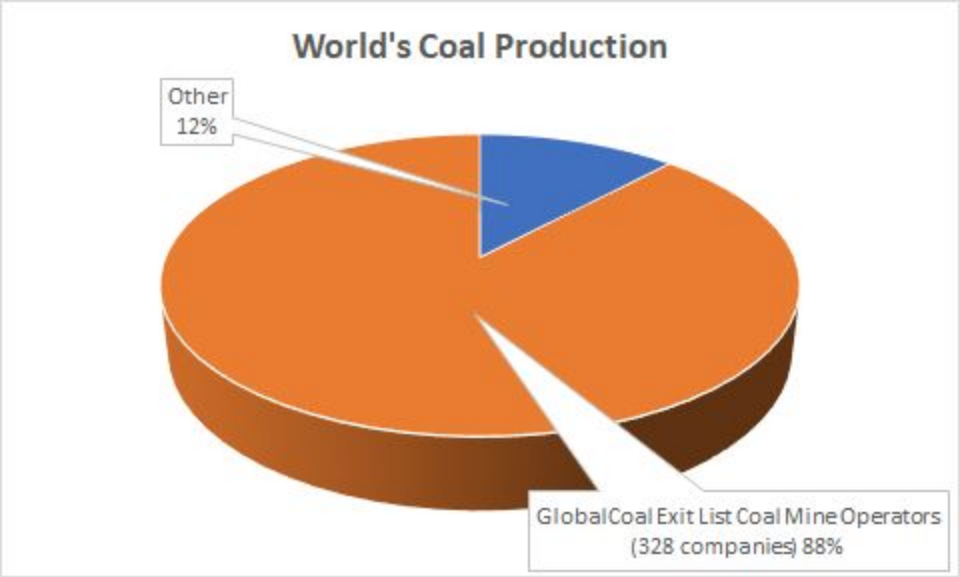
[3] Based on research assistance provided by the Global Strategic Communications Council (GSCC).

The following is a chart of the expansion plans (in MW) of 40 private and unlisted companies (by country of headquarters) contained in the Global Coal Exit List's top companies representing 50% of coal expansion plans, by ownership type.

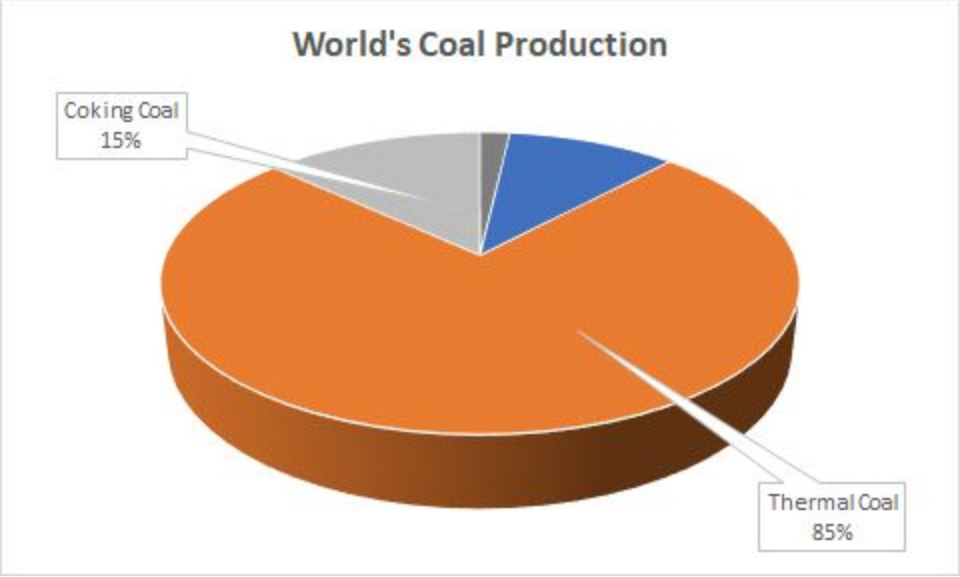


2.2: Ownership of coal mining companies

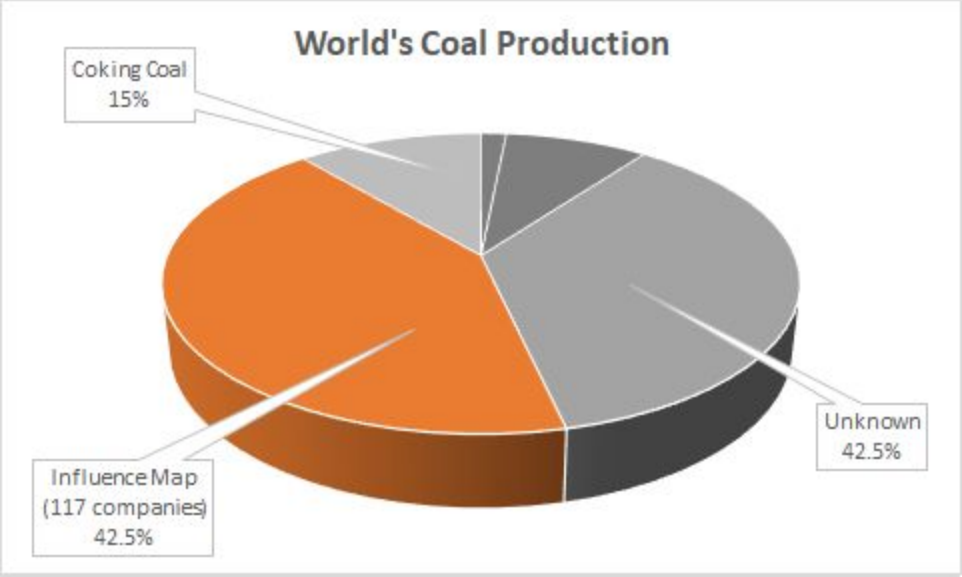
Urgewald's most recent coal exit list provides a list of **328** coal mining companies that control 88% of global coal mining production.



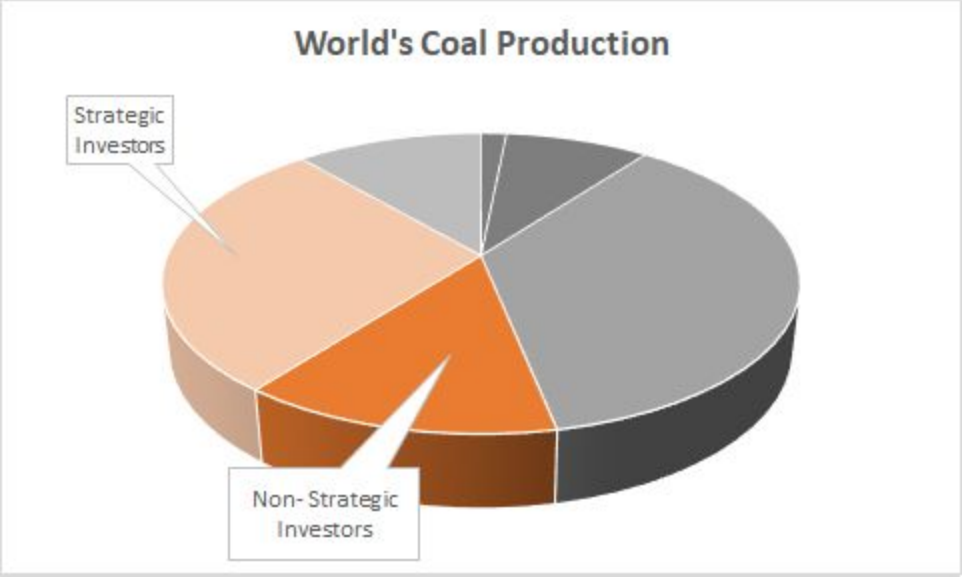
Of this production, the IEA indicates that 85% is thermal coal and 15% is coking coal.



At present, the main aggregated information by shareholdings is from Influence Map's report, "Who owns the World's Coal?" The chart shows that Influence Map provides information about ownership of **1/2 of the total global thermal coal production, constituting 117 listed companies,** and that ownership of the remaining 1/2 remains unknown.



Influence Map does not provide information on the strategic investors in coal, who have some motivation to invest other than, or in addition to, commercial gain, e.g. (governments, individuals, power companies, special purpose companies). It provides information on the **non-strategic investors**, such as asset managers, who are looking purely to generate a return on investment.



This chart provides information about **top "non-strategic" shareholders in coal mining** companies. The central and local governments of India outpace investment in coal tenfold in comparison with the other investors.

Shareholder	Country	AUM in Coal ($m)	Coal Reserves (m tons)
Central and local Gvmt, India	India	22,120	13,878
Life Insurance Corporation of India	India	1,894	1,279
Fude Sino Life Insurance	China	570	702
The Vanguard Group	United States	1,360	462
BlackRock Institutional Trust Company	United States	1,518	344
Dimensional Fund Advisors LP	United States	497	334
HSZ (Hong Kong) Limited	Hong Kong	26	288
Neuberger Berman LLC	United States	201	191
Elara Capital Plc	UK	16	177
Emerging India Fund Management Ltd	Mauritius	15	170
ICICI Prudential Asset Management	India	179	107
Accipiter Capital Management LLC	United States	50	122
M M Warburg Bank (Schweiz) AG	Switzerland	8	99
Prosperity Capital Management	Russia	27	84
BlackRock Investment Management (UK)	UK/US	765	79
Tontine Asset Management LLC	United States	27	72
Mangrove Partners	United States	27	68
Capital World Investors	United States	251	54
Renaissance Technologies LLC	United States	34	75
Templeton Asset Management Ltd	Hong Kong	207	84
Fidelity Management & Research	United States	180	83

[4]

[4] InfluenceMap, "Who Owns the World's Coal", (May 2017), https://influencemap.org/report/Clarifying-carbon-ownership-8cb210f5b6643c8e58037dbfaa28d7ae.

Analysis of types of finance for coal power projects and companies

3.1: Value of coal fired power stations that became operational in 2016

This investment amounted to US$80 billion[5] in 2016, as compared to US$78 billion in 2015.[6]

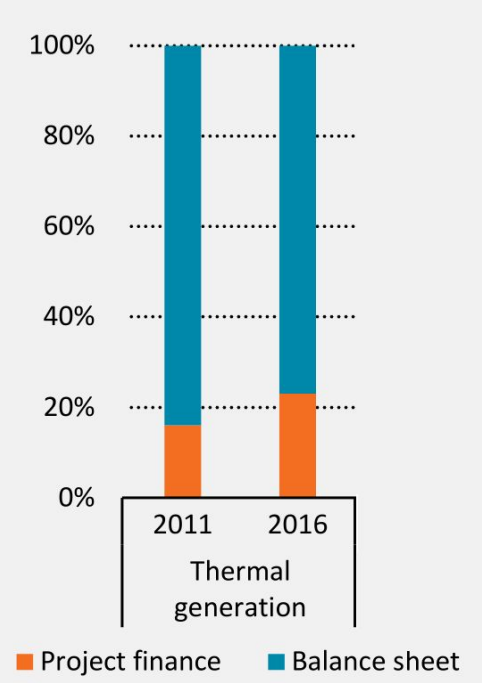
3.2: Corporate v. project finance

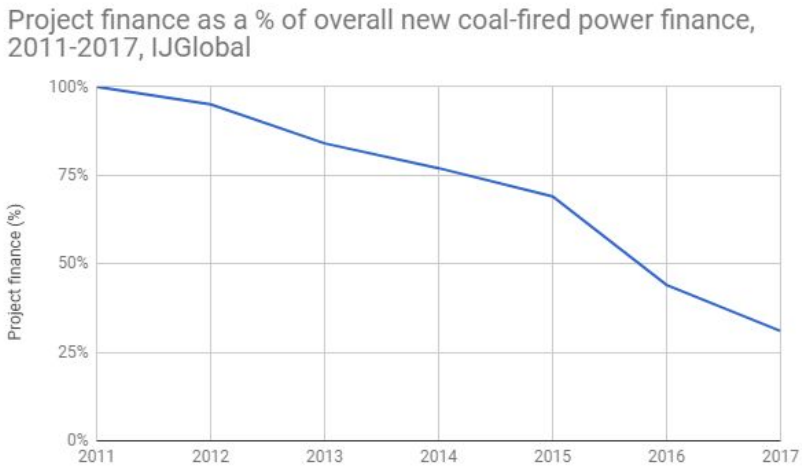
Please note: Regarding International Energy Agency (IEA) data for thermal generation - investment outlays are counted in the year that an asset becomes operational as opposed to when the loans reached financial close. As it may take ~5 years or more between financial close and the operation of a coal-fired plant, the actual investment decisions presented by the IEA may have occurred 5 years ago.

[5] IEA, "World Energy Investment 2017", (2017), p.42, https://www.iea.org/publications/wei2017/, "Unless otherwise noted, the estimates of electricity investment presented in WEI 2017 correspond to overnight capital spending on new power plants and network assets, or the replacement of old assets; i.e., investment outlays are counted in the year that an asset becomes operational. Thus, the investment for 2016 actually reflects spending carried out previous years too." See: IEA (2017) "World Energy Investment 2017: Methodology Annex", p.7, https://www.iea.org/media/publications/wei/WEI2017MethodologyAnnex.pdf.

[6] IEA "World Energy Investment 2016", (2016), p.134, https://www.iea.org/newsroom/news/2016/september/world-energy-investment-2016.html.

Comparing Information on Project Finance and Balance Sheet Finance





[7] [8]

The chart on the left is from the IEA while the chart on the right is produced with data from Infrastructure Journal Global (IJGlobal). Note the contrasting conclusions in these two sources of information, indicating the difficulty in quantifying the split between project and balance sheet finance.

Information about the split between project and balance sheet finance varies widely and the breakdown is difficult to ascertain at a global level. Trends vary regionally. For example, according to the IEA:

> The boom in investment in coal-fired power generation in China over the past decade was fuelled by generation companies' balance sheets leveraged with corporate borrowings from local banks. But this model is proving less viable in other parts of Asia. The attractiveness of project finance is growing in Indonesia, Viet Nam, the Philippines and other emerging Asian economies, as they seek to facilitate investment by independent power producers (IPPs), who often rely on external funding, rather than state-owned vertically integrated utilities (VIUs), whose balance sheets are often too weak to support significant new capital spending.[9]

[7] IEA, "World Energy Investment 2017", (2017), p.90, https://www.iea.org/publications/wei2017/.
[8] IJGlobal, "Transaction Data", (2 November 2017), https://ijglobal.com/data/search-transactions
[9] IEA, "World Energy Investment 2017", (2017), p.90, https://www.iea.org/publications/wei2017/.

On the other hand, Market Forces' analysis of IJGlobal data above shows a steady decline in the proportion of project finance to coal-fired power deals over 2011 to 2017 (to date).

This conflicting data and trend analysis is at least partially a product of the overall poor quality information produced by the global finance industry.

3.3: Private and public (state) finance

IEA (Combines IEA data from 2011 with RAN data from 2014)
The IEA provides the graph below power, mining and transportation, using information from the Rainforest Action Network.

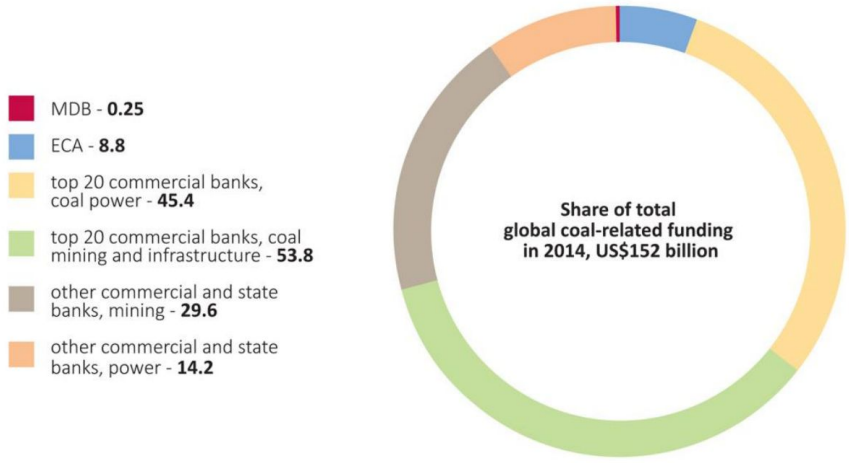


Figure 2 Funding share of coal power and mine projects in 2014 (IEA CCC estimates based on Ran, 2015; IEA, 2016b)

At first glance, this graph indicates that Export Credit Agency (ECA) and Multilateral Development Bank (MDB) funding is minimal when compared to commercial bank funding. However, this graph must be presented in context.

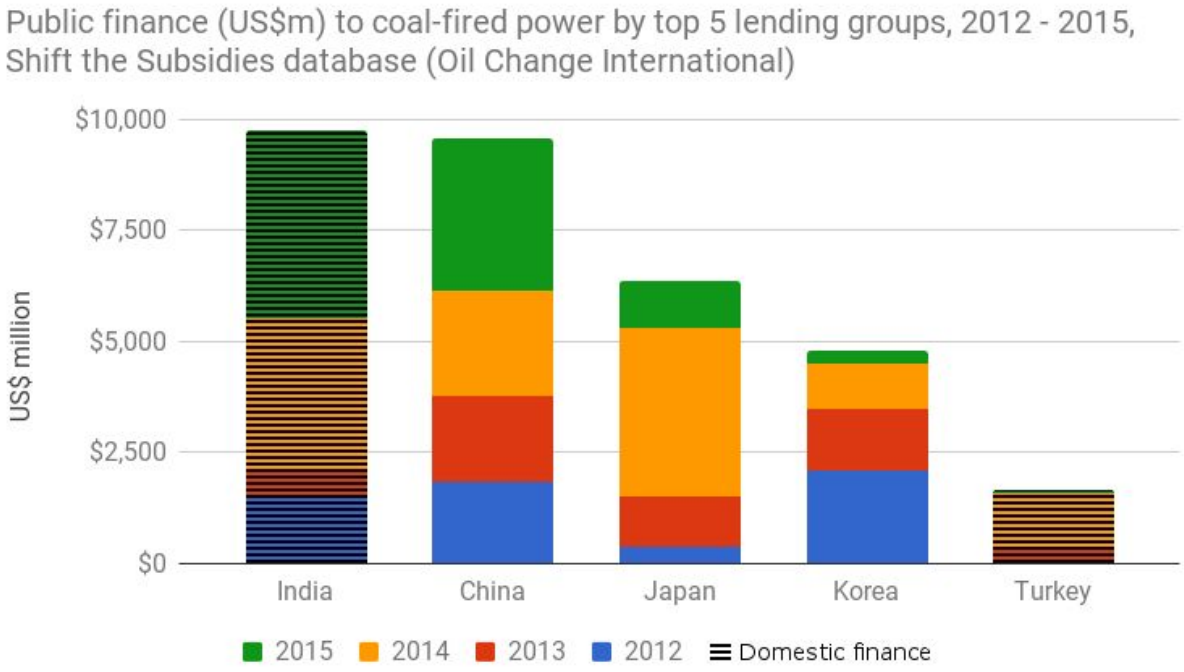
> Public funding bodies such as multilateral development agencies and export credit agencies provided approximately US$9 billion [approx 6%] through mechanisms such as debt and underwriting in 2014. The provision of these services will also attract a proportion of commercial sector funding. The role and influence that public finance institutions may have on project finance is therefore disproportionate to the direct financial support they provide, but the lack of available data makes quantifying this difficult and beyond the scope of this report.[10]

[10] IEA Clean Coal Centre, "International finance for coal-fired power plants", (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-.

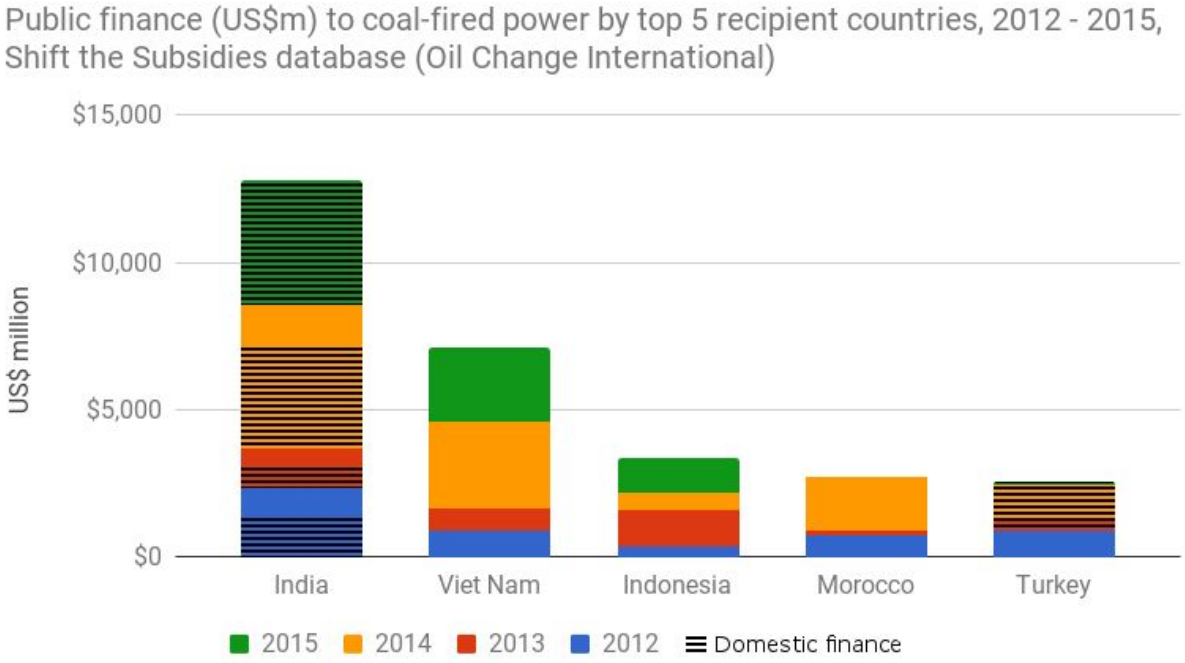
Moreover, the “credit enhancement available by having political risk insurance” provided by ECAs enables commercial banks to participate in these loans.[11] As such, it is clear that ECA support has been and will continue to be vital to a number of projects, particularly in Southeast Asia. For further reading on this topic, see our analysis in section 5.1.

Public (State) Finance

The following is based on the OCI Shift the subsidies database, which provides an indication of public finance to coal fired power: Note that the first graph shows the top 5 lenders – India, China, Japan, Korea and Turkey across 2012 to 2015. The second graph shows the top 5 recipients of subsidies. The subsidies to India and Turkey are primarily domestic.



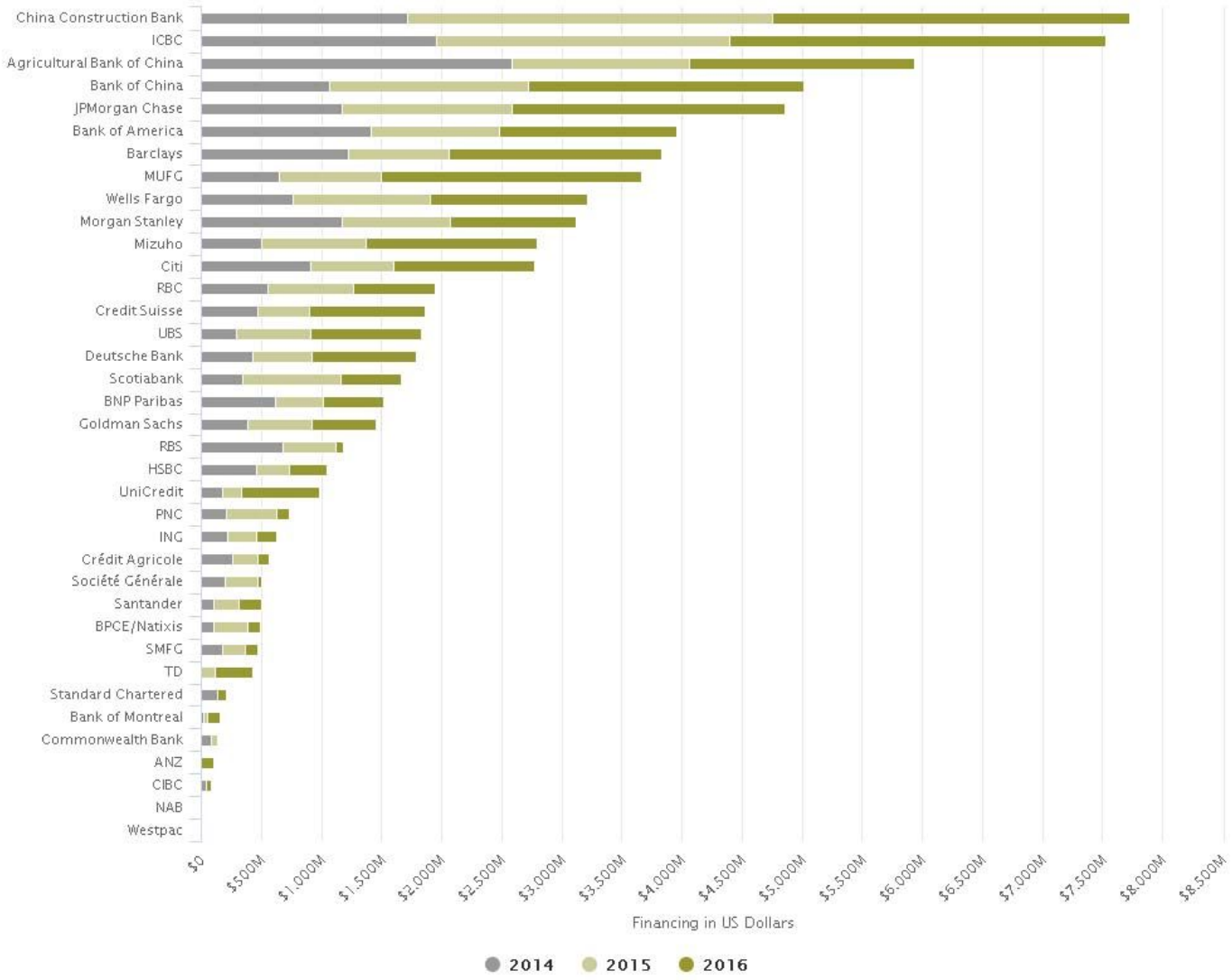
[11] Nomi Ahmad, Project Finance International, “PFI Investing in Asian Infrastructure Roundtable 2016” (October 2016), http://edition.pagesuite-professional.co.uk//launch.aspx?eid=42a63c8e-9bc0-4abe-94d2-cabf8ba7ef59.



Commercial Finance

The following is Banking on Climate Change's 2017 table of top commercial lenders providing finance to coal power. The report by RAN, Bankwatch and others looks at the top 10 companies in the Americas; the top 10 in Europe, the Middle East, and Africa; and the top 10 in Asia and Oceania and the 37 largest commercial and investment banks.

The top lenders are Bank of China, China Construction Bank, ICBC and the Agricultural Bank of China – all of these banks are used by the government of China to pursue strategic objectives (i.e. Belt and Road Initiative) as well as providing domestic finance. However, other lenders are also quite active.



12

3.4: Debt v. Equity

There is limited information about debt and equity and the relative importance of each.

The total value of bonds issued by the coal power companies is unknown. Overall, bonds are much more likely to be issued under corporate finance as compared to project finance. That said, there seems to be somewhat of a resurgence of bond issuance for project financed IPPs, including coal power plants, particularly in Asia (see section 5.3).[13]

[12] RAN et al., “Banking on Climate Change” (2017), https://www.ran.org/banking_on_climate_change
[13] International Financing Review, “Asian project bonds ramp up”, (12 August 2017), http://www.ifre.com/asian-project-bonds-ramp-up/21303967.article.

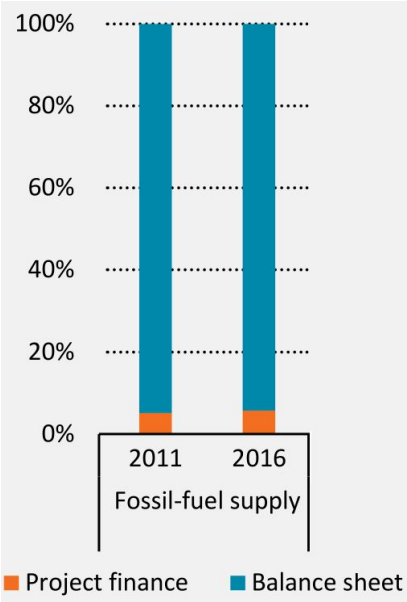
Analysis of types of finance for coal mining projects and companies

4.1: Cost of coal supplied in 2016

The cost of coal supplied in 2016 amounted to US$59 billion in 2016,[14] as compared to US$70 billion in 2015.[15] These figures represent the total amount invested in the capacity required to meet supply in any given year. The supply and demand values are derived from IEA data and industry data on investment costs.[16] They *do not* represent a compilation of actual investment decisions made in the years listed.

4.2: Corporate v. project finance

According to IEA data, most coal mining investment takes the form of balance sheet finance.[17]



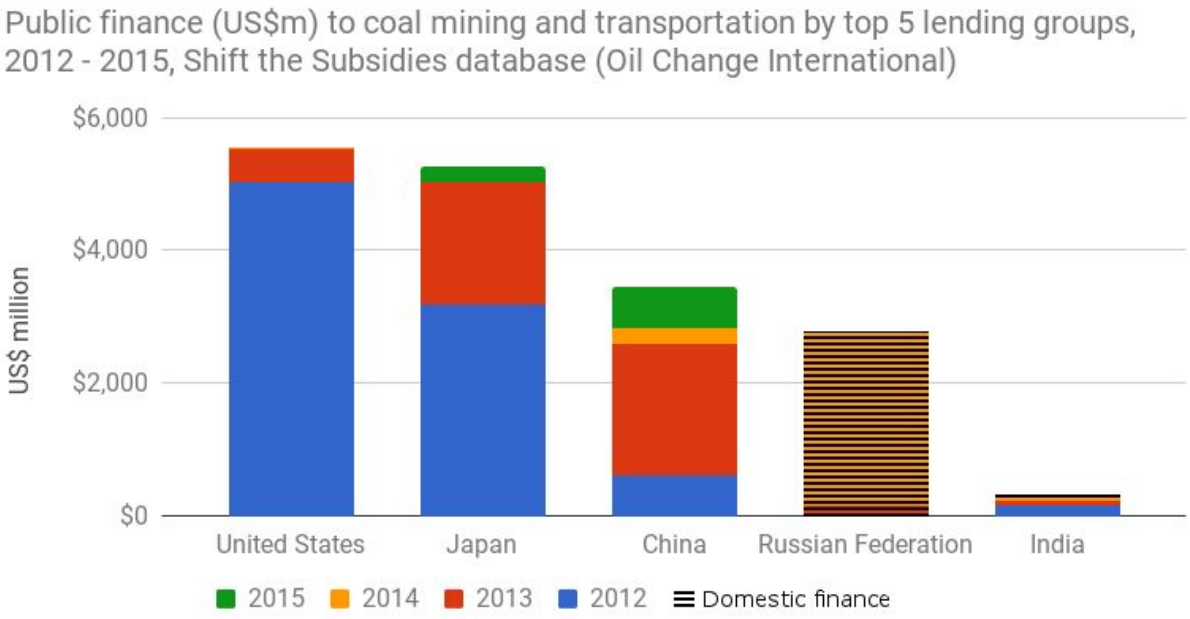
4.3: Private and public (state) finance

[14] IEA, "World Energy Investment 2017",(2017) Table 1.1 (p.22), https://www.iea.org/publications/wei2017/.
[15] IEA, "World Energy Investment 2016", (2016), p.21, https://www.iea.org/newsroom/news/2016/september/world-energy-investment-2016.html.
[16] IEA (2017) "World Energy Investment 2017: Methodology Annex", p.5, https://www.iea.org/media/publications/wei/WEI2017MethodologyAnnex.pdf.
[17] IEA, "World Energy Investment 2017", (2017), p.90, https://www.iea.org/publications/wei2017/. The IEA notes that most project finance for 'fossil-fuel supply' goes to LNG and oil refining, rather than coal supply. This implies that most coal supply is balance sheet-funded.

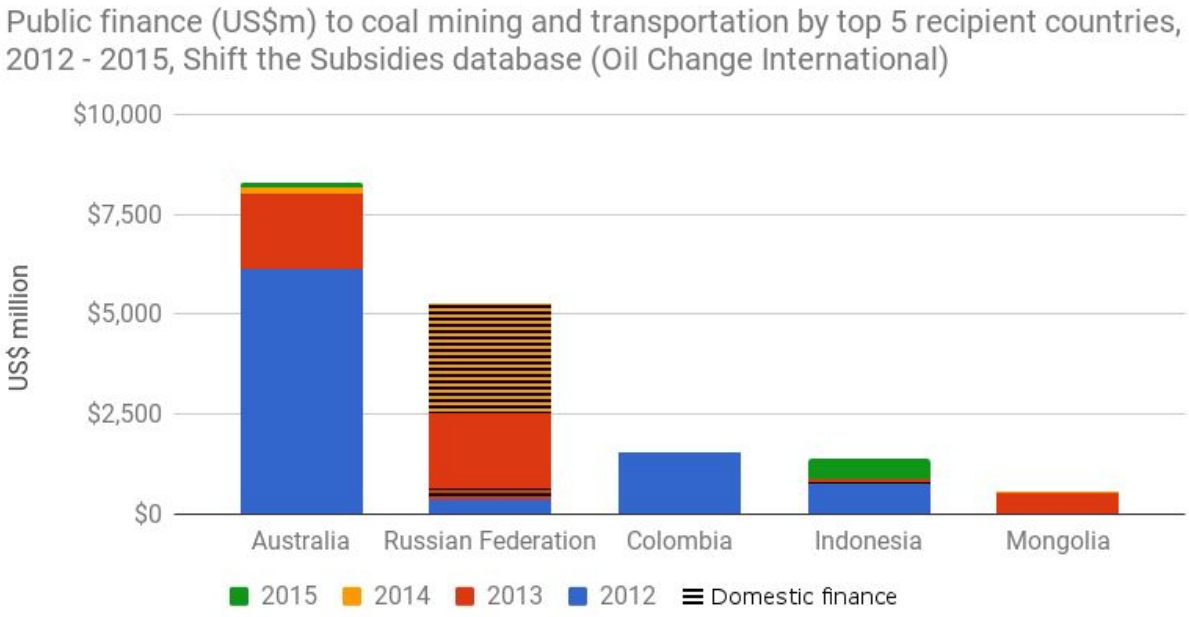
OCI's Shift the Subsidies database reveals that public subsidies for coal mining[18] globally was minimal in recent years compared to overall 'investment' documented by the IEA (as above); US$545 million in 2015 (down from US$2.8 billion in 2014). This is consistent with the analysis of data from IJGlobal which finds limited public finance to this sector. It appears that commercial private sector finance is more important in this space (though the definition of 'private' may become blurred when considering the role of SOE financiers in China and India).

Trends in public subsidies, as well as commercial bank finance, to coal mining globally are available below. The following graphs are based on Oil Change International's Shift the Subsidies database. The first graph shows the top 5 lenders – India, China, Japan, Korea and Turkey across 2012 to 2015. The second graph shows the top 5 recipients of subsidies. The subsidies to India and Turkey are primarily domestic.

Public (State) Finance



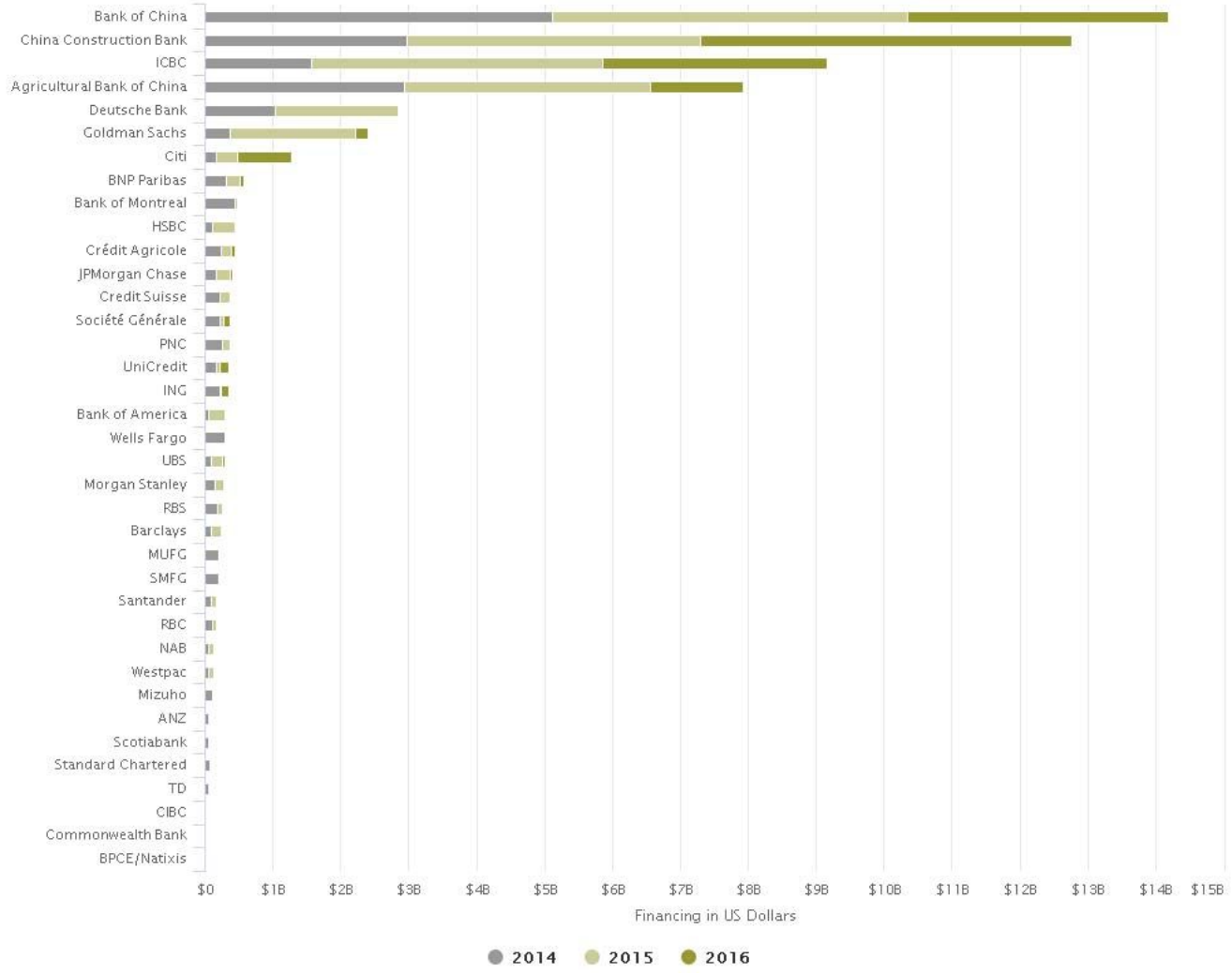
[18] Exploration and extraction



Private/Commercial Bank Finance

The following is Banking on Climate Change's 2017 table of top commercial lenders providing finance to coal mining. The report by RAN, Bankwatch and others looks at the 40 largest coal mining companies based on the Global Coal Exit List and the 37 largest commercial and investment banks.

Again, the top lenders are Bank of China, China Construction Bank, ICBC and the Agricultural Bank of China – all of these banks are used by the government of China to pursue strategic objectives (i.e. Belt and Road Initiative) as well as providing domestic finance. Other lenders are less active in this space.



19

As local banks in emerging markets continue to grow, these banks might be increasingly active in coal mining finance.[20]

4.4: Debt v. Equity

There is limited information in the literature about the relative importance of debt and equity.

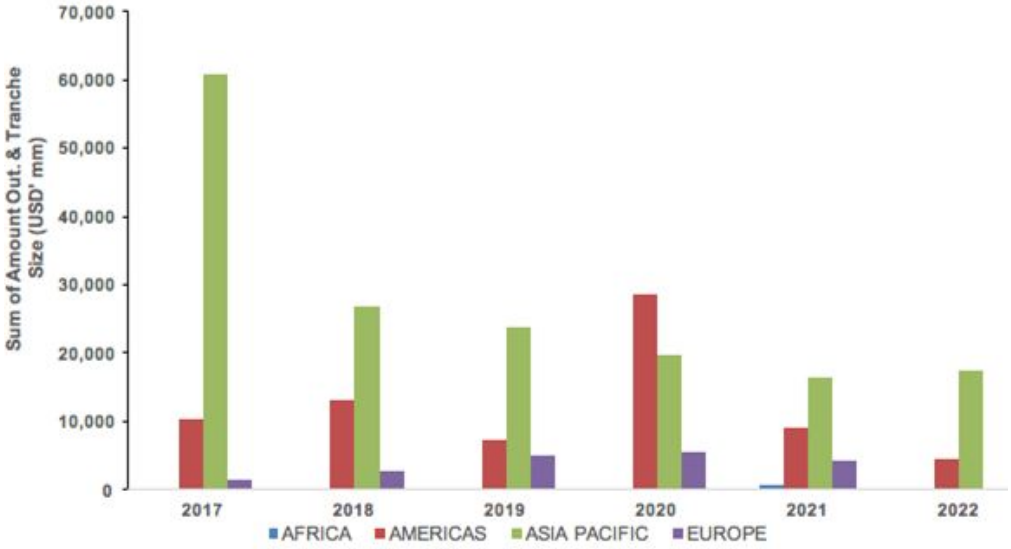
It is apparent however that debt remains an important component of coal mining finance. In the next few years, loans and bonds will mature. Intervention during these periods may ensure that these companies' debt is not refinanced.

---

[19] RAN et al., "Banking on Climate Change" (2017), https://www.ran.org/banking_on_climate_change

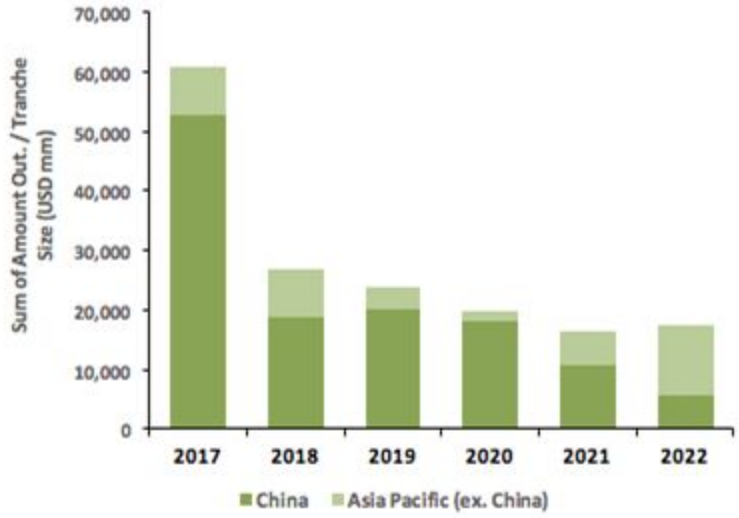
[20] Nomi Ahmad, Project Finance International, "PFI Investing in Asian Infrastructure Roundtable 2016" (October 2016), http://edition.pagesuite-professional.co.uk//launch.aspx?eid=42a63c8e-9bc0-4abe-94d2-cabf8ba7ef59.

Maturity profile of loans and bonds issued by coal mining companies over the next five years (USD mm)



[21]

Maturity profile of loans and bonds issued by coal mining companies over the next five years in the Asia Pacific (USD mm)



[21] These charts are based on research conducted by the GSCC research unit based on the Bloomberg fixed access screen accessed 7 November 2017. For China specific analysis, see: FTI Consulting Asia, "A Brief Reprieve for Coal" (April 2017), http://www.fticonsulting-asia.com/~/media/Files/apac-files/insights/articles/brief-reprieve-for-coal.pdf. FTI Consulting suggests for Chinese companies, this might mean that the Chinese government would play a central role in extending the maturity dates and encourage banks to swap debt for equity.

Trends

5.1: Japan, Korea and China in a race to build coal overseas

Table 5 Manufacturers of components in overseas coal plants (MWe), existing and under construction (Platts, 2016)

Manufacturer	Country	Boiler and steam systems, MW	Turbines, MW	Generator, MW
Dongfang	China	27,743	39,094	37,439
Harbin	China	35,834	25,939	25,879
Shanghai	China	29,394	34,582	
Wuhan	China	30,932		
Beizhong	China		3,760	3,760
Fuji	Japan		11,712	10,879
Hitachi	Japan		28,884	27,568
IHI	Japan	25,961		
Melco	Japan			40,014
MHI	Japan	33,319	48,566	
Toshiba	Japan		61,695	61,095
Skoda	Czech		9,037	9,533
Siemens	Germany		50,388	38,451
BHEL	India	1,866	1,656	1,656
ANSALDO	Italy	2,266	7,945	6,063
Doosan	Korea	17,228	6,496	6,496
ABB	Switzerland	14,288	17,644	17,744
BBC	Switzerland		50,313	45,162
Babcock & Wilcox	US	88,198		
Babcock-Hitachi	US-Japan	15,759		
GE (incl Alstom and CE)	US	64,793	114,267	255,741
Westinghouse	US		5,843	1,0421
Foster Wheeler	US	28,422		
Subtotal for overseas installations		**416,003**	**517,820**	**597,900**
World TOTAL domestic and overseas		**2,228,393**	**2,228,393**	**2,228,393**

China, Japan and Korea are major players in the global coal power export market.[22][23]

[22] IEA Clean Coal Centre, "International finance for coal-fired power plants", (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-. See also Han Chen "Too Coal-Hearted: Japan and Korea's Support for Dirty Energy" (13 November 2017)

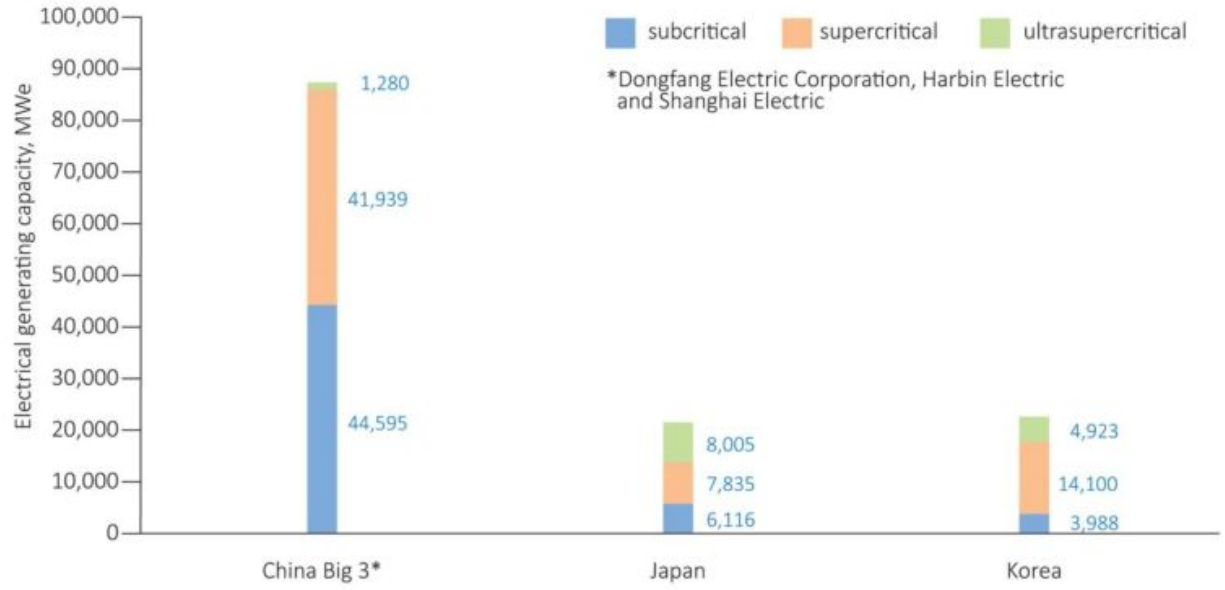


Figure 7 Historical supplies of coal boiler technology from China, Japan, and Korea to overseas power stations in 2008-2016, MWe (author's analysis based on Platts, 2016)

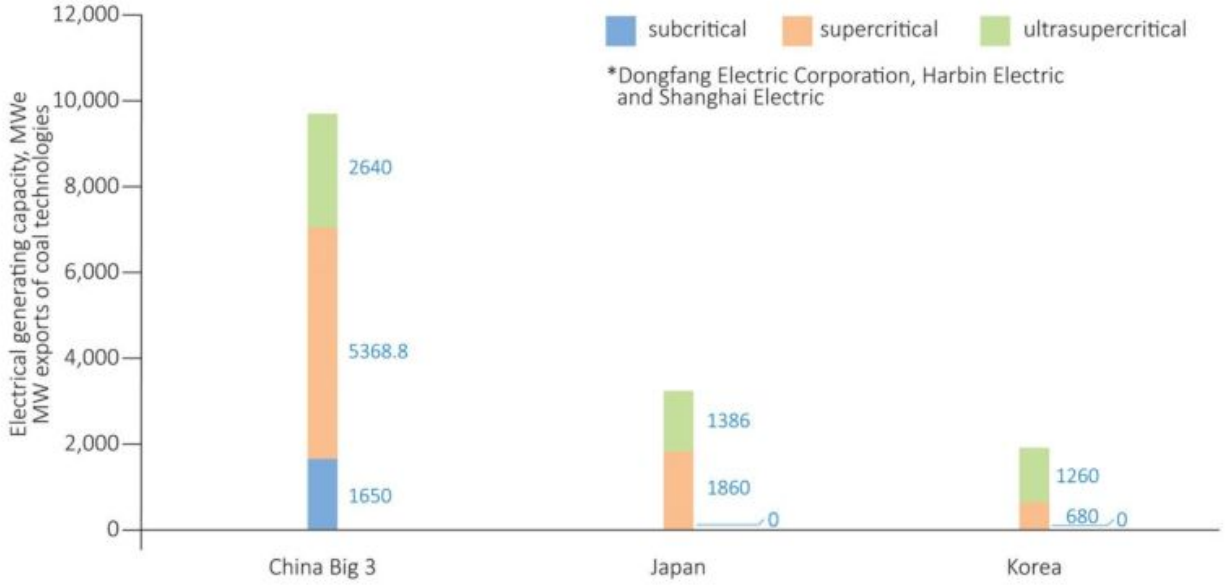


Figure 8 Projected supplies of coal boiler technology from China, Japan and Korea to overseas power stations in 2017-21, MWe (author's analysis based on Platt's, 2016)

24

[23] IEA Clean Coal Centre, "International finance for coal-fired power plants", p.44, (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-.
[24] IEA Clean Coal Centre, "International finance for coal-fired power plants", p.43, (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-.

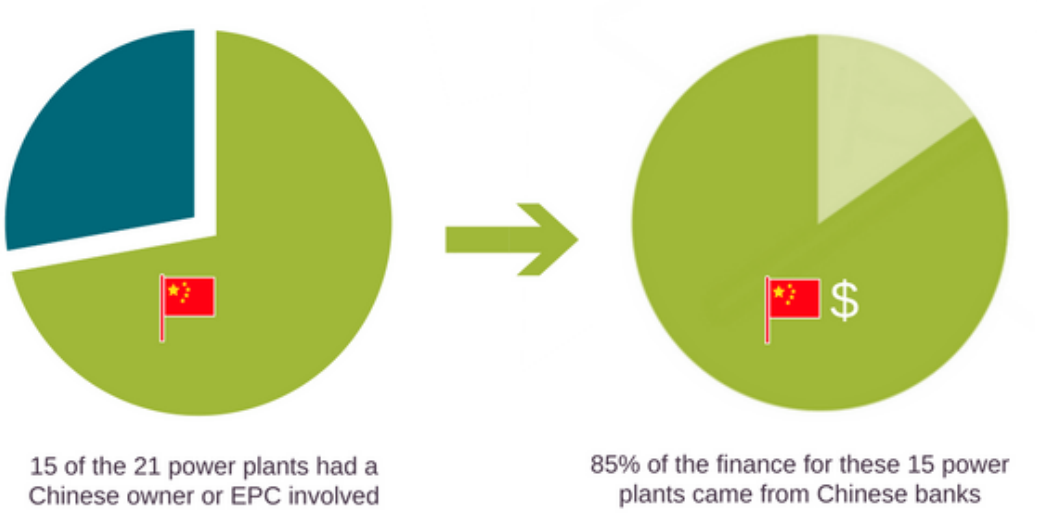
The US, Germany and Switzerland are also large players. In comparison to China, Japan and Korea, however, they lack advantage in areas key to securing new contracts:

- *Integrated public and commercial finance solutions*; It is often quicker, easier and cheaper for project proponents to involve public (state), rather than purely commercial, finance. This is particularly relevant in developing South East Asian economies that want to meet upcoming construction deadlines. Additionally, "Asian banks are willing and able to finance greenfield coal power projects in low and middle income economies" whilst western public agencies have and are distancing themselves.[25]
- *Proximity to and familiarity with the Asian market*; Most new coal plants are earmarked for construction in Asia.

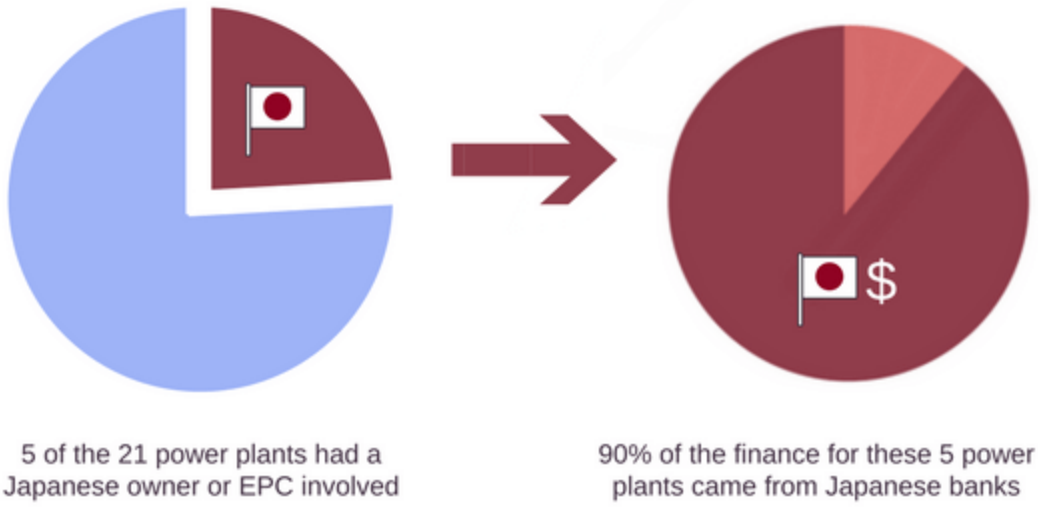
The phrase 'integration of finance solutions' in this context refers to the fact that:

- Engineering, Procurement and Construction (EPC) contractors and project proponents from China, Japan and Korea may be more likely to be selected on the basis that they have a close affiliation with banks and importantly, public finance institutions, from that country.
- Similarly, public finance institutions from these countries approached to fund coal power overseas may agree to provide funding conditional upon pre-approved EPC contracts from the same country.[26]

Market Forces' research has shown the funding outcomes these types of arrangements produce in Indonesia:



[25] IEA Clean Coal Centre, "International finance for coal-fired power plants", p.86, (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-.
[26] IEA Clean Coal Centre, "International finance for coal-fired power plants", p.86, (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-.



In the case of China's global coal power exports; "87 percent of coal power capacity under construction with the help of Chinese finance is sourcing at least one major piece of equipment, such as a turbine, from a China-affiliated company."[27]

China and Japan have significant coal expansion plans which risk not being executed (i.e. China cancelled 103 plants in January[28]).[29] [30] Korea is also looking at slashing its' domestic coal power industry.[31] So aside from *currently* having a significant capacity to supply coal plant equipment abroad, the future may hold *even more* capacity as domestic plans are scrapped. Exporting overseas is viewed as a solution to idle capacity and a means to bolster economic activity.[32] Hence there is competition between these countries to win contracts in the region.

---

[27] Kara Sherwin (Foreign Policy) "China is outsourcing its pollution", (7 December 2016), https://foreignpolicy.com/2016/12/07/china-is-outsourcing-its-pollution/.
[28] Michael Forsythe (New York Times), "China Cancels 103 Coal Plants, Mindful of Smog and Wasted Capacity", (18 January 2017), https://www.nytimes.com/2017/01/18/world/asia/china-coal-power-plants-pollution.html.
[29] Tim Buckley, Simon Nicholas (IEEFA), "Japan: Greater Energy Security Through Renewables", (March 2017), http://ieefa.org/wp-content/uploads/2017/03/Japan_-Greater-Energy-Security-Through-Renewables-_March-2017.pdf
[30] Carbon Tracker, "Chasing the Dragon? China's coal overcapacity crisis and what it means for investors", (27 November 2016), https://www.carbontracker.org/reports/chasing-the-dragon-china-coal-power-plants-stranded-assets-five-year-plan/.
[31] Reuters, "S.Korea to temporarily close 10 old coal-fired power plants in June", (15 May 2017), https://www.reuters.com/article/southkorea-politics-energy/s-korea-to-temporarily-close-10-old-coal-fired-power-plants-in-june-idUSL4N1IH13D.
[32] Kara Sherwin (Foreign Policy) "China is outsourcing its pollution", (7 December 2016), https://foreignpolicy.com/2016/12/07/china-is-outsourcing-its-pollution/.

In the case of China, its' "manufacturing capacity has a scale of economy that means it can build power stations with a lower capex than most other countries. Chinese banks often offer the lowest interest rates on loans."[33] Indeed, China has taken a lead role in the export of coal power:

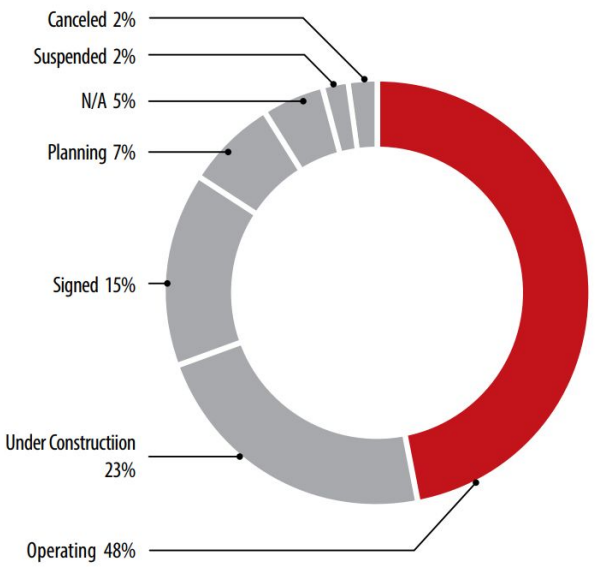
> China's coal power industry is currently only being used at less than 50 percent of its capacity, with each plant mandated to sit idle for three months of the year. "As with all industries suffering from overcapacity, China's coal sector is looking to markets overseas as sources of growth," says Erica Downs, a senior analyst with the Eurasia Group. China is now the largest exporter of coal power equipment, exporting at twice the rate of the runner-up, Japan.
>
> "This clearly has support from the top," Downs adds. Over the past decade, Beijing's two policy banks, Chexim and the China Development Bank (CDB), doubled their financing for energy projects in developing countries — more than half of which has gone to coal power projects. That surge reflects China's broader "going out" strategy known as the Belt and Road Initiative (BRI), with outward-flowing investment increasing tenfold in the last decade.[34]

[35]

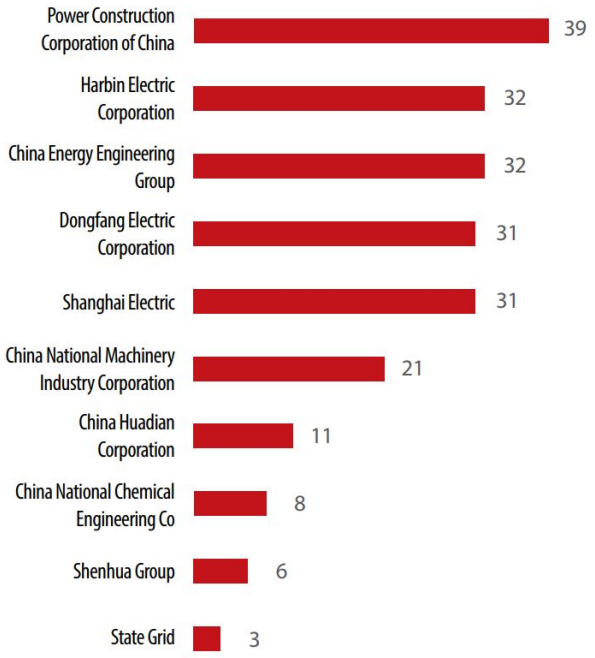
[33] IEA Clean Coal Centre, "International finance for coal-fired power plants", p.63, (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-.
[34] Kara Sherwin (Foreign Policy), "China is outsourcing its pollution", (7 December 2016), https://foreignpolicy.com/2016/12/07/china-is-outsourcing-its-pollution/.
[35] Boston University, China's Global Energy Finance Database, 2017.

As of September 2016, Chinese banks and companies were involved in at least 79 coal fired generation projects, with a total capacity of over 52 GW according to the CEE Bankwatch Network.[36] The graphs below from the Global Environmental Institute provide information on the current state of Belt and Road projects with Chinese involvement (suspended and cancelled plants primarily in India) and on the top 10 Chinese companies involved in Belt and Road Coal-Fired Power.

Graph 5 | **Current Stage of Belt and Road Coal–Fired Power Projects with Chinese Involvement**



Graph 6 | **Top 10 Chinese Companies Involved in Belt and Road Coal–Fired Power**



37

Below is a November 2015 graph of planned Chinese debt and equity investment in both confirmed and unconfirmed coal-fired power projects globally. “The chart shows how much of the past investment was concentrated in India, Indonesia, Vietnam and Turkey. However, the various Silk Road projects will generate more investment in Pakistan and Bangladesh, as well as significant investments in Russia.”[38]

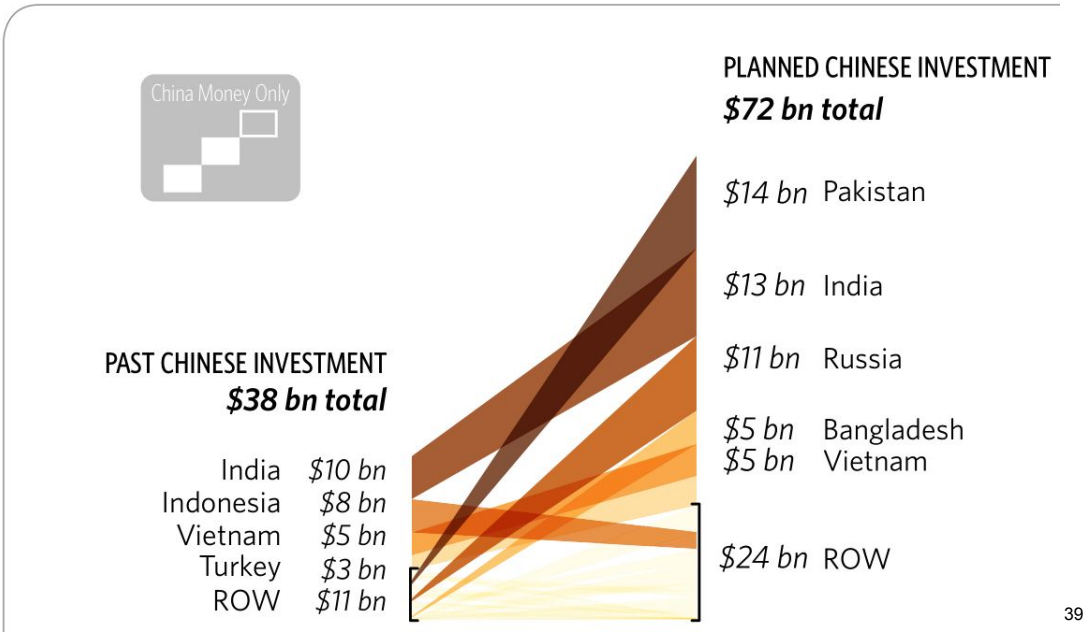
---

[36] Beth Walker (Chinadialogue), “China stokes global coal growth”, (23 September 2016), https://www.chinadialogue.net/article/show/single/en/9264-China-stokes-global-coal-growth.

[37] Ren Peng, Liu Chang and Zhang Liwen, Global Environmental Institute, “China’s Involvement in Coal-Fired Power Projects along the Belt and Road”, (May 2017), pg. 7, http://www.geichina.org/_upload/file/report/China's_Involvement_in_Coal-fired_Power_Projects_OBOR_EN.pdf

[38] IEA Clean Coal Centre, “International finance for coal-fired power plants”, p.57, (April 2017), http://www.iea-coal.org/report/80561//84067/International-finance-for-coal-fired-power-plants,-CCC-277-.

Figure 3 – Top destinations for Chinese overseas coal power finance.



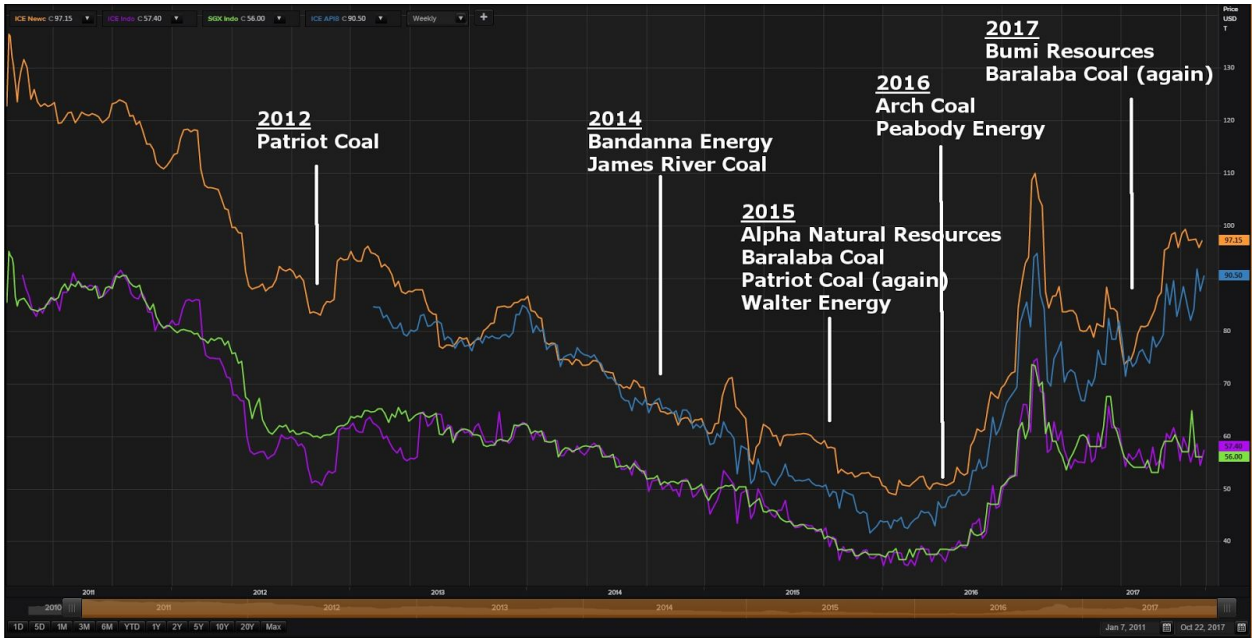
The OECD ECA sector understanding on export credits for Coal-Fired Electricity Generation Projects which came into effect in January 2017, which would limit Japanese and South Korean ECAs from financing most subcritical and some supercritical plants going forward.[40] China is not a party to this Understanding or an OECD member.

[39] Morgan Hervé-Mignucci, Xueying Wang (Climate Policy Initiative), "Slowing the Growth of Coal Power Outside China: The Role of Chinese Finance", (November 2015), https://climatepolicyinitiative.org/publication/slowing-the-growth-of-coal-power-outside-china-the-role-of-chinese-finance/

[40] OECD Sector Understanding on Export Credits for Coal-Fired Electricity Generation Projects, http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/PG(2015)9/FINAL&docLanguage=En.

5.2: Corporate restructure: asset acquisitions, M&A and bankruptcies

Thermal coal price in key Asian markets (which resembles export price trend globally) 2011-present[41], mapped to numerous coal company bankruptcies.



The fall of the global coal price from 2011 to 2016 coincides with the trend in bankruptcies shown in the graph above. Coal companies that have experienced restructures from 2012 to 2017 include:

- Bumi Resources (2017)
- Patriot Coal (2012, 2015)
- James River Coal Company (2014)
- Peabody Energy (2016)
- Arch Coal (2016)
- Alpha Natural Resources[42] (2015)
- Walter Energy[43] (2015)

---

[41] Select Asian thermal coal export price data sets, Thomson Reuters Eikon, accessed 31 October 2017.
[42] See Jon Marino, CNBC, "Wall Street checks out of coal mines". (16 March 2016), available online: https://www.cnbc.com/2016/03/16/wall-street-checks-out-of-coal-mines.html: "After sector pressures forced Alpha Natural Resources into bankruptcy last August, the lack of financing from banks to let the company exit Chapter 11 led the company to sell more assets as it continues its restructuring."
[43] List provided in Michael Leibreich, "Breaking Clean", London Summit 2017, (19 September 2017), pg. 81, https://data.bloomberglp.com/bnef/sites/14/2017/09/BNEF-Summit-London-2017-Michael-Liebreich-State-of-the-Industry.pdf.

- Cockatoo Coal (2015, 2017)
- Bandanna Energy[44] (2014)

These bankruptcies do not mean that the companies themselves are 'dead' or even that they have stopped operations. In December 2016, it was estimated that 44% of US coal comes from companies which declared bankruptcy from 2012 onwards.[45] Further, most of the coal companies filed for bankruptcy under Chapter 11, which permits the company to continue its operations while it is restructuring.[46] In the US, of the 49 coal bankruptcies since 2012, about half have been under Chapter 11.[47] Therefore, the mines themselves will continue operating. Peabody for example has stated that it will continue to operate its mines and that its Australian operations were not included in the restructure.[48] Moreover, bankruptcy offers more incentive to continue mining so that creditors will be paid off.[49]

The newly restructured companies are still susceptible to further bankruptcies.[50] There has been a recent recovery in the global seaborne thermal coal price, contributing to a slowdown in bankruptcies for now. However this may not last for very long. As China is half of the world's coal consumption and production, it has a major effect on global prices and thus the fate of coal producers globally. According to Carbon Tracker "a drop in coal-fired power [in China], combined with the removal of domestic production restrictions spells the death knell for coal imports from overseas. China could become a net exporter of coal again before 2020, which

---

[44] See: FTI Consulting Asia, "A Brief Reprieve for Coal" (April 2017), http://www.fticonsulting-asia.com/~/media/Files/apac-files/insights/articles/brief-reprieve-for-coal.pdf

[45] See Dana Varinsky, Business Insider, "Nearly half of US coal is produced by companies that have declared bankruptcy -- and Trump won't fix that," (10 December 2016), https://www.businessinsider.com.au/us-coal-bankruptcy-trump-2016-12?r=US&IR=T; Arathy Nair, Reuters, "Peabody Chapter 11 tops string of U.S. coal bankruptcies", (16 April 2016), https://www.reuters.com/article/us-usa-coal-bankruptcy/peabody-chapter-11-tops-string-of-u-s-coal-bankruptcies-idUSKCN0XC2KQ.

[46] Daniel Cohan, the Hill, "When coal companies go bankrupt, the mining doesn't always stop" (18 April 2016), http://thehill.com/blogs/pundits-blog/energy-environment/276628-when-coal-companies-go-bankrupt-the-mining-doesnt.

[47] Mary Anne Hitt, Peter Morgan, Compass, "Coal Bankruptcy 101: Companies Are Leaving Workers and Communities In the Lurch", (28 January 2016), http://content.sierraclub.org/coal/posts/bankruptcy-101-companies-are-leaving-workers-and-communities-lurch.

[48] Chris Mooney and Steven Mufson, Washington Post, "How coal titan Peabody, the world's largest, fell into bankruptcy", (13 April 2016), https://www.washingtonpost.com/news/energy-environment/wp/2016/04/13/coal-titan-peabody-energy-files-for-bankruptcy/?utm_term=.343c783d0b96.

[49] Daniel Cohan, the Hill, "When coal companies go bankrupt, the mining doesn't always stop" (18 April 2016), http://thehill.com/blogs/pundits-blog/energy-environment/276628-when-coal-companies-go-bankrupt-the-mining-doesnt.

[50] Peter Morgan, The Planet, "Trouble Behind, Trouble Ahead: The Post-Bankruptcy Coal Landscape" (18 March 2017), http://www.sierraclub.org/planet/2017/03/trouble-behind-trouble-ahead-post-bankruptcy-coal-landscape.

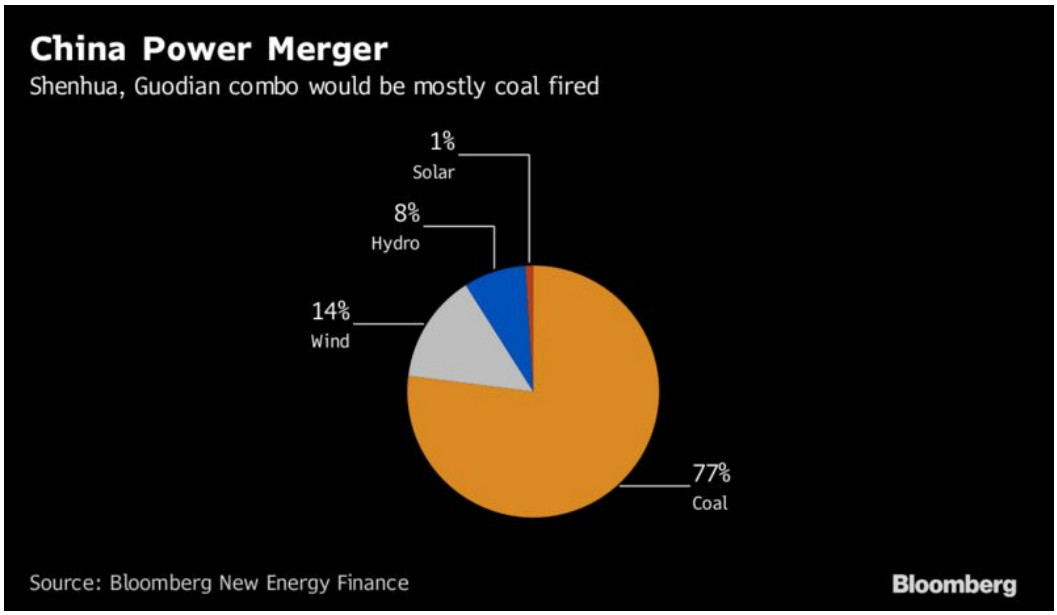
would see the seaborne thermal coal market weakened again..."[51] The decrease in coal price would likely lead to problems for the restructured companies and drive further bankruptcies.

These restructures may also lead to the consolidation of coal companies.[52] Coal producing and mining companies have acquired assets being shed by other companies this year:

- Acquisition by Arclight of AEP's power plants (5200MW) in Ohio and Indiana.[53]
- Sale of stake of mines in Mozambique by Vale to Mitsui.[54]
- Acquisition by Yancoal Australia of Coal & Allied Industries Limited from Rio Tinto.[55]
- Acquisition of Enel's 10% stake in Bayan Resources by the company's founder.[56]

Shenhua Group and China Guodian have merged following approval by the State Council of China. The company has the combined capacity portfolio of 221 to 225 GW,[57] and 500 million tons of coal per year.[58] It would account for 13% of both China's power generation and coal mining capacity.[59]

[51] Carbon Tracker, "China risks wasting $490 bln on unneeded coal plants", (27 November 2017), https://www.carbontracker.org/china-risks-wasting-490-bln-on-unneeded-coal-plants/.
[52] James Goldwin, Huffpost, "3 Reasons Why Coal Companies Declaring Bankruptcy Is Bad," (15 April 2017), https://www.huffingtonpost.com/james-goldwin/3-reasons-why-coal-compan_b_9693926.html; See also, Peter Morgan, The Planet, "Trouble Behind, Trouble Ahead: The Post-Bankruptcy Coal Landscape" (18 March 2017). http://www.sierraclub.org/planet/2017/03/trouble-behind-trouble-ahead-post-bankruptcy-coal-landscape; Murray Energy has been buying up interests in Illinois-based Forsight Energy: see Foresight Energy, About, http://www.foresight.com/about/.
[53] IJGlobal, "Acquisition of AEP's Power Plants (5200MW)", (30 March 2017).
[54] IJGlobal, "Acquisition of a 50% Stake in Nacala Logistics Corridor and 15% in Moatize Coal Mine" (3 July 2017).
[55] IJGlobal, "Acquisition of Coal & Allied Industries" (3 October 2017).
[56] IJGlobal, "Acquisition of Enel's 10% Stake in PT Bayan Resources", (11 October 2017).
[57] BMI Research, "Coal Power Consolidation Under Way, More to Follow", (10 August 2017), https://www.bmiresearch.com/articles/quick-view-coal-power-consolidation-under-way-more-to-follow, see also Tim Buckley and Simon Nicholas, IEEFA, "Global Electricity Utilities in Transition: Leaders and Laggards: 11 Case Studies" (October 2017), pg. 2.: http://ieefa.org/wp-content/uploads/2017/10/IEEFA-Global-Utilities-in-Transition-11-Case-Studies-October-2017.pdf; Bloomberg News, "China is Creating the World's Largest Power Company," (28 August 2017), https://www.bloomberg.com/news/articles/2017-08-28/china-approves-guodian-shenhua-group-to-merge.
[58] Bloomberg News, "China is Creating the World's Largest Power Company," (28 August 2017), https://www.bloomberg.com/news/articles/2017-08-28/china-approves-guodian-shenhua-group-to-merge.
[59] Bloomberg News, "China is Creating the World's Largest Power Company," (28 August 2017), https://www.bloomberg.com/news/articles/2017-08-28/china-approves-guodian-shenhua-group-to-merge.



There are also rumors that China Huaneng, China's largest coal-fired power producer, may merge with State Power Investment Corporation, a coal-fired power company. If completed, this company would have 262 gigawatts of capacity and assets of 1.75 trillion yuan.[60]

At this stage this may be a Chinese trend,[61] nevertheless, given the spate of bankruptcies in the US discussed above, there may be more consolidation expected.

5.3: Project bonds

This funding mechanism does not seem significant to global coal finance at present.

At this stage, project bonds mostly seem to be refinancing project debt, with bank lending absorbing the risk of the project in its early stages.[62] Analysis suggests that it may be a trend that is catching on in Asia.[63] Basel III regulations, soon to come into effect, will require stricter

[60] Bloomberg News, "China Mulls 3 Mega Power Firms in $855 Billion Reshuffle," (8 May 2017), https://www.bloomberg.com/news/articles/2017-05-08/china-said-to-mull-3-mega-power-firms-in-855-billion-reshuffle.

[61] See BMI, "Global Power Report" (September 2017), pg. 19 predicting "increased consolidation as a result of deterioration in the outlook for coal-fired power utilities in the country, amid overcapacity and faltering electricity demand."

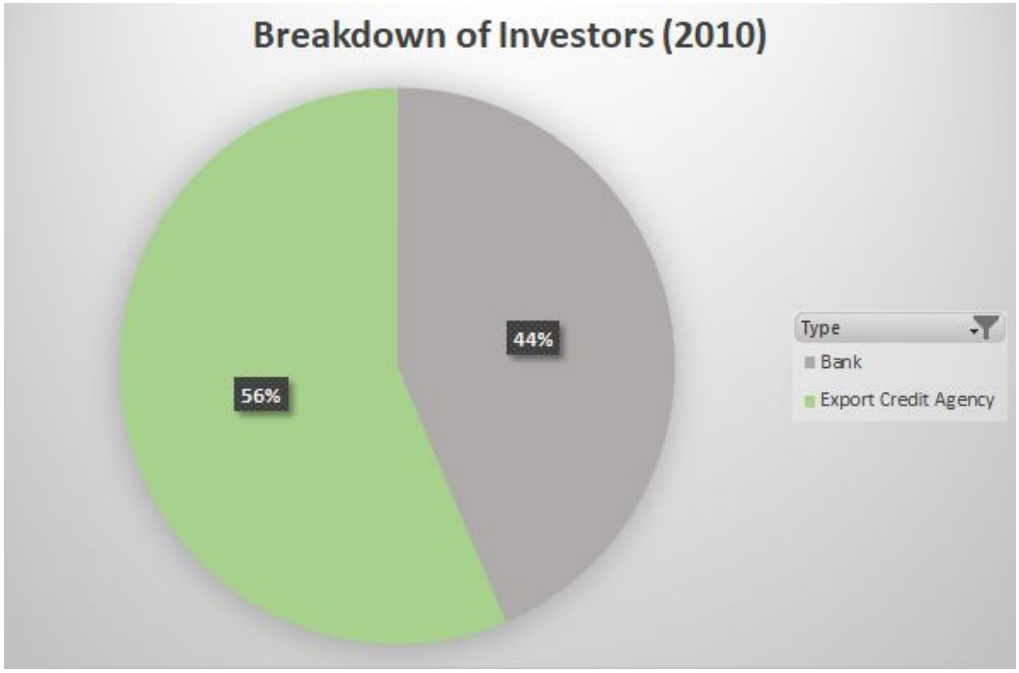
[62] Daniel Stanton, International Finance Review, IFR News, "Asian Project Bonds ramp up" (12 August 2017).

[63] IFR News "Project Pioneers," (5 August 2017). This article discusses Paiton Energy bond issue and Nam Ngum 2. See also, Project Finance International, "Putting a toe into US$90trn" (26 July 2017). This article discusses the Paiton Energy bond issue as well as Indian renewables producer Greenko's solar and wind deals. This may also be because commercial banks are expected to scale back their long-term

monitoring and disclosures on debt, making it more expensive to achieve project lending (as these monitoring and disclosure costs would be passed to the project developers).[64] As such, loans may be less frequent. In order to lower these costs, they may now access the institutional bond market.

Paiton Energy (an Indonesian coal-fired power producer in East Java owned by sponsors are Mitsui (45.5%), Nebras Power (35.5%), JERA (14.0%) and Batu Hitam Perkasa Indonesia (5.0%)) issued a US$ 2bn project bond in August as part of a refinancing package.[65]

The investment in the 2010 loan was as follows:



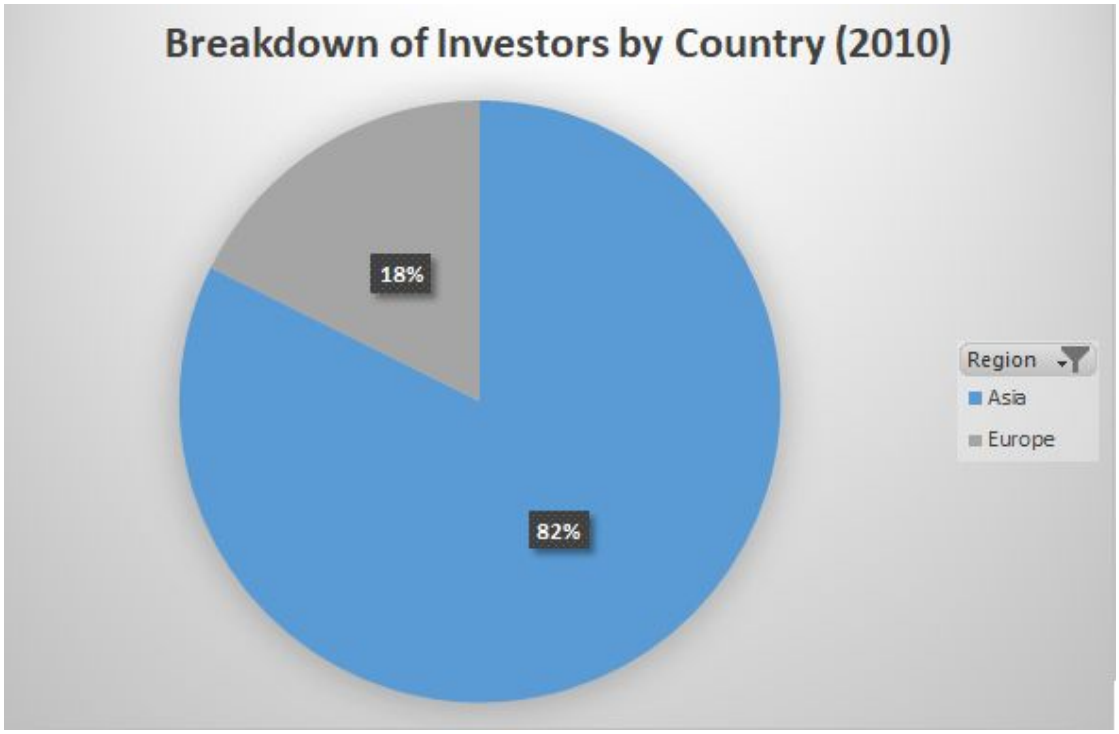
[66]

lending to comply with Basel III rules. See Mia Tahara-Stubbs, IJGlobal, "Asia project bonds: ready for takeoff" (31 Aug 2016). This has been a trend previously in Europe, but not specifically in the coal sector. See Alexander Dockreay, IJGlobal, "Data Analysis: Project bonds restrained" (18 February 2016) and "A project bond refinancing boom, when rates rise" (21 Jan 2016). There may be greater use of this mechanism in the renewables funding space.

[64] Mia Tahara-Stubbs, IJGlobal, "PLN subsidiary issues project bonds", (21 September 2017); Jordan Bintcliffe, IJGlobal, "Mini-perm treatment for GCC tenors in need of a trim", (30 August 2017); Bank for International Settlements, Basel III, https://www.bis.org/bcbs/basel3.htm.

[65] There was also a $750M loan in two tranches which was issued as part of the refinancing package: The lenders were Barclays, Citi, DBS, HSBC, Mizuho, Shinsei Bank, Standard Chartered Bank, and SMBC. See Project Finance International, "Paiton raised US$750M loan" (18 Aug 2017).

[66] TR Eikon, accessed 24 November 2017.

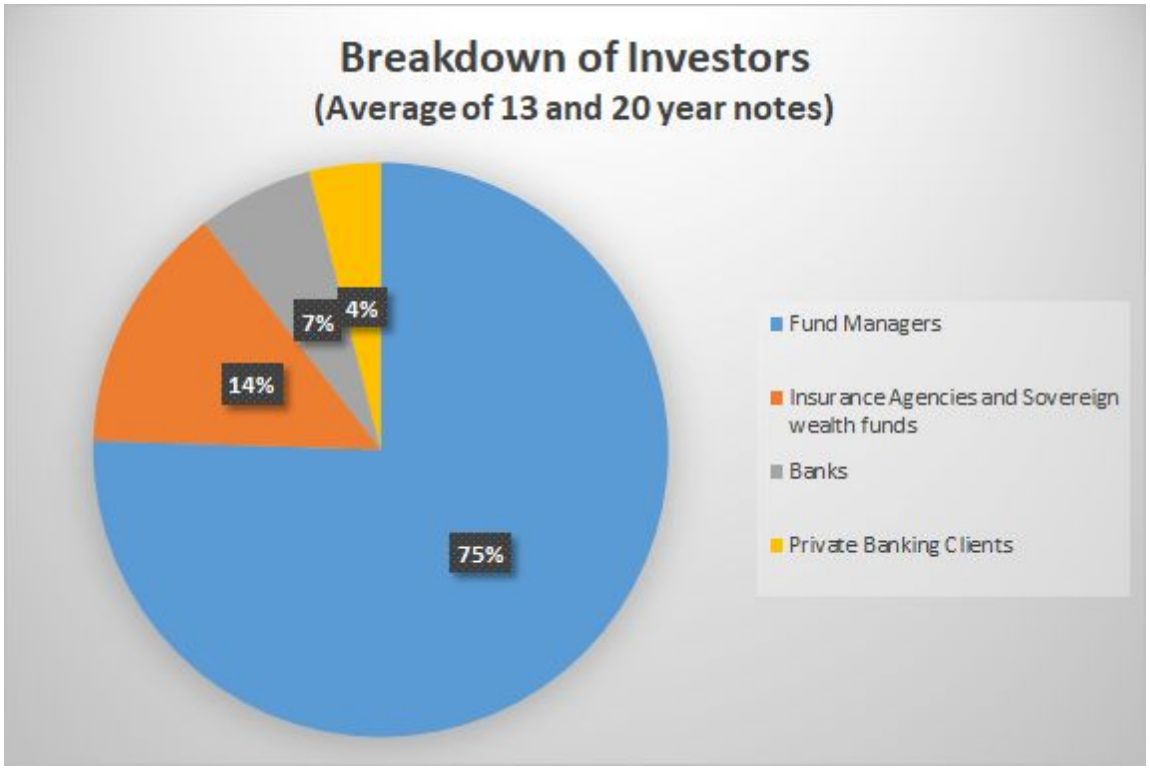


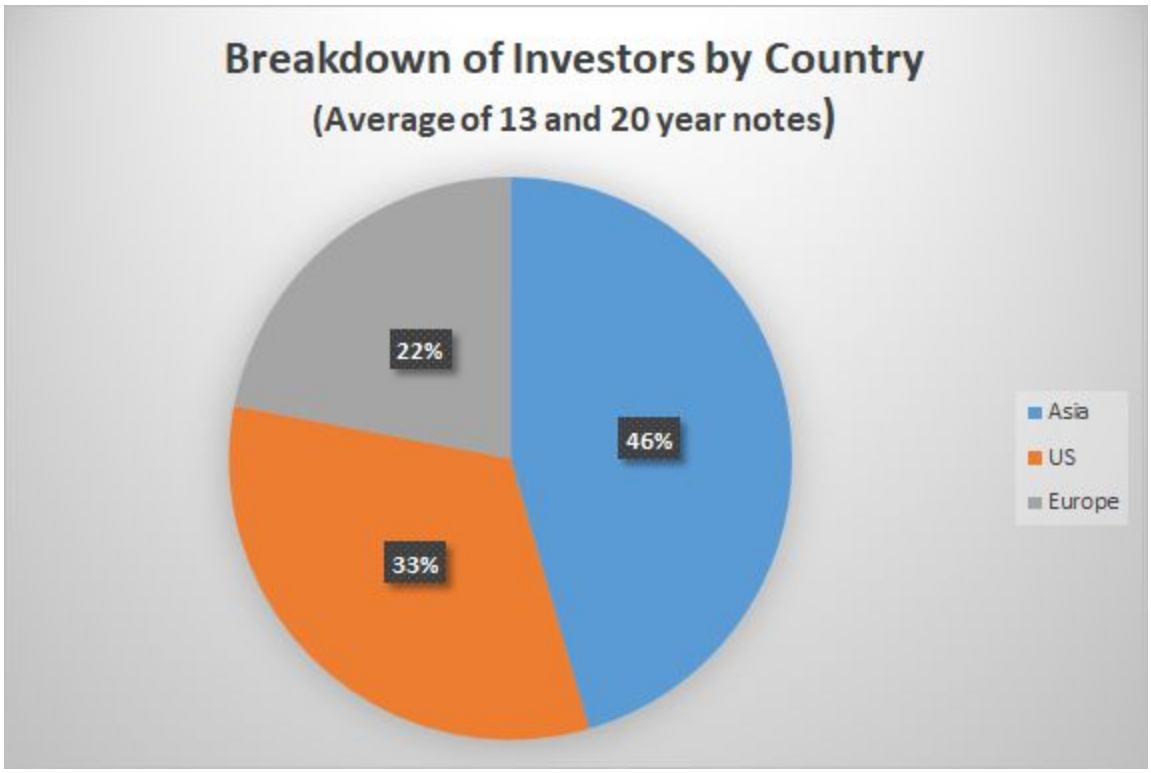
[67]

By contrast, the investors in the bond were far more varied. According to Project Finance International:

> The US$2bn bond issue of Paiton Energy, launched via Minejesa Capital, has received massive interests from investors mainly from Asia when it recently closed its books. For its 13-year tranche, investors in Asia make up 48%, US 31%, and Europe 21%. Fund managers make the biggest portion, comprising 78% of the investors. Others are insurance agencies and sovereign wealth funds (12%), banks (7%) and private banking clients (3%). For the longer 20-year paper, Asian investors again lead with 43% of the buyers, US 34% and Europe 23%. The investor types are fund managers (73%), insurance agencies/SWF (16%), PB (6%) and banks (5%). The 13-year US$1.2bn 2030 bond was priced at 4.625% while the 20-year US$800m 2037 notes were priced at 5.625%. Barclays and HSBC were joint global coordinators, as well as joint bookrunners with Citigroup, DBS and Deutsche Bank.[68]

[67] TR Eikon, accessed 24 November 2017.
[68] Minerva Lau, Project Finance International, “Indonesia, more details on Paiton Bond” (18 August 2017).


Breakdown of Investors
(Average of 13 and 20 year notes)
75%
14%
7%
4%
Fund Managers
Insurance Agencies and Sovereign wealth funds
Banks
Private Banking Clients


Breakdown of Investors by Country
(Average of 13 and 20 year notes)
46%
33%
22%
Asia
US
Europe

This mechanism may enable investors who have tried to distance themselves from coal to continue providing coal finance.

Green bonds

There is also no guarantee that sponsors of projects will not seek to use green bonds in financing coal-fired power projects. Chinese coal power plant producer Tianjin SDIC Jinneng Electric Power registered short-term 'green bonds' on interbank market for $USD150M to finance a 2,000MW coal-fired power plant in Tianjin.[69] The People's Bank of China includes clean coal power plants in projects eligible for green financing.[70]

Voluntary green bonds principles do not expressly exclude coal power from eligible green projects, however, these projects must meet with environmental sustainability objectives and recommend independent review.[71] Further, some standards, such as the ASEAN framework of green bonds standards specifically exclude funding of fossil fuels.[72]

Country Specific Sections

6: China

6.1: Key factors influencing the future of the coal sector

China will be the largest user of coal in the near-term. According to the 2016 IEA Medium Term Coal Market report, "China will still account for almost 50% of global coal demand, over 45% of coal production, and more than 10% of seaborne trade."[73]

6.2: Coal use (across all sectors, including electric power)

Past

[69] Reuters, "China coal-fired power plant issues green bonds", (4 August 2017), https://www.reuters.com/article/china-power-financing/china-coal-fired-power-plant-issues-green-bonds-idUSL4N1KP3RQ
[70] IFR News, "EIB, PBoC urge more work on global Green bond standards", (14 November 2017).
[71] Green Bonds Brochure (June 2017), https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/GreenBondsBrochure-JUNE2017.pdf
[72] IFR News, "UPDATE: ASEAN launches green bond standards", (8 November 2017).
[73] 2016 IEA Medium Term Coal Market Report, Pg. 13.

Economic activity and therefore manufacturing and construction activity, is a major driver of coal use in China. Trevor Houser and Peter Marsters of the Rhodium Group estimated that a decline in construction activity explained about three-quarters of China's decline in coal use since 2013.[74]

Additionally, "improvements in coal plant efficiency and clean energy deployment have cut coal intensity in the electricity sector by 11 percent over the last 8 years."[75] "Air pollution policies have likely played a role, but how much is unclear. It is more likely that China is taking advantage of the lower coal consumption growth to implement and promote its air pollution policies."[76]

Future

According to authors who recently published on the subject in *Nature Geoscience*; "[although] most analysts have predicted that China's coal consumption will peak somewhere between 2020 and 2040 … There is plenty of evidence to support the argument that the current drop is not a temporary dip, but rather the beginning of a new trend."[77] In order of importance, the factors affecting the future of coal are:

1. Economic slowdown and decreased manufacturing and construction.
2. Current policies on climate change and air pollution.[78]
3. China is consciously undertaking a new "industrial revolution" based on technological innovation in energy, communications, and manufacturing.[79]

(Even more) overcapacity on the horizon: "As of July 2016, China has 895 GW of existing coal capacity being used less than half of the time – and perversely has 205 GW under construction and another 405 GW[80] of capacity planned, with a total overnight capital cost of half a trillion US dollars….China risks wasting $490 bln on unneeded coal plants….Investors who fail to understand the immediacy of China's energy transition could find themselves chasing fossil fuel demand that is not there."[81]

---

[74] Brad Plumer, Vox ,"The real war on coal is happening in China right now", (6 March 2016), https://www.vox.com/2016/3/6/11168914/china-peak-coal.
[75] Qi Ye and Jiaqi Lu, "The end of coal-fired growth in China", (4 August 2016), https://www.brookings.edu/blog/up-front/2016/08/04/the-end-of-coal-fired-growth-in-china/.
[76] Glen Peters, CICERO, "Have Chinese emissions peaked?", (30 March 2017), http://www.cicero.uio.no/no/posts/klima/have-chinese-emissions-peaked.
[77]Qi Ye and Jiaqi Lu, "The end of coal-fired growth in China", (4 August 2016) https://www.brookings.edu/blog/up-front/2016/08/04/the-end-of-coal-fired-growth-in-china/.
[78] Especially the Paris Agreement's binding INDCs that set China on the road to meet a 20 percent clean energy target by 2030.
[79]Qi Ye and Jiaqi Lu, "The end of coal-fired growth in China", (4 August 2016) https://www.brookings.edu/blog/up-front/2016/08/04/the-end-of-coal-fired-growth-in-china/.
[80] This figure is outdated but the trend still stands.
[81] Carbon Tracker, "Chasing the Dragon? China's coal overcapacity crisis and what it means for investors", (27 November 2016),

As a result, China will likely be lowering its own consumption of coal and coal power, and finance to domestic sources will be proportionately reduced. Nevertheless, as noted above in section 5.1, China is likely to continue to finance coal power elsewhere.

6.3: Pipeline for coal power and mines

The pipeline for coal power is estimated to be 153 GW.[82] In 2016, China was estimated to have produced 2.65 billion tonnes of thermal coal (49% of global total)[83] and had proven coal (all types) reserves of 244 billion tonnes (21.4% of global total).[84]

https://www.carbontracker.org/reports/chasing-the-dragon-china-coal-power-plants-stranded-assets-five-year-plan/.

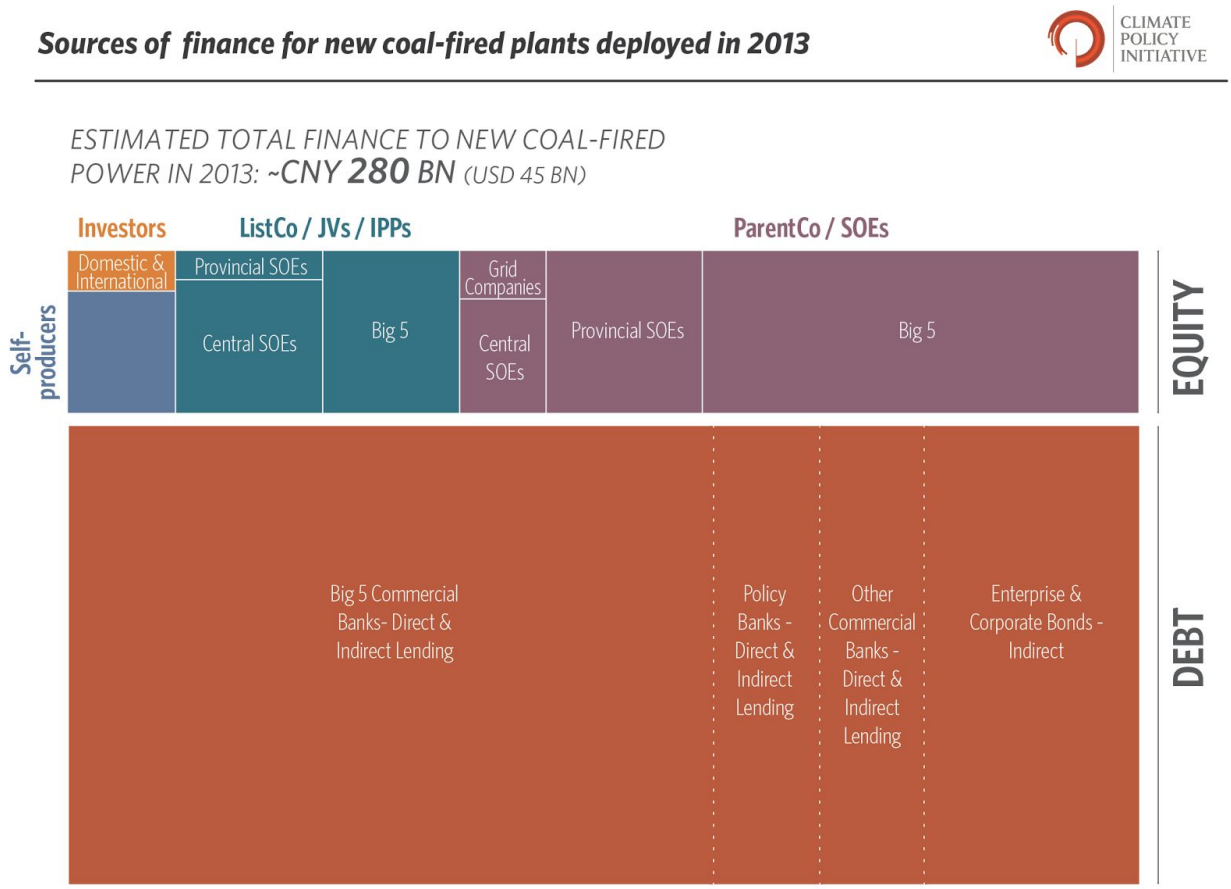
[82] Endcoal, Coal Plants by Country, (July 2017), https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf

[83] IEA, "Coal information 2017", Table 1.2, (2017), http://www.iea.org/bookshop/751-Coal_Information_2017

[84] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf.

6.4: Coal power finance

The graph below describes debt and equity in Chinese coal power finance.



[85]

Equity

- Big 5 state owned enterprise parent companies are important: China Huaneng Group, China Datang Group, China Huadian Group, China Guodian Group, and China Power Investment. Ownership is as follows:
    - China Huaneng Group: Administered by the State Council of the PRC.
    - China Datang Corporation: Directly managed by the CPC Central Committee.
    - China Huadian Corporation: Wholly owned by the state regulated by the State-owned Assets Supervision and Administration Commission of the State Council of the PRC.

[85] Morgan Hervé-Mignucci, Xueying Wang, David Nelson and Uday Varadarajan (Climate Policy Initiative), "Slowing the Growth of Coal Power in China: the Role of Finance in State-Owned Enterprises", p.14, https://climatepolicyinitiative.org/wp-content/uploads/2015/12/Slowing-the-Growth-of-Coal-Power-in-China-%E2%80%93-the-Role-of-Finance-in-State-Owned-Enterprises.pdf

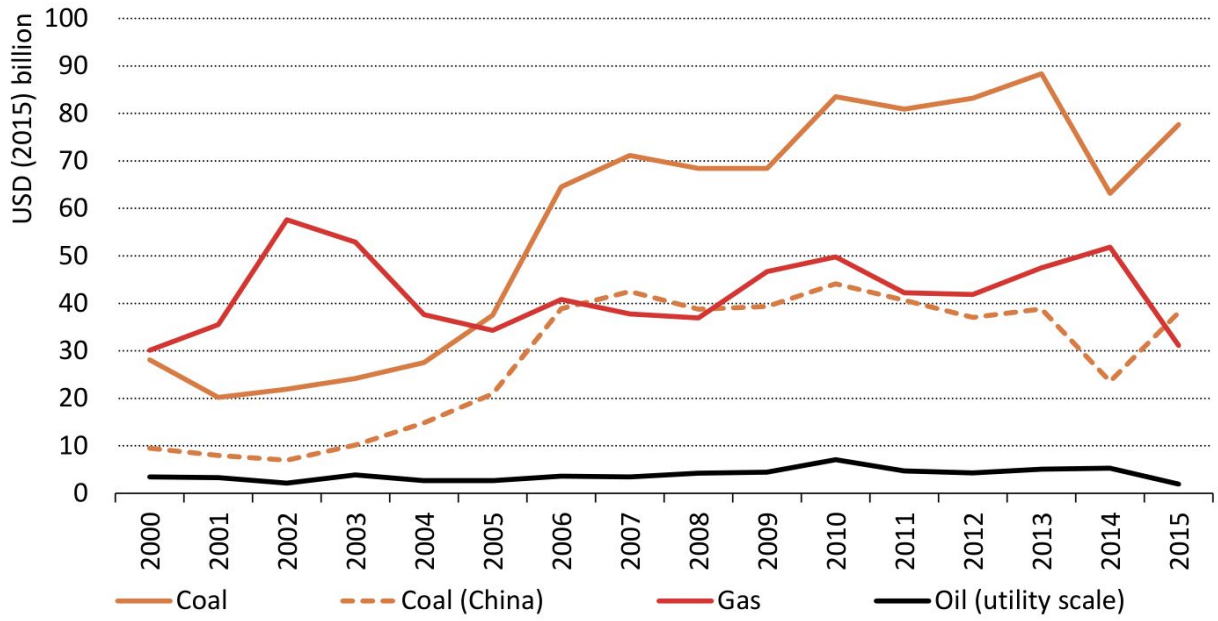
    - China Guodian Group: Administrated by SASAC for the State Council of the PRC.
    - State Power Investment Corporation: "Under the correct leadership of the CPC Central Committee and State Council"
- Subnational governments (provincial SOEs)
- Big 5 ListCos (companies 'spun off' and listed by Big 5 ParentCos):
    - **Huaneng Power International** (owned by Huaneng International Power Development - 48.25%, China Huaneng Group - 14.81%, Hebei Construction & Investment Group - 5.02%, Jiangsu Provincial Investment and Management - 3.97%, Liaoning Energy Investment Group - 3.7%)
    - **Datang International Power Generation** (China Datang Corporation - 41.41%, Tianjin Jinneng Investment Company - 12.97%, Hebei Construction & Investment Group - 12.82%, Beijing Energy Investment Holding Co., Ltd - 12.62%, Central Huijin Asset Management Co. 0.77%)
    - **Huadian Power International**: (China Huadian Corporation - 55.66%, Shandong International Trust Company - 9.83%, Shenergy Co Ltd., 1.75%, China National Arts & Crafts Group 1.12%, Central Huijin Asset Management Co. 0.96%)
    - **Guodian Power Development:** (China Guodian Corporation - 46%, National Social Security Fund 4.67%, Central Huijin Asset Management Co.-1.09%, Shanghai Electric Group - 0.96%, China Asset Management - 0.80%) and
    - **China Power International Development:** (State Power Investment Corporation - 55.61%, Value Partners Ltd. - 1.82%, The Vanguard Group - 1.55%, BlackRock Institutional Trust Company -0.95%, INVESCO Great Wall Fund Management - 0.92%)

Debt

- Big 5 commercial bank lending: Bank of China, China Construction Bank, Agricultural Bank of China, Industrial and Commercial Bank of China, and Bank of Communications
- Bonds

China has historically accounted for approximately half of coal power investment globally:[86]

Figure 4.20 • **Global fossil fuel power investment**



6.5: Coal mining finance

There is little information on this issue in the available literature. Further research into coal mining finance is necessary.

Debt-equity swaps are a measure taken by the Chinese government to reduce soaring corporate debt in China, which has surpassed $100 billion.[87] This trend may change the way that Chinese coal mining companies are financed. 20% of the debt equity swaps were

[86] IEA, "World Energy Investment 2016", Figure 4.20, (2016), https://www.iea.org/newsroom/news/2016/september/world-energy-investment-2016.html

[87] See: FTI Consulting Asia, "A Brief Reprieve for Coal" (April 2017), http://www.fticonsulting-asia.com/~/media/Files/apac-files/insights/articles/brief-reprieve-for-coal.pdf for Bumi Resources and Berau Coal, E-Commodities Holdings (China) This is also being funded by a bond issue in China's interbank bond market with guidelines issued by the National Development Reform Commision, see IFR News, "UPDATE: China welcomes first special bonds to fund DOE," (22 September 2017); IFR News, "NDRC unveils 'special bonds'" (7 Jan 2017). See also, Denise Wee and Lianting Tu, Bloomberg Markets, "China's Debt Swaps Surpass $100 Billion," (21 August 2017), https://www.bloomberg.com/news/articles/2017-08-20/zombies-propped-up-as-china-s-debt-swaps-surpass-100-billion.

undertaken by Chinese utility companies and 27% by Chinese coal companies in second quarter 2017.[88]

6.6: Latest price of solar

BNEF 1H2017 LCOE[89]:
Solar: US$76/MWh
Coal: US$46/MWh

7: India

7.1 Key factors influencing the future of the coal sector

In 2017, the two main factors influencing the future of the coal sector are the decline in the predicted economic growth rate of India, from 6.1% down from 7% and much of that growth has been in service industries.[90] The second factor is the declining cost of renewables, solar power, in particular, which is now less expensive than coal.[91] India is planning to install 100GW of solar by 2022,[92] nevertheless, India will likely continue to use coal in its electricity mix in the medium term. Energy self sufficiency continues to be an important driver of coal use.

---

[88] Denise Wee and Lianting Tu, Bloomberg Markets, "China's Debt Swaps Surpass $100 Billion," (21 August 2017), https://www.bloomberg.com/news/articles/2017-08-20/zombies-propped-up-as-china-s-debt-swaps-surpass-100-billion.

[89] Bloomberg New Energy Finance '1H 2017 APAC LCOE Update' (21 April 2017).

[90] Geeta Anand, New York Times, "India, Once a Coal Goliath, Is Fast Turning Green" (2 June 2017),: https://www.nytimes.com/2017/06/02/world/asia/india-coal-green-energy-climate.html. Related to this may be fear of overcapacity. See Greenpeace India, "Stranded Investments: How India is wasting billions on idle coal plants" (October 2016), https://secured-static.greenpeace.org/india/Global/india/report/2016/Power%20scenario%20briefing-%20overcapacity%20FInal%20Ver.pdf which looks at projected power capacity, and states that 94% of the coal power capacity under construction at the writing of the report would be idle for overcapacity. Tim Buckley, IEEFA Asia, "India's Electricity-Sector Transformation is Happening Now" (17 May 2017), http://ieefa.org/ieefa-asia-indias-electricity-sector-transformation-happening-now/.

[91] Geeta Anand, New York Times, "India, Once a Coal Goliath, Is Fast Turning Green" (2 June 2017), https://www.nytimes.com/2017/06/02/world/asia/india-coal-green-energy-climate.html, BNEF 1H2017 LCOE:Solar: US$68/MWh, Coal: US$52/MWh provides the average price but there has been significant deflation in the price since these calculations. Bloomberg New Energy Finance '1H 2017 APAC LCOE Update' (21 April 2017); Nathaniel Bullard, Bloomberg View, "Coal's Future in India", (3 June 2017), https://www.bloomberg.com/view/articles/2017-06-02/coal-s-future-in-india.

[92] Hindustan Times, "Renewables to be over 60% of India's generation capacity: Piyush Goyal"" (25 March 2017), http://www.hindustantimes.com/business-news/renewables-to-be-over-60-of-india-s-generation-capacity-piyush-goyal/story-qPV4Jb5h1sasZ3yBOPzHsN.html.

7.2: Pipeline for new coal power

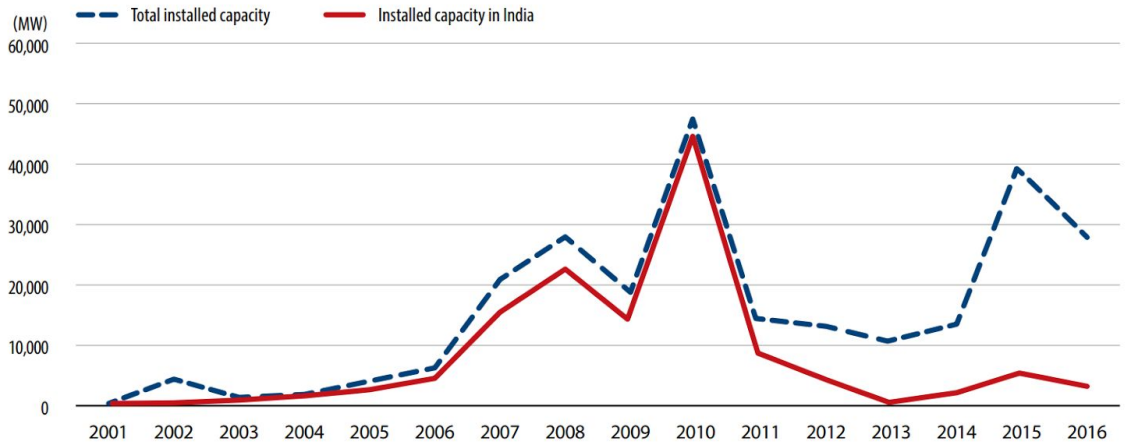
The Global Coal Plant Tracker lists India as having 101.37 GW of coal-fired power capacity announced, pre-permit or permitted.[93] There has been a decline in the pipeline of coal-fired power stations in India. The draft Third National Electricity Plan (NEP3), which includes electricity planning until 2027, provides that India requires no new coal-fired power stations further than the half-built plants already under construction. [94]Since 2010, 452 GW have been cancelled.[95] IEEFA stated that, "Relative to a planned total system capacity of 650GW, the plan sees thermal power capacity falling from 69 percent of India electricity-generation mix in March 2016 to 43 percent by 2027."[96]

7.3: Companies involved in coal power

India manufactures most of its own technology for its power plants,[97] owing to Indian policy changes in 2009 banning foreign participation in certain coal-fired power projects and in 2012 instating a import duty on power generation equipment.[98] See graph below from the Global Environmental Institute showing this dropoff in Chinese investment.

[93] Endcoal, Coal Plants by Country, (July 2017), https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf.
[94] Tim Buckley and Simon Nicholas, IEEFA, "Global Electricity Utilities in Transition: Leaders and Laggards: 11 Case Studies" (October 2017), pg. 34, http://ieefa.org/wp-content/uploads/2017/10/IEEFA-Global-Utilities-in-Transition-11-Case-Studies-October-2017.pdf.
[95] Endcoal, Coal Plants by Country, (July 2017), https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf.
[96] Tim Buckley, IEEFA, "IEEFA Asia: India's Electricity-Sector Transformation Is Happening Now", (17 May 2017), http://ieefa.org/ieefa-asia-indias-electricity-sector-transformation-happening-now/.
[97] Platts (2016).
[98] Ren Peng, Liu Chang and Zhang Liwen, Global Environmental Institute, "China's Involvement in Coal-Fired Power Projects along the Belt and Road", (May 2017), pg. 4, http://www.geichina.org/_upload/file/report/China's_Involvement_in_Coal-fired_Power_Projects_OBOR_EN.pdf

Graph 2 | **Scale of Coal–Fired Power Projects with Chinese Involvement in India and in Total**



NTPC is one of the top 10 coal-fired power generators in the world.[99] It provides approximately 25% of the national electricity supply of India.[100] While it is moving to renewables, coal will continue to play a major role in NTPC's energy generation,[101] with the most recent draft national energy plan proposing that coal would form 55% of India's power generation in 2015-2016.[102] The NTPC's total potential capacity (announced, under construction, pre-permit, permitted and operating) is 67,665MW.[103]

NTPC's shareholders are the government of India (62.99%), Life Insurance Corporation of India (11.69%), HDFC Asset Management (1.75%), ICICI Prudential Asset Management (1.58%), T. Rowe Price International UK (1.09%).[104]

There are several state power companies with a large existing and announced capacity. The five largest private companies are:

---

[99] Tim Buckley and Simon Nicholas, IEEFA, "Global Electricity Utilities in Transition: Leaders and Laggards: 11 Case Studies" (October 2017), pg. 33. http://ieefa.org/wp-content/uploads/2017/10/IEEFA-Global-Utilities-in-Transition-11-Case-Studies-October-2017.pdf; see also Tim Buckley and Simon Nicholas, IEEFA, "NTPC as a Force in Indian Electricity Transition" (May 2017), available online: http://ieefa.org/wp-content/uploads/2017/05/NTPC-as-a-Force-in-Indian-Electricity-Transition_May-20171.pdf.

[100] Tim Buckley, "IEEFA Asia: As India Moves, Europe Follows" (17 October 2017), http://ieefa.org/ieefa-asia-india-moves-europe-follows/.

[101] Tim Buckley and Simon Nicholas, IEEFA, "Global Electricity Utilities in Transition: Leaders and Laggards: 11 Case Studies" (October 2017), pg. 33, http://ieefa.org/wp-content/uploads/2017/10/IEEFA-Global-Utilities-in-Transition-11-Case-Studies-October-2017.pdf.

[102] Draft National Energy Plan, NITI Aayog, Government of India, (27 June 2017), para. 5.2, http://niti.gov.in/writereaddata/files/new_initiatives/NEP-ID_27.06.2017.pdf.

[103] "Global Coal Plant Tracker," July 2017, CoalSwarm

[104] Thomson Reuters Eikon, NPTC Ltd, Shareholders Report, accessed 23 October 2017.

Company	Total Potential capacity (announced, under construction, pre-permit, permitted and operating)	Top 5 shareholders
Adani Group	17,440 MW	The Adani Group itself is unlisted but Adani Power Ltd. is listed: ● SB Adani Family Trust (36.43%) ● Parsa Kente Rail Infra Ltd. (9.78%) ● Universal Trade and Investments Ltd. (7.55%) ● Afro Asia Trade & Investments (6.88%) ● Opal Investment Pvt Ltd (5.53%)
Vedanta Resources	8,327 MW	● Agarwal (Anil Kumar) (69.39%) ● Falk (Victor) (3.09%) ● Aberdeen Asset Investments (1.07%) ● Standard Life (0.86%) ● BlackRock (0.79%)
Jindal Group	7,760 MW	Jindal Group is a private company but Jindal Steel and Power Ltd. is owned by: ● Jindal Organisation (23.82%) ● OPJ Trading PVT Ltd. (20.51%) ● Gagan Infraenergy Ltd. (5.43%) ● HSBC Global Asset Management (3.12%) ● Glebe Trading Pvt (1.78%)
Reliance Group	6,260 MW	Reliance Group is a private company but Reliance Power Ltd. is owned by: ● Reliance ADA Group (62.51%) ● Reliance Wind Turbine (12.39%) ● Life Insurance Corporation of India (4.03%) ● Dimensional Fund Advisors (0.91%) ● The Vanguard Group (0.67%)
Tata Group	5,897 MW	Tata Group is a private company but Tata Steel is owned by: ● Tata Group (10.61%) ● Life Insurance Corporation of India (10.61%) ● HDFC Asset Management (5.04%) ● ICICI Prudential Asset Management (2.24%) ● Reliance Nippon Life Asset Management (2.14%)

[105]

The following is a chart of the top 5 shareholders of the companies seeking to expand coal power in India, NTPC, Power Finance Corporation, Adani Power, Adani Enterprises, NLC India, JSW Energy, CLP Holdings, Lanco Infratech, Jindal Steel and Power, AES Corporation, based on the Global Coal Exit List.

[105] "Global Coal Plant Tracker," July 2017, CoalSwarm, ownership information from Thomson Reuters Eikon, accessed 6 November 2017

	Investor	Value USD↓	Country	Type
1	Government of India	$19.62B	India	Public
2	Life Insurance Corporation of India	$ 3.76B	India	Public
3	Lawrencium Mikado Holdings	$ 2.37B	Hong Kong	Private
4	Adani Gautum	$ 2.26B	India	Private
5	Oak CLP	$ 2.22B	Hong Kong	Private

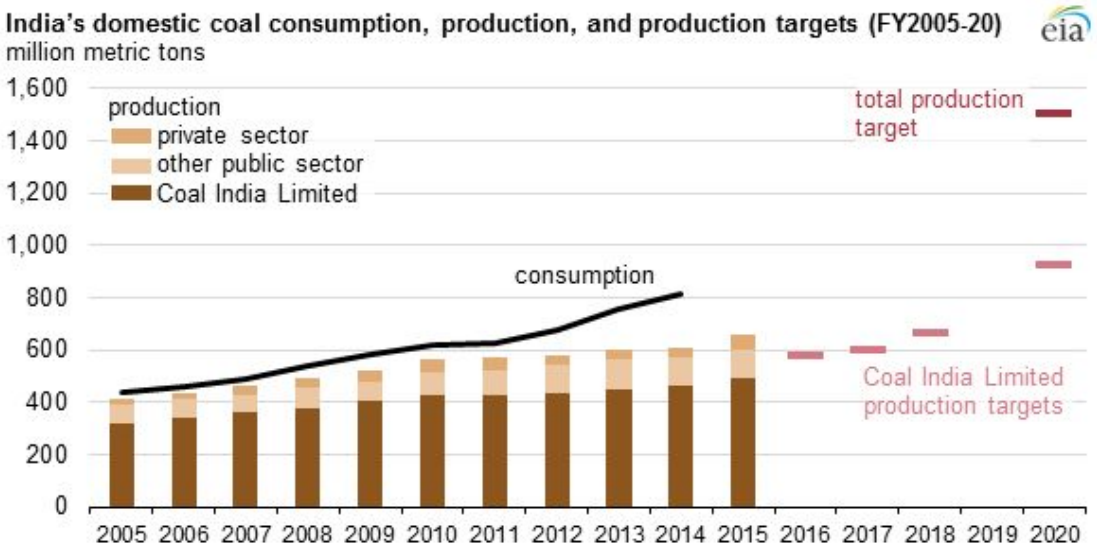
[106]

7.4: Pipeline for coal mining

In 2016, India was estimated to have produced 608 million tonnes of thermal coal (11.2% of global total)[107] and had proved coal (all types) reserves of 94.77 billion tonnes (21.4% of global total).[108]

Coal India Limited produces around 84% of India's overall coal production.[109] It is 78.86% owned by the Government of India and 7.54% owned by the Life Insurance Corporation of India.[110] Singareni Collieries Company Limited (SCCL) is a private company jointly owned by the Government of Telangana and the Government of India.The graph indicates that Coal India remains an important part of the meeting India's coal consumption into the future.

[106] Based on assistance provided by the Global Strategic Communications Council (GSCC)
[107] IEA, "Coal information 2017", Table 1.2, (2017), http://www.iea.org/bookshop/751-Coal_Information_2017
[108] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf.
[109] Coal India, "About Us", https://www.coalindia.in/en-us/company/aboutus.aspx.
[110] As of 23 October 2017, Thomson Reuters Eikon, Coal India, Shareholders Report: Vanguard Group owns 0.69%, Goldman Sachs owns 0.5% and BlackRock owns 0.35%.



[111] Please note that this information is from 2015, and a more updated chart incorporating this information could not be obtained. The targets for Coal India have been revised up to 1 billion from 0.9 billion in 2020.[112]

Commercial coal mining is essentially monopolised by Coal India since nationalization of the mines in the 1970s, and has only in the last year opened up to private entities.[113] Indian power producers such as Adani, Jindal, Essar Energy, and Tata have overseas coal assets, evidencing vertical integration.[114]

There was an upward trend in mining in India in 2017 of about 4% in the first five months of the year.[115] While India has coal capacity to be self-sufficient and not use coal imports, there are

---

[111] US Energy Information Administration, "India's coal industry in flux as government sets ambitious coal production targets," (25 August 2015), https://www.eia.gov/todayinenergy/detail.php?id=22652.
[112] Steel360, "Is CIL's 1 Billion Tonne Target Attainable," (22 March 2017), http://news.steel-360.com/coal/cils-1-billion-tonne-target-attainable/.
[113] Rajesh Kumar Singh, Bloomberg Markets, "India Opens Coal-Mining Market for First Time in Four Decades," (3 February 2017), https://www.bloomberg.com/news/articles/2017-02-02/india-opens-coal-mining-market-for-first-time-in-four-decades; See also Sumit Moitra, DNA India, "Adaani, Tata Steel line up for coal mining, but foreigners not keen", (24 April 2017), http://www.dnaindia.com/money/report-adani-tata-steel-line-up-for-coal-mining-but-foreigners-not-keen-2413397. In the recent years, some private entities were permitted to mine for their own use such as iron, steel or cement and some state governments were able to mine coal.
[114] Sourcewatch, "Indian Company Investments in overseas coal mines," https://www.sourcewatch.org/index.php/Indian_company_investments_in_overseas_coal_mines
[115] Matthew Brown and Katy Daigle, Associated Press, "Coal on the rise in China, US, India after major 2016 drop," (26 June 2017), https://www.usatoday.com/story/money/2017/06/26/coal-rise-china-us-india-after-major-2016-drop/427818001/.

coal power plants which are designed to process more efficient, higher-calorific value coal than Indian coal, therefore, imports continue.[116]

7.5: Sources of funding for coal projects

The literature does not provide a recent cohesive analysis into finance to coal power or mining. Market Forces recently analysed the lenders to 15 deals from August 2016 to August 2017, with only 12 in scope.

Finance to coal power projects from August 2016 to August 2017 (from TR Eikon)

Top 10 Lenders	Primary Financing	Refinancing	Total
State Bank of India	₹1,391.00	₹11,388.67	₹12,779.67
Power Finance Corporation	₹1,647.00	₹4,262.69	₹5,909.69
Rural Electrification Corp	₹1,344.00	₹2,917.36	₹4,261.36
Axis Bank	₹407.00	₹2,469.42	₹2,876.42
Punjab National Bank		₹2,650.92	₹2,650.92
Bank of Baroda	₹90.00	₹2,431.24	₹2,521.24
Union Bank of India	₹226.00	₹2,040.53	₹2,266.53
Andhra Bank	₹565.00	₹1,619.61	₹2,184.61
India Infrastructure Finance Company		₹2,020.00	₹2,020.00
IDBI Bank		₹1,791.10	₹1,791.10

The total lending to coal power projects in that period was ₹51,262.17(M) (or US$7.68B). In comparison, there was one mining loan for ₹175(M) (or approximately US$25.1M) in that same time period.

[116] Michael Safi, the Guardian, “India has enough coal without Adani mine, yet must keep importing, minister says”, (13 June 2017), https://www.theguardian.com/environment/2017/jun/13/india-enough-coal-without-adani-mine-must-keep-importing-piyush-goyal.

8: Indonesia

8.1: Key factors influencing the future of the coal sector

Coal power

Coal presently makes up 57% of Indonesia's energy generation.[117]

- Increasing energy demand: "Indonesian energy demand is expected to increase strongly driven by rising economic and social development and a growing population."[118]
- Completing electrification: "a key priority for Indonesia is to increase the country's power generation capacity to complete the electrification of the country and meet increasing electricity consumption."[119]
- The above forces drive government national energy planning - plans that require 30% of total primary energy to come from coal by 2025 while at the same time growing 'new and renewable energy (NRE)' sources to 23 per cent over the same period.[120] This has been labelled "an apparent double standard in relation to climate policy"[121]

[117] Fergus Jensen, Reuters, "No new coal power stations in Java, Indonesia energy minister says," (12 October 2017), https://www.reuters.com/article/indonesia-power-coal/no-new-coal-power-stations-in-java-indonesia-energy-minister-says-idUSL4N1MN4ZI.

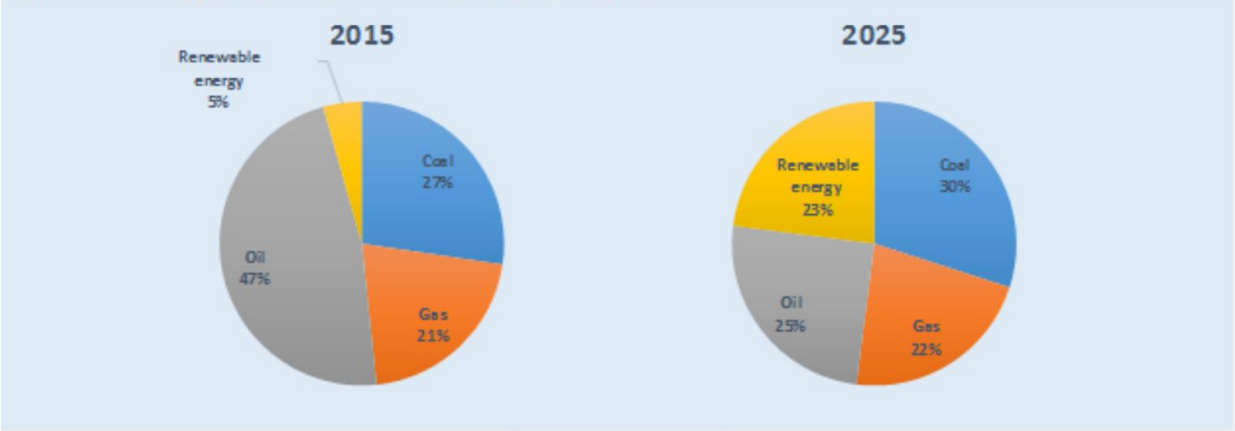
[118] The Oxford Institute for Energy Studies, "Indonesia's Electricity Demand and the Coal Sector: Export or meet domestic demand?" (March 2017),pg. 3 , https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/03/Indonesias-Electricity-Demand-and-the-Coal-Sector-Export-or-meet-domestic-demand-CL-5.pdf

[119] Sylvie Cornot-Gandolphe, The Oxford Institute for Energy Studies, "Indonesia's Electricity Demand and the Coal Sector: Export or meet domestic demand?", (March 2017), https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/03/Indonesias-Electricity-Demand-and-the-Coal-Sector-Export-or-meet-domestic-demand-CL-5.pdf.

[120] Sylvie Cornot-Gandolphe, The Oxford Institute for Energy Studies, "Indonesia's Electricity Demand and the Coal Sector: Export or meet domestic demand?", (March 2017), https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/03/Indonesias-Electricity-Demand-and-the-Coal-Sector-Export-or-meet-domestic-demand-CL-5.pdf.

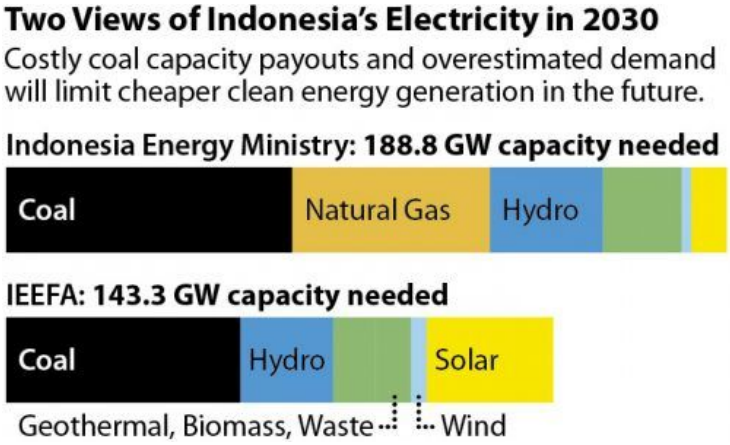
[121] Climate Action Tracker, "Indonesia", (18 September 2017), http://climateactiontracker.org/countries/indonesia.html.

Figure 1: Energy mix in 2015 (actual) and 2025 (KEN)

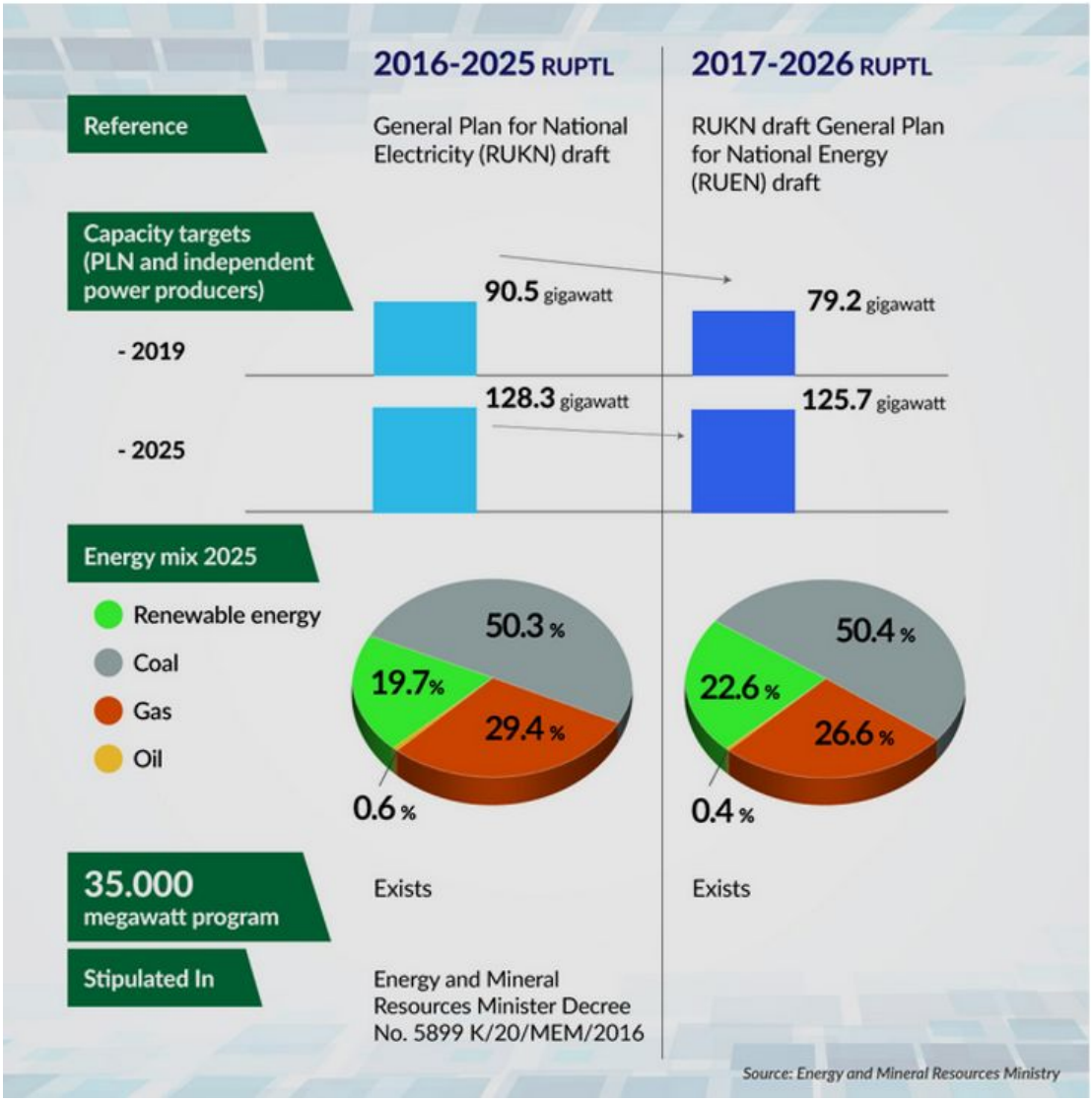


Excludes traditional biomass
Source: MEMR

- PLN's perception of the economic and technical viability of coal and non-coal, including renewables, informs electricity supply planning and regulatory frameworks:
  - Government electricity tariff policy (capacity payments):[122]
  - PLN's competency in structuring tariffs and regulations to benefit renewables
  - There is a moratorium on coal-fired power stations in Java.[123]
- See comment for example of recent changes to regulatory framework for renewables.



[122] Yulanda Chung, IEEFA, "Overpaid and Underutilized: How Capacity Payments Could Lock Indonesia Into a High-Cost Electricity Future", (10 August 2017), http://ieefa.org/wp-content/uploads/2017/08/Overpaid-and-Underutilized_How-Capacity-Payments-to-Coal-Fired-Power-Plants-Could-Lock-Indonesia-into-a-High-Cost-Electricity-Future-_August2017.pdf.
[123] Fergus Jensen, Reuters, "No new coal power stations in Java, Indonesia energy minister says," (12 October 2017), https://www.reuters.com/article/indonesia-power-coal/no-new-coal-power-stations-in-java-indonesia-energy-minister-says-idUSL4N1MN4ZI.



Coal mining

- Economics of coal demand in key markets:[124]
    - Seaborne thermal coal market in structural decline: India restriction on coal imports, China peak coal in 2013.
- Redirection of Indonesian coal to domestic market[125]

[124] FTI Consulting, 'A Brief Reprieve for Coal' (April 2017), http://www.fticonsulting-asia.com/~/media/Files/apac-files/insights/articles/brief-reprieve-for-coal.pdf.
[125] FTI Consulting, 'A Brief Reprieve for Coal' (April 2017), http://www.fticonsulting-asia.com/~/media/Files/apac-files/insights/articles/brief-reprieve-for-coal.pdf.

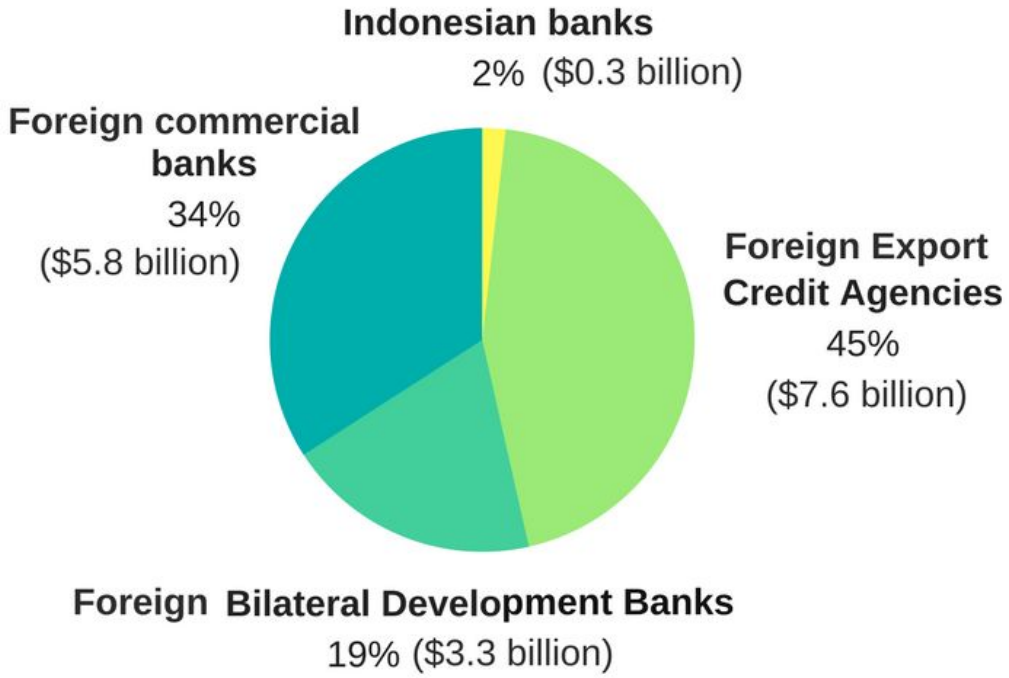
8.2: Pipeline for new coal power and mines

The Global Coal Plant Tracker lists Indonesia as having 34.23 GW announced, pre-permit or permitted.[126]

In 2016, Indonesia was estimated to have produced 459 million tonnes of thermal coal (8.5% of global total)[127] and had proved coal (all types) reserves of 25.57 billion tonnes (2.2% of global total).[128]

8.3: Coal power finance

Debt finance sources for Indonesian coal power January 2010 – March 2017 (Market Forces, 2017):



[126] Endcoal, Coal Plants by Country, (July 2017) https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf.
[127] IEA, "Coal information 2017", Table 1.2, (2017), http://www.iea.org/bookshop/751-Coal_Information_2017
[128] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf.

In project finance, it is typical for 25% of the enterprise value of the project to come from equity - provided by the sponsors. To provide an idea of where the sponsors came from - 51% of overall project value was owned by Japanese and Chinese companies, while 39% came from Indonesian companies.

The following chart ranks the top 5 shareholders of companies seeking to expand coal power in Indonesia, specifically KEPCO, Marubeni, Tenaga Nasional Berhad, J-Power, PT Bukit Asam and Adaro Energy, based on the Global Coal Exit List.

	Investor	Value (USD)↓	Country	Type
1	Korea Development Bank	$7.18B	South Korea	Public
2	Khazanah Nasional Bhd	$5.60B	Malaysia	Public
3	Ministry of Strategy and Finance (Korea)	$3.97B	South Korea	Public
4	Employees Provident Fund (Malaysia)	$2.22B	Malaysia	Public
5	PT Adaro Strategic Investment	$1.84B	Indonesia	Private

[129]

8.4: Coal mining finance

The following is an analysis by Market Forces of lending to coal mining from 2010 to 2016.

Bank	Lending (US$m)	# deals
Sumitomo Mitsui Banking Corporation	$422	5
Australia and New Zealand Banking Group	$400	5
China Development Bank	$300	1
Bank of China	$300	1
HSBC	$268	5
Standard Chartered Bank	$262	5
OCBC Bank	$246	4
Bank Mandiri	$232	6
CIMB Group	$214	3
Bank of Tokyo-Mitsubishi UFJ	$182	3

[129] Based on assistance from Global Strategic Communications Council (GSCC)

Although this chart shows the predominant involvement of overseas banks, local banks could become more important in future.[130]

8.5: Latest price of solar

BNEF 1H2017 LCOE:
Solar: US$155/MWh
Coal: US$55/MWh

9: Turkey

9.1: Key factors influencing the future of the coal sector

In Turkey, the perceived rate of economic growth coupled with a serious concern regarding dependence on natural gas from Russia and Iran,[131] are fueling domestic coal mining and power projects. As a result, Turkey is looking to take advantage of domestically produced lignite coal to use in its energy mix.[132] In 2016, Turkey also imposed an import tax on thermal coal for power generation.[133]

9.2: Scale of the pipeline for new coal power and mines

The Global Coal Plant Tracker lists Turkey as having approximately 60 GW announced, pre-permit or permitted.[134] In 2016, Turkey was estimated to have produced 1.8 million tonnes of

---

[130] Project Finance International, "PFI Investing in Asian Infrastructure Roundtable 2016" (October 2016), http://edition.pagesuite-professional.co.uk//launch.aspx?eid=42a63c8e-9bc0-4abe-94d2-cabf8ba7ef59.
[131] GSI, "Subsidies to Coal and Renewable Energy in Turkey," (March 2015), https://www.iisd.org/gsi/sites/default/files/ffsandrens_turkey_coal_eng.pdf, See also, Arthur Nelsen, the Guardian, "Turkish Coal Plants in line for Public Subsidies" (6 September 2016), https://www.theguardian.com/environment/2016/sep/06/turkish-coal-plants-in-line-for-public-subsidies, : "According to Turkey's ministry of public affairs, natural gas accounted for 37.8% of total electricity generation in Turkey in 2015. Coal accounted for 28.4%, hydro 25.8%, wind 4.4%, geothermal 1.3%, fuel oil, diesel and naphtha 1.6% and biogas 0.6%." See Olivia Gagan, IJGlobal, "Consultant needed for Turkey renewables subsidy revamp" (27 June 2017).
[132] IEEFA, see also Gerard Wynn, "IEEFA Update: Turkey Wakes up to Solar Opportunity", (6 July 2017), http://ieefa.org/turkey-wakes-solar-opportunity/; Turkey is seeking to transform its outdated coal fired power plants to make them more environmentally friendly. See Hurriyet Daily News, "Turkish gov't vows to make coal-fired plants eco-friendly by 2019" (13 October 2017), http://www.hurriyetdailynews.com/turkish-govt-vows-to-make-coal-fired-plants-eco-friendly-by-2019-120836.
[133] Reuters, "Turkey imposes import tax on thermal coal for power generation", (6 August 2016), https://www.reuters.com/article/turkey-coal-imports/turkey-imposes-import-tax-on-thermal-coal-for-power-generation-idUSL8N1AM473.
[134] Endcoal, Coal Plants by Country, (July 2017) https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf; see also,

thermal coal (0.03% of global total)[135] and had proved coal (all types) reserves of 11,353 million tonnes (1.0% of global total).[136]

9.3: Coal power and mining finance[137]

The top investors in the companies seeking to expand coal power in Turkey (ACWA Power, Elektrik Üretim A.Ş. Genel Müdürlüğü (EÜAŞ), Eren Holding, Hattat Holding, State Power Investment Corporation (SPIC) and Yildirim Energy Holding) are:

Investors / Companies	#1	#2	#3
ACWA	Public and private - unknown stakes		
EÜAŞ	Ministry of Energy and Natural Resources (Turkey)		
Eren	Ahmet Hilmi Eren	Ismail Eren	Mehmet Yahya Eren
Hattat	Mehmet Hattat	Hema Holding A S	Ibrahim Hattat
SPIC	SASAC (Chinese state)		
Yildirim	Ali Riza Yildirim	Yuksel Yildirim	Mehmet Yildirim

The following is the result of a search in IJGlobal for lenders to Turkish coal fired power stations or mine projects. Based on a search in IJGlobal of mining and power deals, only 7 since January 2012 were in scope and were all coal power deals. These are the top 10 lenders by amount loaned:

Olivia Gagan, IJGlobal, "Turkey plots major coal plant building plan" (1 March 2017): "The country's power needs are expected to increase significantly in the next five years as it rapidly industrialises. The state wants domestic coal-based electricity generation to grow to 60 billion kWh in 2018, compared to 39 billion kWh in 2012. The country's installed electricity generation is 74GW, with a plan to increase this to 120GW by 2023." "The first coal plant under the scheme, the $1.1 billion, 720MW Cayirhan B was awarded to a local Turkish consortium in early February 2017, IJGlobal understands. The coal-fired power plants expected to come up for tender next are the 6.5GW Afşin-Elbistan C-D-E, the 5.2GW Konya-Karapınar, the 4GW Eskişehir-Alpu, the 3.5GW Afyon-Dinar, the 1GW Trakya-Çerkezköy-Çatalca and the 800MW Kırklareli-Vize."

[135] IEA, "Coal information 2017", Table 1.2, (2017), http://www.iea.org/bookshop/751-Coal_Information_2017

[136] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf.

[137] Based on a search in IJGlobal of mining and power deals, only 7 since January 2012 were in scope.

Lenders	Value of Loan ($m)
Garanti Bank	$ 6,051.00
Isbank	$ 6,051.00
Yapi Kredi	$ 5,148.00
Halkbank	$ 5,148.00
Ziraat Bankası	$ 5,011.00
HSBC	$ 907.00
BNP Paribas	$ 907.00
Vakifbank	$ 744.00
Bank of Tokyo-Mitsubishi UFJ	$ 735.62
UniCredit	$ 735.62

Garanti Bank is considered one of the largest funder of Turkey's new coal plants.[138] Turkey is presently seeking Chinese investment in its energy market.[139] There is already Chinese investment in several key deals, including a proposed 1,320 MW coal-fired power station in the Amasra Region.[140]

Analyzing the investment prospects in coal,in June 2016, IEEFA put out a report which stated that:

> Even though some greenfield coal plants secured financing in 2012-2014, the appetites of investors have fallen sharply because of high operational costs, environmental regulations, added safety standards and current electricity prices. The value of energy sector investment deals in Turkey almost halved from U.S.$9.5 billion in 2012 to US$4.8 billion in 2015 with the average deal size dropping to US$ 107 million from US$216 million (graph 14). Turkish banks are pressing for a solution to non-performing loans across the coal sector. Loan defaults are on the rise and banks are facing difficulty floating US$50 billion of total credits to the energy sector. Bankers in Turkey say they

[138]Damian Carrington, the Guardian, "Is it too late to stop Turkey's coal rush?" (6 August 2015), https://www.theguardian.com/environment/2015/aug/06/is-it-too-late-to-stop-turkeys-coal-rush.
[139] Arif Cem Gundongan and Ethemcan Turhan, China Dialogue, "China's Role in Turkey's Energy Future", (26 September 2017), https://www.chinadialogue.net/article/show/single/en/10047-China-s-role-in-Turkey-s-energy-future.
[140] Arif Cem Gundongan and Ethemcan Turhan, China Dialogue, "China's Role in Turkey's Energy Future", (26 September 2017), https://www.chinadialogue.net/article/show/single/en/10047-China-s-role-in-Turkey-s-energy-future.

> are unlikely to extend credits to the coal sector under current market conditions but would consider doing so under a feed-in-tariff scheme.[141]

The IEEFA report also evaluated the subsidies under a then-proposed electricity law, indicating that such coal power station buildout could result in the annual cost of $USD 2 billion.[142][143]A majority of subsidies in the fossil fuel sector is provided to the coal industry (although there is some subsidies for renewables as well).[144] Transfers from 2009 to 2013 range from US $260-$300 million per year.[145] They also provide investment guarantees to coal power plants for up to 15 to 20 years of operation.[146] These subsidies are also complemented by exemptions from environmental regulation.[147] The total value of all of these exemptions is difficult to quantify.

9.4: Latest price of solar

Turkey is investing in renewables, “renewable energy has gone from zero share of the market in 2009 to 7.8% in 2015”.[148] In March 2017, a South Korean and Turkish firm won a tender for the 1 GW Konya solar plant offering to sell the generated electricity at a feed-in tariff of $0.0699 per kWh.[149]

---

[141] Pelin Yenigun Dilek and David Schlissel, IEEFA, “Turkey at a Crossroads: Invest in the Old Energy Economy or the New” (June 2016), pg. 19, https://endcoal.org/wp-content/uploads/2016/06/Turkey-Crossroads-Invest-in-the-Old-Energy-Economy-or-the-New_June-20162.pdf

[142] Pelin Yenigun Dilek and David Schlissel, IEEFA, “Turkey at a Crossroads: Invest in the Old Energy Economy or the New” (June 2016), pg. 20, https://endcoal.org/wp-content/uploads/2016/06/Turkey-Crossroads-Invest-in-the-Old-Energy-Economy-or-the-New_June-20162.pdf

[143] For further information on this issue, see Health Environmental Alliance (HEAL), “Hidden Price Tags: How ending fossil fuel subsidies would benefit our health,” http://env-health.org/IMG/pdf/healthandenvironmentalliance_hidden_price_tags_report.pdf

[144] GSI, “Subsidies to Coal and Renewable Energy in Turkey,” (March 2015), pg. 7, https://www.iisd.org/gsi/sites/default/files/ffsandrens_turkey_coal_eng.pdf.

[145] GSI, “Subsidies to Coal and Renewable Energy in Turkey,” (March 2015),pg. 8, https://www.iisd.org/gsi/sites/default/files/ffsandrens_turkey_coal_eng.pdf.

[146] GSI, “Subsidies to Coal and Renewable Energy in Turkey,” (March 2015), pg. 8, https://www.iisd.org/gsi/sites/default/files/ffsandrens_turkey_coal_eng.pdf.

[147] GSI, “Subsidies to Coal and Renewable Energy in Turkey,” (March 2015), pg. 9, https://www.iisd.org/gsi/sites/default/files/ffsandrens_turkey_coal_eng.pdf.

[148] Pelin Yenigun Dilek and David Schlissel, IEEFA, “Turkey at a Crossroads: Invest in the Old Energy Economy or the New” (June 2016), pg. 6, https://endcoal.org/wp-content/uploads/2016/06/Turkey-Crossroads-Invest-in-the-Old-Energy-Economy-or-the-New_June-20162.pdf

[149] Ilias Tsagas, PV Magazine, “Turkey’s 1 GW Konya Solar PV tender concludes at $0.0699 per kWh”, (20 March 2017), https://www.pv-magazine.com/2017/03/20/turkeys-1-gw-konya-solar-pv-tender-concludes-at-0-0699-per-kwh/

10: Vietnam

10.1: Key factors influencing the future of the coal sector

Coal is seen as a stable source of energy in Vietnam given domestic and regional supply.[150] The most recent National Power Development Masterplan indicates that coal is to be used to build 31 coal-fired power plants to meet nearly half of the electricity needs by 2020.[151] However, some of the issues have been:

- Lack of planning around renewables;[152]
- Currency convertibility: the government is unwilling to guarantee to convert more than 30% of revenues under the power purchase agreements;[153]
- National Debt: Vietnamese government has a significant national debt burden (62.4% ratio of external debt to GDP) in 2016,[154] which has restricted investment in power projects;
- Domestic coal being unsuitable for new coal-fired power plants, which is a risk for national energy security,[155] and,
- Public protest of coal fired power plants - more recently, Vinh Tan 1 and 2.[156]

---

[150] BMI Research, Vietnam Power Report Q3 2017 (May 2017), pg. 11.
[151] Mia Tahara-Stubbs, IJ Global, "Vietnam: Last Chance for Coal" (20 February 2017).
[152] Mia Tahara-Stubbs, IJGlobal, "Vietnam Proposes Wind Tariff Hike" (8 September 2017).
[153] Jon Whiteaker, IJGlobal, "How-long Bay?" (1 August 2017), although there may be some sense that some IPPs have negotiated a 100% guarantee Project Finance International, "IPPs may get a full guarantee" (8 June 2017).
[154] Trading Economics, International Government Debt to GDP, https://tradingeconomics.com/vietnam/government-debt-to-gdp; Mia Tahara-Stubbs, IJ Global, "Vietnam: Last Chance for Coal" (20 February 2017).
[155] Hellenic Shipping News, "Vietnam's coal-fired thermal power dependent on China," (3 October 2017), http://www.hellenicshippingnews.com/vietnams-coal-fired-thermal-power-dependent-on-china/.
[156] Change VN, "Warnings from Vietnam Coal Power" (2 Aug 2016), https://youtu.be/7VOi6Upnh3c?t=438.
See also, CustomsNews, "The risk of pollution from coal-fired power" (15 November 2016), http://customsnews.vn/the-risk-of-pollution-from-coal-fired-power-1683.html; Calvin Godfrey, Thanh Nien News, "Vietnam's dirty growth" (23 June 2015), http://www.thanhniennews.com/business/vietnams-dirty-growth-46848.html; See also Vietnam News, "People protest against air pollution by power plant" (15 April 2015), .http://vietnamnews.vn/society/269099/people-protest-against-air-pollution-by-power-plant.html#74Xjge4BPD96L0gW.97; Thanh Nien News, "Vietnam orders coal power plant to reduce pollution following 30-hour protest" (23 April 2015), http://www.thanhniennews.com/society/vietnam-orders-coal-power-plant-to-reduce-pollution-following-30hour-protest-42524.html; Dantri Internationalnews "Vietnam Fishereis Association opposes mud dumping for power project" (21 July 2017), http://dtinews.vn/en/news/021/51953/vietnam-fisheries-association-opposes-mud-dumping-for-power-project.html; Pham Huong, VN Express International, "Concerns as Vietnam allows coal-fired power plant to dump waste near protected waters" (2 July 2017), https://e.vnexpress.net/news/news/concerns-as-vietnam-allows-coal-fired-power-plant-to-dump-waste-near-protected-waters-3607712.html.

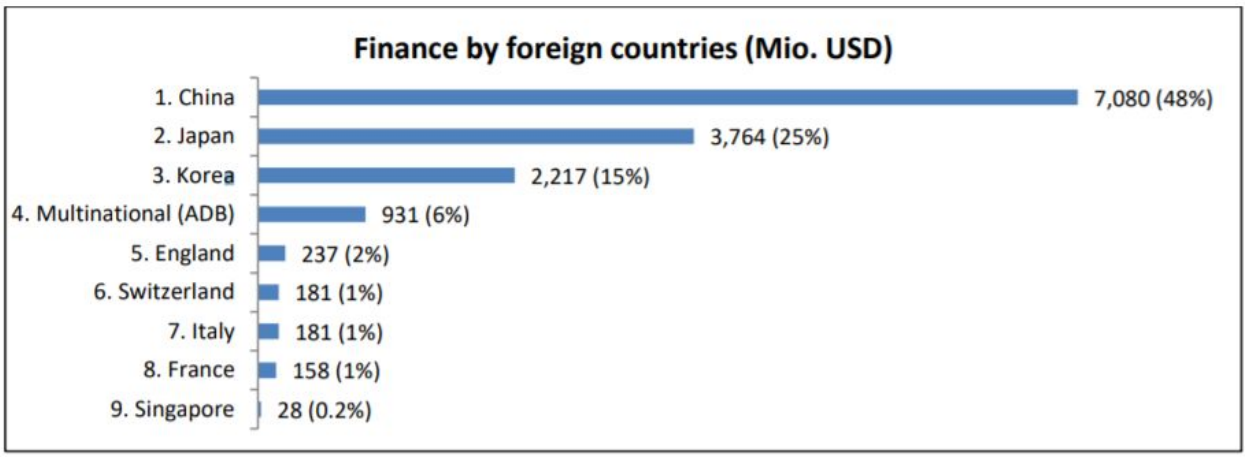
10.2 Pipeline for new coal power

The Global Coal Plant Tracker lists Vietnam as having 35.29 GW announced, pre-permit or permitted.[157]

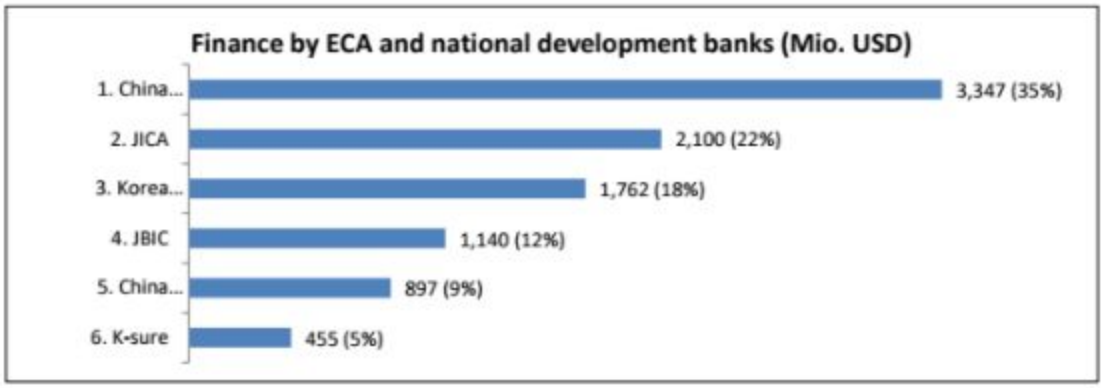
10.3: Coal power finance

According to analysis by Green Innovation and Development Centre (GreenID):

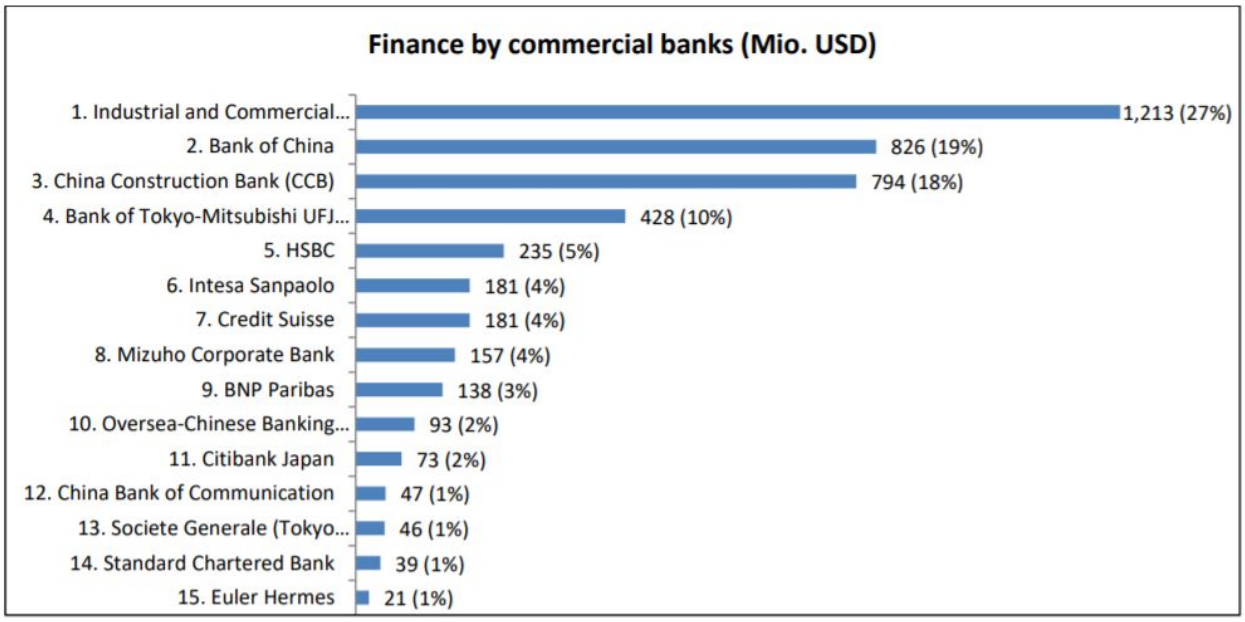
- By 2016, of 27 coal-fired power plants, 14 had been built by Chinese EPC contractors.
- About US$8 billion, or 50 percent of total foreign capital flowing into coal-fired thermal power, is from China.[158]
- 11 large-scale projects capitalized at billions of dollars and implemented under the Build-Operate-Transfer mode are Chinese invested.[159]



[157] Endcoal, Coal Plants by Country, (July 2017) https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf.
[158] Hellenic Shipping News, "Vietnam's coal-fired thermal power dependent on China," (3 October 2017), http://www.hellenicshippingnews.com/vietnams-coal-fired-thermal-power-dependent-on-china/.
[159] Hellenic Shipping News, "Vietnam's coal-fired thermal power dependent on China," (3 October 2017), http://www.hellenicshippingnews.com/vietnams-coal-fired-thermal-power-dependent-on-china/.



Note: 1 on this list refers to China EximBank and 5 on the list refers to China Development Bank.



160

Market Forces' analysis of prospective coal-fired power stations indicates that Japan, Vietnam and South Korea are most often involved as sponsors. The following is a table of lenders who have been linked to more than one prospective power project.

Lenders	Number of Projects
Mitsubishi UFJ Financial Group	4
Standard Chartered	4

[160] Green ID, A Study on Financers of Coal power in Vietnam Green Innovation and Development Centre (GreenID) (October 2016) (available upon request from GreenID).

Mizuho Financial Group	3
DBS	3
KEXIM	3
HSBC	2
Sumitomo Mitsui Banking Corporation	2
JBIC	2

10.4: Renewables

Vietnam has also set a renewables target of 10% of the country's total power generation by 2030.[161]However, skepticism remains about the bankability of these projects.[162] In April 2017, the Vietnamese government released details of the new regulations on the feed-in tariff for solar power projects for June 2017, this rate is set at VND 2,068 per KWh or USD 0.091 for 20 years.[163] The BNEF 1H2017 LCOE provides the following:

- Solar: US$152/MWh
- Coal: US$80/MWh

11: Japan

11.1: Key factors influencing the future of the coal sector

According to IEEFA, Japan's declining electricity demand means that much of the coal power pipeline is unlikely to reach construction. This lower demand, alongside increased renewables capacity, is expected to drive declining utilisation rates for thermal power to 40% below 2015 levels by 2030.[164]

Some members of the Japanese government have adopted language that would indicate that the domestic coal power pipeline is unrealistic;

---

[161] Jon Whiteaker, IJGlobal, "How-long Bay?" (1 August 2017).
[162] Project Finance International, "Renewables – Here to stay and save the planet", (18 October 2017); IJGlobal, "Vietnam Solar PPA is "unbankable" (27 June 2017), "Vietnam plans new solar policy in 2018" (26 September 2017); IJGlobal, "Vietnam and World Bank to hold solar auction" (18 September 2017).
[163] BMI Research, Vietnam Power Report Q3 2017 (May 2017), pg. 7.
[164] Tim Buckley, Simon Nicholas (IEEFA), "Japan: Greater Energy Security Through Renewables", (March 2017), http://ieefa.org/wp-content/uploads/2017/03/Japan_-Greater-Energy-Security-Through-Renewables-_March-2017.pdf

> "*It doesn't matter if they are highly efficient or not, power stations using coal are seen outdated as EU (European Union) and other countries are moving away from them,*"
>
> "*If all those plants are built, it will become a major obstacle for Japan's 2030 target to cut emissions,*" - Kouichi Yamamoto, Environment Minister.[165]

This appears not only to directly contradict domestic policy but also Japan's exports of coal-fired power, which the Japan Bank for International Cooperation (JBIC) described in November as;

> "*efficient and environmentally friendly technology*"[166]

11.2: Pipeline for new coal power

The pipeline for new coal power is estimated to be 15.12GW.[167]

11.3: Sources of funding for new coal projects

The best available research comes from an August 2016 report published by 350 Japan (research by Profundo). It investigated total loans and underwriting to 17 Japanese fossil fuel-related companies including the top 7 coal, oil and gas-related companies ranked by the carbon content of their fossil fuel reserves and 10 companies involved in the expansion of domestic coal-fired power plants by capacity.[168]

---

[165] Yuka Obayashi, Ami Miyazaki (Reuters), "New coal power plants may block Japan's carbon emissions goal: minister", (29 June 2017), https://www.reuters.com/article/us-japan-environment-analysis/new-coal-power-plants-may-block-japans-carbon-emissions-goal-minister-idUSKBN19K15Z

[166] Japan Bank for International Cooperation, "Project Finance for Expansion of Cirebon Coal-fired Power Plant in Indonesia", (14 November 2017), http://www.jbic.go.jp/en/information/press/press-2017/1114-58534

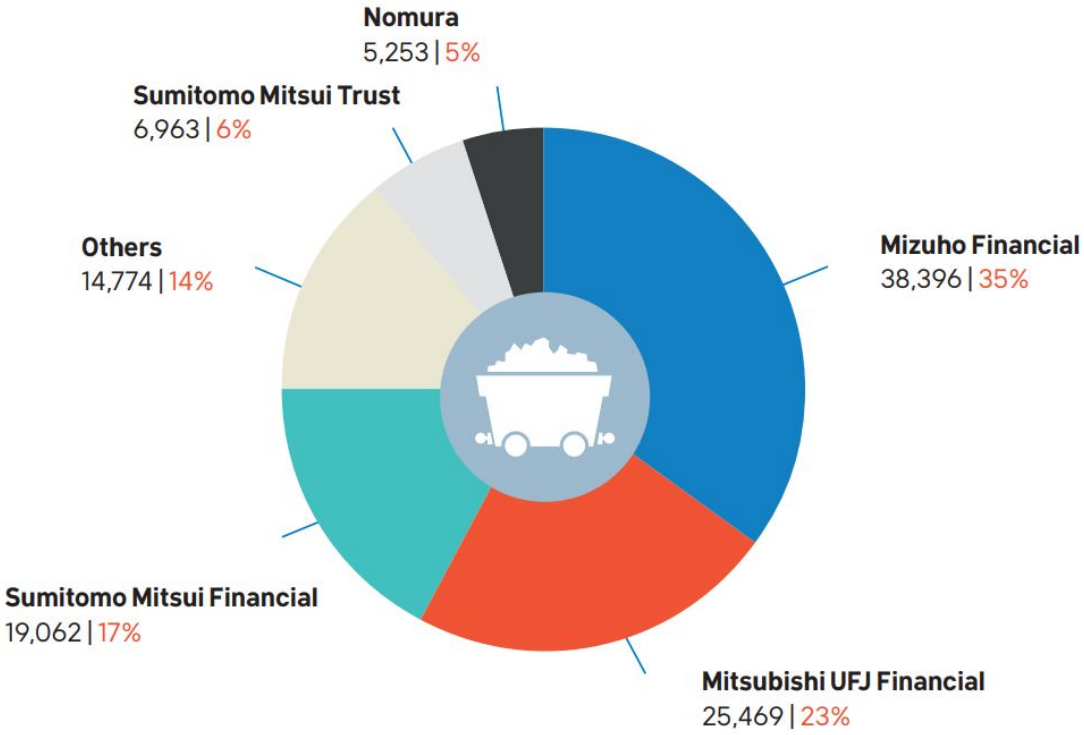
[167] Endcoal, Coal Plants by Country, (July 2017) https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf.

[168] 350 Japan, "Energy Finance in Japan: Funding Climate Change and Nuclear Risk", (8 August 2017), http://40w95614sn5m1jd0sb353zli.wpengine.netdna-cdn.com/ja/files/2016/10/energy_finance_in_japan.pdf

FIGURE 1

SHARE OF LOANS AND UNDERWRITINGS (FOSSIL FUELS)

provided by the selected financial institutions to the selected companies in the fossil fuel sector (2011-2016, US$ million)



Sources: Bloomberg Database, viewed in May 2016; Thomson Reuters Database, viewed in May 2016

Top Shareholders of Power Producers seeking to expand coal power in Japan (Marubeni, J-Power, Chubu Electric, Kansai Electric, Chugoku Electric, and Tokyo Electric), based on the information in the Global Coal Exit List.

	Investor	Value (USD)↓	Country	Type
1	Government Pension Investment Fund	$3.64B	Japan	Public
2	Nippon Life Insurance Company	$1.31B	Japan	Private
3	City of Osaka	$1.07B	Japan	Public
4	Asset Management One	$1.04B	Japan	Private
5	Vanguard Group	$0.99B	USA	Private

[169]

[169] Based on assistance provided by the Global Strategic Communications Council (GSCC)

11.4: Latest price of solar

BNEF 1H2017 LCOE:
Solar: US$161/MWh
Coal: US$80/MWh

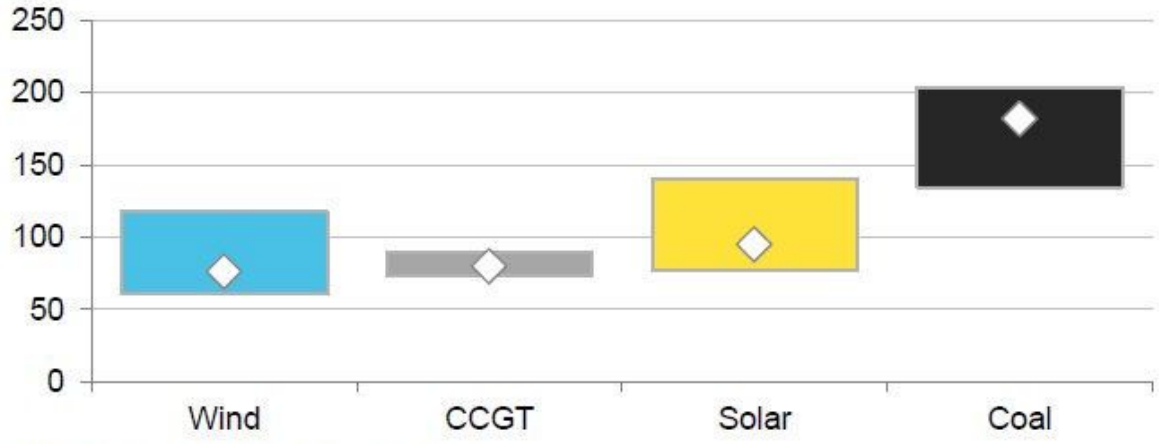
12: Australia

12.1: Key factors influencing the future of the coal sector

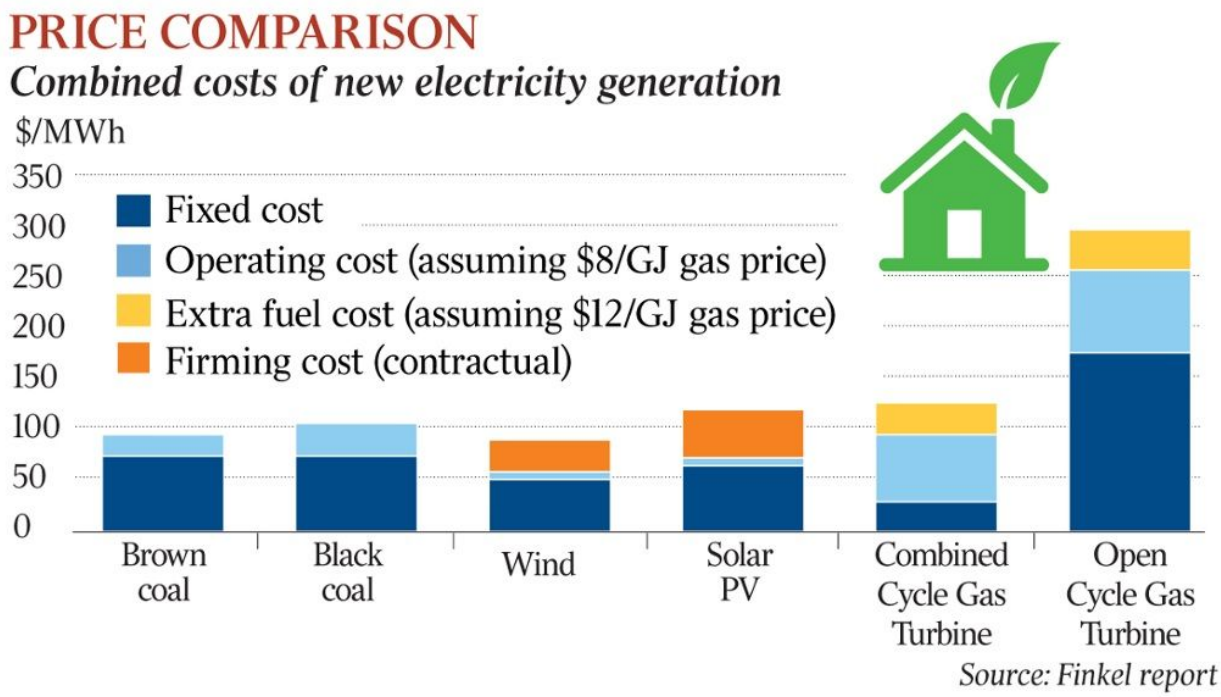
Coal Power

Coal-fired power is not financially viable in Australia according to BNEF and a report chaired by Australia's Chief Scientist.

Figure 1: 2017 levelised cost of energy for new build technologies in Australia (AUD/MWh)



Source: Bloomberg New Energy Finance



There is also strong community (and increasingly, corporate) opposition to coal:

"The only reason there is no coal-fired power station being built is because no Australian bank is going to be on the front page of the paper lending to coal. We have to go overseas for lending for our Loy Yang bid. It's ridiculous." - Trevor St Baker, “coal baron”.

Coal Mining

- IEEFA believe that Australia’s seaborne thermal coal exports are in “...structural decline due to the Indian Government’s policy of reducing coal imports to zero and China’s progressive electricity sector transformation...”[170] Leading corporate analysts such as Morgan Stanley and Goldman Sachs maintain the same view.[171] [172]
- Community opposition (as above).
- Banks adopting policies against lending (as a consequence of both of the above).

[170] IEEFA, “A House of Cards in Australia” (October 2017), http://ieefa.org/wp-content/uploads/2017/10/Escalating-Financial-Risk-of-Adanis-Abbot-Point-Coal-Terminal.pdf

[171] Cole Latimer, Sydney Morning Herald, “Weak Coal may stymie Whitehaven’s aggressive growth” (25 October 2017), http://www.smh.com.au/business/mining-and-resources/weak-coal-may-stymie-whitehavens-aggressive-growth-20171025-gz7ozb.html

[172] Michael West, Sydney Morning Herald, “Digging a deeper hole for coal” (19 February 2016), http://www.smh.com.au/business/energy/digging-a-deeper-hole-for-coal-20160218-gmxgue.html

12.2: Pipeline for new coal mines

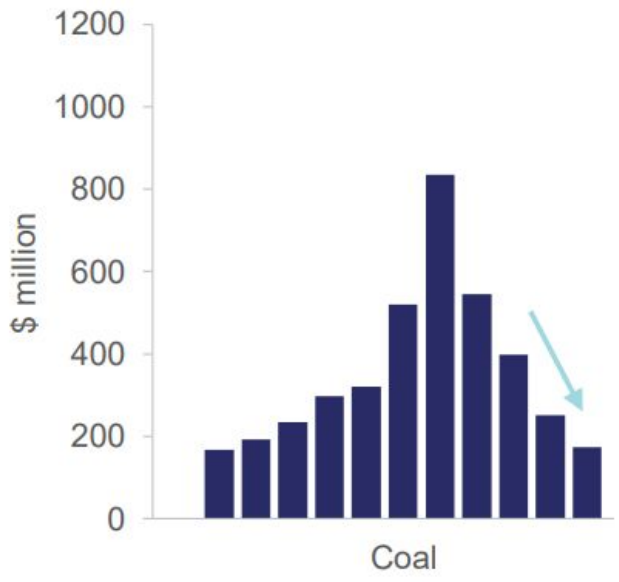
In 2016, Australia was estimated to have produced 250 million tonnes of thermal coal (4.6% of global total)[173] and had proved coal (all types) reserves of 145 billion tonnes (12.7% of global total).[174]

The Office of the Chief Economist provides information on the pipeline of coal mines in Australia. Below is an analysis of that data which includes any mine earmarked to produce thermal coal[175]:

- 6 in 'publicly announced' stage (all new projects), estimated new capacity at least 77 Mt, indicative cost estimate A$9.4b.
- 30 in feasibility stage (9 expansion, 1 extension, 20 new projects), capacity at least 274 Mt, indicative cost estimate A$52.9b.
- 1 committed (a final investment decision has been taken and construction activity is likely underway, new project), capacity 5 Mt, indicative cost estimate $600m.

[173] IEA, "Coal information 2017", Table 1.2, (2017), http://www.iea.org/bookshop/751-Coal_Information_2017
[174] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf.
[175] Office of the Chief Economist, "Resources and Energy Major Projects List", (December 2016)https://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/req/Projects-listing-December-2016.xlsx

Figure 1.6: Exploration expenditure by commodity, 2005–06 to 2015–16



Source: ABS (2016) Mineral and Petroleum Exploration, Australia, 8412.0

The top coal operators by production in Australia are Glencore, BHP, Peabody, AngloAmerican, Whitehaven Coal, Yancoal, Mitsubishi Corp and New Hope Group.

These are the top shareholders in these companies:

	Investor	Value (US)	Type	Country
1	Qatar Investment Authority	$568.83B	Public	Qatar
2	Glasenberg, Ivan	$564.38B	Private	Switzerland
3	Volcan Investments	$513.52B	Private	Bahamas
4	Conclave PTC	$513.52B	Private	Bahamas
5	Blackrock	$125.08B	Private	USA

[176]

12.3: Coal power and mining finance

The funding has mainly come from state money.

<u>Power</u>

There has been no funding to new coal-fired power stations since at least the beginning of 2015. The only thing that comes close is new finance to companies which own coal-fired

[176] Based on assistance provided by the Global Strategic Communications Council (GSCC)

electricity, such as AGL, EnergyAustralia and Origin Energy - all of which have distanced themselves from the technology, alongside most of the business community. Public finance is perhaps the most serious threat of new funding.

Mining

Investment in new Australian coal is consistent with the findings of the IEA's Coal Medium-Term Market Report - "coal mining investment is drying up". From 2015 to 1H2017, there was just AU$96m (US$75m) in new debt finance for coal mining projects and companies in Australia across two deals from four institutions including Barclays, Mitsubishi UFJ, NAB and Westpac. Both of these deals occurred in mid-2015.[177]

The table below is extracted from Market Forces' fossil fuel database on the top lenders to coal operators in Australia.

Bank	Lending (AU$m)
National Australia Bank	$697
Citi	$613
Australia and New Zealand Banking Group	$603
Bank of Tokyo-Mitsubishi UFJ	$400
Japan Bank for International Cooperation	$355
Westpac Banking Corporation	$305
Société Générale	$293
Commonwealth Bank of Australia	$289
Sumitomo Mitsui Banking Corporation	$249
BNP Paribas	$214

- However, the Carmichael mine remains a pending project.
- Banks continue to fund refinancings for coal companies (i.e. Whitehaven).

13: South Africa

13.1: Factors influencing the future of the coal sector

One of the main factors propelling coal in South Africa is the ready availability of domestic coal. It is ranked as the world's seventh largest coal producer with coal production in 2016 at MTOE

[177] Market Forces, Fossil Fuel Lending Database, (2017) accessed 25 October 2017.

142.4.[178] It currently generates 90 percent of its electricity through coal.[179] Eskom, South Africa's unlisted, state-owned electricity company, generates about 95% of the nation's electricity and about 45% of the electricity generated on the entire continent of Africa.[180]

Eskom is building two huge coal-fired plants, Kusile and Medupi, each with 4.8 GW of capacity and at a combined cost to completion estimated at R448bn ($34bn).[181] This investment, and Eskom's continued monopoly, could be reasons for continued promotion of coal-fired power.[182]

13.2: Scale of the pipeline for new coal mines

In 2016, South Africa was estimated to have produced 253.5 million tonnes of thermal coal (4.7% of global total)[183] and had proved coal (all types) reserves of 9.9 billion tonnes (0.9% of global total).[184]

---

[178] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf

[179] Victoria Schneider, Al Jazeera, "The heavy toll of coal mining in South Africa" (2 April 2015), ahttp://www.aljazeera.com/indepth/features/2015/03/heavy-toll-coal-mining-south-africa-150329123518557.html; Tim Buckley and Simon Nicholas, IEEFA, "Global Electricity Utilities in Transition: Leaders and Laggards: 11 Case Studies" (October 2017), pg. 37, http://ieefa.org/wp-content/uploads/2017/10/IEEFA-Global-Utilities-in-Transition-11-Case-Studies-October-2017.pdf.

[180] Tim Buckley and Simon Nicholas, IEEFA, "Global Electricity Utilities in Transition: Leaders and Laggards: 11 Case Studies" (October 2017), pg. 37, http://ieefa.org/wp-content/uploads/2017/10/IEEFA-Global-Utilities-in-Transition-11-Case-Studies-October-2017.pdf.

[181] Chris Yelland, EE Publishers, "Massive cost and time overruns at Eskom's Medupi and Kuile power stations", http://www.ee.co.za/article/massive-cost-time-overruns-eskoms-medupi-kusile-power-stations.html; see also, Keith Schneider, Circle of Blue, "South Africa Coal Projects Collide With Water Scarcity, Financial Turmoil, http://www.circleofblue.org/2016/africa/south-africa-coal-projects-collide-with-water-scarcity-financial-turmoil/. This is also despite having a surplus capacity of 5 GW See Grove Steyn, Jesse Burton, Marco Steenkamp, Meridian Economics, "Eskom's Financial Crisis and the Viability of Coal-Fired Power in South Africa" (15 November 2017), pg. 3, http://meridianeconomics.co.za/wp-content/uploads/2017/11/CoalGen-Report_FinalDoc_ForUpload-1.pdf

[182] Charlotte Matthews, Business Day, "What experts say about Eskom's excuses for renewable delays" (29 June 2017), https://www.businesslive.co.za/bd/companies/energy/2017-06-29-what-experts-say-about-eskoms-excuses-for-renewable-delays/; Tim Buckley and Simon Nicholas, IEEFA, "Global Electricity Utilities in Transition: Leaders and Laggards: 11 Case Studies" (October 2017), pg. 37, http://ieefa.org/wp-content/uploads/2017/10/IEEFA-Global-Utilities-in-Transition-11-Case-Studies-October-2017.pdf

[183] IEA, "Coal information 2017", Table 1.2, (2017), http://www.iea.org/bookshop/751-Coal_Information_2017

[184] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf

13.3: Coal power and mining finance[185]

The industry is highly concentrated with a few coal mining companies accounting for around 85% of all production. These companies are Anglo American, Sasol, South 32, Glencore and Exxaro.[186] The following is a list of the top 5 shareholders of the top coal producers in South Africa.

	Investor	Value (US)	Type	Country
1	Qatar Investment Authority	$568.83B	Public	Qatar
2	Glasenberg, Ivan	$564.38B	Private	Switzerland
3	Volcan Investments	$513.52B	Private	Bahamas
4	Conclave PTC	$513.52B	Private	Bahamas
5	Blackrock	$125.08B	Private	USA

[187]

There is limited comprehensive research on coal power and coal mining finance in South Africa. The following is the results of a search in IJGlobal for lenders to South African coal fired power stations or mine projects and included corporate loans, only 5 since January 2012 were in scope. These are the top 10 lenders by amount loaned:

Lenders	Value of Loan ($m)	
Siemens Bank	$	965.00
JPMorgan	$	965.00
Citigroup	$	965.00
Bank of China	$	965.00

[185] Based on a search in IJGlobal of mining and power deals, only 5 since January 2012 were in scope. These have not been verified against annual reports.
[186] Based on reviewing the 2016 annual reports and other financial results of these companies. See "Annual Report", Anglo American, 2016, pg. 62, http://www.angloamerican.com/~/media/Files/A/Anglo-American-PLC-V2/documents/annual-reporting-2016/downloads/annual-report-2016-interactive-v2.pdf; "Annual Report", Sasol, 2016, pg 92, http://www.sasol.com/sites/sasol/files/financial_reports/Annual%20Integrated%20Report%202016_1.pdf; "Annual Report", Glencore, 2016, pg. 72, http://www.glencore.com/assets/investors/doc/reports_and_results/2016/GLEN-2016-Annual-Report.pdf; "Annual Report", South 32, 2016, pg. 43, http://www.angloamerican.com/~/media/Files/A/Anglo-American-PLC-V2/documents/annual-reporting-2016/downloads/annual-report-2016-interactive-v2.pdf
"Summarized Financial Results for the six month period ended 30 June 2017", Exxaro, http://www.exxaro.com/wp-content/uploads/2017/08/Exxaro-Advert_August-2017.pdf
[187] Based on assistance provided by the Global Strategic Communications Council (GSCC)

KfW IPEX Bank	$	965.00
Bank of Tokyo-Mitsubishi UFJ	$	965.00
Standard Chartered Bank	$	965.00
CaixaBank	$	965.00
HSBC	$	965.00
African Development Bank	$	375.00

The South African government has provided significant guarantees of R350bn for the two major power projects discussed above.[188] Eskom itself was reported to be approximately R322bn in debt in March 2016.[189]

Bank Track provides a list of funders who have loaned or underwritten shares or bonds in respect of Eskom.[190] From 2012 to 2017, Banktrack estimates that these funders provided US$7.87B in loans or bond underwriting to Eskom.

13.4: Latest price of solar

A 2016 analysis by the Centre for Scientific and Industrial Research in South Africa (Dr Tobias Bischof-Niemz and Ruan Fourie) indicates that solar and wind are on par on pricing, and are more than 40 per cent cheaper than new baseload coal plants. Solar and wind are at 0.62 rand per kilowatt hour ($A0.058/kWh), with coal at 1.03 rand/kWh ($A0.09/kWh).[191]

14: USA

14.1: Key factors influencing the future of the coal sector

[188] Linda Ensor, Business Day, “State guarantees of R466bm unlikely ‘to explode’” (10 May 2017), https://www.businesslive.co.za/bd/economy/2017-05-10-state-guarantees-of-r466bn-unlikely-to-explode/
[189] Justin Brown, City Press, “Eskom debt to rise to R500bn plus”, http://city-press.news24.com/Business/eskom-debt-to-rise-to-r500bn-plus-20160713
[190] BankTrack, Eskom, https://www.banktrack.org/show/companyprofile/eskom#popover=financiers
[191] Giles Parkinson, Renew Economy, “Wind, solar almost half the cost of new coal generators in South Africa”, (21 October 2016), http://reneweconomy.com.au/wind-solar-almost-half-the-cost-of-new-coal-generators-in-south-africa-75194/

Almost half of all US coal power plants have been closed or are committed to close.[192] IEEFA estimates that:

> At least 46 coal-fired generating units at 25 electricity plants in 16 states will likely close, convert to natural gas, or be intentionally curtailed in 2017 and 2018 as the U.S. electricity sector moves increasingly away from coal and toward other sources of power.
>
> These changes will have an adverse impact on the coal-mining industry—and on certain mines and companies in particular—eliminating about 28.2 million tons of annual demand by the end of 2018, an amount of coal worth nearly $1.1 billion, delivered, at 2016 prices.[193]

According to the US Energy Information Administration, "In 2016, U.S. coal production decreased 18.8% year-over-year to 728.4 million short tons (MMst), the lowest annual production level since 1979."[194] One major driver of coal is the Trump administration, which continues to promote subsidies for coal-fired plants to prevent them from going out of business, in the name of national energy security.[195]

14.2: Pipeline for new coal power and mines

The Global Coal Plant Tracker lists the US as having a nearly non-existent pipeline of coal power projects.[196] In 2016, the US was estimated to have produced 554.7 million tonnes of thermal coal (10.3% of global total)[197] and had proved coal (all types) reserves of 251.6 billion tonnes (22.1% of global total).[198] In 2016, the Obama administration placed a moratorium of new coal mining leases on federal lands which was overturned by the Trump administration in 2017,

---

[192] Timothy Gardner, Reuters, "Bloomberg's charity donates $64 million to 'war on coal', (11 October 2017), http://www.reuters.com/article/us-usa-coal-bloomberg/bloombergs-charity-donates-64-million-to-war-on-coal-idUSKBN1CG2M5

[193] Steven Mufson, The Washington Post, "Bipartisan group of former FERC commissioners rejects energy secretary's bid to help coal plants", (19 October 2017), https://www.washingtonpost.com/news/energy-environment/wp/2017/10/19/former-ferc-commissioners-reject-energy-secretary-perrys-bid-to-help-coal-plants/?utm_term=.637f0d4d2239

[194] US Energy Administration Agency, Annual Coal Report, (15 November 2017), vii, https://www.eia.gov/coal/annual/pdf/acr.pdf

[195] Seth Feaster, IEEFA, "Research Brief: U.S. Coal Phase-Out, Blow by Blow" (April 2017), pg. 1, http://ieefa.org/wp-content/uploads/2017/04/Research-Brief-U.S.-Coal-Phase-Out-Blow-by-Blow_April-2017.pdf

[196] 895 MW announced, pre-permit or permitted, Endcoal, Coal Plants by Country, (July 2017) https://endcoal.org/wp-content/uploads/2017/07/PDFs-for-GCPT-July-2017-Countries-MW.pdf

[197] IEA, "Coal information 2017", Table 1.2, (2017), http://www.iea.org/bookshop/751-Coal_Information_2017

[198] BP Statistical Review of World Energy, 2017, pg.38, https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-coal.pdf

although the large players in the industry have leases to last over a decade.[199] The pending lease applications are purported to involve nearly 2,000 million tonnes of coal.[200]

[199] Timothy Gardner, Richard Valmanis, Reuters, "Trump to offer federal coal to industry awash in reserves" (29 March 2017), https://www.reuters.com/article/us-usa-trump-coal-analysis/trump-to-offer-federal-coal-to-industry-awash-in-reserves-idUSKBN16Z2AT

[200] Phys.org, "US environmental groups file suit to block new coal mining on public lands (30 March 2017), https://phys.org/news/2017-03-environmental-groups-block-coal.html

14.3: Coal power and mining finance

The top major US Coal Producers in 2016 were:

Table 10. Major U.S. Coal Producers, 2016

Rank	Controlling Company Name	Production (thousand short tons)	Percent of Total Production
1	Peabody Energy Corp	143,024	19.6
2	Arch Coal Inc	96,483	13.2
3	Cloud Peak Energy	58,370	8.0
4	Murray Energy Corp	46,033	6.3
5	Contura Energy Inc	44,231	6.1
6	NACCO Industries Inc	36,373	5.0
7	Alliance Resource Partners LP	35,243	4.8
8	Westmoreland Coal Company	29,594	4.1
9	CONSOL Energy Inc	24,666	3.4
10	Vistra Energy	24,247	3.3
11	Foresight Energy Labor LLC	19,040	2.6
12	Alpha Natural Resources	12,396	1.7
13	Kiewit Peter Sons' Inc	12,031	1.7
14	Blackhawk Mining LLC	11,842	1.6
15	Bowie Resources Partners LLC	10,853	1.5
16	Coronado Coal LLC	7,175	1.0
17	Western Fuels Assoc Inc	6,141	0.8
18	Sunrise Coal LLC	6,113	0.8
19	Prairie State Energy Campus	5,913	0.8
20	Armstrong Energy Inc	5,889	0.8
21	Global Mining Group LLC	5,609	0.8
	Subtotal	**641,265**	**88.0**
	All Other Coal Producers	**87,099**	**12.0**
	U.S. Total	**728,364**	**100.0**

[201]

The following is a chart of the top 5 shareholders of the top listed coal operators (Peabody, Arch Coal, Cloud Peak, Alliance Resource Partners, Westmoreland Coal Company and NACCO Industries), based on production.

Investors	Value (US)	Country	Type
1 Alliance Entities	$1.64B	USA	Private
2 Elliot Management	$1.26B	USA	Private
3 Contrarian Capital Management	$0.46B	USA	Private
4 Monarch Alternative Capital	$0.41B	USA	Private
5 Vanguard Group	$0.41B	USA	Private

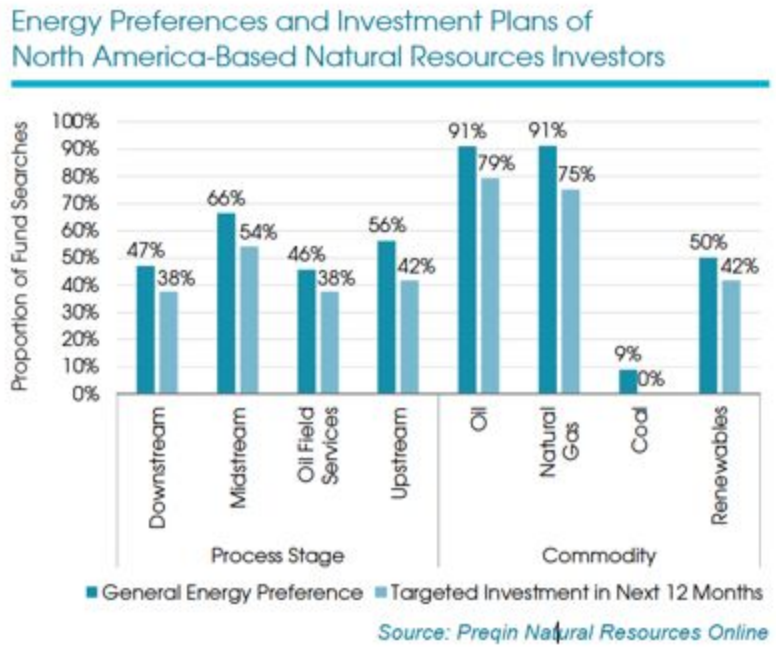
[202]

[201] US Energy Administration Agency, Annual Coal Report, (15 November 2017), pg.16, https://www.eia.gov/coal/annual/pdf/acr.pdf

[202] Based on assistance provided by the Global Strategic Communications Council (GSCC)

There is a lack of enthusiasm for US coal investment in the investment community. According to Prequin Natural Resources online:

> Of the funds currently in the market raising funds to invest in energy, zero have coal as an investment preference. Things haven't been great during the last decade either: only 4% of the number of funds closed targeted coal, representing a meagre 2% of capital raised since 2006.[203]



A review of IJGlobal indicates that there are one coal mining deal from 2014 to present.

14.4: Latest price of solar

The latest cost of solar is LCOE $70.2/MWH as opposed to $78.0 for coal (90% CCS).[204]

Conclusions

The literature shows that understanding emerging markets (Vietnam, Indonesia, Turkey) will be integral to the future of coal. Japanese, Korean and Chinese companies will be seeking to build

---

[203] "Study: Private capital investment in US coal is over," (30 November 2016), http://www.mining.com/study-private-capital-investment-us-coal/

[204] US Energy Information Administration, AEO 2017, Levelized Costs, Pg. 8, https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf

power projects overseas, and will likely be assisted by Japanese, Korean and Chinese public finance. Understanding China will remain key to stopping coal projects.

Both project and balance sheet finance remain important, however, further research would be necessary to determine whether project finance is an increasing or declining phenomenon. Further, new debt mechanisms such as project bonds may increase in importance. In coal mining companies, the spate of bankruptcies appears to have stopped for now and mining continues. If the coal price declines again, further bankruptcies and additional consolidation may be observed.

Overall, it is clear that more research may have to be conducted into some specific areas in order to better understand global coal finance. Some areas include:

- Domestic finance to coal mining in China
- Domestic finance to coal mining and coal power in India
- Finance to coal power in Turkey
- Finance to coal mining in South Africa.