



Seriously Stressed and Stranded

The Burden of Non-Performing Assets in India's Thermal Power Sector

Executive Summary

India's thermal generation sector is carrying US\$40-60 billion (bn) in non-performing or stranded assets supported by the troubled banking sector. This is undermining the flow of capital critical to sustain strong economic growth and a renewable energy future.

Under the leadership of Prime Minister Narendra Modi, the Government of India has embraced the enormous opportunities emerging from low cost renewable energy, including the additional energy security benefits from a reduced reliance on imported expensive fossil fuels.

A rapid expansion of domestic wind and solar infrastructure is driving sustainable investment and employment prospects. At the same time, renewables are providing part of the solution to growing water stress and air pollution issues that are eroding quality of life and the sustainability of economic growth.

With zero indexation contracts extending for 25 year terms, year one renewable energy tariffs consistently below Rs3/kilowatt hour (kWh) are now the low cost source of electricity supply in India.

LOW COST RENEWABLE TARIFFS ARE A FUNDAMENTAL THREAT to the viability of new and proposed thermal coal-fired power plants. This is only going to intensify over time given the ongoing capital cost deflation in the renewable sector.

The economics of low cost renewables has already destroyed the viability of proposed new import coal-fired power plants.

Low cost renewables are also progressively eroding the viability of non-mine mouth coal-fired power plants, given these plants must also wear the burden of expensive and rising rail transportation costs and supply disruptions.

India will continue to rely on coal-fired power generation for decades to come, given strong energy demand growth needs, enormous domestic coal reserves, and the relative lack of commercially viable oil and gas reserves of scale. However, this thermal power reliance has significant adverse implications for the financial system in India.

There has been a succession of initiatives by government and the Reserve Bank of India (RBI) to resolve the massive financial distress evident at many coal- and gas-fired power plants. The problems however remain unresolved, and non-performing

assets continue to choke the banking system, accumulating unfunded interest expenses that are unlikely to ever be paid.

This failure to resolve the multiple and deep-seated issues involved adds to the ongoing debacle of the power distribution company (discom) sector, despite some solid progress evident under the government's Ujjwal DISCOM Assurance Yojana (UDAY) scheme designed to 'turn around' the financial mess.

THERE IS CURRENTLY UPWARDS OF US\$100 BILLION OF NON-PERFORMING OR STRANDED ASSETS shared between discoms and the thermal coal- and gas-fired power plant sectors.

In this report, IEEFA has reviewed 12 case studies of non-performing or stranded assets across the thermal coal-fired power generation sector of India.

Some projects are built, yet are unable to operate at a competitive price sufficient to deliver a viable return to investors. Others are half-built and stranded, and the balance is yet-to-be built, facing ongoing delays. Two of the case studies reviewed have additionally destroyed significant shareholder wealth by failing in attempts to develop baseload gas-fired power plants in addition to their coal-fired investments.

IEEFA notes each of the 12 non-performing assets has questionable economics behind their investment proposals, particularly as lower cost renewable alternatives can be built in a third of the time and at 30% or lower cost to Indian electricity consumers.

India is yet to experience the growing [global capital flight](#) from coal mining or thermal coal-fired power plants on environmental, social and governance (ESG) grounds. The country is however seeing capital flight by its domestic financial system.

Domestic investors are fleeing billions of dollars' worth of non-performing assets and the intractable nature of the complex issues causing enormous losses in the thermal power sector, including:

- Loss of competitiveness to renewables;
- Poor investment decisions by promoters and ensuing bankruptcies;
- Out-dated technologies and second rate equipment purchases;
- An inability to cost-effectively supply power at a commercially viable or previously agreed rate as per the power purchase agreement (PPA);
- Construction cost and timeline overruns;
- Fuel supply issues;
- Land acquisition and resettlement conflicts; and

- Multiple litigation disputes.

According to Global Energy Monitor, there are 85 gigawatts (GW) of coal-fired power projects in the pipeline at various stages of regulatory approval (37GW capacity under construction).

The government projects 90GW to 110GW of gross new capacity additions in the coal-fired generation sector, with 40GW to 50GW of capacity retirements by financial year (FY) 2029/30.

GIVEN THE ONGOING STRESS IN THE THERMAL POWER SECTOR, without subsidy support from the government, construction of new capacity will be extremely risky and unviable.

IEEFA projects only 30GW of net new additions in the coal-fired sector by FY2029/30.

India's future grid will be dominated by variable renewable sources of energy. There needs to be a greater attention towards also resolving India's gas-fired power sector. Gas-fired power plants provide much greater flexibility for peak demand and grid-balancing.

The Chair of State Bank of India [Mr Rajnish Jumar](#) stated in early 2019 that all 25GW of operational gas-fired power plants in India were stranded assets.

IEEFA agrees, but advocates for a time-of-day pricing structure to incentivise the retrofitting of gas plants to enable the supply of higher value peaking power demand as a possible solution. We briefly cover gas-fired power generation in annexure I of this report.

Table of Contents

Executive Summary	1
1. Introduction	5
2. The Many Significant Issues Within India's Thermal Power Sector	8
3. Case Studies: The Various Ways in Which Indian Thermal Power Plants Are Stranded.....	16
3.1 PPGCL's Prayagraj Thermal Power Plant.....	16
3.2 Mahagenco's Koradi Thermal Power Station	21
3.3 Lanco's Amarkantak Thermal Power Plant.....	25
3.4 GVK's Gas and Coal-fired Power Plants	29
3.5 KWPCCL's Korba West Thermal Power Plant.....	31
3.6 Tata Power's Mundra Power Plant.....	36
3.7 CTNPL's Cheyyur Ultra Mega Power Plant.....	41
3.8 Adani's Godda Thermal Power Plant.....	43
3.9 RattanIndia's Nasik Sinnar Thermal Power Plant.....	46
3.10 THDC's Khurja Thermal Power Plant.....	50
3.11 SJVN's Buxar Thermal Power Station	54
3.12 PCKL's Gulbarga Thermal Power Station.....	57
Annexure I: Opportunities for Gas 'Peakers'	60
Annexure II: Global Trends in Divestments from Thermal Power.....	62
About the Authors	64

1. Introduction

India's thermal power generation sector continues to pose trouble for Indian banks, accounting for US\$40-60 billion in potentially stranded assets.

A variety of factors can lead to thermal power generating assets becoming stranded - or economically non-viable and unable to deliver a viable return on investment over its useful life. These include changes in demand, new government regulations, fuel supply, availability of financing, capital cost and timeline blowouts in construction, and even legal action.

The thermal power generation industry is seriously underperforming, despite dominating India's electricity generation sector, with 61% of total installed capacity and 75% of generation coming from thermal sources in 2018/19.

Unsustainably low capacity utilisation rates of less than 60% over the past three years, combined with excessive financial leverage, makes debt servicing extremely difficult.

The industry's distress is exacerbated by loss-making electricity distribution companies (discoms) that have often failed to make timely payments, or have sought to renegotiate tariffs on existing power purchase agreements (PPAs)—electricity power supply agreements between the generator and buyer.

Out of some 40 gigawatts (GW) of stressed coal-fired projects in India, 15GW has yet to be commissioned, according to a report by the government's Standing Committee on Energy in March 2018. Further, some 16.2GW of coastal power plants built to operate 100% on imported coal have been severely affected by the doubling of imported coal prices since 2016.

While delays in project implementation related to land acquisition and permit approvals have resulted in cost overruns, the unavailability of coal supply contracts has also been an issue. Insufficient coal railway capacity has kept Coal India—the primary supplier—from consistently keeping up with demand. Higher prices for domestic and international coal in recent years, a declining exchange rate, and rising railway freight charges for coal transportation over distances of more than 500 kilometres (km), have also inflated the variable generation costs for many coal-fired power plants at a time of renewable energy deflation.

Coal is increasingly challenged from a cost-competitiveness perspective. New 25-year, zero indexation, renewable energy PPAs are consistently being signed at Rs2.60-3.00/kWh, some 20-30% below the first year cost of existing coal-fired power plants in India.

In this report, we examine 12 non-performing or stranded thermal power plants that are proposed or under construction from India's thermal power generation sector.

Five are from the list of 34 stranded assets (40GW in generation capacity) formally identified as non-performing assets by the Reserve Bank of India (RBI). Although

the remaining seven plants reviewed in our report are not formally identified as non-performing or stranded assets, IEEFA views them as equally financially exposed. In short, the issues impacting the sector go much deeper than the 34 projects officially identified as stranded.

Of the 12 case studies, IEEFA notes common themes emerging as to why the thermal power assets have become stranded:

- **Amarkantak Thermal Power Plant** – Stranded due to the company over-expanding in too many directions and the poor financial health of discoms affecting the company. Highlights the need for an effective bankruptcy process.
- **Buxar Thermal Power Station** – Stranded due to promotor inexperience in thermal power, the high cost of new emissions-compliant coal plants, and the inability to find lenders whilst the banks are weighed down with non-performing assets.
- **Cheyur Ultra Mega Power Plant** – Stranded due to a lack of interest in Ultra Mega Power Project construction, and concern over the cost of imported coal. Now undercut by lower cost, deflationary renewables.
- **Godda Thermal Power Plant** – On the brink of being stranded, propped up by multiple government favours (e.g. tax free zones) and subsidies.
- **Gulbarga Thermal Power Station** – Stranded due to Karnataka's lack of in-state coal-mining capacity and the company's failure to deliver coal-fired power projects.
- **GVK's Gas-fired Power and Coal-fired Power Plants** – Stranded as the company over-expanded in too many directions, and due to coal and gas supply issues. Highlights the need for an effective bankruptcy process.
- **Khurja Thermal Power Plant** – Stranded due to the lengthy coal freight distance resulting in high tariffs, overcapacity risk, and promotor inexperience in thermal power. This plant will be unable to compete with cheap renewables.
- **Koradi Thermal Power Station** – Stranded due to lengthy coal freight distances as well as existing spare capacity already in Maharashtra. Serious air pollution issues have also hurt this project.
- **Korba West Thermal Power Plant** – Stranded due to technical issues and the lack of PPAs. Highlights the need for an effective bankruptcy process.
- **Prayagraj Thermal Power Plant** – Stranded due to low coal supply, a lack of working capital, and cost overruns, while subsequent operational issues occurred as a result of the low plant load factor.
- **Sinnar Thermal Power Plant** – Stranded due to outdated technology, no

PPA, and land acquisition issues resulting in the absence of a rail link.

- **Tata Mundra Thermal Power Plant** – An operating plant with an over-aggressive tariff bid now impacted by higher-than-expected imported coal prices.

IEEFA’s analysis aims to be a cautionary note for investors, developers and the Government of India to cease pursuing stranded projects. Non-pithead coal power projects that are being established at distance from coal mines should be seriously re-evaluated, and non-coal states would do well to instead invest in cheaper, sustainable renewable energy options and, if need be, import electricity.

Various government reports project 90-110GW of net new coal-fired plant additions on India’s grid by financial year (FY) 2029/30, such as the National Electricity Plan 2018 (NEP) and the Central Electricity Authority’s (CEA) February 2019 report.

CEA’s optimal energy mix by FY2029/30 report projects India’s coal-fired capacity to be 266.8GW¹ —a net 64GW addition on the current installed capacity of 203.9GW (as of October 2019). This is 17GW in addition to India’s NEP2018 which projects India’s net coal-fired capacity to be 249GW by FY2026/27. NEP identified 49GW of end-of-life capacity retirements, and capacity that should be retired due to age plus space constraints preventing the implementation of emission control systems on plant facilities.

Figure 1.1: India’s Electricity Sector Composition FY2029/30

	---- Capacity ----		-- Generation --		Capacity	Increase
	GW	%	TWh	%	Utilisation	GW vs FY19
Coal-fired	230.0	30.9%	1,154.5	48.8%	57.3%	29.3
Gas-fired peakers	30.0	4.0%	65.6	2.8%	25.0%	5.0
Diesel-fired	0.0	0.0%	0.0	0.0%	0.0%	-0.6
Large Hydro	69.0	9.3%	205.8	8.7%	34.0%	23.6
Nuclear	12.0	1.6%	73.4	3.1%	70.0%	5.2
Renewables	404.0	54.2%	850.6	35.9%	24.0%	324.0
Bhutan/Nepal	n.a.	n.a.	16.4	0.7%		
Total	745.0	100.0%	2,366.3	100.0%		386.5
Battery Storage	20.0					
Captive power	55.0					
Total	800.0					

Source: CEA, IEEFA estimates.

Note: Renewables include small hydro.

Given the dire financial situation of the thermal power sector, construction of new coal-fired power plants without subsidy support from the government will be highly risky and unviable.

India’s largest thermal power developer—NTPC— recently announced that it will

¹ Central Electricity Authority, [Optimal Generation Mix Report 2029-30](#), February 2019.

not undertake any new thermal power plant development beyond its current portfolio. India's largest private power company, Tata Power, reached the same conclusion in 2018.

IEEFA projects India's net coal-fired capacity to be lower than the government estimate at 230GW by FY2029/30 (refer to Figure 1.1), up a net 26GW from today.

2. The Many Significant Issues Within India's Thermal Power Sector

Indian Parliamentary Committee's Report on Stranded Assets

Stranded or non-performing assets² in India's thermal power generation sector has been worrying the Indian government for some time.

In FY2017/18, the government set up a special Parliamentary Standing Committee on Energy tasked with reviewing a country-wide list of 34 non-performing assets in India's thermal power sector. The committee found that of those 34 assets with a total generation capacity of 40.1GW, only 24.4GW had been commissioned, with the remaining 15.7GW deemed 'under construction'. Of the fully commissioned capacity, 8.2GW had yet to secure PPAs.

The committee found the 'stressed' value of the 34 stranded assets to be Rs236,619 crore (US\$33.5bn) in total, with stranded loans of Rs176,130 crore (US\$25bn) and an equity value of Rs60,489 crore (US\$8.5bn), as of March 2018.

² The Reserve Bank of India (RBI) defines a non-performing asset (NPA) as a loan or advance where interest and/or instalment of principal remains overdue for a period of more than 90 days. An asset, including a leased asset, becomes non-performing when it ceases to generate income for the bank.

Figure 2.1: Non Performing Assets in India's Thermal Power Generation Sector

Total Number of Thermal Power Projects	34
Total Stressed Capacity (MW)	40,130
Commissioned Capacity (MW)	24,405
With PPAs	16,129
Without PPAs	8,279
Under Construction Capacity (MW)	15,725
Coal Linkage	
Linkage available (MW)	11,050
Block allotted but under dispute (MW)	3,830
Imported coal (MW)	1,800
Linkage required (MW)	7,725
Linkage allotted/ in process under SHAKTI (MW)	6,150

Source: 37th Parliamentary Standing Committee's report on Energy.

In their final report,³ the Parliamentary Committee identified key reasons for stress in India's thermal power sector, including:

- Lack of fuel due to cancellations in assigned coal linkages or projects set up without any coal linkages;
- Lack of PPAs with state discoms;
- Inability of promoters to infuse equity and working capital;
- Contractual and tariff-related disputes;
- Issues related to banks and financial institutions;
- Delays in project implementation leading to cost overruns;
- Over-aggressive tariff bidding by developers to win PPAs.

The Indian thermal generation sector has faced multitudes of problems this past decade. A far too ambitious expansion program was undertaken, almost entirely funded by financial leverage. Financial problems were compounded by cost overruns, project delays, floods, earthquakes, fuel supply interruptions, PPA contract cancellations, and a lack of accountability by promotor groups.

³ Power Ministry of India, 37th Standing Parliamentary Committee on Energy, [Stressed/Non-performing Assets in Electricity Sector](#), March 2018.

Obtaining a fuel-supply linkage is one of the most important prerequisites for getting regulatory approvals, environmental approvals, and contract PPAs with power discoms.

Projects tend to rely on Coal India Ltd (CIL), a state-owned coal mining giant supplying more than 80% of India's thermal coal demand to generators. The company however has struggled to expand its mining operations, mainly due to being unable to get environment and forestry clearances for proposed mines, land conflict issues, coal evacuation complications, and other law and order problems arising from protests against mining.

Like many countries, future power demand was vastly overestimated in India, resulting in many of the 34 stranded assets. On average, 18-20GW of coal-fired capacity was added between FY2011/12 and FY2015/16. Electricity demand growth has not kept pace.

At the same time, renewable energy wholesale tariffs have become increasingly cheaper due to the introduction of reverse bidding auctions, and supported by falling costs in solar modules and wind turbines. As a result, state discoms have increasingly preferred to procure power through cheaper renewable energy contracts to meet incremental demand.

IEEFA expects this trend to continue as renewable energy tariffs continue to decline over the coming decade, and while India strives to build massive renewable energy capacity, targeting up to 450GW by 2030 (over 50% of its total installed capacity).

Reserve Bank of India's "12th February Circular" to Tighten Lending to Stressed Assets

In 2018, the Reserve Bank of India (RBI) revised its framework on measuring whether an asset had become stressed, reflecting its deep concern for the level of debt being carried.

According to a bank circular distributed on 12th February 2018, lenders were to classify a loan as stressed on just one day of default, while bankers were required to mandatorily refer all accounts holding over Rs2,000 crore (US\$280m) in loans to the National Company Law Tribunal (NCLT) or bankruptcy court, if those companies had failed to resolve non-payment problems within 180 days of default. Previously, the bankruptcy code had allowed 270 days for lenders and asset owners to resolve non-payments through mechanisms such as corporate or strategic debt restructuring. RBI's 12th February circular ruled out such provisions.⁴

RBI's new rules were deemed unfair by proponents of stressed assets. They argued that much of the pressure in the sector was due to reasons outside of their control, such as delays in assigning coal-supply linkages from the Ministry of Coal, and issues with land acquisition.⁵

⁴ Reserve Bank of India, [Resolution of Stressed Assets – Revised Framework](#), 12 February 2018.

⁵ Economic Times, [What RBI's February circular means: Should India Inc worry?](#), 08 May 2018.

Previous RBI schemes had failed to address issues around bankruptcy, and had been misused by borrowers and lenders to help hide the non-performing asset (NPA) status of their stressed assets.

RBI's new circular called for a faster resolution process and substantial haircuts on lenders' debts, without the loopholes. As a result, ten projects with total loans of Rs39,400 crore (US\$5.6bn) were reported to have been referred to the NCLT for bankruptcy proceedings, with a further eight projects with loans of Rs36,500 crore (US\$5.2bn) set to be referred.⁶

RBI's passage of reform was not to last. In April 2019, the Supreme Court of India quashed RBI's 12th February circular on project owners' appeal, and also ruled to invalidate all actions taken since its inception.

This was no doubt a relief to stressed asset owners and lenders, but it leaves the Indian financial sector hostage to open-ended promotor delays and gaming of the system, and prevents the speedy resolution of decade-old poor investment decisions. As a result, the banking system remains hamstrung, stymying India's enormous economic growth potential.

Coal Supply Issues and the Increasing Cost of Coal

The Indian coal-fired power sector is struggling with coal supply issues.

India's domestic coal deposits are concentrated in central and eastern Indian states: the states of Jharkhand, Odisha, Chhattisgarh, West Bengal and Madhya Pradesh produced ~80% of the country's thermal coal in FY2017/18.⁷

States such as Karnataka and Gujarat with high electricity demand growth have almost no in-state black coal mining capacity (Gujarat produced 13.3 million tonnes (mt) of lignite in FY2017/18). These states are dependent on imported coal, or domestic inter-state coal hauled via railways from distant coal mines — with both mechanisms contributing to high marginal fuel costs in power production.

Coal India Ltd (CIL), a state-owned coal mining giant, supplies more than 80% of India's thermal coal demand, yet it has consistently failed to meet its production growth targets. CIL is aiming to produce 625 million tonnes per annum (mtpa) in FY2019/20 (growth of 3.6% year-on-year), more than 10% below its original target for the year, after missing production targets of 600mt and 660mt over the last two fiscal years.

CIL has struggled to expand its mining operations to meet coal supply demand due to difficulties in getting environment and forestry clearances for proposed mines, land acquisition issues, community protests against mining, coal evacuation problems, poor planning and the rising cost of coal and coal transportation.

Coal mining and evacuation activity is impacted by India's annual monsoon season

⁶ Economics Times, [Banks may face 60% haircut on power loans](#), 04 September 2018.

⁷ Coal Controller Statistics, [Provisional Coal Statistics FY2017/18](#).

(June-September) which further impacts coal supply and the reliability of coal-fired power stations. The impacts of the monsoon in the current fiscal year have been particularly severe. Coal India's 30mtpa Dipka mine in Chhattisgarh was flooded due to the diversion of an overflowing river in its vicinity.⁸ Operations at this mine remained stalled for both August and September, severely limiting its output. Relatively smaller flooding has also affected thermal coal mines in other states such as Jharkhand and Maharashtra.

India's attempt to rationalise assigned coal linkages to power plants was assigned to Ujjwal Discom Assurance Yojna (UDAY), a national scheme introduced in FY2015/16 to assist financially stressed state-owned discoms. India hoped to minimise the distance between the mine and the power plant to reduce the cost of power production. This initiative grew in significance when the price of coal and coal transportation surged in FY2018/19. Coal prices across all grades increased by 17%, while railway transportation charges increased 21% in January 2018, and then another 8.75% effective November 2018. Brookings India found Indian railways were overcharging coal freights by 31% to offset losses from passenger coaches, resulting in an increased cost of power, on average, of about Rs0.10/kWh on the basis of all electricity generated in India.⁹

As a result of many of the input costs described, the power costs of state discoms increased during FY2018/19.¹⁰ After dropping to Rs4.19/kWh in FY2017/18, the average power purchase cost increased to Rs4.42/kWh in FY2018/19.

Figure 2.2: Discom Performance Under UDAY Scheme

REPORT CARD				
Financial parameters	FY16	FY17	FY18	FY19
Profit/loss (₹ crore)	-51,562	-38,080	-15,132	-28,036
ACS-ARR gap in (₹/kwh)	0.6	0.42	0.17	0.27
AT&C loss (in %)	20.81	20.28	18.8	18.19
Power purchase cost (₹/kwh)	4.22	4.22	4.19	4.42

Sources: Ministry of Power, booklet for State Power Ministers' conference.

IEEFA notes that while India remains reliant on thermal coal-fired power generation, it needs to prioritise the development of lower cost mine-mouth coal-fired power plants built close to the supply of coal. A coal supply travelling 500km can increase delivered coal costs by 50%, while 1,000km doubles the cost of the delivered coal, which becomes a massive extra cost to Indian consumers.

⁸ News 18, [Coal India's 30 Million Tonnes Dipka Mine to Stop Output for a Month after Flooding](#), 02 October 2019.

⁹ Brookings India, [Indian Railways and Coal — An unsustainable interdependency](#), July 2018.

¹⁰ Ministry of Power (India), Conference Handbook of Power and Renewable Energy Ministers of States & UTs, 11 October 2019.

Risk from Water Stress

India's thermal power sector is very dependent on water, as ~90% of thermal power generation is dependent on freshwater for cooling.

The country's thermal coal-fired power plants are withdrawing around 22 billion cubic metres of fresh water per year (on 2016 figures), more than half of India's domestic water requirements.¹¹

According to the World Resources Institute (WRI)¹², ~40% of India's current thermal capacity is located in water-stressed areas, with water shortages leading to losses in electricity generation and significant revenue losses for power producers.

WRI found India lost about 14 terawatt-hours (TWh) of thermal power generation due to water shortages in 2016, cancelling out more than 20% of growth in the country's total electricity generation from 2015. Similarly, a study by Vasudha Foundation¹³ revealed losses of 5TWh a year between 2012 and 2017 on account of water scarcity, with strong annual variation year to year.

**India's thermal coal-fired
power plants are
withdrawing more than
half of India's domestic
water needs every year.**

Losses in power generation due to water shortages has impacted the profitability of various companies. An October 2019 study by WRI analysing data from three of the five companies in their sample revealed significant negative impacts to earnings before interest, tax, depreciation and amortization (EBITDA) on account of water induced shortages.¹⁴

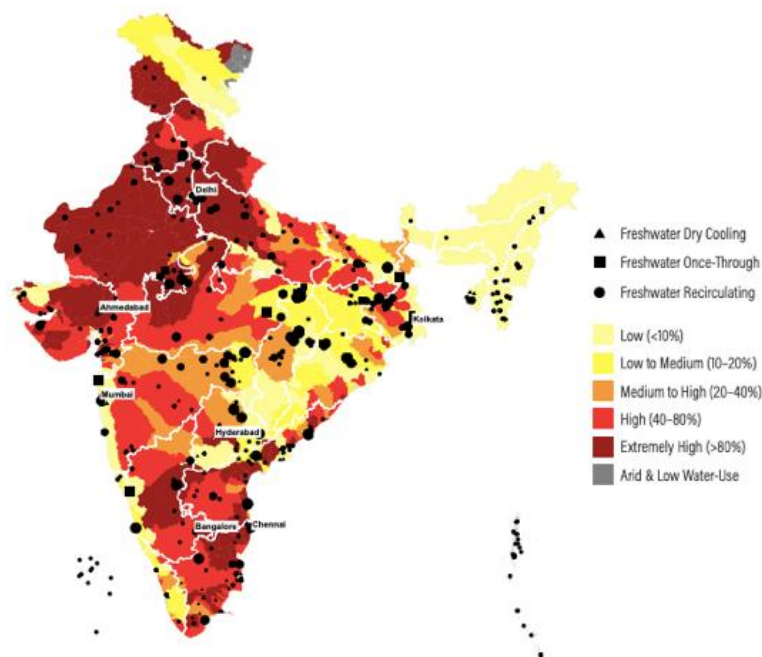
¹¹ CSE. India's first-ever environmental rating of coal-based power plants finds the sector's performance to be way below global benchmarks, 2017.

¹² WRI, January 2018. Parched Power: Water Demands, Risks, and Opportunities for India's Power Sector.

¹³ Vasudha Foundation, November 2018. Energy-Water Nexus. A study on Water and Coal Power Linkages in India.

¹⁴ WRI, Financial Implications of Parched Power: Insights from an Analysis of Indian Thermal Power Companies, October 2019.

Figure 2.3: India's Freshwater-Cooled Thermal Utilities Mapped Against Baseline Water Stress



Source: Adapted from WRI Report.

To address increasing water shortages in India, particularly as it impacts thermal power generation, the Ministry of Environment Forest and Climate Change (MoEF&CC) issued a notification in December 2015 tightening standards around air pollution and water consumption in thermal power plants.

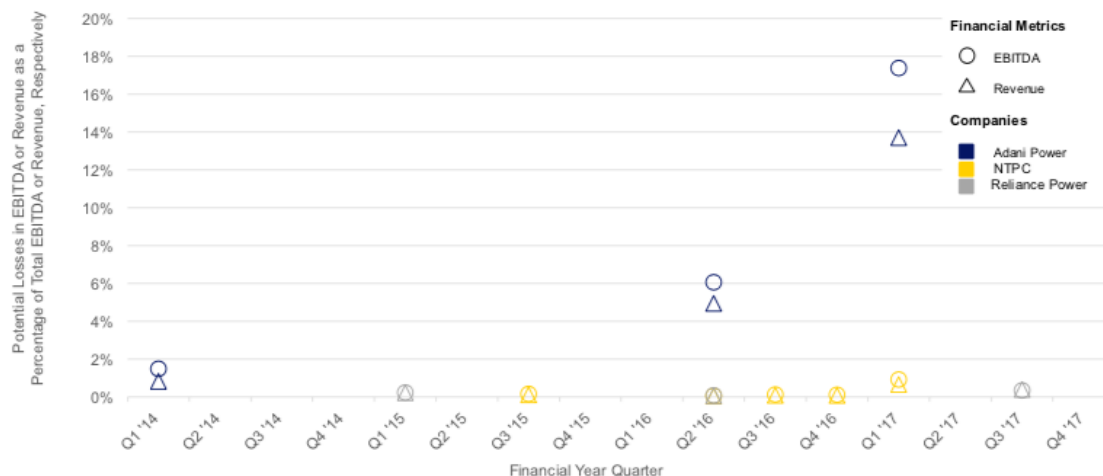
These were incorporated into the legal framework in June 2018 through an amendment to the Environment (Protection) Rules, 1986 issued under the Environment Protection Act. Unfortunately, the standards were diluted and limits for water consumption were increased to 3 cubic metres per megawatt-hour, 20% higher than the cap of 2.5 cubic metres of water per megawatt-hour initially notified.

Losses in power generation due to water shortages has impacted profitability.

The basins where thermal power plants are located are expected to face acute water shortage in coming years.

IEEFA notes water stress may become an increasingly constraining factor for sustained strong economic growth in India. This will affect coal-fired power generation while increasing operating costs into the future, thereby increasing stranded asset risks.

Figure 2.4: Potential Water-Shortage-Induced Losses in Revenue and EBITDA as a Percentage of Total Revenue



Source: Adapted from WRI Report.

Slowing Electricity Demand Growth in India

India's recent economic slowdown has considerably impacted electricity demand growth. As of November 2019, year-to-date electricity demand for FY2019/20 grew at just 1.9% compared to 6.2% for the same period in FY2018/19.

The slowdown in electricity demand has meant non-coal power generation sources have fulfilled the entire demand growth, and more. Generation from hydro, nuclear and renewables grew significantly over the first half of FY2019/20—15%, 26% and 6% respectively.^{15 16} Generation from coal dropped 1% in the same period.

Generation from hydro, nuclear and renewables grew significantly in the first half of FY2019/20 while generation from coal dropped.

The sudden decline in coal-fired power generation continued throughout October 2019. By the end of the month, the annual increase in coal consumption by the power sector, which had previously averaged 6.3% or 27 million extra tons each year for the last 12 years, fell to zero, not only for the financial year to date but also for the full 12 months to 31 October 2019, compared to the previous year.

In IEEFA's view, this sudden decline in coal-fired generation is not primarily a consequence of coal shortages. Power plant stocks in October 2019 were 8.5mt (66%) more than in October 2018 when coal-fired generation was much higher, despite 29 plants having 'critically low' stocks.¹⁷ Rather, these figures may be

¹⁵ CEA Generation report, September 2019.

¹⁶ CEA Renewable Generation report, September 2019.

¹⁷ IEEFA, Thermal coal flat-lines in faltering economy, power from non-coal sources continues to grow, November 2019.

impacted to some extent by the seasonal nature of some non-coal power sources, particularly hydro and wind, which generate more during the first half of the fiscal year than the second.

The much lower-than-expected electricity demand growth, combined with the cost competitiveness of wind and solar—with wholesale electricity tariffs consistently below Rs3.00/kWh, and zero indexation and zero marginal costs—are driving the dramatic turnaround in coal consumption for the power sector in 2019.

IEEFA notes with renewable energy set for further cost reductions over the next decade, wind and solar will further undercut thermal power, mopping up most of the incremental electricity demand growth.

3. Case Studies: The Various Ways in Which Indian Thermal Power Plants Are Stranded

The following 12 case studies highlight some of the various ways in which Indian thermal power plants have become stranded assets, with common themes emerging including dire financial pressure, issues around coal supply, and lower-than-expected power demand growth.

Another common theme is the uptake of increasingly cheaper renewable energy. Often financially distressed discoms are increasingly turning to cheaper renewable energy to fulfil electricity demand, making PPAs for thermal power plants increasingly hard to come by.

3.1 PPGCL's Prayagraj Thermal Power Plant

Jaypee Power's subsidiary, Prayagraj Power Generation Company Ltd (PPGCL), owns and operates the 1,980 megawatt (MW) Prayagraj Thermal Power Plant at Tehsil Bara, District Allahabad, in Uttar Pradesh.

The project was awarded by the Uttar Pradesh Power Corporation Ltd (UPPCL) through a case-2 bidding process whereby the developer bids on the basis of a specific fuel and location, with details provided by the government. The power plant's three supercritical units were commissioned during 2016 and 2017.¹⁸

The plant executed a fuel supply agreement (FSA) with Coal India's Northern Coalfields Ltd. (NCL) for supply of 6.95Mtpa 'C/E' grade coal.

The power project gained permission from the Chief Engineer, Irrigation Department, Government of Uttar Pradesh for drawing 96 cusecs (about 9,782 m³/hr) of water on an annual basis from the Yamuna River, also called Jumna.

Power evacuation is through a 765 kilovolt (kV) S/C transmission line and a 400 kV

¹⁸ SBI Report for [Proposal for Majority Stake Sale of PPGCL](#).

D/C transmission line.

PPGCL entered into a 25-year PPA with the five distribution utilities of Uttar Pradesh for sale of 90% of the power generated from the commercial operation date (COD), with the balance of power being sold by PPGCL on a merchant market/bilateral basis. The PPA has provision for pass-through of variable costs as per actuals.

Overrun in Construction Costs of 44%

The Prayagraj Thermal Power Plant project was funded by a consortium banking arrangement led by the State Bank of India (SBI).

The original project cost was estimated at Rs10,780 crore. The project however was delayed by 33 months on account of:

- Delays in land transfer by UPPCL;
- Delays in equity infusion by promoter;
- Increases in foreign exchange rate variations, the assumed rate of interest, and the cost of equipment and labour as per contract; and
- Additional interest costs accumulated during construction due to the construction time overrun.

The revised project costs now stand at Rs15,537 crore (US\$2.1bn) (up 44%).

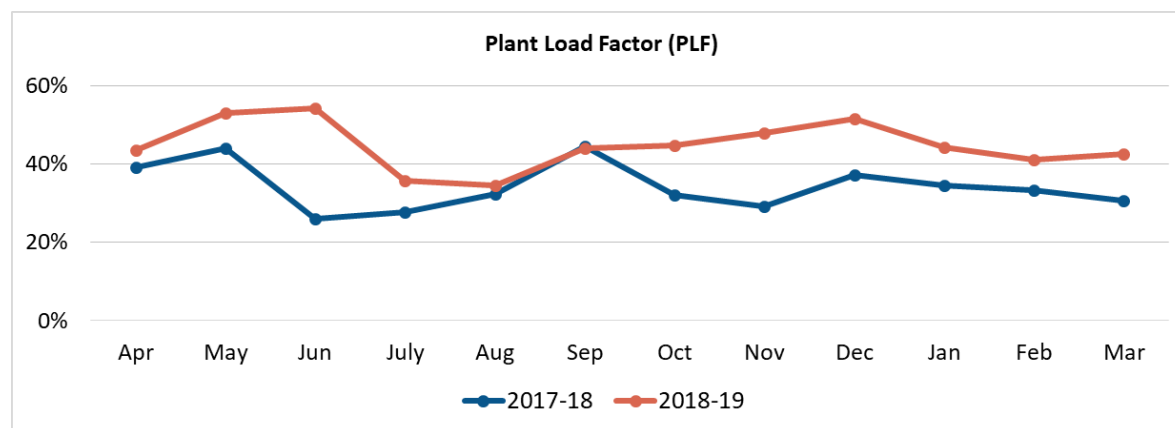
PPGCL Is a Stranded Asset

The Ministry of Power's 37th Standing Committee on Energy identified 34 coal-based power plants as financially 'stressed' in 2018. PPGCL was included, with an outstanding debt of Rs11,493 crore (US\$1.6bn) (74% of total outlays) and equity infusion of Rs4,043 crore (US\$0.56bn) (26%).¹⁹

While the power plant has both a fuel linkage and a PPA tied up for 90% of its capacity, the utilisation levels of the plant have been averaging just 40% over the last two fiscal years due to the non-availability of coal and a lack of working capital.

¹⁹ Ministry of Power, *Stressed /Non-performing Assets in Electricity Sector*, March 2018.

Figure 3.1.1: Prayagraj Power Generation Company Limited Plant Load Factor FY2017-18 and FY2018-19



Source: CEA Monthly Generation Reports.

In 2017-18, the plant's plant load factor (PLF) was very low at around 35%. While the PLF improved to 45% in 2018-19, it is much lower than the technical requirement of 75% on which the project's viability was modelled.

During FY2018-19, gross generation and net saleable energy was 7,759 million units (MUs) and 7,271 MUs respectively, while gross revenue was Rs2,840 crore (US\$0.4bn), giving a tariff of Rs3.91/kWh. Figure 3.2.2 shows the summarised profit and loss statement of PPGCL for FY2018-19.

Figure 3.2.2: Prayagraj Power Generation Company Limited P&L FY2018-19 and FY2017-18

	Rs million	Rs million	US\$ million	US\$ million
	FY2018-19	FY2017-18	FY2018-19	FY2017-18
Gross Total Revenue	28,406	20,730	398	290
Total Expenses	29,722	35,232	416	493
Exceptional/Extra-ordinary items	-	-	-	-
Profit before Tax	-1,316	-14,502	-18	-203
Profit after Tax	55	-9,821	1	-137

Source: Jaypee Power Annual Report FY2018-19.

PPGCL earned a net profit of Rs55 million for FY2018-19, and a net loss of Rs9,821 million in the previous financial year²⁰ due to low plant utilisation levels and an increase in interest liability on COD. PPGCL received only 4.97Mt (64%) of coal against the required 7.80Mt for the year ended 31 March 2019, due to non-availability of the requisite working capital.

²⁰ Jaypee Group, Annual Report 2018-19.

A Fire-Sale to Resurgent Power

In November 2018, Renascent Power Ventures Private Limited (Renascent Power), a subsidiary of Resurgent Power Ventures Pte. Limited (Resurgent Power), signed a share purchase agreement with a consortium of lenders led by the State Bank of India (SBI) to acquire a 75% stake in PPGCL. Resurgent Power is a joint venture between Tata Power, ICICI Bank and global investors.

SBICAP Trustee transferred the entire shareholdings of PPGCL's Jaiprakash Power Ventures Limited (JPVL) (equivalent to 89.47% of total capital of PPGCL, comprising 75.01% of equity shares and 100% of preference shares) in its name and on behalf of the lenders, upon payment of an aggregate consideration of approximately Rs6,000 crore (US\$0.8bn). Jaiprakash Associates Limited (JAL) still holds a residual 11.49% equity share in PPGCL.²¹

As per the terms of the share purchase agreement, the State Bank of India was required to obtain approval for changes in management from the Uttar Pradesh Power Corporation Ltd. (UPPCL). Given the project was awarded under a Case-2 bidding process and approved by the Uttar Pradesh Electricity Regulatory Commission, the Power Corporation suggested the Bank obtain approvals from the Commission.

In its order dated 29 March 2019, the Commission approved the change of management subject to Renascent Power reducing fixed capacity charges by Rs0.14/kWh in each year for the remaining term of the PPA, starting from 1 April 2020. The Commission also required Renascent Power to withdraw all cases filed by PPGCL against the Power Corporation.

Resurgent Power approached the Appellate Tribunal for Electricity (APTEL) to argue against the lowering of the tariff. In September 2019, APTEL upheld the approval granted for transfer of 75.01% ownership of the Prayagraj Power Project to Renascent Venture, without any reductions in the adopted tariff.

In order to revive the project, the lenders have taken a 'haircut' of more than Rs5,000 crore (US\$0.7bn).²² This loss is borne by the banks, which is effectively a loss of public monies.

The stranded asset losses have been socialised and the original promoter has been largely safeguarded. The new promoter is required to take fresh loans of Rs6,000 crore (US\$0.8bn), with the interest rate and repayment period

**The lenders have taken a
'haircut' of more than
Rs5,000 crore (US\$0.7bn).
This loss is borne by the
banks, which is effectively a
loss of public monies.**

²¹ Ibid.

²² UPERC Order, [Approval of change in ownership of Prayagraj Power Generation Co. Ltd.](#)

having an important bearing on the cost of generation.

Outcome: An Asset Revived by Changing Ownership but May Continue to Be a Stressed Asset

The 1,980MW super-critical PPGCL project is now commissioned with all approvals and clearances in place. The power plant has a fuel supply agreement executed with NCL, and a PPA with Uttar Pradesh discoms for 90% of generated power, including fuel cost as pass-through.

The total project cost blow-out from initially Rs5.44 crore (US\$0.75m) per megawatt to Rs7.85 crore (US\$1.1m) per megawatt meant an increase of 44% in construction costs.

The tariff at the time of bidding in 2012 was Rs3.02/kWh with fuel cost pass-through.²³ By FY2018/19, the UPERC approved tariff had risen to Rs3.81/kWh, an increase of 26%. The approved tariff is now a Rs0.98/kWh fixed cost, and Rs2.83/kWh for the per unit energy charge.²⁴

IEEFA notes PPGCL quoted a non-scalable capacity charge in the bid which resulted in lower-than-expected project returns, thereby limiting the debt servicing capability of the company. Further, the project remains exposed to high counterparty credit risk arising out of the poor financial health of Uttar Pradesh-based discoms.

There is increasing national government pressure on Indian states to curb air pollution. The Ministry of Environment, Forest and Climate Change (MoEFCC) has legislated standards to limit the concentration of sulphur dioxide, nitrogen oxides, particulate matter and mercury in stack emissions for coal-fired power plants. In order to comply with these environmental standards, the Prayagraj Thermal Power Plant will have to incur additional expense, resulting in an increased tariff between Rs.0.32/kWh to Rs.0.72/kWh.²⁵

IEEFA notes with cheaper renewable energy increasingly available, the dispatchability from such plants will remain a matter of concern.

The operational parameters for the plant remain weak, reflected in high auxiliary power consumption, high heat rates, and low PLF. The plant is currently receiving only 64% of its coal requirement, and it is unlikely the plant will get enough coal to run at 80%-85% PLF to recover costs in the near future. If the coal requirement deficit is met through expensive imported coal, it will severely impact the economic viability of the plant.

²³ Jaypee Power, [Investor Presentation 2012](#).

²⁴ UPERC tariff order, [Approval of Aggregate Revenue Requirement & Tariff for FY2018-19](#).

²⁵ IISD-CEEW report, [The Cost of Meeting Air Pollution Standards in the Coal-fired Electricity Sector 2019](#).

Further compounding issues, India's ICRA rating agency has assigned a D-rating to the company on account of its poor operational and financial performance.

IEEFA notes the PPGCL thermal power plant is based on relatively modern technology. Resurgent Power can improve the viability of the plant and run it profitably if coal supply can be improved, resulting in an increase in the plant utilisation factor. However, if coal supply remains an obstacle, the viability of the plant will continue to be seriously doubtful.

If coal supply remains an obstacle, the viability of the plant will continue to be seriously doubtful.

The cost of renewables has dropped and IEEFA expects this deflationary trend to continue. On the other hand, coal plants are inflationary with the cost of fuel likely to increase in coming years. Given the poor financial health of discoms, the increased costs being worn by of the project will eat into its dispatchability and profitability.

Even if the coal supply situation can be improved, the tariff of the plant will have to be reduced in order to remain competitive with renewable energy, thereby implying a lower rate of return for investors.

3.2 Mahagenco's Koradi Thermal Power Station

Owned by the Government of Maharashtra, Maharashtra State Power Generation Co. Ltd (Mahagenco) is the largest power generator in the state and the second largest across the whole of India in terms of installed capacity, behind NTPC. In addition to 2.4GW of hydro capacity and a 672MW gas-fired power plant, Mahagenco currently operates just over 10GW of coal-fired power capacity (Figure 3.2.1).

Figure 3.2.1: Mahagenco Coal-Fired Power Capacity and Generation

Plant	Capacity (MW)	April 2018-March 2019		April 2019-August 2019	
		Generation (GWh)	PLF (%)	Generation (GWh)	PLF (%)
Bhusawal	1,210	6,596	62.23	2,881	64.84
Chandrapur	2,920	15,851	61.97	7,076	66.00
Khaparkheda	1,340	7,471	63.65	3,199	65.01
Koradi	2,400	8,430	40.09	3,750	42.55
Nasik	630	2,316	41.97	1,413	61.10
Paras	500	2,628	60.01	1,533	83.51
Parli	1,170	2,842	27.73	247	5.75
Total Coal-Fired	10,170	46,134	51.78	20,099	53.82

Source: Central Electricity Authority. PLF= Plant Load Factor.

Koradi Thermal Power Plant Expansion (1,320MW)

Mahagenco has in-principle approval to expand the 2,400MW Koradi coal-fired thermal power plant with two new units totalling an additional 1,320MW.²⁶ The new capacity will replace units to be shut down across several Mahagenco coal-fired power plants; 200MW to be closed at Koradi, 420MW at Nasik, 420MW at Parli, and 210MW at Chandrapur.²⁷ Coal for the new units will need to be railed from a mine located in Chhattisgarh, some 600km distance from the Koradi plant.

With 1,250MW to be retired and 1,320MW to be built, Mahagenco is increasing its coal-fired power capacity despite its coal fleet operating at less than 54% plant load factor (PLF) in the current fiscal year (Figure 3.2.1).

The Koradi plant is situated close to the city of Nagpur and not far from another Mahagenco coal-fired power plant - the 1,340MW Khaparkheda power station. The proximity of so much coal-fired power capacity, and the fact that Mahagenco did not install flue-gas desulphurisation (FGD) equipment at Koradi, despite being required to do so in 2012, has contributed to a major air pollution problem for the city of Nagpur. The Koradi extension was given in-principle approval despite this lack of compliance.²⁸

The Koradi coal-fired power plant was identified as one of the nation's major pollution hotspots in a 2019 report showing India as the largest emitter of sulphur dioxide in the world.²⁹ A Central Pollution Control Board inspection found that sulphur dioxide levels in the Koradi area were 14 times the prescribed norms.³⁰ Faced with receiving closure notices for the existing units at Koradi, Mahagenco finally agreed to begin the installation of FGD equipment to reduce air pollution.³¹

IEEFA notes that washing coal used in Mahagenco plants would reduce ash content and air pollution. However, coal washeries in the state have been mired in corruption, leading to the unavailability of washed coal. A recent tender run by the Maharashtra State Mining Corporation for new washed coal supply has being challenged on the basis that the tender was biased towards favoured companies.³²

²⁶ Business Standard, [Maha approves 660 MW coal-based units at Koradi power station](#), 5 March 2019.

²⁷ Times of India, [New power units in Koradi against old ones in Nashik, Parli](#), 14 September 2019.

²⁸ Huffington Post, [Life in Grey-Scale: What Life is Like When You're Sandwiched Between Two Coal Plants](#), 10 September 2019.

²⁹ Indian Express, [India biggest emitter of sulphur dioxide: report using NASA data](#), 20 August 2019.

³⁰ Times of India, [Analysis reveals 10 kids under 5 may die annually after 2 units are added to Koradi power plant](#), 15 July 2019.

³¹ Times of India, [8 yrs after green nod, Koradi plant to get SO2 control units](#), 16 May 2019.

³² Times of India, [HC notice to MSMC over 'fixed' coal washery tender](#), 10 September 2019.

Koradi Expansion Is a Stranded Asset

The Ministry of Environment, Forest and Climate Change (MoEFCC) refused to initiate an environmental clearance process for the Koradi plant expansion due to the very high level of localised pollution.³³ The proposal is still awaiting clearance from the ministry.

In addition to air pollution concerns and strong local opposition, the planned expansion is faced with other headwinds.

The 1,320MW of new Koradi capacity will replace existing units soon to be shut with a total capacity of 1,250MW. Mahagenco is increasing coal-fired power capacity despite the fact that the PLF across the coal fleet is less than 54% in the current fiscal year. IEEFA notes there appears to be plenty of additional generation available in the current fleet to meet growing power demand, without the need for new units.

Mahagenco has been identified as a state-owned power generator exposed to the very high costs of transporting domestic coal, along with the state-owned power companies of Gujarat and Rajasthan. Mahagenco will reportedly pay over Rs1,000/t (US\$14/t) to transport coal from its allotted mine in the state of Chhattisgarh to its power stations in Maharashtra, including Koradi.³⁴

**Railing coal over many
hundreds of kilometres
increases the cost
of power generation.**

Railing coal over many hundreds of kilometres increases the cost of power generation. The distance between the Koradi plant and its coal supply further reduces the viability of the proposed extension.

IEEFA notes transporting coal over long distances also exposes the plant to significant logistical issues. In September 2019, monsoon rains affecting coal transportation issues, issues with wet coal, and a subsequent coal shortage, led to reduced power output from the state's coal plants, including those owned by Mahagenco.

According to the most recent coal stocks data from the Central Electricity Authority, a number of Mahagenco coal plants have very low stocks (as at 10 October). The Koradi plant itself has just five days of stock and the nearby Khaparkheda plant just 2 days. Other Mahagenco coal plants with low stocks include Chandrapur (4 days), Nasik (4 days) and Parli (2 days).³⁵

³³ Times of India, [High SO2 emissions create hurdles for Koradi power units](#), 27 June 2019.

³⁴ Business Standard, [State govt-run power firms hit by huge cost of transporting their own coal](#), 14 October 2019.

³⁵ Central Electricity Authority, [Daily Coal Reports](#), 10 October 2019.

IEEFA notes a reliance on coal supplies from hundreds of kilometres away will be a continuous burden on the proposed Koradi extension.

Outcome: Stranded by Air Pollution Concerns

Already burdened by the need to rail-in coal from hundreds of kilometres away at significant expense, the Koradi extension project may become an example of an Indian coal plant proposal stranded by air pollution concerns.

Public concerns about air pollution are rising in India, as in other countries. China is now in its sixth year of its “war on pollution”. In July 2018 it released its 2018-20 Air Pollution Action Plan aimed at reducing smog, including cutting coal consumption.³⁶ The expanded plan now applies to 82 Chinese cities and the major coal producing provinces of Shanxi and Shaanxi.

In South Korea, air pollution concerns are leading directly to accelerated coal plant closures and the reduced utilisation of others.³⁷ In September 2019, the country’s National Climate Change and Air Quality Committee recommended a significant increase in coal-fired power plant closures and called for up to 14 other coal plants to be shut down between December and March each year to address air pollution. The government is expected to fully implement the committee’s proposals.

IEEFA notes concern about air pollution in India is likely to continue to rise and will quickly match the level of disquiet felt by the public and governments in countries such as South Korea, China, and across Europe. As with these nations, further regulation to reduce air pollution is certain to follow. This represents a regulatory and financial risk to any proposed coal-fired power plant in India.

Air pollution represents a regulatory and financial risk to any proposed coal-fired power plant in India.

Koradi’s air pollution problem has been made worse by delays in installing expensive flue gas desulfurization (FGD) equipment to the existing plant, and the fact that washed coal is not available due to corruption issues.

In addition to air pollution, the Koradi case illustrates many of the other issues that come from a reliance on coal for power generation. Koradi’s coal stocks have been lowered due to the impact of the monsoon on coal logistics. Meanwhile the private Nasik coal plant is unable to generate due to land acquisition issues for the rail siding.

IEEFA notes solar and wind energy are now cheaper than coal-fired power in India, especially when coal must be transported hundreds of kilometres at Rs1,000/t. It is

³⁶ Reuters, [China to cut coal use, curb steel in 2018-2020 pollution plan](#), 4 July 2018.

³⁷ Reuters, [More South Korean coal power plant curbs needed to tackle pollution: advisory group](#), 30 September 2019.

highly relevant that air pollution concerns, coal transport delays, rail siding construction, coal washing, and expensive FGD equipment are only issues for coal-fired power, and not for renewable energy projects.

The retiring Mahagenco units that the Koradi expansion is intended to replace are to be closed down progressively between 2020 and 2027.

IEEFA notes given the long-term retirement schedule and the declining cost of renewable energy and battery storage, Mahagenco is missing an opportunity to match the coal plant shutdowns with a progressive buildout of low cost renewable energy over the years to 2027. As well as resulting in lower-cost power generation and the avoidance of coal logistics issues, such a plan would help address air pollution in Maharashtra state.

Mahagenco is missing an opportunity to match coal plant shutdowns with a progressive buildout of low cost renewable energy.

3.3 Lanco's Amarkantak Thermal Power Plant

Lanco Infratech Ltd (Lanco) entered this decade as a leading listed private Indian power generation, property and infrastructure development company. Lanco planned to become a major international thermal coal mining group, claiming coal reserves of 2 billion tonnes.

By March 2014, Lanco had 3,964MW of power generation capacity operational, and another 5,368MW under construction across India, plus conceptual plans for another 6,840MW.

In 2011, Lanco had acquired the gross cashflow loss-making 3-4Mtpa Griffin Coal Mine at Collie in Western Australia for A\$740m (100% debt financed). This acquisition proved to be an unmitigated disaster. Plans to expand it to 15Mtpa never materialised and the mine was put into administration six years later, losing almost all of the capital invested and leaving the ICICI Bank entirely stranded.

During FY2013/14 Lanco entered corporate debt restructuring (CDR), and it remains in this process five years later, with most of its assets yet to be completed and/or massively underperforming their targets.

Overall, Lanco had expanded on multiple fronts concurrently, primarily relying on debt funding for its multiple greenfield project development plans. It became unstuck as capital cost blow-outs, the USD/rupee currency devaluation, and delays impacted across its portfolio.

Lanco's Range of Stranded Thermal Power Plants

Lanco had 4,696MW of mostly thermal power generation capacity notionally operational as of 2013/14. These assets included:

- Kondapalli domestic gas-fired power plant of 1,466MW capacity in Andhra Pradesh, albeit with the 366MW Phase II unit idle from a lack of gas, and the 732MW Phase III unit not formally commissioned, again due to a lack of gas supply;
- Tanjore domestic gas-fired plant of 120MW capacity in Tamil Nadu;
- Amarkantak coal-fired power plant of 600MW capacity in Chhattisgarh (2 units of 300MW each, with one unit idle in 2013/14 due to coal supply and regulatory issues), with plans to build the Amarkantak 3&4 units of a combined 1,320MW of new capacity;
- Anpara domestic coal-fired power plant of 1,200MW capacity in Uttar Pradesh;
- Udipi import coal-fired power plant of 1,200MW capacity in Karnataka;
- A 41MW solar project; and
- Budhil hydroelectric power plant of 70MW capacity in Himachal Pradesh.

Domestic gas supply issues have severely affected Lanco, with 1,466MW of fully built gas plants operating at just 19% in FY2012/13, and then 11% in FY2013/14.

In 2016, Lanco received a government subsidised gas supply sufficient to run the Kondapalli units 2&3 at a 30% load factor medium term. For the combined gas plant, Kondapalli operated on an average of just 17% in FY2016/17.

Amarkantak Coal Power Plant (1,320 MW), Chhattisgarh

At the start of this decade, Lanco commissioned Units 1&2 of the Amarkantak coal-fired power plant in Chhattisgarh, giving total operational capacity of 600MW. Soon after, Lanco announced plans to build Amarkantak's Units 3&4 of a combined 1,320MW of new capacity for commissioning in 2014/15.

In FY2013/14, the 300MW Unit 2 idled due to the suspension of its coal linkage after the PPA to the Haryana discom (HPGCL) was terminated for non-compliance with certain covenants. Litigation was entered into, but the merchant tariff available remained below the marginal cost of operation, so the unit was left idle. The PPA for Unit 2 was terminated in January 2015.

In March 2018, the Amarkantak coal-fired power plant was listed as a stranded asset in the Indian Government's Parliamentary Committee Report on Energy, with total debts of Rs8,782 crore (US\$1.2bn) and equity of Rs1,533 crore (US\$2.3bn), giving a total investment to-date of Rs10,315 crore (US\$1.45bn, or US\$1.1m/MW of

capacity). The power plant is reported to be 85% built, putting it at least two years behind schedule and 20-30% over budget.

Lanco's 1,200MW Anpara C thermal power plant in Uttar Pradesh, the 1,320MW Vidarbha thermal power plant in Maharashtra, and the 1,320MW Babandh thermal power plant in Odisha, were all likewise listed as stranded assets, with a collective Rs28,295 crore (US\$4bn) of additional investment across the three coal plants (Figure 3.3.1). The National Company Law Tribunal (NCLT) has given liquidation orders for Lanco's Odisha's Babandh power plant.³⁸

Figure 3.3.1: Lanco Infratech's Non-Performing Assets

Project	Capacity	State	Debt	Equity	Total
Amarkantak Power Limited	1,320	Chattisgarh	8,782	1,533	10,315
Anpara C	1,200	Uttar Pradesh	3,071	969	4,040
Vidarbha Thermal Power Limited	1,320	Maharashtra	4,762	1,079	5,841
Babandh Power Limited	1,320	Odisha	6,976	1,123	8,099
Total	5,160		23,591	4,704	28,295

Source: 37th Parliamentary Standing Committee's report on Energy.

Lanco's Extreme Financial Leverage

Lanco reported a net loss of US\$380m in 2013/14, almost double its US\$200m loss in 2012/13. A further US\$300m net loss was reported in 2014/15 as the group massively downsized and divested assets. Losses reduced to US\$40m in 2015/16 before rebounding to a loss of US\$337m in 2016/17 (the last year consolidated accounts were available).

Total borrowings reached Rs36,705 crore (US\$6bn) by March 2014, representing financial leverage of 25 times the book value of ordinary equity of just Rs1,458 crore (US\$2bn).

Excessive financial leverage, project construction delays, and the lack of fuel supply security pushed Lanco into a corporate debt restructuring (CDR) program in 2013/14. The major banks involved were ICICI Bank, IDBI Bank, Bank of India, Bank of Baroda and the Punjab National Bank. ICICI Bank had also provided a US\$450m loan against the Griffin Coal mine.

IEEFA notes a key factor for Lanco's financial distress was its debt-funded concurrent expansion in all directions. For example, the group had tried to build the 500MW Lanco Teesta Hydro Power proposal which was due for commissioning in 2015/16 and was reported as half built by March 2014. But a combination of delays in land acquisition, poor geology, and earthquakes (a common, predictable issue with Indian hydro projects) resulted in substantial cost and time overruns, such that

³⁸ ET Energy World, [National Company Law Tribunal orders Liquidation for Babandh](#), 04 December 2019.

the company cancelled the PPA in September 2014. By March 2017, having invested over US\$425m, this hydro facility was reportedly just 52% complete.

A secondary but contributing factor was the ongoing inability of state discoms to fund their own operations. As such, two years into Lanco's debt restructuring, the company was still owed US\$300m by various discoms in March 2016.

The 1,200MW Udupi import coal-fired power plant in Karnataka was divested to Adani Power Ltd in April 2015 for Rs6,300 crore (US\$1.2bn), equating to US\$1.0m/MW of capacity³⁹ as part of the progressive downsizing of the Lanco group.

By March 2017, Lanco's ordinary equity was reported at negative Rs1,035 crore (US\$150m).

Outcome: The Need for an Effective Bankruptcy Process

IEEFA notes Lanco Infratech illustrates the multitude of problems the Indian thermal and hydro power generation sector have faced this past decade.

A far too ambitious expansion program was undertaken, almost entirely funded by financial leverage. Financial problems were compounded by cost overruns, project delays, floods, earthquakes, fuel supply interruptions, PPA contract cancellations, and a lack of accountability for the promotor group.

Lanco illustrates the ongoing problem of Indian banks being unable to assert control of stressed businesses through a much needed bankruptcy process. If this were to occur, potentially viable projects could be written down and on-sold to other business groups with adequate equity capitalisation and expertise to solve compounding issues.

In August 2018, the NCLT ordered the liquidation of Lanco Infratech. This was after the infrastructure firm's committee of creditors rejected a revised resolution plan from Thriveni Earthmovers,⁴⁰ and more than a year after the corporate insolvency resolution process (CIRP) was initiated on application by IDBI Bank.

In September 2019, the NCLT approve Axis Bank to start bankruptcy proceedings against a subsidiary company, Lanco Amarkantak Power, after it defaulted on a loan.⁴¹ Attempts to resolve the default under previous schemes such as corporate debt restructuring had failed for six years.

³⁹ Adani Power Ltd press release, [Adani Power Completes Acquisition Of Lanco Infratechs Udupi Power Plant](#), 20 April 2015.

⁴⁰ Economic Times, [NCLT orders liquidation of Lanco Infratech](#), 28 August 2018.

⁴¹ Economic Times, [NCLT okays start of Lanco Amarkantak bankruptcy process](#), 14 September 2019.

3.4 GVK's Gas and Coal-fired Power Plants

GVK Power & Infrastructure

A decade ago, Dr G.V. Krishna Reddy was head of the promoter group that controlled 54% of GVK Power & Infrastructure (GVK Power), one of India's leading listed infrastructure development conglomerates. Its operations spanned gas, coal and hydro-electricity power generation, toll-roads, and its two crown jewels, the controlling stakes in the Mumbai and Bangalore international airports.

To-date, GVK Power shares have destroyed enormous shareholder wealth, dropping over 90% in the last decade against a more than 40% rise in the Indian stock market.

GVK Power had expanded in too many directions concurrently and rapidly, financed by debt. By March 2011, GVK Power had net debts of Rs6,350 crore (US\$1.5bn at the 2011 currency conversion rate), almost double GVK Power's ordinary equity of Rs3,390 crore (US\$0.48bn).

While not a prohibitive level of financial leverage compared to Indian company norms at that time, GVK Power's financial leverage was unsustainable given the number of greenfield development projects they had undertaken, few of which were providing any operating cashflow to support interest payments of 12-14% annually.

To compound this problem, the promoter made two strategic blunders. GVK Power refinanced in 2010/11 with a group of private equity firms, offering a 5-year term at a prohibitive guaranteed 20% annual cost of capital. Secondly, the GVK family borrowed to acquire a now worthless thermal coal tenement in the Galilee Basin in Queensland, Australia at a record price of US\$1.26bn in 2011, pledging a large part of the assets of the listed GVK Power as collateral (refer below).

GVK Power's Stranded Assets

GVK Power has been in financial distress since 2011. Domestic and international creditors, minority shareholders, and banks have been left carrying the convoluted mess due to an inability to put the group into bankruptcy to resolve the various share ownership pledges, notwithstanding some valuable underlying assets. Significant construction delays have only added to the financial problems.

GVK Power had entered this decade with plans to build 4,270MW of Indian electricity generation assets across the gas, coal and hydro sectors. Despite grand announcements, GVK Power has repeatedly run into coal and gas fuel supply problems, construction delays, financial distress, legal issues, and land access disputes that have collectively derailed the group's viability.

GVK Power shares have destroyed enormous shareholder wealth, dropping more than 90% in the last decade.

By the end of 2014/15, GVK Power only had 1,086MW of capacity operational (25% of announced capacity), and just one unit of all these power projects was generating enough earnings to cover its interest costs.

Gas Power Plants (900 MW), Andhra Pradesh

GVK Power built three gas-fired power plants with a combined capacity of 900MW in Andhra Pradesh: the Jegurupadu Phase I 216MW and Phase II 220MW gas power plant, and the 464MW Gautami plant.

These power plants were operational for three years from 2012-2014. The Jegurupadu Phase I plant was divested in 2015. The other two units have been mostly idle/mothballed due to the non-availability of domestic gas.

Goindwal Sahib Coal-fired Power Plant (1,800 MW), Punjab

In February 2011, GVK Power announced plans to develop the Goindwal Sahib Phase II 1,320MW coal-fired power plant in the Tarn Taran District of Punjab, but this was never built. GVK Power had aimed to expand on the existing 540MW (270MW x 2) Phase I subcritical coal-fired power plant, despite massive ongoing coal supply problems.

GVK Power built Phase I at a then cost of US\$725m (Rs3,200 crore). The plant was commissioned in early 2016 after three years of delays due to the inability to access domestic coal supply.

With a carrying value at Rs3,966 crore (US\$0.55bn) as of 2019 (after depreciation, this is still up 25% on the original development cost projection), the lenders have classified the project as a non-performing asset due to the subsidiary being in default of dues, while the operating rate of the plant in recent years is an entirely suboptimal 40-48% PLF.

**The lenders have
classified the project as
a non-performing asset.**

GVK Power was allocated a proposed 3Mtpa coal supply from two coal mines at Tokisud and Seregarha, Jharkhand, by the central government in May 2014. However, these private captive mine allocations were cancelled in August 2015 by the High Court as part of the wider 'Coalgate' scandal originating in 2012.

GVK Power is claiming force majeure and has resorted to sourcing imported coal from South Africa after trying to buy domestic Indian sourced coal from e-auctions. GVK has also claimed a tariff uplift associated with the need to use expensive imported coal, but this petition against the Punjab State Electricity Regulatory Commission is disputed and held up in the courts.

Hydroelectric Projects

GVK Power partly developed the 810MW Ratle Hydroelectric Project in Jammu and Kashmir, with a total expected cost of Rs5,368 crore (US\$1.9bn) in 2011, but never completed the project (as of 2019). The Goriganga 370MW hydro development in Uttarakhand was announced in 2011 but divested without any progress in 2018. The 330MW Alaknanda hydro facility for Uttarakhand was commissioned in 2015 at a prohibitive US\$1bn cost, three years behind schedule.

Promoter Pledges

In September 2011, the GVK family acquired a huge but isolated coal tenement in the Galilee Basin in Queensland, Australia at a record price of US\$1.26bn.⁴² Dr G.V. Krishna Reddy's family borrowed 100% of the funds required and deferred a significant part of the purchase payment, while at the same time pledging a large part of the listed GVK Power's assets as collateral. The Galilee coal tenements were entirely undeveloped and GVK Power had no employees in Australia. IEEFA would view this asset as nearly worthless⁴³ before considering that Axis Bank is understood to be owed over a US\$1bn, while another US\$750m final payment is still owed to the original vendor, Hancock Prospecting.

Despite the ongoing financial distress of GVK Power, and the pledging of assets in a public listed entity to secure loans which were 90% to the benefit of the private family entity, the promoter remained at the helm of GVK Power until his [retirement](#) at the age of 81 years on 31 March 2019.

IEEFA notes this case study illustrates the need for substantially improved minority interest protection, and corporate governance, to ensure clear accountability of promoter groups when running listed Indian companies. Further, the RBI needs to be given greater powers in non-performing asset resolution, including functioning bankruptcy laws.

**The Reserve Bank of India
needs to be given greater
powers in non-performing
asset resolution.**

3.5 KWPCl's Korba West Thermal Power Plant

Korba West Thermal Power Plant is a 600MW subcritical technology-based coal-fired plant in Chhattisgarh, India, originally owned by Avantha Power Limited through the special purpose vehicle, Korba West Power Company Limited (KWPCl).

The plant reportedly had a memorandum of understanding signed with the government of Chhattisgarh for 35% of total power offtake to the state, 30% on a

⁴² GVK Hancock Coal, [GVK acquires Hancock Coal in Australia](#), 16 September 2011.

⁴³ Half of the nearby [South Galilee Coal Project](#) deposit was purchased in 2019 at a price understood to be US\$0.4m.

cost plus basis and 5% on a variable cost basis.⁴⁴ A formal PPA had not been signed between the state and KWPCCL for the above mentioned 35%, and there is no clarity about the remaining 65% of power offtake.

The plant had received initial approvals for three additional units—one of 600MW and two of 800MW. Avantha Power received environmental clearances in 2010 for the first 600MW unit, and the plant had a fuel supply agreement of 2.7 million tonnes per annum (MTPA) from South Eastern Coalfields (SECL), 140km from the plant location.⁴⁵

Korba West Is a Stranded Asset

In March 2018, the Parliamentary Standing Committee on Energy identified 34 power plants as non-performing assets. Korba West was one of those with a total stranded value of Rs4,929 crore (US\$0.62bn), of which Rs3,099 crore (US\$0.43bn) was debt and Rs1,830 crore (US\$0.25bn) equity.⁴⁶

With the power plant being declared a non performing asset, the plant's expansion plans appear shelved.

Despite being declared fully commissioned in March 2014, a report by the Central Electricity Authority stated the plant was not yet stabilised, meaning commercial operations had yet to commence.

Outcome: An Asset Changing Ownership but Still a Stressed Asset

In March 2015, Adani Power Ltd began its long-running attempt to acquire the Korba West Power Company (KWPCCL), which is still unresolved today.

With no PPA and unstable operation, Adani Power's interest in Korba West was strategic due to its location in the 'coal belt' of central western India. It planned to participate in future auctions of coal mining blocks in the region, allowing the company to vertically integrate power production with its own coal mining.

Reportedly, Adani Power pegged the value of KWPCCL in excess of Rs4,200 crore (US\$0.58bn) at the time. Adani Power executed a share purchase agreement to acquire a 100% stake in KWPCCL, paying advance consideration of Rs775 crore (US\$101m).⁴⁷

IEEFA found discrepancies in Adani Power's disclosure on transactions in its annual accounts from FY2014/15 to FY2017/18. The independent auditor's report on APL's annual accounts FY2017/18 cited a 'material weakness' in Adani Power's

⁴⁴ Asia Power, [India's Adani Power to acquire Korba West Power](#), 10 December 2014.

⁴⁵ Ibid.

⁴⁶ Standing Committee on Energy, [Stranded/Non-performing Assets in Electricity Sector](#), March 2018.

⁴⁷ Adani Power Ltd, [Annual report FY2015/16](#).

financial reporting on transactions related to KPWCL.⁴⁸

Before the transfer of funds could take place, the plant's operation was suspended due to technical failures in its generators, which led to a dispute with the original equipment supplier.

**Before the transfer of funds
could take place, the plant's
operation was suspended
due to technical failures
in its generators.**

Meanwhile, the execution of Adani Power's share purchase agreement was delayed. This was due to the pending resolution of disputes around the share purchase agreement and again, pending restructuring of the loans by the lenders.

Due to a lack of proficiency in commercial operations, KPWCL was unable to service the debt and lenders decided to restructure part of its debt position into equity, taking a 51% stake in the plant.

In 2015, Adani Power was offered a 49% stake and operational control of the power plant, which they accepted. With KWPCCL heading into the National Company Law Tribunal (NCLT) for bankruptcy proceedings, Adani Power, as part owner, was not able to participate in the bidding process. Ironically, after having tried to buy KWPCCL, Adani Power was now precluded from acquiring a 100% equity stake in the asset until after resolution of the proceedings.

By March 2018, Adani Power had paid Rs775 crore (US\$101m) as advance consideration for 100% of its equity, and loaned Rs1,628 crore as an intercorporate deposit, but was still no closer in gaining control of the power plant.

To overcome the complexity of the acquisition, Adani Power had notionally sold its 49% of shares to a third party for Rs240 crore (US\$33m), taking a loss of Rs139 crore (US\$19m) on its initial payment of Rs775 crore (US\$101m) for KWPCCL's 100% equity. (It is not clear whether the payment of Rs775 crore (US\$101m) gained Adani Power the equity value it wanted.)

In September 2019, the Ahmedabad (Gujarat) bench of NCLT approved a resolution plan from a committee of creditors led by Adani Power, which was also an unsecured creditor to KWPCCL and to Axis Bank. Adani Power held the maximum voting share of 37% in the resolution committee of creditors, while Axis Bank had a 7% share. The new resolution plan was approved by a 68% majority of voters on the committee.⁴⁹

The resolution plan directed the unsecured financial creditors to receive their entire claim, while secured creditors received a 'haircut' of 67% on their claim (refer to

⁴⁸ Adani Power Ltd, [Annual report FY20117/18, Annexure 2 to the Independent Auditor's report](#), Page 97.

⁴⁹ Business Standard, [IBC proceeding: Adani Power to get entire claim for Korba project](#), 5 September 2019.

Figure 3.5.1) IEEFA notes that on face value, the plan seems entirely contradictory; a secured creditor should rank ahead of an unsecured creditor in any normal situation.

With its intercorporate deposit of Rs1,685 crore (US\$230m) for an unsecured creditor position, Adani Power received its entire claim. Secured financial creditors received just Rs1,100 crore (US\$150m) against their total claim of Rs3,346 crore (US\$466m).

Figure 3.5.1: Haircut for Lenders Under the New Resolution Plan

Haircut for Lenders of KWPCCL Under the Resolution Plan					
(Rs Crore)	Claims	% of Total	Receivable	Haircut	
Secured loans (banking syndicate)	3,346	67%	1,100	67%	
Unsecured loans (Adani Power)	1,685	33%	1,685	0%	
	5,031	100%	2,785	45%	

Source: Business Standard.

Adani Power agreed to make an upfront cash payment of Rs100 crore (US\$13m) to secured financial creditors on a pro-rata basis.

Additionally, the company planned to invest Rs594 crore (US\$82m) to meet capital expenditure requirements of the Korba West plant to replace faulty equipment. As the new owner, Adani Power also bears the additional capital expenditure of Rs480 crore towards environmental compliance upgrades.

As of November 2019, Korba West Power Plant was still not operational.

As of November 2019, Korba West was still not operational.

Adani Power's total bid in the new resolution plan is not known, although the liquidation value of the plant - the total value of physical assets if it were to go out of business and the assets sold - is estimated at Rs1,454 crore (US\$2bn).

Figure 3.5.2: New Resolution Plan and Estimated Value Loss

Estimated Enterprise Value of the Asset				
			Residual value	
Total investment incl. capex	6,105.0	Crore	3,859.0	63%
Total investment incl. capex	61,050.0	Rs Million	38,590.0	
Capacity	600.0	MW	600.0	
	101.8	Rs Million / MW	64.3	
Forex rate	71.0		71.0	
Value per MW	1.4	US\$m/MW	0.9	
		Loss	2,246	Rs Crore
			22,460	Rs Million
			316	US\$m

Source: Business Standard, APL's annual reports, IEEFA estimates.

Adani mining, a subsidiary of the Adani group, now co-owns a coal mining block with the government of Rajasthan in Parsa Kante. It has 15Mtpa capacity and an estimated 5.5 billion tonnes of reserve in Chhattisgarh, located around 300km from the Korba West power plant. The company plans to source coal from Parsa Kante for the Korba West power plant.

IEEFA estimates the enterprise value of the asset at Rs6,105 crore (US\$0.86bn), including additional capital expenditure required of Rs1,074 crore (US\$0.14bn), and total debt of Rs5,031 crore (US\$0.71bn) (refer to Figure 3.5.2). Against 600MW of capacity, this translates into an asset value of US\$1.4m/MW. After the secured lenders have taken a massive 67% 'haircut' on its total lending of Rs3,346 crore (US\$0.46bn), Adani Power is paying full price of US\$0.9m/MW as per current going cost for an outdated subcritical technology-based thermal power plant.

Due to discrepancies in Adani Power's disclosure on transactions, especially regarding the equity buy-out in FY2014/15, it is hard to estimate the company's loss of value on equity write-down. The asset has incurred massive losses due to being idle for almost five years, and for non-payment of interest. On top of that, Adani Power's shareholders have incurred a further likely value loss on their holdings from paying US\$1.4m/MW of capacity, 40% or more higher than the replacement value.

The stranded finances have caused an unprecedented liquidity crunch in the Indian economy.

Without knowledge about Adani Power's final bidding price for KWPCCL, it seems

secured lenders are getting a poorer deal. Although Adani Power have incurred losses on equity value from being the promoter since FY2014/15, including the potential return on equity and interest on lending, it will theoretically have a better chance to recover its losses in the new resolution plan.

IEEFA notes an efficient resolution process, or bankruptcy of non-performing assets, must ensure appropriate balancing of risks where promoters and lenders both bear fair costs of the risks.

Stranded finances have caused an unprecedented liquidity crunch in the Indian economy, choking up further investments in infrastructure and impacting economic growth. In all, IEEFA acknowledges there has been progress in resolving issues affecting Korba West. The resolution freed up stranded bank capital, which can now be potentially recycled into newer infrastructure lending.

3.6 Tata Power's Mundra Power Plant

Tata Power is India's largest private integrated power company with a presence in electricity generation, transmission and distribution. The company also has businesses in electric vehicle (EV) charging infrastructure, solar photovoltaic manufacturing, and is India's largest installer of rooftop solar.

Like other Indian power generators, Tata Power has historically been dependent on coal-fired power generation. The company has 7.7GW of thermal power in total, with more than half represented by just one coal-fired power plant at Mundra, Gujarat.

Tata Power's subsidiary, Coastal Gujarat Power Ltd (CGPL), operates a 4,150MW coal-fired power plant at Mundra, Gujarat (net generation capacity is 3,800MW after deducting auxiliary power consumption requirements). The plant is fuelled by imported coal and it has PPAs with state discoms of five Indian states: Gujarat, Maharashtra, Haryana, Rajasthan and Punjab.

The power plant's five supercritical units were commissioned during 2012 and 2013 with funding from the Export-Import Bank of Korea, the Asian Development Bank, and the International Finance Corporation (IFC), the private-sector arm of the World Bank. Two further units were planned but have been cancelled. Since then, the IFC's approach has changed; it now focuses on the expansion of renewable energy in India and no longer finances coal-fired power plants.⁵⁰

In February 2019, a landmark judgement was handed down by the U.S. Supreme Court. Local farmers and fisherman took the IFC to court over environmental damage caused by the Mundra plant. The Supreme Court ruled international organisations like the World Bank Group can be sued in U.S. Courts. The case has returned to lower courts for litigation.⁵¹

⁵⁰ IEEFA, [Every two weeks a bank, insurer or lender announces new coal restrictions](#), 26 February 2019.

⁵¹ Reuters, [U.S. Supreme Court revives Indian power plant lawsuit](#), 28 February 2019.

Mundra Is a Stranded Asset

The Mundra plant is financially unviable based on its originally tendered tariffs. It has incurred significant continuous financial losses due to higher-than-expected prices for imported coal combined unhedged currency depreciation. By the end of FY2018-19, Coastal Gujarat Power had incurred total retained losses in excess of US\$-1.5bn.⁵²

The Mundra plant is financially unviable.

Further increases in the cost of imported US\$ coal saw Coastal Gujarat Power's coal increase to Rs2.74/kWh per unit sold—higher than the lowest renewable energy tariffs in India. With operational revenue per kWh at only Rs2.85/kWh and other expenses of US\$76m, Coastal Gujarat Power made another loss before interest, depreciation and amortisation in FY2018-19. (see Figure 3.6.1)

To combat continual, significant losses at Tata's Mundra power plant, the proponent imported a higher proportion of lower energy coal in an attempt to reduce fuel costs. The proportion of lower energy coal used at Mundra increased from 20% in FY2017-18 to 42% in FY2018-19.⁵³

The promoter's excessively aggressive decision to tender an unrealistic price for the US\$4bn project caused this plant to become a stranded asset. Additionally, the proponent built an import coal dependent power plant, but then failed to hedge against the known risk of currency devaluations.

The proponent also assumed it could successfully vertically integrate the Mundra project with the development of an Indonesian export coal mine. The landed cost of fuel rose dramatically against Tata's expectations when the Indonesian government benchmarked coal export prices against international prices, with a full 13% royalty applied to the market price.

⁵² Coastal Gujarat Power Ltd, [Annual Report FY2018-19](#).

⁵³ Tata Power, [Analyst Presentation Q4 FY19](#), 2 May 2019.

**Figure 3.6.1: Coastal Gujarat Power Ltd Profit and Loss FY2018-19
& FY2017-18**

	Rs millions	Rs millions	US\$ millions	US\$ millions
	FY2018-19	FY2017-18	FY2018-19	FY2017-18
Revenue from Power Supply	66,070	58,432	926	819
Other Revenue from Operations	4,574	4,278	64	60
Other Income	725	285	10	4
Total Income	71,369	62,995	1,000	883
Cost of Fuel	(67,902)	(59,835)	(952)	(839)
Other Expenses	(5,403)	(4,721)	(76)	(66)
EBITDA	(1,936)	(1,561)	(27)	(22)
Finance Costs	(10,121)	(8,500)	(142)	(119)
Depreciation & Amortisation Expenses	(4,481)	(4,661)	(63)	(65)
Impairments	-	(3,109)	-	(44)
Loss Before Tax	(16,538)	(17,831)	(232)	(250)
Total Comprehensive Loss for the Period	(16,530)	(17,815)	(232)	(250)
Generation Sales (Million kWh)	24,752	24,599	24,752	24,599
Fuel Cost/kWh	(2.74)	(2.43)	(0.038)	(0.034)
Operational revenue/kWh	2.85	2.55	0.040	0.036

Source: Coastal Gujarat Power Ltd Annual Report FY2018-19, Tata Power Ltd Annual Report FY2018-19.

Unsellable Asset, Bailed out by Government, Asset Still Unviable

Coastal Gujarat Power applied to India's Central Electricity Regulatory Commission (CERC) for compensatory tariffs that allowed pass-through of the higher coal cost. This was initially granted, but then challenged by state discoms with PPAs covering Coastal Gujarat Power's output.

In 2017, the Indian Supreme Court effectively disallowed the compensatory tariffs, placing Coastal Gujarat Power and two other Mundra power plants fuelled by imported coal—owned by Adani Power and Essar Power—into extreme financial distress.

Following this, Tata Power offered to sell 51% of Coastal Gujarat Power's equity to its PPA off-takers, in particular Gujarat's state discom, for a single rupee in return for agreeing to pay a higher rate for the power produced. The company noted that, with Coastal Gujarat Power's financial situation worsening, it was now in a "critical situation."⁵⁴ Adani Power made a similar offer for its 4.6GW Mundra power plant.

**Tata Power offered to sell
51% of its subsidiary's equity
for a single rupee.**

Tata Power and Adani Power failed in their attempts to offload 51% stakes in their Mundra plants for one rupee each. The prospect of a highly favourable central government-led bailout attempt seemed likely, which would allow pass-through of coal costs onto consumers.

In April 2019, CERC officially approved a tariff uplift for PPAs covering 2,000MW of Adani Power's Mundra plant, setting a precedent for the rest of the Mundra coal-fired power capacity of Adani Power, Tata Power and Essar Power. In addition to the tariff lift, Adani is to share profits from its Indonesian coal mining operation.⁵⁵

Although highly favourable to the plant owners, whilst placing an additional 30-year burden on consumers, the bailout was not enough to make Tata Power's Mundra plant viable. Tata Power's Managing Director Praveer Sinha stated the PPA uplifts would only halve Coastal Gujarat Power's losses from the current level of US\$-225m to US\$-240m per year.⁵⁶ The tariff increase was reported at between Rs0.3/kWh⁵⁷ and Rs0.4/kWh.⁵⁸ Even using the higher figure, the tariff hike would only increase FY2018-19 revenue by Rs9,901m (US\$139m) based on the 24,752 million kWh sold that year (Figure 3.6.1), resulting in a loss of US\$93m.

Tata's Mundra plant demonstrates that it is not only proposed, or under construction coal plants, that are stranded in India. The Mundra plant has been operational for years but will remain unprofitable. It remains a heavy financial burden on Tata Power, even after the bailout supported by Indian consumers and banks, and despite the fact that Tata Power owns coal mining operations in Indonesia that are meant to hedge coal cost fluctuations (judging by CERC's new

⁵⁴ Nikkei Asian Review, [Tata Power offers to sell western India plant for 1 rupee in salvage attempt](#), 23 June 2017.

⁵⁵ ET Energyworld, [Fuel cost pass-through for Adani plant positive sign for imported coal-based IPPs](#), 15 April 2019.

⁵⁶ Economic Times, [After tariff relief, our Mundra losses would come down by 50%: Praveer Sinha](#), Tata Power, 6 December 2018.

⁵⁷ Economic Times, [CERC's Adani order has set precedent for Mundra tariff hike: Tata Power](#), 16 April 2019.

⁵⁸ Financial Express, [SC relief for Gujarat power plants: CERC may consider PPA revision only after all five states seek it](#), 4 December 2018.

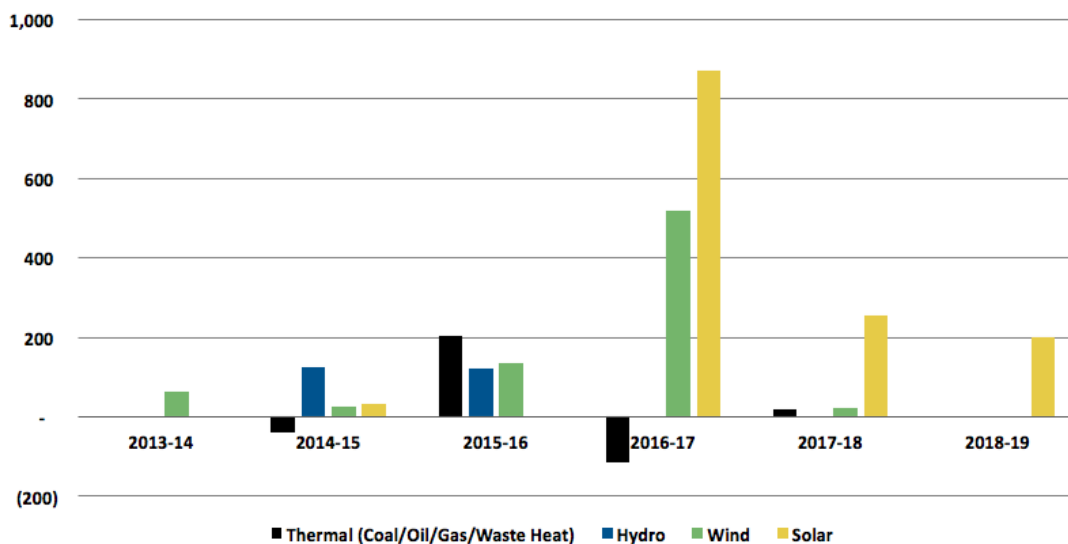
agreement with Adani Mundra, Tata Power will be required to share profits from its coal mining operations as part of any tariff raise agreement).

Outcome: Tata Power Abandons New Coal Plants

Prior to the commissioning of the Mundra power plant in 2013 and subsequent heavy financial losses, the company had planned other new coal-fired power plants, including some to be fuelled by imported coal. However, those plans are no more. Since 2010, more than 13GW of Tata Power’s planned new coal-fired power plants have been cancelled or shelved. Tata Power has abandoned plans for new coal plants.

Since the end of FY2012-13, Tata Power has only added 68MW of thermal power (after taking decommissioning into account) but has added more than 2,000MW of wind and solar power, as well as 246MW of hydro power. Tata Power acquired Welspun Energy’s renewable portfolio of over 1GW in 2016. In total, non-thermal power additions make up 97% of all additions over this period. (See Figure 3.6.2)

Figure 3.6.2: Tata Power Net Capacity Additions Since FY2012-13 (MW)



Source: Tata Power.

Tata Power’s longer-term growth plan sees 40-50% of the company’s generation capacity coming from non-fossil fuel sources by 2025 (up from 30% currently). Assuming 50% is achieved, this means that 70% of new capacity will come from solar, wind and hydro.

Although Tata Power is intending to add some thermal capacity during the period to 2025, it is intending to do this via acquisition of existing plants at fire-sale prices, rather than constructing new ones. At a recent Coaltrans India conference in New Delhi, Rajit Desai—Tata Power’s head of engineering, procurement and construction (EPC)—confirmed the company was not seeking to develop any new greenfield coal-

fired power plants going forward.⁵⁹

The fact that a power utility as large and influential as Tata Power has turned away from building new coal-fired power plants is a telling moment in India's energy transition.

3.7 CTNPL's Cheyyur Ultra Mega Power Plant

Plant Cheyyur is a proposed 4,000MW supercritical, import coal-fired power station and associated coal import jetty for the town of Cheyyur Taluk, of Kancheepuram District in Tamil Nadu. The proponent, Coastal Tamil Nadu Power Limited (CTNPL), is a special purpose vehicle of the government-owned Power Finance Corp (PFC).

The first public hearing for the Cheyyur plant was held in May 2010, and included significant public protest over environmental damage, loss of livelihoods (given the proposed site is fertile agricultural land), and water risks.

Disregarding community concerns, the proponent received environmental clearance on 30 September 2013. Since then, the project's capital cost estimate has risen by two-thirds from the original estimate, with the latest (2016) proposal sitting at Rs24,200 crore (US\$4bn) for plant and accompanying infrastructure.⁶⁰

Today, the Cheyyur proposal remains notionally on governments books as a project in planning, despite zero progress.

Cheyyur Plant Is a Stranded Asset

The Cheyyur plant is one of 16 ultra-mega power plants (UMPP) proposed back in 2008. At that time, large scale coal-fired power was considered one of India's better commercial options, predicated on low import coal prices and unrealistically low capital construction costs.

Only two ultra-mega power plants have been built and both are stranded assets.

Only two ultra-mega power plants have since been built (Reliance Power's Sasan and Tata Power's Mundra), and both are stranded assets.

Early Delays: May 2014 Request for Qualification

In May 2014, Coastal Tamil Nadu Power accepted seven proposals for development of the plant in response to its request for qualification (RFQ). During the ensuing months, a group of the applicants wrote to CTNPL requesting changes to the RFQ in order to provide a more predictable operating environment.

⁵⁹ Reuters, *Coal going from winner to loser in India's energy future*: Russell, 20 February 2019.

⁶⁰ IEEFA Report: *India Clings to Questionable Ultra Mega Power Plant Plans*, 3 August 2016.

In December 2014, it was reported that CTNPL received only one bid for the next phase of the program, from public sector enterprise NTPC. This stalled the process because under the terms of reference, multiple private sector bids were required to establish a true market price.

In January 2015, CTNPL officials announced the bid process was terminated. At various times since then the proposal has been revisited, while land acquisition disputes and legal proceedings are continuing.⁶¹

In March 2016, the Indian government announced plans to out-bid three UMPPs: Cheyyur in Tamil Nadu, Bedabahal in Odisha, and Banka in Bihar.

According to India's proposed Electricity Plan 2017-2022, fresh bids on the three UMPPs will be issued after the standard bidding documents have been finalised by the expert committee.⁶²

In December 2018, Power Finance Corp submitted an online application to the India Ministry of Environment, Forests and Climate Change (MoEFCC), changing its source of coal from imported to domestic non-mine mouth coal. This was consistent with a representation to this effect made a year earlier by the Energy Minister.

April 2019: Plant Cheyyur Still Stalled

In April 2019, the government stalled the establishment of a captive port for the proposed Cheyyur project.

Earlier in February, the Environment Ministry had denied clearance for the Cheyyur UMPP after the fuel source was changed from 10-12Mtpa of imported coal to 18-20Mtpa of lower energy content domestic coal (to be railed, then coastal barged a combined 1,500km from North East India). The greater scale of coal use meant the land use requirement had nearly doubled to 2,000 acres.

CTNPL has been directed to reapply for clearances, including conducting an environmental impact assessment and holding public hearings once again.⁶³

A Rs5-6/kWh Tariff is Required

In 2015, IEEFA modelled the likely cost of electricity from the import coal-based Cheyyur plant at a year 1 tariff of Rs4.90/kWh in 2021, rising to a levelized cost of electricity of Rs5.95/kWh over the life of the project.⁶⁴ This showed the presumption of an 80% PLF was unrealistic.

⁶¹ CAG, [Cheyyur Ultra Mega Power Plant - A Site Visit Report](#), 23 April 2018.

⁶² The Telegraph, [Energiser for mega power projects](#), 1 March 2016.

⁶³ The Indian Express, [Centre stalls captive port for Ultra Mega Thermal Power Project near Cheyyur in Tamil Nadu](#), 11 April 2019.

⁶⁴ [Cheyyur UMPP: Financial Plan Will Make Electricity Unaffordable](#), 20 May 2015.

IEEFA notes that in the four years since that modelling was undertaken, the average coal-fired power plant in India has operated at less than 60% PLF. The assumed cost of debt financing at 12.5% per annum would have decreased somewhat since, however the availability of finance for new coal-fired power projects has also become increasingly constrained.

**The average coal-fired
power plant in India
operates at less than
60% capacity.**

In our modelling, IEEFA also assumed the cost of imported 5,000kcal thermal coal (free on board) at US\$65/tonne, converted at an assumed US\$ exchange rate of Rs62/US\$. The internationally traded coal price is some 20% lower today, but the exchange rate is 10% lower, offsetting half of this. As such, assuming an average 60% PLF and using current borrowing costs, exchange rates and coal prices, Cheyyur's required tariff would be Rs5-6/kWh, with ongoing fuel cost escalations over the life of the project.

In contrast, Tamil Nadu has consistently awarded wind and solar tenders at below Rs3/kWh over the last three years, which have been half the modelled price required for the Cheyyur proposal, with zero price indexation over the 25-year contract life.

3.8 Adani's Godda Thermal Power Plant



Adani Power Ltd is India's largest private thermal power producer. Unlike its peer Tata Power Ltd, which owns growing renewable energy capacity, Adani Power generates power almost entirely from coal-fired power plants. The great majority of the Adani Group's renewable energy capacity is owned by the separate listed entity Adani Green Energy Ltd.

Adani Power currently has 11.8GW of operational coal-fired power plants. Its 4.6GW Mundra plant, like Tata Power's Mundra coal plant, has been making significant losses and has never covered its cost of capital due to the higher-than-expected cost of imported coal and the associated currency devaluation. This has placed doubt on the viability of Adani's proposed Carmichael coal mine project in Queensland, Australia, which was planned to produce coal for consumption at Adani Power's Mundra plant.

Adani Power's 1.6GW Godda coal-fired power project, currently under development, will also use imported coal. The Godda project is 700km from the nearest coal port, and is located in the coal mining state of Jharkhand, home to the largest coal reserves in India. Originally planned using domestic coal, which is only available to fuel plants producing power for Indian consumption, Godda, as now configured, is another attempt to make the Australian Carmichael thermal coal project viable by providing another off-taker for the mine.

Power from the Godda plant is to be transmitted to Bangladesh via a 100km 400 kV DC transmission line. Jharkhand government policy requires any power project located in the state that transmits power externally to reserve 25% of the power generated for local consumption.⁶⁵

Coal will be imported to the port of Dhamra, Odisha (owned by sister company Adani Ports and SEZ) and then railed 700km to the plant. Adani Power's other coal plants that are also fuelled by imported coal are located on the coast close to ports.

Is Adani's Godda Power Project a Stranded Asset?

Under any normal circumstances, a proposal to build an imported coal-fired power plant in a key coal region of India, 700km from the nearest port, in an era of increasingly cheap renewable energy, would be stranded before it commenced construction.

In the case of Adani's Godda project, the power plant that was stranded before it began has been made viable by a series of subsidies and special treatment not shown to other power proposals.

Land acquisition is often a long and complicated process holding up any power investment in India, regardless of the technology being used. Adani's Godda project was greatly assisted by the Jharkhand government's wielding of a new law on land acquisition that allegedly undermined numerous public interest protections.⁶⁶

⁶⁵ Scroll, [In final days of Modi government, Adani project in Jharkhand becomes India's first power sector SEZ](#), 25 March 2019.

⁶⁶ Bloomberg Quint, [Jharkhand Villagers Sue Adani Group Alleging Illegal Land Acquisition For Power Plant](#), 13 February 2019.

Water access represents a significant and growing financial risk for Indian coal-fired power plants, as it can significantly impact a plant's ability to generate power.⁶⁷ In the case of Adani Power's Godda plant, the project was allowed to change the plant's water source after environmental approval had been given. Instead of taking water from the Chir River as stated in the project's environmental impact statement, the plant now proposes to take water from the Ganga.

Water access represents a significant and growing financial risk for Indian coal-fired power plants.

The question of how a heavily indebted and loss-making company like Adani Power could finance the US\$2bn⁶⁸ Godda project has also been resolved via generous loans from state-owned financial institutions. The Power Finance Corporation and the Rural Electrification Corporation are reportedly set to loan Adani US\$1.4bn.⁶⁹ Such large loans are likely the only loans currently being made to private sector coal power projects given the high level of financial stress in India's thermal power sector.

Jharkhand is one of the states most impacted by stressed coal-fired power assets currently seizing up India's banking sector.⁷⁰

Adani Power applied for the Godda project to be declared a special economic zone (SEZ) in order for it to access benefits, including import duty and tax exemptions. This proposal was rejected in February 2018 as it "was inconsistent with the sectorial guidelines".⁷¹ However 12 months later, the central government amended the SEZ guidelines for power projects, which allowed Godda to become India's only standalone power project to receive SEZ status. As a declared SEZ, Godda will avoid having to pay duty on imported coal and the clean energy cess, amongst numerous other financial benefits.⁷² The new SEZ guidelines require 100% of electricity generated at Godda to be exported, which now calls into question whether Jharkhand will benefit from the 25% of generation reserved for local consumption.

The Godda project is also made viable by a very generous cost + PPA with the Bangladesh Power Development Board. Although not publicly disclosed, it is known that under the terms of the PPA, Adani Power can pass on the full cost of importing

⁶⁷ IEEFA, [Major water shortages and other stressors raise risks for India's coal sector](#), 3 September 2019.

⁶⁸ Adani Power, [Investor Presentation](#), September 2019.

⁶⁹ The Hindu BusinessLine, [Adani Power seeks Rs.10,000 crore loan from REC, PFC for Godda plant; to export power to Bangladesh](#), 14 January 2019.

⁷⁰ IEEFA, [The economics and politics of rising non-performing assets](#), 27 August 2019.

⁷¹ Economic Times, [Adani Power's proposal for setting up SEZ in Jharkhand rejected](#), 11 February 2018.

⁷² Scroll, [In final days of Modi government, Adani project in Jharkhand becomes India's first power sector SEZ](#), 25 March 2019.

and transporting coal. This cost would otherwise make the project unviable—the additional cost will instead be borne by Bangladesh consumers.

Bangladesh needs new power generation sources to meet growing electricity demand and to replace expensive oil and diesel-fired generation. Its supply of domestic gas is also falling. The country's response has been to plan a large fleet of new coal plants fuelled by imported coal. The expense of the power produced by these plants mean Bangladesh is currently missing out on the lowest-cost form of power generation in South Asia (wind and solar). Given coal for the Godda plant has to be imported and then railed 700km, power from this source is likely to be even more expensive.

**Adani Power can pass on
the full cost of importing
and transporting coal
to Bangladesh consumers.**

There are growing concerns that Bangladesh is planning to build too much coal-fired power capacity. Bangladesh Power Development Board has reportedly halted approvals for new plants.⁷³ This calls into question the need for Bangladesh to import expensive coal-fired power from India.

Outcome: A Stranded Asset Made Viable by Subsidies and Special Treatment

Despite being sold as a project for the benefit of Bangladesh, the conversion of the proposal from one that would use domestic coal to one that would use imported coal with the generated power exported, demonstrates that the Godda power plant is designed - to a large extent - to support and justify Adani's Australian Carmichael coal mine project. It is clearly devised in Adani's own interest at the expense of Bangladesh and Jharkhand - which will wear all the air pollution and agricultural land loss while receiving little or none of the power - and Indian taxpayers who are subsidising the plant's construction.

Any project can be made viable if given enough government and taxpayer help, regardless of how nonsensical the project appears on paper. Adani's Godda project demonstrates just how much favour via subsidies and special treatment is required to make such coal projects viable in India's growing renewable energy era.

3.9 RattanIndia's Nasik Sinnar Thermal Power Plant

RattanIndia group, formerly named India Bulls Power, is one of the larger players in private generation in India. Rattan India Power Limited (formerly known as

⁷³ ChinaDialogue, [Bangladesh may suspend new power plant approvals](#), 11 September 2019.

Indiabulls Power Ltd.), along with its subsidiaries (together referred to as the 'Group'), is principally engaged in the business of power generation, distribution, trading and transmission, and other ancillary and incidental activities.

RattanIndia Power Limited has coal-based thermal power projects at Amravati and Nasik in Maharashtra (2,700MW each). Phase I of the Amravati power plant with total installed capacity of 1,350MW is fully operational, while Phase I of the Nasik power plant with generation capacity of 1,350MW has been commissioned.⁷⁴

Nasik (Sinnar) Thermal Power Plant (2,700 MW), Maharashtra

RattanIndia Power Limited's subsidiary, RattanIndia Nasik Power Ltd. (formerly known as Indiabulls Realtech Ltd.), is funded by a consortium of banks, with Power Finance Corporation (PFC), the Union Bank of India and Axis Bank as the primary lenders.

The company's coal-based thermal power project is located in Sinnar in Nashik district, Maharashtra. It has 2,700MW capacity in two phases (at 1,350MW each). Each phase comprises five units of outdated sub-critical technology units at 270MW each, all commissioned.

The project originally had a completion date of 2013 with the total project cost estimated to be Rs60,480m (Rs4.5m/MW of capacity). However, on account of construction delays, the project was completed in June 2017 with a total outlay of Rs93,020m (Rs6.9m/MW of capacity).⁷⁵

The project is situated on 1,070 acres of land in a special economic zone (SEZ) in Sinnar, originally set up by Indiabulls in 2007. The project has all approvals from statutory authorities, and a fuel supply agreement (FSA) for a total of 5.226 million tonnes per annum (Mtpa) of coal signed with South Coalfields Limited (SECL) and Mahanadi Coalfields Limited, both subsidiaries of Coal India Limited (CIL).⁷⁶ The plant has a 36.5 million cubic meter water allocation from the Water Resource Department in Nasik, and evacuation of power will be done at 400 kV level.

The plant has a long term PPA for 950MW with Maharashtra State Utilities. The plant has also received a letter of intent from Maharashtra State Electricity Distribution Company Limited (MSEDCL) for a PPA supplying 507MW for 25 years.⁷⁷

Nasik (Sinnar) Is a Stranded Asset

The Nasik power plant was listed on the government's special Parliamentary Standing Committee on Energy identifying 34 stranded assets in the thermal power

⁷⁴ RattanIndia.

⁷⁵ 37 Standing Committee on Energy.

⁷⁶ Nasik Thermal Power Project.

⁷⁷ Rattan India Power Limited, Annual Report 2018-19.

sector. It has an outstanding debt of Rs7,107 crore (US\$1bn) and an equity infusion of Rs2,454 crore (US\$0.34bn).⁷⁸

Despite the project being commissioned in June 2017, the plant has been idle since then. The primary reason for the lack of operation is the lack of a PPA for rest of its capacity. The company is reportedly in the process of arranging necessary bank guarantees for the signing of the PPA. When that is completed, the plant is still unable to run as the railway siding from the main railway line, needed to transport coal and other raw materials to the plant, is not ready due to problems in acquiring a residual block of 50 acres.⁷⁹

The Nasik power plant is under huge financial stress. RattanIndia Power Ltd. have defaulted to the tune of Rs 2 lakh million for the two thermal power plants at Nashik and Amravati in Maharashtra.⁸⁰

PFC, on behalf of other lenders, filed an application in the National Company Law Tribunal (NCLT) against the company and its wholly owned subsidiary, Sinnar Thermal Power Limited, pursuant to and in terms of the 2018 Reserve Bank of India (RBI) Circular on the Resolution of Stressed Assets. When the Supreme Court of India quashed the RBI circular, the application was withdrawn by PFC. The project lenders are now in the process of forming a suitable resolution plan.

**The Nasik power plant is
under huge financial stress.**

In FY2018-19, the power group (including the operational 1,350MW Amravati power plant) incurred US\$391m in net losses due to construction delays, the lack of a PPA, and the inability to transport coal to the project site. (See Figure 3.9.1)

The project is stranded, as it was constructed with the hope of selling surplus capacity at higher prices in the merchant market, despite having not signed a long-term PPA. The prices at the power exchange have instead fallen rapidly as supply has exceeded demand in most time periods.

⁷⁸ 37 Standing Committee on Energy.

⁷⁹ Times of India, June 22 2019. [1,350MW plant lying idle in Nashik but state Oks 1,320MW in Koradi.](#)

⁸⁰ DNA, June 2018. [Lenders to discuss takeover of RattanIndia's power plants.](#)

Figure 3.9.1: Rattan India Power Ltd Profit & Loss FY2018-19 & FY2017-18

	Rs million	Rs million	US\$ million	US\$ million
	FY 2018-19	FY 2017-18	FY 2018-19	FY 2017-18
Revenue from Operations	19,093	20,154	268	282
Other Income	1,801	2,241	25	31
Total Income	20,894	22,395	293	314
Cost of Fuel, Water & Power Consumed	10,289	11,808	144	166
Other Expenses	15,148	14,701	212	206
EBITDA	-4,542	-4,115	-64	-58
Exceptional Items	23,377	-	328	-
Tax Expenses	-	69	-	1
Profit / (Loss) for the Period	-27,915	-4,184	-391	-59
Total Comprehensive Income / (Loss) for the Period	-27,915	-4,181	-391	-59

Source: Rattan India Power Ltd Financial Report FY2018-19.

The lenders have attempted to find a new buyer for the project. The state distribution company, Maharashtra State Power Generation Company (Mahagenco) turned down an offer by PFC for the asset, as they did not find the project viable on account of the lack of proper rail connectivity for coal supply, and water shortages. Mahagenco already has a 630MW (210MW x 3) plant near Nashik at Eklahare village. It too is facing coal supply issues, mainly because of the lack of adequate railway connectivity. Taking on this additional project would have added to their woes.⁸¹

To compound the stranded asset costs of this plant, the Maharashtra state government decided in June 2019 to add 1,320MW capacity to the Koradi Thermal Power Plant, in an area which is already heavily polluted. IEEFA notes the state already has fully constructed, but idle, thermal capacity, that could be utilized to meet growing electricity demand (see the Koradi case study). Clearly, the government is not working to revive the Nasik power project and selling the capacity in the merchant market will be difficult.

Outcome: A Stranded Asset Difficult to Revive

Without a rail link or PPA the plant is stranded, a status that will be difficult to change.

⁸¹ Business Standard, [Mahagenco not keen to take over RattanIndia's Nashik project](#). June 2018.

Maharashtra has other spare thermal power capacity. The idle Nasik (Sinnar) power plant is based on outdated technology offering low efficiency and high carbon emissions. It would require more fuel to generate the same electricity.

With increasing domestic coal prices, and given the poor financial health of state discoms, selling power with higher tariffs, on account of higher fuel costs, will be increasingly difficult. The prices at the power exchange have been averaging Rs2.71/kWh in October 2019, which is lower than the marginal cost of generation from the power plant.⁸²

There is increasing pressure to curb air pollution in Maharashtra. A plant with sub-critical technology will release higher carbon emissions. This impacts the plant's ability to provide dispatchable electricity that complies with environmental standards. With the availability of cheap renewable energy, the electricity generated from sub-critical coal plants will remain a matter of concern.

**There is increasing
pressure to curb air pollution
in Maharashtra.**

The developer has been unable to find a new lender and/or a buyer to purchase electricity from the power plant, nor can the plant effectively source coal, given the absence of the final section of railway line.

The lenders will have to take a big haircut. The government will not take over the plant without the lenders giving a deep discount. And even then it is not assured.

3.10 THDC's Khurja Thermal Power Plant

THDC, formerly Tehri Hydro Development Corporation India Limited, is a 75:25 joint venture between the Government of India (GoI) and the government of Uttar Pradesh (GoUP).

THDC proposed the 1,320MW Khurja Supercritical Thermal Power Plant in the Bulandshahr district of Uttar Pradesh in December 2010, and signed a memorandum of understanding (MOU) with the Uttar Pradesh government to build the power plant. It remains unbuilt till today.⁸³

The Khurja project had a construction cost of Rs12,676 crore (US\$1.8 billion) according to the Environmental Impact Assessment (EIA), and THDC had secured PPAs with electricity distribution companies in Rajasthan, Uttarakhand, Uttar Pradesh, Himachal Pradesh and Delhi.

⁸² The Economic Times, [Average spot power price drops 54% to two-year low at IEX](#), November 2019.

⁸³ Khurja Super Thermal Power Project, [Environmental Impact Assessment Report](#), November 2016.

IEEFA noted in 2018 that the long-delayed Khurja thermal power project was based on an out-dated business model that was too expensive, and no longer met the state's or nation's rapidly changing energy market needs.⁸⁴

In March 2019, the seemingly shelved project received an endorsement from a special cabinet committee on economic affairs. THDC had continued to push for a revival in the project.

Then, in October 2019, it was reported the government of India has decided to sell down its stake in THDC.⁸⁵ The project remains stalled.

Expensive and Unrealistic Tariffs

The project developers originally estimated the Khurja plant's electricity cost at Rs4.88/kWh. Even using such optimistic assumptions, Khurja's projected tariffs are way above current renewable energy tariffs of Rs2.44-3.00/kWh.

IEEFA estimates the plant's electricity would cost at least Rs5.67/kWh, based on expensive coal freight costs, coal price inflation, and adjustment for lower capacity utilisation rates common in Indian coal plants.

The Khurja thermal power plant is not a mine-mouth facility. It would have to transport coal more than 900 kilometres, incurring significant freight charges.

Further, the plant's initial cost estimates were prepared before the coal price increases of the past couple of years. IEEFA estimates fuel cost alone to be around Rs3.08/kWh (refer to Figure 3.10.1).

Figure 3.10.1: Estimated Fuel Cost for Generation of Electricity at the Khurja Thermal Power Plant

Distance (km)	900
Freight Rate (Rs/t)	1,597
Freight Rate (Rs/Kg)	1.60
Coal Requirement (Kg/kWh)	0.80
Cost of Coal Transportation (Rs/kWh)	1.28
Coal Price (Rs/kg)	1.41
Coal Taxes - Levies, Excise & Corporate (Rs /kg)	0.85
Total Per Unit Fuel Cost Including Transportation (Rs/kWh)	3.08

Source: CIL Annual report, India Railways Freight Information System, IEEFA estimates.

Finally, the plant's environmental impact assessment from November 2016 assumed the facility would operate with a capacity factor of 90%. The country's existing coal fleet has averaged below 60% for the past three years.

⁸⁴ IEEFA, *The Khurja Power Project – A Recipe for an Indian Stranded Asset*, October 2018.

⁸⁵ ET Energy World, *Govt decision to sell THDC may hit 5,000 employees*, 14 October 2019.

Legal Challenges

Aside from cost issues, the Khurja project is facing serious legal challenges on environmental grounds. Farmers are challenging land acquisition and compensation, with that dispute currently before the Allahabad High Court. And the plants' coal, intended to be sourced from the proposed Amelia coal block in Madhya Pradesh, may not be mineable as it sits in an area deemed "inviolable" by the Ministry of Environment, Forest and Climate Change (MoEFCC).

The rated coal capacity of the Amelia coal mine proposal is 8.4 million tonnes per annum (Mtpa). The coal block has total reserves of about 393 million tonnes (Mt). The cost of developing the coal block is estimated at Rs1,587 crore (US\$235m).

Under current Indian regulations, the coal mine linkage is an inseparable part of the combined project proposal. As such, legal issues around Khurja's coal linkage will continue to remain a major risk.

When proposed in 2010, the power plant was touted as essential to meet the region's fast-growing electricity needs and alleviate local supply shortages. Nine years on, India's electricity sector has been on a transitional path with an average 8-10GW of renewable energy capacity installed annually since FY2016/17.

India's electricity sector has been on a transitional path with an average 8-10GW of renewable energy capacity installed annually.

The five states that had already entered PPAs with the proposed Khurja power plant have increasingly entered into cheaper renewable energy PPAs to meet incremental power demand.

There are serious questions about the plant's viability in a market rapidly moving to cheaper, cleaner alternatives. Compared to sub-Rs3/kWh renewables with zero indexation, IEEFA estimates the Khurja project, at a realistic tariff of Rs5.67/kWh, is effectively reliant on a tax-payer sponsored subsidy of Rs6,946 crore (US\$10bn) over a period of 25 years.

Khurja Is a Stranded Asset Risk

More broadly, the Khurja project faces the same risks confronting India's entire coal plant pipeline today. For example, NTPC Ltd, India's largest power generator, shelved 9.3GW of coal-fired power plants in 2018, largely at the request of states seeking to cancel existing PPAs because of slower demand growth.⁸⁶ NTPC recently announced it will not undertake any new coal-fired power plant development apart from projects already under construction.⁸⁷

⁸⁶ IEEFA India, [Continued Decline in Indian Thermal Capacity Additions](#), 10 April 2019.

⁸⁷ Economic Times, [NTPC to invest Rs25K crore to set up solar park](#), 19 September 2019.

Another complication for the Khurja plant is that 6.7GW of coal-fired capacity is already under construction in Uttar Pradesh—far more than is needed, according to IEEFA's estimates. Uttar Pradesh, as with the rest of India, has aggressive renewable energy goals for the next 10 years. Specifically, it plans to have 10.7GW of solar installed by 2021/22, of which 4.3GW will be rooftop solar. If the state meets its solar goals, demand for coal generation will fall significantly. The excessive new thermal capacity buildout will result in sub-optimal capacity factors for the state's coal-fired fleet, or even lower if the Khurja plant is built—seriously undercutting the plant's economic case.

If the state meets its solar goals, demand for coal generation will fall significantly.

Beyond Uttar Pradesh, the Khurja project does not fit with India's ambitious renewable energy goals and its desire to rationalise the finances of its many troubled coal-fired power plants, both operational and planned.

The Khurja project will also undermine the new financial ambitions of Uttar Pradesh discoms. To ensure a debt recovery, they need to lower their wholesale electricity costs via lower cost renewable energy projects at nearly half the price of coal.

The Khurja project is entirely reliant on state-subsidised financing from India's Power Finance Corporation (PFC), which is already struggling with billions of dollars in stressed coal project loans. As of June 2019, PFC's loans to non-performing assets totalled Rs15,700 crore (US\$2.2bn) or 4.7% of its' total loan book. In IEEFA's view, lending another Rs9,000 crore (US\$1.26bn) to the Khurja project would make PFC's stranded asset problems worse.

Following the IL&FS (Infrastructure Leasing & Financial Services Limited) debacle of October 2018, IEEFA considers PFC and the Indian government would be better served if the lending entity continued recent efforts to boost its' involvement in the renewable energy sector.

In the past year, PFC's green lending jumped 43%, climbing from Rs12,973 crore (US\$1.8bn) as of June 2018 to Rs18,502 crore (US\$2.6bn) by June 2019. PFC's target of further increasing its exposure in the renewable energy sector to 20% of its total lending, up from 6% currently, is a move in the right direction.

The Khurja thermal power project sits increasingly outside THDC's traditional hydroelectricity focus, and its more recent foray into renewable energy and storage projects. THDC to-date has built 113MW of wind power projects in Gujarat, has bid on multiple solar power tenders, and is now building the 1GW Tehri Pumped Hydro Storage project in Uttarakhand. Given this focus on sustainable energy projects,

Khurja is little more than an expensive drag on the company's greener expansion plans.

The Khurja facility, initially backed by the Uttar Pradesh government to meet existing shortages and expected demand growth, is no longer needed. Instead of improving access to energy and boosting energy security in northern India, the Khurja facility will add to the country's distress in the thermal and financial sectors.

**Khurja is little more than
an expensive drag on
the company's greener
expansion plans.**

With the government of India's decision to dilute its stake in THDC, it is unlikely that any new private promoter will go forward with the Khurja thermal power plant, increasing the inevitability of the project being shelved.

3.11 SJVN's Buxar Thermal Power Station

SJVN Limited, a Mini Ratna company, was incorporated on 24 May 1988 as a joint venture of the Government of India (GOI) and the Government of Himachal Pradesh (GOHP).

The company started with a single project and single state operation, which is India's largest 1,500MW Nathpa Jhakri hydro power station in Himachal Pradesh. Since then, the company has expanded, commissioning five projects totalling 2,015MW of installed capacity including wind and solar power plus one transmission line of 86 km length.

SJVN aims to be a 5,000MW capacity company by 2023, a 12,000MW company by 2030, and a 25,000MW company by 2040.

The company's current portfolio totals 7,579MW, from which 2,015MW is operational, 2,880MW is under construction, 572MW is in the pre-construction and investment approval stage, and 2,112MW is being surveyed and investigated.⁸⁸

Buxar: A Decade On, and Construction is Yet to Commence

SJVN took over Buxar Bijlee Company Pty Ltd in July 2013 and changed the name to SJVN Thermal Pvt. Ltd.⁸⁹ The company is developing the greenfield 1,320MW coal-based supercritical power project located near Chausa village in District Buxar of Bihar. Commissioning was originally scheduled for FY2015/16, having first been proposed in 2008.

In July 2013, the Ministry of Coal granted SJVN a long term coal linkage via Coal India Ltd. (CIL). The company was allocated 486Mt of coal reserves in the 2,102Mt Deocha-Pachami Coal Block located in West Bengal, 500km away. A Letter of

⁸⁸ SJVN Ltd. [About Us](#).

⁸⁹ SJVN Ltd. [Thermal Power Projects](#).

Assurance was then issued in December 2018 from Central Coalfields Ltd, identifying Amrapali and Magadh coal blocks—domestic mines yet to be developed - as the source. The proponent would have to rely on imported coal for four years until the domestic source is ready.

The plant requires 6.7MT of coal for it to run at the modelled 85% plant load factor (PLF). IEEFA notes the average coal-fired power plant in India has been running at less than 60% since 2016/17. Water will be sourced from the river Ganga.

The Buxar project obtained environment clearance from the Ministry of Environment, Forest and Climate Change (MoEF&CC) in February 2017. Private land of 1,064 acres has been acquired for the main plant. The Cabinet Committee on Economic Affairs (CCEA) approved investment for the project in March 2019. And a single engineering, procurement and construction (EPC) package has been awarded for work to begin on the main plant. The transmission line work has also been awarded, to the South Bihar Power Distribution Company Ltd. (SBPDCL) on a deposit for works basis.

The project's PPA has been signed with the Bihar State Electricity Board (which constituted into the Bihar State Power Holding Company Limited (BSPHCL)) for 85% share of power generation on bus bar rate. This has now been assigned to Bihar's State Distribution companies.

The levelised tariff of the project is Rs4.19/kWh.

Buxar Is a Stranded Asset

The Buxar power project is yet to reach financial close. A tender inviting expressions of interest for debt refinancing was issued in August 2019, but financial lenders are yet to agree to fund the project.

**Arranging debt for a
thermal power project
will be difficult.**

India's banking system is already plagued by stranded or non-performing assets worth US\$40bn from the coal-fired power generation sector. In such a situation, arranging debt for a thermal power project will be difficult.

The Buxar thermal plant is based on supercritical technology with two units of 660MW each equipped with new emission control technology to protect the environment. The estimated cost of the project is Rs10,439 crore (US\$1.45bn) (US\$1.1m/MW) with a completion period of 58 months. The cost per MW is very high, resulting in a high levelized tariff.

The Bihar discom is reeling under huge financial losses with a gap of Rs0.86 per kWh between the average cost of supply (ACS) and the average revenue requirement (ARR).⁹⁰ The average power purchase cost for discoms in Bihar (including PGCIL and POSOCO charges) is Rs4.09/kWh for FY2019-20.⁹¹ The levelized tariff of the Buxar

⁹⁰ UDAY, [Financial Indicators](#).

⁹¹ Bihar Electricity Regulatory Commission, [Determination of Retail Tariff for FY2019-20](#).

power project is high relative to alternative renewable energy sources, and this will add to the poor financial health of the state.

Bihar's power supply situation has improved since this project was first proposed a decade ago. The energy and peak power deficit in FY2018-19 was 0.7% and 0.6% respectively.⁹²

The All India plant load factor (PLF) of thermal power projects was 64% in March 2019, dropping to 51% in September 2019.⁹³ In Bihar also, the PLF of thermal plants was ~68% from April through to September 2019.⁹⁴ Adding more capacity beyond demand growth will further depress the underutilisation of existing power plants.

The Bihar Renewable Energy Development Agency (BREDA) is promoting deployment of low cost grid-connected and decentralised renewable energy power in the state. These low cost renewable sources will pose a threat on the dispatchability of power from the expensive Buxar thermal power project, with its new proposed commission date of 2023.

The project is also facing difficulties with land acquisition, as some landowners have filed claims for higher compensation. If the decision is taken in their favour, this will further increase the project cost, leading to higher tariffs. The legal dispute is already adding to costs and causing extended project timetable delays.

Outcome: Stranding Can Be Avoided

SJVN has experience in hydro power generation and has also ventured into wind and solar power. IEEFA contends that the company should not expose itself by venturing into resource-based power projects, an area it has no expertise in, while India is undergoing a transition towards renewable energy technology.

The total income of the parent company for FY2018-19 was Rs2,909 crore and profit after tax was Rs1,364 crore (US\$190m).⁹⁵ The profitability of the company will be impacted by adding a thermal-based capacity to its portfolio as most thermal power plants are struggling with low PLFs and running into losses.

The Buxar power plant should not be constructed given the low PLFs of existing thermal power plants, the availability of low-cost renewable energy sources, and the poor financial health of discoms.

The focus of the central and state government should be resolving the already 34GW of stressed coal-based power projects, rather than adding to new thermal capacity. The drivers of asset stranding in the thermal power generation sector are not likely to change in the next few years. Rising water scarcity is likely to get serious and will be another driver leading to the stranding of this asset. The Buxar power plant is susceptible to all of the drivers of asset stranding. It should not be built.

⁹² CEA, Monthly Executive Summary Report, [March 2019](#).

⁹³ CEA, Monthly Executive Summary Report, [September 2019](#).

⁹⁴ CEA, Monthly Generation Report, [September 2019](#).

⁹⁵ SJVN Ltd., [Annual Report 2018-19](#).

3.12 PCKL's Gulbarga Thermal Power Station

Gulbarga Thermal Power Station (1,320MW) was proposed by state-owned Power Company of Karnataka Limited (PCKL) in 2010. The power plant is proposed to have two units of 660MW based on outdated subcritical technology. The cost of the project is estimated to be Rs7,500 crore (US\$1.1bn).

Land totalling 1,600 acres was acquired in 2010 for Rs158 crore (US\$22m) in Farthabad Hobli, Gulbarga Taluk, Gulbarga district, Karnataka. Since then, the project has not acquired a coal linkage nor an environmental clearance.

Lack of In-State Coal Capacity

In 2018, IEEFA appraised the electricity sector of Karnataka and its thermal power sector. Karnataka does not have any in-state coal production. It is dependent on coal with a high delivery cost, procured either via railways from mines outside the state, and via imported seaborne coal.

Domestic coal for Karnataka's power plants comes from Western Coal Fields Limited (Maharashtra), Mahanadi Coal Fields (Odisha), Singareni Coal Mines (Telangana), and Pakri Barwadih (Jharkhand). All of the mines are located 700 - 1,200 kilometres (km) from Karnataka's power plants, introducing difficult rail logistical issues and potential additional transportation-related costs for the state's thermal generation.

As of September 2019, Karnataka had 9.8GW of operational coal-fired capacity. The coal-fired power fleet in Karnataka has operated at an unsustainably low utilisation factor of 35% for two consecutive years in FY2017/18 and FY2018/19.

IEEFA calculates the marginal cost of coal transportation over the distances of 200km, 700km and 1,200km to be Rs0.39/kWh, Rs1.06/kWh and Rs1.66/kWh.

Figure 3.12.1: Cost of Coal Transportation in Electricity Tariffs

Distance (km)	200	700	1,200
Freight Rate (Rs/T)	490	1,320	2,077
Freight Rate (Rs/Kg)	0.49	1.32	2.08
Coal Requirement (Kg/kWh)	0.80	0.80	0.80
Cost of Coal Transportation (Rs/kWh)	0.39	1.06	1.66

Source: Indian Railways, IEEFA estimates.

In April 2016, the central government recommended Brahmanbil Coal Block in the state of Odisha as the supplier of coal for the Gulbarga plant, a distance of roughly 1,200km from the plant's location.⁹⁶ Although, the coal block has not been formally allotted to the project, the expensive freight costs in themselves would create a

⁹⁶ The Hindu, [Coal block allotment recommended for Farhatabad thermal power project](#), 21 April 2016.

massive burden on the Gulbarga plant.

Sourcing coal from distant mines has proven unreliable for Karnataka's electricity security, with the state buying expensive power from the open market or importing it from neighbouring states.

PCKL has failed to find a developer to build, own and operate the Gulbarga proposal even after multiple round of tenders in 2010, 2012 and 2014. In the 2010 round, 23 bidders qualified for the project. However, none of them agreed to sign as PCKL had not found a coal-linkage for the project.⁹⁷ The tenders in the following years had the same outcome.

Karnataka's Renewable Energy Growth

Karnataka is a leading state for renewable energy in India. As of September 2019, Karnataka has 14.2GW of renewable energy, 6.4GW from solar and 4.7GW from wind.

Karnataka has added roughly 7GW of renewable energy capacity since FY2016/17, and none from thermal power.

Karnataka houses one of the world's largest operational ultra-mega solar parks of 2GW in Pavagada called "Shaktisthala" (also Pavagada Solar Park). The 2GW capacity was auctioned in phases between 2016 and 2018. The tariffs dropped 41% in the initial rounds of tenders from Rs4.79/kWh to Rs2.82/kWh by May 2018.⁹⁸ Leading Indian developers such as Renew Power, Azure Power and Avaada, as well renowned international investors such as SoftBank's Indian renewable energy arm SB Energy have developed solar capacity in Pavagada Solar Park to offer low-cost, low-emission power to Karnataka.

PCKL's Stranded Assets

The Government of Karnataka formed PCKL in 2007 to facilitate power capacity addition. PCKL has proposed five thermal power projects to date, including two coal-fired projects and three gas-fired projects. Two further operational projects include the coal-based Ghataprabh Thermal Power Project of 1,320MW and three gas-based power plants of 700MW each in Belgaum, Gadag, and Devanagere in Karnataka. IEEFA completed an analysis in 2018 of five gas-based stranded assets, including three gas-fired power projects as well as two LNG import terminal facilities, in Karnataka.⁹⁹

None of PCKL's proposed projects have received comprehensive regulatory approvals or PPAs. However, KPCL has acquired land for each of the projects which has remained unutilised, wasting public capital, resource and efforts.

⁹⁷ Business Standard, [Fresh global bids called for 1,300 Mw Gulbarga thermal power project](#), 30 January 2019.

⁹⁸ ET Energy World, [SB Energy wins SECI's 200 MW auction in Karnataka](#), 18 May 2018.

⁹⁹ IEEFA, [Karnataka's Electricity Sector Transformation \(page 24-28\)](#), July 2018.

In IEEFA's opinion, Gulbarga, and the other proposed projects, should be shelved. Instead, PCKL should pivot to building renewable energy capacity supported by flexible on-demand peaking power generation capacity (either via a gas peaker, pumped hydro storage or batteries). In this way, the company would be more aligned with Karnataka's current energy transformation.

Annexure I: Opportunities for Gas 'Peakers'

India's entire gas-fired capacity of 25GW remains financially stressed due to the lack of sufficient domestic gas supply, and the lack of a peaking power price. On the other hand, imported gas is too expensive to make gas-fired power viable.

In January 2019, India's standing parliamentary committee on energy submitted a report on 'Stressed/Non-performing assets in gas-based power plants.'¹⁰⁰ The committee's report noted that 14.3GW (57%) out of the 25GW was stressed due to gas supply issues, equating to 31 gas-fired power plants of which 24 are owned by the private sector, six by state governments, and one by the central government. In terms of financing, Rs65,000 crore (~US\$8.9bn) has been invested into the stranded capacity, out of which about Rs50,000 crore (~US\$7bn) (77%) was funded by banks.

The committee noted that almost all of the power plants were planned based on the expectation of an increase in domestic gas production, particularly from the Krishna Godavari Dhirubhai 6 (KG-D6) field. However, production from KG-D6 has reduced to zero since March 2013. The committee also noted that policy inconsistency in terms of prioritising gas supply in power, city gas distribution (cooking) and transportation, was another factor causing issues in the sector.

Apart from a lack of sufficient domestic production, there have been delays in building pipelines to deliver liquified natural gas (LNG) from gas handling terminals. (See Figure I)

IEEFA notes that the LNG handling infrastructure bears an equivalent stranded risk as the gas-fired power plants. India's gas handling infrastructure is equally stressed due to underutilisation. About 50% of the current LNG infrastructure under construction and planning hinges on the revival of India's gas-fired power plants.

In order to save these units from being stranded, the government will need to incentivise capital investment in transportation pipelines and revive the utilisation rates of gas-fired power plants, in addition to promoting gas in other sectors such as cooking, heating and transportation.

Gas-fired power plants can be quickly switched on to respond to high demands on the grid. NTPC Ltd recently announced a pilot project to use 2.3GW of its existing but stranded gas-fired capacity during the evening hours for peak-hour supply. This is part of NTPC's long-term plan to maximise the value of its underutilised gas-fired capacity to meet peak power needs, while providing grid stabilisation and balancing services. There has been no progress on this plan to date.

¹⁰⁰ Indian Ministry of Power, Standing Committee on Energy (2018-19), [Stressed/Non-performing Assets in Gas Based Power Plants](#), 04 January 2019.

Figure I: India's LNG Infrastructure

Terminal	Developers	Capacity (MMTPA)
Existing Terminals		
Dahej	Petronet LNG Limited	17.5
Hazira	Royal Dutch Shell	5.0
Dabhol	GAIL, NTPC	5.0
Kochi	Petronet LNG Limited	5.0
Ennore	Indian Oil Corp	5.0
Total Existing		37.5
Construction Completed		
Mundra	GPSC, Adani	5.0
Under Construction		
Jaigargh (FSRU)	H Energy	4.0
Dhamra	Adani	5.0
Total Under Construction		9.0
Planned		
Jafrabad (FSRU)	Swan	5.0
Proposed		
East Coast	Petronet LNG Limited	5.0
Kakinada	GAIL, APGDC, Shell or VGS	2.5
Kolkata Port	H Energy	2.5
Chhara	HPCL & Shahpoorji Pallonji	5.0
Krishnapatnam	LNG Bharat/others	2.5
Total Proposed		17.5
Grand Total		74.0

Source: Petronet.

IEEFA endorses the Central Electricity Authority's (CEA) plans to re-orient 25GW of gas-fired capacity to better address fluctuations from large amounts of renewable energy that will be built by 2022.

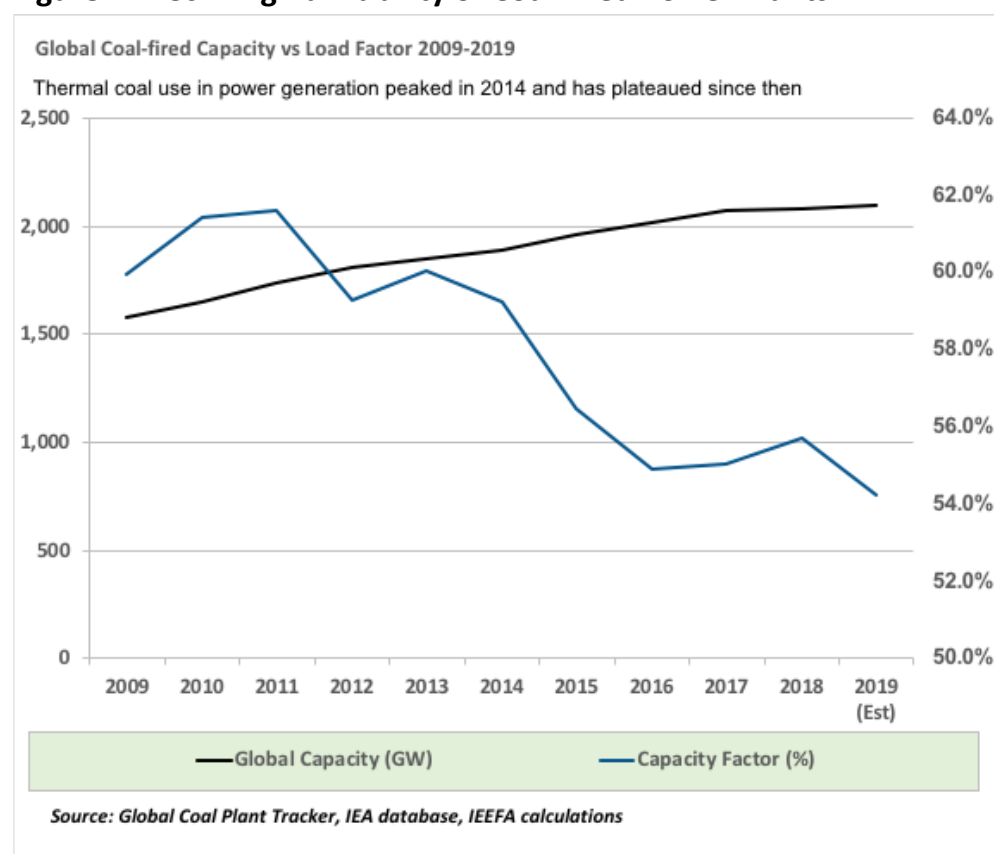
In IEEFA's opinion, a 'time-of-day' pricing mechanism will be key to reviving the stranded gas-fired capacity in India as the gas-fired capacity could be reconfigured to operate flexibly, and 'peakers' could be introduced to deal with intermittency of supply from variable renewable energy sources. Finally, a pricing signal would incentivise the required capital investment needed for flexible operation of the stranded gas power fleet in India.

Annexure II: Global Trends in Divestments from Thermal Power

Today, over 100 globally significant financial institutions have divested from thermal coal, including 40% of the top 40 global banks and 20 globally significant insurers. The list also includes multi-lateral public development banks, national development finance institutions and export credit agencies. As of today, IEEFA counts 113 such institutions that have developed formal thermal coal mining and/or coal-fired power plant restriction policies since 2013.^{101 102}

Apart from the financial risk posed by a changing climate, an important factor driving global divestment from coal is capacity growth versus utilisation rates of the coal-fired power plants. While global coal-fired capacity has continued to grow over the past decade, the concurrent collapse in average global coal-fired power plant utilisation rates has seen record lows reached each year. (See Figure II)

Figure II: Declining Bankability of Coal-fired Power Plants



¹⁰¹ IEEFA, [Over 100 and counting](#), As of 19 November 2019.

¹⁰² IEEFA defines globally significant financial institutions as banks and insurers/reinsurers with assets under management (AUM) or loans outstanding in excess of US\$10 billion. For now we are excluding the Asset Managers/Asset Owners group, given definitional vagaries and the far larger number of global participants.

Task Force on Climate-Related Financial Disclosures

Another important factor driving both an accelerated global move away from coal divestment, coupled with the institutionalisation of rigorous climate policy statements, stems from the Task Force on Climate-related Financial Disclosures (TCFD).

Under the visionary guidance of the Bank of England's Governor, Mark Carney,¹⁰³ the Financial Stability Board (FSB)—an international body monitoring and making recommendations about the global financial system—has strongly endorsed the industry-led TCFD and its (for now) voluntary agreement to develop aligned and uniform disclosures acknowledging and assessing climate risks as they relate to financial institutions.

The TCFD covers all companies. This is important given financial institutions both own, insure and lend to virtually every company in the world, and any evaluation of climate risk requires clarity, transparency and reporting on systemic risks in their underlying asset and liability exposures.

While companies are currently not required to comply with the TCFD, financial regulators⁴ and courts are increasingly recognising that directors have a fiduciary duty to assess, manage and report to shareholders on all key risks. For example, although a company's Board might deem the International Energy Agency's Sustainable Development Scenario (SDS) as unlikely, their fiduciary duty will be to show they have clearly evaluated the financial risks in the event they are wrong.

India has made important commitments under the Paris Climate Agreement to reduce carbon emissions 33-35% by 2030 from the 2005 level, build a large renewable energy capacity base (40% of total installed capacity by 2030), and create a carbon sink through additional forest and tree cover totalling 2.5-3.0 billion tonnes of CO₂ equivalent.

To its credit, the Indian government has taken steps in the right direction with its ambitious plan to build 450GW of renewable energy by 2030. However, reducing emissions will require much bigger reforms. Attracting international capital into India's economy has been one of the prime motives in recent years. In order to make Indian financial markets more conducive for foreign capital, they will have to evolve to international standards by incorporating climate-related financial disclosures as a mainstream policy moving forward.

¹⁰³ In September 2015 Mark Carney gave the landmark speech "[Breaking the tragedy of the horizon](#)". This has been built upon in subsequent keynote speeches, including in April 2018: "[A transition in thinking and Action](#)."

About IEEFA

The Institute for Energy Economics and Financial Analysis conducts research and analyses on financial and economic issues related to energy and the environment. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About the Authors

Tim Buckley

Tim Buckley, IEEFA's director of energy finance studies, Australia/South Asia, has over 25 years of financial market experience covering the Australian, Asian and global equity markets from both a buy and sell side perspective. Tim was a top-rated Equity Research Analyst and has covered most sectors of the Australian economy. Tim was a Managing Director, Head of Equity Research at Citigroup for many years, as well as co-Managing Director of Arkx Investment Management P/L, a global listed clean energy investment company that was jointly owned by management and Westpac Banking Group.

Vibhuti Garg

Vibhuti Garg, an energy economist at IEEFA, has advised several private and public sector clients on commercial and market entry strategies, investment diligence on power projects, and the impact of power sector performance on state finances. She has worked in Nepal, Bangladesh, Vietnam and in the Caucasus.

Simon Nicholas

Simon Nicholas is an energy finance analyst with IEEFA in Australia. Simon holds an honours degree from Imperial College, London and is a Fellow of the Institute of Chartered Accountants of England and Wales. He has 16 years' experience working within the finance sector in both London and Sydney at ABN Amro, Macquarie Bank and Commonwealth Bank of Australia

Kashish Shah

Kashish Shah, an energy finance analyst at IEEFA, has a master's degree in economics from the University of Sydney and an engineering degree from NMIMS University in Mumbai. Kashish has worked in the Global Analytics Division of the Royal Bank of Scotland with a focus on regulatory policies. Kashish has research experiences in India's public sector in his work for a member of Indian Parliament and a University of Sydney-based research group.

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