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A Study on India's IPPs hammered by declining Plant Load Factor, its consequences & steps involved in the capacity Utilization

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**A DISSERTATION REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE  
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CENTRE FOR CONTINUING EDUCATION  
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## Declaration by the Guide

This is to certify that the Mr. Prince Siddharth a student of Executive MBA (Power management) SAP ID: 500065322 of UPES as successfully completed his dissertation report on " A Study on India's IPPs hammered by declining Plant Load Factor, its consequences & steps involved in the capacity Utilization" under my supervision.

Further I certify that the work is based on the investigation made, data collected and analysed by him and it has not been submitted in any other University or Institution for award of any degree. In my opinion, it is fully adequate, in scope and utility, as a dissertation towards partial fulfillment for the award of degree of Executive MBA



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## EXECUTIVE SUMMARY

The PLF is the actual power generation out of the total installed capacity of a power plant. In India, the average PLF hovers around 60 per cent, even which is accounted for by higher generation from public sector undertaking NTPC's plants. Private power plants, on the other hand, have much lower PLF, close to 40 per cent.

Determining the performance of a power plant can be a complex topic to understand, given the various factors such as availability of fuel/water, installed capacity, the age of the unit, planned outage etc., at play. A brief understanding of different aspects of plant load factor may help in enhancing our knowledge on performance parameters for thermal power plants. The Plant Load Factor is commonly considered as a measure of a power plant's capacity utilisation.

Even existing new plants are suffering from poor capacity utilisation (PLF). In 2013-14, PLF for thermal power plants dipped to 65 per cent, which is the lowest level in 14 years and has stagnated at the same level as well. This further questions the need for new plants when existing plants are not being utilised fully.

Price of renewable energy is set to reach parity with coal-based generation and even surpass it. Combined with the government's revised targets for renewable energy capacity of 100 GW by 2022, coal-based generation is likely to face strong headwinds. Now would be the right time for the government to re-think coal's contribution to India's energy mix and formulate a strategy to use existing capacity effectively as well as prevent accumulation of non-performing assets in the future.

Coal shortage owing to inadequate transportation infrastructure has also affected private PLFs. And rising global prices have served as a deterrent to coal imports. "Higher global coal prices has seen independent power producers with regulated tariff and cost under-

recovery going for a voluntary shutdown. As a result, a fleet of private IPPs are under-utilised

India is also acutely aware that its existing coal fleet is underutilized, and notes that over the past five years, the national average plant load factor (PLF) for India's coal and lignite plants—a measure of average capacity utilization—began a downward tumble. The Power Ministry expects that by 2021–2022, coal unit PLF could fall to 56.5%.

One of the reasons why central sector coal-based units could outperform the private players was the guaranteed long-term PPAs (power purchase agreements) and availability of coal linkages or captive coal sources. On both counts, private producers suffered- many of them were without long-term PPAs while disruption in coal supplies was a commonality. In its FY19 outlook on energy infrastructure, India Ratings reveals that about 51,000 MW of pipeline thermal capacity and soaring renewable capacity compound the stress on waning thermal PLFs”.

This Report comprises of an effort to study and analyze the India's IPPs hammered by declining Plant Load Factor & Analysis to ascent the Load Factor.

I have also emphasized on the various components responsible for low Plant Load Factor of IPPs, impact of low Plant Load Factor & proposed steps to be taken for revival of stressed power assets.



## CHAPTER 01: INTRODUCTION

### 1.0 Introduction

The Key of economic development is directly related to power sector. Under the policy of liberalisation the Government of India announced in 1991 and consequent amendments in Electricity (Supply) Act have opened new vistas to involve private efforts and investments in electricity industry. The Electricity (Supply) Act, 1948 was amended in 1991 to provide for creation of private generating companies for setting up power generating facilities and selling the power in bulk to the grid or other persons.

Sector	MW	% of Total
State Sector	83922	24.3
Central Sector	103030	29.8
Private Sector	159096	45
Total	346048	100

Table 01: Sector wise power production

India is the world's third largest producer and third largest consumer of electricity. The national electric grid in India has an installed capacity of 360.788 GW as of 31 August 2019. Renewable power plants, which also include large hydroelectric plants, constitute 34.86% of India's total installed capacity. During the 2018-19 fiscal year, the gross electricity generated by utilities in India was 1,372 TWh and the total electricity generation (utilities and non-utilities) in the country was 1,547 TWh. The gross electricity consumption in 2018-19 was 1,181 kWh per capita. In 2015-16, electric energy consumption in agriculture was recorded as being the highest (17.89%) worldwide. The per capita electricity consumption is low compared to most other countries despite India having a low electricity tariff. India has

a surplus power generation capacity but lacks adequate distribution infrastructure. To address this, the Government of India launched a program called "Power for All" in 2016. The program accomplished by December 2018 in providing the necessary infrastructure to ensure uninterrupted electricity supply to all households, industries, and commercial establishments. Funding is supplied through a collaboration between the Government of India and its constituent states.

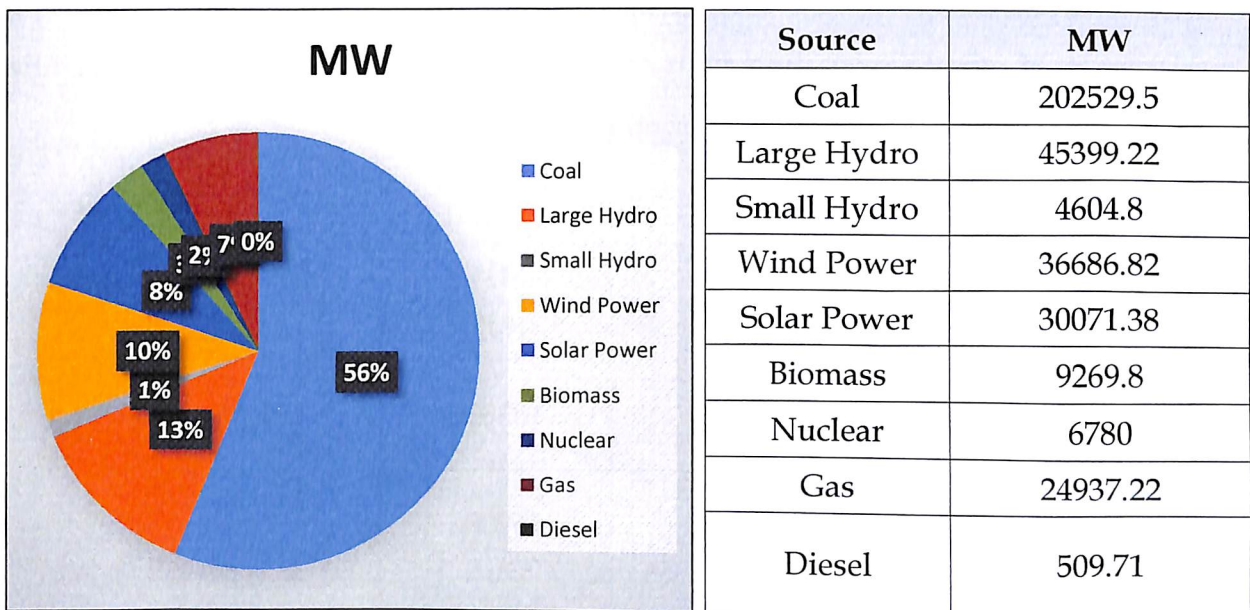


Fig .01/ Table 02: Installed capacity in India as on 31<sup>st</sup> August 2019

India's electricity sector is dominated by fossil fuels, in particular coal, which during the 2018-19 fiscal year produced about three-quarters of the country's electricity. The government is making efforts to increase investment in renewable energy. The government's National Electricity Plan of 2018 states that the country does not need more non-renewable power plants in the utility sector until 2027, with the commissioning of 50,025 MW coal-based power plants under construction and addition of 275,000 MW total renewable power capacity after the retirement of nearly 48,000 MW old coal-fired plants.

Financial Environment for private sector units modified to allow liberal capital structuring and an attractive return on investment. Up to hundred percent (100%) foreign

equity participation can be permitted for projects set up by foreign private investors in the Indian Electricity Sector. Administrative & Legal environment modified to simplify the procedures for clearances of the projects. Policy guidelines for private sector participation in the renovation & modernisation of power plants issued in 1995.

The initial response of the domestic and foreign investors to the policy of private participation in power sector has been extremely encouraging. However, many projects have encountered unforeseen delays. There have been delays relating to finalization of power purchase agreements, guarantees and counter-guarantees, environmental clearances, matching transmission networks and legally enforceable contracts for fuel supplies.

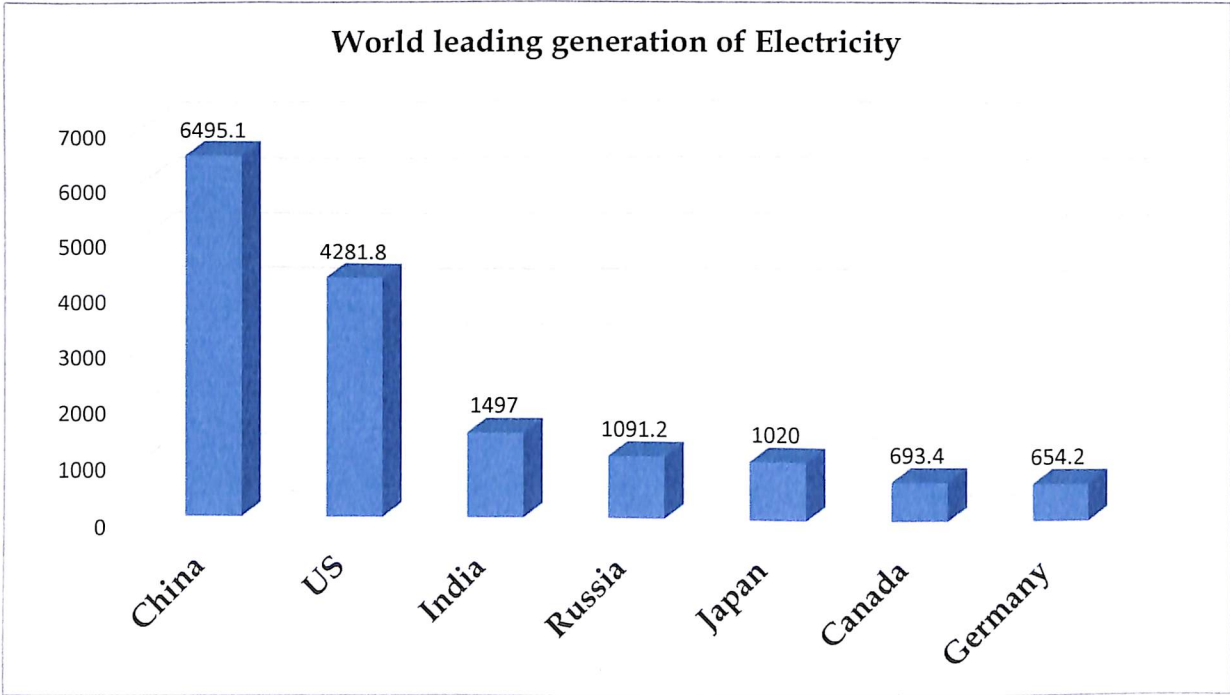


Fig 02: World leading generation of Electricity in 2017 (TWh)

With a generation of 1,497 TWh, India is the third largest producer and the third largest consumer of electricity in the world. Although power generation has grown more than 100-

fold since independence, growth in demand has been even higher due to accelerating economic activity.

The shortfall in the private sector was due to the emergence of a number of constraints, which were not anticipated at the time the policy was formulated. The most important is that lenders are not willing to finance large independent power projects, selling power to a monopoly buyer such as SEB, which is not financially sound because of the payment risk involved if SEBs do not pay for electricity generated by the IPP. Uncertainties about fuel supply arrangements and the difficulty in negotiating arrangements with public sector fuel suppliers, which concern penalties for non-performance, is another area of potential difficulty. It is important to resolve these difficulties and evolve a framework of policy which can ensure a reasonable distribution of risks which make power sector projects financially attractive.

Overall, the country recorded marginal demand-supply gap both in terms of energy and peaking as given below.

	Energy MU	Peak MW
Requirement	1213325	164066
Met	1204697	160752
Gap	-8629	-3314
Gap %	-0.7	-2.1

Table 03: Energy Demand Supply Gap

Western & Southern Regions met the demand almost in full with insignificant demand-supply gap both in terms of energy and peaking. Northern, Eastern & North-Eastern Regions experienced minor demand-supply gap in terms of energy and peaking, on an

overall basis. The demand-supply gap was generally on account of the factors other than non-availability of power e.g. transmission & distribution constraints. However, there were short-term surpluses in most of the states at some point of time or the other depending on the season or time of the day.

Region-wise picture with regard to actual power supply position in the country during the year 2017-18 in terms of energy and peak is given below:

Region	Energy					
	Requirement	Availability	Surplus/Deficit (-)	Demand	Availability	Surplus/Deficit (-)
	MU	MU	MU	MU	MU	MU
Northern	371934	365723	-6211	60749	58448	-2301
Western	368404	368081	-323	50477	50085	-392
Southern	320248	319642	-606	47385	47210	-175
Eastern	136522	135490	-1032	20794	20485	-309
North-Eastern	16217	15764	-452	2629	2520	-109

Table 04: Region-wise actual power supply position in the country

The assessment of gross energy generation in the country during the year 2018-19 has been carried-out in CEA taking into consideration the past performance of the thermal plants, their vintage and maintenance schedule of the generating units during the year, likely partial and forced outages and availability of fuel etc. The generation from new units considering their commissioning schedule has also been included in the estimates of the generation targets.

A capacity addition programme of 9626.15 MW during the year has been considered with source wise breakup as under:

Category	Installed Capacity (MW)
Thermal	8216.15
Hydro	910
Nuclear	500
Total	9626.15

Table 06: Energy Base Installed Capacity

### 1.1 Performance Parameters:

The performance of a power plant can be expressed through some common performance factors given below

- Heat Rate (energy efficiency).
- Thermal Efficiency
- Capacity Factor
- Plant Load Factor
- Economic Efficiency
- Operational Efficiency

Current practice of performance measurement of the coal fired power plants, in the Indian context done by CEA involves ratio analysis in which set of ratios (input to output and output to input) like Plant Load Factor (PLF), Operational Availability Factor (OAF), Planned Maintenance (PM), Forced Outage (FO), Auxiliary Power Consumption (APC), Specific Coal Consumption (SCC) etc. are computed. These ratios indicate the partial factor productivity of the plants. With different indications being provided by these ratios interpretation becomes subjective leaving the managers to select their set of preferable ratios

for decision making. Attempts made by CEA to aggregate the ratios to get a composite index based on predefined weight matrix for the ratios, again suffers from subjective bias.

In India, the Ministry of Power has, since the early 90s, used the Plant Load Factor as a metric to check the efficiency of a plant. A PLF norm has been set, and incentives are being given to those producers who produce power in excess of the norm. Currently, the flat rate payable for excess generation corresponding to the scheduled generation is 50 paise per kWh as specified in regulation 36 (B) of CERC regulations. In the last decade, India's Plant Load Factor for coal-based power plants has seen a steady decline.

The decline is more observable in the private sector, which largely cites a shortage of coal as the reason for reduced power generation. This has been acknowledged in NITI Aayog's Draft National Energy Policy, (Draft National Energy Policy, 5.4.2 & 8.7.4) which notes that the falling PLF is threatening the government's power augmentation agenda. "The issue of meeting full coal demand of the power plants with FSAs (fuel supply agreements) needs to be resolved so that these plants are able to receive their full coal demand, and raise their PLFs.

A low PLF is bad for the power plant as it indicates that the plant is not being used to its optimal capacity. This will increase the per-unit cost of the power thus produced, making it unattractive for purchase by Discoms. A higher PLF, on the other hand, will generate a greater total output which will reduce the cost per unit of energy generated. The higher the output, the lesser will be cost per unit. The additional energy produced would also result in an increase in revenue of the plant.

The news is distressing for India's coal generators, who industry experts say are facing a serious three-pronged assault. In a recent report, the industry-led and managed Confederation of Indian Industry (CII) said that as energy demand fails to keep pace with



the rise in supply, the poor financial health of state distribution companies (DISCOMs) have hampered them from committing to long-term power purchase agreements (PPAs).

A sustained fall in utilization levels can be a major earnings risk, and running power plants at sub-optimal levels would hamper returns. The sustained pressure on coal plant load factors is an area of concern as it affects efficiency parameters.

### **1.2 Plant Load Factor (PLF):**

$$\text{PLF (\%)} = \text{Total Generation/Installed Quantity}$$

PLF determines the exact loadability of the thermal power plant. Indirectly, it gives the performance of the power plant. If the PLF is 100%, it means plant is running on full load as per installed capacity. As the PLF approaches 100%, the performance of the thermal power plant also increases. Among various advantages of higher PLF, one of the major one is reduction in the planned or forced outages, that finally optimises auxiliary power consumption. On higher load, all the respective auxiliaries also run on full load, which results in utilisation of various auxiliaries at higher efficiency. Ultimately life of the auxiliary also increases. Hence PLF is found to be the key indicator for the analysis of performance of any power plant.

The Plant Load Factor is commonly considered as a measure of a power plant's capacity utilization. The Central Electricity Regulatory Commission defines Plant Load Factor as a percentage of energy sent out by the power plant corresponding to installed capacity in that period. For example, if a power plant with an installed capacity of 500 MW operates through the day at its maximum load, the energy generated will be:  $500 \text{ MW} \times 24\text{hr} = 12,000 \text{ MWh}$ .

### 1.3 Current Scenario:

In India, the average PLF hovers around 60 per cent, even which is accounted for by higher generation from public sector undertaking plants. Private power plants, on the other hand, have much lower PLF, close to 55.32 per cent as shown in Fig 3.

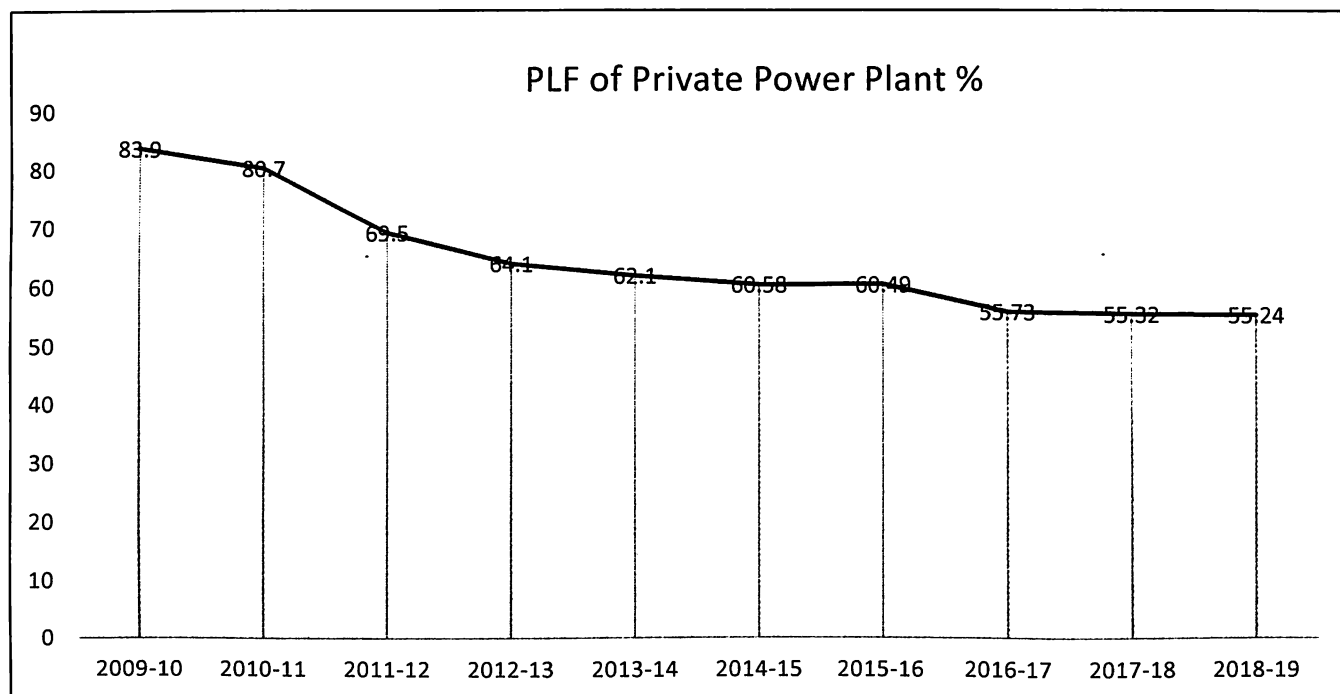


Fig 03: Plant Load Factor of Private Power Plant

India's power generators continue to face declining capacity utilisation, mainly because financially stressed power-distribution companies are unable to purchase power. A sustained fall in utilization levels can be a major earnings risk, and running plants at sub-optimal levels would hit returns. The fall in utilization, indicates the discretion in electricity purchases by state utilities. The coal construction boom in the first half of this decade has now come to an end but leaves a critical legacy of significant over-capacity. The construction boom in the early 2010s was so pronounced, in fact, that the amount of installed coal-fired capacity in India is now 20 percent higher than the country's peak demand level and fully 50 gigawatts (GW) above average demand levels.

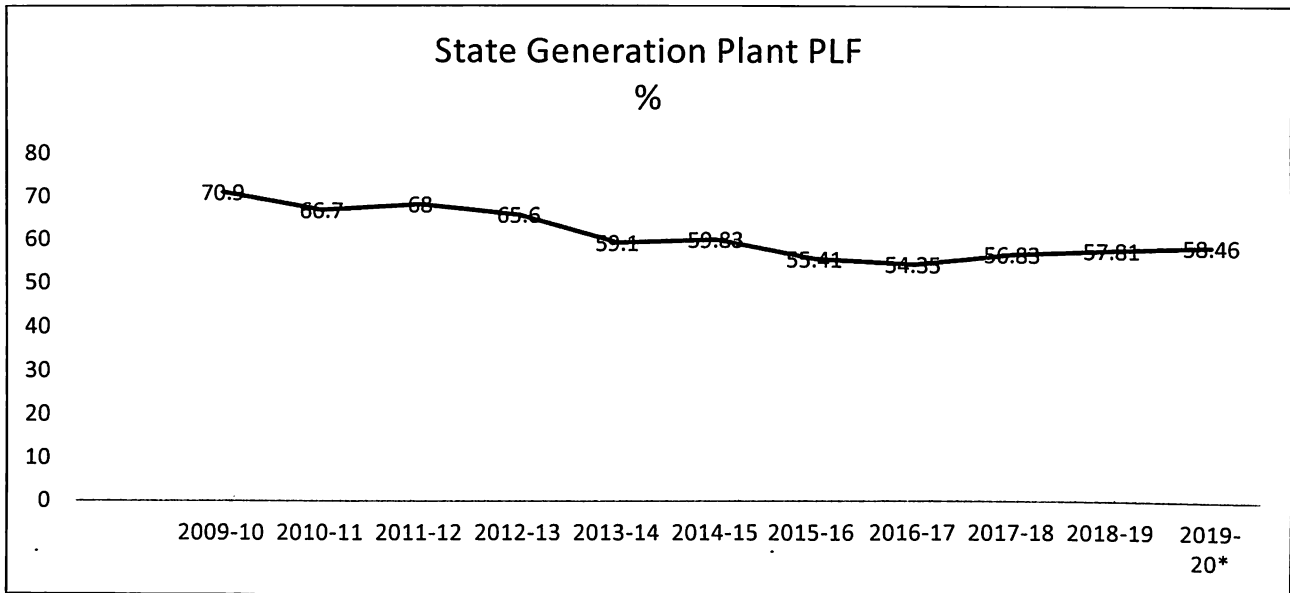


Fig 04: Plant Load Factor of state generation Plant.

Plant load factor of state generation plant is also not satisfactory but in year 2017-18, improvement observed and it's presume that in the coming year there will be improvement in the Plant Load Factor of state generation Unit due to various initiative taken by Government of India.

The All-India thermal plant load factor (PLF) fell to 51% in August 2019 (August 2018: 55.5%), due to decrease in central, state and private sector PLF . The coal inventory at thermal power stations rose 46.8% yoy to 21.6 mt in August 2019, however, declined 11.1% mom due to lower coal production, according to India Ratings.

Coal India Limited's (CIL) production fell 10.3% yoy in August 2019, owing to lower production at its subsidiaries Western Coalfields Limited (WCL; down 26.4% yoy), Mahanadi Coalfields Limited (MCL; down 26.8% yoy) and South Eastern Coalfields Limited (SECL; down 17.7% yoy). MCL's production, which contributes over 20% to CIL production, declined on account of protest at its Talcher mine in Odisha. SECL's production declined due to a mine accident and WCL's production fell due to higher-than-expected rainfall in August 2019.

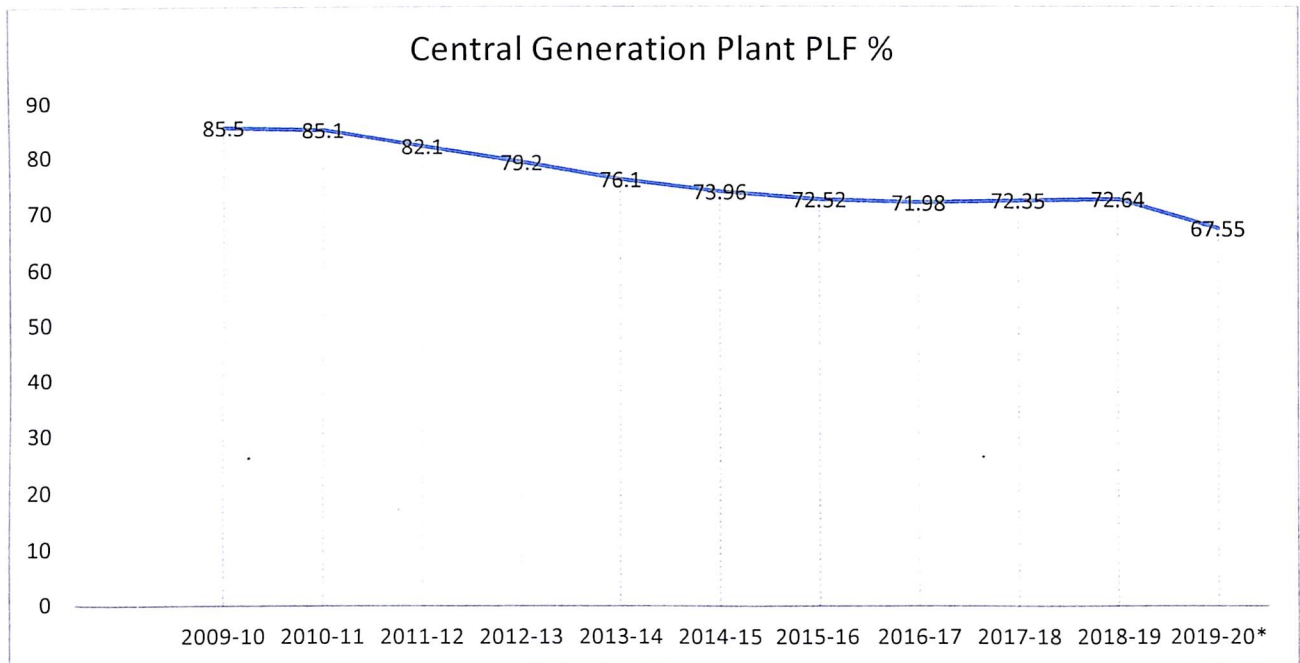


Fig 05: Plant Load Factor of Central generation Plant.

As indicated in the trend, condition of Central generation unit is somewhat better in comparison with State and Private players but downtrend is alarming.

Utilization has been steadily trending lower in recent years due to subdued demand. But the drop seems to have accelerated recently. “The 720-basis-point drop in NTPC’s coal PLF to 71% at the peak summer in May, which recorded the highest energy/peak demand, is quite surprising. The difference between the all India thermal PLF and NTPC’s coal PLF was at a record low of 8%. The fall in utilization coincides with a pickup in hydropower generation and in renewable energy. Given renewable energy’s must-run status, power distribution companies (Discoms) would have reduced thermal power purchases. While tariffs in renewable energy have steadily fallen to ₹2.50 per unit, the average tariff at NTPC has risen from ₹3.18 in FY16 to ₹3.38 in FY19. The tariff rise at the company may not be huge and the gap with renewable tariffs may not appear large, but for cash-strapped bulk buyers, such as state power discoms, the savings are considerable. Some of NTPC’s newly-built plants have significantly higher variable costs, resulting in tariffs of more than ₹4 a unit. As

states come across less-expensive alternatives in the form of hydropower, renewable or even spot thermal power, they generally back away from costly power-purchase agreements.

Year	PLF	Sector-wise PLF (%)		
	%	Central	State	Private
2009-10	77.5	85.5	70.9	83.9
2010-11	75.1	85.1	66.7	80.7
2011-12	73.3	82.1	68	69.5
2012-13	69.9	79.2	65.6	64.1
2013-14	65.6	76.1	59.1	62.1
2014-15	64.46	73.96	59.83	60.58
2015-16	62.29	72.52	55.41	60.49
2016-17	59.88	71.98	54.35	55.73
2017-18	60.67	72.35	56.83	55.32
2018-19	61.07	72.64	57.81	55.24
2019-20*	60.96	67.55	58.46	58.07

Table 06 : Comparison of PLF Between Central, State & Private Sector

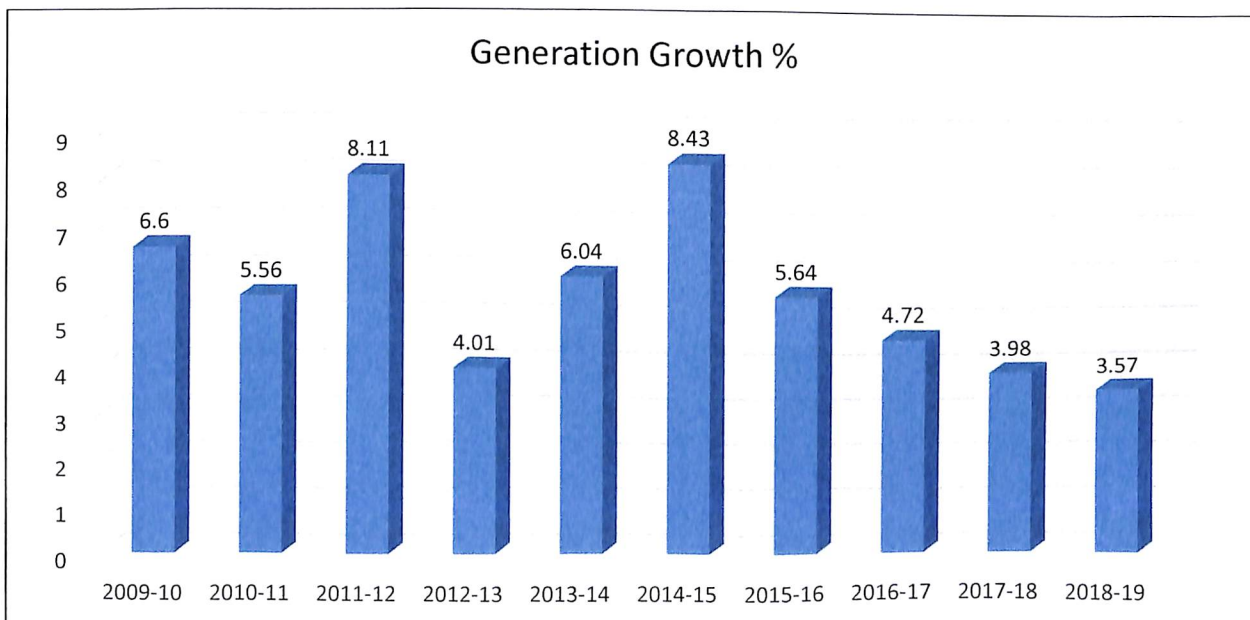


Fig 06: Generation Growth in %

Declining Plant Load Factor and downtrend in generation growth reveals a fact that there is requirement of power but due to various factors India Thermal sector are hammered by declined PLF. In the report we will see the various factors responsible for decline PLF, what all the consequences generated due to low PLF, what all the steps taken by Government of India to improve the PLF, What more need to done in order to improve the Plant Load Factor.

#### **1.4 Objective of Project:**

- To Study and analyse the plant load factor of Thermal Power Plant.
- To Study and analyse the India's IPPs hammered by declining Plant Load Factor.
- To analyse the action need to improve the PLF.
- To study the key reason for stresses in power sector.
- To identify the consequences & the steps involved in capacity Utilization.

To analyse different suggested measure to improve the PLF which in turn convert the stressed assets to performing assets.

#### **1.5 About the Organisation:**

M/s Korba west Power company Limited(KWPCL) , a company incorporated under the companies Act 1956 and having its registered office at 301,Rajinigandha,Green Garden Estates, City Centre,Gwalior-474011,Madhya Pradesh. The KWPCL has installed capacity of 1X600 MW coal based thermal power plant at Village-Chhote Bhandar, PO-bade Bhandar, Tehsil-Pussore, Dist-Raigarh, Chhattisgarh. The main plant BTG portion was supplied by BHEL, India.

The various mile stones of KWPCCL are:

Zero Date	01st May 2009
First Boiler light Up	06th Mar 2013
Steam Blowing	23rd Aug 2013
Oil Synchronisation	08th Oct 2013
COD	01st Apr 2014
72Hr. Full Load Operation	27th Feb 2015

Table 4: Mile stones of KWPCCL

The KWPCCL entered into a Power Purchase Agreement (PPA) with Chhattisgarh State Power Trading Company Limited on dated 09th Feb 2015 for supply of 05% of the net power generated from the power station i.e. 30 MW. As of record KWPCCL do not have any Long term Open Access for its rest 95% of power. However it can sell its rest of generating power in power trading market to different open access consumers in different region of India. Another option is to put its power sell bid on the power exchange.

Fuel Supply Agreement (FSA) was made on dated 9th November 2015 between Mahanadi Coalfields Limited (MCL) and KWPCCL on dated 9th Nov 2015 for the supply coal to its 600MW power plant.

Total LOA quantity is 2.315 MT, out of which 0.115749MT was allotted against long term PPA furnished (Annual Contracted Quantity-ACQ) including admissible quantity for



transmission loss and auxiliary consumption (for 30 MW). However for rest 2.199251 MT coal, no long term PPA was furnished/available till date. This agreement is valid for 20 years from the effective date of 23.07.2015.

Description	FY 2015-16	FY 2016-17
Generation Capacity (MU)	5270	5256
Actual Generation (MU)	2272	2819
Plant load Factor (PLF) %	43.11	53.6
Aux Power Consumption%	6.5	5.79
Specific Oil Consumption ml/KWH	0.73	0.38
Specific Coal consumption gm/KWH	743	739

Table 08: KWPCCL Statistics

If we see the performance of for the FY2015-16 and FY2016-17, it is observed that PLF in both the FY were 43.11% and 53.6% respectively. The Auxiliary Power Consumption (APC), Specific Oil Consumption (SOC), Specific Coal Consumption (SCC) are in improved trend from the FY16 to FY 17 and this indicates that Plant performance was better , but due to less demand PLF was on down trend.

### 1.6 Problem Statement:

India's IPPs hammered by declining Plant Load Factor & decline in utilization has led to significant financial troubles for coal utilities and India's power distribution companies. About 20 percent of India's total coal capacity had been identified as "stressed assets".

The manifestation of risks to Indian coal generation—including overbuilt coal capacity, competition from renewables and water availability issues—can be seen already in lost

generation and growing sector-wide financial risk. Going forward, these risks are expected only to increase.

Power generation units in India are running below capacity as debt-ridden power distribution companies (discoms) shy away from buying more power. The robust capacity addition that the government has been boasting of has actually aggravated the problem as several independent power producers have been forced to scale down output as demand continues to be muted.

There are 12,000 MW of new capacity which have no power purchase agreements. If they had, then the demand-supply gap would have widened even more. Power sector executives have been worried about the reluctance of loss making discoms to enter into power purchase agreements.

Lack of fuel and then low demand from buyers has forced generators to run below optimal capacity while industry is forced to fuel operations with expensive power generated from diesel generator sets. India has a total installed capacity of 90,000 MW of diesel generator sets, providing power at upwards of 20 a unit.

34 thermal power projects, representing 40 GW of capacity, going sour, jeopardizing Rs 1.74 lakh crore in bank loans, becoming the principal line item in India's terrifying bad loans problem. And yet, some of India's top banks are staring at the spectre of taking as much as an 80% haircut in massive loans extended to power plants. And now, with India's new bankruptcy rules and a recent central bank directive, the parties involved are also running out of time for negotiation and course correction. The private sector was always allowed to produce power, but the enactment of the Electricity Act, 2003, which liberalised the entry of the private players, was the watershed. The decision paid rich dividends as private companies delivered in spades. In no time, they were adding more megawatts (MW) in capacity than all the state-owned utilities that had dominated the sector all these years.

During the 12th Five-Year Plan, private firms added 54,279MW of capacity (of the total 99,209MW capacity added), achieving 116% of the target given, according to the Union ministry of power. State government-controlled utilities added 24,477 MW, whereas the central PSUs generated an additional capacity of 20,452 MW. The massive contribution by the private sector helped achieve the good news described earlier. In 2017, India became a net power exporter, selling 5,798 million units to Nepal, Bangladesh and Myanmar.

This would have been unimaginable just five years ago. It must be noted that total installed capacity does not mean all of it is produced. Production depends on demand, which is linked to consumer's access to electricity and her ability to pay.

The viability of a thermal power plant, therefore, depends on a complex matrix of factors. Seamless availability of coal, power purchase agreements with distribution companies at a favourable rate, demand and the price of non-thermal sources of power. Many of these companies were affected by the Supreme Court's 2014 cancellation of coal block allocations

The challenge from renewable sources is another factor. Solar, for instance. In May 2017, the Solar Energy Corporation of India received a winning bid of Rs 2.44 per kilowatt hour (kWh) from ACME Solar Holdings Pvt Ltd for a 500 MW phase of the 10,000-hectre Bhadla Solar Park, bordering the Thar desert. Thermal power prices averages Rs 3.7 per kWh in India's power exchanges. Suddenly, for tariff-sensitive and debt-saddled distribution companies that are mostly owned by state-governments, which love nothing more than to be able to offer cheaper power to voters, there was a cheaper source of power. They were not about to conclude power purchase agreements in a hurry.

S.No.	Source	2014-15	2015-16	2016-17	2017-18	2018-19
	% Renewable power	17.28%	16.02%	16.52%	17.50%	19.10%
	<b>Total</b>	<b>191,025</b>	<b>187,158</b>	<b>204,182</b>	<b>227,973</b>	<b>261,797</b>
	Total utility power	1,105,446	1,168,359	1,236,392	1,302,904	1,371,517
1	Large Hydro	129,244	121,377	122,313	126,134	135,040
2	Small Hydro	8,060	8,355	7,673	5,056	8,703
3	Solar	4,600	7,450	12,086	25,871	39,268
4	Wind	28,214	28,604	46,011	52,666	62,036
5	Bio mass	14,944	16,681	14,159	15,252	16,325
6	Other	414	269	213	358	425

Table 09: Year Wise Renewable Energy Generation

India added more capacity in renewables than in the thermal and hydro sectors combined. Thermal power contributes around 65% to India's energy basket. All of this meant the companies that set up coal-fired thermal power plants were either unable to start production for lack of coal, or were unable to find buyers.

## **CHAPTER 2: LITERATURE REVIEW, POLICY REVIEW AND RESEARCH METHODOLOGY.**

### **2.1 Literature Review:**

To check the efficiency of thermal power plant, plant load factor is being used as a metric by the Ministry of Power.

From the last five year, it has been observed that private sectors of Indian thermal plant are facing a declination in plant load factor.

A low PLF is bad for the power plant as it indicates that the plant is not being used to its optimal capacity. This will increase the per-unit cost of the power thus produced, making it unattractive for purchase by Discoms. A higher PLF, on the other hand, will generate a greater total output which will reduce the cost per unit of energy generated. The higher the output, the lesser will be cost per unit. The additional energy produced would also result in an increase in revenue of the plant.

In this report we will emphasize on all the factors that leads a low PLF, action need to take to improve the PLF, steps taken by government of India to ascent the PLF, the ill effects arises due to consistent declination in PLF & suggested measure to improve the PLF which in turn convert the stressed assets to performing assets.

Coal and Discom financial health were the two key constraints to the overall PLF.

However, demand, solar capacity addition and discom financial health will be the major factors putting pressure on PLF in future.

Report will also reveals that how long-term power purchase agreements (PPAs) and assured supply of coal ensure the financial health of a power producer.

Significant capacity addition in the same period, lack of fuel supply, the high cost of imported coal, lack of long-term Power Purchase Agreements with the Discoms for off-take of power, increase in availability of affordable power from wind, solar and hydro power put pressure on PLF.

Power generating companies are not earning enough to pay interest on loans from Banks. These loans become NPAs necessitating banks to make substantial provisions. As a consequence the companies are reluctant to invest in new capacities and bad loan encumbered banks are reluctant to lend. Power sector, thermal in particular, is one of the sectors that has contributed the most to the NPAs. Considering the gravity of the issue and its potential to harm not only the Banking Sector but to hinder further investment in Power Sector which has grown at tremendous pace in the recent years

During the last ten years, the public sector (both Central and State combined) contributed 73,402 MW while private sector alone contributed 77,891 MW capacity addition. In order to strengthen the economy, private sector participation can't ignored and necessary step need to take to improve overall health of IPPs.

India is also acutely aware that its existing coal fleet is underutilized, and notes that over the past five years, the national average plant load factor (PLF) for India's coal and lignite plants – a measure of average capacity utilization – began a downward tumble. The Power Ministry expects that by 2021-2022, coal unit PLF could fall to 56.5%.

Even 1% improvement in PLF makes available on additional 450 MW of power. Thus improvement in PLF will increase power supply as well as generate more financial resources for power plants.

## 2.2 Policy Review:

Major policies and regulations affecting the trading scenario:

### *Inception of Power Trading Corporation, 1999*

- Facilitator for market participant in finding counterparts.
- Low volume relative to huge demand

### *Availability Based Tariff, 2002-03*

- Incentive for generator for efficient operations and central dispatching.
- Grid security problems due to over drawl on high UI charges

### Electricity Act, 2003

- Identified trading as a distinct licensed activity.
- Provided provision for open access
- De-Licensing of Generation
- Development of multi buyer & multi seller market in power
- Introduced trading & competitive bidding for procurement of electricity

### National Electricity Policy, 2005

- Measures to promote competition aimed at consumer benefits
- Promote competition for optimal pricing of power

### Electricity (Amendment) Bill 2014

- Enhance efficiency and completion in distribution sector
- Strengthen grid security and safety.
- Promote renewable energy and encourage open access
- Rationalise tariff



## Coal Mines Act (Auction of Coal Blocks), 2015

- 2015 - Auction of Coal Blocks to power generators for captive mining.

## Prudential framework for resolution of stressed assets

- The revised framework [FRESA – Framework for Resolution of Stressed Accounts] has much larger room for discretion to lenders. The RBI has reserved the rights, under sec. 35AA of the BR Act, to refer specific borrowers to the IBC, the FRESA gives liberty to the members of the joint lenders forum consisting of banks, financial institutions, small finance banks and systemically important NBFCs, to decide the resolution plan. The resolution plan may involve restructuring, sale of the exposures to other entities, change of management or ownership of the borrower, as also reference to the IBC.

## Insolvency and Bankruptcy Code, 2016 (updated on 06.08.2019)

- The Insolvency and Bankruptcy Board of India (IBBI) is the regulator for overseeing insolvency proceedings and entities like Insolvency Professional Agencies (IPA), Insolvency Professionals (IP) and Information Utilities (IU) in India. It was established on 1 October 2016 and given statutory powers through the Insolvency and Bankruptcy Code, which was passed by Lok Sabha on 5 May 2016. It covers Individuals, Companies.

Report of the High Level Empowered Committee to address the issues of Stressed Thermal Power Projects.

## **2.3 Research Methodology:**

In this project, Descriptive and Historical research methodology is used for various analysis. Descriptive research is usually a fact finding approach generalizing a cross-sectional study of the present and future energy market condition in India.

Historical research is used for getting the details on past Indian Energy market scenario -sector wise generation data of 2018~2019 and the percentage growth of generation capacity addition is calculated.

Analysis of Load Generation Balance (LGBR) Report is analysed. Region wise electricity demand and availability is calculated. Current power deficit, surplus scenario of different region is calculated.

Analysis of 37th Lok sabha Report of Standing committee on Energy has been analysed.

Analysis of CERC Executive summary-March'19 on Power Sector has been analysed.

Included case study approach to find out the ways to revive the stressed thermal power assets in India.

Take a support of prudential framework for resolution announced by RBI for stressed assets to analyse the measures taken for stressed assets.

#### **2.4 Downtrend in Independent Power Producer's Plant Load Factor**

India's financial year (FY) 2018-19 was marked by a record slowdown in thermal generation capacity additions in the electricity sector.

From the highs of 20 gigawatts (GW) of new coal-fired power plants commissioned every year between FY13 to FY16, net capacity additions from coal over the past three years have been 7 GW, 5 GW and 1.2 GW, respectively.

The FY19 net capacity additions for coal account for 3.3 GW of new capacity added during the financial year minus 2.1 GW of capacity retired up to 11 months (plant retirement data is not yet published for March 2019).

The continued decline in thermal capacity additions is the result of a fundamental change in electricity market dynamics driven by competition from cheaper renewable energy sources.

Lack of policy clarity and power evacuation infrastructure, the imposition of trade duties on imported solar modules, and the high number of tender cancellations materially tempered the momentum in renewable generation capacity as well.

Only 6.7 GW of renewable capacity was added until February 2019 compared to 12 GW added during the previous financial year.

Renewable energy tendering activity is still exhibiting the pace required to achieve the government's ambitious target of 175 GW of renewable capacity by FY22.

According to the Ministry of Renewable Energy's recent statement, 75 GW of renewable capacity has been installed, 28 GW auctioned and 38 GW of capacity is under various stages of tendering and bidding. Further, more than 95 per cent of awarded variable renewable capacity last year came in at sub-Rs. 03 per kilowatt hour (kWh).

India's timely transition to a low-cost, lower-emission, domestic-focused electricity sector is inevitable. New Global Energy Monitor (GEM) data released in January 2019 showed that state-owned thermal power giant NTPC proposed more than one-fifth of the country's pipelined capacity that currently lies in various pre-construction stages.

Private players are especially vulnerable because they cannot receive letters of assurance for coal allocation without PPAs. Domestic coal prices have also been increasing year-on-year over the past six years, and already financially strapped generators must pass on that cost to consumers.

Yet another issue assailing generators is the exorbitant cost of freight, which constitutes 20% to 30% of fuel costs for thermal plants – which are typically sited away from coal sources. "Freight charges in India are among the highest in the world," and they have increased by nearly 50% over the last five years alone.

Finally, compounding supply and demand challenges faced by coal generators, a large number of projects experience execution challenges, which inevitably result in delays and cost overruns.

## **2.5 Reason behind Low PLF**

It is clear that the low PLF was not just on account of coal shortage, as it was made out to be. The low PLF is, paradoxically, an indicator of excess base load capacity in the system, even when there are shortages during peak hours. Due to the cyclical nature of demand, several coal plants operate at sub-optimal loads during the night and off-peak hours, resulting in low, average annual PLF. Not only does such cycling cause harm to the machinery, but adds inefficiencies to generation.

Reserve margin of a system is defined as the difference between the Installed Capacity and the peak load met as a percentage of the peak load met. This factor depends on a number of parameters, major ones being the mode of power generation i.e. hydro, thermal, and renewable and the availability of the generating stations which primarily is a function of forced and planned shutdown of the generating units, capacity of the Discoms to procure power. This increase in Reserve Margin is on account of decrease in thermal PLF from 73.32 % in 2011-12 to 59.88 % in 2016- 17.

Lowest PLF, even when the output has touched a trillion unit mark is a concern which needs to be examined and corrective action needs to be taken. Otherwise, the burden of under utilised capacity will have to be borne by those same consumers for whom various subsidy schemes are being worked out. A possible solution to this is that certain flexible technologies like storage hydro plants and gas-based reciprocating engine plants are also made part of the system. This will not only bring down the overall investment requirement for the same installed capacity, but also improve efficiency of the coal or base load stations by allowing it to operate at optimum PLF, while the variability is taken care by flexible plants.

The reason behind the low PLF could be that there has been a sharper increase in total capacity as compared to the growth in demand. Coal shortages and grid problems are also responsible. But a more fundamental problem is the dysfunctional nature of distribution companies (DISCOMS)—inefficiently run with huge losses, they don't have the money to buy power and supply it to people. Meanwhile, huge generating capacity lies idle. This also exacerbates pollution problem—DISCOMS prefer buying from the older, more polluting power plants because their electricity is cheaper than that generated by the new plants.

This happens because the old plants are fully depreciated and, as a result, their input cost is lower. While the introduction of standards for new plants is a welcome move, more work is needed to address impacts of the existing old power plants. Old plants accounted for the bulk of the environmental impacts in the CSE study. Without stricter requirements on old plants, there will be little incentive to invest in improved technologies.

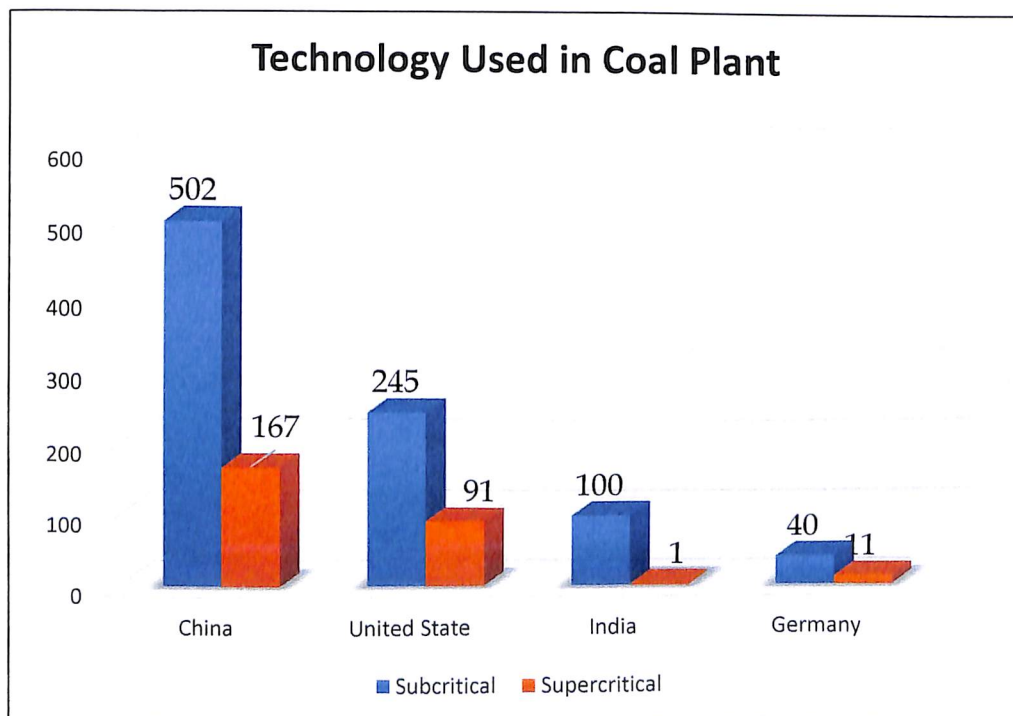


Fig 07: Technology used in coal plant in major countries.

In a recent departure from its policy to retire relatively small capacity (around 4 GW of capacity in the 13th Five Year Plan period), the government announced it plans to retire 36 GW of old coal-fired units.

## **2.6 Way to Improve Low Plant Load Factor**

Development of Power Projects on Tariff Based Bidding ensures the competitive procurement of electricity by the distribution licensees is expected to reduce the overall cost of procurement of power and facilitate development of power markets. As per the revised Tariff Policy "All future requirement of power should continue to be procured competitively by distribution licensees except in case of expansion of existing projects or where there is a company owned or controlled by the State Government as an identified developer and where regulator will need to restore to tariff determination based on norms provided that expansion of generation capacity by private developers for this purpose would be restricted to one time addition of not more than 100% of the existing capacity.

Development of Ultra Mega Power Projects.

Development of Ultra Mega Power Projects is to achieve faster capacity addition and to minimize the cost of power to consumers due to economy of scale. Four UMPPs were awarded to the developers selected through tariff based competitive bidding which are Mundra UMPP in Gujarat, Sasan UMPP in MP, Krishnapatnam UMPP in AP and Tilaiya UMPP in Jharkhand. All units of Mundra UMPP (5X800 MW) and Sasan UMPP (6X660 MW) have been commissioned. The developer of Krishnapatnam Ultra Mega Power Project, namely M/s Coastal Andhra Power Ltd (CAPL), had started the construction work but has stopped the construction work citing new regulation of the Government of Indonesia as the reason which prohibits sale of coal, including sale to affiliate companies, below bench mark price. Andhra Pradesh Southern Power Distribution Company Limited (APSPDCL), who is the lead procurer from Krishnapatnam Project has issued termination notice to Coastal Andhra Power Limited (CAPL). CAPL had approached the High Court of Delhi. The Delhi

High Court has dismissed the petition of CAPL on 2nd July, 2012. CAPL has approached Division Bench, Delhi High Court as well as Indian Arbitrator Council for arbitration. The matter is subjudice. For Tilaiya UMPP, the developer (Jharkhand Integrated Power Ltd, a subsidiary of RPL) has issued notice of termination of Power Purchase Agreement on 28th April, 2015 citing non transfer of land to the developer by the Jharkhand Government. Procurers have accepted the termination notice in November, 2015 and after transfer of SPV (Special Purpose Vehicle), necessary development activities for re-bidding would be started as per revised standard bidding documents(SBDs).

Distribution is the most important link in the entire power sector value chain. As the only interface between utilities and consumers, it is the cash register for the entire sector. Under the Indian Constitution, power is a concurrent subject and the responsibility for distribution and supply of power to rural and urban consumers rests with the States. However, Government of India provides assistance to states through various Central sector / centrally sponsored schemes for improving the distribution sector.

Efficient operation of the thermal unit is very critical due to cost and reliability factors. The cost implication due to excess in the heat rate, oil consumption, make-up water consumption, excess air, condensed back pressure, etc indicate the urgent need to control these parameter. Autonomous & IT system have made the power plants much more efficient and faster.

Adequacy of Generation Capacity both existing & upcoming has been analyzed for meeting the projected peak demand. Studies have been carried out to find out the optimal generation mix to meet the peak electricity demand and electrical energy requirement for the year 2029-30 with the objective to minimize the total system cost subject to various constraints. The generation capacity mix for the year 2021-22 as projected in National Electricity Plan. The base year of the study has thus been taken as 2021-22. Therefore, the study period from 2022-23 to 2029-30 has been considered to arrive at the optimal generation capacity mix for

the year 2029-30. The projected installed capacity of the power plants of the country by the end of 2021-22 as per NEP is 4,79,419 MW comprising of 51,301 MW Hydro; 2,17,302 MW Coal; 25,736 MW Gas; 10,080 MW Nuclear, 175,000 MW RE has been considered as the base capacity. The 19th Electric Power Survey (EPS) projections for peak electricity demand and electrical energy requirement have been considered for the studies. Electricity demand assessed by the 19th EPS Report gives the year-wise demand upto 2026-27 and then long term demand projections of 2031-32 with CAGR for peak demand and energy requirement. The demand for 2029-30 has been assessed with a CAGR of peak demand of 4.4% and that of energy requirement of 4.33% from 2027-2032.

Years	Electrical Energy Requirement (BU) EX BUS	Peak Electricity Demand (GW)
2021-22	1566	225.751
2026-27	2047	298.774
2029-30	2325	339.973

Table 10: Futuristic comparison between Energy Requirement & Peak Electricity Demand

## 2.7 Case Study on Korba West Power Company Limited

For the 600MW unit, assuming that its declared capacity is 100% for the FY 2016-17 i.e. 5256 MU in a year. For KWPCCL, the power scheduled (as its PPA is only for 30 MW & rest can be traded under STOA) in the FY 2016-17 was 2637.22 MU and power export was 2557.78 MU. Assuming that total power was traded through STOA, without considering the PPA for 30 MW and the rate, if traded at 3 /kWh, just for calculation purposes.



Month	Power Generation on Capacity MU	Total Export Schedule MU	Actual Export done MU	Power Generated MU	Loss in MU of Generation due to less Schedule	Loss in % of Generation due to less schedule
Total	5256	2637.22	2557.78	2819.48	2436.52	46%
Cost in crore for trading @ 3 Rs/KWH	157.7	79.1	76.7	84.6	73.1	

Table 11: Approximate losses due to low PLF at KWPCCL in the year 2016-17

It is clear that, a huge revenue loss of 73.1 Cr. was incurred due to unavailability of full capacity export schedule. The loss in MU of generation due to less schedule was 2436.52 MU. The PLF for the year 2016-17 stood at 53.6% .Being a single unit of 600 MW capacity, if there is no generation or less generation, the auxiliary power consumption is still there and import of power is required for unit in idle condition to cater power to the auxiliary drives like lubricating oil pumps.

The unavailability of long term PPA with low ACQ (proportion to the PPA for 30 MW) leads to the burden of heavy input fuel cost and coal was procured through e-auction to meet its fuel requirement. As per the Standing Committee on Energy report, the estimated cost of KWPCCL was `4929 Cr and with no viability of sustainable operation, No long term PPA beyond meagre 30 MW, the company filed for insolvency and the case has put under jurisdiction of NCLT.

Lenders are taking about a dozen stressed power projects, including Jaiprakash Associates' Prayagraj PowerGen, KSK Mahanadi, Maheshwar Hydro, Essar Mahan, Jindal India Thermal and GMR Chhattisgarh, to the NCLT after courts denied extension of the RBI

defined deadline for resolving these non-performing accounts (NPA) outside the bankruptcy process.

On 12 February 2018, the Reserve Bank of India (RBI) had set a 180-day timeline starting March 2018 for resolving large corporate loan defaults, failing which banks have to refer these cases for insolvency proceedings.

The instant application No. 236 of 2019 in CP(IB) No. 190/2018, is filed by the applicant, the Resolution Professional of Corporate Debtor Korba West Power Company Limited, under section 30(6) read with Section 31(1) of the Insolvency and Bankruptcy Board of India (Insolvency Resolution Process for Corporate Persons) Regulations, 2016 with the following prayers:

- a) Pass an order approving the Resolution Plan submitted by the successful resolution applicant in respect of the corporate Debtor under section 31(1) and declare that the same shall be binding in the Corporate Debater and its employees, members, all creditors, guarantors and other stakeholders in the ICR process of the Corporate Debtor.
- b) Pass appropriate directions for grant of relief and waivers sought for by the successful Resolution Applicant under section 6, Part V of the resolution Plan.

The detail of financial claim submitted by Resolution Professional as on March 7, 2019 are mentioned herein below:

S.No.	Name of the Bank	Amount Claimed	Amount Admitted	Voting Share (%)
1	Adani Power Limited	1878.52	1878.52	37.33
2	Axis Bank	351.11	351.11	6.98
3	Union Bank of India	327.2	327.2	6.45
4	UCO Bank	284.75	284.75	5.66
5	Bank of India	254.16	254.16	5.05
6	Central Bank of India	187.62	187.62	3.73

7	LIC of India	172.18	172.18	3.42
8	Allahabad Bank	160.24	160.24	3.18
9	Bank of Maharashtra	159.25	159.25	3.16
10	Corporation Bank	157.25	157.25	3.12
11	Phoenix ARC	154.72	154.72	3.07
12	State Bank of India	147.01	147.01	2.92
13	Syndicate Bank	131.94	131.94	2.62
14	Edelweiss ARC	123.1	123.1	2.45
15	United Bank of India	118.88	118.88	2.36
16	Dena Bank	114.03	114.03	2.27
17	Andhra Bank	110.69	110.69	2.2
18	SREI Infrastructure Finance Limited	107.69	107.69	2.13
19	Aditya Birla Finance Limited	94.98	94.98	1.89

Table 12: KWPCCL financial claim submitted by Resolution Professional

Adani Power has been awarded a letter of intent to acquire debt-laden Korba West Power Company. "The company has been awarded the letter of intent (LOI) for Korba West Power Company Ltd (KWPCCL). The Committee of Creditors of KWPCCL, a company undergoing insolvency resolution process under the Insolvency and Bankruptcy Code, 2016, has approved the resolution plan submitted by Adani Power.

Adani Power will acquire a 100 percent stake in this Chhattisgarh-based power plant by paying Rs 204 crore to secured financial and operational creditors, the filing said. The debt will be restructured to the tune of Rs 1,000 crore with the deal being estimated to be completed by July end, it said. The Korba West Power plant, however, has not generated power since May 2017.

Under Pilot Scheme-II of Ministry of Power, Korba West Power Company supply 295 MW. Since a PPA is a prerequisite for getting coal linkage, these plants are under stress. The objective of the scheme is to facilitate procurement of power for three years from coal-based power plants that are already commissioned, but do not have PPAs.

## CHAPTER 03: ANALYSIS & REMEDIAL ACTION

### 3.1 Overview Of Stressed Assets

A condition in which a firm or an individual cannot generate revenue or income because it is unable to meet or cannot pay its financial obligations due to high fixed cost, ill liquid assets, revenue sensitive to economic downturn is termed as stressed assets.

Stressed Assets are the sum of NPA, Restructured load and written off assets. NPA is a loan whose interest and/or installment of principle have remained overdue for a period of 90 days. Restructured loan are that asset which got an extended repayment period, reduced interest rate, converting a part of loan into equity, providing additional financing or some combination of these measure. Write off assets are those where the bank and lender doesn't count the money borrower owes to it.

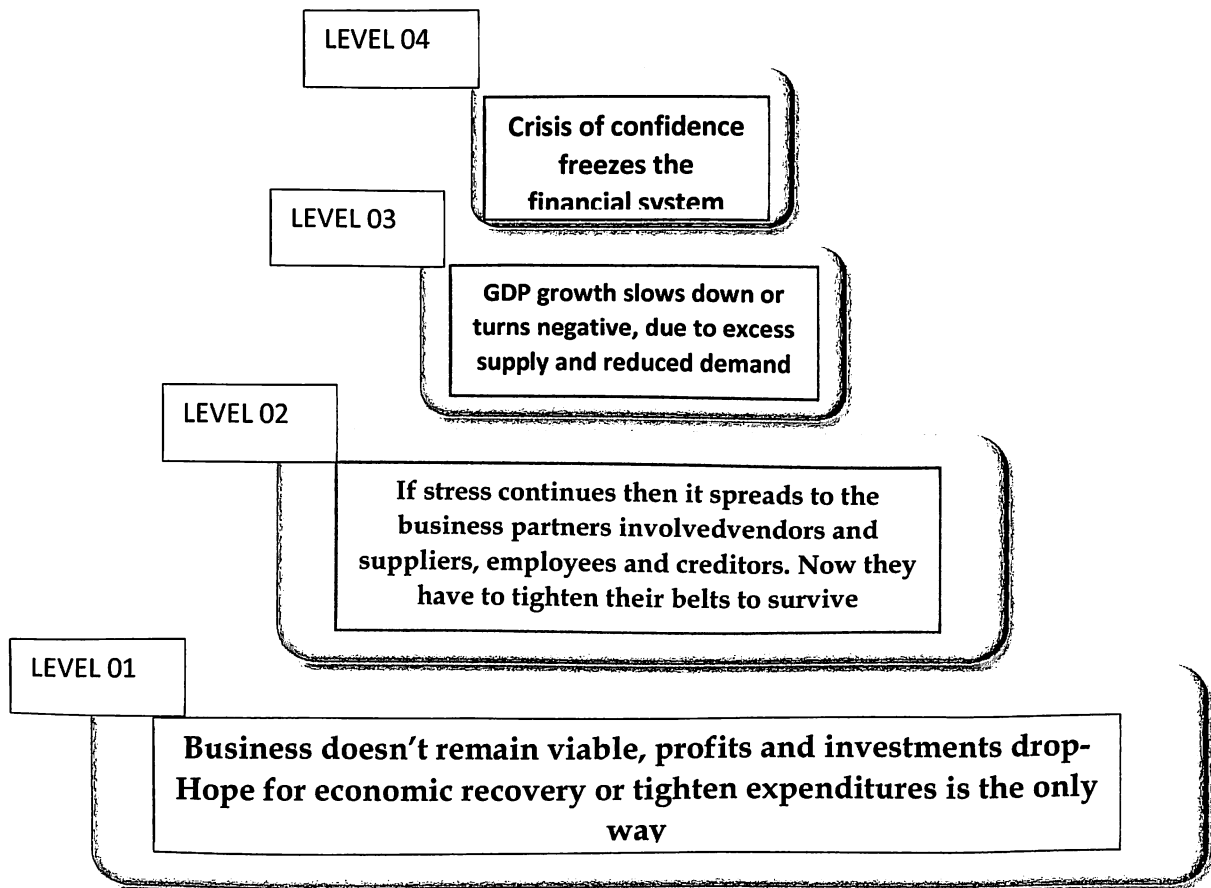


Fig 08: Consequences of stress at individual and macro level

India's power sector is in the midst of a crisis with ramifications of a wholly different kind. The crisis arises because firms accounting for significant proportion of power sector assets have defaulted on their debt servicing commitments, and banks are not able to find ways of restructuring that debt or recouping their money. So the RBI's guidelines requires that the assets should be liquidated to recover whatever is possible and compensate banks from which these firms had taken loans and then defaulted. But the assessment is that liquidation would yield the banks little, if anything at all.

There are 34 projects that have been identified as stressed, accounting 24,405 MW of commissioned capacity and another 15,725 MW of capacity still under construction. The total outstanding debt in these projects is Rs. 1.74 lakh crores. The projects are stressed either because the loans concerned have been declared non-performing assets or are identified as being potential NPAs. Gross NPAs in the power sector were at the end of June 2017 place at Rs. 37,941 crore, of which as much as Rs. 34,244 crore was in generation. But the magnitude of NPAs is set to rise in the coming weeks and months.

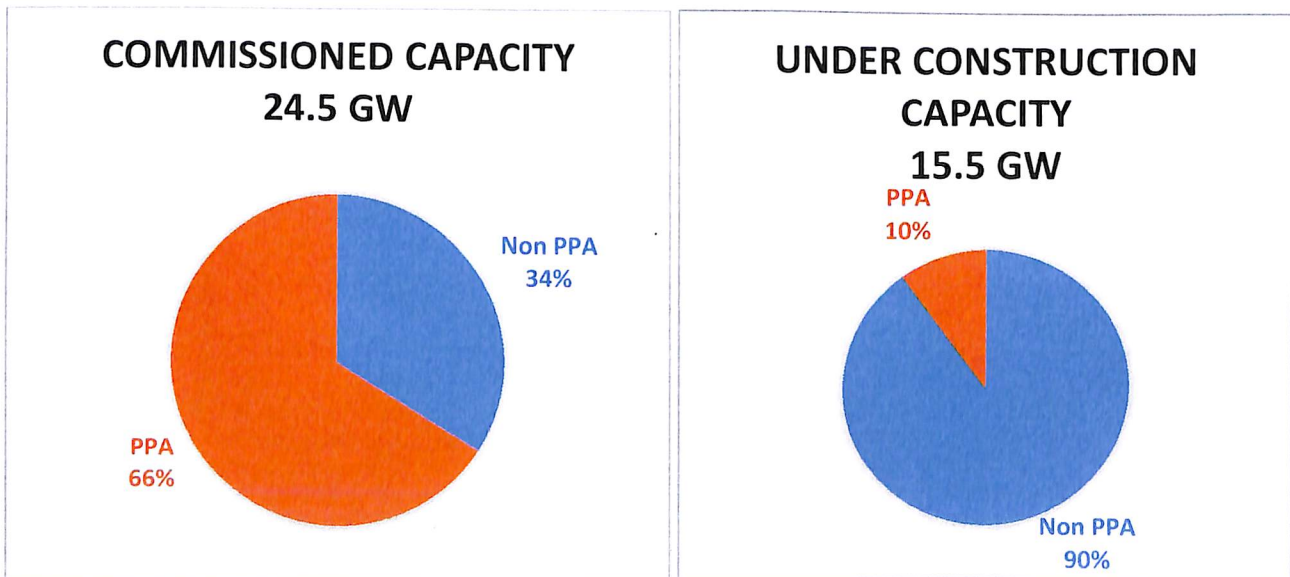


Fig 09: Stressed capacity in generation segment

Thermal capacity additions have outpaced the demand for power over the last five-six years, and the share of the private sector has increased from 29% in November 2012 to 46% in October 2018.

Total No.of Project	34
TotalStressed Capacity	40130 MW
Commissioned Capacity	24405 MW
Under Construction Capacity	15725 MW
PPAs Tied up	18516 MW
PPAs not Tied up	21614 MW
Linkages Available	29190 MW
Linkages Not Available	10940 MW

Table 13: Overview of Non-Performing Assets in Thermal Sector.

High capacity addition without tied-up Power Purchase Agreement (PPA) with distribution company (DISCOM), coal supply issues, inability of DISCOMs to pay to generators, regulatory challenges, inability of promoters to infuse equity, tardy implementation have all been responsible for stress in some coal based power plants to serve their debt. Department of Financial services (DFS) has provided a list of 34 projects, which have been indentified as stressed projects.

The following table captures an overview of these projects:

S.No.	Developer	Project	State	Total Investment (Rs Crores)	Public / Private	Lenders
1	Adani Power	Korba West Power Station	Chhattisgarh	4,929	Private	Commercial Banks - SBI, Bank of India, Central Bank, Dena Bank, Syndicate Bank, Allahabad Bank, Corporation Bank, Bank of Maharashtra, UCO Bank, United Bank, Union Bank, Andhra Bank NBFC - LIC
2	Adani Power	Tiroda TPP	Maharashtra	19,788	Private	Commercial Banks - SBI, BoB, Syndicate Bank, Corporation Bank PNB IOB, UCO Bank Union Bank NBFC - REC, PFC, LIC IFIs - China Development Bank, Standard Chartered, Industrial Commerce Bank of China
3	Adhunik Group	Mahadev Prasad TPP	Jharkhand	3,377	Private	Commercial Banks - SBI
4	Athena Energy Ventures	Singhitarai TPP	Chhattisgarh	6,224	Private	Commercial Banks - SBI
5	Avantha Group	Seoni Jhabhua TPP	Madhya Pradesh	4,806	Private	Commercial Banks - SBI, Bank of India, Corporation Bank, PNB, Oriental Bank of Commerce, UCO Bank, Union Bank & Axis Bank NBFC - LIC

6	Coal & Oil Group	Mutiara TPP	Tamil Nadu	7,706	Private	Commercial Banks - SBI & Indian Bank NBFC - PFC, HUDCO
7	Dainik Bhaskar Group	Baradarah TPP	Chhattisgarh	8,965	Private	Commercial Banks - SBI, BOB, Bank of India, PNB, Oriental Bank of Commerce, Union Bank NBFC - LIC, L&T Infra
8	Damodar Valley Corporation (Govt. of India)	Raghunath pur TPP	West Bengal	4,944	Public	NBFC - PFC, REC
9	East Coast Energy	Bhavanapadu TPP	Andhra Pradesh	3,670	Private	Commercial Banks - SBI NBFC - PFC
10	Essar Group	ToriPower Project	Jharkhand	4,831	Private	Commercial Banks - Central Bank NBFC - PFC, REC, PTC
11	Essar Group	Essar Mahan Power Plant	Madhya Pradesh	7,173	Private	Commercial Banks - ICICI Bank, PNB NBFC - REC, PFC
12	GMR Group	Raikheda Power Project	Chhattisgarh	11,542	Private	Commercial Banks - SBI Bank of Baroda, Dena Bank, Bank of India
13	GMR Group	Warora Thermal Power Plant	Maharashtra	4,250	Private	Commercial Banks - SBI
14	GMR Group	Kamalanga TPP	Odisha	6,519	Private	Commercial Banks - SBI NBFC - REC, IDFC
15	GVK Group	Goindwal Sahib Power Plant	Punjab	4,773	Private	Commercial Banks - IDBI, OBC NBFC - IIFCL
16	IndBarath Power Infra	Utkal TPP	Odisha	4,360 (up to Sep 2017)	Private	Commercial Banks - Bank of Baroda, Indian Overseas Bank, Corporation Bank, PNB, Vijaya
17	Jaypee Group	Nigrie TPP	Madhya Pradesh	10,023	Private	Commercial Banks - SBI, Bank of Baroda, Central Bank, Syndicate Bank, PNB, IDBI Bank, Corporation Bank, BOM, OBC & IOB United Bank Canara Bank, ICICI Bank NBFC - IDFC, LIC IFIs - JBIC



18	Jaypee Group	Bina TPP	Madhya Pradesh	3,518	Private	Commercial Banks - SBI, Allahabad Bank, PNB, Central Bank, Union Bank, Canara Bank, Karnataka Bank, J&K Bank
19	Jaypee Group	Bara Thermal Power Station	Uttar Pradesh	15,537	Private	Commercial Banks - SBI, Bank of Baroda, Indian Bank, Indian Overseas Bank, Bank of India, UCO Bank, United Bank, Canara Bank, Andhra Bank, IDBI Bank, Corporation Bank, Oriental Bank of Commerce, PNB NBFC - LIC, L&T Infra, L&T Finance
20	Jindal Group	Derang TPP	Odisha	6,875	Private	Commercial Banks - SBI, Bank of Baroda, Indian Bank, Central Bank, Punjab & Sind Bank, PNB
21	KSK Energy Ventures Limited	Akaltara Power Station	Chhattisgarh	20,428	Private	Commercial Banks - Oriental Bank of Commerce NBFC - PFC, REC, HUDCO IFIs - China Export and Credit Insurance
22	KVK Energy & Infrastructure Pvt. Ltd.	KVK Nilachal Power Station	Odisha	1,339 (up to Jul 2016)	Private	NBFC - PFC, IIFCL, HUDCO
23	Lanco Group	Amarkantak TPP	Chhattisgarh	10,315	Private	Commercial Banks - Bank of India, United Bank, Allahabad Bank, PNB, IDBI Bank, Indian Overseas Bank NBFC - PFC, REC, IDFC, HUDCO, SIDBI, LIC IFIs - China Development Bank
24	Lanco Group	Vidarbha TPP	Maharashtra	5,841 (up to Sep 2017)	Private	Commercial Banks - PNB NBFC - REC
25	Lanco Group	Babandh Power Station	Odisha	8,275 (up to Sep 2017)	Private	NBFC - REC

26	Lanco Group	Anpara C Thermal Power Station	Uttar Pradesh	4,845	Private	Commercial Banks - Oriental Bank of Commerce NBFC - REC, IIFCL
27	Madhuc n Projects Ltd.	Simhapuri TPP	Andhra Pradesh	3,510	Private	Commercial Banks - SBI
28	Monnet Power Group	Malibrahm ani TPP	Odisha	6,700	Private	Commercial Banks - SBI, Bank of Baroda, Bank of India, Indian Bank, Central Bank, PNB, IDBI Bank, UCO Bank, Union Bank, Axis Bank, Federal Bank, Yes Bank NBFC - LIC
29	NTPC (Joint Venture with BSPGCL)	Muzaffarpur TPP	Bihar	3,784	Public	NBFC - PFC, LIC
30	Rattan India	Nashik TPP Phase -I	Maharashtra	9,303 (up to Aug 2017)	Private	Commercial Banks - IDBI Bank, Axis Bank, ICICI Bank NBFC - PFC, Vistra ITCL
31	RKM Powergen Private Limited (Joint Venture with Mudajaya Corporati on Berhad Malaysia)	Uchpinda TPP	Chhattisgarh	11,219	Private	Commercial Banks - Indian Bank, Vijaya Bank NBFC - PFC, REC, PTC, HUDCO
32	SKS Ispat & Power Ltd.	Binjkote TPP	Chhattisgarh	5,663	Private	Commercial Banks - SBI
33	Vandana Vidyut Limited	Salora TPP	Chhattisgarh	1,949 (except interest cost after restructuring)	Private	Commercial Banks - SBI, PNB
34	Visa Powertec h Pvt. Ltd.	Deveri TPP	Chhattisgarh	2,047 (up to Mar 2017)	Private	Commercial Banks - SBI, Bank of Baroda, Bank of India, Central Bank, Oriental Bank of Commerce,

Table 14: List of 34 projects identified as stressed projects.

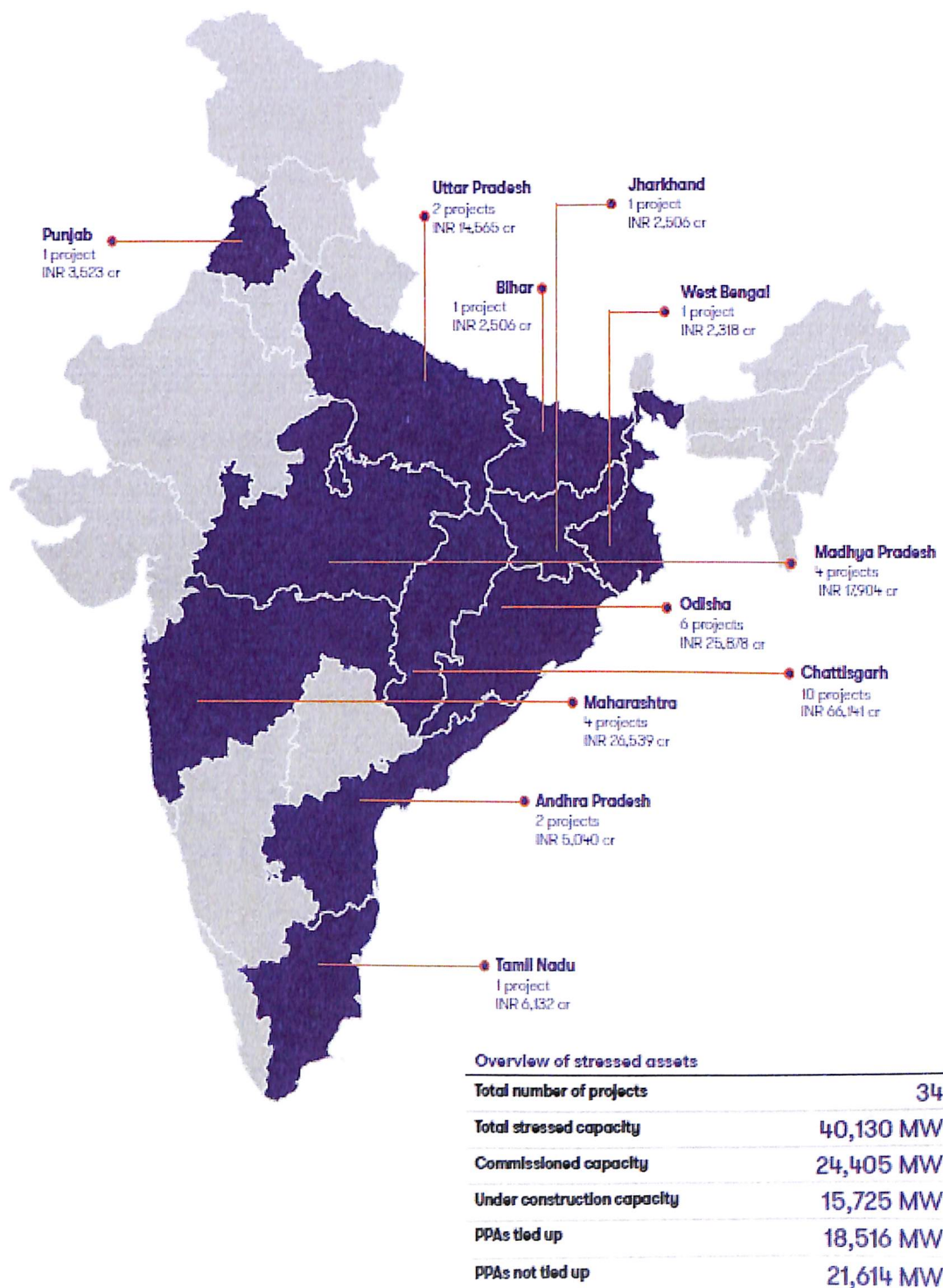


Fig 10: Overview of Stressed Assets.

### **3.2 Key Reasons for Stress In Power Sector**

There are various factors responsible for reason for power sector stressed like supply of fuel, fixed cost debt, technological risk, economic slowdown, judicial delay, traditional exuberance, railways, market factors, low capacity utilization, high real interest rate, regulatory roadblock, health of discom, operational inflexibility of plants.

Companies are not earning enough to pay interest on loans from banks, within a stipulated time (90 days as per the RBI). These loans turn into non-performing assets (NPAs), requiring banks to undertake corrective measures (such as rectification, restructuring and recovery). Consequently, these companies are reluctant to invest in new capacities and the banks with bad loans are reluctant to lend. The thermal power sector is one such sector which has contributed the most to NPAs. Stressed assets include NPAs as well as those projects which have the potential to become NPAs. As of June 2017, NPAs in the electricity sector amounted to Rs 37,941 crore. The Committee looked at 34 thermal power projects that have turned into stressed assets. These have a capacity of 40 GW. Reasons for financial stress in these thermal power projects include: (i) non-availability of fuel (coal), (ii) lack of enough power purchase agreements (PPAs) by states, (iii) inability of the promoter to infuse equity and working capital, (iv) tariff related disputes, (v) issues related to banks, and (vi) delays in project implementation leading to cost overruns.

Electricity is critical to fuel the economic growth of India. The country is on the fast trajectory of development but to keep the momentum of growth high, availability of uninterrupted power supply is a must.

There are many roadblocks in unleashing the full potential of India's power sector. One is fuel availability concerns faced by the industry. Coal supply by Coal India Ltd (CIL) is restricted to around 65% of actual coal requirement by coal-based thermal plants, leading to increased dependence on imported coal. This results in increasing power generation costs

due to limited fuel availability. Increasing operational inefficiencies and outstanding debts have led to poor financial health of state.

Coal India, in view of the substantial private sector capacity addition, was constrained to reduce the contracted supplies under the coal linkages for maintaining a PLF of 80%. This has resulted in lower PLFs. Further, no coal linkages were provided for power capacity having no firm PPAs leading to lower PLFs, which impacted the debt servicing ability.

Inability of the promoters to complete the large complex power projects within the stipulated costs and timelines. Almost all the capacity additions undertaken by private sector power producers from FY 2010 onwards have faced significant cost overruns, which were close to 70-80% of the originally appraised project cost. This happened due to time delays exceeding three years.

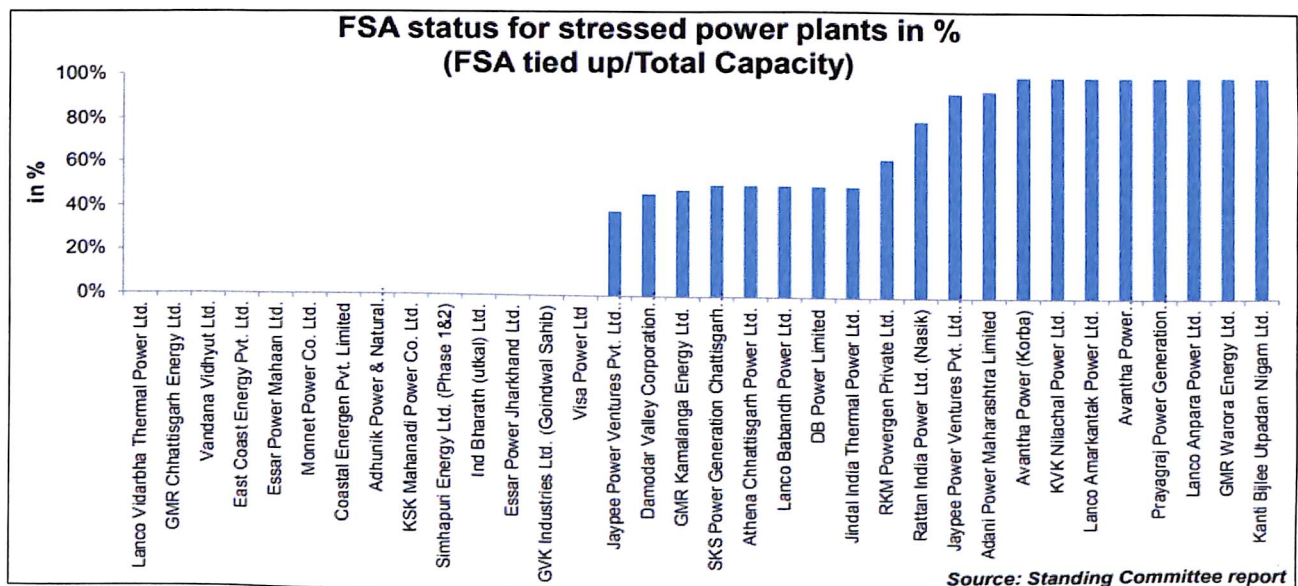


Fig 11: FSA status for stressed power plant in %

Even after the increase in the project cost overruns by banks/ financial institutions (FIs), the promoters have not been able to arrange for the additional equity required due to macro environments, including reduction in free cash flows from their existing operational plants.



This has resulted in further delays, making the completed costs of such projects unviable for capital cost recovery.

The banks were also reluctant to provide continued financing to power projects having no PPA tie-up, as high capital costs were making the projects unviable at projected lower PLFs

Absence of creditable off-take under long-term/medium-term PPAs (negligible power procurement by DISCOMs)

Power being on the concurrent list, the power off-take is the prerogative of the states that come under the competitive bidding route.

There has been no major off-take of long-term/medium-term power by DISCOMs rendering the viability of substantial private sector capacity, which in the absence of PPAs, could not procure coal linkages.

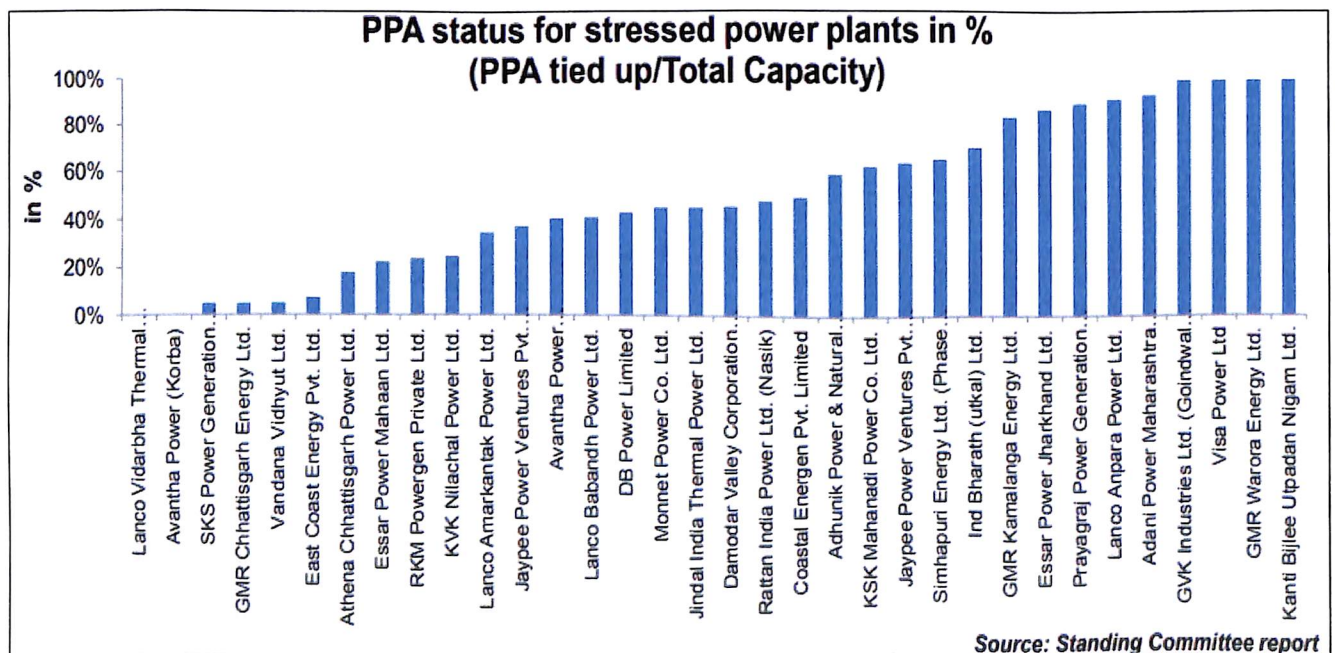


Fig 12: PPA status for stressed power plant in %

Low growth in power sector demand in both industrial and domestic sectors coupled with significant thermal capacity addition by the private sector, and effective demand side management led to a power surplus scenario.

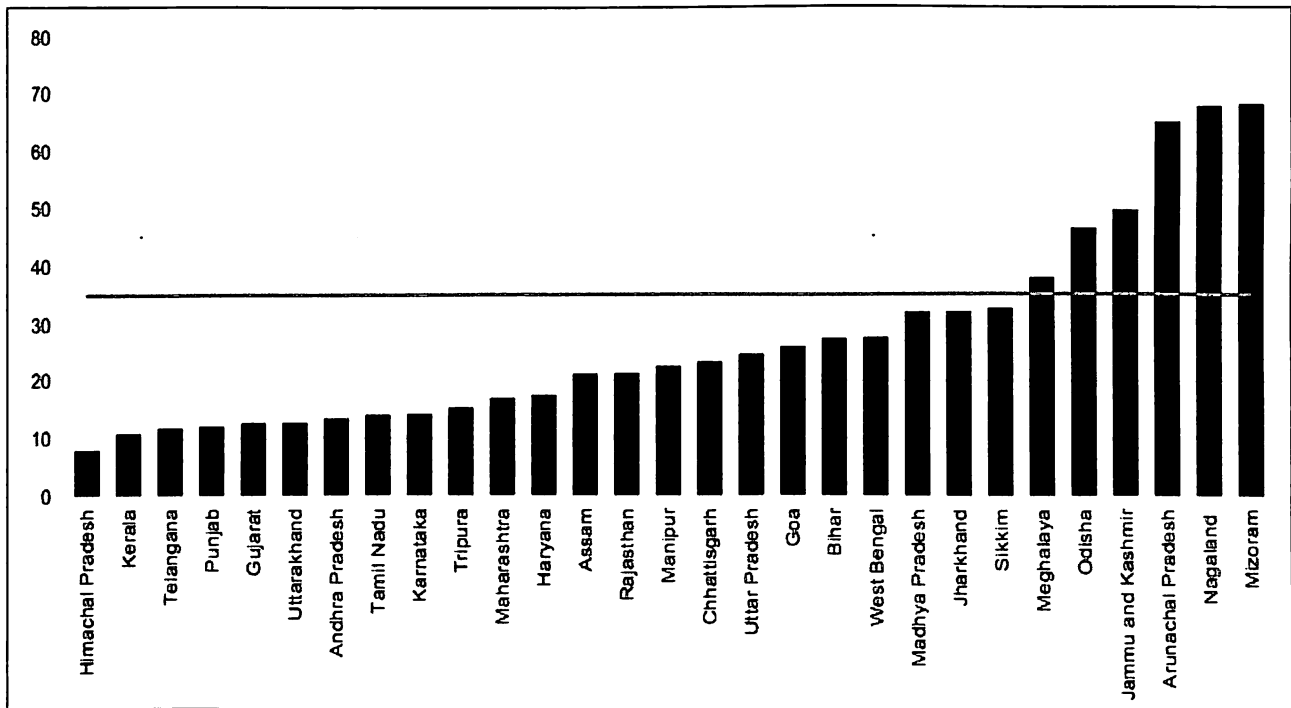


Fig 13: Discom with Aggregate Technical and Commercial Losses

DISCOMs due to their deteriorating financial position not only shied away from power procurement on long-term basis, which led to significant under-utilisation of thermal power capacity, but also delayed payments, which created liquidity mismatch for the project companies.

Many DISCOMs, the average cost of power purchase is above Rs. 3/kWh and it is increasing every year. However, new solar and wind capacity is available at less than Rs. 3/kWh, with tariff remaining fixed for the next 25 years. Therefore, capacity addition in the future is likely to be less expensive than the long term capacity currently contracted, if DISCOMs transition to renewable energy.

The distribution business is based on a 'cross-subsidy' model wherein some consumers are charged tariffs higher than the average cost of supply (ACOS) whereas agricultural and small consumers pay a tariff that is much lower than the ACOS. The 'subsidy' thus received from the higher tariffs charged to large consumers is referred to as cross-subsidy. In addition to such cross-subsidy, the state government may allocate explicit revenue subsidy for agricultural pump sets, below poverty line (BPL) households, and a few other consumer categories. The increasing ACOS and falling prices of renewable energy are making the 'non-DISCOM' supply options such as renewable-energy based open access and captive consumption more economical and technically feasible. Given the economic incentives, the high-paying consumers are likely to opt for such non-DISCOM options leading to loss of sales and hence of the cross-subsidy revenue for the DISCOMs.

Delayed payments by DISCOMs coupled with litigations in tariff approvals by regulators. The delay in the realisation of receivables from DISCOMs not only created liquidity mismatches, but also led to exhaustion of working capital and debt servicing defaults. As of June 2018, an amount of approximately INR 25,000 crore was the outstanding receivables from DISCOMs for all power sector companies, out of which approximately INR 18,000 crore was the outstanding amount for the private sector power producers. This was more than 70% of the total outstanding amount, which has added to the stress.

Lower power demand in India has been the key reason for poor financial health of the thermal power plants in India. This was mainly due to the poor financial conditions of Discoms balance sheet which resulted in poor demand for the power sector. The basic problem is one of a mismatch between the revenues and expenses of the Discoms. According to the Central Electricity Authority, the average revenue realized by Discoms per unit of electricity distributed by them is Rs.3.76 while their cost of supply is Rs.5.01 a unit (as per Ujwal DISCOM Assurance Yojana or "Uday" documents, Ministry of Power), which is a deficit of Rs.1.25 a unit straightaway. This was mainly due to increasing base of rural electricity supply which is typically highly subsidized and non-remunerative, and second,



the inability to control Aggregate Technical and Commercial (AT&C) losses. Thus, heavy losses resulted in poor financial conditions for the Discoms and this in turn affected its ability to pay the power generating companies. Poor demand from Discoms resulted in declining PLF (or capacity utilization) for most of the power plants and also lower power demand from Discoms wrongly indicated the reducing power deficit.

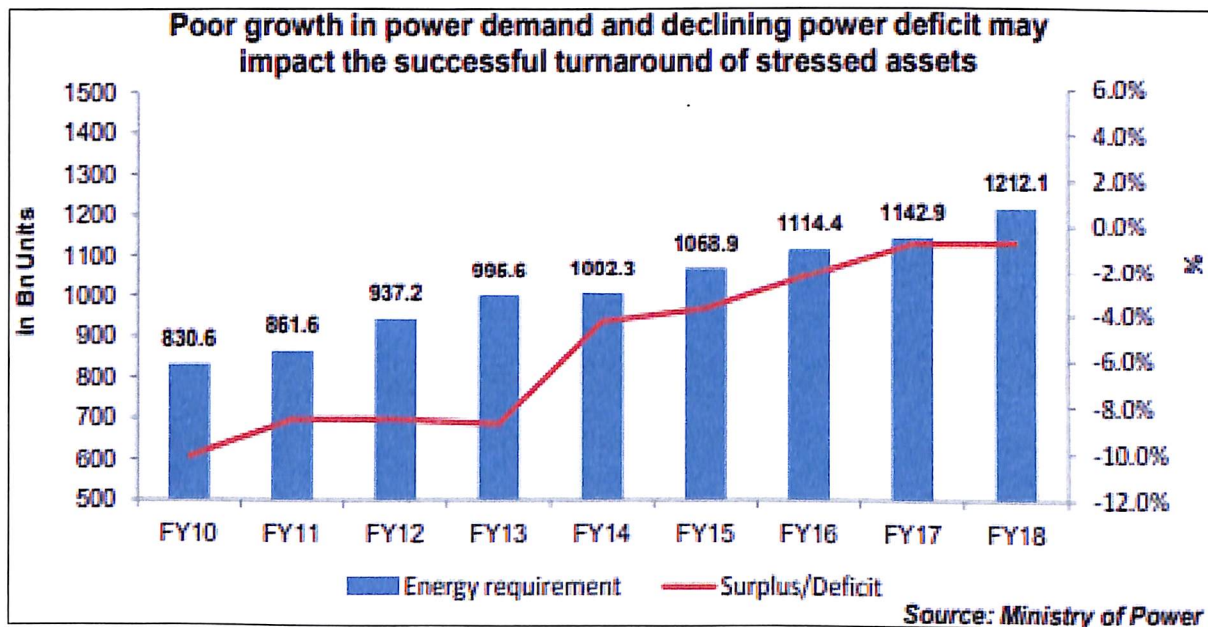


Fig 14: Energy requirement and Surplus/Deficit Trend

Cancellation of all the 214 coal blocks, which were allocated by the Inter-Ministerial Group from 1993 onwards and by the Supreme Court in September 2014, has put approximately 24,000 MW of captive coal-based thermal capacity under stress. These mines were not re-allocated to these project companies in a time-bound manner, and the PPAs executed with DISCOMs based on captive coal was also jeopardised and led to litigations. In fact, many of the bidders bid for the limited captive mines auction quite aggressively (negative bidding) further adding to their existing stress.

Issues related to financing by banks/FIs with inadequate project monitoring and end use utilisation of funds in an attempt by banks/FIs to expand their balance sheets, financing for

power projects has been done without proper project monitoring, especially in cases where the sponsor was also the engineering, procurement and construction (EPC) contractor for project completion.

Interest rates for most of the loans sanctioned in FY2008 went up significantly from 11% to about 14% in FY 2011-12. Together, the foreign exchange differential on the buyers' credit, letters of credit and foreign currency loans led to a significant increase in the project costs and resulted in stress. Stringent provisioning stipulations by RBI for any change in repayment period/interest rates also acted as dampener for the banks to take any timely action to check on the cost over runs, thereby impacting project viability in the long run. Regulatory delays in procurement of regulatory clearances and contractual disputes. In certain cases, due to a delay in the approval of tariff petitions and of additional tariff under change in law provisions in PPA, the projects are unable to recover the cost of generation, which adversely impacted financial viability. Approximately 10,000 MW of imported coal-based capacity in Gujarat entailing capital investment of about INR 47,000 crore is under stress, due to short recovery of the tariff resulting from the change in Indonesian coal prices. Overall competence of the promoters in undertaking/completing large power projects, especially where they also acted as EPC contractor. According to the report released by the High Level Empowered Committee constituted under the MOP, Government of India, the promoters currently under stress have made significant capacity additions without monitoring the macro environment and cash flows from their existing operational projects. The report states that the required equity for power projects was also not raised in a timely manner commensurate with equity requirements, which later proved to be one of the reasons for stress in the power projects.

The country's power sector has been one of the highly stressed sectors in recent times, with loans worth approximately INR 1,00,000 crore having turned bad or been recast. Further, as per the recent estimates, around 66,000 MW capacity is facing various degrees of financial stress, including 54,800 MW of coal-based power, 6,830 MW of gas-based power and 4,570

MW of hydropower with the lenders having an exposure of around INR 3,00,000 crore to these assets, which is alarming, to say the least. According to the RBI, the total outstanding loans of scheduled commercial banks to the power sector, including renewables, stood at INR 5,65,000 crore as of March 2018. The matter has its roots in the controversial circular released by the RBI on 12 February 2018, where it mandated that loan accounts above INR 2,000 crore, that remained unresolved for more than 180 days (the period ended on 27 August 2018) be brought under the IBC and taken to the NCLT for resolution. The Allahabad High Court in a challenge refused to stay the RBI circular and accordingly, lenders in most of the stressed power accounts have filed recovery proceedings against these assets in NCLT.

However, the Power Sector Association along with many of the sponsors have challenged the applicability of the RBI circular without any relief in the Supreme Court, as these projects have structural problems, like lack of long-term power purchase agreement, fuel supply agreement, under-utilisation, lack of equity funding including delayed or no clearances. The Supreme Court was scheduled to hear a challenge by power generation companies to the RBI's circular on November 28, 2018, laying down the norms for resolving bad loans, which provides temporary relief to power companies. It may be mentioned that there is no universal solution for these ailing power assets and a mixed multi-pronged strategy needs to be adopted instead of a straight jacketed approach. This has to be done as there are not enough takers for all of these stressed assets and any unthoughtful action may result in huge credit recovery losses for the banks/FIs.

### **3.3 Steps taken by GOI for reduction of Stress in Thermal Power Sector**

There are various steps taken by Government of India for Stressed thermal power plants. The government has launched a web portal, PRAKASH (Power Rail Koyla Availability through Supply Harmony), with a view to improving coordination between the power, coal and railway ministries to ensure coal supplies to power plants.

It has been developed by NTPC and sources data from different stakeholders such as Central Electricity Authority (CEA), Centre for Railway Information System (CRIS) and coal companies. The Portal is designed to help in mapping and monitoring entire coal supply chain for power plants, viz –

- Coal Stock at supply end (mines),
- coal quantities/ rakes planned,
- coal quantity in transit and
- coal availability at power generating station.
- Coal company will be able to track stocks and the coal requirement at power stations for effective production planning
- Indian Railways will plan to place the rakes as per actual coal available at siding and stock available at power stations.
- Power stations can plan future schedule by knowing rakes in pipe line and expected time to Reach.
- Stock at power generating station
- Ministry of Power /Ministry of Coal/ CEA/ POSOCO can review overall availability of coal at thermal power plants in different regions

Present mechanism to review coal supply situation consists of an inter-ministerial group which has officials from Ministries of Power, Coal, Railways, CEA, power utilities and coal companies. This group holds weekly meetings to review coal supply situation as well as railway logistics. It was observed that this mechanism faced several issues such as scattered information, correctness of data from different organizations, timely availability of data etc. This often led to difficulties in decision making.

To address such situations, Ministry of Power asked CEA for establishment of a transparent mechanism to monitor the coal availability at loading site (CIL,SCCL), placement of rakes by Railways (CRIS) and availability of coal at power stations (NTPC / DVC /State utilities) and also directed NTPC to facilitate CEA for portal development.

PRAKASH Portal is developed by NTPC and sources data from different stakeholders such as Central Electricity Authority (CEA), Centre for Railway Information System (CRIS) and coal companies. All reports are available in PDF/Excel format. However, to present information in a user friendly method, the Portal gives graphical representation of reports with details shown on the map of India.

Currently, the Portal will make available four reports as detailed below -

- i. **Daily Power Plant Status:** This report gives Station data related to power generation, coal receipt, consumption and stock. Report can be generated utility wise, state wise and sector wise (default utility-wise).
- ii. **Periodic Power Plant Status:** Report gives Station data related to power generation, coal receipt, consumption and stock for selected period. Coal materialization based on dispatch by Coal Company is available.
- iii. **Plant Exception Report:** This report gives materialization and rakes in pipeline through Rail.
- iv. **Coal Dispatch Report:** Report gives coal subsidiary wise dispatch for particular period. It also gives source wise details of coal dispatch. Dispatch trend is also shown. Plant wise and siding wise details are available.

Following methodology adopted for allocation of coal as per SHAKTI Policy of HLEC Recommendation:

1. All such power plants including private generators which do not have PPAs shall be allowed Coal linkage under B(iii) and B(iv) Shakti policy for a period of minimum 3 months upto maximum of 1 year, provided further that power generated through that linkage is sold in Day Ahead Market through power exchange or in short term

through a transparent bidding process through Discovery of Efficient Energy Price(DEEP) portal.A methodology in this regard shall be formulated by Ministry of Power in consultation with Ministry of Coal.

2. A generator which terminates PPA in case of default in payment by the DISCOM, may be allowed to use existing linkage coal for sale of power through shortterm PPAs using DEEP portal or power exchange for a period of maximum 2 years or until they find other buyer of power under long/medium term PPA whichever is earlier. Adequate safeguard to be put in place.
3. The provision of Shakti Policy also applicable in cases where the nodal agency designated by Ministry of Power aggregates/procures the power requirement for group of states even without requisition from such states.

The Reserve Bank of India (RBI) on 07 June 2019 issued a new prudential framework for resolution of stressed assets, effectively replacing its controversial 12 February 2018 circular with a mixed bag of norms applying to a wider class of lenders.

Three major changes mark the new circular: The central bank has made it voluntary for lenders to take defaulters to the bankruptcy court; the framework now applies to a larger universe of lenders, which includes small banks and non-banking finance companies (NBFCs); and penal provisions have been introduced for lenders.

RBI has eased the provision of its controversial 12 February 2018 circular on Stressed Asset:

Then	Now
Banks had to refer Borrower to NCLT if it fail to resolve the account within 180 days	Lender given the choice to initiate legal proceeding for insolvency or recovery
The Stressed Asset noms were only applicable to bank	Norms applicable for banks, small finance bank as well as NBFCs
Default of even 01 day had to be and acted upon	lenders gives 30 days to start working on resolution plan from day of default
Agreement of all lender was required on resolution plan	Agreement of 75% lenders by Debt value and 60% lenders by number is needed

Table 15: Comparison between Old & New Prudential frameworks

The RBI, on February 12, 2018, issued a new circular scrapping all previous restructuring mechanisms such as Strategic Debt Restructuring (SDR) and issued stricter norms to deal with the stressed assets (or NonPerforming Assets) which are further adding to the woes of the power sector. Under the new RBI rules, creditors to companies that are defaulting on loans of Rs.20 bn or more, as on March 1, 2018, are required to implement a Resolution Plan within 180 days, or file for insolvency under the Insolvency and Bankruptcy Code (IBC) within 15 days from the expiry of the deadline. If a company defaults after March 1, 2018, then the 180 days will be counted from the date of first such default which was August end. The Allahabad High Court had recently refused to grant any relief on Reserve Bank of India's revised framework on the resolution of stressed assets, where the deadline for the resolution of these stressed assets lapsed on August 27, 2018 and these stressed assets were required to face insolvency proceedings. However, Honorable Supreme Court has provided a relief to Power sector stressed assets, where the Supreme Court has put a stay on the RBI's

February 12, 2018 order which has provided some additional time for Bankers to finalize resolution plan for about 13 GW of pro (HLEC) under the Chairmanship of Cabinet Secretary, to submit its report on corrective actions. We believe, with many of these stressed power sector assets eventually moving to the IBC proceedings they could be sold at a much lower cost or scrap/replacement cost to the prospective bidders under the proceeding. This is likely to pave way for the consolidation in the power generation sector with few cash rich or lesser leveraged large power generating companies like NTPC, JSW Energy, Tata Power and also Adani Power amongst these others are likely to grab these assets at a throw away prices\* (Source: As per Financial Express article dated 29 Aug 2018). However, concerns of reducing demand – supply gap for power sector as witnessed in the recent months and expected rise in power supply once these stranded power plants become operational may further lead to rise in concerns for the overall power sector given the higher power supply scenario going ahead. Projects which are presently in their final stages or under the High Level Empowered Committee (

In April 2018, the Ministry of Power (MoP) issued guidelines for a pilot scheme to facilitate the procurement of aggregated power (2,500 MW for three years) from commissioned coal-based power plants through competitive bidding. PFC Consulting Limited (PFCCL) conducted the bid for the selection of projects on the DEEP e-bidding portal. PTC India, which was the aggregator, received bids for the procurement of 1,900 MW of capacity at a discovered fixed tariff of Rs 4.24 per kWh. In this round, the quoted tariff remained fixed for the three-year PPA period without any escalation.

The MoP announced Pilot Scheme-II in February 2019 with PFCCL as the bid process coordinator and NHPC Limited as the aggregator. This phase entailed bidding for procuring 2,500 MW of power in the medium term for three years. However, some changes were made in the format of the new scheme in order to attract greater participation. For instance, variable charges were linked to inflation while in the previous round they were fixed for three years. Under the second phase, the variable charges will be escalated at the



rate of 50 per cent of the wholesale price inflation. Also, the minimum offtake guarantee was increased from 55 per cent to 85 per cent. Further, for this round, the bidders were required to quote both variable charges and fixed charges whereas in the last round the fixed charges were kept at a nominal rate of 1 paisa per unit.

In the first phase of Pilot Scheme-II, bids aggregating 4,077 MW were received against the 2,500 MW offered in the auction, mainly owing to liberalisation of certain rules. As a result, the government was expecting a reduction in tariffs vis-à-vis the previous round of bidding in 2018. Subsequently, in the reverse auction that concluded on April 18, 2019, about 15 thermal power producers participated. Jindal Power Limited offered the highest quantity at 515 MW. Other bidders included Adani Korba West (295 MW), JSW Energy (290 MW), Essar Power Mahan (200 MW), DB Power (165 MW) and MB Power (125 MW). The lowest bid discovered in this round was Rs 4.41 per unit. The final tariffs are, however,

<b>Bidders in Pilot Scheme-II</b>	
<b>Plant/Genco</b>	<b>Bid Quantity at Rs 4.41 Per Unit (MW)</b>
Jindal Power (Tamnar TPP)	515
Adani (Korba Wset)	295
JSW Energy	290
Essar Mahan	200
DB Power	165
RKM Power Uchpinda	165
Sembcorp Gayatri	150
MB Power	125
Jindal India Thermal Power	115
JP Nigrie	100
SKS Ispat and Power	100
Shree Cement Limited	100
TRN Energy Nawapara	100
Jaypee Bina	100
Total	2520

Table 16: Bidders in Pilot Scheme-II

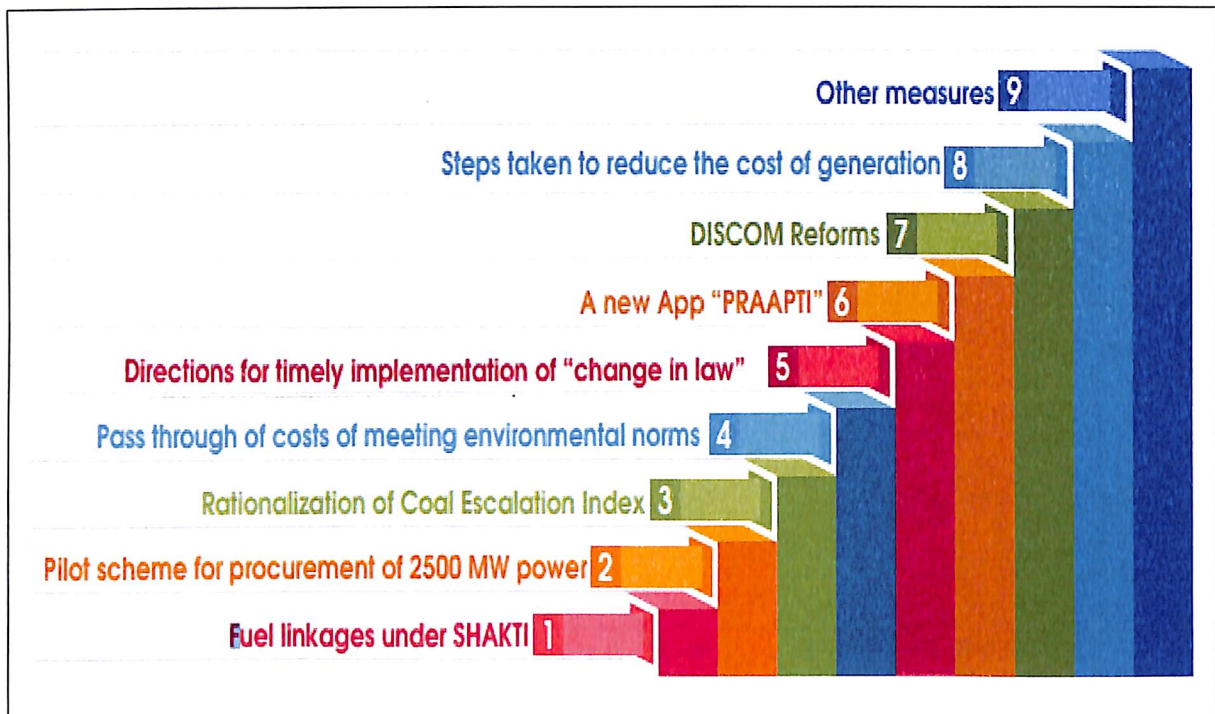


Fig 15: Steps taken by GOI for reduction of Stress in Thermal Power Sector

### *Fuel Linkage under SHAKTI*

Apart from prudential framework for resolution of stressed assets, many other important steps have been taken by Government of India. *SHAKTI scheme* is one of the step convert Non performing Asset into performing assets. The New Coal Distribution Policy, 2007 provided for supply of 100% of coal requirement at a normative requirement of 85% PLF by Coal India Limited (CIL), and based on that, substantial investments have been made in power generation. However, substantial stress in the power sector is primarily due to the unavailability of coal coupled with the absence of long-term PPAs. The Scheme to Harness and Allocate Koyla Transparently in India (SHAKTI) has although partly addressed the coal linkages for projects having PPAs, it has not specifically addressed projects based on captive mines which were summarily cancelled by the Supreme Court, and projects having no PPAs with the increased price of coal as a pass through in tariff. Coal linkages rationalisation shall save on the transportation and other associated costs, and could be way forward for lower

variable costs for the power sector. Augmentation in existing domestic production of coal is required (expeditious approvals under single window) and incremental coal thereby made available under forward e-auction to stressed power projects without being subjected to premium bidding to enable them to operate to even cater short term PPAs and/or through Discovery of Efficient Electricity.

Grade of Coal	GCV of Coal Kcal/kg	CERC allowed storage loss (Kcal/kg)	GCV Considered (Kcal/kg)	Subcritical Unit 250 MW & Above	Supercritical Unit
				Annual Coal consumption at 85% PLF (Tonnes per MW per Annum)	
G4	6100	85	6015	2940	2785
G5	5800	85	5715	3094	2931
G6	5500	85	5415	3266	3094
G7	5200	85	5115	3457	3275
G8	4900	85	4815	3673	3479
G9	4600	85	4515	3917	3711
G10	4300	85	4215	4196	3975
G11	4000	85	3915	4517	4279
G12	3700	85	3615	4892	4634
G13	3400	85	3315	5335	5054
G14	3100	85	3015	5865	5557
G15	2800	85	2715	6514	6171

Table 17: Normative Coal Requirement for Different size of power plant for determination of ACQ

Fuel linkages under SHAKTI The government has approved a new coal linkage allocation policy on May 2017, named SHAKTI (Scheme for harnessing & allocating koyla transparently in India). Under the scheme, auction of coal linkages for Independent Power Producers (IPPs) with PPAs based on domestic coal has been conducted on September 12, 2017. IPPs having PPA but no coal linkages have participated in the auction and linkages

have been granted to 11549 MW capacity (10 projects) including stressed projects of total 8490 MW capacity, and these projects have been resolved. Under B(i) provision of SHAKTI scheme, linkages have been granted to States/ Central Gencos for 870 MW for 10 projects. Further, Coal India Limited (CIL) may grant future coal linkages on auction basis for power producers/IPP's without PPAs that are either commissioned or to be commissioned. Fuel linkages under SHAKTI Pilot scheme for procurement of 2500 MW power Rationalization of Coal Escalation Index Pass through of costs of meeting environmental norms Directions for timely implementation of change in law.

Year	Opening Stock	Required	Receipt	Consumption	closing Stock (Days)	No.of Critical Stations (Stock < 7days)
July -19	15	51377	44265	46458	15	45
July -18	10	45974.3	42237.4	41571.6	11	54

Table 18: Coal Supply Position

#### *Pilot scheme for procurement of 2500 MW power*

In order to address the problem of lack of Power Purchase Agreements (PPAs) in the country, The Ministry of Power has noticed a scheme for procurement of 2500 MW on competitive basis for a period of 3 years from the generators with commissioned projects having untied capacity. The main purpose of the scheme is to revive commissioned power plants which are unable to sell electricity in the absence of valid power purchase agreements. These plants can bid for power supply under the scheme. Power Ministry had recently issued the model bid documents, PAPP (Pilot Agreement for Procurement of Power) and PPSA (Pilot Power Supply Agreement) on April 6, 2018. The guidelines for the said scheme was issued on April 10, 2018. The PFC arm PFC Consulting Ltd has been appointed as the Nodal Agency and PTC India Limited as the Aggregator. The PTC India

will sign three-year (mid-term) agreement for power procurement with successful bidders and Power Supply agreement with the Discoms (distribution companies). Under the scheme a single entity can be allotted maximum capacity of 600 MW. The scheme assures a minimum offtake of 55 per cent of contracted capacity. The tariff will be fixed for three years without any escalation. The PFC Consulting is in process of inviting the bids in first week of May under the scheme. The bidding will be conducted on the DEEP e-Bidding Portal and with L1 matching for bucket filling without reverse auction. It is expected that this scheme help to revive the power demand which has affected the generators not having Power Purchase Agreements, it added. According to industry sources, the move will help nearly 12 GW commissioned thermal power plants get the medium-term power purchase agreement (PPA) which is a pre-requisite for getting coal linkage. Presently out of the 40 GW stressed coal based power generation capacity, 28 plants of 24 GW worth Rs 1.44 lakh crore are commissioned. Nearly half of these capacities (12GW) do not have coal linkage because of no PPAs. Under the scheme, PFC Consulting Ltd. invited bids for 2500 MW of power wherein PTC India Limited acted as an aggregator of demand for purchase of power from the power projects and sell that power to states utilities. Bids have been received from 7 (seven) projects for aggregate power of 1900 MW. Demands from DISCOMS/States for 2100 MW have been received by Power Finance Corporation (PFC). Letter of Award (LOA) has been issued for 550 MW so far. This will potentially improve the financial viability of the power projects and help developers in serving the debt obligations.

***Rationalisation of coal escalation index:***

In 2017, CIL has done source rationalization of 12 state owned power plants based on the requests from these plants. The quantity rationalized was about 13 MT. The approximate potential annual savings in transportation cost by these power plants would be to the tune of Rs 774 crore, details of which are as under:

Sr. No	State/ Developer	Power Plant	Quantity rationalized (in MT)	Potential Annual Savings (in Crore)
1	Maharashtra	Bhusawal	2.312	415
		Paras	1.204	
		Chandrapur	1.525	
2	Haryana	RGTPP	1.33	50
3	(JV of NTPC & HPGCL)	APCPL, Jhajjar	1.13	31
4	Gujarat	Wanakbori	3	240
		Ukai		
		Gandhinagar		
5	West Bengal	Bakreshwar	1.2	2
		Kolaghat		
		Santaldih		
6	Uttar Pradesh	Paricha	1.2	36
<b>Total</b>			<b>12.901</b>	<b>774</b>

Table 19: Source rationalization of 12 state owned power plants

Total coal movement rationalization of 54.76 MT has taken place with annual potential savings of Rs. 3354 crore. An Inter-Ministerial Task Force (IMTF) was constituted in July, 2017 to undertake a comprehensive review of existing coal sources of Independent Power Producers (IPPs) having linkages and consider the feasibility for rationalization of these sources with a view to optimize transportation cost given the various technical constraints. The underlying objective behind the exercise was to reduce the landed cost of coal due to reduction in transportation cost. The methodology for linkage rationalization for IPPs has been accepted by the Government and the same has been circulated on 15.05.2018 to the CIL/SCCL to implement the methodology.

***Pass through of cost of meeting environmental norms:***

Coal-based thermal power plants tariff will rise in coming days because the government has decided to allow pass-through of cost incurred by them for meeting environment norms notified by the environment ministry in December 2015. To ensure timely implementation of new environment norms, the central government has decided that the additional cost implication due to installation or up gradation of various emission control systems and its operational cost to meet new environment norm. The central government has decided that the additional cost implication due to installation or up gradation of various emission control systems and its operational cost to meet new environment norms shall be considered for being made pass through in tariff by the commission.

<b>Pollutant</b>	<b>Control Equipment</b>
Sulphur oxides	Flue gas desulphurization, Limestone injection
Particulate Matter	Electrostatic Precipitator
Nitrogen Oxides	Overfire air burner Low Nox burner Selective catalyst reduction Selective non-catalyst reduction

Table 20: Pollutant Control measures in Thermal Power Plant

However, the ministry said that the pass-through of cost for upgradation of power plants under new environment norms as change of law would not be applicable where tariff is determined under Section 63 of the Electricity Act.

### ***A New App PRAAPTI:***

A Web portal and an App namely PRAAPTI (Payment Ratification And Analysis in Power procurement for bringing Transparency in Invoicing of generators), has been developed to bring transparency in power purchase transactions between Generators and Discoms. The App and Web Portal will capture the Invoicing and payment data for various long term PPAs from the Generators. This will help the stakeholders in getting month-wise and legacy data on outstanding amounts of Discoms against power purchase. The app will also allow users to know the details related to the payments made by the Discoms to the power generation company and when they were made. PRAAPTI will also enable the consumers to evaluate financial performance of their Discoms in terms of payments being made to the generation companies. The Portal would also help DISCOMs and GENCOs to reconcile their outstanding payments. The portal would facilitate relative assessment of various State DISCOMs on “Ease of making payments” to various Generation Companies, and will also help make transactions in the power Sector more transparent.

### ***Discom Reform:***

The three major factors that contribute to the increase in demand of power are: rural electrification, GDP growth rate, demand for 24x7 power for all (PFC, 2016). Various issues viz. unavailability of fuel, power purchase agreement (PPA) issues, and poor financial health of DISCOMs make it difficult to meet this increasing demand for power. Hence to meet energy demand, the Government has taken several initiatives. A summary of the major initiatives has been given below in tabular form.

Scheme	Year of Approval	Financial Outlay (In Crores)	Objective
R-ARDRP Restructured Accelerated Power Development and Reforms Program	2008	44011	IT integration for energy accounting Consumer Services



IPDS- Integrated Power Development Scheme	2014	32612	Strengthening of sub transmission and distributopn network in the urbam areas Metering of distribution transformer/feeders/cnsu mers in the urban areas IT enablement
UDAY- Ujjwal Discom Assurance Yojana	2015	State shalltake over 75% of DISCOM debt as on 30 september 2015 over two year - 50% of Discom debt shall be taken over in 2015-16 and 25% in 2016-17	Financial Turnaround Operational improvement Reduction ofcost of Generation
DDUGYJ Deen Dayal Upadhyay Gram Jyoti Yojana	2014	44033	Seperation of Agriculture and Non Agriculture Feeder Strengthening of sub transmission and distribution network Rural Electrification

Table 21: Major Initiative taken by Government of India in DISCOM Reforms

The National Thermal Power Corporation (NTPC) had executed a substantial number of long-term PPAs with state utilities prior to the applicability of compulsory competitive bidding power procurement for all DISCOMs even from its projects which were yet to be commissioned. To alleviate this stress of the existing operational projects having no PPAs, the NTPC can act as an aggregator to procure power under transparent bidding process, till the time its capacity is commissioned. Procurement of power by Power Trading Corporation (PTC) under medium term PPAs (about 5,000 MW to start with) from the power projects

having inadequate PPAs shall address the issues related to the absence of power procurement by DISCOMs over the last four-five years. The existing PPAs contracted by stressed projects which is yet to be commissioned should not be cancelled and a grace period of two-three years is allowed. Further, the promoter should be given the flexibility to supply power under the mentioned PPAs from any of its alternate operational plant as long as the power procurement cost is not altered for a period of five years. This shall reduce the level of stress at the group company level. Under the new policy for allocation of coal linkage (SHAKTI), a nodal agency designated by the MoP, the Power Finance Corporation (PFC), can become the procurement of bulk power against pre-declared linkages to facilitate DISCOMs to procure power for medium term (three-five years) at competitive prices, assuring coal supply to generators. Improving DISCOM finances (UDAY), portal for auction for short term PPAs through DEEP and augmenting transmission capacity are some of the other measures to improve power markets.

***Remedial measures for bringing stressed power capacity back on stream:***

Old, inefficient and environmentally non-compliant capacity may be retired on priority to create space for the stressed power assets presently lying under-utilised to be brought back on stream. It is estimated that approximately 30,000 MW of coal-based capacity primarily of the centre/state sector has surpassed its operational life of 25 years and can be replaced in a phased manner with efficient super critical plants of unit size of 500 MW plus capacity. National Investment Infra Fund (NIIF) along with the NTPC could take decisive steps for resolution of stressed capacity particularly for stressed projects, which are more than 90% complete, but are stuck up due to shortage of funds. NIIF noted in December 2015 that progress has been slow due to the absence of any major funding commitments from foreign sovereign wealth funds or investors till Q1FY18 coupled with its over cautious approach in making investments. However, they, along with expertise from NTPC, can provide a pivotal role in bringing the stressed assets back on stream. An asset-specific strategy by identifying low hanging fruits needs to be adopted especially where projects are fully commissioned

but are stuck due to the absence of creditable long-term PPAs, working capital funding issues etc. Differential strategy for stressed assets which are commissioned and are under different stages of construction. It is suggested that for projects which are less than 50% complete, it would make more economic sense to temporarily maintain status quo and utilise their long term contracted PPAs, if any at the group level by appropriate policy changes. No Greenfield capacity to be undertaken by the NTPC/State Gencos and in the aliter, takeover of stressed power assets in a graded manner through competitive bidding. It is estimated that more than 20,000 MW capacity by state/NTPC is at an initial stage wherein insignificant investments have been made and it would be more practical for them to acquire the stranded capacity under transparent bidding mechanism instead of any fresh investments in greenfield projects.

RBI Circular dated February 12, 2018 has mandated banks/FIs to compulsorily approach the NCLT in case of a non-satisfactory resolution within 180 days from the reference date of 01 March 2018 (for exposures greater than INR 2,000crore).The matter is in the Supreme Court and the hearing was to take place on 28 November 2018 by power producers challenging this decision. As mentioned before, to address the huge stressed capacity, a multi-pronged strategy with differentiation of projects (completed versus under construction, PPAs and fuel availability etc.) is required with them strategic involvement of all stakeholders.

Asset-specific strategy consensus need to be crystallised among banks which may include sale to ARC on as is where basis, sale to financial/strategic investor under the Swiss Challenge route to select the best bidder, creation of an Asset Management Company (AMC) for funding by alternate investment fund (AIF), NIIF driven revivals, etc. It is reported that Sashakt India Asset Management (AMC) has been formed to work towards stressed power resolution. Further, two of the power cases have also seen change in ownership viz. SKS Ispat and Prayagraj power.

Quick disposal of tariff petitions including capital cost approvals with prompt release of compensatory tariffs, compensation of various levies/surcharges etc. is a pre-requisite for the revival of power plants already saddled with working capital issues pursuant to large receivables from DISCOMs. Increased emphasis on medium-term/short-term power procurement by DISCOMs aided through DEEP portal for a minimum of 5,000 MW is required to provide a much-needed impetus to the already operational projects avenues to operate. Securitisation of receivables from DISCOMs as a product shall alleviate the issues of delayed payments and its consequential impact on debt servicing and working capital requirement of the power generators.

Introduction of pre-packaged bankruptcy schemes (known as pre-packs) is prevalent in the US, and the UK shall allow the creditors and shareholders to approach a pre-negotiated corporate reorganization plan under a transparent mechanism shall go a long way to ensure that unnecessary litigations are done away with and timely resolutions are created. Capacity building at NCLT/NCLAT level to reduce the present timelines for getting admittance, time gap between hearings, etc. is required to be further streamlined to ensure that time value of the asset is preserved. Formulation of cross-border insolvency and notification of individual bankruptcy and insolvency laws shall provide an additional mechanism for getting effective resolutions under the IBC framework. It is already reported that pursuant to IBC, a recovery of more than INR 3,00,000 crore has been effected by the banks over the last two years.

Implementation of policy towards phasing out of old inefficient and highly polluting units, savings on account of under utilisation of natural resources like fuel and water. This is a long pending issue and now also reflected in the National Electricity Plan 2018(NEP 2018).NEP 2018 includes a target for phasing out of 48.3 GW of end-of-life coal Plants. Out of these 22.7 GW of coal power plant will be closed over the five years from 2016-17 to 2021-22. An additional 25.6 GW of coal capacity is slated for retirement in the five years to 2026-27.

The Cabinet Committee on Economic Affairs chaired by the Prime Minister has approved the recommendations of Group of Ministers (GoM) constituted to examine the specific recommendations of High Level Empowered Committee (HLEC) constituted to address the issues of Stressed Thermal Power Projects.

The CCEA has approved recommendations of the GoM mainly relating to grant of linkage coal for short-term PPA, allowed existing coal linkage to be used in case of termination of PPAs due to payment default by DISCOMs, procurement of bulk power by a nodal agency against pre-declared linkages, Central/State Gencos may act as an aggregator of power, increase in quantity of coal for special forward e-auction for power sector, coal linkage auctions to be held at regular intervals, non-lapsing of short supplies of coal, ACQ to be determined based on efficiency, payment of Late Payment Surcharge (LPS) made mandatory, non-cancellation of PPA/FSA/LTOA post NCLT scenario and non-cancellation of PPA for non-compliance of COD. With the implementation of these recommendations, many of the issues affecting the Thermal Power Sector are likely to get resolved.

Background:

The Government of India constituted a High Level Empowered Committee (HLEC) under the Chairmanship of Cabinet Secretary to address the issues of stressed thermal power projects. The committee made its recommendations to resolve the stress in thermal power sector and submitted its report in Nov' 18. The Government thereafter constituted a Group of Ministers (GoM) to examine the specific recommendations of HLEC and forward its comments for consideration of the Cabinet. Subsequently GoM recommended majority of HLEC recommendations.

The CCEA has approved recommendations of the GoM mainly relating to grant of linkage coal for short-term PPA, allowed existing coal linkage to be used in case of termination of PPAs due to payment default by DISCOMs, procurement of bulk power by a nodal agency against pre-declared linkages, Central/State Gencos may act as an aggregator of power, increase in quantity of coal for special forward e-auction for power sector, coal linkage

auctions to be held at regular intervals, non-lapsing of short supplies of coal, ACQ to be determined based on efficiency, payment of Late Payment Surcharge (LPS) made mandatory, non-cancellation of PPA/FSA/LTOA post NCLT scenario and non-cancellation of PPA for non-compliance of COD. With the implementation of these recommendations, many of the issues affecting the Thermal Power Sector are likely to get resolved.

***Step taken to reduce cost of generation:***

There are various steps need to consider for reduction of cost of generation. PLF incentive, Availability based tariff (ABT), incentive-based efficiency improvement, revised performance benchmark, Relative performance incentive, Self-improvement incentive are the important steps taken to reduce cost of generation. While the PLF incentive is mainly aimed at increasing generation in power plants, it is also important that generation is properly matched to load/demand conditions. Excess (reduced) generation during off-peak (peak) hours can lead to increased (decreased) system frequency, leading to grid disturbances. A 'relative performance incentive' (RPI) provides additional motivation for plants to improve their efficiency relative to each other. This is a mechanism intended to provide a positive incentive for good performance rather than a penalty for poor performance - it is therefore targeted only at power plants whose efficiency performance is better than the median, with the level of incentive escalating with increasing deviation from the median efficiency. A 'self-improvement incentive' (SII) provides financial benefit for power plants to improve efficiency in relation to their own past performance. The greater the improvement in the power plant performance in relation to the previous time-period, the higher the incentive; at the same time, poorer-performing power plants are given a higher incentive than better-performers.

### 3.4 Benefits of The NCLT And Samadhan Resolution

Samadhan – the flagship scheme by State Bank of India (SBI) for resolving stressed assets outside the National Company Law Tribunal (NCLT) – is going into a maze.

The resolution of the stressed power projects under NCLT or SAMADHAN scheme largely depends on the availability of FSA and PPA as plants with inadequate arrangements may find it difficult to find a prospective buyer for the assets. This leaves a limited opportunity with the prospective buyers as only 22760 MW of stressed power plants capacity have both PPAs and FSA. Historically 8 projects with 10200 MW of capacity out of 38870 MW of total capacity of stressed assets which have been resolved had PPA agreement ranging from ~43% to 100% of their total capacities tied up apart from FSA for most of these plants. Thus, only those assets with PPAs and fuel arrangements could possibly be looked at by investors, and there are just a handful of such assets out of around 34 stressed assets identified.

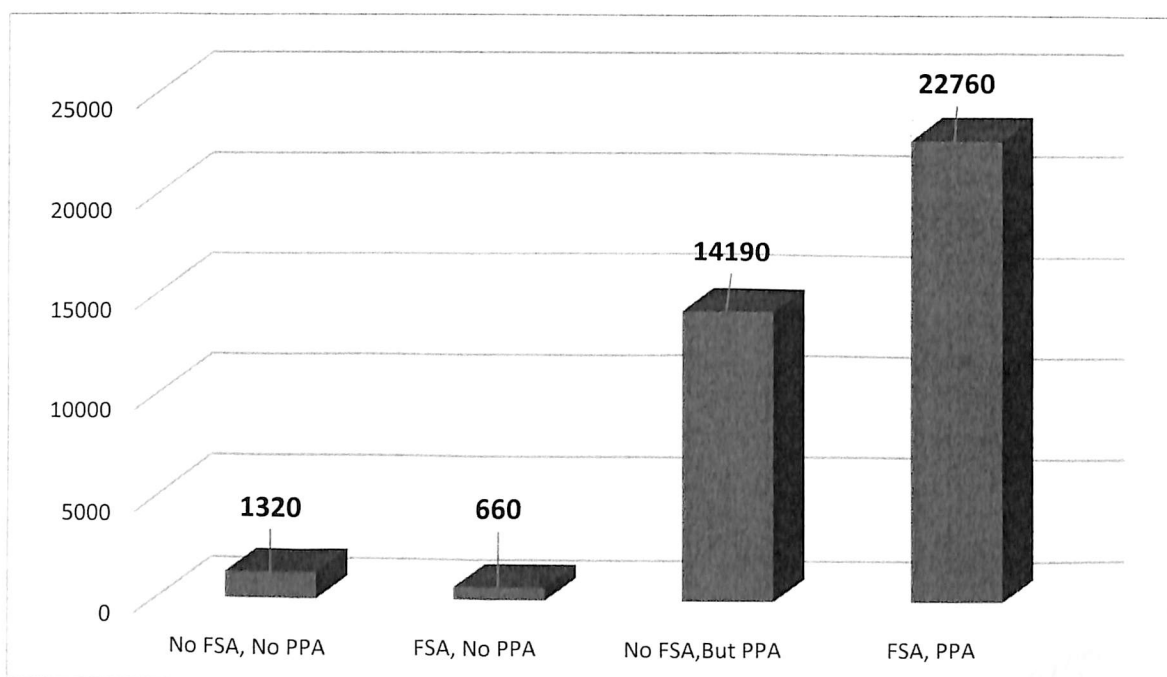


Fig 16: Status of FSA and PPA of 34 stressed power project (capacity in MW)

Samadhan is an initiative taken by the lenders. It involves change of ownership along with change in debt repayment schedule. The lenders will also keep part equity in the projects as it may provide upside in future. The State Bank of India has come up with the Samadhan

Scheme for resolution of stressed assets, under which 11 operational projects having either partial or full power purchase agreements and assured fuel supply are available for takeover from lenders who have converted their portion of debt into equity to be sold to prospective buyers to recover debt. However, players are bidding much lower than actual investment in assets, leading to huge haircuts for banks. All the same, resolution will be challenging given the sector dynamics.

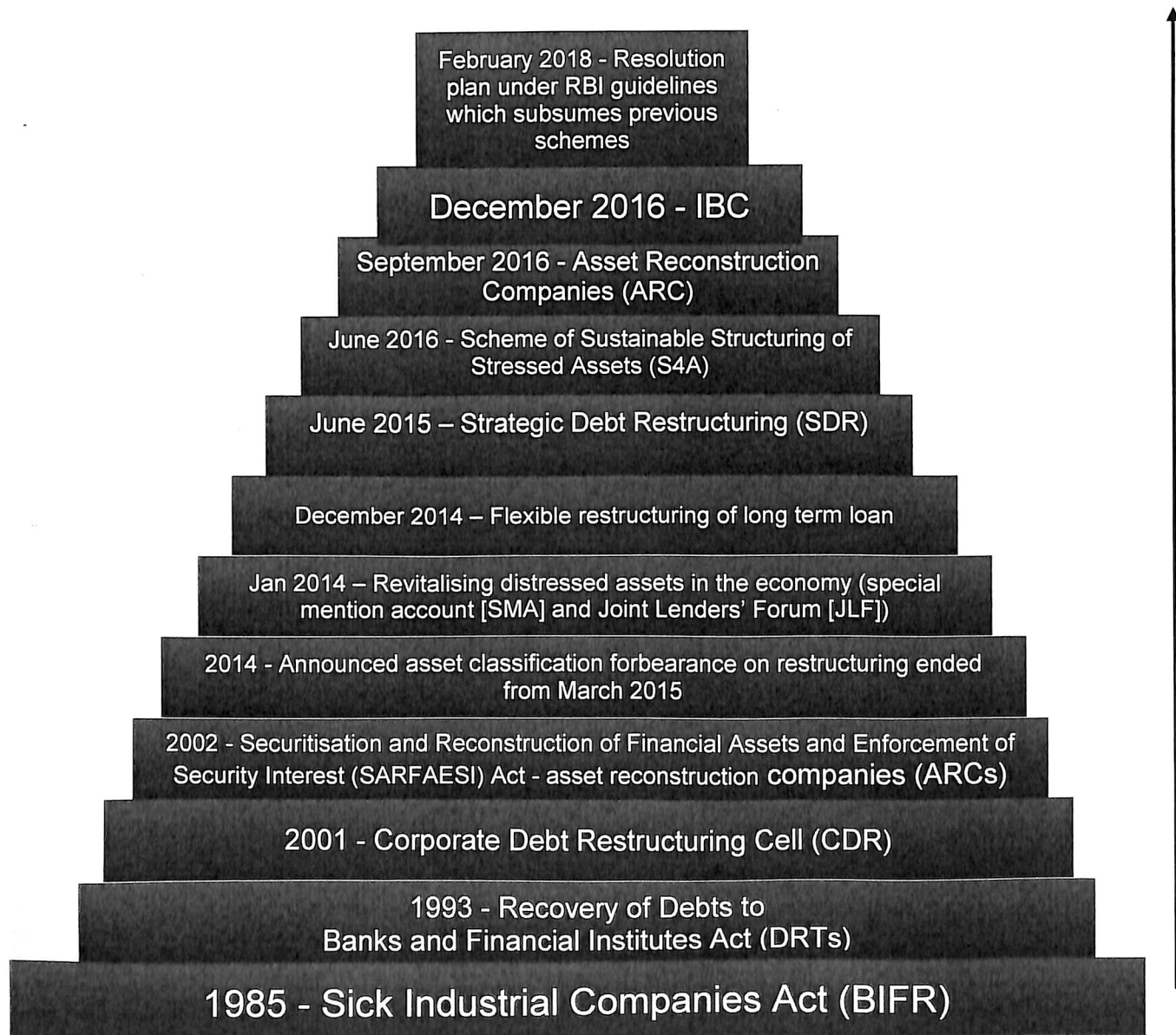


Fig 17: Debt resolution mechanism in India since 1985



The individual banks/FIs at their discretion can use this scheme as a means to resolve stressed power projects. Salient features of the scheme are as follows:-

- Debt restructuring scheme to be prepared in compliance with the Revised Framework of RBI.
- As a prudent measure, the existing promoters may be asked to reduce their shareholding in the project company.
- Lenders may determine sustainable and un-sustainable portion in the existing debt.
- Un-sustainable portion being held by lenders may be converted to equity/ equity like instruments.
- Ownership of the company may be given to a new investor (strategic/financial investor or Asset Management Company) as and when the lenders get a good offer with some equity stake remaining with lenders and existing promoters.
- Project operations may be given to an Operations & Maintenance Contractor (OMC) having requisite experience and credentials in operating power plants.
- Resolution Plan (RP) will be submitted to accredit rating agency for Independent Credit Evaluation (ICE) and Ratings will be obtained.
- New investor, who can buy upto 51% equity, after the lock-in period of 3 years, may sell their equity shareholding with prior approval of lenders.
- Based upon the sustainable debt levels and with RP-4 rating from rating agencies, the lenders may decide if this scheme is a better option as compared to outright sale of project (either through NCLT or outside).

An SBI-led consortium of bankers, earlier this year, shortlisted 11 power plants with up to 15,000 MW total capacity for change of management under the scheme of asset management and debt change structure or Samadhan scheme. Projects of Lanco Infratech, Jaypee Power Ventures, KSK Mahandi, Coastal Energy, Avantha Power, SKS Power and Prayagraj Power were among those assets selected for the scheme. In fact, Prayagraj Power has emerged as one of the first cases where resolution was about to be finalised outside the NCLT. Last week, Tata Power and ICICI Venture-promoted Resurgent Power announced receiving

Letter of Intent from the lenders of Prayagraj Power, which was earlier promoted by Jaiprakash Associates. However, JSW Energy, another bidder for the 1,980 MW thermal power plant, revised its bid to ₹6,200 crore from its earlier bid of ₹5,890 crore.

S.No.	Project/Company	Capacity	Lead Institution
1	Avantha Power (Jhabua)	600	Axis Bank
2	Coastal Energen Pvt Ltd	1200	SBI
3	Ideal Energy	270	Canara Bank
4	Jaypee Power Ventures Ltd	1820	ICICI Bank
5	Jindal India Thermal Power	1200	PNB
6	KSK Mahanadi Power Co. Ltd	2400	PFC
7	Prayagraj Power Generation	1980	SBI
8	RKM Powergen	1440	PFC
9	SKS Power Gen	600	SBI
10	Essar Mahan	1200	ICICI Bank
11	GMR (Chhattisgarh)Energy Ltd	1370	Axis Bank

Table 22: List of 11 projects identified under Samadhan Scheme

Coastal Energen Pvt. Ltd (debt of ₹ 6,132 crore), KSK Mahanadi Power Ltd ( ₹ 17,194 crore) and GMR Chhattisgarh Energy Ltd ( ₹ 8,174 crore) will be sold to Adani Group.

The lenders, led by State Bank of India (SBI), plan to frame resolution plans under the Scheme of Asset Management and Debt Change Structure, or Samadhan. Under the Samadhan scheme, a stressed power company's debt will be divided into sustainable and unsustainable portions. While the liability of the sustainable debt will be assumed by the new owner, the unsustainable part will be converted into equity.

## 4.1 Suggestions for Revival of Stressed Power Sectors

At present, many coal based power plants have Fuel Supply Agreements (FSA)/Letter of Assurance (LoA) but do not have medium term/long term PPAs. In the absence of long/medium term PPAs, these plants are not able to operate because linkage coal cannot be used against short term PPAs. In recent past, few States have invited bids for procurement of power under long/medium term PPAs as they want to refrain from the cost which they will have to incur in case of medium/long term PPAs.

One of the major reasons for stress is the delay in payments by the DISCOMs to the generators. This adversely affects their liquidity and ability to service the debt and to operate the plant as they are not able to make payment for the procurement of coal and meet other operating expenses. Though, there is a provision for termination of PPAs in the event of default of payment by DISCOMs, the generators are unable to exercise the option because, in absence of a valid PPA, they will lose the coal linkage and Long Term Open Access (LTOA) for transmission.

DISCOMs are unable to make timely payments to the generators because of their poor financial health. At the same time, most of the generators lack liquidity to withstand the shortfall in cash due to such delays. A suggestion was made by the Ministry of Power that Public Financial Institutions (PFI), such as REC & PFC, may discount the receivables from DISCOMs and make up front payment to the generators.

*“The list of recommendations from the High Level Empowered Committee-2018 (HLEC) to address the issues of Stressed Thermal Power Projects “as below:*

<b>Recommendations by HLEC</b>	
ACQ (Annual Contracted Capacity) to be determined based on efficiency	<b>Recommendations for Coal allocation/supply</b>
Non-accrual of short supplies of coal	
Linkage to be provided at notified prices without bidding	
Increase in quantity of coal for special forward e-auction for power sector	
PSU to act as an aggregator of power	
Procurement of bulk power by a nodal agency against pre-declared linkages	
Coal Supply in case of termination of PPAs due to Payment default by DISCOMs	
Coal Linkage for short term PPA	<b>Recommendations to facilitate sale of power of stressed power plants</b>
Retirement of old and inefficient plants	
Mandatory payment of Late Payment Surcharge (LPS)	<b>Recommendations on Regulatory &amp; DISCOM payment issues</b>
Payment Security mechanism for IPPs	
Prevent cancellation of PPA/FSA/ LTOA post NCLT scenario	<b>Other Recommendations</b>
Avoid Cancellation of PPA for non-compliance of COD	
Low utilization of Gas plant capacity due to paucity of natural gas	

*Fig 18: Recommendations from the High Level Empowered Committee-2018 (HLEC) to address the issues of Stressed Thermal Power Projects.*

**a) Coal Linkage for short term PPA:**

Linkage coal may be allowed to be used against short term PPAs and power be sold through Discovery of Efficient Energy Price (DEEP) portal following a transparent bidding process. During the year 2017-18, total 30 electricity Distribution utilities have invite bids for 2,22,084 MW of electricity using DEEP portal for meeting short term power requirements .

**b) Facilitate Coal Supply in case of termination of PPAs due to Payment default by DISCOMs:**

A generator should be able to terminate PPA in case of default in payment from the DISCOM with the facility to use linkage coal for short term PPAs for a period of maximum of 2 years or until they find another buyer of power under long/medium term PPA, whichever is earlier.

**c) Procurement of bulk power by a nodal agency against pre-declared linkages:**

A nodal agency may be designated which invite bids for procurement of bulk power for medium term for 3 to 5 years in appropriate tranches, against pre declared linkage by Coal India Limited (CIL).

**d) PSU to act as an aggregator of power:**

NTPC can act as an aggregator of power, i.e. Procure power through transparent competitive bidding process from such stressed power plants and offer that power to the DISCOMs against PPAs of NTPC till such time as NTPC's own concerned plants/units are commissioned.

**e) Increase in quantity of coal for special forward e-auction for power sector:**

Ministry Of Coal may earmark for power, at least 60 per cent of the e auction coal, and this should be in addition to the regular coal requirement of the power sector.

**f) Linkage to be provided at notified prices without bidding:**

The generator should be required to bid only once, for the procurement of PPA and linkage should be granted at notified price without any further bidding, to the extent of incremental coal production.

**g) Non-accrual of short supplies of coal:**

If there is a shortfall in the supply of coal and it is attributable to the Ministry of Coal or Railways; such shortfall need not lapse and be carried over to the subsequent months up to a maximum of three months.

**h) Annual Contract Quantity (ACQ) to be determined based on efficiency:**

Upper ceiling for the ACQ/MW may be prescribed by the CEA on the basis of efficiency parameters and irrespective of the capacity and actual consumption of that plant, the coal may be supplied on that basis.

**i) Retirement of old and inefficient Plants**

**j) Mandatory payment of Late Payment Surcharge (LPS):**

Late Payment Surcharge be mandatorily paid in the event of delay in payment by the DISCOM.

**k) Payment Security mechanism for IPPs:**

Public Financial Institutions (PFI), such as REC & PFC, providing the Bill Discounting facility may also be covered by TPA i.e. in case of default by the DISCOM, the RBI may recover the dues from the account of States and make payment to the PFIs.

**l) Cancellation of PPA/FSA/LTOA post NCLT scenario:**

PPAs, FSA and LTOA for transmission of power, EC/FC clearances, and all other approvals including water, be kept alive and not cancelled by the respective agencies even if the project is referred to NCLT or is acquired by any other entity. All of these may be linked to the plant and not the Promoter.

**m) Cancellation of PPA for non-compliance of COD:**

In case there is a delay in the commissioning of a project, the DISCOMs may be advised not to cancel the PPAs signed with the Generator and the same be kept on hold for a certain period of time.

## **4.2 CONCLUSIONS:**

Low PLF in thermal power sector has been arises due to number of factors. Short supply of coal is not only the reason behind it. Promotion of Solar power in the price of thermal power lead to low PLF. Solar power has many hidden subsidies The notion that solar power has become cheaper than coal-based power is an illusion. Its true cost is far higher than for thermal power. Solar power looks great when the sun shines, but stops at sunset, just as power demand soars to its evening peak. Much thermal power has to remain idle during the day, ready to pick up the slack when solar production suddenly stops. This forced idleness carries huge costs hidden by ostensibly cheap solar power quotations

The burden of under-utilized capacity will have to be borne by those same consumers for whom various subsidy schemes are being worked out. A possible solution to this is that certain flexible technologies like storage hydro plants and gas-based reciprocating engine plants are also made part of the system. This will not only bring down the overall investment requirement for the same installed capacity, but also improve efficiency of the coal or base load stations by allowing it to operate at optimum PLF, while the variability is taken care by flexible plants.

Committee (HLEC) has not fixed responsibility as who should have been held accountable for the current NPA crisis in power sector, whether it was the Ministry of Power, banks and financial institutions or the power companies. It was expected from the Committee that it would keep the interests of the people foremost, while issuing its recommendations. However, in the entire report, the Committee has emphasized more on the market oriented solutions for dealing with the problem of stressed assets such as taking steps for boosting the demand for power, but has not at all touched upon the role of welfare state in addressing

the energy inequity, which deprives millions of people the access to electricity. The success or failure of power projects is usually assessed from the point of view of their financial viability, but their impacts on communities, their livelihoods and the natural resources should also be taken into account, even though they cannot be monetized.

A higher-than-expected tariff could lead to difficulties in buying for procurers of power under the current scheme given the weak financial health of discoms. More so, as a major portion of discoms' demand is already tied up under long-term PPAs, the remaining can be met through competitive short-term options at the exchanges. For instance, the market clearing price (MCP) for the day-ahead market at the Indian Energy Exchange varied from Rs 2.76 per unit to Rs 4.69 per unit in April 2019 (till April 20, 2019). The average MCP stood at Rs 3.12 per unit in March 2019.

Also, while the scheme's intent is positive, as it aims to provide relief to stressed assets, experts say that substantial gains may not be realised by power plants owing to the short duration (three years) of contracts. Net, net, the two schemes only provide a partial relief to about 4.4 GW of capacity out of the 15-16 GW of operational coal-based capacity without PPAs.

Coal-fired power is expected to remain the main source of energy for the next decade. The capacity of coal based generation would increase from the current about 195 gigawatt (GW) to 238 GW by March, 2027.

The total debt burden of India's states is expected to touch Rs 52.58 Lakh crore by the end of financial year 2020, an 11.5% increase from previous year. The outstanding debt of states has increased to 25% of their combined GDP over the last five year, according to RBI report. While the Reserve bank of India suggest bringing down states outstanding debt to 20% of GDP in line with Fiscal Responsibility and Budget Management Act.

The total expenditure of Indian states in the power sector increased significantly in 2015-16 and 2016-17, after launch of Ujwal Discom Assurance Yojana (UDAY). Under the



programme, state government took over 75% of the outstanding liabilities of Discoms in the form of grants or equity, which stretched their finances.

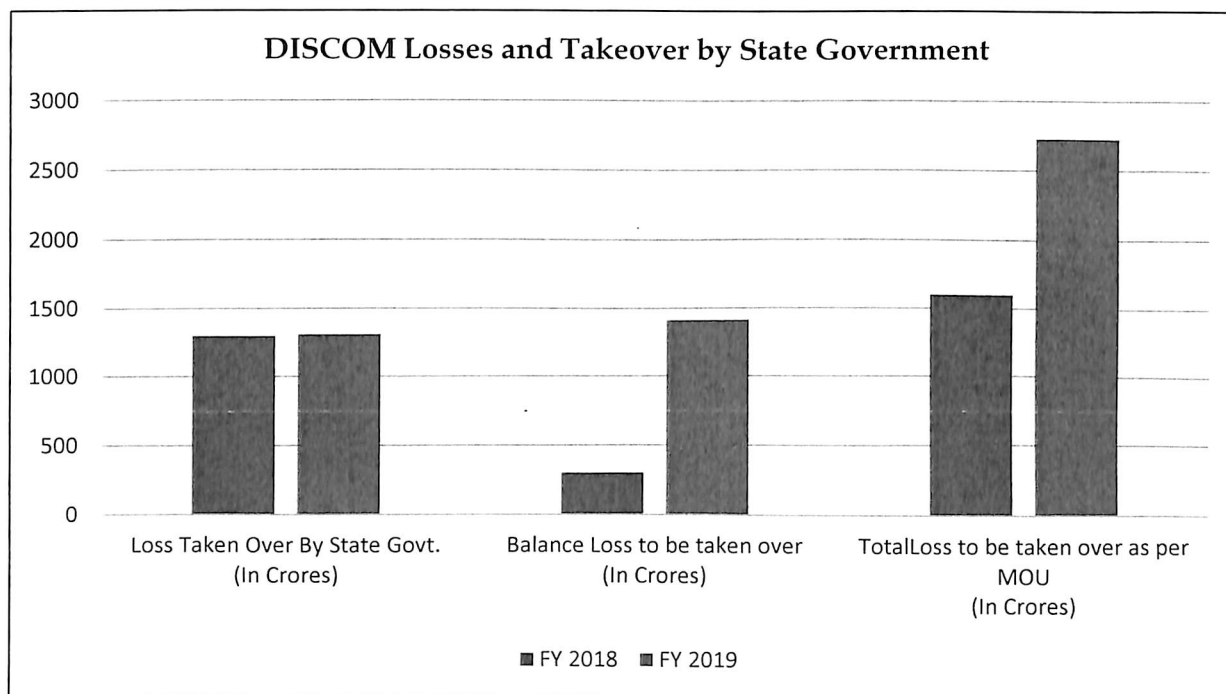


Table 23: DISCOM losses and takeover by state Government

Government of India along with IPPs have taken various initiative to convert Non Performing Assets into Performing Assets in the field of Power Sector. But scope for improvement is always there.

Control in generation cost will be the important initiative from IPPS view point. Companies should develop captive coal field to reduce price volatility. Power companies have to locate near energy source. This will minimize cost of fuel transport.

Acquiring source of fuel supply should be the other initiative need to take by IPPs for reliable operation of unit. Adequate supply of fuel by targeting not only domestic but also overseas resources increase the reliability. Government has enabled the power utilities for swapping their coal supplies with the nearest sources so as to save miscellaneous costs and decongest the rail network.

Companies are using multiple-generation technologies based on a project's requirement.

Government of India need to take various initiative under Digital India Platform. Launch of smart grid mission with 14 DISCOMS as a pilot. It is need to increase. Smart metering need to implement at fast pace.

The Central Electricity Regulatory Commission (CERC) has issued a notification for an amendment in the regulation for sharing of the inter-state transmission system (ISTS) charges and losses. The regulation was introduced in 2010 and has been amended six times. According to the latest amendment in the Central Electricity Regulatory Commission (Sharing of inter-state Transmission Charges and Losses) Regulations:

“No transmission charges and losses for the use of ISTS network will be payable for the generation based on solar and wind power resources for a period of 25 years from the date of commercial operation.” It is also required to provide such provision for Thermal Power Station to convert Non Performing to Performing Asset.

#### **4.3 Scope of Future work**

As CCEA has approved the recommendations of Group of Ministers (GoM) constituted to examine the specific recommendations of High Level Empowered Committee (HLEC) constituted to address the issues of Stressed Thermal Power Projects. Further study may be done to evaluate the implementation of the recommendations in its true sense and may reevaluate the condition of stressed thermal power sector.

We all knows and understands the future need of renewable energy and its importance for the sustenance of our future generations, but not at the expense of thermal sector .Looking into the current Indian scenarios, thermal installations of new ones may be discouraged but at the same time we must have a strong policy to allow the existing one to complete its life cycle. Hence a detailed study may also be taken for phasing out of old and in efficient thermal power units.

We may also explore the possibilities to reduce the state wise AT & C losses in India, which eats away a major revenue portion of respective DISCOMs. The study may also focus on the resolution of practical problems being faced by the DISCOMs as the improvements in their financial health ultimately leads to increase in demand of more power ,which obviously raise overall productivity of power sectors with sustainable and viable Power Generation.

For over 20,000 MW of the already commissioned thermal capacity set up with an investment to the tune of ` 150000 Crores is beleaguered as there are either no takers for their power or they do not have assured supply of coal for their operation. So efforts should be made by Coal India Ltd. to have reliability in coal supply.

As coal based power plants comprising of 54.7 % of the total thermal power capacity, Government should remove levies like Coal Cess and reduce freight charges as they significantly impact the cost of power.

SHAKTI scheme is a step in the right direction as this has been positively impacting both generators as well as consumers. However sustainability of the benefits and long term success of the exercise depends on availability of domestic coal and its distribution across the stressed power plants.

The thermal power assets ended up being NPAs causing great distress to the private investors as well as their financiers, losing confidence for future investments, as witnessed by low investments during the last two years. Steps must be taken at policy making levels at GoI for investor friendly environment in India.

In order to bring more efficiency and customer oriented, steps must be taken to bring more competition in transmission and distribution sectors of power .As of now 85% of power distribution and trading is being done by the state owned utilities. Time has come to consider increasing the share of private and PPP investors from the present level of 15% to 50% over the next 5 years.

Steps are to be taken for making power more affordable for consumers through reduction of cross subsidy, transmission & maximum demand charges. The target for 24X7 power supply to all within the next 5 years should be the vision.

Unless the present generation capacity gets utilized to the extent of more than 75%, no new thermal power units including UMPPs should be taken up.

GOI should take proactive steps to ensure that any surplus power capacity without PPAs get covered by the medium and long term PPAs.

It may be proposed that the role of CEA be redefined for doing due diligence at the initial stage only, so that only feasible / viable projects are build.

Following steps may be opt by Government of India for forther reduction in Non-Performing Assets in Thermal sector.

- Low-hanging fruit may be identified and an exercise to develop asset-specific strategy should be undertaken, as different assets have different types of challenges
- The NIIF, along with central public sector units, could take decisive steps for the resolution of stressed capacity
- Old, inefficient and environmentally non-compliant capacity may be retired on priority
- A mechanism needs to be developed to ensure that revivable stressed capacity is put to use. A tolling arrangement and the DEEP (Discovery of Efficient Electricity Price) portal can provide a better platform for revival
- Anti-dumping duty, collected from Chinese imports, could be used for establishing the viability of domestic solar manufacturing capacity

- Some value-unlocking options could be “as is” sale, sale to an ARC, sale to a financial investor/ strategic investor, NIIF revival and lender revival
- Selling assets without any value addition would attract a steep discount from the buyer
- Resolution strategies should depict realistic value-unlocking options related to the project.

## 5.0 BIBLIOGRAPHY

1. Power Sector in India , [www.ibef.org](http://www.ibef.org)
2. [https://en.wikipedia.org/wiki/Electricity\\_sector\\_in\\_India](https://en.wikipedia.org/wiki/Electricity_sector_in_India)
3. 13. Standing Committee on Energy\_2017-18\_Sixteenth Lok Sabha reports
4. Load Generation Balance Report, [CEA.nic.in](http://CEA.nic.in)
5. National Electricity Plan, CEA , Govt. of India
6. [www.cea.nic.in](http://www.cea.nic.in)
7. [www.cercind.gov.in](http://www.cercind.gov.in)
8. [www.powergridindia.com](http://www.powergridindia.com)
9. [www.nldc.in](http://www.nldc.in)
10. [www.erltdc.com](http://www.erltdc.com)
11. [www.wrtdc.com](http://www.wrtdc.com)
12. [www.posoco.in](http://www.posoco.in)
13. [www.data.gov.in](http://www.data.gov.in)
14. Press Information Bureau ,Govt. of India, [www.pib.nic.in](http://www.pib.nic.in)
15. <https://npp.gov.in/publishedReports>
16. [http://164.100.60.14/reports/committee/nep/nep\\_jan\\_2018.pdf](http://164.100.60.14/reports/committee/nep/nep_jan_2018.pdf)
17. [indiainfrastructure.com/reportpdf/reportcoalbasedpowergenerationinIndiaapril2018.pdf](http://indiainfrastructure.com/reportpdf/reportcoalbasedpowergenerationinIndiaapril2018.pdf)
18. <https://ibbi.gov.in/legal-framework/act>
- 19.