Examining Financial Feasibility of a Power Plant from a Project Financing Perspective

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Anyone who has been involved with activities concerning a large scale, capital intensive project knows that it is a challenging task to achieve the desired outcome, especially so in developing countries. Perhaps the biggest initial challenge is finding sponsors (promoters) with adequate resources and expertise to undertake the project. Promoters are often intimidated by size, complexity and resource requirements of large scale projects. Even in case of financially feasible ventures where they choose to undertake it, they are often confronted by myriad setbacks and delays which have become a potential characteristic of large scale project. Enter project financing.

Project financing is a method of organizing and funding large scale, capital intensive projects. In contrast to traditional finance's view of "black box" decision making: simply stating "go" or "no go", project financing offers truly innovative approach to finding sources of value and risk. Stated simply, project financing is a way of distributing risks and rewards more efficiently. Different risks are distributed to people who are best able to manage them and are paid to do so. Project financing unbundles and re-bundles the sources of value to compensate for the risk borne by parties, making the overall venture more efficient and perhaps feasible. This is particularly relevant in emerging economies where infrastructure, which is both large scale and capital intensive, is sorely lacking.

Infrastructure in India is far from adequate. Of the many areas where infrastructure needs improvement, power sector is among the most important in India. Demand for electricity is already on the verge of overwhelming supply and, as evidenced by the recent blackout in Northern parts of India, is expected to put acute pressure on the grid. It is very improbable that strong economic growth of India can be sustained without adequate electric power to the masses.

This study by Chenna Avinash is an endeavour to illustrate and examine the impact of key variables on project feasibility under a project financing structure.

S Abhijith

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Power Sector in India

Electricity is one of the key inputs for the overall socio-economic development of the country. The basic responsibility of the power supply industry is to provide adequate electricity at economic cost, while ensuring reliability and quality of the supply. Despite significant progress in capacity addition since Independence, the demand for electricity continues to outstrip the supply with the result that energy and peaking shortages continue to plague the economy. With the increasing pace of economic development facilitated by the reforms initiated by the Government, the demand for power in both rural and urban areas is likely to increase rapidly in the coming years. The demand for power has grown at a steady rate of CAGR of 5.7% (FY 07-11). But demand grew by only 3.7% in 2010-11 due to the underperformance of state distribution companies (discoms). Demand is expected to grow by CAGR of 6.6% over the next five years with few policy reforms. Capacity addition has picked up in the last few years. After increasing for few years, deficit has declined over the last two years driven by capacity additions.

However, the achievements of India's power sector growth looks phony in the face of huge gaps in supply and demand on one side and antediluvian generation and distribution system on the verge of collapse having plagued by inefficiencies, mismanagement, political interference and corruption for decades, on the other. Indian power sector is at cross roads today.

Installed Capacity in Terms of Thermal, Hydro, Nuclear and Renewable Energy Sources

India's power market is the fifth largest in the world. The power sector ranks high on India's priority as it offers tremendous potential for investing companies based on the sheer size of the market and the returns available on investment capital. The total installed power generation capacity of India is around 205340.26 MW by July 2012 as per the statistics published by Central Electricity Authority (CEA). Almost 56.5 per cent of this capacity is based on coal, about 9 per cent on gas, 26 per cent on hydro, approximately 5 per cent on renewable sources, about 3 per cent on nuclear and 0.5 per cent on oil.

Forecasted Demand by 2017

During 2005-06 to 2010-11, the energy demand for electricity rose at a CAGR of around 6.4 per cent, from 632 billion kWh in 2005-06 to 861 billion kWh in 2010-11. During the same period, supply increased at a CAGR of around 6.4 per cent, from 579 billion kWh in 2005-06 to 788 billion kWh in 2010-11. As a result, the energy shortage grew from 53 billion kWh in 2005-06 to 73 billion (Power Industry Information, 2011).

At present the demand for electricity at power stations is around 968.659 billion kWh (2011-12). If India continues to grow at average rate of 7 to 8 percent, the country's demand for power is likely to soar.Long term electricity requirement at power station bus bars is forecasted to be around 1392.066 billion kWh by 2016-17 (17th Electric Power Survey of India, 2007).

Role of Thermal Power Plants (TPP) in Adding New Capacities

Thermal power plants convert energy rich fuel into electricity and heat. Possible fuels include coal, natural gas, petroleum products, agricultural waste and domestic trash / waste. Other sources of fuel include landfill gas and biogases. In some plants, renewal fuels such as biogas are co-fired with coal. Coal and lignite accounted for about 57% of India's installed capacity. However as wind energy depends on wind speed, and hydropower energy on water levels, thermal power plants account for over 65% of India's generated electricity. India's electricity sector consumes about 80% of the coal produced in the country (CRISIL RESEARCH, 2012). India expects that its projected rapid growth in electricity generation over the next couple of decades is expected to be largely met by thermal power plants.

Key issues in Installing New TPP's

Coal availability

Though India has the fourth largest reserves of coal, inadequate fuel supplies are constraining the growth of power sector. Despite an increase in generation capacity, the country has been grappling with power shortage in the peak summers as the availability has not risen at the same pace as generation capacity, owing to fuel unavailability and other supply constraints. An analysis of data for the 11th Plan ended March 2012 showed the installed generation capacity had increased 40 per cent but the actual generation rose 29 per cent. The installed capacity at the end of March as of 2012 was 199,877 MW from 143,061 MW at the end of March 2008 (Shivanshtyagi, 2012). The increased generation, though reduced the power deficit from 9.8 per cent in March 2008 to 8.5 per cent in March 2012, according to experts: the

reduction of deficit would have been more, if there hadn't been fuel supply constraints. Fuel constraint has not only affected generation at units which have been commissioned but has also hit projects that were in line to be commissioned.

Tariffs for Electricity

The Indian Power market has a fledging organised power market based on trading of power on the Power Exchanges (PX). In India, tariffs have been predominantly regulated by CERC. It has specified a Pre-Tax Return on Equity (RoE) of 15.5% for the tariff period FY 2009-14. Further, it has allowed an additional RoE of 0.5% for projects commissioned after April 2009 within specific timelines. The additional RoE allowed by CERC is acting as an incentive for a project developer to achieve time-bound milestones. Competitive bidding for tariff determination is in place for power procurement (except hydro and renewable). Power generators selling in the short term market are referred as merchant power producers. Spot power exchange prices at open market is determined based on Double-sided closed auction basis. Power sold through long term PPAs is typically priced lower than that sold in the short term market. These generators have gained more than Rs 7 a unit in the open market in recent times and at few instances the prices shot up to Rs 12 per unit in the southern states due to weak monsoon. Consumers would be the biggest beneficiaries if more merchant power companies tie up long term PPAs.

Subsidies from Government

World Economic Forum (WEF) calls for more transparency in India's energy market, stating that current practices are damaging the country's economic outlook. In a budgetary context, subsidies may be defined as 'unrecovered costs in the public provision of private goods' (Srivastava, 2003). The energy market must be made more transparent and efficient to attract foreign and private investment. Because residential and agricultural electricity prices are heavily subsidized, the WEF says there is little incentive for private companies to invest in the power sector. The key trends analyzed in the operating/regulatory environment and the financial position for discoms in eleven key states[3], which approximately contribute to about 82% of the overall power consumption in the country. Overall, the discoms in many states continue to face challenges arising from inadequate tariffs as compared with their cost of supply, rising subsidy dependence and high operational in-efficiencies (Kadam, Ghosh, & Majumdar, 2012).

[3] Eleven states include Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Punjab, Haryana, Rajasthan, Uttar Pradesh, Madhya Pradesh, Tamil Nadu and West Bengal.

Commercial Losses

The Aggregate Technical and Commercial losses (AT&C losses) are exceptionally high at 27-28 per cent compared to developed countries where losses are 10-15 per cent. Technical losses are inherent in the system and occur due to the conversion of electricity into heat and magnetic energy in T&D equipments such as conductors, transformers and switchgears. Commercial losses occur due to non-metering, non-billing or pilferage of power. These losses can be largely attributed to faulty meters, reading errors, unmetered supply and unauthorized connections. On account of inadequate metering arrangement, it is difficult to estimate the extent of the loss and attribute it to a specific reason. Some of these losses are reported as agricultural consumption since most rural connections are unmetered. In addition, a large proportion of the losses can be attributed to theft through unauthorized connections in both rural and urban areas (CRISIL RESEARCH, 2012). Though commercial losses are not completely avoidable, they can be reduced substantially through additional investments.

Transmission and Distribution (T & D) losses

Huge T&D losses are largely due to outright theft and unmetered supply. It has been estimated that theft alone causes loss of about Rs. 20000 crores annually. Apart from rampant theft, the distribution sector is beset with poor billing (55%) and collection (41%) efficiency in almost in all States. More than 75-80% of the total technical loss and almost the entire commercial loss occur at the distribution stage. It is estimated that 1% reduction in T&D losses would generate savings of over Rs.700 to Rs.800 crores. Reduction of T&D loss to around 10% will release energy equivalent to an additional capacity of 10,000-12,000 MW (Mehta & Madhav).

Capital Structure (Debt to Equity)

A company's debt to equity ratio is calculated as the long-term debt upon shareholders' equity. The lenders will prefer a lower debt to equity ratio in order to ensure a greater investment from the shareholders ensuring shareholder commitment to the project and an increase in the net value of project assets. Shareholders, on the other hand, will want a higher debt to equity ratio, decreasing the amount of investment they will need to make. The debt to equity ratios for power projects in developing countries tend to be about 80:20 or 70:30, while other projects with higher market risks may not exceed 6065 percent debt. The actual agreed debt to equity ratio will be the result of a compromise between the project company and the lenders, based on the overall risk to be borne by the lenders. Govt of India has allowed debt-equity ratio in few cases as 5:1 but financer always

like to have bigger equity participation and it may go up to 2:1 or even 1:1. Generally 75:25 (3:1) ratios are followed in most of the private power projects in India.

Legal, Statutory and Environmental Clearances

For reasons including high costs, environmental impacts, and perception of financial irregularities, there have been protests against some power plants. Litigation, such as also renegotiation of Power Purchase Agreements (PPAs) has caused long delays in project completion. Hence construction has not been completed as scheduled. There are numerous statutory[4] and non-statutory clearances[5] to be obtained for starting a power project. All these can result in considerable delays and thereby cost escalation.

Project Financing Techniques

Project Financing is generally used to refer to a non-resource or limited recourse financing structure in which debt, equity, and credit enhancement are combined for construction and operation, or the refinancing, of a particular facility in a capital-intensive industry, in which lenders base credit appraisals on the projected revenues from the operation of the facility, rather than the general assets or the credit of the sponsor of the facility, and rely on the assets of the facility, including any revenue producing contracts and other cash flow generated by the facility, as collateral for the debt.

According to Nevitt & Fabozzi (2000), "A financing of a particular economic unit in which a lender is satisfied to look initially to the cash flow and earnings of that economic unit as the source of funds from which a loan will be repaid and to the assets of the economic unit as collateral for the loan" (P.K., 2000). The basic characteristics of project financing are as below

a) Creation of Separate Entity – Project Financing involves a creation of a separate entity popularly known as Special Purpose Entity or Special Purpose Vehicle (SPE/SPV). The SPV has a defined objective and definite life.

[4] The statutory clearances include cost estimate clearance, techno-economic clearance (TEC) from CEA, water-availability clearance from the CWC/State government, pollution clearance from the state and central Power Corporation Boards, forest and environment clearance and rehabilitation and resettlement clearance from the Ministry of Environment and Forests (MoEF) and the SEB/state government clearance.

[5] The non-statutory clearances include land availability from the State government, fuel linkages from the Departments of Coal and Petroleum and Natural Gas, transportation of fuel from the Departments of Coal/Petroleum and Natural Gas, and the Ministries of Railways, and Shipping and Surface Transport, and financing from CEA/DOP/Department of Economic Affairs/FIs.

b) Equity Holding Pattern – The project financing structure or SPV is a highly concentrated ownership structure. It is normally, an outcome of partnership or joint venture between 3 or 4 equity sponsors. This format is similar to the venture-backed companies with the only exception that equity sponsors are not the managers.

c) Non-recourse Debt – The debt component provided by lenders is on non-recourse nature and the lenders have no claim on the equity sponsors for the repayment of debt service but fully rely on the project cash flows for the debt service.

d) Leverage – The project financing deals are highly leveraged deals typically involving a leverage of 70% and at times going up to 80% or more.

e) Contractual Structure – The project financing because of definite life and objective are highly contractual entities and the operations are highly structured by entering into various contracts.

Project Finance Encouraging Investment in Power Sector

The key characteristic of Project Finance is 'Non-Recourse Lending'. In simple terms it means that, the lender shall not have any recourse to any other assets of the borrower, apart from the current assets and future assets of the project for which the loan is being sanctioned. In other words, in case of any default on the loan, the lender can take charge of only the 'project assets' exclusively. This feature of Project Finance enables both the lenders and promoters to share the risk. It also places a greater responsibility on the lenders to keep all check and balances on the developer/promoter. Hence the lenders prime focus on primary security for these capital intensive projects incentivises many investors to come forward and invest.

Better Risk Management using Project Finance

The fundamental concern of the sponsors of any power project is to maximise the profit of the project whilst eliminating inherent risk. Project risk is found at all stages of the project life and affects the present, as well as the future, profitability of the project. In project finance, the most important element is the protection of the project's isolated and assignable cash flow. This is not just the source of funds used to operate and manage the project, but more importantly, to service debt. It is essential that the risks do not adversely affect project cash flow to such an extent to that the project is no longer

able to operate and debt repayment becomes problematic.

Stabilizing Flow of Inputs (supplies)

In order to resolve the issue of adequate coal supplies to power plants from Coal India Limited (CIL), the Prime Minister's Office (PMO) has directed CIL to sign Fuel Supply Agreements (FSA) with power generation companies that have long-term power-purchase agreements with state distribution utilities. The signing of the FSAs would ensure better fuel availability to upcoming power plants dependent on linkage based domestic coal. The PMO's directive includes the agreement for the supply of coal of specified quality in the Letter of Assurance (LOA) granted to the power generation companies for a period of 20 years. If the supply falls below 80 percent of annual contracted quantity (ACQ), CIL will be liable to pay a penalty. On the other hand, CIL will be awarded incentives if the supply is more than 90 per cent of the ACQ. The contracted quantity in the LOA has been set at a plant load factor (PLF) of 85 per cent of the rated capacity.

Revenue Stability Using PPA

A Power Purchase Agreement (PPA) secures the payment stream for a Build-Own Transfer (BOT) or concession project for an independent power plant (IPP). It is between the purchaser (often a state-owned electricity utility) and a privately owned power producer (Power Purchase Agreements (PPAs) Web page). Power purchase agreements (PPAs) may be appropriate where the projected revenues of the project is uncertain and so some guarantees as to quantities purchased and price paid are required to make the project viable.

Improved Operating Efficiency Using Project Finance Structure

Under the certainty of revenue stream, the entire financial structure of the project is dependent on the projected costs of operations. Any increase in the cost of operation, lenders want to be protected to the extent that it will impact the revenue stream. For instance, the cost can be locked in, to some extent, through hedging contracts and through input agreements but there are likely to be some costs that are not hedged and the lenders will want to be sure that these are limited. Another key cost in operations will be the cost of workers and an assumption for wage inflation is usually built into the agreement by reference to an index such as the retail price index. It is important to ensure that the index covers increases in the sorts of costs incurred by the project. The other key risk in operations is performance. The lenders and other investors are likely to have chosen an experienced

operator to operate the project but there will be risks associated with operations such as key pieces of plant breaking down when they are out of construction warranty and also in the project company failing to meet the performance requirements and facing penalties and even the risk of termination for default. The lenders will seek to mitigate these risks through warranties and step-in rights.

Hindrances in expediting Project Finance Structure

In India, average electricity tariffs are lower than the average cost of supply (cost of generation plus T&D costs). The gap between average tariff and average cost of supply has increased from 36 paise per kWh in 2005-06 to 86 paise per kWh in 2009-10. This has led to the annual losses of all state distribution utilities rising continuously from over Rs 86 billion in 2005-06 to Rs 275 billion in 2009 -10 (CRISIL RESEARCH, 2012).

Although discoms have been granted partial financial autonomy, most of them work under the administrative control of the respective state governments. As a result tariff revision filing has not been regular and the average cost of supply is higher than average revenue realised for most states. Further, the tariffs for agricultural and domestic consumers is subsidised in most states. To compensate for this, most states charge higher tariffs to commercial and industrial consumers. The state electricity boards of Andhra Pradesh, Gujarat, Karnataka, Rajasthan, Haryana, Punjab and Maharashtra are riddled by huge losses. They depend on subsidies which, in some instances, are as high as 25% of the annual power revenue accruing to the state (Bhaskar, 2010).

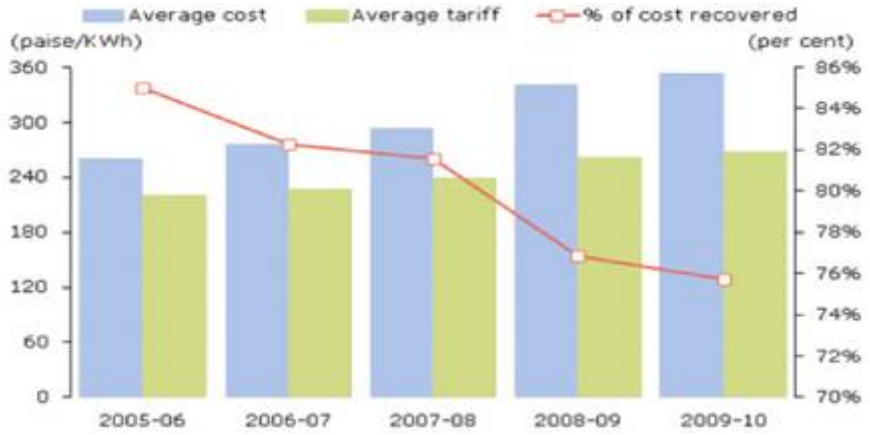


Figure 1: Average cost vs. Average tariff vs. % of cost recovered

Source: PFC Report, CRISIL Research

Bureaucratic and government delays associated with obtaining permits and clearances for pre-bid activities such as land acquisitions, water allocation, environmental clearances, and commercially viable power purchase agreements also contribute to power generation capacity commissioning delays and shortfalls.

Analysis of XYZ Ltd

Introduction

In order to effectively show the various issues involved in power projects, an example XYZ Ltd (*) is taken and financials are determined. It is assumed that this particular SPV, XYX Pvt. Ltd is promoted by three different promoters at holding levels of 51%, 26% and 23%.

The basic entity details are as below. (#)

Table 1

Category	Domestic & imported coal based TPP
Capacity	1320 MW
Cost	Rs. 6,446.56 crores
Cost / MW	Rs. 4.88 crores
Debt:Equity	75:25 :: Rs. 4,834.92 crores : Rs. 1,611.64 crores

Other project details

Table 2

Item	Value
Project cost w/o IDC	5,548.00 (Rs. In crores)
Interest During construction	898.56 (Rs. In crores)
Total Project Cost	6,446.56 (Rs. In crores)
Total debt	4,834.92 (Rs. In crores)
Foreign debt	28%
Senior debt	47%
Interest on Rupee Term Loan	12% (pre COD 12.5%)
Interest on Foreign Currency Loan	10%
Debt repayment period	12 years
Life of the SPV	25 years (excluding 44 months of construction)

Working Capital debt percentage	75%
PPA at CERC tariff	85% (rest 15% on merchant basis)
Fuel price including taxes	1130 (INR)
Imported coal price	$ 69 (exchange rate 48.92)
Shipping charges	Rs. 685 ($ 20 for imported coal)
Fuel mix (domestic : imported)	60:40
Depreciation	15%(machinery) and 10%(buildings)

(*) Real name of the company has been masked upon company's request

(#) All data is based on actuals with minor variations.

Based on the above project details and current market prices of raw materials, a financial model is developed and results of this SPV are projected for the life of the project (25 years). The results are as below

Table 3

Parameter	Value
DSCR	
Minimum	1.36
Average	1.38
Maximum	1.58
Project IRR, pre-tax	14.13%
Current Tariff	Rs. 3.96 per kWh (Levellized at discount rate of 10.19%[6])

Key Parameter Which Impact IRR & DSCR (cut-off values)

In order to examine the feasibility of financing power projects, different parameters which impact the project are taken and sensitivity analysis is carried out. The cut-off values for IRR and DSCR are taken and compared with the outcomes of the sensitivity analysis for different parameters. The cut-off values are taken based on the credit policies of one of the leading NBFC in India.

[6] Discount rate to be used for bid evaluation as per the Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees, the Central Electricity Regulatory Commission

The cut-off values taken are

Table 4

IRR	14.00%
DSCR Average	1.35

Social Risks - Impact of delays

Power projects generally have an important impact on local communities and quality of life like pollution (due to ash and sulphur content in the coal which is to be burnt), land acquisition (land intensive projects), etc. Project impact on society, consumers and civil society generally, can result in

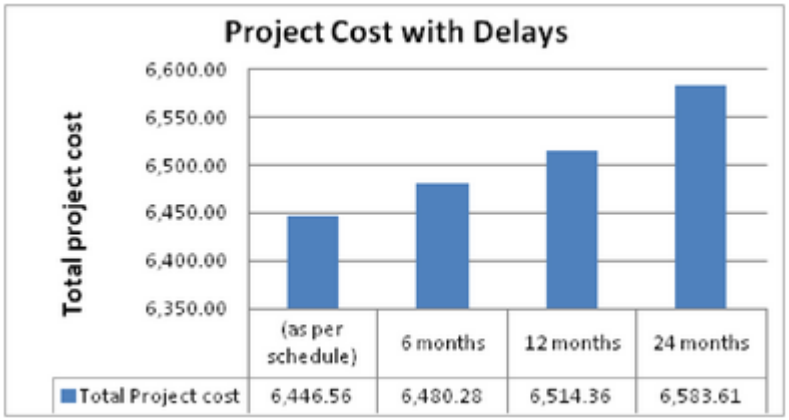


Figure 2

resistance from local interest groups that can delay project implementation, increase the cost of implementation and undermine project viability (Delmon, 2009). This social risk should be high on lenders due diligence agenda, though it often is not. The lenders and Project Company often look to the grantor to manage this risk. The grantor in turn may underestimate its importance, since the social risk paradigm for public utilities is very different, the grantor may not have experience of its implications for private investors.

In the recent times, there were many cases where environmental clearances issues were raised and the constructions of the power plants were stopped. The impact of such delays is studied for this example by analyzing a situation where the construction of this thermal power plant is stopped after one year. Three different levels of delays are taken and impact is calculated.

Table 5 (Rs. crores)

Delay	(as per schedule)	6 months	12 months	24 months
Total Project cost	6,446.56	6,480.28	6,514.36	6,583.61
Increase in IDC	0	33.73	67.80	137.06
Percentage change	-	.52%	1.04%	2.08%

Impact of Tariff Change (2% increase, 4% increase, 6% increase)

The losses of power distribution companies crossed Rs 2 lakh crore at the end of March 2012, as lower consumer tariffs and higher fuel costs continued to hurt their bottom lines. As per Crisil Research, power tariffs in India rose just under five per cent per annum in the five years ended FY'10. During the same time, per capita income grew by 13.4 per cent every year while household expenditure increased by 10.6 per cent per annum (Power distribution companies' losses cross Rs 2 lakh crore, says Crisil, 2012). This indicates that Indian consumers can bear higher tariffs and policy makers may have more flexibility to increase tariffs than they are currently exercising.

The sensitivity involved in this parameter is analyzed by taking three levels of increase in tariffs charged by this particular generation plant. The results are projected below.

Table 6

Tariff change	current	+ 2%	+ 4%	+ 6%
IRR	14.13%	14.94%	15.72%	16.45%
DSCR				
Minimum	1.36	1.41	1.46	1.50
Average	1.38	1.44	1.49	1.55
Maximum	1.58	1.68	1.78	1.87
Levellized tariff	3.98	4.06	4.14	4.22

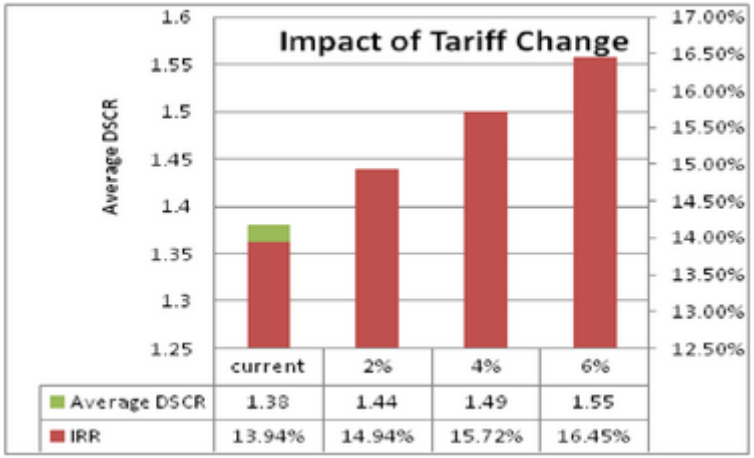


Figure 3

A small increase in tariff would show a very positive impact on the project figures. A small reform in the tariff policy would move the existing and new investors in power projects to look forward in near future. IRR becomes 16.45% from 14.13% with just an increase of 6% in the tariff levels. Such tariff revises would even attract the financiers like banks to come forward in lending power projects. There is also a concern that a small reversal in the tariff would negatively impact the project more aggressively. This may happen because of any further subsidisation in the future.

Exchange Rate Impact

Project finance debt is often sourced from foreign lenders, in foreign currencies, yet project revenues are generally denominated in local currency. Where the exchange rate between the currency of revenue and the currency of debt diverge, the cost of debt can increase, often dramatically. Though under the theory of purchasing power parity, inflation pressures on the devalued currency will eventually bring the foreign exchange rate back to parity, project finance lenders are generally not prepared to wait quite so long (with average periods of about 10 years).

Where revenues are to be earned in some currency other than that in which the debt is denominated, the lenders will want to see the revenue stream is adjusted to compensate for any relevant change in exchange rate or devaluation. If this is not available, the lenders will want to see appropriately robust hedging arrangements or some other mechanism to manage currency exchange risk. Sometimes even the raw materials are to be procured from international suppliers like in this case the imported

coal is procured from outside the India. Then the change in currency rate more than the escalation assumed during the appraisal of the project, this parameter would impact the cost of generation which ultimately affects the profitability of the project itself.

Table 7

Exchange rate	(48.92 per USD	INR 53 per USD	INR 56 per USD	INR 60 per USD
IRR	14.13%	13.88%	13.69%	13.43%
DSCR				
Minimum	1.36	1.35	1.33	1.32
Average	1.38	1.36	1.35	1.34
Maximum	1.58	1.54	1.51	1.48

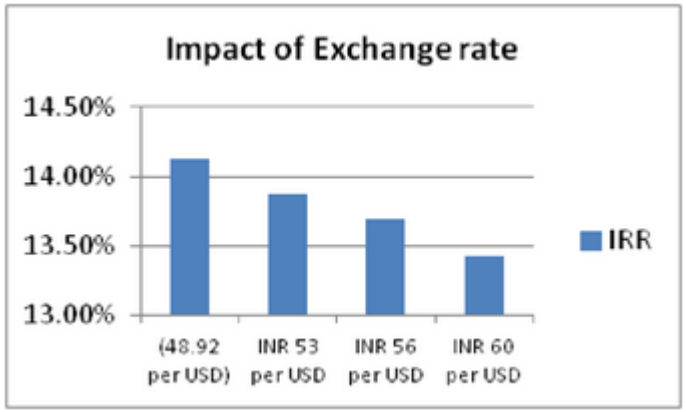


Figure 4

Impact of exchange rate on IRR is considerable. The current exchange rate currently running at 55-56 would take the IRR below the cut-off level of 14%. So the currency risk must also be taken as a factor to assess the project before financing. Hedging cannot be done for the entire life of the project, 25 years.

Impact of increase in Coal prices by (2%, 4% and 6%)

The cost of generation majorly depend on the prices of raw material i.e. coal prices. Again the coal prices depend on the demand and supply situation

of coal which in turn depend upon demand and supply of other fuels like oil, gas and nuclear energy. More than 60% of India's coal imports are through spot or short-term contracts and experts say the power producers are finding the sudden increase in price too sharp for comfort. Besides private producers, state-run Coal India also imports coal from Indonesia, mainly to feed NTPC and other public sector units. In order to assess this scenario, different levels of increase in coal prices are taken and the impact on key parameters of the project is forecasted. The results are as below :

Table 8

Change in coal prices	**At current**	**+ 2%**	**+ 4%**	**+ 6%**
IRR	14.13%	14.04%	13.95%	13.88%
DSCR				
Minimum	1.36	1.35	1.35	1.35
Average	1.38	1.38	1.37	1.36
Maximum	1.58	1.57	1.56	1.54

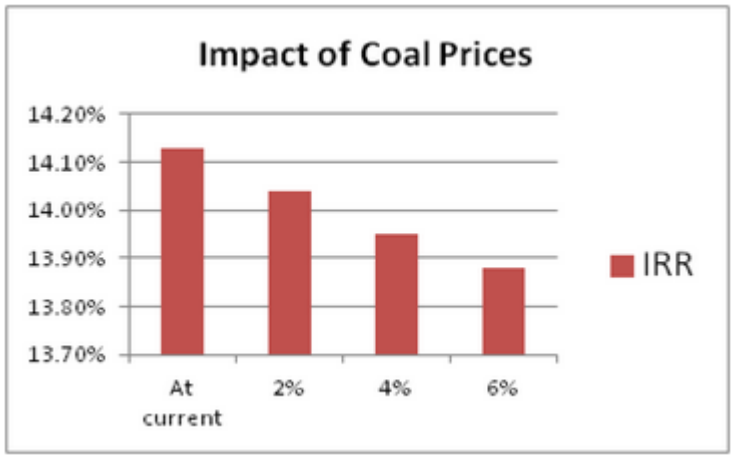


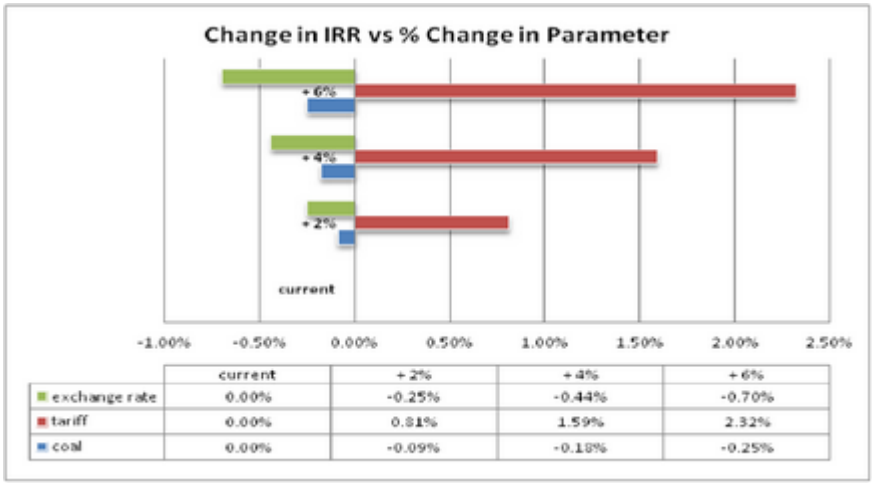
Figure 5

Coal prices have been very dynamic in the recent years. Cost of other fuel sources and imported coal determines the cost of domestic coal as well. A small increase in the coal prices by 6% would reduce the IRR to 13.88%

which is below the cut-off level of acceptance. There were even times when coal prices were raised by 12% (Press Trust, 2012). Hence this particular parameter must also be taken into consideration by financial institutions before financing power projects.

Sensitivity Analysis Results

Impact on IRR



	current	+2%	+4%	+6%
exchange rate	0.00%	-0.25%	-0.44%	-0.70%
tariff	0.00%	0.81%	1.59%	2.32%
coal	0.00%	-0.09%	-0.18%	-0.25%

Figure 6

Impact on Average DSCR

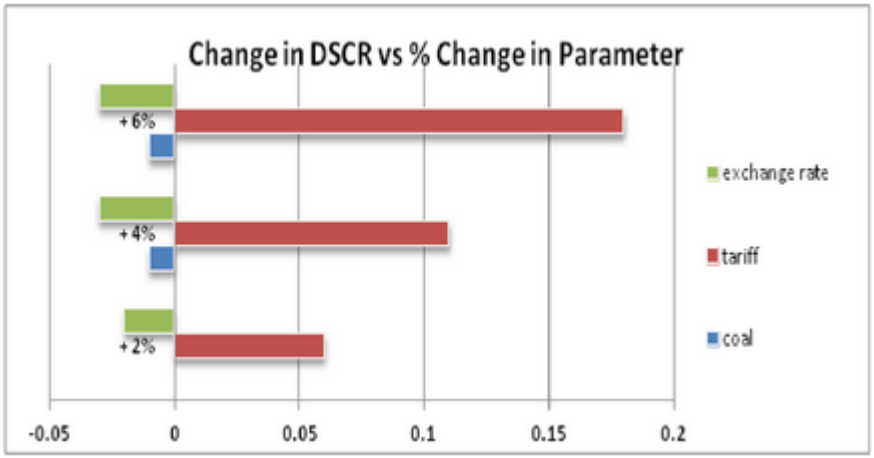


Figure 7

Conclusion

Hence from this research work it is clearly evident that for power generation companies, key parameters like exchange rate and tariffs show a considerable impact on the financial viability or bankability of the project. Even though coal prices doesn't show relatively greater impact but its affect is considerable to an extent. Delay in the construction and commencement of the project is also one of the factors that need to be considered by lenders while carrying the risk assessment. As far as power generation is concerned other issues like funding issues, less generation in existing power plants, and lack of realistic or cost-representative tariffs need to be seriously looked into. The Indian government, national and state-run utilities, and independent power producers (IPPs) are all taking measures to address these critical infrastructure development roadblocks. Automatic tariff increases, reduction of Aggregate Technical & Commercial (AT&C) losses and timely payment of subsidies by governments to their respective discoms, are among the steps that can help in bettering the power sector. Project finance is still in its adolescent years, and has seen a growth since 1990s. But the growth has been hindered by the recent difficulties in specific sectors and geographical areas. This research does not suggest that the companies must immediately and completely shift from traditional financing to project financing for all types of infrastructure projects. The companies should adopt the project financing structures so that the objective of shareholders wealth maximization can be achieved. Private power continues to face many challenges in developing countries. Protracted contract renegotiations and a lack of adequate government risk assumption may erode investor confidence and restrain private investments. Continued growth may require greater private debt capital risk taking. Governments, developers, institutional banks, private lenders, and financiers all have a role in helping to meet future challenges. The profile of planned capacities will also need to be suitably modified to fulfil peak demand, keep emissions under check, reduce dependence on imported fuels and provide affordable power. A step-up of this magnitude is unlikely to materialise with a traditional approach. A radically new approach is required.

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