

## **EXECUTIVE SUMMARY**

Electricity is a 117 year old commodity in India. The first statute laying down the Indian Power Sector business framework was enacted in 1910, which led to Private Investments in the pre-Independence era. In the post-independence period however, the Federal Government laid special thrust on development of Indian power system by Public Sector over the first four decades.

Indian laws and statutes for the power sector have since changed, particularly in the last 20 years. Shifting from the post-independence policy of development through public sector, the focus has shifted to the need for aggressive capacity addition by private sector. Government of India made special endeavours, since 1990's, to bring in private capital for development of Indian power sector. One of the chief reasons for doing so was to address the large demand-supply gap, then prevailing.

However, while the latest comprehensive statute on electricity business, Electricity Act 2003, provides special thrust on generation capacity addition and private investment, certain key policies like Government fuel policy and policy on development of power market do not seem to work in tandem with the objectives of the Act. Viability of large generation capacity recently created by private investors on the basis of specific Government assurance on coal supply and retail market creation is facing serious challenges. New restrictive conditions have suddenly been imposed by the Government instrumentalities throwing fuel supply for these plants into deep uncertainty. The other objectives of 2003 Act like developing retail market and introducing competition in the said market are yet to materialize on ground. This, along with the change in the fuel policy, inadequate power demand and sharp fall in prices in the wholesale market is leading to stranding of large-scale private capacity created. These are highly capital intensive projects involving significant public finance.

Taking this as a cue this research framed the following **Business Problem**:

India had significant demand-supply gap in power. To address this gap, GOI invited major private sector participation for building up new capacity. Responding, major investment followed and large Private Power capacity is scheduled for commissioning in the 12th Five Year Plan itself. Such investments have already been made by Developers based on Central Government's assurance of

- (a) Fuel tie-up (raw material) for these plants  
and,
- (b) Providing access to retail market for power sale

At this advanced stage of construction, the assets now face the risk of being stranded because the much needed Government assurances are unlikely to materialise.

Available literature was gathered on the subject with key words like IPP, Indian Power Sector, MPP, Power Sector Reform, Policies, Uncertainties, Generation capacity creation, coal supply to Indian power plants, Competitive Bidding, Retail Power Market, Wholesale Power Market, Investment appraisal criteria, Laws in Indian Power Sector and Unbundling etc.

In this context, over 300 documents covering national / international journals, data-bases, books, media reports, rules, regulations, policies and judgements of Hon'ble Supreme Court, High Courts, Appellate Tribunals and Regulatory Commissions were studied. Information thus collected have been arranged thematically as follows:

- (1) Indian Power sector business framework (Wholesale & Retail) & IPP investment
- (2) Indian Fuel Context
- (3) Indian Reform Experience, Demand Supply & Power Market Behaviour
- (4) International Power Sector Reform

An analysis on the outcome of the literature review identified the following gaps:

- 1) Implication of change of fuel policy on project viability of IPPs is not known
- 2) Implication of barriers in retail market on project viability of IPPs is not known
- 3) Overall viability of IPPs in the present scenario of likely stranding is not known
- 4) How policy uncertainty during ongoing project stage be part of investment appraisal to evaluate various options?

From these gaps, the following research problem and research objectives were derived:

**Research Problem:**

- 1) How fuel policy changes/ uncertainties are impacting the viability of IPPs in India?
- 2) How barriers in the Retail Electricity Market are impacting the viability of IPPs in India?
- 3) Is there a large viability gap?
- 4) If yes how to address the problem of stranding assets

**Research Objectives:**

1. To identify investment appraisal criteria used by IPPs in India and Developers' views under current uncertainty in power generation in India
2. To study the impact of change in policy on viability of IPP in India.
  - (a) To study implication of change in fuel policy (coal) on project viability.
  - (b) To study implication of barriers in retail market on project viability.

- (c) To examine viability gaps for IPPs in terms of cost of generation and expected revenue and evaluate options
3. To Suggest framework for mainstreaming stranded IPPs

With these objectives in view, this research used a combination of qualitative and quantitative methodology. On the qualitative side, Interviews were conducted with Developers/ leading Consultants in power sector/ Industry Association/ Traders/eminent Energy lawyers and Policy makers. These were conducted face to face with the aid of voice recorder by permission. Qualitative data collected through various interviews were thereafter analysed in accordance with Framework Analysis (Ritchie & Spencer, 1994). This methodology covers a five-step process.

- 1) Familiarization
- 2) Identifying thematic framework
- 3) Indexing
- 4) Charting
- 5) Mapping and interpretation

Transcriptions were made and interesting segments of texts were highlighted. These text responses were read through to look for patterns and/or themes emanating. Themes and responses were charted. Recurrent themes and emerging issues were identified and thereafter charted.

On the quantitative aspect, project cash flow analysis was used for examining project viability under various options available to the developers. Real option theory and transaction cost quantification were used for barrier analysis and its impact on project viability with scenario/ sensitivity analysis. Quantitative techniques used in the research include the following:

1. Mathematical model development considering operating and financial parameters of coal based thermal power generating station,
2. Scenario analysis for various combinations of input cost / input mix, output price, capacity utilisation (“options”, also referred as

Market Side Options - MSOs and Supply side Options - SSOs in the research) and various levels of transaction costs, and

3. Computation of Net Present Value (NPV) to arrive at the project viability, using Discounting Rate as notified by the Central Electricity Regulatory Commission.

Having noticed that there is a major viability issue and the investments are facing acute financial distress, various options for main-streaming these assets were then generated through interviews with experts. Analyses of the same identified the main stakeholders as Government of India, State Government, Coal India Limited, Regulators, concerned private companies, CTU/STU/Discoms and Banks/ Financial institutions with main issues involved as Coal Availability, Contracting (Power Purchase), Access to Retail market / Retail market development and Financing & Policy issues. Such options were then distilled and final recommendations are made issue-wise and stakeholder-wise.

Over Rs.2,50,000 crore worth of new assets are currently in jeopardy. This figure is growing even larger with each passing day. Share prices of the unfortunate developers have taken a huge beating in the bourses and they are now extremely wary of new investments. Now that the Government is hopeful of stepping up domestic coal production and improving bankability of State Distribution Companies in India, it is time for considering special initiatives including easing of restrictions on coal supply and removing entry barriers in retail power market in order to mainstream large thermal power capacity newly built at a very high cost and currently lying unutilized in the country.

The study addresses a burning business problem of high value stranded assets. It analyses the important policy issues and causes leading to such situations and recommends key action plan around topics / stakeholders. The study also explores exercisability of Real Option Theory (ROT) by IPPs in current uncertainties looming around IPP investments in India. **Major Findings** are:

1. Internal Rate of Return commonly called IRR is the most popular investment appraisal criteria and the IPP/ developers mostly used this.
2. Government assurances were not honoured and considerable uncertainty around fuel and market have impacted viability of investments undertaken
3. Developers feel keeping ROT in view earlier would not have helped in current uncertainty; ROT options like Flexible Production Options, Mothballing Option, Market Selection Options and Conversion Option are all financially unviable in prevailing situation
4. A well-coordinated approach combining stakeholders like State and Central Govt., Electricity Regulators, Bank, Discoms and Project Developers is necessary. Issues that will need special focus are efficient coal production, equitable allocation, innovative contracting, market development and financing issues