Chapter – 2
Survey of literature

The Government of India announced the policy of liberalization in 1991 and consequent amendments in Electricity (Supply) Act, have opened new vistas to involve private efforts and investments in Power generation industry. Considerable emphasis has been placed on attracting private investment and the major policy changes have been announced by the Government in this regard and State Electricity Boards (SEBs) were subsequently unbundled in most of the states making them state corporations.

The literature review conducted here has been taken in the above perspective and thus the papers relating to that are mostly of post 1991 era for Indian context, however the case of other developing countries have been accordingly taken as per their respective years of sectoral reforms and private sector participation in those countries. The literature review focuses upon the following aspects in the context of the Research work.

a. Need of private sector participation in power generation

b. Drivers of private sector participation in power generation

c. Sustainability of private sector power projects

d. Availability of resources for capacity addition

e. Privatization in various developed and developing countries

f. Research Gap

2.1 Need for Private Sector Participation in Power Generation

Tongia Rahul (2003) has described the political aspects of the Indian economy with special reference to power sector. After independence the Indian economy followed a socialist path, with the state assuming an ever-larger role in economic activity. In the power sector, the central government created State Electricity Boards (SEBs) that gradually assumed responsibility for nearly all power activities in the country. A handful of power companies continue today as private electricity suppliers for several major cities including Ahmedabad,
Kolkata and Mumbai. However, the vast majority of the private entities were amalgamated after independence into state-owned enterprises.

Balachandra (2006) has discussed the implications of such private sector participation in power generation on various stakeholders, viz., public utilities, consumers and private sector. The study attempts to analyze issues like planned rationing, guarantees to private sector, backing down of existing capacity. Using the State of Karnataka (in Southern India) as a case study, the paper has developed multiple scenarios using an integrated mixed integer-programming model. The results show the advantage of marginal non-supply (rationing) of electricity in terms of achieving overall effective supply demand matching as well as providing economic benefits to the state that could be generated through cost savings.

Puneet Chitkara, et.al., (2001) have stated that there is a general opinion that the reforms should start with privatization of Power generation. Others believe that the government has started at the wrong end by not beginning the reform process with privatization of distribution. This has to be seen from a view that this should not form a vicious circle. If the government privatizes generation without improving revenue collection, the generators have to take into account highly risky cash inflows, and would typically insist upon ESCROW/state guarantees. If distribution is privatized it will have to bear significant supply risk because of the current poor state power generation in various states. A possible solution is to let the same entity own power generation as well as power distribution.

Waquar Ahmed (2007) has examined the evolution of electric-power policy in India adopting a political-economy approach by drawing linkages between global and local/national discourses, of development. The study focuses on the objectives and goals of the post-colonial developmental state of India, and examines the transition of India’s electricity policy regime from Keynesianism to neoliberalism. He has argued that the historically dynamic nature of state-society coalition in India, representing varying social and spatial interests, has impacted India’s power policy. In addition, he further adds that even as neoliberalism at the global level is pushed forth under the rhetoric of free market, global corporations, in collaboration with Global Governance Institutions, demand guarantee of profits and incentives from local/national governments that violate the principle of free competition.
Dubash Navroz K. and Sudhir Chella Rajan (2001), have provided an analysis of the social and political context in which power sector reforms have taken place in India. They have focused on the character and effects of those reforms and the roles and responses of different players. The authors have tried to place these issues within their institutional context and examine the extent to which the political interests shaping the reform agenda have addressed public benefits that includes pricing of electricity, expanding services to rural areas and environmental dimensions of providing electricity. They have also placed emphasis on the governance processes necessary to achieve these objectives.

Woods Laura (2011) has highlighted the Major Opportunities Present in Power Sector. The Indian Power Sector is undergoing a rapid growth phase with a vision to provide reliable, affordable and quality power for all by 2012. The demand for power is growing exponentially in accordance with the high level of developments in the infrastructure sector pertaining to progress in telecommunication, roads, airports and ports. However, in the past few years' policy makers and regulators have taken their stand in order to accelerate the growth of power sector leading to capacity additions in generation, transmission and distribution, stable regulatory environment coupled with focus on rural electrification, nuclear and renewable sources of energy. There is immense scope for further investment in the sector, both from domestic and international.

T L Shankar (2004) writes that in subsidizing power to agricultural machinery (such as pump sets etc.), the correct procedure would be to separate out small and marginal farmers and supply them with least expensive power. But the data is not available to do so.

As per the article ‘Indian Power Sector in Transition Mode’ P.P.Basistha revealed (published by Athena Information Solutions Pvt. Ltd) that it needs to be reinstated that the government, the power project developers and the other stakeholders in the Indian power sector will have to address numerous issues through concerted efforts both for mid and long-term, if India will have to attain its mammoth power capacity addition of 85,000 MW during the twelfth plan period (2012-17) so as to realize GDP growth of over 7 percent during the period. According to industry insiders, given the ongoing intention of the government to materialize higher GDP growth, shortages in slippage are likely to happen due to persisting
multiple issues, requiring intervention by the government and also by the private project
developers by putting its act together.

The Department of Economic Affairs, Government of India (2009) has summarized the
policy initiatives to encourage private participation. To attract large scale private investment,
the Central Government has taken a number of steps including the private sector to set up coal,
gas or liquid based thermal, hydel, wind or solar projects with foreign equity participation up to
100% under the automatic route. The bulwarks of the new policy framework are the Electricity
2006, New Hydro policy 2008 and Mega Power Projects 2008. In addition, the Central
Government has notified the National Load Dispatch Centre Rules, 2004. Further, the Central
Electricity Regulatory Commission (CERC) has notified several important regulations
including the regulations on tariff, open access in transmission and licensing of transmission
service providers and traders and the Indian Electricity Grid Code, 2006. The Appellate
Tribunal for Electricity was set up in 2004 to hear appeals from Central and State Electricity
Regulatory Commissions.

In line with the schemes formulated by the Government of India for attracting private
developers towards Non-Conventional Energy Sources, the various state governments have
formulated the policy guidelines for promotional and fiscal incentives to encourage private
developers and entrepreneurs for developing non-conventional energy sources.

The Indian power sector is characterized by a shortage of power supply. Northern
region remains the most potential area for installed power with maximum shortfalls followed
by Southern region. This provides an opportunity to bridge demand-supply gap in the Indian
power sector. the demand driven power sector will boost private investment especially
merchant power plants. In addition, renewable power will remain a favorite investment avenue
as more than 80% renewable power is generated by private players.

As per report of Department of Energy, Government of Assam the state has a
hydropower potential of the order of 541 MW (2007) against which only about 2.00 MW has
been harnessed so far from the Bordikhara Small Hydropower Project (that remained
inoperative since April’ 1999 due to technical snag). The Government of Assam has decided to
encourage generation of power through small hydropower (SHP) sources of energy and has framed a policy so that the development of this sector serves as an engine to achieve the objective of promoting the all-round development of the region by inducting private participation.

The Government of Gujarat is keen on development of renewable energy sector as well, given the dwindling resources of fossil fuels, increased threat of global warming and the concern on environmental protection. The state is blessed with long coast line and good wind speeds for harnessing of the Wind Energy. The State of Gujarat is committed to have investment in Clean and Green Energy to reduce Carbon Dioxide emissions.

The Government of Bihar has a policy for active promotion of private entrepreneurs in the areas of power generation and distribution. Therefore, with a view to encouraging private sector participation in decentralized generation of grid grade level power, through utilization of the available inputs of renewable and non-conventional sources of energy like solar, wind, water, biomass and other wastes.

The Jharkhand Government has a policy to encourage private sector participation in generation and distribution of power. The distribution of power in industrial areas and major cities of the State like Ranchi, Jamshedpur and Dhanbad are being contemplated for privatization.

Chhattisgarh government in its policy directives (2002) have announced that every unit, organization or private agency desirous of installing power generating unit based on non-conventional resources (like Mini/ Micro, Hydel Projects, Wind Energy, Bio Energy, Solar Energy etc.) in Chhattisgarh shall be eligible for incentives.

The State Government of Haryana has taken strong steps for creating conditions conducive for the involvement of private sector or public –private sector participation in Renewable Energy Sources based power projects in the State. The State Govt. aims to achieve a minimum of 10% (i.e. 500 MW) of the total capacity addition of 5000 MW of conventional power to be generated through Renewable Energy Power Projects by 2012 as per Ministry of Non-conventional Energy Sources, Govt. of India’s policy.
The Government of Himachal Pradesh has been laying the desired thrust for encouraging generation of power through renewable energy sources as well as the SHPs including and up to a capacity of 5 MW through an agency called "HIMURJA". Government of Himachal Pradesh to harness and effectively utilize the other renewable sources of energy has encouraged conducive conditions for involvement of private investors in the small hydro and renewable energy Projects

According to a report by Indian Chambers of Commerce (2010) regarding the North eastern states, going forward the eastern and north eastern belt of the country would certainly become the major supplier of power to rest of the country as these regions has abandon coal reserves and huge hydro potential. The region also has the geographical advantage to make up any deficit through imports form the neighboring countries.

According to a report (2003) of Govt. of Rajasthan the state there has been encouraging growth in development of wind power projects in the State in the recent past, primarily due to prevailing incentives and benefits offered in the afore-mentioned Policies.

The Government of Rajasthan has enforced the Policy for Promotion of Private Sector Investment for setting up of Power Generation to meet the growing demand for electricity and for rapid economic development of the state (2005). Various concessions and assistance will be provided to the private entrepreneurs setting up thermal projects of 125 MW and above capacity within the State (except captive power plants) such as Land, water stamp duty, taxes besides making systems simple such as single window clearance, generation tariff and state government guarantee.

The private sector power plant would be able to sell power to the State Electricity Board or to supply directly to bulk consumers and units in their designated load areas. It shall also be able to sell power to any grid or export power outside the state with the concurrence of the State Electricity Board. Thus, it is intended to provide wheeling and banking of power through the transmission and distribution system of the State Electricity Board.

According to a report by the Government of Uttar Pradesh (2009) the State Government has declared the Energy Policy, which envisages that the per capita consumption of power would increase from the meager 370 units at present to 1,000 units by 2017. Efficient and
quality power supply is key to inclusive socio-economic development. With burgeoning population and demand, it is imperative that well-defined plans and policies are laid down for proper and time-bound improvement in power scenario of the State. It gives renewed thrust to power generation, transmission and distribution along with simplified procedures and incentives for active private participation.

In view of the above authors the main role of the government is to form policies and appoint regulators to provide a level playing field for all the player of power sector who are involved in the value chain of power generation up to distribution to end consumers. The key concept of economic viability and open market competition should be there to promote private sector participation. It is emphasized that the beginning of the reform process should start with privatization of distribution. It has also been advocated by many authors to integrate the concept of free market, market driven price mechanism and assured returns to investor to make it viable to have encouraging private sector participation. In view of the Indian Power Sector undergoing a rapid growth phase with a vision to provide reliable, affordable and quality power for all the participation of private sector can significantly improve the condition of the power sector infrastructure and can help achieving overall objective of effective power supply as well as providing economic benefits to the state that could be generated through cost competitiveness in the free market dynamics.

2.2 Drivers of Private Sector Participation in Power Generation

Desai Vishvanath V. (2004) has reviewed the obstacles to private sector participation in India in power generation Industry. Desai has identified that there are several factors that have acted upon as obstacles to private investment in the power sector. For example, the various reforms as discussed were not introduced all at one time, but in bits and pieces over a period of time, which may have diluted their impact on investors. Improvement in administrative and bureaucratic structures has not been commensurate with the spirit and pace of reforms. Improvements such as, simplification of procedures, reduction in administrative delays, elimination of multiplicity of clearances and approvals, adoption of a business-orientation, have been slow to develop and may have dragged down the impact of reforms. The controversy surrounding the Enron project may have also adversely affected investor
sentiment. Besides these factors, it is important to recognize that perhaps the most severe obstacle to private investment in the power sector has been its lack of financial viability.

Niranjan Swain, et al. (2004), have discussed the various inhibitors to growth in power sector but the major roadblock in the growth path, which made it difficult or rather impossible for a private player to enter is the Government Policy. Further the lack of knowledge and experience of Indian entrepreneurs as they didn't have enough knowledge and experience in developing power projects further aggravated the situation and made the things worse. The SEBs and other Government Agencies became financially weak and could not propel any future expansion or growth in the sector. Electricity Act, 2003 was a major step in solving the above underlying problems of the power sector. A whole new system was evolved where private players were invited to be an active participant. The system primarily demanded financial, political and other infrastructural growth (particularly in roads and communication). Some of the bold steps taken in the Act were separating power generation and distribution out of ‘License Raj’ regime, opening access to national grid and demolishing the ‘Single Buyer’ model.

Niranjan Swain (2004) further stated that the primary lesson in keeping the power sector under tight government regime was to have proper access, equity and distribution of power to various sections of society. The socialist dream did not materialize as the above benefits have not reached the general population (A significant fraction of the population particularly the rural India does not have access to electricity). At the same time, some consumer categories, not necessarily the poorest, are given subsidized electricity. Benefits are skewed in favor of certain categories of consumers (e.g., in agriculture the consumption is almost one third of total power consumption in India, yet agriculture provides less than 5% of the total revenues.

Antonette D'Sa, et. al. (1999) have critically examined the various aspects of private sector participation in India’s Power Sector. They report that Independent power producers (IPPs) claim that their progress has been hindered by problems such as litigation, financial arrangements, and obtaining clearances and fuel supply agreements. On the other hand they found that, the State Electricity Boards have been burdened by power purchase agreements (PPAs) that favor the IPPs with such clauses as availability payment irrespective of plant
utilization, tariffs reflecting high capital costs and returns on equity, etc. The process of inviting private participation in the power sector and the problems experienced seem to have spurred on the restructuring of the power sector, including the formation of Central and State Electricity Regulatory Commissions.

As reported by Antonette D'Sa, et. al, additions to the generation capacity without corresponding improvement of the transmission and distribution facilities are likely to further undermine the system efficiency. The problems of private producers are various, which includes Litigation/renegotiation leading to delays, financing problems, risk sharing (construction risk, market risk, fuel-supply risk, exchange fluctuation risk) obtaining clearances & environmental problems.

Ernst &Young (2012) undertook a survey of various sectors to determine the overall outlook for India which turned out to be remains positive. However, it was found through the survey that inadequate infrastructure and a lack of governance and transparency were the major obstacles to investment in power sector. The report concludes that by improving upon these obstacles will result in an improvement in India's attractiveness for investment. The Government, though sensitive to the challenges, has to hasten policy-making and implementation, so that India continues to remain attractive.

The Shunglu committee appointed by the Prime Minister submitted a report to the Planning Commission on July 25th 2011 and highlighted the fact that all is not well in the appointment and functioning of the State regulators. The functioning of state regulators has come under a lot of criticism lately because of the mounting discom losses and inability to supply power to the consumers who are ready to pay the price for it. It is noteworthy that the independence of the regulator (CERC / SERCs) is one of the pillars of Electricity Act which lays the foundation of power sector reforms in India. This independence and autonomy is reportedly being diluted by the State Governments for various political reasons.

Nakul Korrea (1999) in Unbundling and Deregulating Electric Power in Tamil Nadu India writes Unbundling combined with deregulation has been very successful in significantly improving the efficiency of the power sector in those countries that have done it. The primary advantage of this method is that by deregulating to open competition, the industry functions at
much higher levels of efficiency. This is particularly important in a developing country like India with severe demands on its capital. Efficiency gains in the power sector result in lower prices for consumers and, because electricity is a core input to all sectors, significant gains for the economy as a whole.

Pillai N. Vijayamohan (2008) in a review of Kerala has emphasized the adoption of reform steps undertaken by other states which may be helpful in organizing power sector reforms in Kerala. Radical policy changes were legislated in India and so far 13 States have reorganized their power sector. In Orissa, Delhi and Noida in Uttar Pradesh the power distribution was entirely privatized. Kerala with a militant trade union presence has so far been dragging her feet, even in the face of the stern legislative requirement, portending an ultimate surrender.

In a report of Asian Development Bank (ADB) Institute (2007) it has been inferred that the basket of choice available to private investors depends on the privatization / investment liberalization process adopted by the respective governments. There is wide variation in the mode of private privatization among various countries. Divestiture of generation and distribution assets is expected to bring efficiency improvement and superior management skills in the sector. However, this does not translate to capacity expansion or increased access to electricity in the immediate future. The government gains in terms of divestment funds, which can be utilized for temporarily bridging the fiscal gap. These funds can also be ploughed back to the sector or utilized for budgetary support to other social sectors.

According to, Research and Markets Adds Report (2012) Power generation costs are the key to determining the best generation mix for a reliable supply of electricity while making it available for use economically. With an increasing demand for power for economic development, countries around the world need to evaluate the present and future costs of generating electricity using the presently available and future power generation technologies. Evaluating the cost of power generation depends on various factors that are responsible for driving the prices of electricity. The most important factors driving the power generation costs are government policies and incentives, capital (investment cost), fuel costs, operations and maintenance cost.
According to a Report by FICCI (2002), the Indian private sector has already acquired capabilities for participating in nuclear power projects. Private sector investors should be allowed to have majority ownership in power projects, the industry forum said. This will boost private investment in nuclear power sector. The country has the potential to generate 60,000 MW of nuclear power over the next 25 years, which needs an investment of over $100 billion. The government is already vetting 10 nuclear power projects. Companies like National Thermal Power Corp (NTPC), Reliance Energy, Tata Power, Larsen and Toubro, and Bharat Heavy Electricals Ltd can now look forward to working as partners with international companies like General Electric, Westinghouse, Areva, and Atomstroy in the field of nuclear energy generation.

The most important aspect of sectoral reform is that the various reforms as mentioned were not introduced all at one time, but in bits and pieces over a period of time, which should have been introduced in a single ambit to get the desired results. Although the Electricity Act, 2003 was a major step in solving the above underlying problems of the power sector and an entire new system was developed where private players were requested to be an active participant. Some of the bold steps taken in the Act were separating power generation and distribution. It is also being advocated that additions to the generation capacity without corresponding improvement of the transmission and distribution facilities are likely to further undermine the system efficiency and therefore a holistic approach has to be there regarding the reforms being taken in power generation. It is also worth mentioning that the problems of private producers are various, which includes Litigation/renegotiation leading to delays, financing problems, risk sharing (construction risk, market risk, fuel-supply risk, exchange fluctuation risk) obtaining clearances & environmental problems and hence the rules and laws should take into consideration all these aspect before enforcement. As regards the improvements such as simplification of procedures, reduction in administrative delays, elimination of multiplicity of clearances and approvals, adoption of a business-orientation, have to be fast to progress the change and should not drag down the impact of reforms.
2.3 Sustainability of Private Sector Power Projects

Saraswata Mohapatra (2010) has discussed as to how the private sector can contribute to realizing the purpose of these reform initiatives. The common thread across all the people-centric solutions is a strong understanding of the root cause of the troubles and challenges faced by Indians, as the momentum for sustainability is derived from people. The solutions proposed are not limited to the provision of products and services to cater to the unmet needs of Indians from the viewpoint of consumers but to think of them as partners and allies in our fight for sustainability. The emphasis is not only on meeting the unmet needs of Indians but also to develop the market and inculcate a culture of fostering ‘sustainability’. In many of the areas proposed, the government initiatives and programmes have been mentioned in order to convey the commitment of the government in the said area, for in a country like India, given its socio-economic realities, government’s role becomes important. It acts as a booster for the private sector and acts as a catalyst to make a success out of their investment.

According to Desai Vishvanath V. (2004) the dominant sector entities, namely the SEBs, are technically insolvent. They are unable to recover the costs of power supplied and remain burdened with ever-growing commercial losses. The power market in India is essentially a single-buyer market and the SEBs are the single buyer. Private power producers are therefore required to sell power to SEBs, who lack financial resources to pay for it. Initially, private investors sought comfort by asking SEBs to create ESCROW accounts so as to ‘ring fence’ the revenues payable to them. However, such arrangements did not address the basic issue of inadequate cost recovery and turned out to be unsustainable. Private investors also sought comfort in guarantees from state governments, but these too proved to be of limited value given the precarious finances of the state governments themselves. This meant that private investors, most of who were interested to invest in Power generation, did not have credible counterparts to sell their output. Faced with uncertain prospects of getting paid for their supplies, private investors held back from investing in the sector, despite substantial reforms and incentives.

In view of the above it is possible that few modest sized investments may be attracted under such conditions. However, it appears unlikely that major investments would be committed by private investors when the sustainability of the power sector as a whole is far
from assured. This is so because the issue of inadequate cost recovery from subsidized consumers would remain unaddressed and as long as that continues to be the case, SEBs, who are likely to retain responsibility for the bulk of power distribution for the next several years, would continue to be financially unviable. In fact, in the absence of increased cost recovery by SEBs, accelerated liberalization of the sector could result in further deterioration of SEB finances, and in the sustainability of sector operations.

CRISIL Research in its report (2009) states that in order to enable a seamless flow of power across various regions the transmission segment needs a revamp with regards to transmission pricing method, greater private sector participation and open access in transmission and distribution (T & D).

Chandrajit Banerjee (2012) in a recent report of the Confederation of Indian Industry (CII) states that that unless the issues plaguing the power sector are urgently addressed, the aspiration for 9% growth in the 12th Plan may not materialize. Even as the Indian government draws-up ambitious plans envisaging 100 GW capacity addition in the 12th five year plan period (2012-17), the country’s power sector faced with multidimensional challenges. These issues are constraining growth in the power sector and may have adverse impact on the economic growth in the long run. He has further revealed that critical obstacles including fuel supply bottlenecks, distribution losses and lack of funding are essential for achieving double digit GDP growth.

The planning commission in its annual report has reviewed the working of state power utilities and Electricity Departments.

During the 1980s and early 1990s, the World Bank lending had been influenced by what is known as the ‘Washington consensuses’. According to this, the development processes were hindered less by capital shortages, and more by economic policies that hindered market forces. The Bank, therefore, began approaching privatization as a serious policy option. The World Bank, incidentally, had assisted various power sector projects, especially at the time the NTPC was set up in 1974. It is felt that the World Bank was interested in the creation of the NTPC because the Bank felt that their loans were better assured as the NTPC projects were expected to be better managed as compared to SEB projects. Over time, however, the World Bank was desirous of moving away from generation because of environmental issues. Since
coal was the primary fuel for power generation which gave rise to environmental de-gradation, the Bank wanted to support projects which envisaged restructuring of the sector, in terms of reforms.

A R Sihag et al (2002) have observed that the focus of Indian reform legislation has been more on improving financial viability of the ailing power sector than on improving access to electricity. The legislation does not explicitly spell out the provisions for the extension of electricity services to the poor and the need and mechanism for subsidizing marginalized consumers. In contrast, the Philippines legislation has provision of lifeline rates for the poor and the approach to cross-subsidy, subsidy and the expansion of network. The Act stipulates a definite time frame for the elimination of cross-subsidy and at the same time it ensures subsidized rates for the identified poor.

These authors emphasize upon the need to have a proactive legislation that addresses issues linked to access to reliable and affordable sources of electricity. To effectively meet the electricity needs of the poor, legislative and policy support for mechanisms like the provision of lifeline rates and special functions like missionary electrification needs to be put in place.

According to Santhakumar et. al. (2003) the costs and benefits of power sector reform include (a) The subsidy the households currently receive for the consumption of electricity, which may be reduced as part of the reform, and this is a likely cost of the reform and (b) The losses due to the poor quality of electricity supply, which can be improved as an outcome of reform, and hence it can be taken as a likely benefit of reform. In addition, households might also perceive the indirect losses on account of the non-viability and inefficiency of the power sector (due to their impact on industrial, economic and employment growth, and also the consequent fiscal problems of the State) in the pre-reform stage. Avoiding or reducing such indirect losses can also be reckoned as another benefit of power sector reforms for the households.

Santhakumar V. et. al. (2003) have concluded that factors that facilitate/discourage power sector reforms, are very important also in the context of assessing Indian economic reforms. The public utilities in power sector are the single largest contributor of fiscal deficits in the country and the efforts to change the situation have not been very successful so far.
Reducing fiscal deficits and reforming power sector are major items of the unfinished agenda of Indian economic reforms. Thus there is a need to analyze the reasons that make power sector reforms a politically intractable issue in the country. Their study attempts to analyze how social support for reforms depends on the variables that have a bearing on the costs and benefits for different households due to power sector reforms.

ICRA in its report (2011) has mentioned that the risk profile of private IPPs have increased appreciably over the last few years. These include, vastly increased fuel supply risks, exposure to volatility in merchant tariffs, preference to Case-I bidding by distribution companies (discoms), Upward pressure on tariffs that would impact the viability of competitively bid projects, exposure to execution, regulatory and geo-political risks in case of coal assets acquired abroad, Financial position of state distribution companies (discoms) remains weak resulting in high counterparty credit risks and high leveraging levels for many of private IPPs to remain high due to phase wise investment.

D & B (2010) in its report on India’s Energy Sector has discussed the regulatory requirements of the sector. The regulatory system was not effective in the power sector in India before 1997. The SEBs performance was not satisfactory; they were suffering from huge financial and commercial losses; there was no regulatory body to regulate the functioning of SEBs and regulations were not addressing core issues like consumer interest, supply of reasonable power, and quality of power. The sector was facing an urgent need of regulatory bodies, which would regulate the sector efficiently. Therefore, in order to make competitive, transparent, and consumer-friendly environment, an independent Central Electricity Regulatory Commission (CERC) at the Centre and independent State Electricity Regulatory Commission (SERC) at the state level were considered as the need of the hour for regulating the power sector.

Dharmadhikari Sripad (2009) has critically discussed the reforms relating to hydropower projects and their implications focused on the privatization of water supply and irrigation, the creation of independent regulatory authorities in the water sector, measures like elimination of subsidies and tariffs based on full cost recovery. One important aspect that is often missed in these discussions is the privatization of hydropower projects and the changes in the legal and policy regimes enabling it. This privatization of hydropower has implications that
are as serious as privatization and commercialization of water supply. In the case of the public sector hydropower companies, when cost of generation falls during the later years of the project, this benefit will go towards lowering the average cost of production of electricity and will be passed on to the consumers. However, in case of a private developer, this benefit will go towards increasing the profits of the shareholders. In other words, a common property natural resource (water and river) is being diverted for profits of private interests.

In a compiled report of selected papers on power sector reforms (2000) Prayas group described the impact of reforms in the compendium that which states that the situation requires intense and urgent efforts on the part of the public-interest organizations to take up challenges thrown up by the reform process in general and the regulatory processes in particular.

McKinsey & Company in its report (2007), suggests that if India continues to grow at an average rate of 8 percent for the next 10 years, the country’s demand for power is likely to soar from around to 315-335 GW by 2017. Four key factors will drive this demand: a) India’s manufacturing sector growing faster than in past, b) residential consumption growing at 14 percent over last ten years c) the connection of 125000 villages , the grid through several programs that aspires to provide power to all by 2012 and d) the realization of demand suppressed due to load shedding.

In a report by Public Private Infrastructure advisory facility (2002) the power sector restructuring in Orissa has been critically examined , the features of which are summarized as below.

i) Industry restructuring model:
The sector structure adopted in Orissa (and chosen for implementation in other states) is based on the single-buyer model. Reform in Orissa continues to focus on noncompetitive solutions, to protect the cross-subsidies necessary (in the absence of government support) to ensure the viability of the industry. In the next stage of reform the state is expected to implement a multi-buyer model, reallocating the contracts between the generators and the Grid Corporation of Orissa to the four distribution companies.

Prayas (Energy Group) based in Pune has been working in Electricity Sector on activities including Research , information dissemination ,policy activism and regulatory interventions.
ii) Privatization strategy:

Orissa privatized distribution through the sale of assets. Its experience shows the importance of undertaking financial restructuring at the beginning of reform, which may require using privatization revenues to pay down debt. Possible options for this financial restructuring include transferring debt to the private sector, transferring debt to the public sector, and writing off debt.

iii) Regulatory framework:

Orissa's experience has shown that price setting can be undertaken by an independent regulator. It has also shown the importance in India of adopting a transparent regulatory process for price setting. But there are major concerns relating to the qualifications of the members of the electricity regulatory commission and the lack of an explicit obligation for the regulator to ensure financial viability of regulated companies.

H.K Ahuja (2010) has emphasized the need of policy making process capable of balancing both local and global aims in light of the drawbacks faced by various states in India's multi governance system. States have found several difficulties in implementing power sector reform policies designed at higher levels of governance. Such reforms can only be successful if democratic means are involved in implementing them. In this paper the author offers a democratic solution after justifying its applicability and reliability for initiating implementing and governing power sector reforms through advanced participative techniques like social multi-criteria evaluation. This can become a true and legitimate basis for carrying out governance reforms in the power sector. This initiative of Government of India towards power reforms would remain a wishful thinking unless the issues relating to these reforms, mainly concerned with the distribution sector are not conclusively settled.

According to an analysis of the Union Budget 2012-13 undertaken by Grand Thornton it has been found that there are various problems and potentials associated with private sector participation in power generation. The expectations of the power sector relating to reforms and taxation have been emphasized in view of the terminal date of availing deduction for the undertaking generation and transmission and distribution of power such as, distribution of
power by laying network of transmission and distribution lines, undertaking renovation or modernization of existing distribution lines etc. which expired on 31 March 2012. Considering the importance of this sector, there has been lobbying for extension of the date for availing tax benefits. In view of the pressurized margins, the sector had been expecting some avenues to access low cost funds. The sector also expected speedy and swift approvals for power projects as well as favorable implementation policies. Facing the challenges of high capital investment and interest cost, the sector expected indirect tax benefits along with concessions and exemptions for plant and equipment required to set-up solar and wind power projects as well. The industry also expected relaxation in import duty to bring down the input cost involved in buying equipment, which are mainly available in the western countries.

Sonal Patel (2012) has described that the patterns of coal trade have been shifting in recent years as demand surges in Asian countries. Whereas Japan and the European Union (EU) have long been the world’s largest hard coal importers, China and India are now emerging as top importers. This surge has shifted the center of gravity in international coal trade to the Pacific Basin market, as estimates from the International Energy Agency (IEA) show. All projections are per the IEA’s New Policies Scenario, which assumes cautious implementation of policy commitments and plans announced by countries around the world.

As the momentum for sustainability is derived from people, the common thread across all the people-centric solutions is a strong understanding of the root cause of the troubles and challenges faced by people of the country. The power market in India is essentially a single-buyer market and the SEBs are the single buyer. Private power producers are therefore required to sell power to SEBs, who lack financial resources to pay for it. Thus there has to be ways and means to ensure proper returns to the private sector players. In case the private sector players face uncertain prospects of getting paid for their supplies, they may hold back from investing in the sector, despite substantial reforms and incentives. However it is also emphasized that the proposed solutions are not limited to the provision of making products and services to cater to the unmet needs of Indians from the viewpoint of consumers but to think of them as partners and allies in the fight for sustainability.
2.4 Availability of Resources for Capacity Addition

Ravi Krishnan et al. (2012) have stated that India’s long-term annual economic growth rate is projected at over 7%, and the country is investing in its hydroelectric, nuclear, and renewable resources. However, the primary fuel used to produce electricity remains coal, and the government has ambitious plans to significantly increase coal-fired capacity. Those plans have been challenged by a number of unexpected factors that threaten to stifle India’s economic growth. Though the projected capacity additions are an impressive objective, in reality there have been and will continue to be shortfalls in capacity additions due to a variety of factors, including fuel constraints, regulatory and tariff issues, shortages of skilled manpower and construction equipment, infrastructure issues, and bureaucratic delays in obtaining clearances and permits. Contributing to the capacity addition shortfall is a shortage in domestic coal production, price volatility for higher-quality imported coals, and limited domestic sources of natural gas. 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.

Ghosh Sukanya, et al. (2001), have reviewed the future prospects of Indian thermal power sector in the perspective of the depleting coal reserves of India and the deteriorating quality of the coal. As an alternative to the critical demand for power, country planners have concentrated more on commissioning of thermal power plants. Coal happens to be the basic fuel of any thermal power plant and India had a plentiful supply of this basic raw material until recently. Unfortunately, the stock of coal in India is not unlimited. The share of coal in electricity generation declined from 98% in 1950-51 to 62.3% in 2009-10. Even then, it accounts for more than one-half of the electricity generation of the country. Coal mining in India commenced in the 18th century when much of the stock was exported to the UK due to limited requirement for thermal power in industries and in the domestic household sector. The coal industry was in the hands of private entrepreneurs. In 1923, the India Government developed a regulatory framework and in 1972-73 nationalized the coal industry.

India is the third largest coal producing country. Unfortunately, Indian coal is of poor quality with high ash content and low caloric value (i.e. gross heat of combustion). High ash
content of Indian coal (which aggravates the difficulty of removing ash before combustion) and inefficient combustion technology contribute to emission of suspendable air particles and other trace gases which are responsible for the greenhouse effect. Thus, the vicinity of thermal power house in India are highly polluted causing health hazards and damage to agriculture. In consideration of depleting stocks of quality coal, India has started importing coal from countries like Indonesia, Australia and South Africa. However, cost of imported coal is high. Moreover, the ability to continue importing coal from these countries is uncertain, as there is likely to be worldwide shortage of coal in the near future.

CRISIL (2010) in its customized research bulletin has made an overview with sector focus on Power wherein it has described the scenario that India has been a high power deficit country with the deficit rising continuously over the last few years. This rise has been due to limited capacity addition while demand continues to grow in line with economic growth. However, this scenario is likely to change in future with huge capacities expected to be commissioned especially by private sector. As it is expected that about 82 GW capacity shall be added over the period of 2010-11 to 2014-15 as compared to 33 GW of last five year. Most of these capacities will use coal as fuel. An investment of Rs 8.5 trillion is expected over the next five years. Additionally a new trend is emerging in the sector where a number of players (public and private) are focusing on backward integration to secure fuel supply.

KPMG (2010) has presented a report on Power Sector in India, which identifies few other problems of the private sector participation. While the power sector in India has witnessed a few success stories in the last few years, the road that lies ahead is dotted with innumerable challenges that result from the gaps that exist between what’s planned versus what the power sector has been able to deliver. While there may be heavy dependencies on equipment suppliers and challenges around logistics and work-front availability – with the right and timely application of project management principles along the lifecycle of the project, one can strive to achieve increased project completion against baselines. Certain best practices around stakeholder management, integrated project and asset development and interdependency mapping across various entities can help improve overall project planning. Once the practical implementation challenges are recognized, various teams and people get
aligned to the overall strategy and then the delivery on the estimated plans becomes more of a reality.

In view of the total availability of natural gas in the country which is not very encouraging, the public and private sector entities have embarked upon imported coal as a means to bridge the deficit. Coal is the mainstay of the power production in India and is expected to remain so in the future. Additional power generation is likely to require incremental amount of coal transportation by Indian Railways within the country and increasing unloading at ports in India for imported coal. In both cases, India currently faces capacity shortage. Hence, a project developer has to account for and manage its logistics chain in a manner that minimizes disruption to its fuel supply.

ICRA in its report (2011) has indicated that with a strategy of providing long-term fuel security and control over coal costs, many Independent Power Producers (IPPs) have been looking at acquisition of overseas coal assets. Some of the leading private sector IPPs has acquired substantial coal assets predominantly in three countries namely, Indonesia, Australia and South Africa. The preference towards these countries has been on account of adequacy of deposits in these countries with surplus coal availability for exports, logistical advantages of proximity to India and availability of low ash coal (that is below 10%) with high calorific value.

Sonal Patel (2012) has written that the country plans to fuel its current level of gross domestic product growth of between 8% and 9% with massive power capacity additions (mostly coal-fired) over the next decade. It has commissioned an 800-MW supercritical unit in March 2012 at the first of India’s government-envisioned ultra-mega power plants (UMPP). Tata Power, the country’s largest integrated private utility, put online Unit 1 of the five-unit 4,000-MW Mundra UMPP in Gujarat State, just 48 months after construction began on the project. Only four projects have been awarded so far on a build, own, and operate basis. In addition to Tata’s Mundra in Gujarat, three are being developed by Reliance Power: the Sasan UMPP in Madhya Pradesh, Krishnapatnam UMPP in Andhra Pradesh, and Tilaiya UMPP in Jharkhand.
The first 660-MW unit at Sasan is expected to come online in January 2013, just as the last Mundra units will be commissioned. At Krishnapatnam, however, where Reliance had planned to build six 660-MW units, work has been paused since last June. The Tilaiya project, which would also comprise six 660-MW units and is expected to come online between May 2015 and June 2017, is being built at a coal pithead (mine mouth) and has dedicated captive coal blocks—unlike the other three projects, which will rely on imported coal.

Sonal Patel (2012) has further written that Future UMPP projects may be sited in this way, or closer to ports, as India battles chronic coal shortages. Though the country has large coal reserves, domestic mining companies are struggling to keep up with demand needed to sustain its existing coal plants, which account for 55% of India’s generation.

Availability of the resources are the most vital and crucial issue when it comes to the execution of such mega size projects. It is understood that the shortfalls in capacity additions due to a variety of factors, including fuel constraints, regulatory and tariff issues, shortages of skilled manpower and construction equipment, infrastructure issue and bureaucratic delays in obtaining clearances can impose problems in translating these reforms to reality. Proper planning needs to be there for timely and properly addressing such issues so as to avoid any uncertainty in the project and to control the time and cost overrun. Backward integration for fuel supply is one of the key measures for sustainability and cost competitiveness. Fuel security and backup arrangement should be in place especially for those projects where the promoters have tried to have fuel security by acquiring overseas assets. With the advent of new technology there remains always a dearth of skilled manpower which needs to be properly engaged for efficiently handling the project under the given timeline. With the increasing market size of power generating and allied equipment there seems to be a limitation in timely supply of such big size equipments which are now days being procured mostly through international competitive bidding (ICB).
2.5 Privatization in Various Developed and Developing Countries

Yin-Fang Zhang, David Parker and Colin Kirkpatrick (2008) have reviewed the electricity sector reforms in developing countries. They have found that electricity sector reforms have altered significantly the sector's market structure and institutional framework. Over the last few decades' electricity sector in both developed and developing countries have been subject to restructuring to introduce private capital and increase competition. Although the effects of such reforms in a number of the developed economies are now well documented, apart from a few case studies the experience of developing countries is less researched.

Anoop Singh et al. (2005) in a review, of private investment in power sector in developing countries have emphasized that apart from macroeconomic stability, the pace and sequencing of reforms has a strong influence on private investment in the power sector. Distribution reforms and setting up of an independent regulatory institution reduces risk for investors. A peace-meal approach to reform keeps uncertainties alive for investors and does not translate in significant investment in the sector.

Cropper Maureen L. et al. (2012) estimated the impact of restructuring on electricity generation efficiency in the Indian Thermal Power Sector. They have examined the impact of the unbundling of power generation from transmission and distribution on the operating efficiency of state-owned thermal power plants in India. Using information collected by India’s Central Electricity Authority, they constructed a panel data set for thermal power plants for the years 1988–2009. They took the advantage of variation across states in the timing of reforms to examine the impact of restructuring on plant performance and thermal efficiency. The models suggest that unbundling significantly improved average annual plant availability by about 7.5 percentage points and reduced forced outages by about 4.5 percentage points in states that unbundled before 2003. Restructuring has not, however, improved thermal efficiency. This may reflect the fact that unbundling has not yet attracted independent power producers into the market in India to the extent that it has in the United States.

Philip Gray (2001), has reviewed the evidence on the extent to which private participation in developing countries have been achieved. First and foremost, private investors will only invest in infrastructure enterprises if the government gives a credible commitment to cost covering tariffs. Commitments of these kinds are far more durable than the same
undertakings given to managers of public enterprises, who have limited leverage to negotiate commitments and no effective sanction if governments succumb to populist pressures to renege. With appropriate regulatory or contractual commitments, private investors have incentives to expand services and the ability to finance the investments that expansion requires. Second, private investors face stronger incentives to ensure effective billing and collection, to control costs, and to stem technical losses, which contributes to greater resources for network expansion. Finally, unlike their public sector counterparts, private operators have stronger incentives to comply with quality standards and other regulatory obligations, as failure to do so is more likely to result in fines or other penalties.

A report on unbundling of utilities like electricity submitted by European Commission (2010) has detailed the method of unbundling with clarity on issues related to legal unbundling, functional unbundling and accounting unbundling. Within functional the report detailed the way-out based on management separation, effective decision-making rights, compliance programme and few additional measures to ensure effective functional unbundling.

Das Rasmi Ranjan (2010) writes that since inception, the electricity industry in the USA was treated as a natural monopoly and accordingly was subject to regulation primarily by individual states. The sector was characterized by vertically integrated private investor owned utilities (IOUs) owning the entire generation, transmission and distribution assets in the area of their operation. The federal involvement was limited to oversight of interstate transmission and wholesale trading through the Federal Electricity Regulatory Commission (FERC).

Bacon R. W. et.al. (2002) have revealed that the sequencing of reforms is crucial to the long-term sustainability of electric power industry in developing countries. They recommended that first; the legal and regulatory framework should be in place before privatization of the restructured power supplier. Second, major restructuring should precede the creation of private ownership rights to avoid problems with stranded assets. Third, the scope for introducing competition to the wholesale power market should be incorporated into the initial structural reforms to the power market, rather than relying only on later regulatory interventions to reduce the market power of the largest power generating companies. Fourth, the incumbent utility should not sign many long-term power off-take agreements with IPPs before it is restructured and the regulatory framework for a liberalized power market is in place. Fifth,
where cash collections fall far short of the revenues that should be collected by the incumbent power utility from power consumers—regrettably, a situation that exists in many developing countries—the priority for the privatization strategy should be to improve this performance by privatizing the distribution and supply functions first. This would help attract potential bidders for the upstream generation facilities by signaling that the distributors and suppliers would become creditworthy buyers of power from the generators.

The timing of reform is also critical, particularly relative to the electoral cycle, for the privatization of electricity generators and distributors, and for an unpopular increase in electricity tariffs needed to remove major subsidies. The success of a privatization program often depends on divesting most of the state's ownership before the government faces the next election, and this can force a compromise with long-term efficiency objectives for the sector.

Paton Celine (2012) has emphasized greater private sector participation and renewable energy development to back Moroccan Electricity Industry growth. Due to its advantageous geographic location and relatively low labor costs, Morocco has built close ties with Europe, its main trading partner. Since 1993, a privatization policy has been implemented in certain sectors, including electricity. Morocco began to privatize state-owned firms before most other Arab and African states. In critical sectors, such as electricity, the government's strategy has been to enforce public-private partnerships. Economic policies pursued, since 2003, have brought macroeconomic stability with generally low inflation, improved financial performance, and steady progress in developing the service and industrial sectors.

Harris Clive (2003) has reviewed private Participation in Infrastructure in developing countries, about the trends, Impacts and policy lessons. Many of the problems as seen relate to difficulties in sustaining cost-covering user fees for these sectors, which have a tradition of pricing below costs. They have also highlighted the challenges involved in the regulation of these sectors. Critics of the private provision of infrastructure argue that it has made services less affordable and adversely affected access by the poor to modern infrastructure services. The decline in public opinions of private provision is matched by the reduced enthusiasm of many investors in developing country infrastructure, driven in part by some disappointing experiences.
Victor David G. and Thomas C. Heller (2006) evaluates the experiences of five countries—Brazil, China, India, Mexico and South Africa—as they have shifted from state-dominated systems to schemes allowing for a larger private sector role. Having the largest power systems in their regions and among the most rapidly rising consumption of electricity in the world, these countries are the locus of massive financial investment and the effects of their power systems are increasingly felt in world fuel markets.

Kintanar Noel Eli B., et.al. (2003) have described how the Government of the Philippines continues to pursue its policy of encouraging the private sector to participate in the financing, construction, management and operation of infrastructure services and facilities in the country. Through the BOT Law, the Government has put together a portfolio of approximately US$ 25 billion in infrastructure projects involving private sector investments. A number of these are big-ticket transport projects which could not be funded solely from government coffers in view of the magnitude of the capital investments required. To ensure the steady promotion of infrastructure projects that are ready for private sector investments, the Government established the Build-Operate-Transfer Center (BOT Center), whose mandate is to find technical, legal, financial, economic and institutional solutions to help government implementing agencies to make BOT projects work.

Izaguirre Ada Kannza (1997) writes that, over the past decade a growing number of developing countries have opened their electricity industries to the private sector. The new wave of policy reforms designed to promote private participation has been driven by three main forces: the need to expand the capacity or increase the reliability of systems, or both; public sector budget constraints; and the positive results of the early experiments with private sector participation in Chile and the United Kingdom. Between 1990 and 1997 sixty-two developing countries introduced private participation in the electricity sector to varying degrees-ranging from management contracts for the state-owned utility in Mali to the privatization of most sector operations in Argentina, Bolivia, and Hungary.

The Frost & Sullivan research service titled Private Power Generation Opportunities in South Africa provides a comprehensive overview of the dynamics driving market growth, the industry challenges and the current and anticipated projects. In this study, Frost & Sullivan's
expert analysts have thoroughly examined the various application areas such as Wind, Solar, Small Hydro, Coal, Gas, Diesel and Oil.

GBI Research, a leading business intelligence provider, has released its latest research, Power Market in SAARC Countries to 2020 - FDI Driven by Private Sector Participation is key to future growth. The report gives an in-depth analysis of power markets in seven SAARC countries namely India, Pakistan, Bhutan, Bangladesh, Nepal, Afghanistan and Sri Lanka, with forecasts through to 2020.

Indian reform legislation has been more on improving financial viability of power sector than on improving access to electricity. These attempts are not addressing core issues like consumer interest, reliability, supply of reasonable power and quality of power. Therefore the situation requires intense and urgent efforts on the part of the public-interest organizations to take up challenges thrown up by the reform process in general and the regulatory processes in particular.

Uncertain prospects of getting paid for their supplies, private investors held back from investing in the sector, despite substantial reforms and incentives. In view of inadequate cost recovery and the reforms turned out to be unsustainable, the limiting factors one of which is essentially a single-buyer market. It may further be seen that momentum for sustainability is derived from people. The solutions proposed are not limited to the provision of products and services to cater the unmet needs of Indians from the viewpoint of consumers but to think of them as partners and allies in the fight for sustainability. In this perspective of its socio-economic realities, government’s role becomes important.

In study of developing countries it has been witnessed that apart from macroeconomic stability, the pace and sequencing of reforms has a strong influence on private investment in the power sector. It is observed that the study of variation across states in the timing of reforms to examine the impact of restructuring on plant performance and thermal efficiency reveals that unbundling significantly improved average annual plant availability. It is also concluded that Private investors have incentives to expand services and the ability to finance the investments that expansion requires if provided with appropriate regulatory or contractual commitments. In view of the above it has also been advocated that unbundling of utilities like electricity with
clarity on issues related to legal unbundling, functional unbundling and accounting unbundling can make it more effective and efficient.

**Research Gap:**

On completion of the literature review, it is observed that sector wise classification such as private sector’s contribution to power generation in Uttar Pradesh is not very well addressed in view of its potential for significant contribution in changing scenario of power generation and open access to private sector participation. With the given background of lowest per capita power consumption, population increase, infrastructure growth and industrialization, it appears that these factors may influence the growth of power sector in Uttar Pradesh provided the sectoral reforms are proper and adequate for facilitating fuel supply, realization of revenue and reduction in various losses. Besides these, conducive government policy, workforce & political stability and encouragement of market driven mechanism, are few other important influencing factors which pave the growth of private sector participation. Therefore the gap identified for the study is mainly focused on identifying the factors affecting sustainability of private sector participation in power generation. It has also been attempted to determine the problems and challenges that confront private sector participation in Power generation in Uttar Pradesh. Since these factors are greatly influenced by the policies of the Government, therefore it has been an earnest need to assess the role and impact of Government policies relating to private sector participation in Power generation in Uttar Pradesh.