Chapter-5

Conclusions, Recommendations & Directions for Future Research
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In view of the outcome of the survey administered to power generation companies and to the end consumers of power, the following are the conclusion, recommendation and direction for future research.

5.1 Conclusions

It is inferred that among the factors affecting sustainability the issues of implementation of government policies, modernization of transmission and distribution, adoption of alternate sources and future demand due to population growth are significant. Besides this, investment cost, fuel cost, operation & maintenance cost and modernization of transmission & distribution would have a significant impact on the sustainability of private sector power generation. Whereas government being single buyer is impacting conversely on the sustainability of private sector power generation there are brighter prospects due to the fact that an increasing trend of population growth with rising trend of economic growth in U.P. would significantly increase consumption of Electricity (power). It is also expected that private companies have a significant cost benefit if they undertake gas based power projects.

On the other side of the coin the problems relating to these prospects are also significant as is also evident from the survey. Risk of timely payment by distribution companies in U.P. would significantly impact privatization. Inadequate infrastructure is one of the reasons that would significantly hinder the privatization process particularly relating to Inefficient transmission and distribution capacity. Fuel supply problems, land acquisition problems, nonpayment of power generation, inadequate cost recovery and bias of state regulators for public sector corporations would significantly hinder the privatization process. Apart from these intervention by NGOs, load shedding & geopolitical risk in case of coal asset acquired abroad would significantly impact the potential of growth of private sector power companies. It is expected that Simplification of procedure, reduction in administrative delays, End of License Raj regime & Improvement in overall policies of the Government would have a significant positive impact on the private sector participation in power generation and supply in
U.P. It is also prudent for power generation companies to have backward integration of fuel supply & producing electricity through renewable energy sources for sustainable growth in U.P.

5.1.1 Issues Relating to Power Generation Companies:

1) Related to sustainability of private sector participation in power generation in Uttar Pradesh

From the survey administered to the private sector power generation companies it is inferred that implementation of Govt. policy participation has very significant impact on sustainability of private sector. Though less impacting Investment cost would have significant impact on the sustainability of private sector participation in power generation.

Fuel cost has been considered to be having very significant impact on the sustainability of private sector power generation, the operation & maintenance cost would have also have significant impact on the same. Modernization of transmission & distribution would have as significant impact on the sustainability of private sector power generation as Govt. being single buyer is impacting conversely on the sustainability of private sector power generation.

An increasing trend of population growth in U.P. would more significantly on future demand for Electricity (power) compared to the rising trend of economic growth in U.P. It is also inferred that Private companies have a significant cost benefit if they undertake gas based power projects.

2) Related to problems and challenges that confront private sector participation in power generation in Uttar Pradesh

Risk of timely payment by distribution companies in U.P. would significantly impact privatization has been rated to be very high on the Likert scale (4.75) which seems to be the biggest problem among all problem and challenges. Whereas land acquisition problems, fuel supply problems, inadequate infrastructure & inadequate cost recovery are the few factors which would significantly hinder the privatization process it is inferred that lack of knowledge
and experience by private entrepreneurs would not significantly hinder the privatization process.

The statement "Lack of knowledge and experience by private entrepreneurs would significantly hinder the privatization process" has a mean value of 2.94 (less than 3.0) and therefore inferred that it has not been accepted by the private power generating companies and concluding thereby "Private Power generating companies have the competency of their domain and therefore this factor would not hinder the privatization process".

Inefficient transmission and distribution capacity & nonpayment of power generation bill would significantly hinder the privatization process. Bias of state regulators for public sector corporations or against private sector companies & load shedding would seem to be equally and significantly impacting the privatization process the potential and growth of private sector power companies. Geopolitical risk in case of coal asset acquired abroad and the intervention by NGO's would also have significant impact on privatization process.

3) Related to role and impact of Government policies relating to private sector participation in power generation in Uttar Pradesh

The following factors have been observed to be very significant which are related to the role and impact of government policies (all have mean value at least 4.0 or above).

Financial promotional and fiscal incentives, improvement in administrative & bureaucratic functioning, simplification of procedure, reduction in administrative delays, improvement in overall policies of the Government and end of License Raj regime.

4) Related to measures by which private sector participation in power generation can be improved in Uttar Pradesh

It has been observed that two major factors which have importance in improving the private sector participation have been considered to be significant are backward integration of fuel supply which would have significant impact on fuel security and prospects relating to producing electricity through renewable energy by private companies.
5.1.2 Issues Relating to End Consumers: The exclusive survey of end consumer(s) has concluded that

1) For the hypothesis that Market driven (non-subsidized) price mechanism can improve the availability and reliability of power in U.P. when analyzed on the demographic parameters revealed that based on the mean value it is accepted and stands valid by all age groups & occupation however there was varied opinion on the basis of areas/districts & income groups.

2) The hypothesis based on the statement that Immediate privatization of power generation and distribution would improve power generation & distribution of power supply in U.P. when analyzed on the demographic parameters revealed that based on the mean value it is accepted and stands valid by all occupation however there was varied opinion on the basis of areas/districts, income groups and age groups.

3) For the hypothesis based on the statement that Large size plants/capacity addition of power plants will have negative environmental impacts when analyzed on the demographic parameters revealed that based on the mean value was very well accepted and stands valid by all age groups, occupation, areas/districts & income groups. This also reveals that there is a general awareness among people of all groups on such vital issue of environmental concern.

4) For the hypothesis based on the statement that, with high capital investment there is a likely of increase tariff in open market of power generation when analyzed on the demographic parameters revealed that based on the mean value it is accepted and stands valid by various occupation, income groups and age groups however there was varied opinion on the basis of areas/districts.

5) For the hypothesis based on the statement that Privatization would not have any effect on subsidies provided for household consumers when analyzed on the demographic parameters revealed that based on the mean value it is accepted and stands valid by various occupation however there was varied opinion on the basis of income groups areas/districts and age groups.

6) For the hypothesis based on the statement that Privatization would result on pricing of power based on price band method for the amount of power consumed initially subsidized upto a certain level and subsequently on actual market price (non-
subsidized) mechanism when analyzed on the demographic parameters revealed that based on the mean value it is accepted and stands valid by various occupation & income groups however there was varied opinion on the basis of areas/districts and age groups.

7) For the hypothesis based on the statement that Private companies in power generation would have stronger incentive to comply with quality standards and other regulatory obligations when analyzed on the demographic parameters revealed that based on the mean value it is accepted and stands valid by various occupation, income groups and age groups however there was varied opinion on the basis of areas/districts.

8) For the hypothesis based on the statement that Privatization for transmission / distribution followed by before privatization of power generation in Uttar Pradesh would be beneficial for consumers when analyzed on the demographic parameters revealed that based on the mean value it is accepted and stands valid by various occupation & age groups however there was varied opinion on the basis of areas/districts and income groups.

9) For the hypothesis based on the statement that Privatization would have the impact of reducing power deficit through the addition of power generation capacity by private companies when analyzed on the demographic parameters revealed that based on the mean value it was very well accepted and stands valid by all age groups, occupation, areas/districts & income groups.

5.2 Recommendations

Many assume that reforms will cut costs and lead to lower tariffs which is not the case in reality. In fact, the fundamentals are different at conclusion in the industry point of view and opposite to the perception for at least two reasons. First, the SEBs are increasingly purchasing power from non-SEB generators and these new power purchases are more costly than the incumbent SEB supply. Second and closely related, is that greater transparency and unbundling of the functions of the electric power system will reveal fully the need to lift tariffs so that each link in the power chain generation, transmission and distribution is viable. In view of the tariff fixation the policy would be required to support market driven price mechanism which may not be acceptable to the end consumers in large, however a middle way of moving ahead in this
direction can be the implementation of tariff plans as per price band method which is a more practical approach in moving towards the market driven price mechanism. Adoption of this methodology of tariff in which a fixed amount of power can be at a lower price band and as it goes high for any consumer the premium of that may go high for higher range of consumption. Following are the major thrust areas/issues for effective private sector participation and to achieve the bigger objective of reliable, cost effective and quality power to all. The following are the recommendations of the above study.

5.2.1 Related to Problems & Challenges that confront Private Sector Participation

Among the problems and challenges being faced are issues of risk of timely payment by distribution companies, infrastructure problem, inefficient transmission & distribution system and land acquisition problem. In the survey administered to the private sector power generation companies the issue of timely payment has been observed to be the most significant factor that impacts private sector participation. In view of this, it is recommended that the Government of Uttar Pradesh may take up such reform process which ensures timely payment by distribution companies. In the other survey administered to the end consumers it has been observed that the hypothesis which relates to the privatization of transmission and distribution (even before that of generation) has been supported by various age group and occupation (though have varied opinion on the basis of area and income group). Fuel supply problem has also been considered significant among such issues. Bias of state regulator against private sector, land acquisition problems, inadequate cost recovery, nonpayment of power generation bill and load shedding are other such important issue which needs to be addressed by the Government of Uttar Pradesh immediately in order to have successful reform process and to remain attractive for future investments by private sector companies. It may be noted that the private sector power producers do not significantly acknowledge the lack of knowledge & experience by private entrepreneurs which shows high confidence that the private producers can efficiently manage new power projects. Therefore the following factors should be immediately addressed by the Government of Uttar Pradesh in view of the problems and challenges being faced by power generation companies to pave the way for their investment in power generation projects in Uttar Pradesh.
a) Timely payment by distribution companies
b) Ensuring ways and means of adequate cost recovery
c) Addressing land acquisition problems
d) Improving Infrastructure and modernization of Transmission and distribution
e) Ensuring unbiased state regulator for power sector

5.2.2 Related to Policies of the Government (Reform process)

There has been a large variation in the performance of the states and reforms alone do not indicate success in terms of loss reduction or efficiency. This variation was observed due to the fact that some states were choosing to privatize distribution, some simply unbundling the SEBs, and others keeping the SEBs intact while adopting organizational reforms aimed at improving economic efficiency. The main factor in explaining outcomes is the ability of the state governments to implement reform (or operational improvement) plans and the strength of their institutions. Governments with weak institutions have performed poorly even when they had ambitious reform plans, as in Orissa. Governments with strong institutions and sustained commitment to reform (e.g., Andhra Pradesh and subsequently Delhi) have fared much better. In general, reforms have increased the average costs at the SEBs at a rate higher than the increase in revenues, primarily because reforms have forced a shift to greater reliance on non-SEB generators whose costs include commercial rates of return. New generators have long-run marginal costs that are higher than the costs SEBs saw in the past and it is estimated that reforms in distribution and transmission will also force a rise in tariff to meet the statutory profitability. A financially sustainable system must have higher end tariffs, however there are expected improvements in operation due to better management and therefore a competitive and cost effective economically viable solution can be in place.

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. Hence, in response to the increased pace of the reform and regulatory processes, it is necessary that these individuals and organizations should come together, share experiences, and learn from each other. It must, however, be remembered that there is considerable diversity in the functioning of the state regulatory commissions and even
in the techno-economic, political, institutional and historical contexts in different states. It is therefore required that following areas must be improved by the Government of Uttar Pradesh to encourage private sector participation and make the power sector viable and efficient.

a) Simplification of procedures
b) Reduction in administrative delays and decision making
c) Elimination of multiplicity of clearance
d) Recovery of revenue
e) Other aspects of the reform process which need to be in place concurrently and consistently
f) Restructuring of legal issues should be well before in place.

5.2.3 Related to Factors Affecting Sustainability

In view of the potential to grow and with the advent of new technologies and changing economic scenario across globe, the power sector may lead towards a market driven mechanism of tariff fixation. This will not only make the Government free from the burden of subsidy but explore the potentials of market driven economics in the country. In the survey administered to the end consumers of power the hypothesis ‘Market driven (non-subsidized) price mechanism can be the option to improve upon the availability and reliability of power in U.P.’ was accepted by all age group and occupation, however had varied opinion on the basis of area and income group. When considered on the basis of price band method (initially subsidized upto a certain units and subsequently on market price mechanism) , the statement was in agreement with various occupation and income group. It was also understood that for the hypothesis relating to privatization of transmission & distribution to be done before that of generation was in agreement with various age group and occupation however has varied opinion on the basis of area and income group. In the same survey the hypothesis relating to rise in tariff under open market (non subsidized pricing) system due to high capital investment was acknowledged by all occupation, age group and income group however had varied opinion on the basis of area/districts.
Environmental considerations have not played a major part of Indian reforms, although the net effect of reforms has probably been positive for the environment. Reform is probably reducing losses in the power system, which will lower emissions per unit of energy actually delivered. In generation, reform is probably encouraging the construction of more efficient plants. A major improvement for the environment is found in the rise of natural gas, a trend that is due to many factors largely unrelated to reform, such as new gas finds and improvements in gas-fired generation technologies. In response to the survey administered to the power generation companies it has emerged as one of the significant aspects of sustainability if the private power generation companies take up the gas based power plants. Also in the survey administered to the end consumer all the respondents have considered this aspect as an environmental consideration. It is recommended that all potential private sector players must ensure their fuel security by having own assets or long term agreements with suppliers to ensure fuel security and remain competitive in the market.

The problems related to power sector which needs to be addressed immediately, especially with respect to sustainability and generation deficit are

a) Economically viable price mechanism
b) Issue of subsidy
c) Cost of supply versus realization,
d) Remedial for utilities which are bleeding money
e) Wasteful consumption in irrigation and
f) Capacity addition to overcome power deficit.

In view of the above study it is inferred that large potential exists across the state of Uttar Pradesh which is in want of energy so as to cope up with the increase in population growth and industrial growth as has also emerged in the survey administered. Policy changes as are being notified by the Government of Uttar Pradesh from time to time which are welcome move and are the need of the hour.
5.2.4 Related to Measures by which Private Sector Participation could be increased

The National Electricity policy 2005 has been made in view of making accelerated development of the power sector which should have an impact on economics of generation using different resources. The National Tariff Policy 2005 was aimed to devise a better tariff structuring system in place and therefore an attractive tariff for players. As discussed in the literature review section, 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. 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. Besides key factor as discussed above the following are some important measures by which private sector participation can be increased.

a) Tariff structure revision with
b) Link to market driven price mechanism
c) Mode of participation such as BOOT concept

The tariff structure also needs to be designed in a more structured way depending on the time of tariff. In any power system, especially in India, during the late night and early hours of the day, say from 10 pm to 5 am, the power supply is in excess of demand, while during the morning hours supply is inadequate to meet the demand. During certain hours like 6 pm to 9 pm the demand is the highest due to the lighting needs of households and commercial establishments and these are called the peak hours. The tariff structure can be modified based on the peak hour and normal (non-peak) hour. In terms of the market driven price mechanism which may not be acceptable to the end consumers in large, a middle way of moving ahead in
this direction can be the price band method which is a more practical approach in moving
towards the market driven price mechanism.

5.2.5 Mode of Private Sector Participation

It is also understood from the study that private sector participation would lead to better
competition among the private players and public sector utilities would also be forced for
adoption of such management to remain competitive. The concept of BOOT can work very
well as these have been well experienced in other infrastructure sector. It is also advisable to
the power sector players to have their fuel linkages and fuel security plans in place before
entering in power generation sector. Also the fuel opted would have their environmental
cconcerns which needs to be separately addressed in view of MoEF guidelines. From the
response of private sector power generating companies, it has also been inferred that

a) Best Public - Private Partnership in case of a joint venture is 49-51 % which mean for
such participation between public and private partnership the management control has
to be in the hands of private sector.

b) As regards the Equity participation between foreign & Indian company in power
generation there are varied opinion on the composition of equity participation however
it has been observed that 30-70% and 49-51 % composition has been preferred by
private sector power generators.

c) For the alternative mode of Private Sector of participation BOOT concept has been
widely agreed.

The role of the private sector remained quite limited in past years. Slowly but gradually the
role of private sector in power generation is increasing and thus competition is being
experienced by the existing players. The domineering of executing Power projects on time
without cost escalation and operating the power plant at a superior performance level have
forced the new generating organizations to identify areas of improvement to enter the field and
remain competitive.
On the basis of extensive literature review, the following approach is being recommended for private sector participants / JVs for setting up of a new power plant, especially for new organizations/entrants.

a) **Location**: The project should be planned near to the load center to avoid loading of transmission charges, however in case of proximity to fuel source the merit has to be seen in that perspective.

b) **Fuel Mix**: In case of gas based power plant a fuel mix with RLNG upto 20% with domestic gas may work, however in case of high LNG prices the economics may not work and then alternative fuel such as coal may be considered.

c) **Scale of operation**: For gas based plants it is advisable to set up power plants in Combined Cycle Power Plant (CCPP) which has higher efficiency and thus gives effective cost benefits. The plant size should be of medium scale upto 500 MW as an initial venture.

d) **Technology**: It is recommended that for base load operations combined cycle gas turbines may be used, however for peak load operations gas engines may be used. Depending upon the cost of power generation and CERC guidelines a combination of these may be used.

e) **Development model & marketing**: It is preferred to make joint ventures with strategic business partners who are already an established player in the field of power generation in any part of the globe; this gives the leverage of having core competency of promoter(s) besides having a project management consultant. For the marketing of the power thus produced, long term/ short term power purchase agreement has to be in place with some major utilities.

In the above perspective it may be worth considering that the prospects of decentralized medium size power generation units may once again be seen and for upcoming projects the BOOT concept may work.
5.3 Directions for Future Research

Based on the above research, following directions have been pointed out for future research

1. Future researchers may expand the scope of study to other geographical region of India or other Indian states or other region of the world where it may deem suitable and worthy to conduct the research work.
2. Further research may be carried to explore other / additional important factors or decision making variables.
3. The present private sector power generation is in nascent stage in various Indian states, with the upcoming technology and globalization it may happen easily that private power producers may take competitive advantage and thereby bringing the private sector participation to a greater extent which may be studies in further research. Bringing the cost of power to lower side is presently not viable in the current scenario however with the advent of new technologies it may happen in future. In view of that various other issues relating to private sector participation may crop up.
4. Future research may treat this as a service industry wherein multiple service providers may be available and accordingly the service quality may also be studied for various regions or private power generation companies.