CHAPTER - 2

RESEARCH DESIGN
<table>
<thead>
<tr>
<th>NO.</th>
<th>PARTICULARS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Statement of the Problem</td>
<td>44</td>
</tr>
<tr>
<td>2.2</td>
<td>Review of Literature</td>
<td>45</td>
</tr>
<tr>
<td>2.3</td>
<td>Research Gap</td>
<td>53</td>
</tr>
<tr>
<td>2.4</td>
<td>Need for the Study</td>
<td>54</td>
</tr>
<tr>
<td>2.5</td>
<td>Objectives of the Study</td>
<td>55</td>
</tr>
<tr>
<td>2.6</td>
<td>Hypothesis</td>
<td>55</td>
</tr>
<tr>
<td>2.7</td>
<td>Scope</td>
<td>56</td>
</tr>
<tr>
<td>2.8</td>
<td>Limitations of the Study</td>
<td>56</td>
</tr>
<tr>
<td>2.9</td>
<td>Sources of Data and Methodology of Research</td>
<td>56</td>
</tr>
<tr>
<td>2.10</td>
<td>Tools for Data Collection</td>
<td>57</td>
</tr>
<tr>
<td>2.11</td>
<td>Analysis of Data</td>
<td>57</td>
</tr>
<tr>
<td>2.12</td>
<td>Chapter Scheme</td>
<td>57</td>
</tr>
</tbody>
</table>
CHAPTER 2

RESEARCH DESIGN

2.1 Statement of the Problem

Sound infrastructure, efficient industrial culture, a strong political economy, are the three criteria essential for development. The performance of the energy sector needs to be revved up in order to ensure that the state's industry prospers leading eventually to the prosperity of the state itself. To make matters worse, at present Karnataka bills only 37 percent of its production, which is unfortunate. It has privatised distribution and allowed foreign firms to bid. The power sector was jolted by Cogentrix's withdrawal from the much-delayed Mangalore power project. In the area of power we have a long way to go. The least we can do is minimise T&D losses. In some quarters it is felt that PSUs should generate power, disinvest once the project reaches the commercial stage and privatise the distribution process.

Hence, it goes without saying that the state has to augment power generation, streamline transmission and distribution arrangements. More and more investment in the energy sector is urgently required in view of the ever-increasing demand. The corollary that emerges therefore is that more and more investment in the energy sector is the need of the hour. An empirical study is needed to ascertain the public investment pattern in the areas of conventional and non-conventional energy. The availability of energy from different sources is to be studied for the purpose. A review of energy
consumption will help in assessing the shortage in power supply as accurately as possible. This should eventually make it easier to devise ways and means of closing the gap between the potential and actual supply of energy.

2.2 Review of Literature

1. **World Bank Report (2000)** maintains that it is essential to respond to serious fiscal and credibility crises. Public divestment, even in service-oriented sectors, is necessary because government can no longer afford to support loss-making enterprises. Also, the conflicting roles of government as owner, provider and rule-maker in these enterprises have led to corruption and poor performance, deepening the suspicion that mere government cannot be part of the solution. Thus, it is argued, a competitive private sector would relieve the government of its losses and allow it to divert its resources towards its primary development and governance functions (such as health care, education and sound monetary policy). Similarly, independent, transparent governance would reduce the scope for corruption while regulating private monopolies or partial monopolies.

2. According to the Planning Commission, as a result of the 1948 Act, nearly every state and territory organized its own vertically integrated entity or state electricity board (SEB). Most SEBs were financially structured entirely through state government loans and operated as extensions to the states' energy ministries, “indebted in perpetuity” to the government.
3. According to the Central Electricity Authority's Power Survey, by 1991, official reports could also make the surprising claim that the electrification rate was 80 percent, and that in some states like Karnataka and Punjab, it was 100 percent. This often meant, however, that the grid had reached most hamlets, but not that every household in them was electrified; in fact, official figures showed that even in states claiming 100 percent electrification, fewer than one in two rural households received electricity from the grid.

4. Arun Swamy (1998), maintains that the move in Tamil Nadu (to expand the provision of free electricity) was a typical case of "sandwich politics," on the part of the ADMK, which being in close competition with the DMK, was trying to form alliances between the rich and poor communities against the middle, upwardly mobile or "kulak" groups. Similar tactics were not used in other states. "However, after the 1980 elections, in which a DMK / Congress alliance swept the national elections and then lost narrowly to ADMK in the state elections several months later, the chief minister of Tamil Nadu started to expand the provision of free electricity out of (a misplaced) fear that he was losing farmer's votes." But here, "the proximate cause of the lowering of electricity tariffs was a large and violent agitation by the Tamil Nadu Agriculturists Association (led mostly by large farmers who wanted better "terms of trade") in the late 1970s, to which [the chief minister] responded first by ordering police firing and then offering a progressive tariff structure providing free electricity only to small farmers."
5. Prayas (1999) maintains that "...subsequently, political leaders in Maharashtra, Karnataka and elsewhere began to view the entitlement per se as a remarkably effective political device, in part because of the growing political power of backward rural communities and the rise of a middle-class farmers’ movement. In many states, a flat-rate tariff, rather than free electricity, has been offered, but in both cases, existing meters are no longer monitored or are simply removed and returned to the SEBs, in part because there was outright opposition to metering but also because the transactional costs of such un-remunerative monitoring and meter installations for new connections were starting to seem unreasonable."

6. P.S. Verma (1999) maintains that "many dalit leaders raised their voice against the decision of giving free power to farmers ... as it had created a wide gap between the farming community and those living in urban areas and dalits. Some dalit leaders, among others, also threatened that landless residents would start taking direct electricity supply unless the state gave at least 100 units free to all landless households as farmers were being given free electricity for irrigation."

7. According to Reddy and Sumithra (1997), the Karnataka Electricity Board, for instance, had shown steadily improving T&D losses and increasing agricultural consumption in its annual reports until around 1997. In an independent study, the International Energy Initiative showed how the actual losses were likely to be much higher than reported and the agricultural consumption, correspondingly lower. In fact, extremely high
transmission and distribution (T&D) losses and not subsidies, were responsible for KSEB's financial difficulties. It turns out that this practice of "hiding behind agriculture" was widely used in states with significant agricultural use and was later exposed by consultants in the course of preparing SEBs for privatization. An interesting question, in the present reform scenario, is how much "gaming" in the other direction is likely when setting a high baseline level for losses would be advantageous to private distribution companies. With the growth of agricultural connections in states where subsidies were being offered, the reliability of consumption estimates also became increasingly suspect. For instance, in Karnataka by the early 1990s, it was estimated that less than half the electricity produced was being metered, the rest being attributed to agriculture and transmission and distribution (T&D) losses. Indeed, this situation generated a perverse benefit to SEBs, because they could hide their losses under the category of agriculture.

8. World Bank Report (1998) maintains that "...almost any indicator of groundwater use in India is alarming. The number of shallow tube wells doubled roughly every 3.7 years between 1951 and 1991. Several states are witnessing problems of increased salinity, fluoride contamination, and/or declining well yields and increasing pumping costs from deepening of wells. Harvest yields from fields dependent on groundwater are also depleting in regions where problems of drawdown or water quality are prevalent. In any case, this situation quickly became a race towards
unsustainability because there were virtually no incentives or regulatory checks to save either energy or groundwater resources.

9. Reddy and Sumithra (1987), report that cross-subsidy undoubtedly caused disaffection among industrial consumers, who finally found it expedient to set up their own captive generation plants to supplement, if not replace, grid supply. Thus, while industrial consumption constituted nearly two-thirds of total SEB sales in 1960, by 1991, its share dwindled to about 40 percent, in part because of the rapid growth in agriculture (whose share meanwhile jumped from about 10 to 25 percent), but also because many industrial consumers had cut back on their consumption from the grid. The net result was that cross-subsidies were not sufficient to compensate for shortfall in revenues.

10. According to World Bank Report (1993), “what was worrying about the peaking shortage problem was that even though the installed capacity in 1990-92 was nearly 70,000 MW, the system could only provide about 37,000 MW of peak power out of a total demand of 44,000 MW. This meant that the system load factor was as low as 53%, largely because of poor load dispatch, regional disparities in generation capacity, inadequate transmission systems and other system inefficiencies. This peaking shortfall of between 15-20% has remained through the 1990s despite some overall system improvements and enhancements in capacity.

11. According to Roy (1993), “while the (World) Bank’s focus was on improving the performance of SEBs, it also continued to focus on the need
for new generation capacity, even though its own analyses had indicated that peak shortages did not reflect a deficit in capacity but poor system load management and regional disparities."

12. According to Reddy et al (1991), "the planning bureaucracy in India, had also embarked on its own analysis of the power sector, and proposed using different models for long-term demand and resource assessments for the country as a whole to help streamline generation needs. A series of reports on tariff reform appeared, many of which urged the reintroduction of agricultural tariffs and metering, but were ignored by state governments. As late as 1996, at a conference of chief ministers, a minimum tariff or Rs.0.50 per kilowatt-hour ($0.015/kWh) was proposed on the recommendations of a Commission formed to address fiscal reforms, but no state actually implemented this norm. In 1991, an independent team of scholars published the DEFENDUS (DEvelopment-Focussed, END-Use oriented, Service directed) model, an integrated resource planning (IRP) approach with supply and demand-side options weighted by life cycle costs and environmental impact. DEFENDUS was a unique Integrated Resource Planning approach because it emphasized access and equity. It modeled its framework on energy services by examining supply expansion as well as efficiency improvements, and allowed for environmental costs to be internalized.

13. Echeverri-Gent (2000) argues that "politicians led India's reform because it offered favourable trade-offs between increasing resources un
der their control and the relative strength of their opposition. In the early 1990s, globalization seemed to present new opportunities and therefore reform proponents incited little opposition among political parties, who at that time were also anxious to keep a fragile coalition together. There were also circumstances within the administration, as well as ideologies beyond it, that helped to steer the minority Congress-led government under Narasimha Rao towards implementing individual measures, which included policies to free up currency and capital markets, reduce government controls on banks and other financial institutions, drastically cut back on licensing requirements for industry, and allow the entry of private players in electricity generation.

14. Reddy and d'Sa (1999) also refer to explicit warnings from the donor community about the global constraints on the availability of multilateral finance: "The World Bank had stated in 1989 that requests from the electricity sector of developing countries added up to $100 billion per year. In response, only about $20 billion was available from multilateral sources, leaving a gap of about $80 billion." This point was re-emphasized in a later Roundtable with Electricité de France on power sector reforms, but the donors' potential contribution was reduced even further, to 10 percent of the requirement. In concert with the country's lowered credit rating, it appears that there were clear signals from the international financial community that earlier levels of debt-based public financed development in the sector would no longer be realizable. The media tends to credit Harvard-educated bureaucrats and an enlightened
minister in the finance ministry for playing the catalyzing role in building momentum for the reforms. Elsewhere, it is often claimed that the unravelling of the Soviet Union actuated a world-wide paradigm shift away from ideas of social democratic governance towards those of market liberalism, which infected even socialist politicians with a strong dose of realism (e.g., Jyoti Basu of the Communist Party of India-Marxist in West Bengal). Thus, once the country found itself pushed into a corner by mid-1991, "reforms"—signalling privatisation—were the only way out.

15. Abhay Mehta (1999) reports that "in 1992, a delegation led by the Power Minister made a special trip abroad to apprise potential investors of the vast investment opportunities that were now available in India. Elected officials in different states from across the political spectrum went to extraordinary length to woo IPPs, in some cases signing MoUs with their representatives within hours of their arrival in the country. For instance, the Enron team signed an MoU with the Maharashtra government three days after it visited the state and reviewed potential sites in 1992. Mehta calls it "an extraordinary deviation from all established convention in similar cases the world over".

16. Pillai and Krishnamurthy (1997) state that in 1998, many states, including those that are undergoing power sector reforms, have also been witness to similar political upheavals during the past decade. Yet, there were several signs of discontent right from the start, amounting to a serious "lack of trust" on both sides. IPPs, consulting organizations and re
lated supporting companies, while remaining the most vocal supporters of the policy, were indignant about delays in obtaining clearances and hurdles to securing adequate fuel supply, and were generally apprehensive about recovery of dues from SEBs and the country's overall political stability. Following the assassination of Rajiv Gandhi in 1991, the Indian polity had functioned primarily through coalition governments. The Narasimha Rao government, which was itself a minority Congress Party in power between 1991 and 1996, was replaced by the 13-party United Front government, which had three successive prime ministers in 1996-1998, before being replaced by the 25-party National Democratic Alliance.

17. Mehta (1999) states that "a memo imputed to be from the World Bank to the Government of India commenting on the Enron project, while strongly criticizing the basis on which the project was chosen, nevertheless urged the government to explore possible ways to sustain the interest of the project sponsors and went on to state that the Bank strongly supported the government's private power initiative and [was] keen to consider other private power project proposals, including a reshaped Dabhol project, for Bank financing."

2.3 Research Gap

Private investment in the energy sector is conspicuous by its absence. Even the maiden attempt made to rope in private investment in the private sector has miserably failed and as a matter of fact, the parent com
pany that undertook a project in Maharashtra has recently filed for bankruptcy. At the same time, not much is left is with the government, state or central, to invest in this vital sector of the economy.

However some states like Kamataka have gone in for major reforms, corporatised distribution and generation of power. In Kamataka, for example, the Kamataka Power Corporation Ltd. (KPCL) has taken over the task of planning, constructing, operating and maintaining power generation projects. Given this scenario not many studies have been made to ascertain how far such corporatisation has helped the government concerned to optimise energy generation the various investment handicaps notwithstanding. This study fills the gap. A corporate body like KPCL in better placed to raise resources in order to invest in the energy sector on account of its strong financials. In Kamataka, KPCL has raised resources in the form of equity and/or debt from World Bank as also a consortium of nationalised banks.

2.4 Need for the Study

Investment in the energy sector has been rather discouraging in spite of the fact that energy sector is a high priority area. Deficiency in energy generation can bring the economy of the state to a grinding halt. This being the ground reality, more and more investments have been necessitated in the sector of the State. But the investible resources with the government coming down rapidly and at times the government is finding it difficult to even meet the basic adequate needs, this vital sector's requirements remain unfulfilled. Throwing open the door to the private sector has not helped if the
country's experience with the jinxed Enron Power Corporation is anything to go by. However, the government must find ways and means of channelling more and more investments into the energy sector failing which catastrophic consequences are bound to result. An introspective study is needed to assess the availability of energy from different sources in Karnataka. The study should cover the problems and constraints faced during the course of generating and distributing conventional and non-conventional energy. This will help in assessing the gap between potential supply and actual supply of energy. The investment that is required to close this gap can eventually be assessed and the impact of such investment on the state's energy sector can be studied.

2.5 Objectives of the Study

The objectives of this study are to:

1. Examine the investment pattern in respect of conventional and non-conventional energy sources
2. Assess the availability of energy from different sources in Karnataka.
3. Identify the problems and constraints in generating and distributing conventional and non-conventional energy
4. Assess the gap between potential supply and actual supply of energy
5. Review the trends and patterns of energy consumption and its impact on economic development.

2.6 Hypotheses

The present study is based on the following hypotheses:
1. Power generation is hampered by financial and ecological constraints.

2. Technology upgradation will improve production and productivity in the power sector.

3. Upgradation of manpower skill will improve production and productivity in the power sector.

4. The participation of independent power producers (IPPs) will help in minimising the demand – supply gap, if not eliminate the gap altogether in the power sector.

2.7 Scope

The study examines the investment in the energy sector of Karnataka and the impact of the said investment on generation and distribution of energy and its eventual impact on the economy.

2.8 Limitations of the Study

Data for analysis has been collected from published reports, reputed journals, periodicals and from sources like departments concerned of the State and Central governments, corporations set up by the government of India in the power sector, etc. Hence, the accuracy of the findings of the study is a function of the accuracy of the said data.

2.9 Sources of Data & Methodology of Research

Data has been collected from various government departments, including the Energy Department and Statistics Department, the Karnataka Power Corporation Ltd. and other relevant institutions. Published reports of
reputed newspapers, magazines, journals, monitoring centres like the Centre for Monitoring Indian Economy (CMIE), etc have been relied upon. In addition, the researcher has personally interviewed the top officers/executives of KPTCL, KPCL, etc to collect micro-level data relevant to the study.

2.10 Tools for Data Collection

Analytical study has been conducted to assess the investment in conventional and non-conventional sources of energy. Secondary data has been used to assess the availability of energy from different sources, to identify the problems faced in generating and distributing conventional and non-conventional energy, to review the energy consumption trends and their impact on economic development and to assess the gap between potential and actual supply of energy.

2.11 Analysis of Data

The collected data was tabulated and analysed using such techniques as percentages, averages, ratios, etc. The reference period for the study is 1980-81 to 2000-01.

2.12 Chapter Scheme

The study is spread over the following six chapters:

Chapter-1: Introduction

Introductory in nature, this chapter traces the growth of the energy sector in Karnataka and the increasingly important role that the energy sector plays in Karnataka's economy.
Chapter-2: Research Design

This chapter details the design of the research. After stating the problem, it lays down the objectives of the research and its scope and explains the sampling technique used. Additionally, it reveals the sources of data and the modus operandi of collection of the said data before concluding with a brief description of the chapter scheme.

Chapter-3: Status of Karnataka’s Energy Sector

This chapter examines the investment made in the conventional and other energy sources by the state. It also ascertains the energy garnered by the state from the various sources and eventually assesses the gap between potential supply and actual supply of energy.

Chapter-4: Problems Faced in Generating, Transmitting and Distributing Energy

Problems do arise while generating, transmitting and distributing energy. These problems are discussed in this chapter.

Chapter-5: Energy Consumption Trends and Their Impact on Economic Development

Energy consumption trends are studied in this chapter in order to assess their eventual impact on the state’s economic development.

Chapter-6: Summary of Conclusions & Recommendations

This chapter summarises the conclusions drawn in the light of the data collected and analysed. In addition, it comes out with recommendations to resolve the said problems.