CHAPTER - I

INTRODUCTION
Competitiveness in such a complex world can be sustained only at a high level of knowledge and skill based at all levels. A. P. J. Abdul Kalam.

1.1 Meaning:

"The availability of adequate infrastructure facilities is vital for acceleration of economic development of a country". Governments have traditionally been well aware of this and have accorded high priority to investments in sectors such as railways, roads, power, telecommunication, ports, water supply, sanitation, sewerage and airports. Its linkage to the economy is multiple and complex because it affects production and consumption directly and creates positive and negative spillover effects.

Infrastructure contributes to economic development by increasing productivity and by providing amenities, which enhance the quality of life. Infrastructure adequately helps determine success in diversifying production, expanding trade, coping with population growth, reducing poverty and improving environmental degradation. As per World Development Report "Infrastructure services – including power, transports, telecommunication, provisions of water supply and sanitation are central to the activities of the households and to economic production. At the same time major infrastructure failure quickly and radically reduce communities quality of life and productivity".

Lexically infrastructure means "the basic structural foundation". Economic infrastructure, therefore, can be defined as "the foundation underlying a nation's economy, upon which the degree of economic activity depends". "Infrastructure is an umbrella term - a portmanteau concept which can be segregated by sectors, origin and investment". Infrastructure is generally defined as the physical framework of facilities through which goods and services are provided to the public. It also refers to "major critical improvements as highways,
bridges, tunnels, airport and transportation facilities as well as water supply system, - sewerage treatment plants, works disposal and recycling plants and other environmental facilities. These are the basic services that make possible the economic and productive activities of a community.

The infrastructure services are intermediate inputs to production and any reduction in these input costs raises the profitability by permitting higher level of output, income and employments. Infrastructure investment raises the productivity of other factors including labour and capital. So infrastructure is often described as "unpaid factor of production" since its availability leads to higher productivity from capital and labour. The physical infrastructure sector that covers a wide spectrum of services, i.e., transportation (road ways, railways, airway and water ways), power (generation, transmission and distribution) telecommunication, port-handling facilities, water supply, sewerage disposal, urban infrastructure and irrigation contribute substantially to the economy of a country.

"Business Today" in an article "How Bad is Indian's Infrastructure?" makes an attempt to see what section constitute infrastructure. "The choice of sectors was guided by just one consideration, which elements of infrastructure are most important to investors planning to conduct business in a particular country. The six sectors that emerged as automatic answers were used for constructing the infrastructure indices. The choice of power, telecom, transportation, roads and railways was axiomatic as all of them are vital inputs to production with their cost and efficiency impacting the cost structure and affecting income probability and returns to investment. Moreover cost arising from inefficiencies of these sectors lead to underutilization of production capacities and constrain productivity and output and insufficient infrastructure needs user to invest in alternative sources raising their capital cost."
But these sectors are important for other reasons too. For instance a poor power infrastructure not only discourages investment but also hurts economic output. Likewise telecom, which is now crucial for monitoring operation, facilitating information flow and enabling networking activities, is of vital strategic importance to business. And also poor transportation infrastructure in the form of roads and railways compounds cost in many ways. For example, studies in Latin American countries show that each dollar not spent on road maintenance increase vehicle operation cost by $3 besides costing an additional $3 for premature reconstruction of road. In addition to this, another area of infrastructure that is vital for investors is port, which ensures access to international markets for both inputs and outputs. This is of paramount importance in today's age of global marketing and sourcing.". World Development Report further states that "Infrastructure can deliver major benefits in economic growth, poverty alleviation and environmental sustainability – but only when it provides services that respond to effective demand and does so efficiently ".

The World Development Report 1994 classifies the entire range of economic infrastructure into three categories:

1. Public utilities – Power, telecommunication, water supply, sanitation and sewerage, waste collection and disposal.


3. Transport sectors - Railways, urban transport, port and airport.
The Government of India (GOI) recognises the following sectors as infrastructure for the purpose of extending fiscal benefits such as tax holidays and income tax benefit. Such sectors have been listed under sec.80 of Income-Tax Ac 1961. The sector includes roads, airport, port, railway (from April 1995), irrigation, water supply, sanitation, sewerage system and telecom. (from February 1997).

The Government of India has identified the following six sectors under infrastructure for the purpose of commercialisation.

i) Power
ii) Telecom
iii) Roads
iv) Ports
v) Industrial park
vi) Urban Infrastructure

1.2 Importance of Infrastructure:-

Dr. APJ Abdul Kalam in his book "INDIA-2020" has mentioned, "In order to achieve the vision, several crucial actions need to be taken to ensure speedier growth of infrastructure: energy, quality electric power in particular, road, waterways, airways, telecommunication, ports, etc. Several short-term measures and some unconventional steps need to be taken. The long-term action should be aimed at providing world-class facilities for all parts of India. Rural connectivity is crucial even in the short run if the boom in agriculture and agro food sector is to be utilized fully. In addition, the progress in information technologies is leading to the possibility of very advanced world-class industries and businesses being established in a village. Highly creative projects in software, information technology, design and other creative work can in fact be better done in a rural environment, which has good facilities and good
connectivity. The persons who live there should have access to the latest information available globally if they have to be creative and current. Such connectivity can be provided by electronic means even today. Thus, there is a true possibility of many of our well-connected rural areas becoming world-class centers of excellence and also making for a lot of value-added exports or vigorous domestic business, besides giving us food and other products, which normally come from rural areas. There are also excellent possibilities that such well-connected rural areas may be host to a number of biotechnology factories, which will produce value-added natural products for sale globally. But all these are possible only with an excellent rural connectivity, which means good roads, telecommunications, and, of course, quality electric power.9

Infrastructure investment has a high potential pay-off in terms of economic growth. It provides a critical support to the growth of economy. It is a well established fact that availability of adequate infrastructure is vital for the acceleration of the economic development of a country.

According to S.K. Sarkar and Rekha Krishnan "Energy projects can contribute to poverty reduction at the macro and micro levels in many ways. At macro level, they contribute to resource savings as energy efficiency gains foreign exchange savings and earnings and increase the tax revenues due to additional employment. These in turn can be invested in poverty alleviations programmes. Projects that promote efficiency in energy supply may also lower the price of energy - making it more affordable. Backward linkages of energy development such as with sectors like iron and steel manufacturing transport etc. will also induce economic growth”10

World Development Report further provides that “adequate and quality infrastructure influence marginal productivity of capital through - reduced
cost of production and structural impacts on demand and supply. Lower cost of production in turn has an impact on the level of output, income and profitability. For example, rural infrastructure in western India helped increase agricultural production with better access and higher yield. Kenya's agro export as well as Mexico's manufacturing operation improved their international competitiveness through better logistic support. The structural impact of infrastructure on demand and supply contributes to diversification and modernisation of economy by facilitating alternative and better modes of production. Further the availability of Infrastructure decides the ranking of location on potential for investment and industrialisation.

Describing the importance of infrastructure APJ Abdul Kalam said, "The reason I am emphasising these aspects is simple. India can launch itself into a developed status only when the economic machinery starts 'real movement' through the infrastructure. Once the machinery moves, the process of economic growth will create more money in about five to seven years. That money can be reinvested in further improvements. Those of traditional thinking may find this difficult to accept. But let us learn the lessons of the past fifty years. The poor people cannot wait for a whole millennium to pass to have a better and more secure living. If a reasonable infrastructure were in place, our innovative people would find avenues to a better life. Money in the hands of our hundreds of million Indians constitutes a huge market. Once they become a force, India will be a billion-plus market that will attract the whole world!"

In recent years, number of studies has been devoted in estimating the productivity of infrastructure investment. Studies examining the link between aggregate infrastructure spending and GDP growth show very high returns in time series analysis. However, the causality "does infrastructure investment cause growth" or "does growth cause infrastructure investment" has not been
fully established. A strong co-relation nevertheless exists between the availability of certain services such as telecommunication, power, paved roads, and access to safe water with per capital GDP. As per World Development Report “The precise linkages between infrastructure and development are still open to debate. However infrastructure capacity grows step for step with economic output – 1 per cent increase in the stock of infrastructure is associated with a 1 per cent in gross domestic product across all countries.”

Sectoral studies focusing on rural infrastructure’s effect on local economy in certain developing countries have revealed more about apparent benefits. Studying data from eighty-five districts in thirteen Indian states, researchers found that lower transport costs increased farmers' access to markets and led to considerable agricultural expansion and that modern irrigation methods brought higher yields. At the same time, because improved communication (through roads) lowered banks' costs of doing business, banks expanded lending to farmers. The farmers used the fund to buy fertilisers, which resulted in increasing yields. According to a household and village level survey conducted in Bangladesh, villages classified as “most developed” in terms of access to transport. Infrastructure were significantly better off than the “less developed” villages – in terms of agricultural production, incomes and labour demand and health.

Adequate quantity and reliability of infrastructure are key factors in the ability of countries to compete in international trade, even in traditional commodities. For example, due to infrastructure problems, shipping cost from Africa to Europe are 30% higher than those from Asia to Europe. Further the competition for new exports is especially dependent on high quality infrastructure.
Infrastructure is important for ensuring that growth is consistent with poverty reduction. Access to at least minimal infrastructure services is one of the essential criteria for defining welfare. The construction and maintenance of some infrastructure – especially roads and water works can contribute to poverty reduction by providing direct employment. Infrastructure provisions result from efforts of individuals and communities to modify their physical surroundings in order to improve their comfort, productivity and protection from elements and conquer distance. Each sector – water, power, transport, sanitation, and irrigation raises issues concerning the interaction between the man-made structure and the natural environment. Environmental friendly infrastructure services are essential for improving living standard. Well-designed infrastructure can promote environmental sustainability.

What infrastructure may achieve can also be illustrated from an Orissa example. In Orissa, the express way connecting Daitari (Iron ore & Chrome ore mines) to Paradeep port has triggered a remarkable growth not only, in export and transport industry but also is responsible for the overall growth on the both side of the 149 km. road. The road which was completed in 1964 has given rise to host of other economic activities such as mining, agriculture and allied activities. There is a distinct improvement in the standard of living and in the quality of life of people on both the side of the road.

Conversely lack of infrastructure slows down economic development. India’s high cost ports have caused diversion of cargo to Singapore and other countries. The shipment bottlenecks almost threatened export till they were air borne recently from India. Lack of proper infrastructure also downgrades the priority of setting of new industries.16
1.3 Present trend in infrastructure sector:

Developing countries invest $200 billion a year in new infrastructure - 4 per cent of their national output and a fifth of their total investment. The result has been a dramatic increase in infrastructure services, for transport, power, water sanitation, telecommunication and irrigation. During the past fifteen years the share of house hold with access to clean water has increased by half, and power production and telecom lines have doubled. But these accomplishments are no reason for complacency. One billion people in developing countries still lack access to clean water and two billion lack adequate sanitation. Electric power has yet to reach two billion people and in many countries unreliable power constrains output.

The past growth of infrastructure has in some respect been spectacular particularly in the field of electricity and telephone. But in other important respect the performance has been disappointing. Infrastructure investment has often been miss-allocated - too much to new investment and not enough to essential maintenance. The delivery of services has been hampered by technical inefficiency and outright waste. Only few investments and delivery decisions have been taken to meet varied demand of different users or groups. Inadequate maintenance has been an almost universal and costly failure. Failure of maintenance is often compounded by ill-advised spending cuts. Curbing capital expenditure is justified during period of budgetary austerity but reducing maintenance budget is false economy. Such cuts have to be compounded for later by much larger expenditure on rehabilitation or replacement. Waste and inefficiency also claim a large share of resources for delivery of infrastructure services. A review of power utilities in fifty-one developing countries showed that technical efficiency has actually declined over last twenty years. Older power stations consume 18 to 44 per cent more fuel for Kilowatt-hour than the new plants.
Commenting on infrastructure development, Pratip Kar of SEBI said, "We have 2.9 million km. road network, the third largest in the world. But the quality of roads are poor, the motor worthiness of the roads decline by the way of causing increase in traffic congestion and pollution. We have no sufficient expressways and more than three fourth of our national high ways and state ways are single or double lane where commercial vehicles only run 200 KM per day compared to 600 Km per day in developed countries. In cities in India, cars run at only 12.5 KM per hour compared to much more in developed countries."

The poor performance and large-scale failure in infrastructure management has triggered a total change in approach in managing infrastructure assets. Over the last decade, the wave of privatisation and deregulation has been sweeping infrastructure sector around the globe. This new approach promotes improvement in efficiency and service quality. The specific motivation and circumstance vary by countries and in countries by sectors. The following are the five pragmatic factors that are leading the economies all over the world to consider enhanced commercialisation of Infrastructure projects.

1. The massive investment requirement arising from sharply rising economic growth rates are pushing countries to look for additional sources of financing against the back drop of fiscal stringency.
2. The rising awareness of the importance of efficiency in investment and delivery in the context of tight fiscal conditions, is leading to rethinking on the ability of the government owned entities to supply infrastructure service in professional manner.
3. Changes in technology make it easier to change for marginal use of infrastructure services. Such technological changes are making
possible the introduction of competition horizontally and unbundling services vertically.

4. The increasing need for countries to compete in the global market place is putting additional pressure on countries to provide efficient infrastructure services in a cost effective and competitive manner. Higher infrastructure cost in terms of both cost and time delay can make the differences between firms being globally competitive or otherwise.

5. The new dynamism and integration of Word capital markets have vastly increased the possibility of raising large amount of funds for infrastructure investment on a commercial basis whereas earlier it was government, which had better access to resources. In many ways it is now the private sector, which has the capability of sourcing large funds for infrastructure projects.

6. Coping up with the future infrastructure, one has to face future challenges which involves much more than a simple number game of drawing up inventories of infrastructure stocks and plotting needed investment on the basis of past patterns. It involves tackling inefficiencies and waste in both investment and in delivering services and responding more effectively to user demand. Half of the labour in Africa and Latin American railways is estimated to be redundant and in Africa and elsewhere, costly investments in road construction have been wasted for lack of maintenance.

The Indian Infrastructure Report submitted by Rakesh Mohon Committee highlighting the present trend mentioned, "A wave of privatization and deregulation has been sweeping infrastructure sector around the globe over the last decade or so. These bold new approaches promise improvement in efficiency and service quality".20
The World Development Report in summarizing the way infrastructure should be managed recommends to:

1. Manage the infrastructure like a business not a bureaucracy.
2. Introduce competition directly if feasible, indirectly if not.
3. Give users and stakeholders a strong voice and real responsibility.
4. Public-private partnership in financing in new capacity building.
5. Government will have a changed role in infrastructure, i.e., as regulator instead of provider of infrastructure.

The present trend in infrastructure financing can be well understood as more and more emphasis is given to BOT, BOOT, BOO and PPP which is explained below briefly:

BOT (Build-Operate-Transfer): Typically in BOT, a private party (or consortium) agrees to build, operate and maintain a facility for a specified period and then transfer the facility to a government or other public authority.

BOOT: (Build-Own-Operate and Transfer): Here the variation from BOT is the private party in charge of construction owns the asset for some period before finally transferring the asset to public authority.

BOO: (Build-Own and Operate): Here the contact accords the right to construct and operate the facility but the facility is not transferred back to the public sector.

PPP: (Private-Public-Partnership): Under this kind of agreement the ownership remains with the private and public authority.
In order to develop the infrastructure sector with a holistic approach, the GOI had set up a committee in October 1994 under the chairmanship of Rakesh Mohan. The objective of Rakesh Mohan Committee was to suggest in details the modalities for taking up reform in infrastructure sector. The committee submitted its report on June 1996 strongly recommending for the commercialisation and privatisation of India's infrastructure sector.

But privatisations in infrastructure sector need to be taken carefully. This is evident from California crisis. California's experience of restructuring and partial deregulations has been an eye-opener for many power sector reformers. Reddy (2001) has described this briefly and Besant-Jones and Jenenbaum (2001) of the World Bank discuss it at length. In March 1998 California asked the utilities to divest their generating capacities and required them to purchase bulk power from independent suppliers in the California Power Exchange one day in advance. The price was to be determined by supply and demand. At the same time the utilities were to sell power to consumers at tariffs fixed for three years by the regulatory authority. The problem started in May 2000 when the price of bulk power went up from about 5 US cents to 52 cents a KWh. Over the next few months the utilities paid billions of dollars for bulk power in excess of what they received from consumers and were unable to get credit to buy power. In January 2001, a severe power crisis developed. A storm clogged the water inlet pipe of a nuclear power plant and took 2200 MW out of the system. Coupled with the poorly scheduled maintenance shutdown of other plants a severe shortage developed. The state had to intervene with financial support. In California the market did not create incentives to bring additional capacity on line. In fact, there are allegations that suppliers colluded to restrict supply and push up prices. The lesson one learns from the examples of Sweden and California is that power sector restructuring is complex and involves many pitfalls.
1.4 Objective of the study:

The specific objectives of this research work are as follows:

1. To analyse the process of reform in infrastructure sector in the world as well as in India.
2. To make an analysis of different sources of financing infrastructure particularly in the context of new challenges in this sector.
3. To make an analysis of the status of power sector in India.
4. To make an analysis of risk and rate of return in power sector projects.
5. To examine the process of reform and the challenges in the power sector of Orissa.
6. To study the subsidy and cross-subsidy existing in the tariff structure in power sector of Orissa.
7. To make a survey into the impact of reform in power sector of Orissa.

1.5 Relevance of the study:

We are aware that infrastructure provides a critical support to the growth of economy. Investment in this sector has a high potential pay-off in terms of economic growth. It is a well-established fact that availability of adequate infrastructure is vital for the acceleration of the economic development of a country and further adequate and quality infrastructure influence marginal productivity of capital through reduced cost of production.
Though the growth in some sectors like electricity and telecom has been spectacular but in some other sector like water supply, urban transport and roads, it is yet to grow keeping pace with the demand. Again due to lack of proper management in almost all infrastructure sectors there is massive wastage of resources and the cost and quality of the service is becoming unmanageable. Of course the causes of such poor performance are many. Firstly the infrastructure services in most of the countries are government owned and managed, resulting in lack of proper professional management in this sector. Secondly the government is not able to mobilize the massive resources required in this sector. So infrastructure sector is undergoing a transformation throughout the world. Recently there is a wave of privatisation or private-public partnership in infrastructure management. Already developed countries have witnessed such changes. This sector is also undergoing changes in developing countries. In India the reform-commercialisation of infrastructure has arrived little late. The GOI started to give a serious thought to bring about reform in this sector in the early part of nineties. This followed the liberalisation and globalisation move by GOI, which compelled the Indian infrastructure sector to grow, so that it would be of world standard in order to make its industries competitive in global market. The recommendations of Rakesh Mohan Committee are of paramount importance and are considered as a milestone in the reform process in infrastructure sector. So we have discussed some of the major recommendation of Rakesh Mohan Committee in this thesis.

The financing of infrastructure projects is different from usual financing. The large capital cost, substantial sunk cost, long gestation period coupled with a very long payback period make the infrastructure project singular in approach. The rate of return, which is a determinant factor in privatization, unfortunately has never been discussed. This was due to a system of public
funding of all infrastructure projects, where concept like welfare was dominating. So a survey in rate of return (RoR) and risk analysis of infrastructure projects has been attempted in this research work.

The privatisation of infrastructure in general and power sector in particular has created number of issues, which is typical to a developing country. Again some of the problems are also typical to India. Is it due to Gunnar Myrdal's concept of "soft state" which imply the good policies that are highly successful in some other part of the world is not successful in India? This thesis attempts to address and analyse these new problems following the reform in power sector. The problems like commercial route of financing the infrastructure sector has focused on rate of return and risk. Secondly, due to shortage of funds with government agencies, the power sector has to depend heavily on private capital implying in a change in government's role. Government instead of being the infrastructure provider has to be the infrastructure regulator. Another dimension to the problem is, following the reform; GOO has stopped providing subsidy to the newly formed power distribution companies. These companies on the other hand are not able to increase the tariff to compensate the subsidy amount. Further the cross-subsidisation of tariff by industrial and commercial consumers to domestic and agricultural consumers is no more possible in post liberalisation period. This thesis attempts to analyse the problem of subsidy and cross-subsidy in the power sector of Orissa. Further this thesis has undertaken a primary survey to study the impact of reform on consumers.

The work done so far in power sector was a pre-reform exercise particularly in context of Orissa reform. This thesis attempts to analyse the post reform scenario in Orissa and offers suggestions to make the reform a success.
1.6 Research Methodology:-

The study is dependent on both primary and secondary data. The secondary sources of data are Government of India’s report and publications, World Bank reports and publications, CMIE report, report of Grid Corporation of Orissa [GRIDCO], Economic Survey of Orissa, Orissa Electricity Regulatory Commission's order, various reports of private distribution companies of Orissa and some important journals and publications of Indian Institute of Management, Ahamadabad, Institute of Public Enterprise, Hydrabad and number of issues of The Economic Times and other newspapers.

Primary data have been collected by making a survey into the impact of electricity reform in Orissa on different type of consumers. Three years have passed in the mean time since Orissa has privatized its distribution of power. So we have undertaken a survey to find how people of Orissa has received the reform.

Population Defined - In order to study the impact of electricity reform in Orissa we had undertaken a survey covering all-important classes of electricity consumers. Primarily we have divided the consumers in to three types, i.e., domestic, commercial and industrial consumers. Further all these consumers have been divided on the basis of area, i.e., urban and rural. Thus we get a comparison between rural domestic, commercial and industrial consumers against urban domestic, commercial and industrial consumers. The questionnaire has been oriented to evaluate the perception of different types of consumers as regards to the reform in this sector. The questions are mainly about the awareness of reform, quality of power, improvement in quality of power, tariff and power interruption. We have taken a population of 450 consumers from different parts of Orissa out of which 164 are from urban and 286 are from rural sector.
The responses collected from different consumers have been edited and tabulated. Ratios and percentage have been widely used for comparison purpose. The accumulated frequencies of the opinion of consumers have been treated with the chi-square statistics and the resulting chi-square have been tested for significance at the .05 level.

1.7 Organization of the Study:-

The present study is organized into nine chapters. The first chapter introduces the topic of research and outlines the objectives, relevance, research design and methodology. The second chapter highlights the changing scenario in infrastructure sector all over the world with special reference to India. The third chapter has been devoted to different sources of financing infrastructure and discusses the newer techniques of mobilisation of funds to infrastructure sector. The fourth chapter deals with the history and development of power sector in India and it also deals with the present predicaments faced by this sector. The fifth chapter deals with the development of power sector in Orissa and critically examines the reform in power sector. The sixth chapter deals with the rate of return and risk associated with power sector. The seventh chapter makes a critical analysis of subsidy and cross subsidy in the tariff structure of Orissa power sector. The eighth chapter deals with the survey undertaken to find the impact of electricity reform in Orissa. The last chapter presents the summary and offers recommendations along with the scope for further work.
References:


13. ibid, 56 pp.

14. ibid, 91 pp.


17. ibid, 112 pp.

