

An Overview Of Power Sector Of Karnataka

Dr.Mallesappa. Kumbar

*Professor & Head, Department of Post-Graduate Studies in Economics
Government College (Autonomous)Kalaburagi-585105*

Abstract

This paper attempts to give an overall picture of power sector in Karnataka in nutshell. Based on the secondary data collected from various sources like All India Energy Statistics, Economic Survey of Karnataka, Reports of Department of Finance GOK and KREDL paper tries to analyse various aspects of power sector in Karnataka which has emerged as the major producer of power in the country and economic power house in recent years. The paper concludes that there has been tremendous increase in the demand for power in the state and attempts to improve supply side through several structural reforms has resulted in meeting the demand. However, still there are certain areas such as increasing burden of subsidised power supply, increasing generation and transmission costs, purchase of power in peak time have worsened the financial health of power generation and distribution companies. Therefore, there is an urgent need to look into these issues so that power sector works efficiently and gears itself for meeting the increasing demand for power in the coming years.

Key words: *Energy,Power,Power Consumption,Transmission,ESCOMs*

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I. Introduction

Energy is an important input for economic development and power sector is an indispensable infrastructure in any economy. Providing adequate and affordable power is essential for economic development, human welfare, and better standard of living. Energy makes people's life easier. hence their productivity also increases. Increase in energy production and supply not only accelerates economic growth but, also improves living standards of people. In addition, power sector contributes immensely to GDP. Realising the importance of power in economic development, governments at centre and states have laid emphasis on the development of power sector on war footing. As a result, India is the third largest producer of power in the world. Within India, Karnataka is the sixth largest producer of power. With installed capacity of 30.15GW Karnataka's share in total power production is 7.46% (All India Electricity Statistics-2022). Besides, Karnataka was the first state to introduce power sector reforms in the country in the post liberalisation era of 1991. In this context this paper tries to explore the power sector of Karnataka to give a bird's eye view of the sector.

II. Objectives

The broad objectives of this paper are as follows

- 1.To get bird's eye view of the power sector of Karnataka.
- 2.To analyse the demand for power in the state.
- 3.To analyse the supply of power in the state.
- 4.To examine the power sector reforms introduced in the state.
- 5.To suggest measures for the further improvement of power sector in the state.

III. Methodology

This paper uses exploratory and diagnostic methods to analyse the power sector of Karnataka and get bird's eye view of the sector in the state. The required data for analyses has been derived from various sources like All India Electricity Statistics-2022 published by the Power Ministry of Government of India, Economic Survey of Karnataka -2022-23 published by Department of Planning, Programme Monitoring and Statistics, Government of Karnataka. Simple mathematical tools like percentage, tables and growth rates are used for analysis and presentation.

IV. An Overview of Power Sector of Karnataka

a) Power Generation

The picture of installed capacity and power generation in Karnataka, progress achieved therein is presented in the following table no-1. The total installed generation capacity both in the public sector and private sector including the State's share in the Central Generation Station (CGS) up to November 2022 is 31634.58MW. The installed capacity in the public sector is 13,601.35MW (including CGS allocation) (42.99%) and the private sector's share is 18033.23MW (57.00%). The State has added 361.84MW of Generating capacity in renewable energy sources during the FY 2022-23 (Up to Nov-22).

Table-1: Installed Capacity and Power Generation in Karnataka

Source	Units	2022-23 (Upto Nov-22)
1. Public Sector		
a) Hydel	MW	
b) Wind energy	MW	5.00
c) Thermal	MW	5,020.00
d) Diesel plants	MW	0.00
e) Solar PV plant	MW	34.00
Total		8,740.00
f) Jurala Hydro	MW	117.00
2. Private Sector		
a) IPP Thermal (including small thermal-conventional)	MW	2197.30
b) Mini Hydel	MW	903.46
c) Wind energy	MW	5218.39
d) Co-generation & Biomass	MW	1870.19
e) Solar (including solar rooftop)	MW	7843.89
Total		18033.23
3. Central Generating Station Allocation	MW	4744.35
Total Installed Capacity		31,634.58
a) Hydel (KPCL)	MU	8681.16
b) Thermal (KPCL)	MU	7683.23
c) Wind	MU	6061.06
d) Solar PV plant	MU	4554.15
e) Mini Hydel	MU	1385.87
f) Co-gen and Bio-Mass	MU	722.31
g) Private sector	MU	1280.36
Total		30,368.14
C. Electricity imports		
a) Central projects	MU	8100.11
b) Other States-Short Term	MU	
Total	MU	8100.11
Total Electricity supply	MU	38,468.25

Source: Economic Survey of Karnataka-2022-23

b) Power Consumption

Power consumption by different category of consumers is shown in the following table-2. The depicts that in the year 2021-22, the agricultural sector (water pumping through irrigation pump sets) accounted for highest share of electricity consumed with a share of 37.32%, followed by domestic consumption occupying a second position with a share of 26.36%.

Table -2: Electricity Consumption by various category of consumers (2021-22)

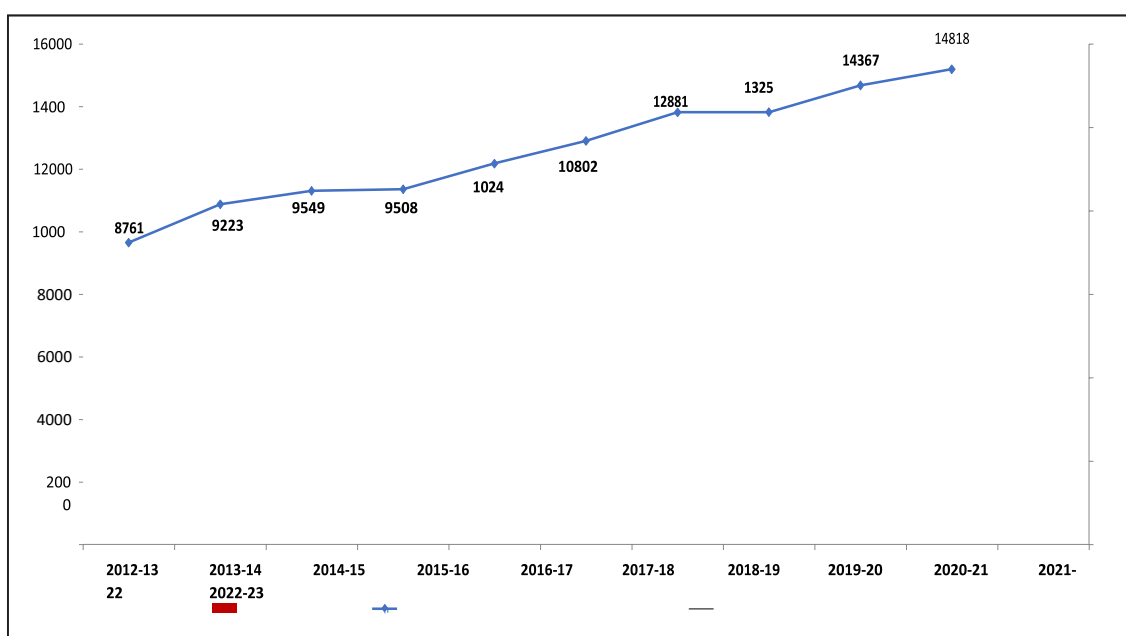
Category of Consumers	Consumption (MU)	% of Sales
Industries	8085.12	13.84
IP Sets	21802.53	37.32
Domestic	13837.17	23.69
LT Industries	2032.45	3.48
Water Works& Sewage pumping	4499.14	7.70
Commercial Lighting	5444.14	9.32
Public Lighting	1143.04	1.96
Others	1573.57	2.69
Total	58417.98	100.00

Source: Karnataka Economic Survey 2022-23

c) Demand and Supply Status of Power in Karnataka

Demand for and supply of power is an indicator of increase in economic activities. The trends in peak demand for power and peak energy supply per day in Karnataka state during the last 10 years (From 2012-13 to 2022-23 (Up to November-2022)) are given in Fig-1. It may be observed that both the peak demand and peak energy supply per day are showing increasing trends since 2012-13. This reveals that there is a continuous increase in the economic activities in the state. The peak demand met during 2021-22 was 14818MW.

Figure- 1: Trends in Peak Power Demand and Peak Power Supply



Source: KPTCL

Though, Karnataka was able to meet the increasing demand for power in the state, till recently there was gap in the demand for and supply of power in the state. The demand supply gap in the power sector of Karnataka is depicted in Figure-2. It is revealed that Karnataka faced power shortage up to 2017-18 and power supply shortage was highest at 1709 MW in 2014-15. Since, 2018-19 Karnataka was able to meet the peak demand for power and since then state has emerged as the power surplus state. This is due to power sector reforms initiated by the state government and due to efficient management of power sector.

Figure -2: Power Supply & Demand Gap (in MW)

18000											
16000								13790	14040	14451	15300
14000											
12000	9550	10473	11258	10214	10895	11517	11882				
10000											
8000											
6000											
4000											
2000	789	1250	1709	706	653	715	0	0	0	0	0
0											

Source:KPTCL

d) Electricity sales and revenue realization by categories of consumers

The ESCOMs in the state supply electricity to various category of consumers at different price slabs. Details of revenue realized from the different categories of consumers are given in Table-3. This shows that during the year 2021-22 nearly 76.43% of the ESCOMs revenue came from LT category consumers even though they account for about 70.37% of the electricity consumption. The HT industrial & commercial sector while accounting for only 18.25% of the electricity sales contributes 24.52% of the total revenue earned in 2021-22. Electricity supplied to HT Agriculture including lift irrigation fetches the lowest average revenue of Rs. 4.33/kWh whereas the LT commercial category provides highest revenue realization of Rs.10.92/kWh. Other than temporary installations, commercial LT consumers and HT industrial and commercial consumers pay higher prices for electricity consumed in the state. Thus, in terms of paying for the electricity, the agricultural sector pays the least whereas the commercial consumers pay the highest tariff.

Table-3: Electricity sales and revenue realization by categories of consumers

Category	Description	Sales (MU)	Revenue (Rs. Crores)	Average revenue realization (Rs./ kWh)*
LT1	BJ/KJ	916.51	601.56	6.56
LT2	AEH	13,080.11	9,697.37	7.41
LT3	Commercial	3,429.67	3,746.65	10.92
LT4	Irrigation Pump sets	21,159.55	12,253.42	5.79
LT5	Industries	2,032.45	1,862.79	9.17
LT6	Street lights and water supply	3,710.99	2,929.50	7.89
LT7	Temporary Installations	320.12	729.54	22.78
Total LT		444649.40	31,820.83	7.13
HT 1	Water supply installations	1,931.53	1,199.48	6.21
HT2	HT Industrial & Commercial	10,658.78	11,088.05	10.40
HT3	Lift Irrigation	872.76	377.74	4.33
HT4	HT Residential	142.61	113.22	7.94
HT5	HT Temporary	157.44	242.55	15.41
Total HT		13,763.12	13,021.04	9.46
Others / Misc. Income		5.46	378.23	
Grand Total		58417.98	45,220.10	7.74

Source: KPTCL

Note: BJ-Bhagya Jyoti, KT-Kuteera Jyoti-Low Tension-High Tension

e) Investment in Power Sector: (Planned by KPCL, KPTCL & ESCOMs during 2021-22)

The Plan Outlay and expenditure incurred by KPCL, KPTCL & 5 ESCOMs during last Five years are given in the table-4.

Table-4: Investment in Power Sector (Rs. in Crore)

Year	IEBR				Capital Outlay / Expenditure for Power Projects (IR & EQUITY)		Total Outlay	
	KPCL		KPTCL & ESCOMs		Plan Outlay	Expr.	Plan Outlay	Expr.
	Plan Outlay	Expr.	Plan Outlay	Expr.				
2017-18	1822.00	968.14	2000.00	2005.14	3555.25	3555.25	7377.25	6528.53
2018-19	1404.00	1001.66	2000.00	3711.64	3129.00	3129.00	6533.00	7842.30
2019-20	1916.00	288.06	3208.00	2406.04	2181.31	2181.31	7305.31	4875.41
2020-21	2345.82	297.68	2000.00	1342.67	1640.35	1640.35	5986.17	4083.32
2021-22	1859.28	362.59	2000.00	4226.29	3426.97	3426.97	8448.16	8015.85

Source: Finance Department, GoK.

From the above table the plan outlay and expenditure incurred by various agencies involved in the power sector of Karnataka is increasing in the last five years except for 2019-20 and 2021-22.

f) Renewable Energy Development

Karnataka is the leading state in the renewable energy in the country. It accounts for 65.57 % of renewable energy produced in the country. For harnessing renewable energy capacity of the state, Government of Karnataka has established Karnataka Renewable Energy Development Limited (KREDL) in 1996. Now, KREDL is the nodal agency for the development of renewable energy sources in Karnataka. To harness green and clean renewable energy sources in the State for environmental benefits and energy security and to initiate energy conservation & efficiency measures in all the sectors for sustainable development, the Government of Karnataka notified a policy on renewable energy (for the period 2009-14) on 19.01.2010 and Solar Policy 2014-21 on 22.05.2014 and Karnataka Renewable Energy Policy 2022-27. The capacity addition in under renewable energy during 2020-21 and 2021-22 was 236.83 and 383.09 MW respectively (table-5)

Table-5: Capacity additions under Renewable Energy (in MW)

Sources	Capacity addition during	
	2020-21	2021-22
Wind Power	148	181.80
Solar	88.83	201.28
Total	236.83	383.08

Source: KREDL

g) Issues and Challenges of Power Sector in Karnataka

Though, Karnataka is moving ahead in the power sector with several reform measures. The power sector in Karnataka is facing several challenges. Some of the important issues of plaguing power sector in Karnataka are as follows

i. Subsidy burden: The Number of IP sets (Up to 10 HP) & BJ/KJ/Gruha Jyoti installations are increasing over the years resulting in increased consumption. The monthly consumption limit per installation of BJ/KJ has been increased from 18 to 40 units per installations and that of Gruha Jyoti 200 units. Similarly, overall increase in consumption of IP sets (Up to 10 HP) has been increased, this has resulted in the increased subsidy burden on the part of state government. Due to inflationary tendency the cost of supply is increasing over the years. The tariff is getting increased due to increase in input cost of Generation, Transmission and Distribution. Timely nonpayment of subsidy amount by the governments have put pressure on the financial health of the ESCOMs.

ii. Cost of Supply: Due to increased demand for power in the state, the share of thermal power has increased adding to the cost of supply. The operational cost is also getting increased. The revenue realisation from sales is not matching with the overall cost of supply and there is gap or deficit in revenue every year. In order to bridge this revenue deficit temporarily ESCOMs are resorting to short term borrowings. The State regulators are considering the revenue deficit of the previous years during the Annual Performance Review and trying to bridge the revenue

deficit as far as possible. The approved average cost of supply for 2020-21 is Rs.7.23 per unit. The provisional actual average cost of supply of 2021-22 is Rs.7.64 per unit.

iii.Short term power purchase: Due to increased demand for power especially during summer season the need-based import of power by the ESCOMs is increasing over the years. This has put pressure on the financial health of the ESCOMs

V. Conclusion

The overall picture that the study gives is that Karnataka state has emerged as the leading state in power generation in the country in recent years due to proactive policies followed by the state government. The state which was hit by the regular power crisis has emerged as the power surplus state in recent years. Power generation and consumption in the state has increased tremendously in the recent past. However, the increasing burden of subsidy, rising generation and supply costs & D losses have put pressure on the financial health of the various agencies involved in the power sector of Karnataka state. With few more proactive measures by the state government power sector of Karnataka can come out of the challenges and emerge as the torch bearer in the country.

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