

## **SUMMARY OF MINOR RESEARCH PROJECT**

### **CAUSAL NEXUS BETWEEN PER CAPITA POWER CONSUMPTION AND PER CAPITA GDP IN KERALA AND ITS POLICY IMPLICATIONS**

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Energy acts as the main facilitator for economic growth and sufficient energy consumption is required for its sustenance. Electricity has started gaining increasing importance in the energy sector in our country. It is the State Electricity Boards that hold the responsibility for the generation of electricity here. Kerala, where electricity generation began in 1940 with the hydraulic project at Pallivasal, had achieved the status of power surplus state by 1970s that it afforded to sell power to neighboring states turned into a power deficient state by the late 1980s. The major reasons for this were the increasing domestic consumption, high levels of T&D Loss, the supply of electricity at subsidized rates to the industrial as well as the tourism sectors, the unreliability of monsoons, the decreasing capacity of reservoirs etc. The state, which was totally reliant on hydro source based electricity generation, turned its focus to a shift to non-hydro source based electricity generation which is largely fossil fuel based for the time being. This has its own economic and environmental drawbacks. The increasing concerns over the electricity supply meeting the ever increasing demand for it in our growing economy brings about a need to look into the causal relationship between electricity consumption and economic growth in it.

There are a number of research works conducted concerning the causality between economic growth and energy consumption at national level in India. But there is no regional study regarding this issue in India by using advanced econometric tools. There is gap in literature regarding this main issue of energy and economic growth perspective, especially in case of Southern parts of India. Therefore, I would like to make an attempt to shed light into the empirical relationship between electricity consumption and economic growth in Kerala state. Since Kerala is highly energy dependent and is vulnerable to energy shocks, from the policy point of view it is very crucial to analyse the energy impact on economic growth and vice versa.

#### **Objectives**

The main objectives of the present study are:

1. Characterization of the relationship and causation between per capita power consumption and per capita GDP
2. Investigate deeply in to the ways means for increase the productive efficiency of power supply and distribution.
3. Investigate into alternative source for electricity other than thermal and hydro electric sources.
4. Investigate about the power theft and T and D Losses and suggest measures for minimize such malpractices and losses.
5. Suggest relevant policy implications and measures for energy conservation and its efficient utilization based on the findings.
6. Inculcate an energy auditing culture among the students and the public.

### **Methodology**

The study investigates the causal nexus between per capita power consumption and per capita GDP in Kerala. In order to pursue the objectives of the study, simple ratios, percentage methods, Dickey Fuller test and Granger Causality tests are adopted. Graphs and diagrams have also been employed to illustrate the trends and composition of electricity consumption. Electricity is being the highest quality energy component and since its share in energy consumption increases rapidly, electricity consumption is mainly considered for this analysis. The data on Kerala's GSDP and Electricity consumption used for the analysis have been obtained from RBI Handbook on State finances as well as annual reports and CMIE reports respectively. The data ranging from 1981 till 2010. Study materials were collected from various libraries and also through the secondary sources

Trend analysis of the electricity availability, demand and pattern of sector wise consumption, T&D losses were also made for the period 1970-71-2012-13. Electricity generation in Kerala was essentially through hydel power station sand up to 1996. Relative share of the thermal power sector was about 5.33 per cent in 2012-2013 and then it was showing increasing trend. Substantial investment in electricity sector for new generating stations and capacity addition is imperative to meet the ever increasing energy demand in Kerala. Domestic sector in Kerala presently consumes about 50 per cent of total electricity. In Kerala up to 1994-95 T& D losses has been increasing from 278Mln kWh in 1970-71 to 1852 Mln kWh which was about 20.81 per cent of total electricity in 1994-95.. In absolute terms it was 11866 Mln kWh. It showed a increasing trend in 2012-13(3337 kWh ).

A survey was completed successfully about the appliance ownership values and monthly per capita expenditure (MPCE) values in kunnankulam Municipality from 500 households (230 in rural areas and 270 from urban areas.) This high level of growth of MPCE indicates a shift towards a consumption oriented economy from subsistence based economy and seems to be consistent with the present expenditure levels and high energy dependent nature.

Granger Causality test was used to enquire into the causal relationship between the electricity consumption and economic growth in Kerala. The results show one way causal relationship between electricity consumption and economic growth. So it can be inferred that an increase in electricity consumption does facilitate economic growth in Kerala for the time period under consideration.

### **Findings and Suggestions.**

The direction of relationship between energy consumption and economic growth is highly relevant for policy makers so as to frame policies in tune with it. The result of empirical analysis of Kerala's data for energy (electricity) consumption and economic growth (per capita GDP) has shown a causal relation running from electricity consumption to economic growth. The findings have practical policy implications for decision makers in the area of economic planning. This implies that over time higher electricity consumption and investment in Kerala give rise to more economic growth. Energy use is a necessity here. So rather than measures to reduce energy consumption we should focus on a shift from less efficient and more polluting energy sources to more efficient options with lesser adverse effect on environment. The findings of this study emphasizes the consumption of electricity as a prerequisite of achieving higher economic growth for Kerala so high priority should be placed not only on power generation but also on the issues of appropriate electricity distribution and management system in the short -run and medium term policies of the government .

It is very important to make electricity accessible to overall economic sectors and it can improve living standard, accelerate urbanization process and stimulate economic development .At the same time the study calls for efficient electricity distribution and management system in the policies of the government and punishment for power theft, minimizing transmission and distribution losses. Energy conservation policies through rationalizing tariff structure, efficiency improvement and demand sides management will reduce wastage energy and thereby reduce consumption without affecting economic growth .