CHAPTER 8
CONCLUSION, FINDINGS AND
POLICY RECOMMENDATIONS
CHAPTER 8

CONCLUSION, FINDINGS AND POLICY RECOMMENDATIONS

This chapter presents the conclusion, major findings and policy recommendations of the study of that have been empirically tested on energy conservation (management), Growth and promotion for renewable energy and consumption of solar energy. In this study has explained the sources of energy, installed and generation of energy sources, demand and supply gap of electricity consumption, pattern of electricity consumption, imports and exports of electricity, transmission and distribution losses of electricity. It also provides renewable energy achievements of on-gird and off-gird power generation, renewable energy potential and energy parks. It also includes of the solar energy consumption in Mysore city, the study has taken only solar water heater system and is based on the segmentation method. SWHs consumption includes consumer’s utilization of SWHs, electricity usage, demand and supply side management, rebate scheme, technology benefited. This chapter also includes recommendations to the policy making in the field of energy management.

8.1 Major Findings

The study is based on the both Primary and Secondary data, therefore major findings are divided into two parts i.e., primary and secondary data sources of findings.

8.1a Findings of Secondary Data:

In long run multi-variables and multi-countries value is empirically explains about, China, Philippines, Indonesia, India and Thailand have long run
relationships between the variables are energy consumption, GDP, labor force and capital.

**In short run** multi-variables and multi-countries value is empirically explained about India and China unidirectional causal relationship, but Indonesia, Philippines and Thailand have shown mixed results.

**Energy Installed Capacity in India** from the sources are Hydro energy, Thermal energy, Renewable energy sources, and Nuclear energy. The total energy installed capacity was 2075.7 thousand MW. The installation capacity from there sources is thermal and renewable energy has generated 1517 thousand MW i.e., 73.2%, when compared other sources are hydro and nuclear.

**Energy Generation in India** During these periods (1995 – 2012) total energy generated was 10162 billion MW. Major energy is generated from the sources i.e., thermal and renewable energy was generated which to the 8327 billion MW and 82%, when compared other sources is hydro and nuclear.

The hydro power energy is generated seasonally and nuclear energy is insufficient in India. But, thermal energy has generated more because, coal, gas, oil source are available even then also there is shortage during that period energy is imported through conventional sources of energy. Therefore, with the given energy sources energy generated is insufficient and facing the problem of electricity shortage.

**Pattern of Electricity Consumption** is an important measure as well as determinant of economic development. In India, electricity consumption patterns are Domestic, Commercial, Industry, Traction, Agriculture and Others. The consumption of power by Domestic Sector in the total utilization
of power has increased (6.5%) from 18.7% in 1995-96 to 25.2% in 2011-12. Because, growth in electronic goods and availability of various electronic goods for a quality living is considered be the main reason for growth in consumption of power by Domestic Sector.

The consumption of power by industries in the total utilization of power has declined of (-1.3%) from 37.8% in 1995-96 to 36.5% in 2011-2012. This does not imply that industrialization and industrial units are shifting to other sources of fuel, large industries are setting up their own captive power plants, instead of depending upon the inadequate and undependable unreliable public utilities. Therefore consumption of power by industries has shown a negative trend.

It was found that, the agriculture sector power consumption, in the total utilization of power has declined (-10.4%) over the years from 30.9% in 1995-96 to 20.5% in 2011-2012. Since the farmers are facing lot of agricultural problems, so consumption of power has declined in agricultural sector also.

The consumption of power by commercial sector has increased (4.3%). Consumption of power by commercial sector was 6.1% in the total utilization of power in 1995-96 and it has increased to 10.4% in 2011-2012. Another sector is traction and others; growth of consumption is very marginal difference in the consumption power by traction. Traction was declined only 0.1%, from 2.3% in 1995-96 to 2.2% in 2011-2012. Then, consumption of energy by others consumption has increased 1.2%, from 4.2% in 1995-96 to 5.4% in 2011-2012.

The Pattern of Electricity consumptions by various sectors of the where is Industry dominates with 36% electricity. Agriculture utilizes 25%, because of
insufficient rural electrification. Domestic had consumed 23%. Commercial electricity utility 8%, Traction utilized was 2%, the remaining pattern of consumption is others utilized 6% electricity. Industry has consumed major portion of electricity when compared to other remaining sector.

Due to this increase in the commercial sectors like institutions, hostels and hospital, energy consumption is also increased, in these sectors.

The **export and import** of electricity in India. India has very less amount of electricity export to other countries ie. 2.943MU annually which is only 1.07% of its production.

India has imported large portion electricity than other countries like China, Nepal, and Pakistan etc. The total imported electricity was 48.301MU, and 98.93 percent. Because, the demand for electricity power has been rising continuously at a faster phase.

The performance of India’s power sector, in the generation of hydro power has been fluctuating from year to year, depending upon the nature and intensity of monsoons. Failure of monsoons adversely affects the generation of Hydropower, and the plant load factor in capacity utilization of thermal power plants have been low, because of deficiencies in management and operation has been very different in recent time.

Due to the availability of appropriate quality of coal maintained has been are of the major problem. Due to this shortage there is critical problem is electricity production. Due to the problems of transmission, peak hour demand problem. Consumption of electricity is very high. Therefore, India imports energy from other countries.
The power installed capacity, electricity generation, import of electricity, transmission and distribution of electricity and energy consumption in Karnataka for the periods 1997 -2013, energy consumption is at a share increase in recent years.

The total power production is grew at 1% by in energy consumption is at 1.7%. So the problem has arised.

Karnataka government imports power from neighboring states such as Tamilnadu, Kerala and Andhrapradesh. Karnataka imported electricity is workout to be 2.8% compound growth rate, it indicates that Karnataka power generation is insufficient and also consumers demand has increased sharply so far there reasons Karnataka is facing the problem of power shortage.

Karnataka power is also facing the problem in respect of loss of transmission and distribution, when compare the past years (-1.1percent) is negative, because there improvement in the technology used is the transmission and distribution.

Power generation from renewable energy sources in India. On-gird renewable energy sources of power generation of wind energy 58percent. In India wind energy is generated more become it is geographically benefited for power generation.

Small Hydro energy was 24% and compound growth rate of energy generated was -2.90, because hydro power generation is more generated energy. It has decreased due to seasonal variation.

Co-generation and biomass energy was 14 percent generated and compound growth rate was 47.36, it shows that co-generation and biomass energy generated had increased, because sugar mills has generated more energy during these years.
Even though solar energy has also been increased during these years, solar energy generated was 3 percent and compound growth rate was 76.08 percent, it shows that solar energy has increased its power generation sources in recent days.

The waste-to-energy is generated was 1 percent but compound growth rate was -2.24. It indicated that, slow power generation from this sector during these years.

On-grid energy generation was increased and suitable to energy generation. Because, it meets to energy demand and supply gap of conventional energy source. 45 percent total generated but compound growth rate was 88.5 percent. The on-grid energy sources have also increased power generation.

Year wise achievement of off-grid of solar PV program in Karnataka through KREDL. Off-grid renewable energy provided to distribution in Karnataka is increased because to solve the problem of conventional energy sources.

District wise renewable energy power generation in Karnataka as on 2011. Total generation and top 5 district of power generation in Karnataka. The finds clearly understands that, in Karnataka, 26 districts has renewable energy.

A Chitradurga top first in respect of to power generation that is 487 MW (as on 2011). The next district is Davanagere with a power generation of 204 MW, with a stands second. The third place is Mandya district, power generation of 197.1 MW. The fourth place is Belagam is power generation of 137.7 MW and is fifth place is Gadag district with 125.6 MW power generation in Karnataka. The result of the total power generation from renewable energy shows that it is
possible to solve a sufficient amount of energy and fill the gap between demand and supply of the conventional energy.

8.1b Findings of Primary Data:

The primary data has been collected through the direct interview with questionnaire format of the household in urban areas, Hostels, Hospitals, Hotels. In Domestic urban like household’s respondents aged 18-65 years from all 371 households in the four areas in Mysore city of Mysore district. Institutional respondents of Hostels and Hospitals respondents are 29 and commercial respondents of Hotels respondents are 10.

There is positive reduction is Energy consumption after installation of SWHs to manage the Demand and supply in Mysore city. Before electricity units is reduced the after installation of SWHs technology.

SWH has positive impact on economic viability it is cost effectiveness when compared to the conventional energy. Results of paired samples test is before and after electricity cost. Before electricity bill of cost is impact on after installation of SWHs technology. It means, after installation of SWHs was reduced the electricity cost.

Energy consumption is related on family income and family size in Households of Mysore city. There is a positively significant predicted to run for multiple analysis, that value of family income and family size is related to energy consumption. Due to increase in family income, there is increase energy consumption.

Since government gave subsidy and rebate scheme, it attracted is promoting for renewable energy resource in Mysore city (Solar Water Heater).
Households in urban respondents are 31% of household’s reason for installation of SWHs is saving electricity bill and problem of fire wood, and they also have concern for environment.

About 77% of the urban households of Mysore city are aware of the rebate scheme. While 36% are still not aware of the scheme in Mysore city.

Due to seasonal problem still urban households are fire wood and electric geyser for heating (hot water).

Purchasing SWHs is most important they are influenced suppliers and agents 48 percent. 21 percent of respondents are influenced on pamphlets, 13 percent by friends and 6 percent government workers suggest for the installation of solar water heater.

81percent of households use SWHs which is important in daily life. Because, it save energy, cost, time and hygienic.

It was identified that domestic water heating system is suitable to households, when compared to electricity or electricity backup the equipments.

Solar energy systems are friendlier to environment and protection of the environment. The reduced of cost, pollution, time as the main advantages of utilization of solar energy and achieve a better sustainable future.

Increase in the price of electricity charges will be due to demand and supply. But, due to the utilization of solar water heater system there is reduced demand for conventional energy.

SWHs save energy to greater extent so the price of electricity comes down. It creates awareness suitable for financing mechanism.
8.2 Policy Recommendations:

- Long run and short run results indicate policy implementation. There is need for better Energy conservation Policy in India.

- Renewable Energy Resources can manage the gap between energy demand and supply. Therefore, government has to take more installation of renewable energy to solve the problem of electrify shortage.

- If Government increase the rebate schemes and subsidy percentage, people decide to install solar is a large scale.

- Government has to frame the rules for the installation Solar PV in domestic urban and rural areas (only for high income families), institutions, commercials and industries.

- Technology improvement of solar systems has to be improved.

- The Government initiative programmes for promoting SPV installation in urban and rural area can solve the problem of electricity shortage.

- Karnataka largely depend on thermal and hydropower energy. If Karnataka promoted for the installation of SPV to each district, it can generate power and also it will not affect on environment.

- Since rural areas are facing electricity problems and load shedding. If government supports implementation of installation from SPV and distribute in villages it can solve the problem of electricity.

- Government should create awareness programme for promoting Renewable energy sources.

- The subject of natural resources, environment concern, and renewable energy resources should be taught at the primary school will lead and help to conserve energy.
Government have to frame rules for all the institutions to installation of SPV, it can reduce the shortage of electricity problems.

Natural energy sources like sun, wind, water has to be utilized for generating power for heating, air-conditioning in the extreme climatic condition utilize energy to better advantage through innovative design and methods in the constructive of factory, floors, office and homes.

Extensive energy can also be used for making different types of machines and precession equipment, health care products including medicine, preservation of agricultural food products through cold chains and for regulating room temperatures, with fast changing climatic conditions thinning ozone layer.

Policy on green buildings and energy saving solution has to be thought of energy efficiency policy has to be implemented at a faster phase.

Renewable Energy law has to be implemented due to climate change at the Global level.

Investing in electricity has to be at a faster scale due to energy shortage.

Government of India has supports the implemented the RECP (Renewable Energy Cooperation Programme). This programme can be benefited long-run support for cooperation on energy issues of strategic importance are energy access, economic growth, employment, energy security, renewable energy markets, sustainable development and future low carbon energy system.