Developing countries firmly believe that economic growth and development are necessary to reduce poverty and human deprivation. The commercial energy growth rate in India during 1980s was around 4.5% per annum comparable with a gross domestic product (GDP) growth rate of 5%. The oil and electricity intensities of GDP for a country such as India are increasing even after past experiences of oil supply and price crises.

The current pattern of commercial energy oriented development has led to very large increase in the consumption of electricity and oil, resulting in inequities, external debt, and environmental degradation as has been experienced by many developing countries. Large proportions of the rural population and urban poor continue to depend on low quality energy sources such as fuel wood and inefficient devices such as low efficiency stoves for cooking, and kerosene lamps for lighting. Many conclude that the conventional paradigm of development characterized by commercial energy supply oriented policies is non sustainable. Thus the search is on for alternate approaches to energy and development which include the efficient use of energy and alternative sources of energy, particularly renewable.

Energy consumption patterns have two critical components, namely, socio-economic and environmental. Major environmental issues confronting the world today are considered to be deforestation, decline in biodiversity, pollution of air and water, global warming leading to climate change and the degradation of soil and water resources. One of the major contributors to these environmental problems is energy extraction and use. The industrial country’s energy use is considered to be the major
contributors to the degradation of the global environment. But what is probably more important is the degradation of the local environment, for which individual countries bear a large responsibility. Environmental concerns have generally received a low priority in developing countries so far, but are now increasingly becoming an important factor in the making of decisions on energy.

In Chapter 1 the estimated potential of various renewable energy sources as well as the viability of these sources are analyzed. Though solar energy can be considered to the most available source the photovoltaic devices have constraints for their operations as climate variations and shortage of open area.

Windmills and tidal plants also require site specifications for their installations. The advanced technologies of fuel cells for electricity take time to reach everywhere. Most of the developing countries are looking for low cost facilities for their power generation.

Looking for the biomass conversion to electricity, the situation is more favorable. The technologies available for the power generation from the biomass are studied and the merits and demerits are accounted.

In Chapter 11 the biomass as a renewable energy source, different technologies and biogas plant as a main source are explained. It gives the details regarding the experimental procedures undertaken to find out the environmental impacts on the performance of biogas plants in field and under different seasons. The experimental biogas plant is a KVIC Model floating drum type. It is constructed by BIOTECH, a leading entrepreneur of Biogas plants in the Kerala state. It is collected and installed at Kayamkulam. To measure the parameters, temperature of the slurry at different depths
and temperature of biogas inside and soil temperature at different depths and air temperature outside plant, a monitor is fabricated with the help of M/s EMCON. Monitor consists of seven sensors for measuring the temperatures of the slurry at different depths, the biogas, the soil temperature at different depth near the plants. There is a sensor for indicating the solar radiation falling on the surface of the gas holder. For measuring the rate of gas formation the vertical motion of the gas holder is recorded with the help of a mechanical arrangement. Data from all the sensors are automatically recorded in the memory module at the prescribed interval throughout the day. Readings can be checked at any time from the monitor with the arrangement given for the same. An additional water manometer is connected to the system to measure the pressure variations produced inside the plant and readings are taken manually.

Data from the memory module can be transferred to a personal computer with the help of a software developed for the particular use. All the data are analyzed individually or in groups for different time duration.

Chapter 111 accounts the detailed study undergone regarding the influence of temperature on the performance of biogas plant. The temperature, at different depth of slurry, biogas inside the plant, air temperature, soil temperature at different depths in contact with the digester are fed at regular intervals to the memory module for two years. All the factors are analyzed for different seasons of the place. The problems developed in the performance due to the seasonal variations are checked out and remedial steps are taken to regain the proper working condition of the plant then and there.
In chapter IV deals with biogas plants emerged as a low cost utility for waste management and decentralized energy production in the Kerala state. Being a tropical region no controlling measures are taken in any plant for temperature regulation. Both the regime of waste management and energy recovery are analyzed after the frequent observations and data collection from the typical plants considered in the study. Results show good aspects of the technology as well as the consequences due to the lack of proper measures in the production and usage of the energy.

Chapter V deals with the most draconic problem of the world – Global warming and the role of biogas plants in the same. The studies and suggestions of the different international bodies are taken in detail for picturing the importance of the problem.

The performance of biogas plant in the real environment is analyzed to find out its role in the ongoing effect. On one side it is contributing to the global warming by trapping the solar radiation by the biogas. But the utilization of the biogas produced inside the plant, otherwise it may be released to the atmosphere during degradation of biomass, is contributing for the mitigation of global warming.

In the Conclusion Chapter VI the micro level analysis of the different parameters is explained for the confirmation of the effects and establishing the requirement of region specific studies in the case of the performance of biogas plants. The different precautions for the optimum performance of the plant are explained after the analysis of a large number of biogas plants working in the state.