

**ENVIRONMENTAL DIMENSIONS OF ENERGY SECURITY:
A STUDY ON SUSTAINABLE ENERGY DEVELOPMENT STRATEGIES OF INDIA**

Final Report of the Minor Research Project

Submitted to the

University Grants Commission, New Delhi

(UGC Ref. No.: MRP (H)-0599/12-13/KLMG031/UGC-SWRO, Dated 23rd September 2013)

By

SHIBU M. GEORGE



**DEPARTMENT OF POLITICAL SCIENCE
BASELIUS COLLEGE
KOTTAYAM
KERALA- 686 001, INDIA**

SEPTEMBER 2016

BRIEF REPORT OF THE STUDY

The UGC minor research project entitled “Environmental Dimensions of Energy Security: A Study on Sustainable Energy Development Strategies of India” was carried out on the basis of information available from primary data published by concerned governmental departments and related agencies along with substantial resource from the secondary sources like books and journals. The tenure of the study is from 23rd September 2013 to 23rd September 2015.

The objectives and summary of the project is mentioned below...

My objectives in this project were to examine the implications of current energy scenario of India and its environmental dimensions and to see what solutions could be presented to develop sustainable energy systems and energy security in long run. This topic was chosen for its current relevance and for the ongoing impact that it will have on global energy and especially on Indian market, economy and foreign policy. With energy being such a central factor to the continuance of everyday life, it is not surprising that energy security has become an essential focus of the foreign policies of nations around the world.

More specifically the study addresses the following research questions or objectives namely:

- To empirically analyse the issues related to energy security and sustainable energy strategies at the global level with specific reference to India. It is also aimed at looking at global/systemic factors or trends favouring an alternative energy mechanism in order to reduce dependence on fossil fuel and to avoid looming threat on environment.
- To assess policies on sustainable energy strategies of India and to evaluate to what extent they are successful in implementing it.
- To analyse India’s overall demand-supply situation, the energy security debate in the country, and the issues, actors, and process involved in policy and decision making with regard to the energy sector.

Methodology followed for the present study is described as follows

The proposed research was carried out by gathering data from primary and secondary sources. The study relied upon documents, archival sources, and reports of the various committees on energy security, parliamentary debates and study reports of various government ministries from respective country. Statistical and content analysis methods also used to arrive at findings. Graphs and diagrams are provided for ideas at a glance.

The proposed study intended to analyse the facts under the following heads.

Chapter one enquiring about the linkages between sustainable development and energy security. The chapter will also address the existing framework and theory which will conceptualize about the relationship between two. The second chapter is a survey on the current Indian energy scenario which will give an overall profile picture about the energy supply side and demand scenario in the country. The third chapter will looking on to sustainability of India's contemporary energy scenario will address implication of excessive dependence on oil based energy scenario from political, economic and environmental perspective. The fourth chapter will address India's sustainable energy strategy in the context of rising concern over climate change and related issues. It will also address the current development in renewable energy sector and how they will an alternative to the fossil intense scenario.

A Brief Summary of the Project

The 'politics of energy' and 'energy security' are reemerging as major areas of inquiry for political science after two decades of relative quiet. One reason is the growth in demand in India and China. Secondly is the growing focus of governments on climate change, given that the largest components of greenhouse gas emissions is the consumption of fossil fuels. Mark Twain once noted, "There is something fascinating about science. One gets such wholesale return of conjecture out of such a trifling investment of fact" (Clemens: 1954). This observation largely reflects the state of affairs in terms of predicting the changes that will occur to our planet as global warming intensifies. Obviously, economic problems caused by global warming will also have national security and energy security repercussions that differ by nation. In Indian scenario it is expected to be severely impacted by higher levels of global warming due to concern over flooding of population centers near to coastline areas.

India's energy sector faces enormous challenges today. These challenges are multifaceted and global in nature. Managing energy poverty, climate challenges and high growth rate are prime concerns. In the new century, India is one of the new drivers of the global economy. The concept of energy security has increasingly acquired a global dimension, particularly as it relates to the threat of global climate change. Energy security is a crucial issue for all countries today, even more so for India at its current stage of development. Lack of energy resources could jeopardise not only economic progress but also security and strategic interests. Even though India is the eleventh largest producer of energy in the world, the gap between production and consumption is huge and growing. Most of the deficit in the energy front is due to the fact that India is a net importer of oil. India continues to depend heavily on coal and hydel power and coal will continue to remain as the most important energy source for the foreseeable future. Deciding about future energy developments requires balanced and trustworthy information about issues such as the relative environmental effects of different options, the safety of installations, economics and the availability of resources. This is of particular importance now because world energy use is expected to continue to grow significantly during this century, particularly in rising powers like India and China.

India being one of the lowest CO₂ emission levels per capita, the Indian government has therefore steadfastly opposed any binding reduction commitments in the ongoing negotiations for a post-Kyoto climate regime. On the other hand, climate change considerations are putting the country under more immediate and intense pressure to reduce dependence on coal or move to clean coal technologies, to use more renewable energy forms (again, higher cost of energy provision), and to adopt more efficient transport options (huge public investments needed). The Indian government has started to ruminate seriously about reducing dependence upon fossil fuels and diversification of energy resources, especially to renewable energy resources. India has a developed renewable energy sector, based both on traditional and modern technologies. India's wind power industry is one of the world's technological leaders. India is one of the top five wind energy generating countries along with Germany, the United States (US), Denmark, and Spain (Herbert et al. 2006).

The gamut of research on energy security and sustainable energy mechanism provides a lot of policy alternatives for the forcible future to maintain a sustainable energy resources and avoiding a harm effects on environment. At the same time providing adequate alternative supply to all. They are from developing hydro power, Bio-based energy, photovoltaic energy, induction of compressed natural gas in public transport, to green buildings.

The hypotheses of the proposed project have come out true in the sense that all four hypotheses are in congruent with the current development at the global level and especially in Indian scenario. The result of the first hypothesis is that India had already integrated its energy market with international energy market since 2004 then UPA government brings to an end to administered price mechanism. Under this system till 2004 the government was the sole administrator to fix the price of oil in the domestic market irrespective of what price existing at the international market. Since 2004 the pricing mechanism for oil in domestic market was depend upon the vulnerabilities in the international oil market. There are possibilities and challenges for the deregulation, after all the experience of last ten years shows that for government the burden had slowdown in terms of subsidies and any fall in the price of oil in international market would benefit more to India's current account balance than to end users. On the other hand India had already started to invest in renewable energy resources, it has 13 percent share of energy from renewable resources out of total energy produced in the country. It consists of wind power, solar power, small hydro, biomass power and bio-gases cogeneration, waste to power.

The result of the second hypothesis is that most of the study conducted by international agencies likes International Energy Agency (IEA), US Energy Information Administration and India's Integrated Energy Policy released in 2006 predicted that the current energy scenario depends upon fossil fuels especially on coal and oil will continue till 2030. According to the latest reports about 75 percent of its oil imported from West Asia, Africa and Russia. India's public owned Oil Company ONGC (Oil and Natural Gas Corporation) is largely investing on foreign oil fields like in Sakhalin (Russia), Nigeria...etc. Apart from this India is trying to bring oil and natural gases from the Iran through Chabahar port and from Central Asia. These developments show that the fossil fuel will dominate the Indian energy scenario for next two decades.

The third hypothesis highlighted that there is a positive co-relationship between oil prices and gross domestic product. When the price of oil jumps, a consumer country like India will badly be affected. That means its balance of payment will increase and lead to inflation in the domestic market. Ultimately it will result in a slowdown of GDP growth and thereby hampering the economic and social growth of the country. The final hypothesis focused on the role of the United States of America on the energy market. As the largest oil consumer state and leading stakeholder of energy security in the West Asian region, the decisions and acts of the US will greatly influence the oil conundrum globally. India after the 1990s has maintained a multifaceted strategic relationship with the US, signing the Civilian Nuclear Energy agreement in 2005 and cooperating in developing a clean energy mechanism. India is expecting to attain energy security through improved cooperation with the US, without their support the country could not develop energy efficient systems and to a certain extent the smooth transit of oil from conflict-ridden regions cannot be possible. So it is in the interest of India to have better diplomatic relations with the US in the energy sector in the long term.

Findings of the study can be summarised as below:

- ❖ Although India is heavily investing in developing sustainable energy resources at the central level, and it has a full-fledged Ministry of New and Renewable Energy, there are still certain drawbacks in its approach. Obviously the policies should be addressed in a decentralized manner that means giving more room for local administration to develop small scale renewable energy resources so that energy scarcity in rural areas can be addressed in a meaningful manner.
- ❖ As a South Asian country there is enormous potential for cooperation in the energy sector with our neighbouring countries. So it is in the interest of India to make a good rapport with South Asian neighbours in tapping the resources to overcome the energy crunch of India.
- ❖ As a signatory to the United Nations Framework Convention on Climate Change (1992) it is the responsibility of India to strengthen the environment protection laws within the country especially relating to deforestation and pollution caused by diesel vehicles.
- ❖ India should develop a technological partnership with those countries who are leading R&D in renewable energy mechanisms. They have a lot of experience in the concerned field that India can follow according to its nature of capability. Such as Germany, one

of the leading country in the world in developing most innovative and successful renewable energy technologies.

- ❖ India should address the aspects of diversification of energy resources in a phased manner so that in an inadvertent situation it couldn't be fall down likes war or natural calamities. And it should also address strategic reserve of oil at least for six months; currently India has strategic reserve of oil barely for three months.
- ❖ The aspect of energy efficiency should be given equal importance as energy conservation. It is a way of managing and restraining the growth in energy consumption.

Achievements of the project

As a part of the study, one article was published as a joint publication in National Journals. An article titled, "Prospects of Renewable Energy in India", in *Journal of Parliamentary Studies*, 2(1): 33-47 (ISSN 2231-0355). A chapter also published in an edited book as a joint publication titled, "Regional Integration and Energy Security in South Asia" in C. Vinodan ed., *South Asia in the Globalised World*, New Delhi: New Century Publications. (ISBN: 9788177083477).

The results of the study may be useful for governmental authorities for effectively addressing the issues of energy security and sustainable development and for policy making, so as to resolve a part of the problem.