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Scenario of Rural Electrification in India- Challenges and Impact

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ABSTRACT
In this paper, the present scenario of rural electrification in India is taken into account. Basically, the electrification in this country is facing a lot of problem and is a growing matter of concern for all. The development in production is not reaching the one who need them. Also taking into picture the present sources of energy it is difficult to make the electricity available to the people belonging to rural areas who don't have much source of income. To overcome this drawback we can utilise renewable sources of energy which is easily available and accessible. Also harvesting this will not cost much except the initial cost of setting up the device to utilise this type of energy. Many projects have been initiated by the government of India to provide subsidy and equipments like solar lantern and solar cooker etc. to the rural population but this didn't turn out to be effective as the follow could not be done by the people to maintain the devices. This can be overcome by implementing off-grid projects which can be initiated at small levels so that people don't have burden to maintain them and it even don't have any adverse effect to environment or society.

Keywords- solar energy, decentralised generation, solar photovoltaic, linkage performance.

I. INTRODUCTION

Rural electrification is one of the main requirements for a country like India with major population of approximately 70% living in rural areas. In India the village is said to be electrified if electricity is used in inhabited locality within the revenue boundary of the village for any reason what-so-ever. An interesting but sad fact is that only 44% of rural household of India has access to electricity. 7 out of 29 states have more than 70% of rural household without access to electricity.

The expansion of electricity services and electrification are vital to both the economic and social development of India. However the current state of electricity services in most of the states of India indicate signs of crisis and are with severe shortcomings in many areas:

a) Limited access to electricity for poor (rural / urban)

b) Generation capacity unable to meet peak demand

c) Supply reliability, in terms of predictability of outages and quality of power.

The Electricity supply across India lacks quality and quantity with an extensive shortage in supply, a poor record for outages, high levels of transmission and distribution (T&D) losses and an overall need for extended and improved infrastructure. A considerable amount of electricity generated is wasted due to transmission and distribution inefficiencies and power theft. But such problems cannot be a good reason to keep more than of India's population from getting access to electricity. Indian Govt. has initiated a major programme of grid extension and strengthening of the rural electricity infrastructure under the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) (GoI 2005).

The Indian Govt. recently outlined an ambitious plan of electrification through solar energy to 400 million people who don't have access to it.

II. CHALLENGES FACED

1. Incomplete coverage
2. Faulty definition/ incomplete data
3. Low demand and low consumption
4. Time consuming and difficult procedures
5. Economically unfeasible
6. Less enthusiastic approach by NGO'S
7. Lack of improvement in technology
8. More-emphasis on grid rural electrification
9. Less use of renewable energy resources
   - Solar energy
   - Wind energy
   - Hydro energy

III. SOLAR ENERGY

The current world energy consumption is much lower than the amount of energy received by the Earth by sun. Taking a glance to the present energy scenario, there is a large gap between the demand and the supply, scarcity of dominant energy resources and with the use of non- renewable

resources the concern for environment is also increasing. With this solar power emerges as one the best solution for sustainable and environment friendly growth of energy supply.

IV. IMPACT OF SOLAR ENERGY USAGE IN INDIA

Rural electrification is not considered as a basic human need like water and food although many studies have shown that rural electrification helps in betterment of rural folk as well as the country's economy. A study by the World Bank for 11 countries revealed that rural electrification has various benefits such as improvement of health facilities, better health from cleanerair as it leads to reduction in use of polluting fuels for cooking, lighting and heating, improved knowledge through increase inaccess to television and better nutrition fromknowledge betterment and storage facilities from refrigerator. Also, leads to improvement in children's education leading to better living standards. In various villages it was reported that crime rate declined due to availability of solar street lights. Another important factor that leads to requirement of solar electrification is that the extensive use of candles and kerosene lamps to light up the homes van lead to lead poisoning which is very harmful. Once solar electrification is used the children will get time to study even during the night and therefore will be able to pitch in the educational growth of India. The overall growth increased in rural areas because with presence of electricity the villagers were able to utilize a lot of services like use of television and internet.

Many alternative approaches to rural electrification have been proposed. They mainly combine centralised grid connections as distribution franchises and distributed decentralised generation (DDG) operated at the local level taking various advantage of renewable energy technologies. So DDG projects, if widely utilised, can ease the burden on both electricity supply shortfalls (by serving rural households and subsequently feeding back into the grid), and reduce the urgency of costly grid extension. DDG offers the potential for clean, affordable and reliable electricity with minimal losses, effective maintenance and local cost recovery.

The use of renewable sources can help to avoid fuel transport or grid interconnection to remote areas, harvest frequently good resource potentials and tap into rural communities with willingness to pay. The application of many renewable technologies allows a gradual increase of electricity services provided in line with the purchasing power of the communities, and therefore avoids the dilemma of past rural electrification projects which first deliver electricity as a free or highly subsidised good and thus subsequently fail to implement effective charging schemes to secure the continuation of power supply. It is also necessary that the concerned authority effectively markets its products related to solar power and also explain their advantages so that the people living in rural areas are ready to accept it.

V. TEST RUN

A few states of India were chosen where the rural

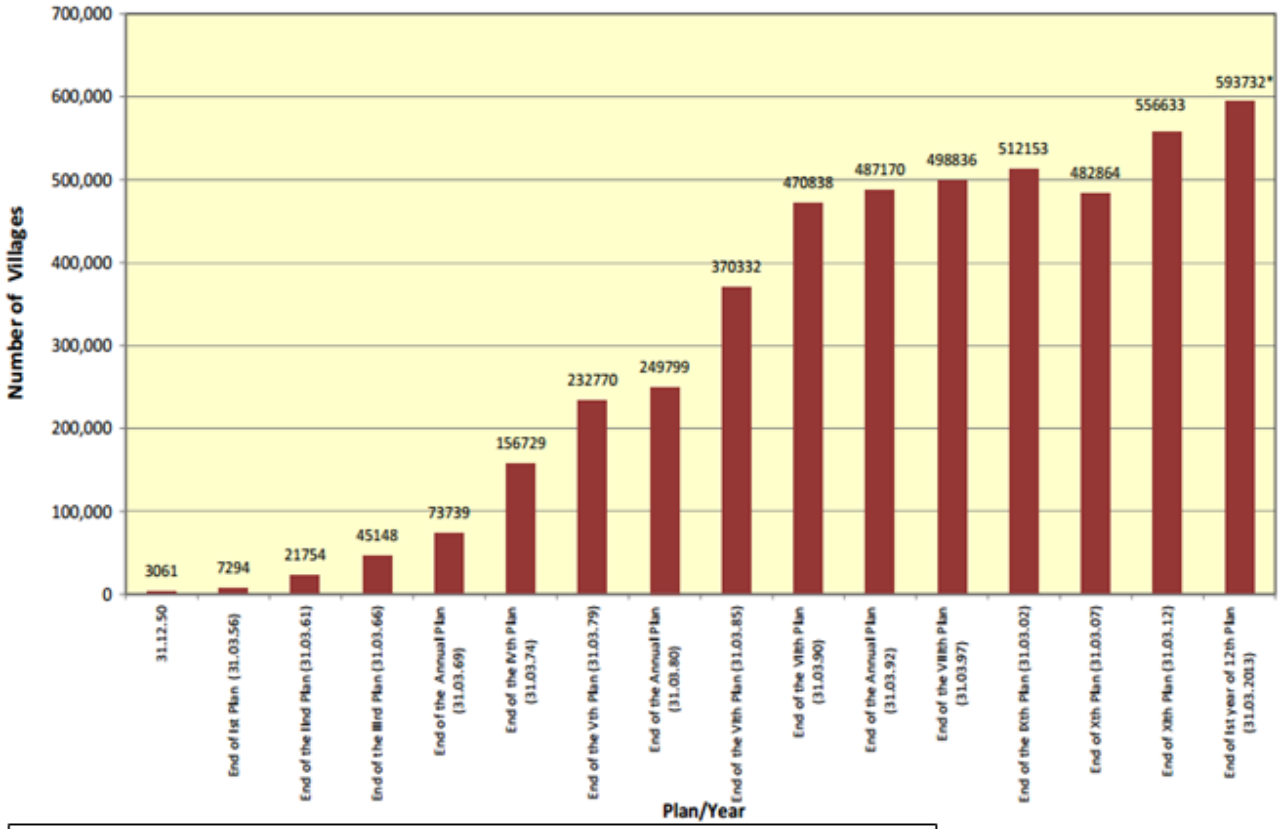


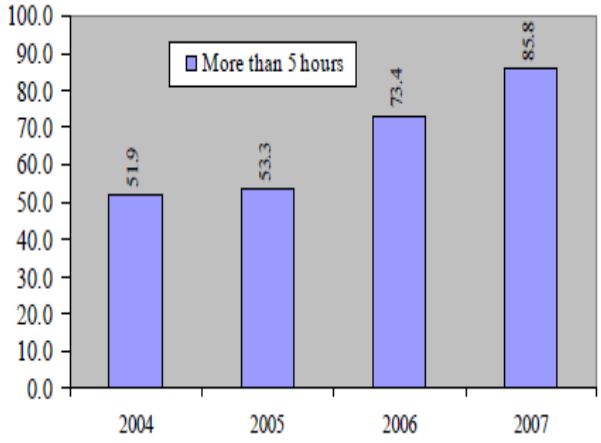
Table1- Plan-wise growth of number of villages electrified in INDIA

* Provisional

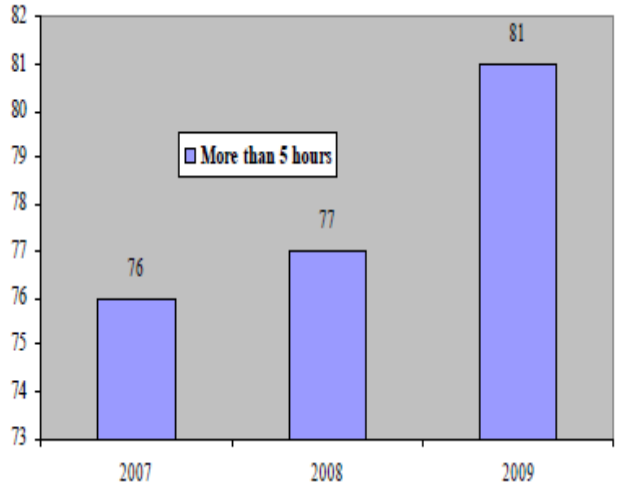
areas were provided with solar photovoltaic individual home lighting systems.
These include

- Jharkhand
- Assam
- Odisha
- Madhya Pradesh

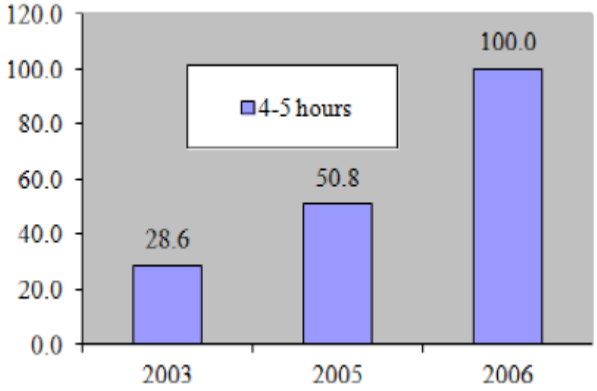
While in Meghalaya and Chhattisgarh solar lights were provided. It was observed that a lot of factors are responsible for the efficient working of such systems like the capacity of modules, their ability to store the power in batteries as well as the season i.e. winter or summer.
It is very obvious that in the summer the entire setup will be more effective as the villages will get more solar energy. However for the system to be efficient in winters it is necessary that the system should have the capability of storage of power without which the system will not be useful for the winter season.
Since the initial installation the performance of the solar powers systems has improved a lot and the graphs shown below will help in supporting this statement.



Linkage performance of system in Jharkhand



Linkage performance of system in Odisha

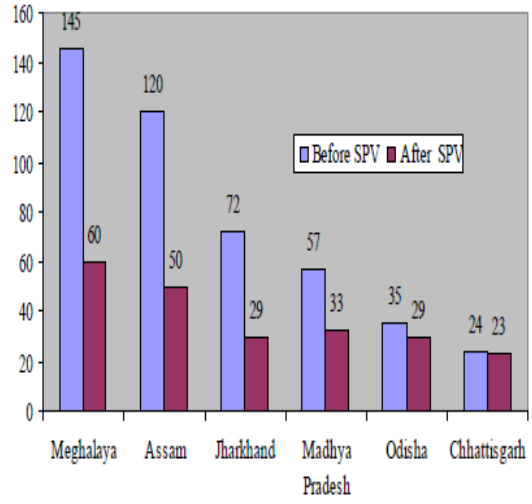


Linkage performance of system in Madhya Pradesh

As we see from the above graphs that the performance has increased effectively and that too to a very high level. Such type of statistics will automatically lead to support towards the solar energy systems.

VI. IMPACT

One of the major impact that the system has had is on expenditure of kerosene.



Expenditure on kerosene

In states like Meghalaya, Assam and Jharkhand people were able to reduce their lighting expenditure by half. Various other benefits are being incurred due to presence of light in the evening and night. People find it easier to cook with the presence of light. The children now get long hours to study as now they do not depend just on the daylight to study. People believe their standard of living has also improved. Villagers are now feeling safe to move around the village due to presence of light. The crime rate has decreased. Many times wild animals would come into the village and eat the villager's cattle but now its not happening as the village is now properly lit. All in all with the use of solar lights and solar power; the life of villagers and people in the rural areas has become more easy and comfortable and with the progress in the energy source we can expect the rural areas to one day come at par with the metropolitans.

VII. DRAWBACKS

- Not much effective in rainy and winter season.
- Installation cost high.
- Batteries are costly which makes it difficult to afford for majority of the rural people.

VIII. CONCLUSION

Renewable energy is being utilised now in many parts of the country as it is better for the environment and so to us. It is the only reliable source in present and future. Solar energy is abundant and easily accessible. With the help of government the technology can be provided at low cost. Besides the advantage of solar energy it is difficult to execute its implementation as at present it has high installation cost. The people in rural areas do not have knowledge of the presence of such renewable sources and have no idea how to harvest them. These resources are now getting due importance since the non renewable sources are getting depleted at a high rate due to the increase in energy demand. With proper knowledge and technology we can harvest these resources to the maximum extent and the problem of lack of electricity in the Indian rural areas can be solved with ease.

Programmes providing subsidy and other benefits can be initiated but with proper research of the area. Care should be taken before the application of program as to whether the inhabitants can carry on the utilisation of the resource or else distributed decentralised generation may be set up.

Rural electrification plays an important role in the growth of economy of the country so its necessary

for the government to take proper and effective initiative for its application in India.

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