STUDY ON DEVELOPMENT OF PHOTOVOLTAIC ENERGY IN INDIA

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Abstract:- This research are the economic growth of India which increases energy demand. Grid losses, enabling off grid PV. The need for energy security. Positive expectations for PV by experts since the government is very clear. Many people are waiting to see what happens in the second phase of the solar mission. Many new entrepreneurs have joined in the PV innovation system and the since the creation of legitimacy is going good a positive feedback loop occurs. Another enabler is the awareness of pollution of current energy generation technologies like coal. Since most of the electricity generation is done by coal a big market share can be won by sustainable technologies like solar.

1. INTRODUCTION

The dominance of fossil fuels makes it difficulties for the development of photovoltaic energy (PV) because it locks in their usage (carbon lock in). Currently fossil fuel has the advantage of experience, which leads to high efficiency, low costs and optimal institutional arrangements (Unruh, 2000). PV is still in its development phase, and therefore less efficient. This makes fast diffusion a difficult process (Rosenberg, 1976). India, being a tropical country receives adequate solar radiation for 300 days, amounting to 3,000 hours of sunshine equivalent to over 5,000 trillion kWh.

Almost all the regions receive 4-7 kWh of solar radiation per sq mtrs with about 2,300–3,200 sunshine hours/year, depending upon the location. Many potential solar photovoltaic areas are available which could make photovoltaic a great addition to the current energy mix. (MNRE, 2014). Technically, photovoltaic energy can replace parts of the energy system without requiring a big alteration in the current distribution system.

In addition, photovoltaic energy is able to reach remote place where it was previously uneconomical to supply electricity. To make PV technologies defuse faster policies can be put into place by the government. The reason to defuse PV technologies faster in India is the need for energy security, growing energy needs, increasing pollution, abundant renewable resources and for rural area development. (Chaurey, 2003). An important question is how stakeholders can accelerate the implementation of PV by removing barriers and break though the locked in fossil fuels system.

To answer this question, information about the inner workings of the current energy system, the history of the system and the future plans from the major stakeholders needs to be analyzed. From this information, knowledge can be obtained about the possible PV technology development and diffusion within the energy system. This knowledge should allow us to locate the processes that block or reduce the development of PV technologies. (Bergek A., 2008).

The Indian PV innovation system has been developed quickly in the last few years. (Akhilesh). This thesis is making an analysis of this development Thereby extracting information for review and possible improvements. The Indian government is only subsiding PV until the technology can stand on its own two feet. (Ministry of New & Renewable Energy, 2014).

2. BACKGROUND

This research is aimed to determine what factors can positively and negatively influence PV technology

development and diffusion in India. The theory needed for this research is an innovation system analysis tool that can analyze the effects on a specific technological innovation. However, it must not lose the overview of the whole innovation system since outside factors can influence the technological innovation system.

Several methods have been developed to analyses an innovation system:-

1. National systems of innovation (Lundvall, 1992)
2. Regional innovation systems (Asheim, 1997)
3. Sectorial systems of innovation and production (Breschi, 1997)
4. Technological innovation systems (Carlsson & Stankiewicz, 1991)

In this thesis, the focus is on the technological innovation systems (TIS) approach because the focus is on 1 technology, namely photovoltaic energy. TIS mainly explains the effects that the role and strategies of specific actors have on the innovation processes Since TIS mainly looks at the technological innovation system and neglects outside influence a combination with the multi-level perspective (MLP) is applied. (Geels, 2002).

The strength of the MLP is that innovation processes can be explained by the stabilizing mechanisms at the regime level and destabilizing landscape forces combined with innovations at the niche level. MLP, however, is less useful when you look at the roles and strategies of actors. That's why combining these 2 analysis together would improve the overall quality of analysis.

(Edquist, 2004) (Carlsson & Stankiewicz, 1991) (Hekkert, 2007) (Geels, 2002). In the case of PV in India technology development are influenced by the established regime structures of centralized electricity regulation, co2 reduction and is also subject to landscape factors such as energy prices, transport costs ect. (Markard & Truffer, 2008).

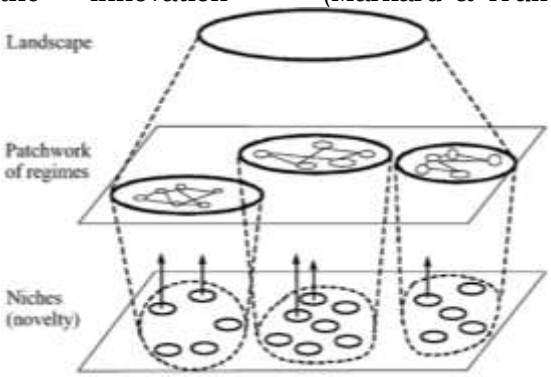

Figure 1: Multiple levels nested as hierarchy

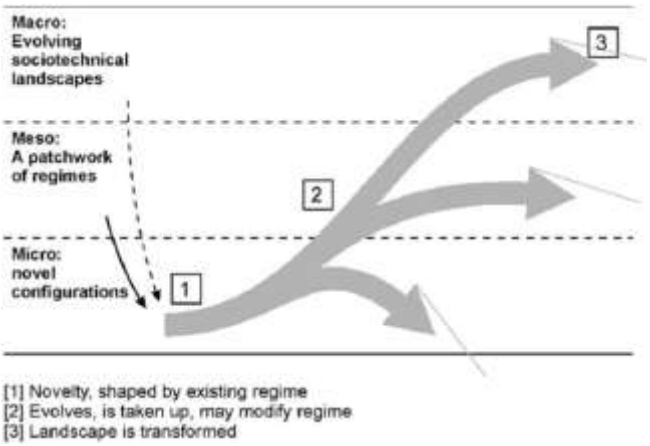

Figure 2: The Dynamics of a socio techno range: (Kemp, Constructing transition paths through the management of niches, 2001)

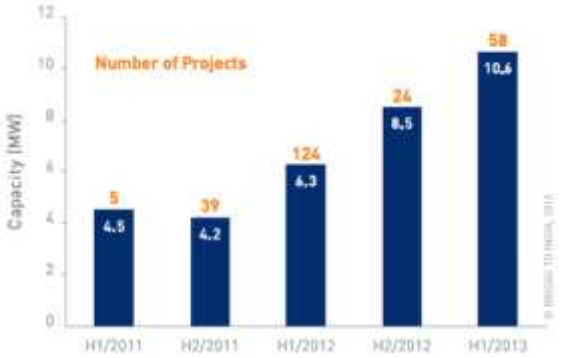

Figure 3: Average project size

Many New PV projects are started and the total PV energy installed is increase exponentially, If the Indian Module producing companies are able to benefit from these projects is not sure, there modules are not competitive with the modules from the Chinese competitor.

3. SYSTEM BUILDING MOTOR

This motor resembles the entrepreneurial motor with some changes; it includes a more important role of market formation. The main difference lies in the connection between creation of legitimacy, on the one hand, and market formation and guidance of the search on the other. Outsiders are increasingly involved in networks by enacting new entrants, governments, intermediaries and stakeholders in their system. From this network, outsiders attempt to develop the innovation system by enhancing the motors virtuous cycles.

4. CONCLUSION

The purpose of this research is to find the factors that hamper or boost photovoltaic energy development India. For that purpose, a set of research questions where predefined as guidance that leads to the research objective. Photovoltaic technology is a newly explored technology with a high potential of technical development that would influence and would be influenced by the diffusion of the technology in the market.

This requires the analysis to take into account the research and development activities as well as the situation of photovoltaic technology market. Furthermore, photovoltaic technology is connecting many sectors in the country and the applications as well as the activities of the Technology are crossing the boundary of the country. This brings the framework of technology Specific Innovation System to fit the analysis of the research.

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