

Skill Development and Empowerment of Rural India through Renewable Energy Education, Training and Innovation: The Role of Delhi Technological University

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Abstract

Access to modern energy is one of the major concern of India. Census of India 2011 indicates that access to electricity stands at only around 55% of the rural households (92.8 million household out of 167.8 million rural households). In few states the household electrification level is strikingly low (Bihar -10.4%, Assam 28.4%, Uttar Pradesh 23.8%, Orissa 35.6, Jharkhand 32.3%, and West Bengal 40.3%). Firewood ,crop residue and cow dung cake continues to be the most important source of energy used for cooking in India , with around 86% of the rural household dependent upon it. In addition 23.2% of urban household still relies in traditional fields to meets their cooking needs. India's action towards suitable energy has been so far been driven by national priorities. Lack of electricity access is a concern and experience within the centralized fossil fuel energy infrastructure region as not been very encouraging .Over the next few years decentralized distributed renewable energy initiatives of communities is likely to make a profound impact in some areas of the country, providing electricity to rural communities . Renewable energy has a central place in national action plan on climate change with national solar mission as one of the key mission .

1. Introduction

There is lack of clean potable water supply in most of the rural and semi urban areas. Providing access to electricity in rural areas of India is a major challenge. The fuel supplied in rural areas is generally of poor quality, and is used inefficiently. The electricity supply is unreliable with frequent power cuts. This not only has an adverse effect on economic productivity; more importantly, it also affects people's quality of life and is having a strong impact on the environment. The unsustainable and inefficient use of locally sourced biomass and an increasing dependence on fossil fuels are causing environmental degradation and health hazards. India is endowed with vast solar energy potential. About 5,000 trillion kWh per year energy is incident over India's land area with most parts receiving 4-7 kWh per sq. m per day. The technology for setting up solar energy systems is widely available in India, we need to bring them to serve our nation's needs. Solar power generation has become inexpensive over the time. Solar energy has turned into an economical power source in the long-run. Solar Systems have become more efficient than before. Diesel and Petrol based power systems have become more expensive. Photovoltaic water pumping systems may be the most cost-effective water pumping option in locations where there is no existing power line. Solar power protects our environment, earth and future.

Delhi Technological University has started a Masters level course on Renewable Energy Technologies and is also in the process of establishing a center of excellence on Renewable Energy Technology with following objectives: to provide education on Renewable Energy Technology,

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to engage in Research & Development in Solar Photovoltaic and Concentrated Thermal Energy Technologies and their various applications for power generation, air conditioning, process heat industries, to promote Renewable Energy Innovation Park for general public, to carry out training program in the field of Renewable Energy Technology for students of other Engineering/Polytechnic/ ITIs/Arts, Science and Commerce colleges, and to collaborate with Industries and national and international agencies related to promotion of education and research. Major Activities of the Centre are to create awareness about renewable energy applications for B. Tech. students of all the disciplines, M. Tech. (Renewable Energy Technology and PhD Program with specialization in Solar thermal, photovoltaic, wind and biomass energy technologies. The authors are engaged in the field of solar energy for last many years with various Indian organizations. DTU has recently conducted Faculty Development Program on renewable energy and alternative fuels from 16-20 June 2014 for various teachers of engineering colleges. More than 100 teachers participated in this program. DTU has collaborated with Tokyo Institute of Technology, Toyo engineering and some Japanese and Indian industries on the aspects of concentrated solar power technologies. We have been working with solar drying, space heating, power generation, cooking and providing training to various stake holders. The various agricultural and industrial applications in India will be discussed in detail in the full length paper.



Fig: 1. Hon'ble President of India inaugurated Solar Car Developed by DTU on 4th sept 2012



Fig: 5. Solar Dryer for Rural Applications



Fig: 2. DTU developed solar car for participation in World Solar Challenge in Australia 2011

References

- [1] Annual report, Ministry of New and Renewable Energy, <http://mnre.gov.in>, 2012-13
- [2] J P Kesari et al., Transforming India into a Green Nation: Bottom up Approach through Solar Energy Education, Training and Innovations. International Journal of Scientific Research, 3(6), 2014
- [3] Y. Tamaura, Tokyo Institute of Technology, CSP Next Step -24 h Solar Power Generation Plant. International Symposium on Concentrated Solar Power (CSP) opportunities for India, 2012



Fig: 3. 100 kW SPV Power Plant on the Roof of the Administrative Building of DTU



Fig: 4. Kitchen Waste Based Biomethanisation Plant (500 kg per day)