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## AN ANALYSIS ON TREND OF SOLAR STREET LIGHTS IN INDIA

### Article Particulars

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### **N.PERIYAMAYAN**

*Department of Environmental Economics**School of Economics, Madurai Kamaraj University**Madurai, Tamil Nadu, India*

### Abstract

*The study observed the trend of solar Photovoltaic Street Lights in India and analyzed the Installation of off-grid Solar Street Lights in selected Southern states and union territories in India. The study exclusively is based on secondary data. The data were collected from previous studies, various journals, government reports, magazines and websites. The annual growth rate and percentage analysis were used to interpret the data. The study shows that year wise growth rate of solar street lights are fluctuating during the study period. It is revealed that 12.97 per cent are highest growth rate and -74.35 percent are lowest growth rate recorded in 2012-2013 and 2010-2011 respectively. Out of seven states the installation of off-grid solar street lights was 36.12 per cent in Tamil Nadu, 26.63 per cent in Andhra Pradesh, 20.63 per cent in Kerala, 8.72 per cent in Karnataka. Above the states, Tamil Nadu is the highest share in the installation of solar street lights in India during the study period of 2009-10 to 2014-15. The union territories of Andaman & Nicobar (3.46 per cent), Lakshadweep (2.89 per cent), as followed by Pondicherry (1.56 per cent) is the very lowest installation of the solar street lighting system as compared to the southern states in India. The government should install a number of solar street lights to eliminate the social problems and reduces the environmental pollutions and greenhouse effect.*

**Keywords:** *street light, conventional sources, solar power, Installation, off-grid solar street lights*

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### Introduction

Streetlight is the major role in today's life of moving for security and happiness of during night at pavements, railway station, bus stand, streets, open place, etc of every country. In this system will lend a greater sense of empowerment to the citizens apart from addressing the safety of women. But this lighting system is mainly dependent on conventional sources and inefficient supply of power of the developing countries. So it will continue to hamper to the growth of the country. Now a day's the criminal

activities such as theft, murder, eve-teasing, stalking, sexual harassment, terrorist and road accident are increasing in the urban areas. There is an increasing trend of the inconsistency of street lighting on its roads and streets in the global level. The 80 per cent of the electricity is producing from fossil fuels in the world. It consequences that majority of the electricity generation is transformed from fossil fuels. The uses of fossil fuels sources adversely impact on environmental problems such as climate changes global warming, soil erosion, flooding threatening, biodiversity, health problems and greenhouse gas emissions. Solar Photovoltaic street lighting system is efficient approaches to fulfil to the aim and electricity generation. It focuses on energy efficiency with the replacement of existing electric street lights with solar power as the main source of energy. It is considered the most abundant, eco-friendly and clean energy of renewable energy source.

### **Solar Street lighting system in India**

Streetlight assumes a serious element in the safety and security of boulevards and open spots. Street lighting must be smarter to act in accordance with new enactment ecological difficulties and need the use of energy. Adequate and appropriate lighting on streets and roads facilitates mobility and affords a sense of security to the citizens. The off-grid or standalone solar street light (SPV) is an outside lighting unit used to illuminate an open place. In this system automatically switch on and off the lights. It consists of solar panel, luminaire, storage battery, control electronics, interconnecting wires and module mounting pole, including hardware and battery box [1]. This system is not only an environmentally friendly and also be located anywhere regardless of local grid availability. This type of solar street light is reducing power consumption and maintenance cost as compared to other conventional street lighting system. In 11<sup>th</sup> January 2010, India has launched the Jawaharlal Nehru National Solar Mission. It's target of deploying 20,000 MW of grid-connected solar power in 2022. The fundamental aim of the scheme is reducing the cost of solar power generation towards long-term policy and increase the use of solar energy, research development activities, domestic production etc. as well as to reducing the cost of raw materials mechanism and through the grid tariff parity by 2022. In addition to India to a new target of 100,000 MW by the year 2021-22 [2]. It resulted in that to fastest increasing development of solar technology in India.

### **Statement of the Problem**

The solar industry in India is facing several challenges. The electricity generation of solar power is very high costs because India is mainly dependent on imports. The raw materials of silicon and solar wafers used to the manufacture of solar cells which are mainly (80 per cent) come from imports. The low level of capital intensive and financing infrastructure are major factors for hampering the growth of this sector. In

spite, the problem of the solar street light system is costly higher than conventional street light. The developing countries manufacturing cost is higher as compared to the developed nations because there are still in importing the spare parts. In India some places of the solar panel are theft and cloudy, rainy season, solar panels cannot generate efficient electricity. The batteries are frequently defaulted and to replace several times over a long time adding to the total lifetime cost is very high. The solar panel is dangerous to the birds and insects. It is dangerous to eyesight from solar reflectors.

### **Materials and Methods**

The study exclusively is based on secondary data. The data were collected from particularly Ministry of New and Renewable Energy; Energy statistics 2013, Central statistics office as well as previous studies, various journals, government reports, magazines and websites. The study covering period was 2009-2010 to 2014-2015 and data were analyzing annual growth rate and percentage analysis used to interpret the data.

### **Objectives**

The main objectives of the study are:

1. The study observed that trend of solar Photovoltaic Street Lighting system in India during the study period of 2009-2010 to 2014-2015.
2. To analyze the Installation of off-grid Solar Photovoltaic Street Lighting System in the selected Southern states and union territories during the study period of 2009-2010 to 2014-2015.

### **Earlier Studies**

Bhanu Pratap Singh (2014) point outs that sustainable improvement in rural areas through solar street light optimization. It analyzes the parameter involved in solar street light optimization system of cost and height which intern denigrate the cost involved in the solar street light system. The study carried out technical and economic merits of CFL and LED-based solar street light optimization in rural areas. The LED-based solar street light is low power consumption, low cost, and more lumen per watt as compared to CFL. The study analyzes the two solar street light systems one is LED and CFL formulated by following factors such as power maintenance, expenditure, consumption of energy and luminance. The LED-based Solar Streetlight system is capable to reduce considerable energy consumption and it's advantageous and economical to be used in rural areas [3].

Rajeev (2012) study examines that the cost-benefit analysis of LED-based solar street lighting system. It points out that LED-based solar street installation cost is very high and it's economically feasible in considering the payback period. Therefore to replace the

existing system with standalone PV type street light system is efficient as well as economic and energy saving. To decreasing the cost of PV and LED-based technology it will increase the saving of energy. The study finds that energy saving is higher as compared to the initial investment of LED-based solar street lighting system [4].

## Results and Discussions

Solar photovoltaic Streetlight is the clean energy source as compared to the electrical street lights. In India majority of the places are getting 300 sunny days in a year which will fulfil the energy shortage problems.

**Table 1 Year wise Installation and Trend Growth Rate of Solar Street Lights in India**

Year	Solar street lights(Nos)	Annual Growth Rate
2009- 2010	797344.0	-
2010- 2011	204523.0	-74.35
2011- 2012	226506.0	10.75
2012-2013	255879.0	12.97
2013-2014	274679.0	7.35
2014-2015	342788.0	24.79

**Source:** Ministry of New and Renewable Energy; Energy statistics 2013, Central statistics office [5].

Table 1 shows the year wise installation and trend growth rate of solar street lights in India. It reveals that year wise growth rate of solar street lights are fluctuating during the study period. It is observed that 12.97 per cent are highest growth rate and -74.35 percent are lowest growth rate recorded in 2012-2013 and 2010-2011 respectively. Figure 1 shows the trend of solar street lights in India.

**Table 2 Installation of off- grid Solar Street Lighting System in Southern States and Union Territories of India**

State/ UT	Solar street lighting system						Total	%
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15		
Andhra Pradesh	35799	4186	4186	6454	6454	6454	63533	26.63
Karnataka	7334	2694	2694	2694	2694	2694	20804	8.72
Kerala	41181	1090	1735	1735	1735	1735	49211	20.63
Tamil Nadu	16818	6350	6350	6350	25150	25150	86168	36.12
Andaman&Nicobar	6296	390	390	390	390	390	8246	3.46
Lakshadweep	0	-	1725	1725	1725	1725	6900	2.89
Pondicherry	1637	417	417	417	417	417	3722	1.56
								100.0

**Source:** Ministry of New and Renewable Energy; Energy statistics 2013, Central statistics office.

Table 2 depicts that the installation of off-grid solar street lighting system in southern states and union territories of India. Out of seven states the installation of solar street lights were 36.12 per cent in Tamil Nadu, 26.63 per cent in Andhra Pradesh, 20.63 per

cent in Kerala, 8.72 per cent in Karnataka. Above the states Tamil Nadu is the highest share in installation of solar street lights in India during the study period of 2009-10 to 2014-15. The union territories of Andaman&Nicobar (3.46 per cent), Lakshadweep (2.89per cent), as followed by Pondicherry (1.56 per cent) is the very lowest installation of solar street lighting system as compared to the southern states in India. Figure 2 exhibits Solar Street Lighting System in Southern States and Union Territories of India during 2009-10 to 2014-15.

### Conclusion

The study concluded that the year wise installations of growth rate of solar street lights system in India is fluctuated during the study period. Of which 12.97 per cent is highest growth rate in 2012-2013 and its lowest growth rate of -74.35 percent recorded in 2010-2011. Among the states, Tamilnadu is a first place of installation of solar street lighting system as compared to the other states whereas the Andhra Pradesh is second position followed by Kerala and Karnataka. The Andaman & Nicobar, Lakshadweep and Pondicherry are very lowest installation of street light in southern states in India. The study suggests that government to install more number of solar street lights. It will decrease the social problems and reduce the environmental pollutions and green house effect.

### References

1. Shaheer Shaida Durrani and Muhammad Imran Khan(2014), "Analysis of Trend of Installing Solar Street Lights in Peshawar Cantonment Areas", First International Conference on Emerging Trends in Engineering, Management and Sciences, December 28-30, 2014,Peshawar, Pakistan.
2. <http://www.mnre.gov.in/solar-mission/jnnsn/introduction-2>.  
Date accessed: 02/06/2017.
3. Bhanu Pratap Singh, B.K Sharma, Hari Singh, and abhinandan Sharma (2014), "Comparative Study on Solar Street Light Optimization for Rural Development", International Journal of Science, Engineering and Technology.2 (7), pp.1522-1531.
4. Mini Rajeev and Sreedevi Sanjeev Nair (2012)"Economic Feasibility of Solar Powered Street Light using high power LED - A Case Study", Proceedings of the International Conference on Renewable Energy Utilization,pp.75-80.
5. Ministry of New and Renewable Energy; Energy statistics 2013, Central statistics office. Date accessed: 05/06/2017.