PERFORMANCE OF CHIEF MINISTER SOLAR POWER SCHEME IN KANYAKUMARI DISTRICT

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Abstract: The contribution of off-grid energy technologies like solar, that in immediate future for villages. Despite Chief minister initiative solar power greenhouse scheme have significance importance in rural household electrification and in rural areas Further, comfort with the new technology, experience with operation and maintenance of the system, usage of the system in the absence of power from the grid and preference of scheme configuration has faced significant barriers in development of off-grid energy developments.

Key Words: Solar Energy, Poverty Scheme, Carbon Emission

I INTRODUCTION

India is fast growing economy, but power scarcity and diminishing sources of coal and other domestic gases is taking over the country. The rapidly emerging industrial sector leads the wide range of energy demand at the environmental concern India will achieve dramatic $C0_2$ emission reduction and economic development by undertaking the clean energy investments. India is blessed with abundant solar energy and if harnessed efficiently the country is capable of producing trillion kilowatts of electricity. Indian government has announced that it will achieve the 100 gigawatts (GW) solar power target by 2022. Conversion of radiations from the sun into electrical energy mostly using photovoltaic cells results in solar power. Geographically, India is a very fitting choice for solar power generation. In most parts of India, clear sunny weather is experienced 250 to 300 days a year. The annual radiation varies from 1600 to 2200 kWh/m2, which is comparable with radiation received in the tropical and sub-tropical regions. The equivalent energy potential is about 6,000 million GWh of energy per year. Solar energy is extremely beneficial as it is nonpolluting and its generation can be decentralized.

Conventional grid extension is the predominant mode of electrification in India, covering around 95% of the inhabited villages. The efforts by the central and state governments to improve electricity service 1950s, the household electrification level and electricity availability in India continue to remain below the global average (Debajit Palit & Kaushik Ranjan Bandyopadhyay 2016). While the global average rural electrification access rate in 2014 was around 85.7 %, the average rural electrification rate for India stood at 81.2% with rural areas registering only 73.6% electrification at the household level (IBRD 2014). In absolute terms, almost 77 million households in India were living without electricity in 2011 (Census 2011).

II STATEMENT OF THE PROBLEM

The contribution off-grid energy technology is the significant rural electrification programme. India spent more investment on solar energy home system. India is blessed with abundant solar energy and if harnessed efficiently the country is capable of producing trillion kilowatts of electricity. Indian government has announced that it will achieve the 100 gigawatts (GW) solar power target by 2022. Furthers state governments also significant performing to boost rural energy with solar panel. The chief minister solar power greenhouse scheme is a notable development movement of alternative technology in Tamil Nadu. Despite, BPL households eligible for this greenhouse programme in rural areas. Further each house is built with an area of 300 square feet at the unit cost of Rs. 2.10 lakhs fully funded by state government. Each house is provided with five solar powered compact fluorescent lamps one each in bed rooms, Kitchen, toilet and verandah. Despite 30,000 for solar powered light with a 4 per centage of service charge provided by Tamil Nadu Energy Development Agency. Despite Chief minister initiative solar power greenhouse scheme have significance importance in rural household electrification and in rural areas Further, comfort with the new technology, experience with operation and maintenance of the system, usage of the system in the absence of power from the grid and preference of scheme configuration has faced significant barriers in development of off-grid energy developments.

III OBJECTIVES AND HYPOTHESIS OF THE STUDY

The main objective of this paper is examining the performance of chief minister solar power scheme in Kan.yakumari district. Further understanding the satisfaction level of the solar grid facility. Finally examine the impact of solar energy in reducing carbon emission in Kanyakumari district. The hypothesis form by the researcher is Respondents are highly satisfied the Operation & Maintenance work in solar power panel.

IV THEROTICAL BACKGROUNDS

George Lof (1973), in their article examining the incentives for the application of solar energy to man energy requirements. Recent and impending fuel shortages, cost increases of energy and environmental degradation have provided strong incentives for the developments of solar energy for wide practical use. Electric powers from solar energy is now competitive with conventional supply. David Pimentel et.al (1994), in their article examined the alternative energy technologies. Solar energy alternatives to fossil fuels have the potential meet a large portion of future US energy needs. Solar energy technologies and that energy conservation of solar technologies will also reduce many of the current environmental problems associated with fossil fuel production use. Priyantha et al., (2005) conducted a case study of socio-economic impact of solar home system in rural Sri Lanka. The large-scale penetration of solar home systems in Sri Lanka has helped rural communities both in terms of reduced adverse environmental impacts. Santhosh Harish & Shuba Raghavan (2011), in their article highlight the success of the Jawaharlal Nehru National Solar Mission. The subsidy structure, the role of standardized systems and institutional models of delivery. As the actual cost of small system are considerably higher, on a per watt basis, than the benchmark costs assumed for the subsidy, smaller systems that are within the reach of the rural poor receive lower subsidies than larger systems. Effort to standardize solar lighting systems should not be driven by the government at the current stage of diffusion. Yasser Maklad (2014), in their study investigate the wind and solar electricity generation availability and potentially for residential buildings in Australia. The result of this study could help resident in Armidale to size and cost their hybrid systems approximately. Different options of funding and financing are still open households to investigate and decide, as well, excess generated electricity by such a hybrid system feed in grid tariff is one of the influencing factors affecting the system payback period. Hippu Salk Kristle Nathan (2014), made a comparative analysis of differences between rates of electrification and consumption in urban and rural areas. Further the study shows that solar PV'S failure in villages is primarily due to glitches in arising from lack of money. Bhamy Shenoy (2017), in their paper analysis NITI Aayog Draft National Energy Policy. In recent years, the cost of solar and wind energy has fallen dramatically. The focus on peak oil supply has been replaced by peak oil demand. The end of the coal era has already begun. Draft National Policy energy mix does not reflect these developments. Hence, NITI Aayog should redo its draft energy policy with a well-developed road map.

V Methodology

The study has collected fresh and original data for the first time through the questionnaire interview method in the study area. There are two reasons for identifying Kanyakumari as the universe for this study. First, the district has a smallest number of beneficiaries on chief minister solar powered greenhouse scheme. Secondly, the researcher is much familiar with the area and so it budgets convenient the scholar to get the co-operation of the officials as well as respondents. There are 9 blocks in Kanyakumari district namely, Agastheeswaram, Thovalai, Rajakamangalam, Thuckalay, Kurunthancode, Thiruvattar, Killiyoor, Munchirai, and Melpuram. Researcher select 9 blocks from 99 village panchayats. There are 4,587 beneficiaries in these 9 blocks as per the government records (Rural Development & Panchayat Raj 2017). Among this 4,587 beneficiaries' households from each block's five percent of the beneficiary's households were selected systematic sampling method. Hence, a total of 230 sample households were selected.

VI RESULTS AND DISCUSSION

Table 6.1

BLOCK WISE DISTRIBUTION OF BENEFICIARIES OF CHIEF MINISTER SOLAR POWER SCHEME IN KANNIYAKUMARI DISTRICT

Sl. No	Block Wise Distribution	Frequency	Per cent
1	Agastheeswaram	16	6.96
2	Thovalai	28	12.17
3	Rajakkamangalam	30	13.04
4	Thuckalay	21	9.14
5	Kurunthncode	20	8.70
6	Thiruvattar	26	11.30
7	Killiyoor	19	8.26
8	Munchirai	34	14.78
9	Melpuram	36	15.65

Grand Total	230	100.00

Source: Field Survey

Table 6.1 reveals that the block wise distribution of sample beneficiaries of chief minister solar power scheme in Kanniyakumari district. Out of 230 sample respondents has distributed 9 blocks. Melpuram has 36 sample beneficiaries which is constitute of 15.65 per cent has lead role and as followed by Munchirai, Rajakkamangalam, Thovalai, Thiruvattar, Thuckalay, Kurunthncode and Killiyoor, which is constitutes of 34 (14.78 per cent), 30 (13.04 per cent), 28 (12.17 per cent), 26 (11.30 per cent), 20 (8.70), 19 (8.26 per cent), and 19 (8.26 per cent), respectively.

TABLE 6.2

Family Members Wise Distribution of Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Number of Family Members Wise Distribution	Frequency	Per cent
1	2 Members	51	22.20
2	3 Members	59	25.70
3	4 Members	80	34.80
4	5 Members	40	17.30
Grand Total		230	100.00

Source: Field Survey

Table 6.2 brings out that size of family out of 230 sample, 4 members have family size has a lead role of 80 families which is constitute of 34.80 per cent. As followed by 3 members family, 2 members family and 5 members family which is constitutes of 59 (25.70 per cent), 51 (22.20 per cent) and 40 (17.30 per cent) respectively. As a result, the researcher has founded that the small size of 4-member families has a lead and dominant role in Kanniyakumari district.

Table 6.3

Spending Status Apart from Subsidies of Distribution of Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Spending Status Apart from Subsidies of Distribution	Frequency	Per cent
1	100000	8	3.50
2	200000	124	53.90
3	300000	74	32.20
4	400000	24	10.40
Grand Total		230	100.00

Source: Field Survey

It is inferred that from Table 6.3, the spending status of sample beneficiaries of chief minister solar power scheme in Kanniyakumari district. It is reveals that the 2,00,000-amount spending group has high 124 families have without their subsidy which is constitutes of 53.90 per cent. Followed the 3,00,000-amount spending group, 4,00,000 amount spending group and below 1,00,000 amount spending group in 74 families,24 families and 8 families which is constituted of 32.20 per cent,10.40 per cent and 3.50 per cent respectively. Therefore, the researcher identifies that the minimum of 2,00,000 amount spending group have dominant role to lead the beneficiaries in the district of Kanniyakumari

Table 6.4

Status of Solar Power Panel is Installed Sample Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Solar Power Panel is Installed	Frequency	Per cent
1	Yes	204	88.70
2	No	26	11.30
Grand Total		230	100.00

Source: Field Survey

Table 6.4 reveals that the status of power panel is installed. Out of 230 sample beneficiaries for 204 families which is constituted for 88.70 per cent have installed. Solar power plant remaining of them where not installed 26 families which constituted in 11.30 per cent. Therefore, the study clearly notifies that the majority of sample respondents have installed solar power plant.

Table 6.5
Satisfaction of Solar Power Panel Sample Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Satisfaction of Solar Power Panel	Frequency	Per cent
1	Solar panel not yet Installed	26	11.30
2	Strongly Satisfied (1)	40	17.30
3	Moderate (3)	36	15.70
4	Strongly Dissatisfied (5)	128	55.65
	Grand Total	230	100.00

Source: Field Survey

It is inferred that from Table 6.5, out of 230 sample beneficiaries for 154 families are strongly dissatisfied of their solar power panel which is constituted in 67.00 per cent. As followed by strongly satisfied and moderate satisfaction in 40 families and 36 families which is constituted of 17.30 per cent and 15.70 per cent respectively. Therefore, the researcher explains that most of the sample beneficiaries are strongly dissatisfied regarding of their solar power plan in the district of Kanniyakumari which clearly indicated in the figure 5.3.8.

Table 6.6
Satisfaction Level of Solar Panel Working on Rainy Season of Sample Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Block Wise Distribution	Frequency	Per cent
1	A= Solar panel is not yet installed	26	10.87
2	5 = Strongly Satisfied	6	2.60
3	4= Agree	90	39.13
4	3= Moderate	79	34.35
5	2= Disagree	20	8.70
6	1=Strongly Dissatisfied	10	4.35
	Grand Total	230	100.00

Source: Field Survey

Table 6.6 reveals that satisfaction level of solar panel working status during the rainy season is out of 230 sample beneficiaries for agree their satisfaction has dominant in 90 respondents which is constituted of 39.13 per cent. Followed by the moderate satisfaction, solar panel is not yet installed, disagree satisfaction, strongly dissatisfied and strongly satisfied 79 sample beneficiaries, 25 families, 20 families, 10 sample families and 6 sample beneficiaries which is constituted of 34.35 per cent, 10.87 per cent, 8.70 per cent and 4.35 per cent respectively. Therefore, the researcher indicates that the most of the sample beneficiaries have agree to satisfy their solar power panel working during the rainy seasons in the district of Kanniyakumari.

Table 6.7
Household Awareness about Solar Energy of Sample Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Household Awareness about Solar Energy	Frequency	Per cent
1	Yes	210	91.30

2	No	20	8.70
	Grand Total	230	100.00

Source: Field Survey

Table 5.3.11 indicates that household awareness about the solar energy is out of 230 sample beneficiaries for awareness to know the solar energy in 210 respondents which is constituted of 91.30 per cent. The remaining sample beneficiaries do not know the awareness about the solar energy in 20 respondents which is constituted of 8.70 per cent. Therefore, the researcher notifies that the most of the sample beneficiaries to aware the solar power plant in the district of Kanniyakumari.

Table 6.8

Solar Power Panel Presently Working Status of Sample Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Solar Power Panel Presently Working	Frequency	Per cent
1	A= Solar Panel not yet installed	26	11.30
2	1=Yes	187	81.30
3	2= No	17	7.80
	Grand Total	230	100.00

Source: Field Survey

Table 5.3.9 explains that the solar power panel presently working status has to understand the study regions. Out of 230 sample beneficiaries for 187 families have good solar power panel working is excellent manner which is constituted of 81.30 per cent. Followed by the solar power not installed the sample beneficiaries for 25 families which is constituted in 10.90 per cent. The remaining of the sample beneficiaries for 18 families have not working the solar power panel which is constituted in 7.80 per cent. Therefore, the researcher founds that the 187 families have dominant role to lead the beneficiaries in the district of Kanniyakumari

TABLE 6.9

OPERATION AND MAINTANENCE

Variables	Operation and Maintenance	Satisfaction Level
Operation and Maintenance	1	0.98 (.138)
Satisfaction Level	0.98 (.138)	1

Source: Computed Variables

The study found the hypothesis results, the respondents are not satisfied Operation and Maintenance work for Solar power panel. So, the correlation results are there is a no relationship between O&M and Satisfaction of the respondents. That means out of 230 sample 93.5 % call for that service 42.6 % respondents disagree the service, 29.6 moderate, 26.5 strongly dissatisfied the study. So, the researcher strongly rejects the null hypothesis accepted the alternative hypothesis.

Table 6.10

Annual Cost of Reducing 1kg of CO_2 of Sample Beneficiaries of Chief Minister Solar Power Scheme in Kanniyakumari District

Sl. No	Annual Cost of Reducing 1kg of CO_2	
1	Capacity of system (in W)	100
2	Unit cost energy saved Month	12
3	Cost energy Saved Month	30
4	Carbon emission factor	1.33
5	CO_2 emission saved per Month	15.96

6	Total sample household have Chief Minister solar power house	225
7	Total CO_2 emission saved Chief Minister solar power scheme per month	2904.72
8	CO_2 emission lost for saved chief minister solar power scheme	686.28

Source: Field Survey

Notes: 100 W System generates around 0.4 units of energy per day 0.4*30=12 units per month.

Carbon emission factor represents the amount of carbon dioxide generated with the use of 1 unit (=1Kwh of energy. The emission for India is 1.33, as given by Brander et al. (2011).

It is inferred that from Table 6.10 out of 230 sample beneficiaries for 182 families have consume solar power which is constituted of 80.9 per cent. The remaining of them not yet installed solar panel for 26 families which is constituted 11.56 per cent and solar power is not working situation for 17 families which is 7.56 Further the researcher has to points out that who are the beneficiaries of solar power panel the cost reducing the 1 kg of CO_2 is 2904.72 which implies that environmentally sustain in the study area of Kaniyakumari district. Further absence of the solar system failure the district lost for saved carbon foot print is 686.28. Therefore, the researcher concludes that the solar power plant beneficiaries are cost of reducing the 1kg of CO_2 in the district in Kanniyakumari.

VII CONCLUSION

The theory of externalities from Arthur Pigou taxes and subsidy as the only option for addressing environmental problems. In this study also support the Arthur Pigou hypothesis. Further 100 Wats Solar power is not satisfied the public. So, the government provide the Hybrid renewable technology. Moreover, Monitoring the Solar power panel subsidy amount and should be accountability. Despite Activating toll-free number for operation and maintenance work effectively. Furthermore, Chief Minister Solar Power Scheme and the usage of subsidy provided for below poverty lined individual is a substantial query. Future researcher must concern about this issue. The policy makers not only fixed the off-grid energy target but monitoring the programme effectively and accountability. Finally, the success of renewable energy technology depends upon people's acceptance, cost effectiveness, price affordability, integration and combination of different energy sources.

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