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KEY FACTORS THAT ARE INFLUENCING THE DECISION OF THE HOUSEHOLDS FOR ADAPTING THE SOLAR ENERGY BASED EQUIPMENT & MICRO GRID SYSTEMS FOR RURAL ELECTRIFICATION IN THE RURAL HILLY TERRAINS OF THE NORTH BENGAL.

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ABSTRACT

This paper describes factors and variables that are influencing the solar adoption along with micro grid implementation of north Bengal. The paper is based on the microeconomic and the product study of the solar and the grid system with the overall description and the solution of the variables, also the paper will focus on the rural electrification implementation of north Bengal. With the purview of examining the socio-economic feasibility and adoption of an efficient rural electrification framework (from the developed countries) in the implementation of solar energy equipment based Micro-grid, several previous researches were analysed. Here the use of the micro grid is actually reducing the usage of the fossil fuel usage, when the grid is fully used for the renewables. Social impacts of Micro-grid deployment have effects on the local labour management, increase in employment, local business profit generation and so on. Otherwise the main disadvantages are the cost impact and the challenges of the return. Yet another economic advantage in the implementation of Micro-grid solutions is that these decentralised grids could be integrated into central grid upon expansion.

Keywords: Rural Electrification, Electrical Equipment, North Bengal, Economic Development, Grid, Solar, Shaubhagya, Load Dispatch, Economic Development, Load.

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Introduction

The main focus of this paper is to detail all the variables and the factors those are actually impacting. To reach to the detailing we have to consider some of the theories of economics those are product theory and the theory of adoption and the innovation. Where we can state that the theory of adoption and the theory of innovation of new technology to the existing market is a part of change management and these will help us to describe the factors and the variables.

The extended part of this paper will also a description of the process or root path to implement a sustainable and proper rural electrification, Theory of Adoption, Perceived Attributes Theory and other relevant theories identified through the literature review would be examined in that context. Furthermore the consumer socialization theory will also help us to describe the consumption pattern and decision when the solar base micro grid will be implemented.

Theoretical approach for solar equipment implementation in north Bengal.

As per the innovation and the new product adoption theory it is needy to implement and also easy to implement the solar base product in the hilly terrine of north Bengal where the population is not so huge but the population is scattered, hence the scattered population is actually the indication of different type of the consumption pattern. To understand the consumption pattern we have to go for some of the particular survey technique with stratification to understand the basic framework of the study.

As per the adoption theory, a new product which is being launched in the market should have previous empirical data pointing towards the possible success of a product. The market test is a possible tool for testing the Adoption theory from the perspective of the current renewable energy based rural electrification (RE) framework evolution initiative. Below are the key assumptions of the adoption theory:

(i) The adoption theory assumes that there are multiple influencing factors responsible for the decision of the customer.

(ii) These factors might include the consumers' knowledge and awareness of the product, his acceptance of innovation, as well as experience in buying such products.

(iii) The researcher thus gathers more information so that he can influence purchasers to buy the product thereby analysing the results of faster product penetration in the market.

(iv) Overall, the diffusion of innovation is a part of the adoption theory where the diffusion of a new and innovative product or even normal product is studied. It is observed that

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the products are always picked up first by innovators, then by early adopters, early majority, late majority and finally laggards.

Demand theory is a theory relating to the relationship between consumer demand for goods and services and their prices. Demand theory forms the basis for the demand curve, which relates consumer desire to the amount of goods available. There is an inverse relationship between the price of a good and demand and below are the depictions of the Law of Demand:

- As prices fall, we see an expansion of demand. If price rises, there will be a contraction of demand.

Ceteris paribus assumption: Many factors affect demand. When drawing a demand curve, economists assume all factors are held constant except one – the price of the product itself. Ceteris paribus allows us to isolate the effect of one variable on another variable. The Demand Curve shows the relationship between the price of an item and the quantity demanded over a period of time. There are two reasons why more is demanded as price falls:

1. **The Income Effect:** There is an income effect when the price of a good falls because the consumer can maintain the same consumption for less expenditure. Provided that the good is normal, some of the resulting increase in real income is used to buy more of this product.

2. **The Substitution Effect:** There is a substitution effect when the price of a good falls because the product is now relatively cheaper than an alternative item and some consumers switch their spending from the alternative good or service.

Finally, as per **Grid Stabilization Theory**, the energy storage can be instrumental for emergency preparedness of an ecosystem because of its ability to provide backup power as well as grid stabilization services for any terrain, while the same could be proved effective for an isolated off-grid operational ecosystem as well.

Now this description of the theories those are actually effective to the research can imply some variable and the sub-variables those are discussed billow.

The detail variables and the sub variables.

Below are the high level conceptual lens and overview of the key variables and sub-variables identified through the secondary document study and literature review for the requirements of the current research work on the possible rural electrification framework through solar energy equipment as part of Micro-grid system:

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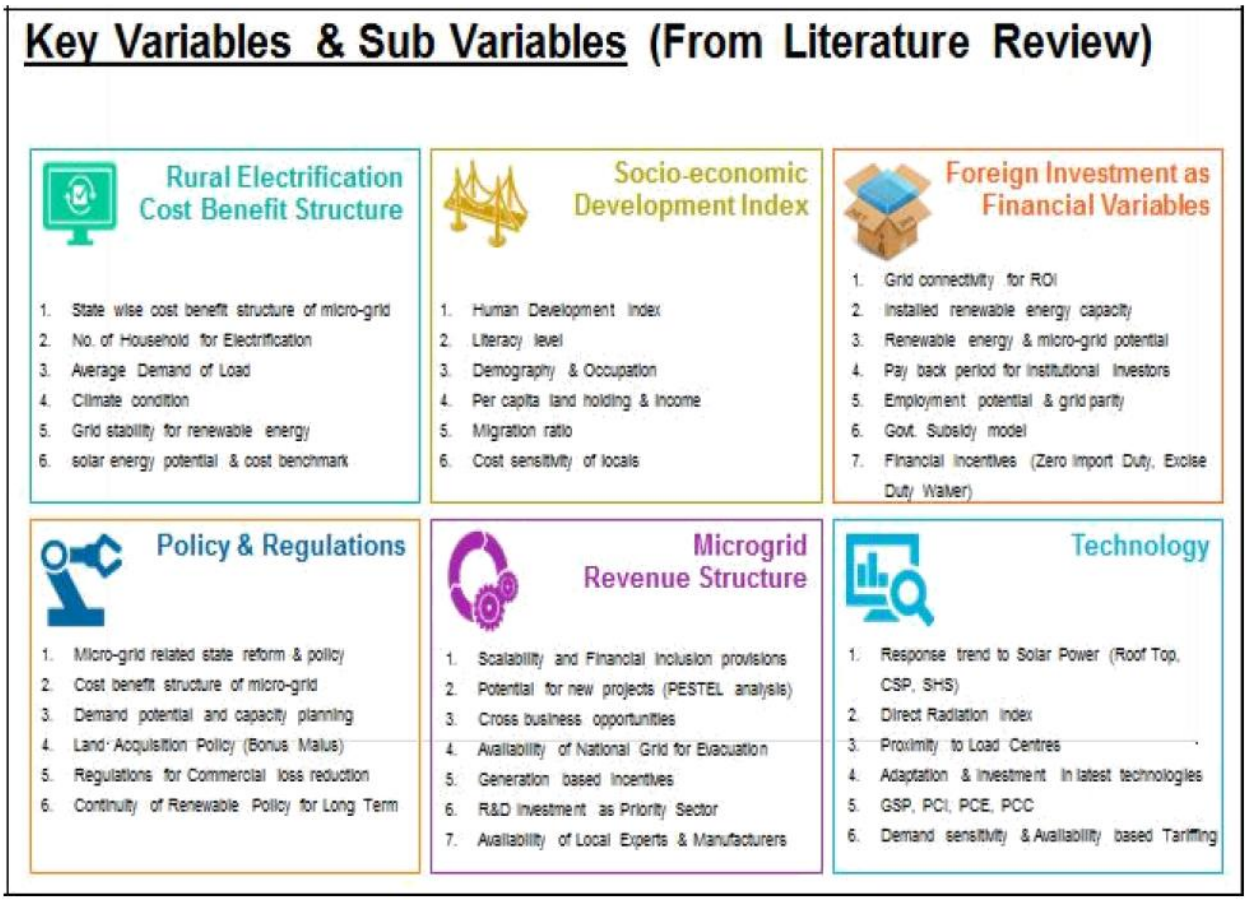

RE Cost benefits analysis:

The Eastern Regional Load Despatch Centre (ERLDC) has been successful in implementing the Real-Time Network Analysis (RTNET) sub- system of Energy Management System (EMS) for contingency analysis after proper tuning of State Estimator (SE) to ensure that the SE output is suitable for use in real time grid operation. Power System simulator Engine (PSS/E) is also being used for detailed off line studies for operation planning, contingency analysis and computation of Available Transfer Capability (ATC), Total Transfer Capability (TTC) etc. The paper describes in detail the event that led to sever depletion of transmission network in Eastern Regional Grid leading to noncompliance of (N-1) security criteria in certain corridors. With onset of monsoon, a conflict arose between economic operation of system and secure operation of system, thus requiring contingency plans. Detailed on-line and off-line studies have been carried out to work out the contingency plans. The paper discusses a case study of application of on-line and off-line tools.

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The Eastern Regional Grid comprises the states of West Bengal, Orissa, Bihar, Jharkhand and Sikkim. The installed capacity of Eastern region is 23119 MW (including Talcher STPS Stg-II) and peak demand met is of the order of 13000 MW. The energy consumption is around 260 MU per day and daily net export from Eastern region is around 40 MU. Eastern Regional Load Despatch centre has been designated by Electricity Act (EA) 2003, as the apex body in grid operation to ensure secure and economic operation of the Eastern Regional power system. As such the EHV grid is operating under the supervision and control of ERLDC on round the clock basis. Transmission facilities are shared resources and the Indian grid is no exception. While we are yet to achieve the desired level of adequacy, the rapid growth of electricity market and its sustenance demands almost 100% availability of the transmission network on 24x7 basis. Despite good practices being adopted in ensuring maximum availability of the transmission system, natural disasters, which now seem to happen more frequently than before, are posing a serious challenge in system operation. In particular, Eastern Region has been affected by several natural disasters over the last couple of years.

Contingency handle tools available in ERLDC:

ERLDC uses the EMS application package supplied by M/S AREVA. Among various applications of this package, Real-Time Network Analysis (RTNET) has the following sub applications:-

1. Network Topology processor: This application processes the status changes of digital inputs (circuit breaker and isolator) to construct an updated network model for use in both real time and study mode. The status changes are taken from the SCADA status processing program or by a manual override of the points.

2. State Estimator (SE): This application gives the best estimate of the state of the system based upon the configuration and given analog measurements and provides a steady state solution. SE has been designed to encompass both the observable portions of the network which are monitored by the RTUs as well as unmonitored areas such as low voltage portion of the system where reasonable estimates of load/ generation exist. The State Estimator solves the entire modelled network.

3. State Monitor: This application monitors limit violations of identified variables (such as bus voltage, MVA flows on line/transformers etc) for an identified set of devices based upon inputs from a calculated network state such as the estimated state from RTNET.

4. Bus load Forecast: This program is primarily responsible for forecasting the loads (MW and MVAR) on the buses and takes into consideration time switch capacitor/reactor breaker position.

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5. Real time contingency analysis (RTCA): This function facilitates to assess the impact of user specified contingencies as well as dynamic contingencies selected automatically based on the base case violations and to alert the operator to any contingency that would cause branch overloads, abnormal voltage or generator limit violation. RTCA can be triggered in the following modes:-

i. Event trigger (i.e. based on occurrence of status changes)

ii. Periodic triggering (i.e. once in every minute/5 minute etc.)

iii. Operator initiated trigger.

6. Contingency Ranking: RTCA ranks contingencies in the order of severity based on criteria like voltage violations & branch flow violations. Full AC load flow is carried out to assess the impact of contingencies. The contingency selection can be dynamic based on present limit violations or user defined. RTCA classifies contingencies as “harmful” “potentially harmful” “processed not harmful” “unsolved” and “not active” (Shown in Fig.3)

7. Security Enhancement (SCNH):- This module helps in identifying the remedial action plans. The employed include generator outputs, transformer taps, capacitor/reactors switching etc.

Other conditions for solar implementation:

The grid stability has been discussed above which is not good as the terrine is hilly the reforms and the gov support of the micro grid is too much necessary for such situation. Coming to the solar potential of the sector that can be understand by the eradiation per hour per year of the north sector form the billow figure we can understand the solar irradiance of the particular geographical area.

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Source: NREL															
Place	Latitude	Longitude	Avg. Rad-iation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bankura	23.2346990	87.0724560	4.82	4.23	5.01	5.77	6.23	6.12	4.98	4.35	4.23	4.14	4.43	4.29	4.11
Bardhaman	23.2324300	87.8637310	4.82	4.23	5.01	5.77	6.23	6.12	4.98	4.35	4.23	4.14	4.43	4.29	4.11
Birbhum	23.8401675	87.6186379	4.82	4.23	5.01	5.77	6.23	6.12	4.98	4.35	4.23	4.14	4.43	4.29	4.11
Cooch Behar	26.3241900	89.4510300	4.81	4.51	4.88	5.42	5.62	6.08	4.95	4.75	4.47	4.13	4.58	4.47	3.82
Dakshin Dinajpur	25.3729562	88.7108964	4.75	4.58	4.86	5.6	6	5.85	4.55	4.32	4.38	4.04	4.53	4.49	3.85
Darjeeling	27.0360066	88.2626751	4.31	3.7	3.98	4.44	4.83	5.47	5.01	4.61	4.1	4.24	4.22	3.88	3.3
East Medinipur	21.9372879	87.7763333	4.84	4.48	5.15	5.89	6.28	6.12	4.55	4.14	4.05	4.19	4.58	4.38	4.27
Hooghly	22.8956000	88.4025000	4.46	4.66	4.87	5.45	5.57	5.6	3.52	3.65	3.88	3.42	4.01	4.46	4.39
Howrah	22.5957689	88.2636394	4.46	4.65	4.95	5.54	5.56	5.51	3.55	3.54	3.74	3.46	4.05	4.51	4.43
Jalpaiguri	26.5220200	88.7174680	4.76	4.38	4.76	5.39	5.68	6.03	5.04	4.57	4.47	4.08	4.59	4.42	3.75
Kolkata	22.572646	88.363895	4.45	4.67	4.92	5.54	5.51	5.5	3.51	3.56	3.73	3.43	4.04	4.5	4.43
Malda	25.0108408	88.1410967	4.76	4.56	4.91	5.54	6.08	5.93	4.39	4.17	4.37	3.97	4.51	4.52	4.13
Murshidabad	24.1675550	88.2708190	4.6	4.59	4.87	5.44	5.8	5.64	4.12	3.94	4.13	3.56	4.4	4.52	4.18
Nadia	23.4709656	88.556531	4.49	4.61	4.86	5.48	5.62	5.64	3.71	3.8	4.06	3.43	4.12	4.52	4.01
North 24 Parganas	22.7100470	88.7108964	4.46	4.66	4.92	5.51	5.58	5.56	3.45	3.64	3.86	3.43	4.12	4.48	4.31
North Dinajpur	25.6140287	88.1268795	4.81	4.55	4.89	5.55	6.06	6.17	4.71	4.51	4.32	4.05	4.53	4.48	3.9
Purulia	23.3320779	86.3652080	4.8	4.32	5.05	5.66	6.13	6.14	4.87	4.26	4.14	4.12	4.49	4.3	4.11
South 24 Parganas	21.8574424	88.3717475	4.54	4.68	4.98	5.6	5.52	5.74	3.49	3.89	3.85	3.85	4.11	4.54	4.21
West Medinipur	22.4080376	87.3810727	4.78	4.31	5.01	5.69	6.2	6.02	4.76	4.24	4.09	4.12	4.51	4.28	4.15

The district wise irradiance data is given for over all year as an average. Here the north district data are given farm hence it can be conclude that the irradiance is variable is supporting the paper and the undertaking of the project. Only the policy and the framework with commercial variables are the main on concern now for the approval of the project.

Here we can understand the Jalpaiguri district is having the farm potential of undertaking the micro grid oriented solar equipment implementation hence here in the table we can understand

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the overall solar project implementation data.

The Socio and economic variables that are influencing the solar implementation in north Bengal:

Economic development and environmental issues must go hand in hand. The natural environment is central to economic activity and growth, providing the resources we need to produce goods and services, and absorbing and processing unwanted by-products in the form of pollution and waste. Natural resources are, therefore, vital for securing economic growth and development, not just today but for future generations. This paper aims to explore the relationship between the economic growth and the pressure on nature from the environmental sustainability perspective. The area chosen for the present study is one of the least economically developed regions of West Bengal. The physical environment influences the type of economic activities especially so in backward areas of Darjeeling Himalaya. Its economy is largely based on tea, agriculture & tourism, where the former has played a significant role in the development of the region since the beginning. The Darjeeling Himalaya constitutes a fragile and unique ecological system. The region is frequently plagued by environmental catastrophes. It reveals from the study that the area under study proves to be a complicated region requiring considerable care & attention in the matter of intensive development.

The table and the data for the Jolpaiguri solar project or plan:

Jalpaiguri, West Bengal

Site Description

Station Name	Jalpaiguri
Station ID	2403
District	Jalpaiguri
State	West Bengal
Latitude	26°32' 46.2" N
Longitude	88°42' 11.5" E
Elevation	82m amsl
Altitude	15m agl
Date of commissioning	22-09-2013
Site Address	Govt. Eng. College, Jalpaiguri, West Bengal-735102

*** amsl- above mean sea level, agl- above ground level**

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May-15	GHI*	GHI	DNI*	DNI	DHI*	DHI	AirTemp	RH	AtmPr	Rain Acc.*	Wind speed	Wind dir.
	[kWh/m²/d]	[W/m²]	[kWh/m²/d]	[W/m²]	[kWh/m²/d]	[W/m²]	[°C]	[%]	[hPa]	[mm]	[m/s]	[°]
average	4.79	200	1.90	79	3.22	134	27.0	72	992	0.3	1.6	86
min	1.91	0	0.03	0	1.82	0	21.5	8	984	0.0	0.3	2
max	6.58	925	4.57	655	3.92	583	33.6	100	998	1.5	23.0	360

Values of all parameters mentioned above are averages/sums/minimums/maximums related to 1 minute values over the entire month including night hours. For wind: maximum wind speed refers to 1 sec values and average wind direction refers to predominant wind direction. *Average, Minimum and Maximum of the daily sums observed in this month.

The economic viability and environmental feasibility do not welcome the industrialists. The environmental problems will be addressed more or less automatically in the process of economic growth. All the countries are developing at different rates & from differing historical levels of achievement. Such development with a view to meeting the socio- economic needs implies that man must use nature in the process of development. It is not that the life-style has changed altogether; the economy in the remote areas is still the same as it has been since the settlements started, but the areas enjoying accessibility to urban centres have already adopted a different character, as profoundly manifest in their day-to-day life..

Significance:

The backwardness of the area in terms of socioeconomic, politics and infrastructural facilities and their variations within the area has called for a distinct study of the different social, economic and political progress that the area has achieved. Secondly, its geo-strategic location is a reason in itself to evoke concern for the region. Darjeeling Himalaya's vulnerable position has made it pass through different events in history, each having a marked effect in the region. Its backwardness can be attributed to environmental/physical constraints like rugged topography, harsh climate, varying altitude with steep slopes, unfavourable valleys; ethnic clashes; and political instability which makes the life painstaking and hazardous. Environmental conditions play a major role in conditioning the livelihood and economy of the people in Darjeeling Himalaya. The topography, climatic variations, soil condition have all influenced human occupancy. Subsistence agriculture, livestock, forestry, plantations and allied activities are the major activity of the rural folks.

Darjeeling Himalaya has only over 13% cultivable land in proportion to its total geographical area. No effort has been made by the government to maximize the utilization of the land.

Study Area:

The Darjeeling Himalaya covers an area of 2476 Sq. Km. spanning three revenue Sub-Divisions of Kalimpong, Kurseong and Darjeeling. Broadly speaking, the Darjeeling Himalaya falls under

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subtropical perhumid climate with an average rainfall of 3104.5mm per annum, with an air temperature of maximum 26º C and minimum 4º C. The Darjeeling Himalaya consist of eight Community Development Blocks or (C.D.) Blocks which include 112 Gram Panchayat, 311 inhabited villages and 31 uninhabited villages as per 2011 census. The total population of the study area during 2011 is 875,703 persons, of which 440,257 are male and 435,446 are female. This Himalayan region is formed of comparatively recent rock structure that has a direct bearing on landslides. However, heavy monsoon precipitation is however a very common cause of the landslides. Soils of this magnificent hill area are extremely varied, depending on elevation, degree of slope, vegetative-cover and geolithology. The Himalayas serves as the natural resource's source for the population in the hills.

Objective of the study of variables:

The main objectives of this paper are:

(i) to discuss the source of economic development in the study area.

(ii) to examine the empirical relationship between economic growth and the environment.

(iii) to discuss the ecological impacts arising from the economic development.

(iv) to explore how economic growth might be decoupled from environmental pressures.

(v) to suggest some recommendation for environmental friendly economic development.

Economic development with social aspect:

Economic development seeks increase, in the rate of increase of national income and achieving an equitable distribution of income. Increase in national income would result only from increased production of goods and services. The process of increase in output would involve greater consumption of resources such as land, forest, fuels etc, whose supply is essentially limited. The productivity of an economy thus depends considerably on the supply, quality and consumption of such natural resources. Thus reckless and thoughtless use of these resources would cause their exhaustion and degradation, thereby reduce productivity and impede economic growth. Also due to such depletion and degradation our future generations will not get enough of these resources for their use thus adversely affecting their output, income and living standards. So environmental degradation not only affects us but will also have repercussions on our future generations.

Agriculture: Agriculture in this region is grossly rain dependent and distributed between pre-kharif and kharif seasons. Almost all upper ridges of the region are forest areas; tea plantations

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and native agriculture occupy mid- hill section. Cultivation of well paddies extends down the mid-hill section up to the bottom valley in some cases. Soil in general is shallow; medium to light textured, surface drainage is rapid, highly susceptible to erosion by water, internally well drained, reasonably high in organic matter, poor in bases and phosphate and distinctly acidic in reaction. Cultivation in drier months is limited to small patches where residual moisture/ limited irrigation from nearby rivulets are available. Almost all arable lands have a slope of more than 8%. In some extreme cases poor farmers are seen cultivating very steep slopes that have gradients of 40% or even more. The annual rainfall is very unevenly distributed over the year. Four fifth of the precipitation is witnessed from June- September. So the hill farmers face surplus water during these months and there is acute scarcity of water from February to May. These conditions necessitate aggressive intervention in conserving the precious topsoil during monsoon as well as harvesting lifesaving irrigation water for the dry months. This could only be done successfully by covering the arable and non-arable lands with perennial plants, disrupting the slope of terraces with vegetable hedges planted along the contour and encouraging cultivation in levelled to inward terraces for checking erosion and by harvesting water in durable structures on stable marginal lands.

Animal Husbandry: Livestock plays an important role to uplift the rural economy in our country and more so in the hills. Its contribution in the Gross National Income is about 25%. Several important technological developments in branches of Animal science has established that Animal Resources

Horticulture: Most of the farmers in these regions are still practicing the traditional method of cultivating traditional crops like ginger millet, local varieties of paddy, maize and vegetables. It has been observed that the traditional method of crop cultivation with local traditional crop varieties is not economically viable these days due to low productivity and high cost of cultivation. It is, therefore imperative that the emphasis and development initiatives vis-à-vis agriculture be shifted to floriculture-horticulture crops in the hill areas of Darjeeling District. The main fruit crops of the area are temperate fruits like orange, plum, pears and peach..

Tourism: Tourism is an important economic activity of hill areas. Darjeeling receives around 3.5 lakhs domestic tourists and 50,000 foreign tourists per year that generates near 30% of total tourism business of the region worth around Rs 350 crore per annum. Apart from an increase in the income and the demand for local products, tourism also results in a multiplier effect. The multiplier effect is based on the concept of interdependency of different sectors of the economy the result of which is that any change in the host economy's level of output, income, employment, government revenue and foreign exchange flows will be greater than the value of the initial change. The multiplier is expressed as a ratio of change in one of the above variables

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to the change in tourist spending that brought it about. In addition to its contribution to economic growth in the host economy, the labour intensive nature of tourism and tourism related industries results in a significant impact upon the level of employment in this sector. Income and employment generation are the most obvious positive impacts of tourism. The facilities and services deteriorate sharply during the peak season as the amenities available cannot cope up with the huge rush.

Tea: Darjeeling Hills has been producing finest quality tea in the world fetching the highest price. Starting on a commercial scale in 1856 the present area under Tea Gardens is 19239 hectares producing 11-12 million Kgs. of tea per year. Cinchona was introduced between 1861 and1869 on trial; large-scale production started from 1887. The best of Indian quality mulberry silk is being produced in Darjeeling hills. Forestry is an important occupation of the people of Darjeeling. Darjeeling has about 38.91 % of its area under forest. Commercial tea production has been the mainstay of livelihoods and economy in the Darjeeling hills for over 150 years. Situated in the Himalayan front ranges in West Bengal, the Darjeeling hills were transformed in the mid-19th century from a sparsely populated, forested landscape to one dominated by extensive tea estates, linked roads, railway, a major town and many estate- based villages populated by workers. The area, with an elevation range of 800 to 2600 m/asl, copious and reliable precipitation (3000mm/annum), steep slopes and a diversity of micro-environments proved suitable for the cultivation of tea on plantation basis. In the last three-four decades, however, the livelihood of the large, dependent population has been threatened. The gradual decline of the Darjeeling-tea industry Compared to strong international competition, increasing production and labour costs, and declining productivity, and other factors, have affected the sustainable livelihoods of plantation workers. Tea is the main crop in the region and is grown over a vast area of hilly land, covering 17 542 hectares divided into 87 tea estates. After the first 3 commercial tea estates were established at Tukvar in 1852, the area under tea expanded gradually to 39 estates in 1866, 56 in 1870 and 113 in 1874. Today there are 87 tea plantations in Darjeeling Himalayas, producing superfine Darjeeling tea. Darjeeling tea makes up for 3 per cent of India's total production. The Darjeeling tea industry at present employs over 52 thousand people on a permanent basis; while a further 15,000 persons are engaged during the plucking season which lasts from March to November. More than 60 percent are women and the employment is on a family basis.

Suggestion and recommendation:

Public participation directly and through voluntary organizations and non-government organizations is essential for utilizing the natural resources for economic development

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- Arrangements should be made to monitor and evaluate the effects of any major development.
- The necessity and importance of soil conservation measured in agricultural and other lands is very important.
- Tea garden area and production are both to be enhanced but these should not be at the cost of forests.
- Deforestation is to be checked; otherwise the rainfall of the area will be disturbed.
- Attention also needs to be devoted to improving the productivity of local human resources so that these can effectively serve the new human resource demands created by development.
- Planning of infrastructure will have to be reoriented around the functional hierarchy of towns and other settlements.
- Efforts should be taken to educate the people about eco-consciousness and integrate education on Eco conservation.
- Agro-based industry around available natural resources should be setup.
- Creation of awareness among the people and educating them
- Biodiversity has also been preserved.

Rural electrification policies & support for the project:

Here the rural electrification status and the statistics are given that is actually giving the overall view of the present scenario that how can this rural policies are going to help the solar implementation. The consumer behaviour and the buying pattern is also can be determine from the data of the table.

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(Status as on 31.12.2017)

I. Village Electrification (Nos.)

a. Total inhabited villages (as per Census 2011) - 37463
State has reported all villages as electrified

II. Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) (as on 31.12.2017)

a. RE projects (erstwhile RGGVY):

Plan	No. of projects	Amount sanctd (Rs Cr)	Amount disbursed (Rs Cr)	Villages covered for providing access to Rural households (Nos)		Electrification of BPL Households (Nos.)		Substation (Nos.)				Remarks
								New		Aug.		
				Scope	Achmt	Scope	Achmt	Scope	Achmt	Scope	Achmt	
X	13	453.24	439.91 (97%)	-	-	93110	93110 (100%)	11	11 (100%)	01	01	closed
XI	16	2334.21	2018.37 (86%)	24015	23783 (99%)	2142532	2089215 (98%)	10	9 (90%)	02	-	14 closed (Hugli & Darjeeling balance)
XII	7	609.61	246.31 (40%)	5628	5617 (100%)	248073	28715 (12%)	04	01	11	11 (100%)	ongoing
Total	**36**	**3397.06**	**2704.59 (80%)**	**29643**	**29400 (99%)**	**2483715**	**2211040 (89%)**	**25**	**21 (84%)**	**14**	**12 (80%)**	**27 closed**

b. New projects:

i. DDUGJY Grid: 13 projects for **Rs. 4262.11** Crore have been sanctioned. All projects awarded and work under progress. The Component wise financial & Physical details are as under:

Financial -

(Rs Crore)

Electrification of Un-electrified Villages	SAGY	Metering	Rural Household Access	System. Strengthening	Feeder Separation	PMA Charges	Total
46.86	0.60	441.22	1729.93	862.34	1159.96	21.20	4262.10

PHYSICAL SCOPE & ACHIEVEMENT

Parameter	Intensive Electrification of Villages (Nos)	SAGY Villages (Nos)	Connections to BPL HHs (Nos)	Substation (Nos)		Distribution Transformers (Nos)	Lines (CKT KMs)				Energy Meters (Nos)		
				New	Aug.		LT line	Feeder Segregation	11 KV	33 & 66 KV Line	Consumer	DTR	Feeder
Scope	**395**	**1**	**31305**	**80**	**103**	**25141**	**8511**	**17579**	**8126**	**1969**	**1366391**	**122597**	**512**
Ach (%)	-	-	-	-	-	-	-	-	-	-	-	-	-

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c. Issues:

- Delay in commissioning of one new Sub-station and Augmentation works in 4 Sub Stations of XI plan, sanctioned in April, 2008
- Poor performance of **XII plan** projects (BPL- 12%) & delay in completion of works in 3 new Sub Stations (Howrah-1 & North 24 Paraganas- 2), sanctioned in Dec, 2013.

III. Saubhagya:

a. Household Electrificationstatus as per LOI: **(Nos. in Lakh)**

Rural:

i.	Total Households in the State	-	146.60
ii.	Households already electrified	-	142.75
iii.	Balance un-electrified households	-	3.84
	• Covered under ongoing DDUGJY Scheme	-	0.02
	• Proposed under Saubhagya	-	2.54

b. States are yet to submit following:

i. Submission of DPRs in web portal
ii. Date of launching of Saubhagya at State level
iii. Communication plan and awareness campaign at site
iv. Schedule for organizing camps covering cluster of villages/Panchayat for households electrification
v. Deployment of dedicated manpower for implementation and appointment of PMA, if required
vi. Monthly/Quarterly target at District/Division/Sub Division level

Conclusion

Hence this situation of the state as well as in the north region of the state is giving that the rural electrification is clashing down with time, as if we compare this with the past data of the financial and the implementation structure of the rural electrification. Hence the policy should be special in terms of grid stability investments and the incentivising to use solar power. Cross subsidy will not going to be a big factor in such case as the industrial consumers are less. The Main consumers are urban household agriculture, and corporations.

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