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SOLAR ENERGY AND IT'S APPLICATIONS AT VARIOUS ECOSYSTEM LEVELS IN INDIA AND GLOBE

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Review Article

ABSTRACT

As India is being a tropical country and is having a more sunlight during day time. Green energy technology is more useful for the development of Rural and Urban areas . How solar energy is useful in industries, households, and various ecosystem levels. India has a vast population, so it requires a large amount of energy supply to rural and urban areas. At the same time it has a vast supply of renewable energy sources and it has one of the largest programs in the world for deploying energy production and systems.

When we talk about solar-powered watches, Solar powered- calculators, solar-powered lamps, solar-powered batteries, solar-powered cookers, solar-powered air-conditioned coolers, and many more devices.

Many solar-powered scooters, solar-powered-bikes, Solar powered railways, solar-powered aeroplane, solar-powered panelled satellite =,etc.

We can analyse various sources for its harvesting through SWOT analysis.

Keywords: Solar-energy; SWOT; application; various ecosystem levels; economic growth; importance.

SWOT means,S=Strength,W=Weakness,O=opportunity, T= Threat.

1. INTRODUCTION

It is a cheap, easily accessible and available source of energy from Nature. As India is having a great amount of light during the day time. It is clear during 8-9 month in through out the year. It can give us benefit of energy from mechanical engineering and conversation process is stored in the Solar power devices.

1.1 History of Solar-energy

The economic history of solar-energy provides a powerful study of arguments. Two major energy transitions have swept the world in the last 125 years ago. First, coal replaced the wood as the dominant source of commercial energy. Coal itself were displaced by oil and gas . Both the changes occurred over a breath taking years, with speed.

Solar-energy is very critical to all development aimed at human welfare covering household, agriculture, transportation and industrial sectors etc.

Indeed ,India only country in the world to have an exclusive Ministry of Renewable Energy Development, the Ministry of Non-Conventional Energy Sources (MNES) Its formation launched the World's largest and the most ambitious Programs on

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Renewable Energy Adani Group of Green Energy also have more than 45,000 crores rupees Solar Energy Projects. (10July, 2020).Reports from Divya Marathi Daily News paper. The Department of Telecommunications and Defence Establishments are also using Solar Photovoltaic systems for their energy requirements. Most of the, School, College, and various offices are also supplied with Solar system.

1.2 Solar-energy: A SWOT Analysis

When we use solar-energy we have to analyse various things like, Strength, Weakness, Opportunity and Threat for any concept of process we propose. In this case also SWOT ANALYSIS is essential so that the analysis shall be considered right at planning stage for ultimate success. SWOT ANALYSIS of Solar-energy is given below:- [SWOT],

S=Strength,W=Weakness,O=opportunity,T=Threat,

Strength:- (**S)**

1. Source of Solar-energy is never ending.
2. Totally pollution free.
3. Can be utilised for all purpose.
4. Can be utilised in any form of energy.
5. Scope for decentralization.
6. Easy to operate.
7. Minimum working expenditure.
8. Saves fossil fuel deposit.
9. Economically self sufficient.
10. Less hazardous.

Weakness:- (W)

1. Problem of storage.
2. Not available on cloudy or eclipse days.
3. Quantum varies according to season or weather.
4. Initial investment is high.
5. Needs subsidy.
6. Spares not easily available.
7. Creates problems for urban planning since higher building interrupts lower solar-energy system.
8. Not yet taken on priority list.

Opportunity :- (O)

1. Scope for utilising magnetic energy from solar-wind.
2. By bringing down the price, it can be boon even for low income group.
3. Chance of hazard is less.
4. Scope for decentralization.
5. Chance of adverting exploitation of energy consumers.
6. Totally pollution free.
7. Vast opportunity for expansion in many use.

Threat:- (T)

1. Threat from oil lobby.
2. Threat from coal lobby.
3. Opposition from different forces due to subsidy.
4. Lack of knowledge of common consumers.
5. Fluctuations due to season or weather may discourage consumers.

How we can solve the problem of energy?

Energy is very critical to all aimed at human welfare covering household, agriculture, transport and industrial sectors. There is also a direct correlation between the level of economic development and energy consumption. Countries all over the world have now think about a policy on energy and look into the possibility of having energy systems with no or very limited environmental impacts. They now plan to use non- renewable sources on a sustainable basis as also replace them by the It may be emphasised that most renewable sources of energy are environmentally rather sound and could especially help to meet decentralised rural areas energy requirements. This itself could stall environmental degradation by fuel substitutions, greater efficiencies in energy production and use improvement and identification of alternative sources.

The commercial energy consumption in the developed countries has increased during the last 3-4 decades. More than 80% of total world consumption of energy is by developed countries which counts for only 30% of the population. On the other hand 20% of energy consumption is by 70% of the world population in developing and socialist countries. Further more there had been a major shift from coal to oil on the increased availability as also many technological advances in the area of oil. The very high consumption of energy in advanced countries is due to the ready access to energy for the daily life of the people, heating, cooking, lighting, domestic works etc.

Warmers are becoming popular these days in Industry and Households For example, At Anand this industry is very famous and has got a award of **1982** (Gold) from Trans World Trade Fare **1982** selection award (Gold Medal). Passive Solar Architectures provide comfortable housing in extreme cold and hot climates. This engineering has also been successfully applied in

warehouses and cold Storages. A multipurpose solar dryer-cum-warehouses is is under construction at Ganaur(Harayana) , India, where Chillies, Potato Chips, and other food stuffs could be dried and stored. Solar energy has also been effectively used in desolenation of water College of Engineering,, Pune has designed a solar furnace that can generate heat up to 2000°C which can be used in various metallurgical industries and other purposes.. Department of Non-Conventional Energy Sources of Government of India, prepared a perspective plan that envisages generation of energy through Non-Conventional energy sources.

The rapid depletion of conventional energy sources has promoted governments and people to concentrate on finding and tapping now conventional energy sources that may last for long. In fact, inexhaustible energy sources like so far energy , tidal wind and atomic power can only bring hope for the sustainable development, and Socio-economic development of humanity for years to come when exhaustible sources will become either inaccessible or too costly to afford. (**DNES**, **2001**), Department of Non-Conventional Energy Sources, Government of India. The replacement of 250 million tons of coal per annum, including 15000MW of electricity by year **2001**, India's first solar power station, soon to be operated near, New Delhi. Rural electrification through photovoltaic or solar plates and in hilly areas also. Moreover, photovoltaic irrigation pump sets have also been installed at some places in Solapur district of Maharashtra state and other places in india and Globe.

The component of non-commercial energy in Nepal is 90% , Bangladesh 83% and in India it is 48% . According to the Advisory Board on Energy, of Government of India various forms of energy is likely to make the following:-

(**2004-2005**) Coal -450-540Mt. Oil 90.110 Mt.

Electricity 501-592billion kWh and Non-commercial Energy 500Mt.

The International Energy Agency (IEA) projected in **2014**, by its "high renewables energy " Scenario by 2050.Solar Photovoltaics and Concentrated Solar Power would contribute about 16 and 11 % of the global energy consumption and solar will be the global Star's largest source of energy/ electricity. Most of the Solar installations were in China and India. In **2017** , Solar power provided 1.7% total global electricity production growing 35% from the previous year. By **2018**, the unsubsidised levilised cost of electricity for utility scale solar power is $43/MWh.

2. MATERIALS AND METHODS

A survey was conducted during, (2004-2005) in this year how energy consumption of different countries were utilised their different sources of energy for, urban areas as well as rural areas of their household, agricultural, industry, transport and other. As shown in the following Tables A. B, and C.

2.1 Observation and Results

In the developing countries the energy (particularly commercial) consumption is concentrated in the urban areas for the, industrial, commercial and even for domestic use. The non-commercial energy is typically concentrated in rural areas through the use of firewood, agricultural residues animal manure and human and animal power.

It is also estimated that at the beginning of next century i. e. **2000-2001** total energy consumption expressed a million ton of coal requirement shall be 14248 were shared up commercial energy expressed same term as above 12613 . The energy picture in various years by estimated/ actually showing different types of sources are given following Tables 1, 2, 3.

This gives a clear about how we consume, what shall be reconsumption in future. Above figure also shows that we use a lot of fuel wood as a source of energy which not only creates health hazards, environmental pollution but also is one of the major reason for deforestation which entirely affects the rain fall in the country.

Table 1. Relative shares [%] of different forms of commercial energy for various sectors (1978-79)

Sr.No.	Sector	Coal	Oil	Electricity	% of Total Commercial Energy consumption.
1.	Household	10. 0	71.2	18.2	13.7% .
2.	Agriculture	0. 0	61.8	38.2	10.6%
3.	Industry	44. 5	7.9	47. 6	38.5%
4.	Transport	13. 3	83. 9	2.8	31.7 %
5.	Others	11. 9	36.2	51.9	5.5%

Table 2. Estimated energy consumption in (2004/05) base case

Sr. No	Fuel	Sectors of Consumption	Household	Agriculture	Industry	Transport	others
1.	Fuelwood	300-330	---	---	---	---	---
2.	Dung cake	199-221	---	---	---	---	---
3.	Agricultural residues	90-104	---	---	---	---	---
4.	Kerosene	16-18	---	---	---	---	---
5.	L. P. G.	2.4	---	---	---		1-1.5
6.	Biogas	169—188	---	---	---	---	---
7.	Softcoke	20-22	---	---	---	---	---
8.	Charcoal	2. 8—3.1	---	---	---	---	---
9.	Coal	---	---	178-198	---	5.4-603	---
10.	Electricity	96—107	42-45	302—366	9-12	52-62	---
11.	HSD/LDO	---	7. 4-8.1	80	21-40	---	---
12.	MS	---	---	---	7.8	---	---
13.	ATF	---	---	---	---	2. 7-3.5	---
14.	HHS	---	---	---	16. 20	---	---

*L.PG :Liquid Petroleum Gas ;HSD: High Speed Diesel;LDO:Light Diesel Oil; MS: Motor Spirit; ATF:Aviation Turbine Fuel ;FO: Furnace oil; LSHS:Low Sulphur Heavy Stock ;HHS:Hot Heavy Stock ; Source: ABE, 1985 , [1-2]**

Table 3. Estimated fuelwood consumption in 2004/05 in Mt

Sr. No.	Region/ State/UT	Fuelwood Consumption in Mt		
	Northern Region	**Rural**	**Urban**	**Total**
1.	Uttar Pradesh	37	10	47
2.	Rajasthan	17	4.0	21
3.	Punjab	3.5	0.5	4.0
4.	Hariyana	2.0	0.5	2.5
5.	Himachal Pradesh	3.0	0.5	3.5
6.	Jammu And Kashmir	2.5	0.5	3.0

Sr. No.	Region/ State/UT	Fuelwood Consumption in Mt		
	Eastern & North Eastern Region	**Rural**	**Urban**	**Total**
7.	West Bengal	9.5	0.5	10
8.	Bihar	19.5	1.5	21
9.	Odisha	13	3.5	16.5
10.	Assam	11.5	1.0	12.5

Sr. No.	Region/ State/UT	Fuelwood Consumption in Mt		
	Southern Region	**Rural**	**Urban**	**Total**
11.	Andhra Pradesh	26.5	8.5	35
12.	Karnataka	17.5	7.5	25
13.	Tamilnadu	20	10.5	30.5
14.	Kerala	11.5	4.5	16

Sr. No.	Region/ State/UT	Fuelwood Consumption in Mt		
	Western Region	**Rural**	**Urban**	**Total**
15.	Madhya Pradesh	20.5	6.5	27
16.	Maharashtra	22.5	5.5	28
17.	Gujrat	10	3.0	13
	Total	247.0	69.0	316.0

*Source :ABE, 1985, [3]**

3. DISCUSSION

In U. S. A. The citizens have formed a solar lobby which argues that a strong federal commitment to solar-energy to increase the renewable energy sources from the present 6% level to more than 25% by year **2000**. For achieving this goal would cost no more and might cost less than a programme to get the same amount of energy from nuclear power or synthetic fuels. The outlined policies to solar future such as equitable energy subsidies, [4,5,6,1] reforming the tax code and fuel pricing policies. However, this aspect is taken care in India by DNES (Department of Non-Convential Energy Sources) .

The programme purpose is posited on an increase in the contribution of renewable energy source from the present 6% level (mostly hydro power) to more than 25% by the year **2000**.This rate of growth of market share approximately 20% in 22 years is not anomalous in our economy. Far more rapid rates of displacements occurred when automobiles, commercial jets, television sets, air conditioners, various other expensive items came on the seen. Rapid growth and market changes also typify the energy sector. Environmentally clean and easily employed in a decentralised fashion, gas and oil become the fuels of choice for tens of millions of families and businesses. Governmental subsidies and price control make these fuels economically attractive as well [7-10].

Solar-energy now makes economic sense at the margin which means that the energy from a unsubsidised new nuclear power plants (if there were such a thing) would cost more than that from an unsubsidised new solar-energy. If the society's scarce capital is to be invested efficiently, the microeconomic interest of individual consumers must be brought more closely in line with the macroeconomic interest of the nation. Only through federal policy can such as an alignment come about. The energy system of our country is complicated [11-17].

A historical force of in its own right its many threads are woven into the fabric of our lives. Therefore, shifting to an economy fueled by renewable resources require taking actions of many kinds of many fronts. It is a major technological revolution is necessary. Outlining the several steps towards this goal all Indian support makes more sense than attempting to chart the entire journey. Since some opportunities will arise, technological breakthrough or holdups will change priorities, and human wisdom will find new paths, the key is to design policies that maximize our opportunities for future flexibility [18-23].

The programme we envision is more modern and more manageable than the moral equivalent of war. It is a practical plan for correcting the distortions in the energy market place by reconstructing the subsidies regulations and other public policies that bias the market in favour of the development and production of conventional fuels. Large number of uncertainties cause public and official understanding of the impact of policies to promote solar-energy development.

4. CONCLUSION OR SIGNIFICANCE OF SOLAR SYSTEM AT VARIOUS ECOSYSTEM LEVELS

1).Some uncertainty systems from the longstanding neglect of solar-energy technology by policymakers. Including the above data, likely impacts on such policies, analyst must now depends on mainly judgement. Whether the energy results are dressed in computer language or dashed off on the backs of envelopes, the assumptions tends to be more important than the computations and there is genuinely scope for disagreement among well informed individuals of good will, [24-29].

2).In general, we feel guarded optimism about the likely impact of pro-solar policies suggested here. Although many solar-energy market penetration studies seems to reflect the notion that India must be dragged into the solar ear kicking and screaming, we believe that we will enthusiastically embrace solar alternative if public policy merely allows them true freedom of choice [30-43].

3). If we go on study the different sources of energy and we can find there are lot of environments in other sources than renewable sources in particular. A SWOT ANALYSIS has been given in respect of solar-energy which also fixed out the need for solar-energy in our society and country today. If we can have a cleaner, environmental and with a infinite solar-energy with better economy we have no other choice left to take up solar-energy from future days to come [14-17,44-49].

4) There are many solar-powered scooters, solar-powered lamps, solar-powered batteries, solar-powered cookers, solar-powered cars, solar-powered furnaces, solar-powered, aeroplane ✈□, solar-powered satellites,, petroleum industry, agricultural-sector, educational-sectors , building, solar-powered boat ⅄,all are prepared and verifications and certifications are done for various countries and companies, solar-powered- <, in different ecosystem and countries, **[**30-43,50,51].

5). All the above mentioned sources of solar-powered instrument, will also saves economical conditions of Maharashtra India and Globe < definitel, [52].

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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