

The Observation of climate change and mitigation of GHG by used of RES

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Key words: Renewable energy sources, green-house gas, emission.

ABSTRACT

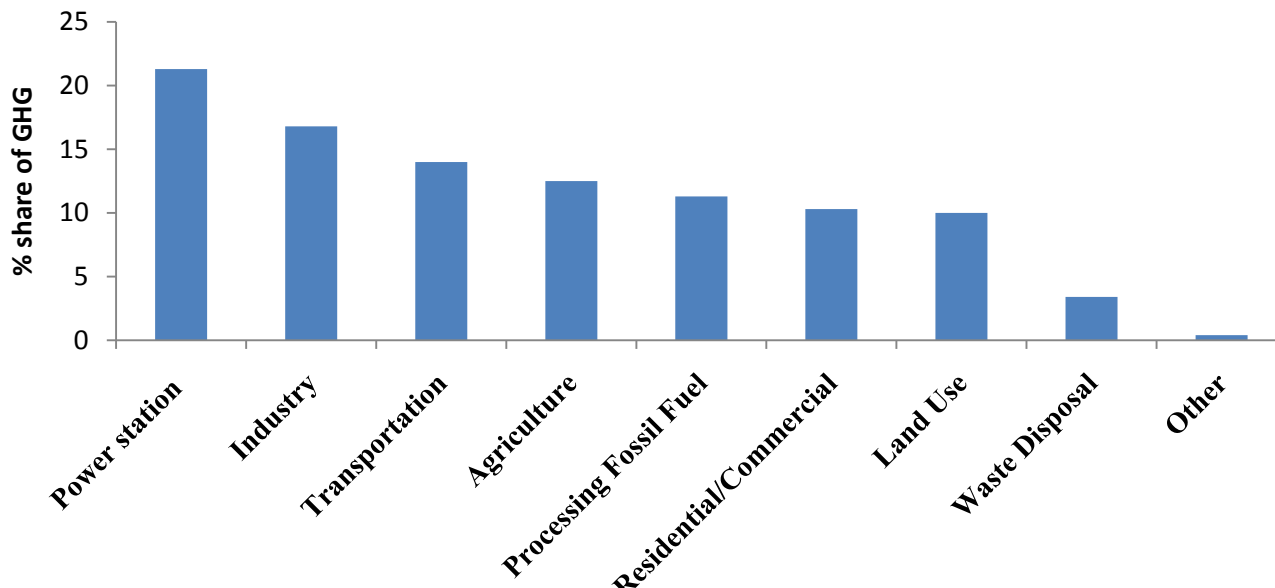
About 32.02% of the Indian population lives in urban area, according to the World Bank. The population of India is growing rapidly three times after the post-independence, the urban population grown five times. The urban population primarily depends on fossil fuel and used cow dung, coal, wood etc. The rapid increase population to become a big disaster because it required energy in different form .Energy required for making a food, electricity, transport, construction etc. Mainly in India used non renewable energy sources such as coal, oil and gas for different use. Around 69% of electricity is generated by the fossil fuel. Firstly used of non -renewable energy in a huge amount it is scarce resources. Its quantity is limited in the earth and they are not available easily .So for the future used its saving is necessary .The second problem is that these energy emitted a huge amount of GHG .Now the condition of earth is very serious and all of nature things is affected by these GHG. Climate changed and the disaster come in this decade is the sign of climate affection. Tsunami, earthquake, heavyrain, drought, flood etc. these are sign of environmental affection. So renewable energy is used because it mitigate CO_2 and it is fulfill the criteria of people.

INTRODUCTION

This study presents energy sources in India and shows the availability of raw material by which produce electricity, mainly concern on solar energy. In India there are so many resources of energy. But in India mainly electricity produce by coal

India is the fourth largest energy consumer in the world after the United States, China, and Russia It faces a formidable challenge in providing adequate energy supplies to users at a reasonable cost. In recent years, India's energy consumption has been increasing at a relatively fast rate due to population growth and economic development. Rapid urbanization and improving standards of living for millions of Indian households, the demand is likely to grow significantly. In order to sustain the production, industries have opted for inefficient diesel-fuelled backup power. India's energy planning, which is based on the twin objectives of high economic growth and providing electricity to all, is failing to meet either. The domestic power demand of India was 918 billion units in 2012. It is expected that at 9.8% annual growth the demand will reach 1,640 billion units by 2020. At this pace, India will require 390 GW in the next eight years which is almost double its current installed capacity of 210 gigawatts (GW). There is growing energy inequity between rural and urban areas and also between the developed and developing state.

This graph shows the GHG emission from different sources.



Different sectors emit GHG

The annual global projection of anthropogenic GHG emissions

As per graph shows that power station emit a huge amount of GHG .This is because power station use coal and coal emit a lot of carbon di oxide .In Industry ,depend on what type of product use .A recent example is china Tianjin explosion .Due to this blast more than 50 people dies ,around 800 people injured. Thousands of people homeless. Today the environment condition is badly destroyed. The explosion were so powerful that they tossed vehicles into the air, blasted building into blackened shells and torched hundreds of new cars lined up.According to the Tianjin Tanggu environmental monitoring station, hazardous chemicals stored by the company concerned include sodium cyanide, toluene di-diisocyanate and calcium carbide , all of which pose direct threats to human health on contact.

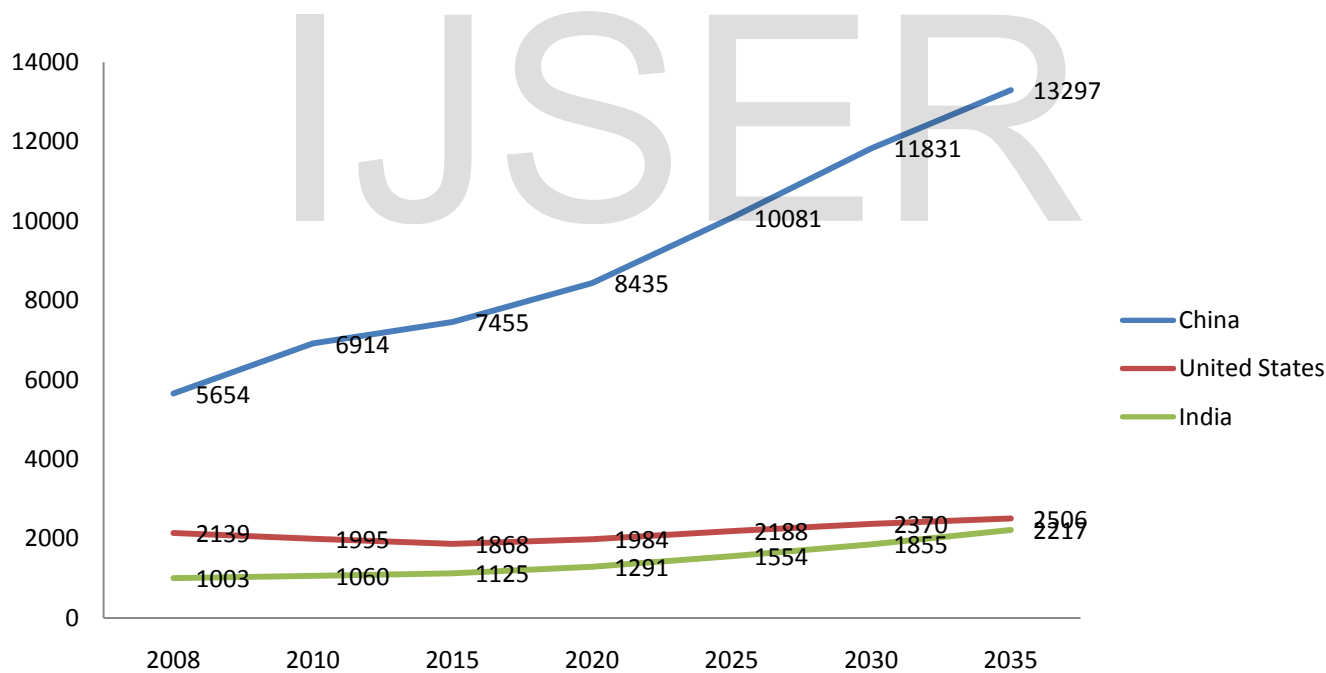
SOME IMPACTS OF DEVELOPMENT ACTIVITIES ON ENVIRONMENT

Development Activities	Major Impacts on Environment
Forest clearing and land resettlement	Extinction of rare species of flora and fauna, creation of condition for mosquito breeding leading to infectious diseases such as malaria, dengue etc.
Shifting cultivation in upland agriculture	Soil erosion in upland areas, soil fertility declines due to shorter cultivation cycle, which is practiced due to population pressure, flooding of low land areas. The problems could be resolved by terraced cultivation.
Agro industries	Air pollution due to burning of bagasse as fuel in sugar mills, large amount of highly polluting organic wastes, surface water pollution
Introduction of new varieties of cereals	Reduction of genetic diversity of traditional monoculture resulting in instability, danger of multiplication of local strains of fungus, bacteria or virus on new variety

Use of pesticides	Organism develops resistance and new control methods are needed (e.g. in malaria, widespread use of dihedron as a prophylactic agent against pests of oil palms made the problem worse), creation of complex and widespread environment problems. The pesticides used in agriculture sometimes go into food chain or in water bodies which may result in harmful health hazards.
Timber extraction	Degrades land, destroys surface soil, reduces production potential of future forests.
Urbanization and industrialization	Concentration of population in urban centers makes huge demands on production in rural areas and put pressures on land, air and water pollution.
Water resource projects, e.g. Dam, extensive irrigation	Human settlement & resettlement, spread of waterborne diseases, reduction of fisheries, siltation, physical changes e.g. temperature, humidity.

(Sources by: compendium of environment statistics 2014)

World CO₂ emission from coal use *In Million Metric Tons Carbon di oxide *



Sources U.S .Energy Information Administration (EIA) International Energy Statistics database

This graph shows the steadily raising of carbon di oxide in there country .After 2008 the pollution in India is almost double in 2035 as shows above. China is the country which contributes a huge amount of GHG. Recently the blast in Tianjin increased the level of pollutant and pollution .

CARBON DI OXIDE EMISSION IN INDIA

India's 2008 total fossil-fuel CO₂ emissions rose 8.1% over the 2007 level to 475 million metric tons of carbon. From 1950 to 2008, India experienced dramatic growth in fossil-fuel CO₂ emissions averaging 5.7% per year and becoming the world's third largest fossil-fuel CO₂-emitting country. Indian total emissions from fossil-fuel consumption and cement production have more than doubled since 1994. Fossil-fuel emissions in India continue to result largely from coal burning with India being the world's third largest producer of coal. Coal contributed 87% of the emissions in 1950 and 71% in 2008; at the same time, the oil fraction increased from 11% to 20%. Indian emissions data reveal little impact from the oil price increases that affected emissions in the United States and Western Europe so dramatically in the late 1970s and early 1980s. With the world's second largest population and over 1.1 billion people, India's per capita emission rate for 2008 of 0.40 metric tons of carbon is well below the global average (1.30) and the smallest per capita rate of any country with fossil-fuel CO₂ emissions exceeding 50 million metric tons of carbon.

A considerable amount of air pollution results from burning of fossil fuels. Fuels are primarily derived from fossilized plant material and consist mainly of carbon and/or its compounds. The household sector is the largest consumer of energy in India. More than 60 percent of Indian households depend on traditional sources of energy like fuel wood, dung and crop residue for meeting their cooking and heating needs. Out of total rural energy consumption about 65 per cent is met from fuel wood. Fuel wood consumption during 2001-02 was estimated at 223 million tones, 180 million tons of which is for household consumption and the balance for cottage industry, big hotels etc. Burning of traditional fuels introduces large quantities of CO₂ when the combustion is complete, but if there is incomplete combustion and oxidation then Carbon monoxide (CO) is produced, in addition to hydrocarbons. Incomplete combustion of coal produces smoke consisting of particles of soot or carbon, tarry droplets of unburnt hydrocarbons and CO. Fossil fuels also contain 0.5–4.0% of sulphur which is oxidized to SO₂ during combustion.

The environmental effects of various fuels, namely, coal, oil, nuclear etc. are of growing concern owing to increasing consumption levels. The combustion of these fuels in industries and vehicles has been a major source of pollution. Coal production through opencast mining, its supply to and consumption in power stations, and industrial boilers leads to particulate and gaseous pollution which can cause pneumoconiosis, bronchitis, and respiratory diseases. Another major impact of coal mining is land degradation, especially of forest areas.

In India, Lignite production is mainly in Tamil nadu, Gujrat and Rajasthan. Coal is the most abundant source of commercial energy in India. Coal resources are continually assessed by the Geological Survey of India through regional mapping and exploratory drilling. The State wise Lignite and Coal production over the years is presented in table Coal production increased rapidly after the nationalization of coal mines. From about 296.7 million ton in 1997-98, it raised to 565.77 million ton in 2013-14 making India, one of the major coal producers of the world. The increase is predominantly low productivity levels in underground mines.

Total absolute emissions of CO₂ from the power sector by region for the year 2005-06 to 2012-13[8] :

(Million tonne CO₂)

Grid	2005-06	2006-07	2007-08	2008-09	2010-11	2012-13	2013-14	2014-15
NEWNE	368.2	385.7	406.9	430.7	453.2	468.4	491.9	539.5
SOUTHERN	101.6	109	113.6	117.9	126.8	129.1	145.4	156.8
INDIA	469.7	494.7	520.5	548.6	580	597.5	637.3	696.3

EMISSION FACTOR OF CARBON DI OXIDE(in tonne CO₂/MWh)

GRID	Average	2011-12			2012-13			CM
		OM	BM	CM	Average	OM	BM	
NEWNE	.78	.97	.94	.94	.83	1	.97	.98
Southern	.96	.96	.85	.91	.85	1	.95	.97
INDIA	.78	.97	.9	.93	.83	1	.96	.98

CM is a weighted average of the OM and BM

OM: (operating margin) is the average emission from all stations excluding the low cost/must run sources.

BM: (build margin) is the average emission of the 20% (by net generation) most recent capacity addition in the grid.

CM :(combined margin) is a weighted average of the OM and BM

Note: Average is the average emission of all stations in the grid, weighted by net generation.

Grid	2011-12						2012-13					
	Coal	Diesel	Gas	Lignite	Naphtha	Oil	Coal	Diesel	Gas	Lignite	Naphtha	Oil
NEWNE	1.06	1.07	.45	1.42	.38	.65	1.05	-	.47	1.36	.4	.63

Southern	1	.58	.43	1.43	.78	.62	1.01	.59	.46	1.41	.56	.61
INDIA	1.05	.59	.45	1.42	.38	.64	1.04	.59	.47	1.4	.4	.61

Source: central electricity authorities

CO/MWh: Carbon Dioxide/meghawattthorss.

Note: NEWNE Grid: Integrated Grid of Northern, Eastern, Western and North Eastern Region.

Impact of policy of RES [1]:

The share of renewable energy has steadily increased due to initiative taken by the Government of India as shown in table.

Sources	Installed capacity by end of 11 th plan (March 2012)	Current installed capacity (March 2015)	Target as per 12 th plan (March 2017)	Revised Targets till 2022
Solar Power	941	3,383	10,941	1,00,000
Wind Power	17,352	22,645	32,352	60,000
Biomass Power	3,225	4,183	6,125	10,000
Small Hydro	3,395	4,025	5,495	5,000
Total	24,914	34351	54,914	1,75,000

Anticipated all India Power Supply Position for the years 2015-16

State / Region		Energy				Peak		
Requirement	Availability		Surplus(+)/ Deficit (-)	Demand		Met		Surplus(+)/ Deficit (-)
(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(MW)	(%)
Northern	355,794	354,540	-1,254	-0.4	54,329	54,137	-192	-0.4
Western	353,068	364,826	11,758	3.3	48,479	50,254	1,775	3.7
Southern	313,248	277,979	-35,269	-11.3	43,630	35,011	-8,619	-19.8
Eastern	124,610	127,066	2,455	2.0	18,507	19,358	851	4.6
North-Eastern	15,703	13,934	-1,768	-11.3	2,650	2,544	-106	-4.0
All India	1,162,423	1,138,346	-24,077	-2.1	156,862	152,754	-4,108	-2.6

(Sources by IGBR report 2015-16)

As per shows this table during 2015-16 the energy is deficit by 2.6. So for improve energy in India the government initiate RES in which fulfil the critereia of energy and mitigate the effect of GHG .Today the World most popular problem is the Population and energy deficit .Energy is required in all sectors.According to IPCC report the global temperature increased 0.8 degree cent. It's a big threat to earth .Glaciers melt and the level of oceans increased .The

people which live near seas their life is disrupted and they migrate to other places .So overcome all of thes the better option is use renewable energy .State –wise solar project in India under different schemes

Commissioning Status of Grid Connected Solar Power Projects under Various Schemes					
Sr. No.	State/UT	Total MNRE Projects MW	State Policy MW	REC Scheme MW	Total commissioned capacity till 29-05-15 (MW)
1	Andhra Pradesh	94.75	115.01	37.7	247.46
2	Arunachal Pradesh	0.025	0	0	0.025
3	Chhattisgarh	4	1.68	4.6	10.28
4	Gujarat	20	974.05	6	1000.05
5	Haryana	7.8	5	0	12.8
6	Jharkhand	16	0	0	16
7	Karnataka	5	73.22	0	78.22
8	Kerala	0.025	0	0	0.025
9	Madhya Pradesh	185.25	297.55	80.78	563.58
10	Maharashtra	57	185.38	121.32	363.7
11	Orissa	12	15.42	4.5	31.92
12	Punjab	10.5	177.25	7.52	195.27
13	Rajasthan	789.1	65	193	1047.1
14	Tamil Nadu	16	33.82	98.16	147.98
15	Telangana	0	39.35	23.4	62.75
16	Tripura	0	0	5	5
17	Uttar Pradesh	12	59.26	0	71.26
18	Uttarakhand	5	0	0	5
19	West Bengal	2.05	5.16	0	7.21
20	Andaman & Nicobar	0.1	5	0	5.1
21	Delhi	0.335	4.237	2.14	6.712
22	Lakshadweep	0.75	0	0	0.75
23	Pondicherry	0.025	0	0	0.025
24	Chandigarh	4.5	0	0	4.5
25	Others	0.79	0	0	0.79
TOTAL		1243	2056.387	584.12	388.507

Different solar schems and project[2] :

For preparation of master plans the ministry has empanelled 26 consultants in June 2009.

- 1. Modal solar cities:** Eights cities choose to be developed as ‘MODAL SOLAR CITIES’. Some states are Nagpur, Chandigarh, Gandhinagar and Mysore is identified as Modal solar cities. The financial up to Rs 9.50crore has been provided to all cities equally by the Municipal Corporation or any other resources include public partnership.

2. **Pilot solar cities:** 15 cities choose as 'Pilot solar cities' and these will be developed. Agartala, Rajkot, Shimla, Faridabad, Thane, Raipur, Shirdi, Leh, Aizawl, Puducherry, Vijaywada and Amritsar have been developed as a Pilot solar cities. For all of these states the municipal corporation or other provided equal amount of Rs. 2.50 Crore.
3. **RE Project:** Chandigarh, Mysore, Rajkot, Agartala, Faridabad, Thane, Aizwal, Puducherry, Nagpur, Surat, Vijaywada & Shimlam have been choose for RE project with the installation capacity of 7.32MWp eq. Solar PV project and 7894.5m².
4. **Green Campus:** 13 campuses namely Silver Jubilee Campus of Pondicherry University; Auroville Campus (Puducherry); Dayalbagh Nagar Panchayat; School of Planning & Architecture (New Delhi); Malkapur Nagar Panchayat; KIIT University; Tezpur University; Indian Institute of Engineering, Science & Technology (BESU); Jadhavpur University; Writers Building (Kolkata); Madan Mohan Malaviya University of Technology (Gorakhpur); Orissa University of Agriculture and Technology (Bhubaneswar) and National Institute of Technology (Hamirpur) choose for a green campus project.

CONCLUSION:

This paper deal with the GHG emission in environment due to installation of Thermal plant, Transportation, Agriculture, Factory etc. Mainly Coal is used in India for power generation so if we reduce coal consumption and use other source which emit a minor or no harmful gases .So through this mitigate GHG .Today Energy is prime and can't assume life without power. All things in life is attached with power. So Use such a process which mitigate GHG and fulfill the criteria of energy .So the answer is renewable energy sources .This energy emit a very GHG and to fulfill the criteria. The government taken an initiative in this field and explore in all states of India. In India, the generation of solar energy increased .The government provided a fund to installed the solar power station and give loan and subsidy .The government conduct the conference so that all of the people inform about the solar energy .The solar energy is free of cost in environment and no harmful to human .Through solar energy unemployed people will get work and it is environment friendly. The people which work on thermal plant suffer many diseases due to smoke of coal, wood and other raw material. The life of employers is studily decreased and employer is not happy to do this work. In roof top solar there is no more loose of transportation .No long cable is required and use of battery to meet power in night.

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