

Review Of Research



Abstract:

First small hydro power was installed at darjiling in 1897 in British India but after independence Indian Renewable energy sector got recognition in 1990s when wind energy introduced at large scale. Renewable energy counted as second life line in energy deficit countries. After independence India got tremendous achievement in energy generation but due to high demand of energy always demand – supply gap exist. Renewable energy didn't get enough attention compare to conventional energy due to unavailability of advanced technology and R&D But from last decade RE scenario has been changed. Conventional energy counted as primary energy resource in world due to low input cost compare to

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GROWTH STORY OF RENEWABLE ENERGY SINCE INDEPENDENCE IN INDIA

environment by extraction of hazardous gases. India is facing 9-13% energy shortage in different segment especially peak & off-peak load hours. In India, renewable energy infrastructure progress is very low compare to other developing Asian countries. According to geographical condition of India huge untapped solar energy potential are available. MNRE initiative JawaharLal Nehru national solar mission is dream project to boost renewable energy especially solar energy contribution in India. In this research paper, main focus is total growth in Renewable energy since independence. Growth accounted in yearly plan wise (yearly and 5 yearly).

Key Words:

renewable energy, solar energy, growth, trend analysis.



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INTRODUCTION

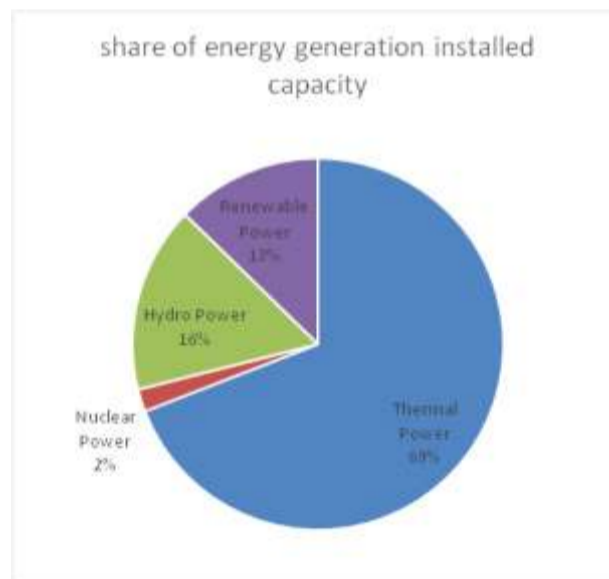
Indian energy sector mainly depend on conventional and Non-conventional resources. Pre independence energy sector was under British government and after independence energy sector under private hand. Indian power sector entering in new regime where capacity addition in renewable energy is very must to run economy smoothly and fill demand and supply gap. Country's Economy mainly affected by manufacturing industry which demand high level of energy. In March 2014, total installed of energy in India was ~250Gw included with conventional and non-conventional energy resources. Conventional energy is main source of energy generation in India due to low capital cost and operation cost flow compare to renewable energy. And other reason is high efficiency and land requirement are main cause to opt conventional energy widely. According to study, coal fired energy generation produce approx. 60 -70% efficiency. And compare to conventional energy, renewable energy especially solar energy produce only 15 – 35% but wind and hydro energy produce relatively high efficiency than solar energy. From last 4 year solar energy got tremendous growth compare to other renewable energy sources. MNRE dream project JNNSM boosted solar energy capacity addition which is targeted to 20,000Mw by 2022. After independence Indian energy sector gone through various phases and changes. After unbundling of power sector, Energy generation boosted and private and government power plant established in various phase. From independence to till 2014, capacity addition of renewable energy reached to ~31Gw only. According to MNRE, by 2022 expected total RE installed capacity would reach up to 100Gw.

OBJECTIVE OF STUDY

Main objective of this study is to find out growth and status of Installed Renewable Energy capacity since Independence also track out renewable Energy component like Solar Energy, biomass Energy, Wind Energy Installed capacity since independence.

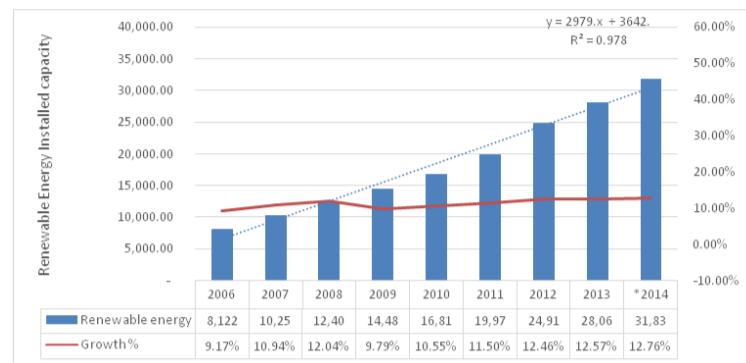
RENEWABLE ENERGY STATUS IN INDIA

After Independence India got his Renewable Energy Ministry in Early 1990s. Ministry of New and Renewable energy is first kind of Ministry in world. Renewable energy referred as alternate or clean energy. From time of independence renewable energy made remarkable space in energy mix. Government of India, introduced and also introducing lot of renewable energy promotion programs under different schemes. In current time MNRE putting main focus on solar energy. MNRE started national solar mission in two phase. India having total installed capacity is 2, 49,488.31 MW with having renewable energy contribution 13%. In renewable energy there is different energy generation segments like Solar, wind, Biomass, Solid waste, geo thermal etc.



According to figure, largest source of energy generation is thermal power it contribute around 69% and with compare to renewable energy take part in 13%. Government of India trying to increase percentage of Renewable energy compare to Thermal energy.

Renewable energy came into existence after 1990s when wind energy contribution was very high. Technology transfer, sufficient fund infusement, subsidy and grant are man instrument to boost renewable energy sector.

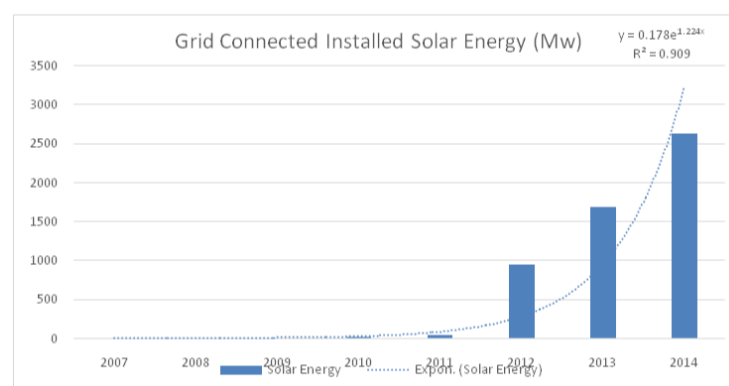


Source: CEA reports

In 2006 renewable energy installed capacity was 8122.1 Mw in which wind energy participation was highest around 82% and till March 2014 total RE Installed capacity accounted of 31,833 Mw. In 2014, wind energy contribution came down to 65% and 7-9% of solar energy and remaining participation of Biomass and other energy sources. In above figure trend line exist in 97% .

GROWTH IN SOLAR ENERGY

In recent time, solar energy sector got marvelous boost due to development of large solar park in different state like Gujarat, Madhya Pradesh, and Rajasthan etc. among of various state Gujarat having maximum installed capacity of solar generation is around 900MW, which is ~36% of total installed solar energy. Solar energy came in to existence in 90s but use of solar energy was at very small scale mainly solar lantern and solar PV cell for home lighting. Solar energy was not at commercial scale. For boosting solar energy, MNRE introduced National solar mission with keeping target to install solar energy in two phase. Phase one up to 2012-17 and phase two up to 2017-22.

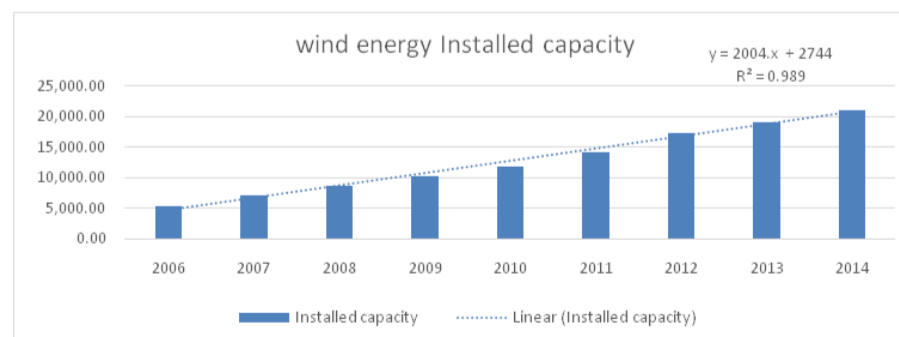


Source: CEA

Before 2007 off-grid solar energy was popular and no grid connected data available. In 2007 Total installed capacity of grid connected solar power was ~ 2Mw compared to current installed capacity is around 2632Mw. According to National Solar Mission till 2022 total installed capacity be set to 20,000Mw.

GROWTH IN WIND ENERGY

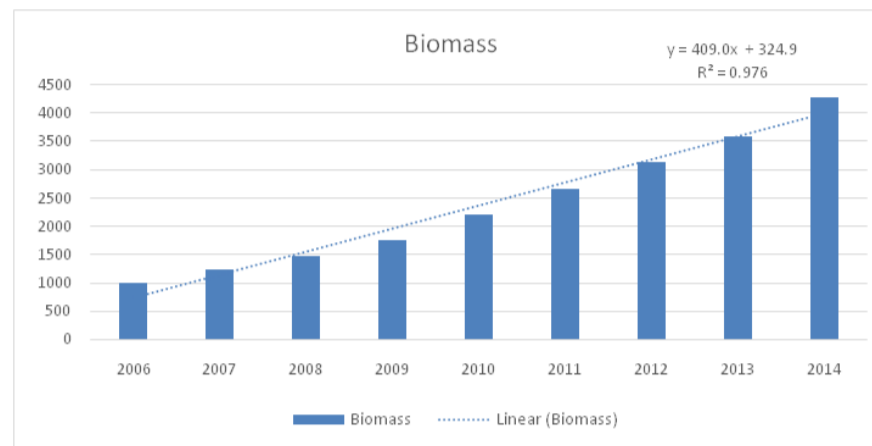
Wind energy is most popular and having largest share of energy resource in RE segments. Wind energy installation present in off-shore, on-shore and desert area where wind flow is high. In India wind energy installed energy growth constant continuous. In 2006 total wind energy installed capacity was 5310 Mw and by 2014 total installed capacity 20136 Mw achieved.



Source: CEA

GROWTH IN BIOMASS

Total installed capacity of Biomass energy in 2006 was 986.3 Mw compare to 4285 Mw till March 2014. In India Biomass is traditional energy resource due to rich forest, agriculture and crop production. Usage of Biomass energy primarily at cooking level at rural and remote area. In Below figure growth trend of Biomass energy have shown. Trend line or 'Line of Fit' shows 97% of Biomass growth means every biomass energy installed capacity achieve targeted growth. Biomass sector divided in to main two type 1. Rankine and combine cycle based power plant 2. Combustion based gasifier.



METHODOLOGY

This research paper based on secondary data, which is published by MNRE, ministry of statistic and central electricity authority in annual, monthly and weekly publication. For calculation of historical data of renewable energy trend analysis method have applied via using Microsoft excel tools. Data have been gather form energy statistic (2008, 09, 10, 11, 12, 13, 14) and "growth of power sector" published by CEA.

LIMITATION

There is some limitation in present study. Available data is very limited, even renewable energy presence from 1893 but officially resource wise renewable energy installed capacity data are available after 2006. On grid solar energy solar energy installed capacity data available from 2007 and wind and Biomass data from 2006 officially in publication. Off-grid data is not available in Mw capacity, data are available in term of Nos.

CONCLUSION

This research paper focused on after independence era of India where energy demand is getting high. Still India surviving energy deficiency compare to other developed and developing countries. Primary focus on conventional energy leads to diminish attention on Renewable energy because of high capital cost of Renewable energy installation. Major Renewable energy promotion program initiated by MNRE and Indian Government for Boosting Renewable energy installation Like JNNSM, CFA for Biomass and small Hydro Power. Apart from Such national level program for High capacity installation, small scale promotion also at high peak like subsidy on solar product (Water Heater, solar photovoltaic panel) and Biomass gasifier (Up to 2 Mw). In renewable energy segment, solar energy is high favorable for capacity enhancement due to easy installation and proper availability of sun rays. In last 3 Year capital cost of solar energy came down to ~50%, which is a major part of Boost installation capacity. Current Installation growth varies 12–15% annually which is very low to set target.

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