"TOWARDS BETTER UTILIZATION OF RENEWABLE ENERGY AND CO-RELATION BEHAVIOUR WITH ECONOMIC GROWTH AND ENVIRONMENTAL ASPECTS USING REGRESSION ANALYSIS"

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Abstract:

India is one of the fast and growing economy in the world with enormous industrial growth, however its major issue with electric however facing with regular power cuts and further additional problems in the power sector. This research comprises the study of renewable energy and its consumption pattern in the country, through three phases. The initial phase consists a case study on the economic development with particular reference to energy consumption. The overall trend reflects larger use of electricity by the farmers for agricultural yields other than revenue and jobs generating industrial consumers mainly due to providing subsidized power to the agriculture sector. The power demand is projected to be 1690 Bn. units by 2022.

Keywords — **Put your keywords here, keywords are separated by comma.**

INTRODUCTION

While the necessity for the energy continually increases, the look for new energy sources has also intensified. In the last decade, a gradual transition from coal to petroleum products and further to gas. This transition process is predicted to still renewable energy (RE) sources because energy usage is quickly rising within the world and therefore the majority of conventional energy sources (CES) (like fossil fuels) are being exhausted. Fuel (similar to coal, petroleum, and natural gas) usage is related to substantial environmental effects like global climate change

1.1 Renewable Energy (RE)

Basically, the RE is defined as the energy harnessed form natural sources like sun, wind, water, biomass, etc., which is available in abundant, and it can also be seen this energy are related to sun directly or indirectly and also there are non-solar sources such as geothermal and tidal energy [38]. Fig. 1.3 shows the different types of RES such as solar, hydro, wind, biomass, geothermal, hydrogen, etc.

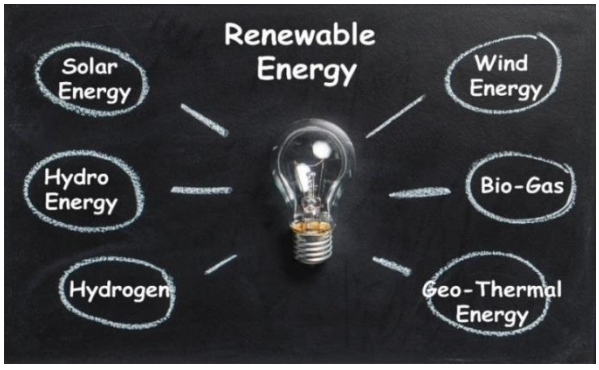

Figure 1 Types of RES. (adopted from OA)

1.2 Solar Energy

Fig. 1. shows the erection of solar panels deployed for harnessing the solar energy. Solar energy is defined as the source of energy, which is directly attributed with the sunshine (light) or heat provided by the sun. The well-known incontrovertible fact, is the solar power comprises the potential to provide thousand-fold for the annual energy consumption of the entire human race

Figure 2: Solar energy harnessing projects. (Adopted from OA)

The harnessing of solar energy comprises two active technologies which are:

1. Solar Thermal
2. Solar Photovoltaic (PV)
3. Wind Energy

The wind energy technology comprises the conversion of kinetic energy from wind into electricity. The wind generated from the convection currents in the earth atmosphere are driven by the heat from the sun. Fig. 1.5 shows the wind turbines generating electricity from the wind power. This may support above statement, which states the most RES is related to sun, here wind power is related indirectly. The capital required for the electricity generation from wind energy comprises the installation costs of the wind turbines, and also the interest on capital relates to

Figure 3: Wind energy. [Comprising wind mills or generators] (Adopted from OA)

Current Scenario of India (RE)

India's carbon dioxide (CO2) emissions from year 1970 to 2020 is presented in the Fig. 1.8, comprising kilotons of CO2with respect to years in (a) and million (Mn) tons per capita with respect to years (b). It is observed from Fig. 1.8, there is no gradual increase in kilotons of CO2and metric tons per capita in years from 1970 to 1990, but after it there is steady advancement [70].

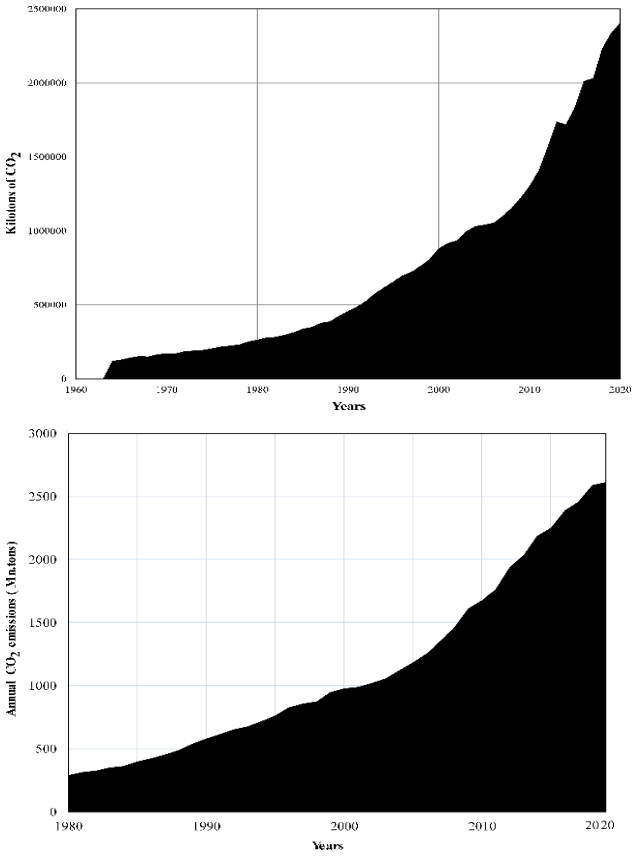

Figure 4(a)& (b) : India CO2emissions in (a) Kilotons of CO2from year 1965 to 2020 and(b) Annual CO2in Mn.tons [70].

India coal usage or consumption from year 1975 to 2020 is presented in Fig. 1.9, comprising percentage (%) of electricity from coal and annual change with respect to years. It is observed, there is a huge high in % of electricity from coal in period from 1980 to 1990 as shown in Fig.1.9 (a).It is also observed that there is consistently high annual change in period between 1990 to 2000, as shown in Fig. 1.9 (b) [71].

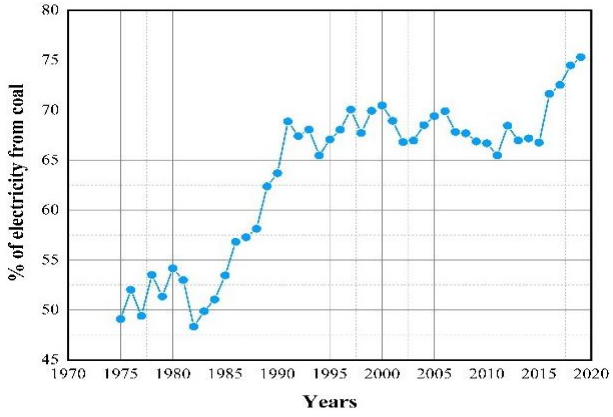

Figure 5: India coal usage from 1975 to 2020 in

(a) % of electricity from coal and (b) Annual change [71]

India's fossil fuel consumption from year 1975 to 2020 is presented in Fig. 5 comprising % of total energy use and annual change with respect to years. It is observed, there is a linear increment throughout the years from 1975 to 2020, as shown in Fig. 6 (a). It is also observed that there is consistently high annual change throughout the years from 1975 to 2020, as shown in Fig. 6. (b)

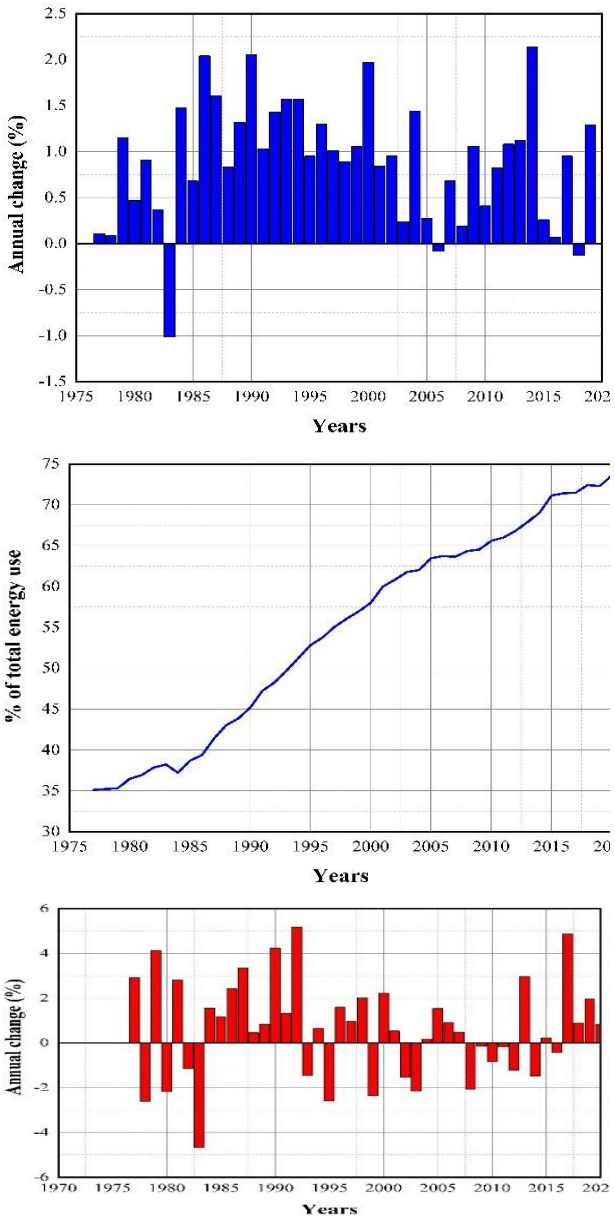

Fig. 6 (a),(b),(c): India fossil fuel consumption from 1975 to 2020 in (a) % of total energy use and (b) Annual change with respect to years [72].

India GHG emissions from year 1975 to 2020 is presented in Fig. 1.11, comprising kilotons of CO2equivalent and annual % change with respect to years. It is observed, there is a linear increment throughout the years from 1975 to 2020, as shown in Fig. 7. (a). It is also observed that there is consistently variable annual % change throughout the years from 1980 to 2020, as shown in Fig. 7. (b) [73].

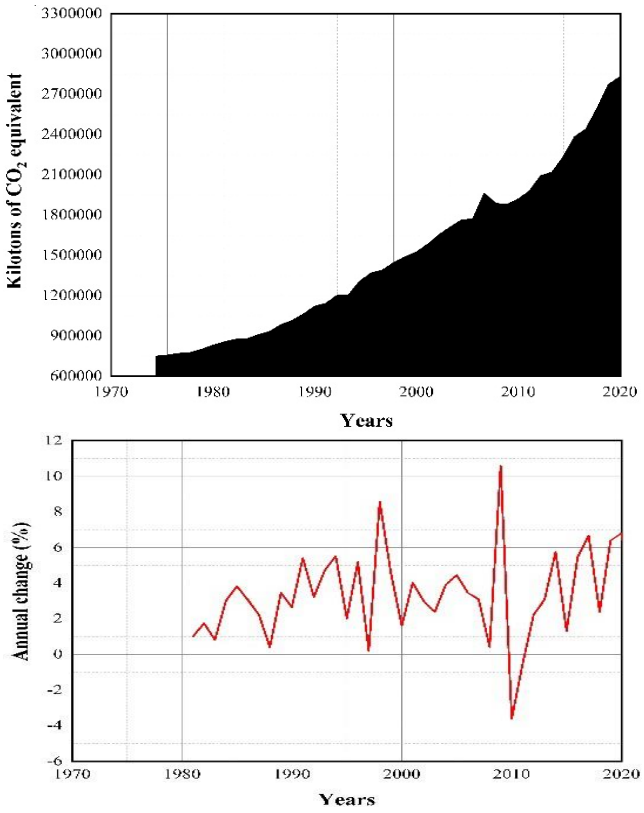

Figure 7. (a),(b): India GHG emissions from 1980 to 2020 in (a) Kilotons of CO2equivalent and (b) Annual % change with respect to years [73].

India RE from year 1995 to 2020 is presented in Fig. 1.12, comprising annual change and % of electricity from renewables with respect to years. It is observed, there is a highest drop in annual change in year 2000, as shown in Fig. 1.12 (a). It is also observed that there is initially drop till year 2005 and further there is linear increment and following with some variability starting from year 2007, as shown

in Fig. 1.12 (b).[74].

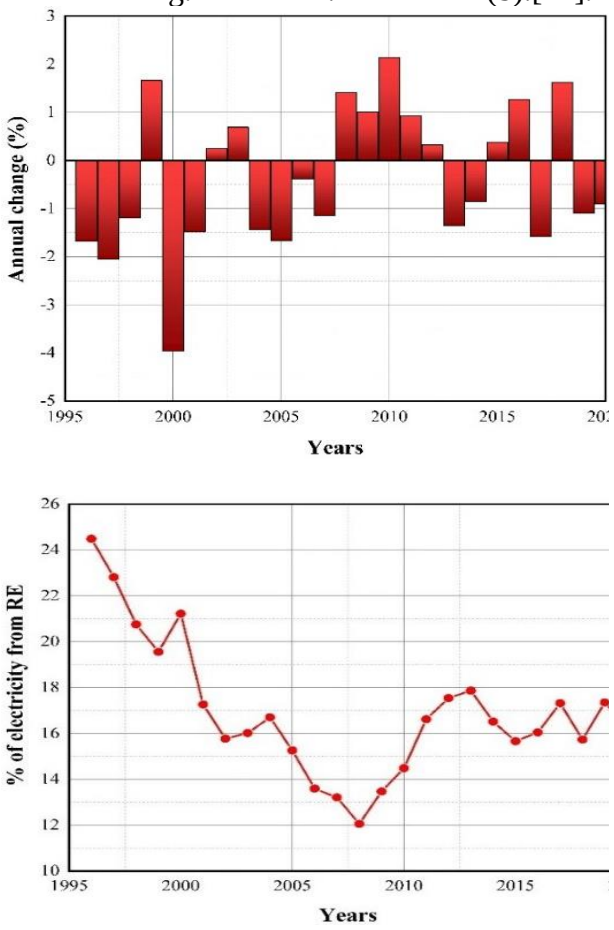

Figure 8.(a) (b): India RE from 1995 to 2020 in (a) Annual change and(b) % of electricity from renewables with respect to years [74].

Conclusions

Tier-1: In this study, the electricity generation scenario in India and Maharashtra and its consumption pattern has been studied. Maharashtra mirrors the national trend. The energy consumption pattern by different sectors also supports the same. The country's GDP growth rate and the state's GDP growth rate has a close association with each other. The state share in national power generation is more than 10% and its renewable power contribution is 11% which supports GoI vision of clean energy. The energy share is increasing with its growing population. The government of Maharashtra along with the national scheme of electrification has 100% electrified all the HHs in rural villages

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