

# Improving Power Generation across the Countryside

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## ABSTRACT

India's rapid economic expansion and vast population make it a key consumer of electric power in the future. All of India's energy sources are examined in this article, along with their current status and future prospects, and the primary tools for supporting their development and use are discussed. Coal and other fossil fuels have been widely used, resulting in the accumulation of a tremendous amount of carbon dioxide in the atmosphere, which has led to global warming. Sustainable development relies heavily on the use of renewable energy sources. There is a wide range of renewable energy sources that can be used to suit India's power generation demands.

**Keywords:** Power generation, renewable energy, Coal, Wind

## Introduction

Using fossil fuels for power generation to fulfil factory demands and nonrenewable sources for electricity production began with the industrial revolution and the growth of industry. In this project, we will generate electricity without affecting the environment by utilising a renewable and efficient energy source. To generate electricity, gravity will be the primary source of energy. [1] To solve this challenge, we need to develop approaches for optimal utilisation of traditional sources for energy

conservation and to locate a new source for renewable energy production.

The large short- and long-term fluctuations in energy levels that come with employing renewable energy sources are one of the biggest drawbacks. Geothermal energy is one of the most reliable and consistent forms of renewable energy because it does not rely on weather conditions. The future energy supply could benefit greatly from the use of geothermal energy. Due to the depletion of fossil fuels and environmental contamination, renewable power generation is essential for sustainable growth. [2] Series/parallel connections can be used to adjust the power output by changing the humidity, temperature, and number of devices.

In total, coal power plants produced 840 TWh, or 63% of the total production, followed by non-utilities (185 TWh) and hydropower (125 TWh, excluding small hydro). In addition, 38 TWh, 44 TWh, 34 TWh, and 500 GWh of power were generated by nuclear, natural gas, lignite, and oil, respectively. An estimated 70 TWh of electricity comes from renewable sources. This renewable energy is mostly generated by wind and small hydropower plants at this time. It's not just the United States that is interested in renewable energy [3].

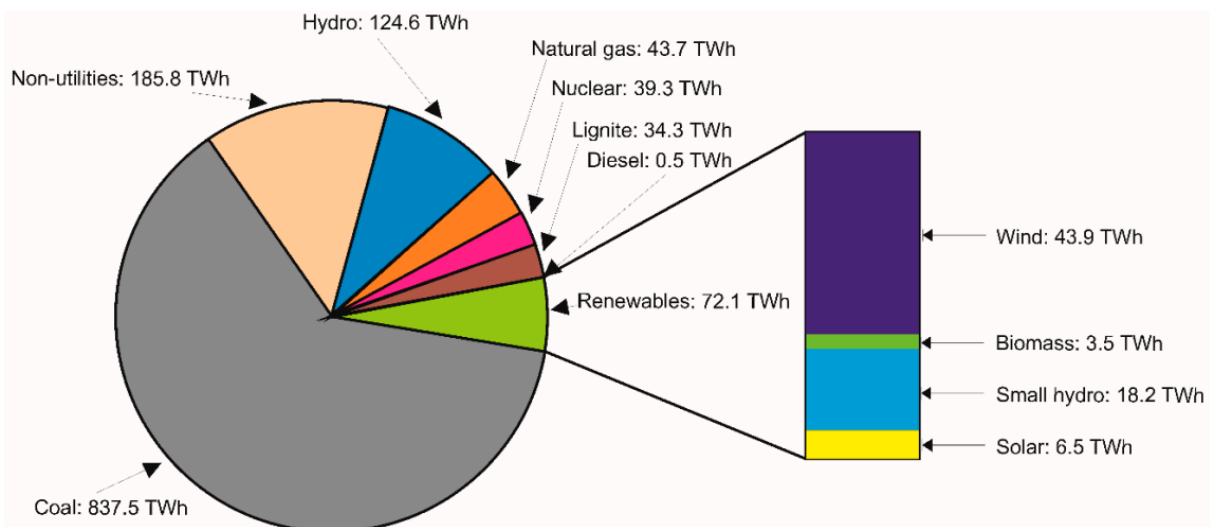


Fig. 1: Electricity in India

Renewable energy sources are becoming increasingly important around the world because of their good environmental impact and their role in promoting sustainable economic growth. By reducing reliance on traditional fossil fuel-based energy, renewable energy also helps to increase the safety and security of the energy supply, reduce emissions of greenhouse gases, safeguard the planet from global warming, and maintain environmental quality. [4]

### **Review of Literature**

Our meagre expertise has been put to good use in [5] through this project activity. While working on this project, we learned a great deal about how to plan, purchase, assemble, and machine. We believe that project work is an useful way to bridge the gap between academia and the private sector. We're pleased of ourselves for getting the job done in the allotted time. There are no issues with the foot step generation at this time.

This project is successful in [6]. A nation's progress can be measured by looking at how much energy it uses. A person may assume that in order to be wealthy and successful, one must consume more and more energy. This project also makes use of the most abundant source of energy available to us on a daily basis. It is an unconventional method of generating power. Existing energy sources, such as coal, oil, and so on, may not be able to keep up with the rising demand for energy. Conventional sources of energy, such as coal, oil, and natural gas, may run out by the end of this century or the beginning of the next century.

Among Australian visitors, Dalton et al. [6] found that they were willing to spend 1-5% more for the presence of renewable energy systems in their hotels. Ek [7] used the statistical approach of binary logistic regression to find that people from Sweden who are more concerned about the environment are more willing to adopt renewable energy sources.

If fossil fuels are substituted with renewable energy sources, greenhouse emissions are reduced dramatically. Because renewable energy is derived from the natural flow of energy in our surroundings, it is expected to be long-term and sustainable. Limitless and non-harmful distribution of environmental goods and services are requirements for sustainable renewable energy. The net CO<sub>2</sub> emissions of a sustainable biofuel, for example, should not be adversely affected by food security or biodiversity threats (Twidell & Weir, 2015). [8]

Because of the increasing daily energy demands of people all over the world, the world is rapidly becoming a global village, despite the fact that the earth itself cannot change form. In order to meet human needs for social and economic progress as well as health and safety, an ever-increasing amount of energy and related services are required. As a matter of fact, all societies rely on the services of energy in order to meet basic human needs such as: health care, lighting, cooking, space comfort, movement, and communication (Edenhofer et al., 2011) [9]

### **Objectives**

The primary goal of this research is to provide an overview of the current state of renewable energy technologies.

### **Research Methodology**

Using a systematic approach to solving the research problem is called research methodology It can be viewed as a branch of science that focuses on the mechanics of scientific investigation. In it, we examine the numerous approaches researchers commonly use to examining their research questions, as well as the reasoning that underlies each one. Research methods/techniques and methodology are essential for the researcher to understand. Secondary sources must be thoroughly reviewed and analysed in order to use analytical and descriptive methodologies to the research. Close reading of a few secondary materials would be necessary to expand the textual analysis and provide additional perspectives.

### **Result and Discussion**

Due to industry's rapid expansion, there is a considerable need for electricity from the manufacturing sector. Although all industries were anticipated to grow at an increased rate, the electricity intensity per tonne of production remained nearly unchanged. Figs 2 and 3 show how much electricity each sector will need by 2030 based on this scenario. Electricity consumption in industry is predicted to rise at a rate of roughly three times that of 2015[10].

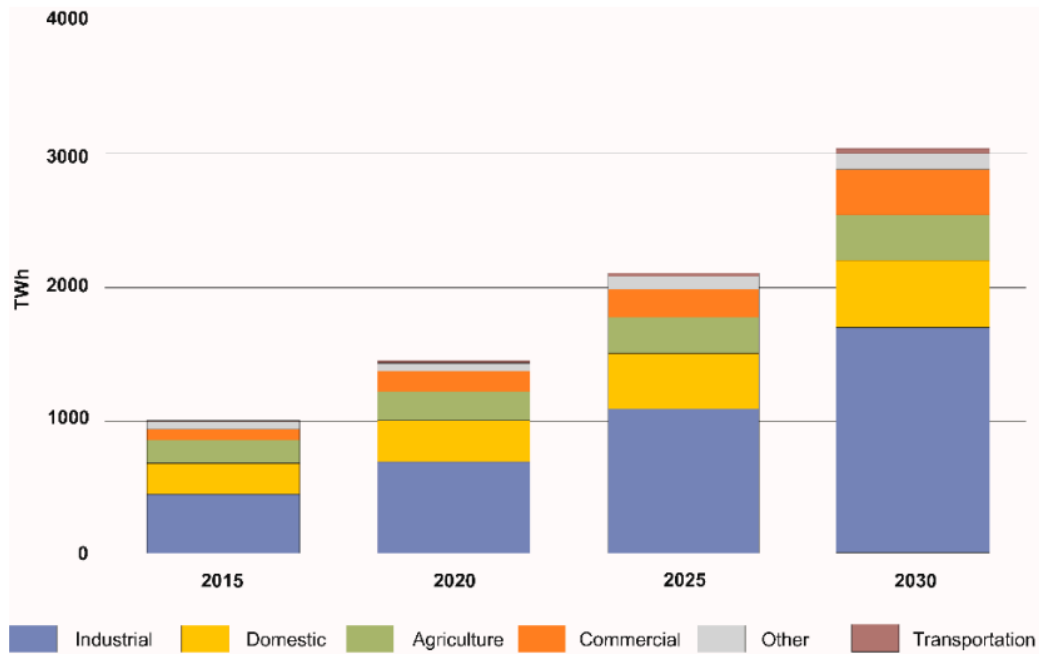


Figure-2: Electricity consumption

The electricity consumption of several sectors in a scenario of rapid growth is depicted in Figure 2.

As compared to 2015, all other industries saw growth of roughly twice as much. Rising populations and rising incomes are cited as reasons for the expansion of the domestic sector in the region. Increased floor space and power intensity per square metre are driving commercial sector growth. This industry is expected to grow faster than agriculture and use the same amount of electricity as agriculture by 2030[11].

Total power usage will rise from about 1000 TWh in 2015 to 2300 TWh in 2030, according to LEAP's energy reduction scenario (Fig. 3).

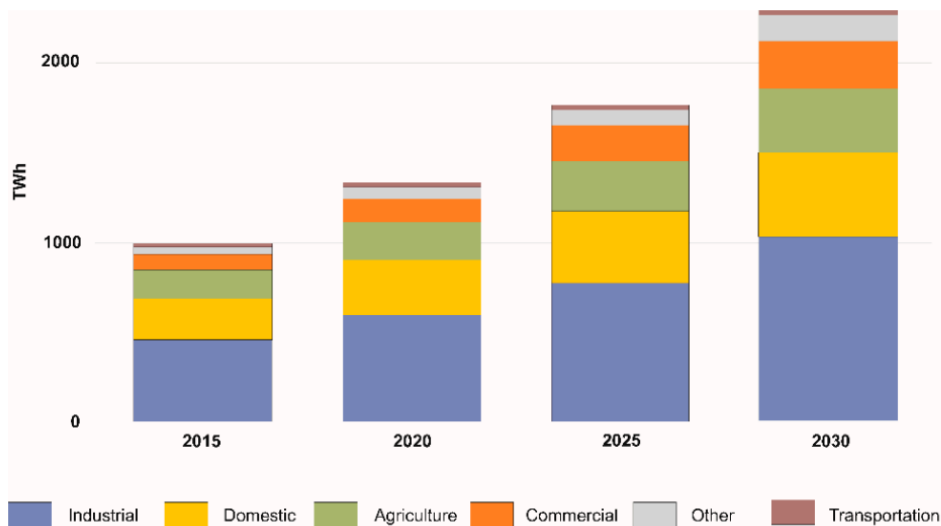


Figure 3: Usage of electricity

Figure 3 shows the usage of electricity in several sectors in an attempt to reduce consumption.

Reduced electricity demand is largely due to industry's employment of energy-saving choices and its slightly slower growth rate than in the previous scenario. 450 TWh of industrial demand in 2015 would climb to 1000 TWh in 2030 under this scenario, an increase of around a factor of 2 [12].

Table 1 Renewable energy sources and their use

Energy sources	Energy conversion and usage options
Hydropower	Power generation
Morden biomass	Heat and power generation, pyrolysis, gasification, digestion
Geothermal	Urban heating, power generation, hydrothermal, hot dry rock
Solar	Solar home systems, solar dryers, solar cookers
Direct solar	Photovoltaic, thermal power generation, water heaters
Wind	Power generation, wind generators, windmills, water pump
Wave and tide	Numerous design, barrage, tidal stream

There are a variety of renewable energy sources that do not deplete the earth's resources, including bioenergy, hydropower, geothermal power, solar power, wind power, and ocean (tide and wave) power. Table 1[13] lists the most common types of renewable energy and how they can be put to use.

Through its effect on human growth and economic output, renewable energy has a direct connection to sustainable development. Reducing environmental and health impacts is a benefit of renewable energy sources. Energy security is a benefit of renewable energy sources, as well as social and economic progress. [14]

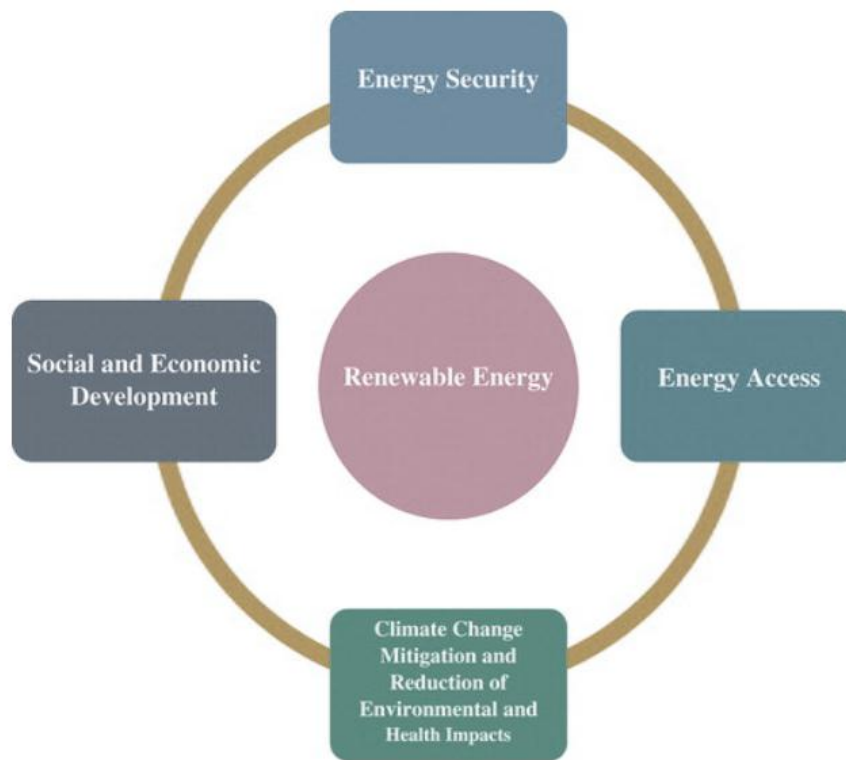


Figure 4: Possibilities for using renewable energy sources

Figure 4 depicts the possibilities for sustainable development offered by renewable energy sources.

### Conclusion

As a means of enhancing human progress and production, energy is an essential component of our daily lives. Climate change mitigation can be achieved by returning to renewable energy sources, but this must be done in a way that is long-term and sustainable. We still don't know enough about the connections between renewable energy and sustainable development. Renewable energy sources are now an important part of the global energy

consumption portfolio due to growing worries about climate change. By replacing fossil fuels in the power generating and transportation sectors with renewable energy technologies, carbon dioxide emissions might be reduced. Renewable energy supply methods must be developed and promoted due to the detrimental and irreversible externalities of traditional energy generation. Wind, solar, and other forms of renewable energy should be used more frequently in order to lower energy costs and make them compatible with conventional energy sources.

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