

## 2. NEED OF RENEWABLE ENERGY RESOURCES

### 2.1. Why we need Renewable Energy Resources

Fossil fuels are buried flammable geologic deposits of organic substances such as dead plants and animals deposited under several thousand feet of silt. These deposits decayed with time and converted to natural gas, coal, and petroleum due to the extreme heat and pressure inside the earth's crust. They are also known as non-renewable sources of energy as it takes a very long time for them to replenish.

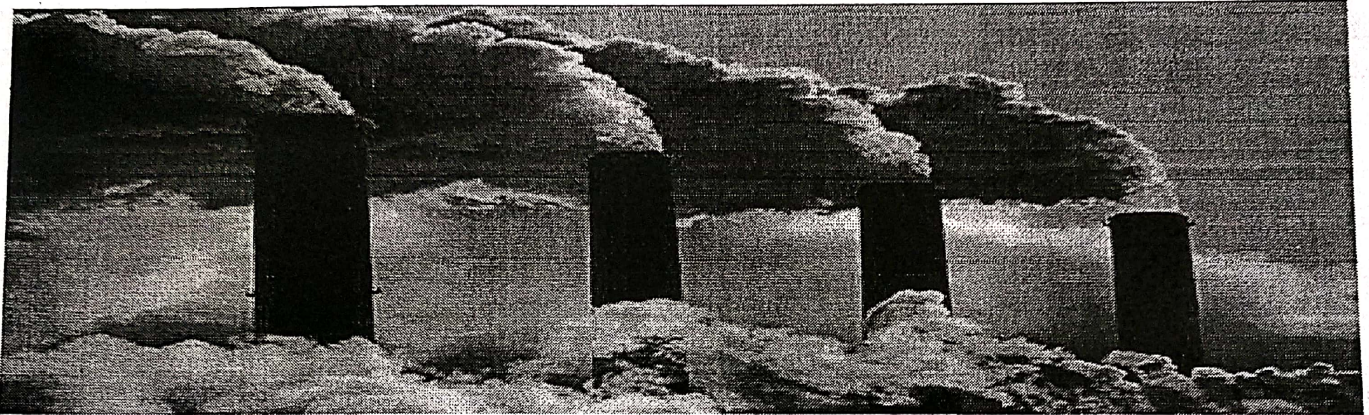


Fig 2.2 Fossil Fuels Disadvantages

### 2.2 Disadvantages of fossil fuels

The disadvantages of fossil fuels are:

- The burning of coal and petroleum produces a lot of pollutants, causing air pollution.
- Fossil fuels release oxides of carbon, nitrogen, sulphur, etc., that cause acid rain, affecting soil fertility and potable water.
- The burning of fossil fuels produce gases such as carbon dioxide that causes global warming.

Today we primarily use fossil fuels to heat and power our homes and fuel our cars. It's convenient to use coal, oil, and natural gas for meeting our energy needs, but we have a limited supply of these fuels on the Earth. We're using them much more rapidly than they are being created. Eventually, they will run out. Even if we had an unlimited supply of fossil fuels, using renewable energy is better for the environment. We often call renewable energy

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technologies “clean” or “green” because they produce few if any pollutants. Burning fossil fuels, however, sends greenhouse gases into the atmosphere, trapping the sun’s heat and contributing to global warming. Climate scientists generally agree that the Earth’s average temperature has risen in the past century. If this trend continues, sea levels will rise, and scientists predict that floods, heat waves, droughts, and other extreme weather conditions could occur more often. Other pollutants are released into the air, soil, and water when fossil fuels are burned. These pollutants take a dramatic toll on the environment—and on humans. Air pollution contributes to diseases like asthma. Acid rain from sulfur dioxide and nitrogen oxides harms plants and fish. Nitrogen oxides also contribute to smog.

Like any human activity, all energy sources have an impact on our environment. Renewable energy is no exception to the rule, and each source has its own trade-offs. However, the advantages over the devastating impacts of fossil fuels are undeniable: from the reduction of water and land use, less air and water pollution, less wildlife and habitat loss, to no or lower greenhouse gas emissions.

### 2.3 Key benefits of renewable energy

In addition, their local and decentralized character as well as technology development generates important benefits for the economy and people.

- **Renewable energy emits no or low greenhouse gases. That’s good for the climate.**

The combustion of fossil fuels for energy results in a significant amount of greenhouse gas emissions that contribute to global warming. Most sources of renewable energy result in little to no emissions, even when considering the full life cycle of the technologies.

- **Renewable energy emits no or low air pollutants. That’s better for our health.**

Worldwide increases in fossil fuel-based road transport, industrial activity, and power generation (as well as the open burning of waste in many cities) contribute to elevated levels of air pollution. In many developing countries, the use of charcoal and fuel wood for heating and cooking also contributes to poor indoor air quality. Particles and other air pollutants from

fossil fuels literally asphyxiate cities. According to studies by the World Health Organization, their presence above urban skies is responsible for millions of premature deaths and costs billions.

- **Renewable energy comes with low costs. That's good for keeping energy prices at affordable levels.**

Geopolitical strife and upheavals often come with increasing energy prices and limited access to resources. Since renewable energy is produced locally, it is less affected by geopolitical crisis or price spikes or sudden disruptions in the supply chain.

- **Renewable energy is secure. That's good for stability.**

Evolving energy markets and geopolitical uncertainty have moved energy security and energy infrastructure resilience to the forefront of many national energy strategies. Security of supply is a serious concern in energy markets worldwide, from the European Union and the United States to Egypt and India.

Renewable energy is plentiful, and the technologies are improving all the time. There are many ways to use renewable energy. Most of us already use renewable energy in our daily lives.

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task of investigating the available resources that could be practically utilized, along with researching the economic possibilities of wind energy. With assistance from the Indian Meteorological Department, the Sub-Committee extensively reviewed available data on surface winds in India and their velocity duration, and began detailed surveys of promising sites for harnessing the optimum amount of wind energy; it also successfully developed and tested large wood-and-bamboo windmills. In September 1954, a Symposium on Solar Energy and Wind Power organised by the CSIR and UNESCO was held in New Delhi; among the attendees was E. W. Golding, a British power engineer and authority on wind energy generation. Convinced of the potential of wind power in India, he recommended continued and extensive wind velocity surveys in different regions of India, the full-time assignment of staff to experimental wind power studies, the establishment of a dedicated research laboratory and development of small to medium-sized wind-powered electrical generators. Golding's recommendations were adopted by the CSIR in 1957. By this time, regions of Saurashtra and around Coimbatore had been identified as promising sites for generating electricity from wind power, and the Wind Power Sub-Committee had begun to erect 20 wind velocity survey stations across India; in addition to testing its indigenously designed windmills and obtaining a 6 kW. Allgaier wind turbine, which was presented to India by the West German government; experiments at Porbandar with the latter had commenced by 1961. The Indian government also considered a proposal to erect over 20,000 small to medium-sized wind-powered electrical generators in rural districts, to be used for powering water pumps and supplying electricity for remotely situated structures such as lighthouses.

**ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS**  
(As on 31.05.2022)  
(UTILITIES)

Region	Ownership Sector	Thermal						Hydro		Renewable		Grand Total
		Coal	Lignite	Gas	Oil	Nuclear	Small	Large	Wind	Solar		
Northern Region	State	17979.00	250.00	2678.00	0.00	2107.00	0.00	5608.25	735.66	6824.16	27732.00	
	Private	22324.35	1080.00	584.00	0.00	23082.33	0.00	3241.00	27881.00	90002.02	84883.25	
	Central	18117.14	250.00	344.00	0.00	17711.20	1620.00	11802.00	378.00	11881.50	31815.72	
	Sub Total	64420.47	1660.00	6766.00	0.00	62781.43	1620.00	20631.77	28778.77	28404.64	112069.87	
Western Region	State	21490.00	850.00	2638.00	0.00	25008.00	0.00	5448.00	575.00	30228.00	70831.00	
	Private	31947.17	800.00	4676.00	0.00	37123.17	0.00	481.00	1000.00	38600.00	28573.24	
	Central	21536.97	0.00	3280.07	0.00	24816.04	1840.00	1035.00	3448.14	42831.64	130681.37	
	Sub Total	74971.14	1450.00	10894.07	0.00	86779.83	1840.00	7862.00	11818.32	38218.74	239664.16	
Southern Region	State	25922.50	0.00	781.00	188.00	21544.50	0.00	0.00	0.00	46510.00	65747.34	
	Private	18373.50	250.00	6540.24	273.70	16237.45	0.00	0.00	541.00	264.00	19850.78	
	Central	12236.50	3090.00	369.58	0.00	18086.08	3120.00	0.00	0.00	0.00	118684.46	
	Sub Total	48265.36	3640.00	6481.82	433.84	58770.78	3320.00	11818.32	4723.87	28483.70	198759.53	
Eastern Region	State	6970.00	0.00	80.00	0.00	6503.00	0.00	209.00	1478.46	1084.46	12414.92	
	Private	6163.00	0.00	0.00	0.00	14720.70	0.00	1005.20	10.00	1015.20	23860.18	
	Central	14728.70	0.00	80.00	0.00	27328.70	0.00	4784.42	1788.04	8320.48	31600.60	
	Sub Total	27220.70	0.00	160.00	0.00	50232.40	0.00	6222.00	2382.50	2855.55	23535.30	
North Eastern Region	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1822.00	1822.00	
	Private	0.00	0.00	1262.00	0.00	1262.00	0.00	0.00	0.00	30.00	1292.00	
	Central	820.00	0.00	1715.00	38.00	2389.00	0.00	0.00	0.00	0.00	28.00	
	Sub Total	820.00	0.00	1750.00	38.00	2389.00	0.00	0.00	0.00	30.00	1320.00	
Islands	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Sub Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ALL INDIA	State	68331.50	1150.00	7067.00	238.00	72284.50	0.00	27328.00	2431.81	10014.50	106649.20	
	Private	73108.00	1850.00	10674.24	273.70	85875.94	0.00	3831.00	10014.50	113073.55	198649.20	
	Central	64060.00	2840.00	7237.91	0.00	74277.91	8780.00	16088.72	1632.30	17297.02	99004.83	
	Total	204079.50	6620.00	24873.21	508.71	236088.42	8780.00	46722.52	113228.37	158948.95	462817.40	

Figures at decimal may not tally due to rounding off

Fig:- State Wise Installed Wind Capacity

