

Renewable Energy Sources

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Introduction

- ★ The increase in energy consumption particularly in the past several decades has raised fears of exhausting the globe's reserves of natural resources in the future
- ★ Due to industrializations and population growth our economy and technologies today largely depend upon natural resources, which are not replaceable
- ★ Approximately 90% of our energy consumption comes from fossil fuels

Introduction (cont'd)

- ★ World Energy Conservation predicted estimation about the rate of utilization of energy resources shows that the coal deposits will deplete within the next 200 to 300 years and petroleum deposits will deplete in next few decades
- ★ So, encourage the research and development activities covering a broad spectrum of possible renewable resources, as their contributions are substantial

Introduction (cont'd)

- ★ Power sector is one of the key sectors contributing significantly to the growth of country's economy
- ★ A Country largely depends on the thermal power generation and a right fuel mix, based on well-diversified portfolios of indigenous and imported fuel would be required

Introduction (cont'd)

Table shows the energy consumption rate in the different area

S.No	Usage Area	Percentage Consumption
1.	Industrial motors	38
2.	Agricultural pumps	30
3.	Lighting	12
4.	Domestic appliances	12

Introduction (cont'd)

- ★ The another advantage using renewable resources is that they are distributed over a wide geographical area, ensuring that developing regions have access to electricity generation at a stable cost for the long-term future
- ★ Many experts now believe that renewable sources are poised to achieve a major break through in the world's energy market
- ★ The huge consumption of fossil fuels has caused visible damage to the environment in various forms

Introduction (cont'd)

The following table shows the amount of carbon and sulphur deposited in the atmosphere

S.No	Activity	Amount Deposited in the Atmosphere
1.	Human Vehicle, Waste product etc	8 billion tones
2.	Fossil fuels	6.5 million tones
3.	Deforestation and forest firing	1.5 million tones

At present so many alternative fuels have been developed, still they are able to meet only a small proportion of our actual demand

Introduction (cont'd)

The Table - 1 shows world wide largest contributions to current energy sources

S.No.	Sources	Available in (%)
1.	Oil	31
2.	Coal	26
3.	Natural Gas	19
4.	Hydro Electricity	6
5.	Firewood & Crop waste	12

Availability of Renewable Energy Resources

- ★ Renewable Energy sources are not depleted
- ★ It won't create any environmental pollution problems
- ★ By an one time investment we can draw energy for many decades without affecting the environment

Solar Energy

- ★ The solar energy falling on the Earth's continents is more than 200 times the total annual commercial energy currently being used by humans
- The government started solar power adoption with subsidies
- Solar Energy can be classified as two types
 1. Passive solar and
 2. Active solar

Passive Solar Energy

- ★ Passive solar energy is making direct and indirect use of thermal energies from the sun
- ★ A southern exposure of a building guarantees the maximum exposure of the sun's rays
- ★ Special metal leaf covering over windows and roofs can block out the sun during the summer months

Passive Solar Energy

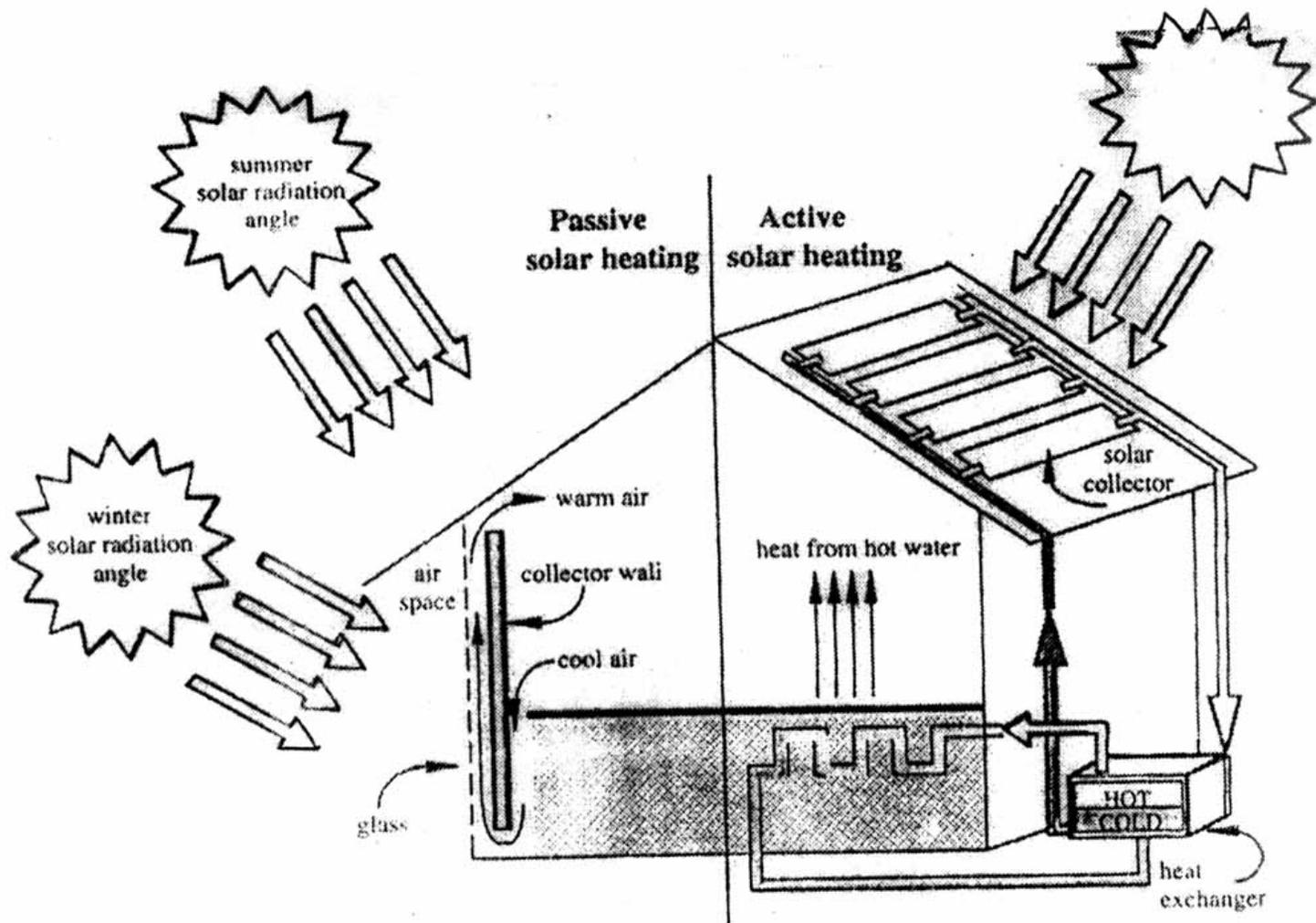


Figure - 1 Passive solar and active solar system

Active Solar Energy

- ★ Active Solar Energy is the use of the sun's Electro magnetic radiation in generating Electrical Energy
- ★ Generally semi-conductor silicon Boron solar chips are used
- ★ The problem of these chips one that they have low Efficiency ratio and can only be used in supplying Energy needs of small devices (i.e. calculators, watches, radio etc.)

Hydropower Energy

- ★ Hydro electric power plants convert the kinetic energy contained in falling water into electricity
- ★ India ranks **FIFTH** in the world
- ★ The country's total hydropower potential has been assessed as 84,044 MW, which is more than the oil potential of the Arab countries
- ★ About 78% of the total hydropower potential is in the Himalayan region
- ★ Based on head it is classified as 1. High head and 2. Low head

Wind Energy

- ★ TamilNadu, Andhra and Gujarat are considered suitable for wind power generation
- ★ The location of wind turbines is a very important factor, which influences the performance of the machine
- ★ The Wind power potential of the country is estimated as 20,000 MW, and India now ranks **FOURTH** in the world

Wind Energy

- ★ Wind mills are operated at wind speed normally not less than 3 mph
- ★ To avoid turbulence from one turbine affecting the wind flow at others it is located at 5-15 times blades diameter
- ★ Wind turbines will not work in winds below 13 km an hour

Biomass Energy

- ★ Biomass is the most important source for energy productions supplied by agriculture
- ★ This energy is also available in the form of biodegradable waste, which is the rejected component of available biomass
- ★ organic matter in which the energy of sunlight is stored in chemical bonds
- ★ When the bonds between carbon, hydrogen and oxygen molecules are broken by digestion, combustion (or) decomposition these substances release stored energy

Biomass Energy

- ★ Anaerobic digestion converts biomass, especially waste product such as municipal solid waste and market waste. By using this method we can derive 70% of the energy
- ★ In Chennai the government set up a power plant using vegetable waste as fuel
- ★ Daily 40 tones of market waste is going to be used for the power plant

Biomass Energy

- * The power plant will generate about 4800 units of electricity/day
- * The power generated from the plant will be sold at Rs.3.15/unit



Figure –2 Bio-Gas Power Plant

Environmental Problems in Non-renewable Energy Resources

- ★ Fossil fuels are coal; oil and natural gas, have originated from the decomposition of organic matter in or on the Earth
- ★ Industrialized countries generate 20% to 30% of their energy from coal. Petroleum is derived from rich organic molecules in the sediments form
- ★ It emits sulphur contents and carbon monoxide and finally leads Acid rain

Carbon Dioxide

- ★ Carbon Dioxide is responsible for 55% of global warming
- ★ The main sources are fossil fuel burning (77%) and deforestation (23%)
- ★ The Table – 2 shows the National (India) Ambient Air quality standards in Different Places

Table – 2

National (India) Ambient Air quality standards

S.No.	Pollutants	Time-Weighted Average	Concentration in Ambient Air ($\mu\text{g}/\text{m}^3$)		
			Industrial Areas	Residential Areas	Sensitive Areas
1.	Sulphur Dioxide (SO_2)	Annual average	80	60	15
		24 Hrs.	120	80	30
2.	Oxides of Nitrogen (NO_x)	Annual average	80	60	15
		24Hrs	120	80	30
3.	Carbon Monoxide (CO)	8 Hrs.	5	2	1
		1 Hrs.	10	4	2

Environmental Problems in Non-renewable Energy Resources

- ★ Due to industrialization and population growth the increase in atmospheric Carbon di-oxide already presents nearly a 30% change in the world
- ★ This could increase the average global temperature by about 1° - 5° C
- ★ Every year the average global surface temperature rises approximately 0.3° - 0.6° C
- ★ The Nitrogen and sulphur oxides are responsible for about 35% of acid rain

Environmental Problems in Non-renewable Energy Resources (cont'd)

- ★ This is mainly emitted from burning of coal and natural gas leaks, natural gas associated with oil production and spillage of petrol
- ★ Thermal power plants the coolant water is discharged into rivers (or) lakes. The water body suddenly increases the temperature and losing its oxygen holding capacity

Existing Available Renewable Resources in India

- ★ The production of fuel alternatives is projected to increase more than 2.5 times their current usage levels
- ★ The Table – 3 shows the New and Renewable sources of energy potential and cumulative achievement in India

Table – 3

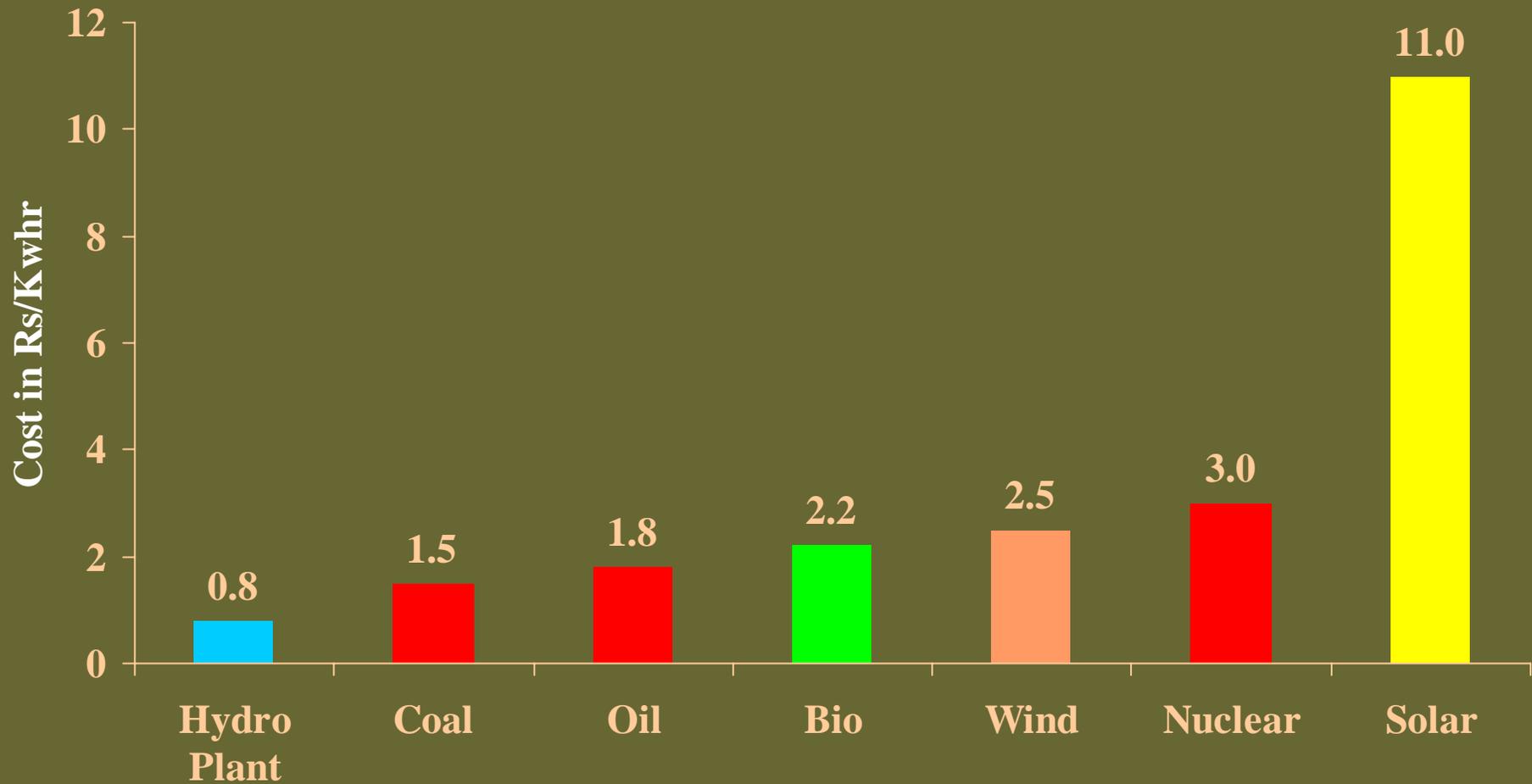
New and Renewable Sources in India

S.No.	Sources	Potential (MW)	Achievement (MW)
1.	Wind	45,000	20,000
2.	Hydro Power Plant	1,48,700	84,044
3.	Biomass Power	19,500	7500
4.	Solar Panel	20 mw/km ²	2mw/km ²
5.	Waste to Energy	1,700	500
6.	Tidal Energy	15,000	10,000

Economical Benefits

- ★ Problems with renewable energy sources are non-availability at a reasonable cost, limited supplies and lack of cost Effective means for capturing and concentrating the renewable Energy
- ★ The production cost of renewable source is reduced by subsidies
- ★ The government by introducing subsidies in the form of relaxing duties, taxes and installation charges, the prices can be drastically reduced and it will come equal to fossil fuel rates

The Chart Show the Production Rate of Energy



Conclusion

- ★ The renewable sources are cost effective, user-friendly, so that they can easily beat the fossil fuels
- ★ By promoting renewable energy sources we can avoid, Air pollution, soil pollution and water pollution
- ★ Country's Economy will increase
- ★ Due to technological advancement vehicles are made with improved fuel efficiency and also perfect hybrid vehicle are made
- ★ Throughout the year these sources are available without affecting the Environment

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Thank You