

**ALTERNATE ENERGY SOURCES -NON-CONVECTIONAL ENERGY -A REVIEW****Mayuri S. Mahure<sup>1</sup>, Harshani R. Ganvir<sup>2</sup>****Department Of Chemical Engineering ,Kinkar Institute Of Polytechnic Seloo, Wardha****<sup>1</sup>mayurimahure02@Gmail.com,<sup>2</sup>Harshani.ganvir14@gmail.com**

---

**ABSTRACT :**

*As the second-largest country of the world, undergoing explosive growth, India represents a unique and little-tapped source of expertise on multifarious issues of economic and social development. Among many problems of concern, the development of alternative sources of energy is crucial to the future wellbeing of India – indeed, of the globe. Yet in spite of its great practical need and considerable human and institutional resources, India remains a blind spot in the view of many professionals from the fields of energy and international development.*

**Key Words :** *Non-Convectional,Energy Source,Wind Energy,Tidal Energy, Biofuel, Solar Energy*

**INTRODUCTION:**

The Industrial Revolution of the 19th century ushered in new technologies. The spurt in inventions in that century was unprecedented in many ways. Some of these inventions involved use of natural resources like coal and oil. The thought of exhaustible nature of these resources and the environmental damage from the use of these resources never occurred either to the inventors or the subsequent generations. In the quest to sustain galloping economic activity, the dependence on coal and oil has soared at a phenomenal rate over the years. The burnt fuels result in the release of carbon dioxide and other gases into the atmosphere causing environmental damage. It has become imperative to look at energy technology with a new perspective. There are abundant renewable sources of energy such as wind, sun, water, sea, biomass apart from even daily wastes. These sources are pollution free and hence clean energy apart from being unlimited/ inexhaustible. Power generation in India has grown in size to around 1 lakh MW and in Tamil Nadu it has increased to 7924 MW which is distributed through a vast network of transmission, sub-transmission and distribution lines that reach all villages even in remote areas. The demand for power is growing rapidly. The problem will be compounded due to fast depletion of fossil fuel deposits, quality of fuels, heavy price to be paid for basic materials plus their transportation cost and above all the environmental degradation caused by the use of conventional energy sources. Under such conditions, environment friendly and pollution-free, non-conventional and renewable energy sources known as 'clean and green energy' have emerged as an important.

**LITERATURE REVIEW:**

Globally, India is the forth position in generating power through Biomass and with a huge potential, is poised to become a world leader in the utilization of biomass (Amol Bhavsar 2011).

Biomass for bio energy comes either directly from the land as dedicated crops or from residues generated in the processing of crops for food or other products such as pulp and paper from the wood industry. (A. V. Herzog et al 2011). Solar energy is an important, clean, cheap and abundantly renewable energy (Naval Singh 2009). India promises to become one of the world's largest photovoltaic energy markets. The country has the best solar resources in the world with 260 -300 clear sunny days per year, on the other hand, it is confronted with continuous electricity shortages (Peter Meisen 2010). Wind energy has been used for thousands of years for milling grain, pumping water and other mechanical power applications. Wind power is not a new concept. The first accepted establishment of the use of windmills was in the tenth century in Persia [A.D.Spera 1994]. Modern windmills tend to be called wind turbines partly because of their functional similarity to the steam and gas turbines and partly to distinguish them from their traditional forbears [G.Boyle 2004].The growth of wind energy, however, is not evenly distributed around the world. By the end of 1999, around 69% of the worldwide wind energy capacity was installed in Europe, a further 19% in North America and 10% in Asia and the Pacific [T.Ackerman 2000] Wind energy is expected to play an increasingly important role in the future national energy Scene[K.T.fung 1981 S.Ezio 1998]. Wind turbines convert the kinetic energy of the wind to electrical energy by rotating the blades. Greenpeace states that about 10% of electricity can be supplied by the wind by the year 2020 [G.M.goselin 2007].The Danish Energy Agency predicts that a further cost reduction of 50% can be achieved until 2020, and the EU Commission estimates in its White Book that energy cost from wind power will be reduced by at least 30% between 1998 and 2010 [prehn morten surensen1997].

### **Types of Non-Conventional Energy**

- 1) Tidal Energy
- 2) Wind Energy
- 3) Solar Energy

### **Advantages of non conventional energy sources**

- 1)Renewable systems based on solar, wind hydro and biomass energy are particularly applicable to rural communities that are not linked to national or regional utility system and that have dispersed populations, as are often found in developing countries.
- 2) Renewable energy had applications around the globe, industrialized and developing nations, rich and poor, regardless of political orientation or culture- all nations can benefit from global transition to clean energy source.
- 3) It is politically, economically and environmentally secure
- 4) Environmental issues; no acid rain, greenhouse effect, no toxic life hazards.
- 5) It gives increased independence and growth without increase environmental impact

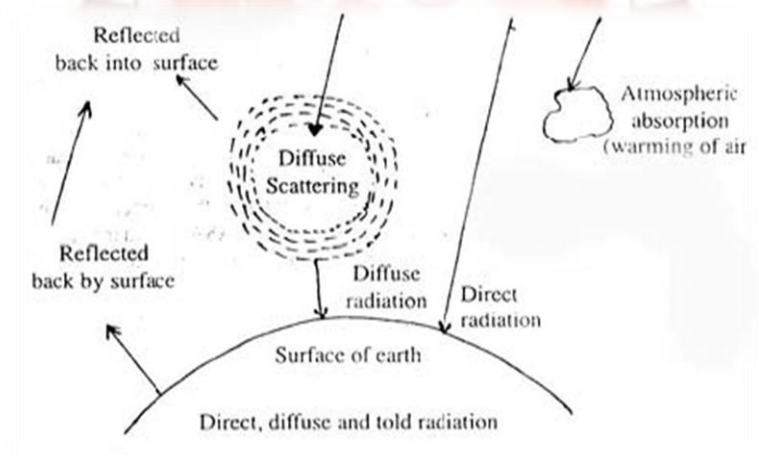
## A Solar Energy

### Introduction

Energy from the sun is called solar energy. The Sun's energy comes from nuclear fusion reaction that takes place deep in the sun. Hydrogen nucleus fuse into helium nucleus. The energy from these reactions flow out from the sun and escape into space. Solar energy is some times called radiant energy. The solar energy that falls on India in one minute is enough to supply the energy needs of our country for one day. Man has made very little use of this enormous amount of solar energy that reaches the earth.

### Solar Radiation at the Earth's Surface

The solar radiation that penetrates the earth's atmosphere and reaches the surface differs in both amount and character from the radiation at the top of the atmosphere. Part of the radiation is reflected back in to the space, especially by clouds. Further more, the radiation entering the atmosphere is partly absorbed by molecules in the air. Oxygen and Ozone( $O_3$ ), formed from oxygen, absorb nearly all the Ultraviolet radiation, and water vapour and carbon dioxide absorb some of the energy in the infrared range. In addition, part of the solar radiation is scattered (i.e. its direction has been changed) by droplets in clouds by atmosphere molecules, and by dust particles.



**Fig 2.1 Solar Radiation at the Earth's surface**

Solar Radiation that has not been absorbed or scattered and reaches the ground directly from the sun is called "Direct Radiation" or Beam Radiation. Diffuse radiation is that Solar Radiation received from the sun after its direction has been changed by reflection and scattering by the atmosphere. Because of the Solar Radiation is scattered in all directions in the atmosphere, diffuses radiation comes to the earth from all parts of the sky. The sum of the beam and diffuse radiation flux is referred to as total or global radiation.

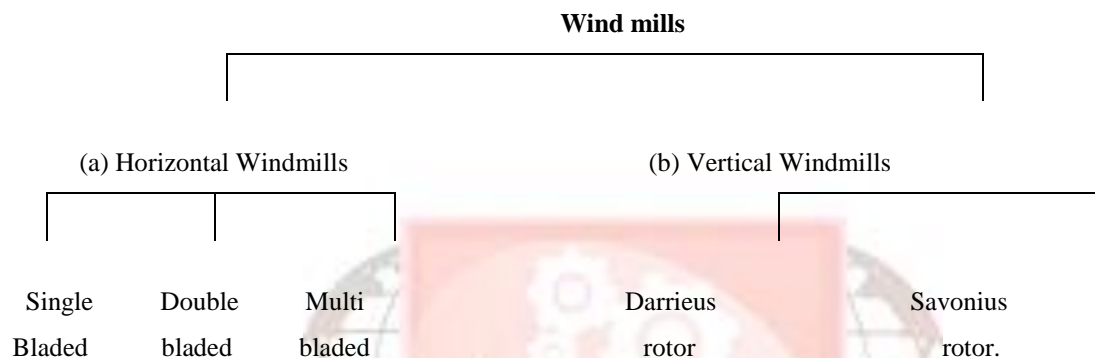
## WIND ENERGY

### Introduction

Winds are caused because of two factors.

- (1) The absorption of solar energy on the earth's surface and in the atmosphere.
- (2) The rotation of the earth about its axis and its motion around the sun.

### Classification of wind mills



## BIO ENERGY

### Introduction

Bio gas is generated through a process of anaerobic digestion of Bio Mass. Bio Mass is organic matter produced by plants, both terrestrial (those grown on land) and aquatic (those grown in water) and their derivatives. It includes forest crops and residues, crops grown especially for their energy content on “energy farms” and animal manure. Unlike coal, oil and natural gas, which takes Millions of years to form, bio mass can be considered as a renewable energy source because plant life renews and adds to itself energy year.

### Bio Gas and its Compositions

Bio gas contains 55-70% methane and 30-45% carbon dioxide as well as small quantities of (N<sub>2</sub>, H<sub>2</sub>, H<sub>2</sub>S) some gases. It is lighter than the air and has an ignition temperature of approximately 700°C.

### Content of Methane in Bio-gas produced from different feed stocks

| S.No. | Feed Stock       | Content of Methane in Bio gas in Percentage |
|-------|------------------|---|
| 1     | Cattle Manure    | 54-56                                       |
| 2     | Pig Manure       | 57  |
| 3     | Poultry Manure   | 55  |
| 4     | Farm yard Manure | 55  |

|   |               |       |
|---|---------------|-------|
| 5 | Straw         | 55    |
| 6 | Grass         | 60    |
| 7 | Leaves        | 58    |
| 8 | Kitchen Waste | 50-52 |
| 9 | Human excreta | 60    |

### Comparison of Bio-gas with other fuels

| S.No. | Name of fuel and Unit | Calorific value(K Cal) | Mode of Burning |
|-------|-----------------------|------------------------|-----------------|
| 1     | Gobar (M3)            | 4713                   | Standard burner |
| 2     | Kerosene (lit)        | 9122                   | Pressure stove  |
| 3     | Fire wood (Kg)        | 4700                   | Open chulla     |
| 4     | Cow-dung cake (Kg)    | 2092                   | Open chulla     |
| 5     | Charcoal (Kg)         | 6930                   | Open chulla     |
| 6     | Soft cake (Kg)        | 6292                   | Open chulla     |

### Selection of site for Installation of a Bio gas plant

Careful selection of the best site for installation of a bio gas unit should be done for every beneficiary. The following points should be taken into consideration.

- (1) The distance between the plant and site of gas consumption or kitchen should be less to Minimize cost on gas pipe line and gas leakage. For a plant of capacity 2m<sup>3</sup>, the optimum distance is 10 Cm.
- (2) It should be near the cattle-shed to minimize the distance for carrying cattle dung and transportation cost.
- (3) It should be 10 to 15 meters away from any drinking water well to prevent contamination of water.
- (4) The area should be free from roots of trees which are likely to creep into the digester and cause damage.
- (5) It should be open to receive the Sun's rays for most part of the day and to keep the plant in warm.
- (6) It should be on an elevated area so that the plant does not get submerged during normal rains.
- (7) Plenty of water must be available as the Cow dung slurry with a solid concentration of 7% to 9% is used.

### TIDAL POWER PLANTS

#### Introduction to Tidal Power Plants

What is tidal power? Tide is periodic rise and fall of the water level of the sea. Tides occur due to the attraction of seawater by the moon. These tides can be used to produce electrical power which is known as tidal power. When the water is above the mean sea level, it is called flood tide and when the level is below the mean level, it is called ebb tide. A dam is constructed in such a way that a basin gets separated from the sea and a difference in the water level is obtained between the basin and sea. The constructed basin is filled during high tide and emptied during low tide passing through sluices and turbine respectively. The Potential energy of the water

stored in the basin is used to drive the turbine which in turn generates electricity as it is directly coupled to an alternator.

## CONCLUSION :

Keeping in view the reserves of the fossil fuels and the economy concerns, these fuels are likely to dominate the world primary energy supply for another decade but environmental scientists have warned that if the present trend is not checked then by 2100, the average temperature around the globe will rise by 1.4 to 5.8 degrees Celsius, which will cause a upsurge in the sea water levels drowning all lands at low elevation along the coastal lines. So the world has already made a beginning to bring about the infrastructural changes in the energy sector so as to be able to choose the renewable energy development trajectory. In developing countries, where a lot of new energy production capacity is to be added, the rapid increase of renewables is, in principle, easier than in the industrial countries where existing capacity would need to be converted if a rapid change were to take place.

## 6. References:

1. Amol Bhavsar (2011): "Overview of non conventional Energy Sources in India", E paper [www.ijtbbs.ac.in](http://www.ijtbbs.ac.in)
2. Antonia V. Herzog, Timothy E. Lipman, Daniel M. Kammen (2011): "Renewable Energy Sources", <http://www.eolss.com>
3. Naval Singh (2009): "Non Conventional Energy Sources", A Project Submitted in Partial Fulfilment of the requirement for Degree of B. Tec, thesis, [nitrkl.ac.in/](http://nitrkl.ac.in/) 218/1, pp 34
4. Peter Meisen (2010): "Over View of Sustainable Energy Potential of India", Global Energy Network Institute, [www.geni.org](http://www.geni.org)
5. A. D. Spera, *Wind turbine technology*, ASME press, London, 1994, p.7.
6. G. Boyle, *Renewable energy, power for a sustainable future*, Oxford University Press, Oxford, England, 2004, p. 244.
7. T. Ackerman, *Wind energy technology and current status, a review*, Elsevier science, 2000, p.322 (Accessed 22/01/2007).
8. K.T. Fung, R.L. Scheffler, J. Stolpe, *Wind energy—a utility perspective*, IEEE Trans Power Appar System, **Vol. 100**, 1981, p. 1176–82.
9. S. Ezio, C. Claudio, *Exploitation of wind as an energy source to meet the world's electricity demand*, Wind eng., **Vol. 74-76**, 1998, p. 375-87.
10. G.M. Goselin, *A review of wind energy technologies*, Renewable and sustainable energy reviews, **Vol. 11**, 2007, p.1118.
11. Prehn Morten Sørensen, *Learning curve: how is new energy technology costs reduced over time, Report of an IEA Workshop*, International Energy Agency, Paris, 1997.
12. Danish Wind Industry Association, *Power control of wind turbines*, <http://www.windpower.org/en/tour/wtrb/powerreg.htm> (Accessed 20/1/07).