

# Review of Different Energy Resources

Sandeep Kumar<sup>a</sup> and Emarti Kumari<sup>b</sup>

<sup>a</sup> Department of Computer Engineering, St. Wilfred's Institute of Engineering & Technology, Ajmer, Rajasthan

<sup>b</sup> Department of Mechanical Engineering, M.B.M. Engineering College, Jodhpur, Rajasthan

**Abstract :** *The demand of Electricity is increasing day by day on the earth, because the global population is increasing continuously. At present, approximately the global population is nearly eight billion people, but one third of the population do not have electricity. Thus, we are looking for alternative energy resources for example renewable energy, fossil fuel energy, nuclear energy, hydro energy, etc. The objective of this research paper is to study the various aspects for instance power consumption rate and power production rate of energy.*

**Keywords:** Renewable Energy; Fossil Fuel Energy; Nuclear Energy.

## Introduction

In now a day the electricity consumption is growing faster than energy production. It is expected that during the period 2000 to 2040 in all fields and regions the annual demand will increase by 2.3 % per year was reviewed by researchers [1 – 3]. Hence, further research and review is necessary to estimate the exact demand and production of energy through various energy resources.

There are many forms of energy resources available for example fossil energy, nuclear energy, renewable energy sources. Mostly countries are using fossil energy as their primary energy sources and nuclear energy as secondary to meet their requirement from day by day, but these sources are not satisfactory and appropriate source of energy and not better for environment. Because fossil and nuclear energy resources are limited. Therefore, for securing the future of coming generations we have to switch on environmental friendly energy resources. This leads to the usage of renewable sources in many parts of the world. Renewable energy is easily available in abundance in most parts of the world and is the most readily available free source of energy. Renewable energy is to be the most appropriate green energy and is environmental friendly. The amount of solar energy incident on the earth's surface is approximately  $1.53 \times 10^{18}$  kW/year, which is about 10,000 times the current annual energy consumption of the entire earth.

## 2. Energy

Energy is the extensive property that can be transferred from one form to another form for example heat to chemical reactions and chemical reactions to thermal energy similarly thermal energy to mechanical energy and mechanical energy to electrical energy or vice versa. An energy resource can produce heat, move objects and produce electricity. The Common forms of energy are kinetic energy of a moving object and the potential energy stored by an object's position in a force field gravitational, electric or magnetic, the elastic energy stored by stretching solid objects, the chemical energy released when a

fuel burns, the radiant energy carried by light, and the thermal energy due to an object's temperature. The people are using several energy's for: residential, commercial, transportation, and industries.

Human energy consumption has grown regularly throughout human and earth history. Living organisms require available energy to stay alive, such as the energy from food. Early humans had modest energy requirements, mostly food and fuel for fires to cook and keep warm. In today society humans consume as much as 200 times as much energy per person as early humans. Most of the energy we use today come from fossil fuels. But fossils fuels have a disadvantage in that they are non-renewable on a human time scale, and also causes other potentially harmful effects on the environment.

Human civilization requires energy to function, which it gets from energy resources such as fossil fuels, nuclear fuel and renewable energy. The processes of Earth climate and ecosystem are driven by the radiant energy Earth receives from the sun and the geothermal energy contained within the earth. Between 2015 and 2040, world energy consumption increases by 30% in the IEO(international energy organization)2017.

## 2.1 Energy Resources

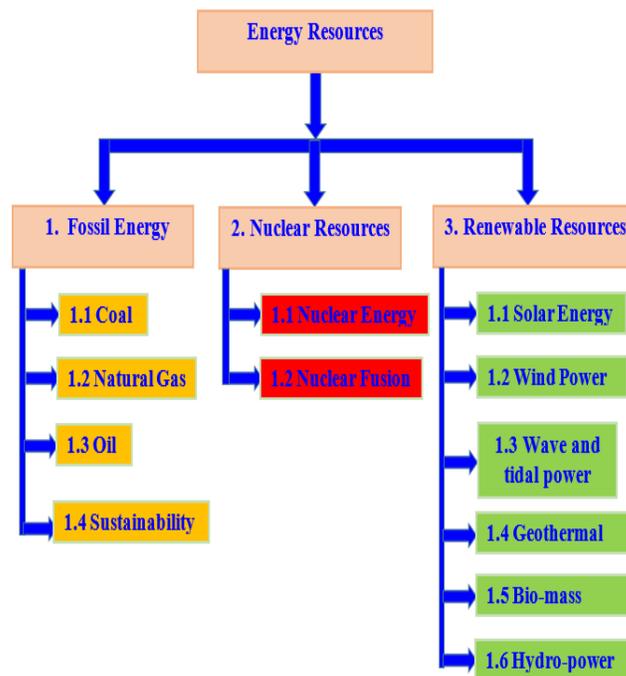


Figure 1. Various available energy resources'

### 2.1.1 Fossil fuel production and consumption

Fossil fuels continuously have a dominant role in global energy systems. Fossil energy was a fundamental driver of the industrial revolution, and the technological, social, economic and development progress which has followed. Energy has played a strongly positive role in global development.

However, fossil fuels also have negative impacts, being the dominant source of local air pollution and emitter of CO<sub>2</sub>, CO, NO<sub>2</sub> and other greenhouse gases. The world must therefore balance the role of energy in social and economic development with the need to decarbonise, reduce our reliance on fossil fuels, and transition towards lower-carbon energy sources. Fossil energy sources available in the form of Coal, Natural Gas, Oil, Sustainability, are expressed in Figure 1. Fossil energy resources are presented by yellow colour because it is reducing continuously due to extraction of resources day by day.

The 20th century saw a large diversification of fossil energy consumption, with coal declining from 96% of total production in 1900 to less than 30% in 2000 and 20% in 2040. Today, crude oil is the largest energy source, accounting around 40% of fossil energy, followed by coal and natural gas at 33% and 28% respectively.

### 2.1.2 Nuclear energy

Nuclear energy is energy in the core of an atom. Everything around you are made up of tiny objects called atoms. Atoms are tiny particles that make up every object in the universe.

Most of the mass of each atom is concentrated in the centre and the rest of the mass is in the cloud of electrons surrounding the nucleus. Protons and neutrons are subatomic particles that comprise the nucleus. Under certain circumstances, the nucleus of a very large atom can split in two. In this process, a certain amount of the large atom's mass is converted to pure energy following Einstein's famous formula  $E = MV^2$ , where  $M$  is the small amount of mass and  $C$  is the speed of light. Nuclear energy can be used to make electricity. It can be released from atom in two ways as shown in Figure 1. Nuclear fusion and nuclear fission, in nuclear fission atoms are split apart to form smaller atoms releasing energy and in nuclear fusion energy is released when atoms are combined or fused together to form a larger atom. Nuclear energy is represented by red colour, because the emission rays due to nuclear fusion and nuclear fission is very dangerous for humans, animals and surrounding. Thus nuclear energy is not environmental friendly. But, nuclear energy is great resources of energy as given here:

- The first commercial nuclear power stations started in the 1950s.
- There are over 450 commercial nuclear power reactors operable in 32 countries, with over 396,000 MW of total capacity and 70 more reactors are under construction.
- Nuclear plant provides over 16% of the world's electricity as continuous reliable power to meet base-load demand without CO<sub>2</sub> emissions.

- 55 countries operate a total of about 250 research reactors, and a further 180 nuclear reactors.

### 2.1.3 Renewable energy resources

Renewable energy is energy that is collected from natural resources which are naturally replenished on a human timescale such as sun, wind, rain, tide, waves, hydropower, biomass and geothermal heat. Typically, renewable energy resources have much lower greenhouse gas and other emissions associated with use.

The renewable energy resources are cleaner and offer a sustainable supply of energy and nature friendly. As of 2015 worldwide, more than half of all new electricity capacity installed was renewable. Renewable energy resources have much lower greenhouse gas and other emissions associated with use. Thus, world is switching to renewable energy resources frequently comparatively primary, secondary energy resources. Various (3.1 Solar energy. 3.2 Wind power. 3.3 Wave and tidal power. 3.4 Geothermal. 3.5 Biomass. 3.6 Hydropower) available renewable energy resources are shown in Figure 1. With green colour because these resources are healthy for human's, animals and surrounding's.

### 2.2 Energy Consumption

Continent wise energy consumption is given in the Table 1. from 2006 to 2016. In the Table also elaborated growth rate per annum of energy consumption. It is observed from Table that due to increasing the use of renewable energy fossil energy consumption is decreases in Europe & Eurasia and South & Cent. America by 0.4 % and 1 % respectively. Here, also observed the average growth rate per annum reduction in year 2016 as compared to year 2006 to 2015 as shown in Figure 2.

**Table 1.** Different continent energy consumption

Year	Africa	South & Cent. America	Middle East	North America	Europe & Eurasia	Asia Pacific
<b>Energy consumption (million tonne oil equivalent)</b>						
2006	334.8	567.8	592.2	2824.1	3023.5	3924.3
2007	347.9	593.9	625.6	2866.5	3017.7	4175
2008	369.5	613.2	667.6	2819.2	3022.2	4292.1
2009	373.4	606	690.3	2689.7	2839.8	4402.2
2010	388.9	641.7	734.2	2777.8	2952.6	4674.7
2011	388	665.4	750.3	2778.6	2937.9	4935.1
2012	402.9	680.9	780.8	2724.3	2936.3	5095.5
2013	415.4	696.7	812.4	2795.9	2900.6	5245
2014	427.9	704.1	840	2821.2	2838.3	5357.2
2015	433.5	710.4	874.6	2792.4	2846.6	5447.4
2016	440.1	705.3	895.1	2788.9	2867.1	5579.7
<b>Growth rate per annum</b>						
2016	1.20%	-1.00%	2.10%	-0.40%	0.40%	2.10%
2006-2015	2.80%	2.80%	4.50%	-0.20%	-0.40%	3.90%

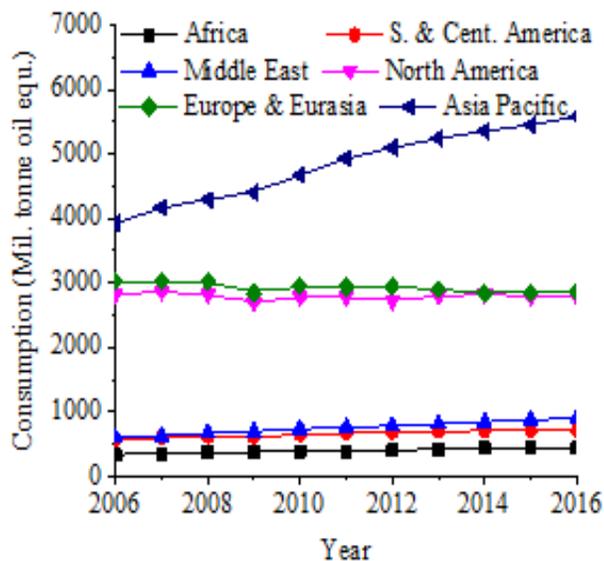


Figure 2. Energy consumption per annum

### 3. Summary

In this communication authors have reviewed the consumption of various energy resources for example fossil energy, nuclear energy and renewable energies in last twelve years by world wise. Here, also noticed the value of renewable energy for instance: solar energy, biomass, wave and tidal energy, wind energy and hydro energy, etc. from environment point of view as well as future perspective wise.

### References

- i. Sumit, W. & Walke, P.V. (2017). Review on wind- solar hybrid system, *International Journal of Research in Science & Engineering*, 3 (2), 71-76.
- ii. Anwarul, H.M. & Dubey, R.R. (2014). Solar Energy – An Eternal Renewable Power Resource, *International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering*, 3 (2), 7344 – 7351.
- iii. Christensen, E. (2015). *Electricity Generation*, 173.
- iv. Schiffer, H.W. (2016). *World Energy Resources*. World Energy Council.
- v. Dudley, B. (2017). *BP Statistical Review of World Energy*.