

## Chapter 1

### INTRODUCTION

#### 1.1. General

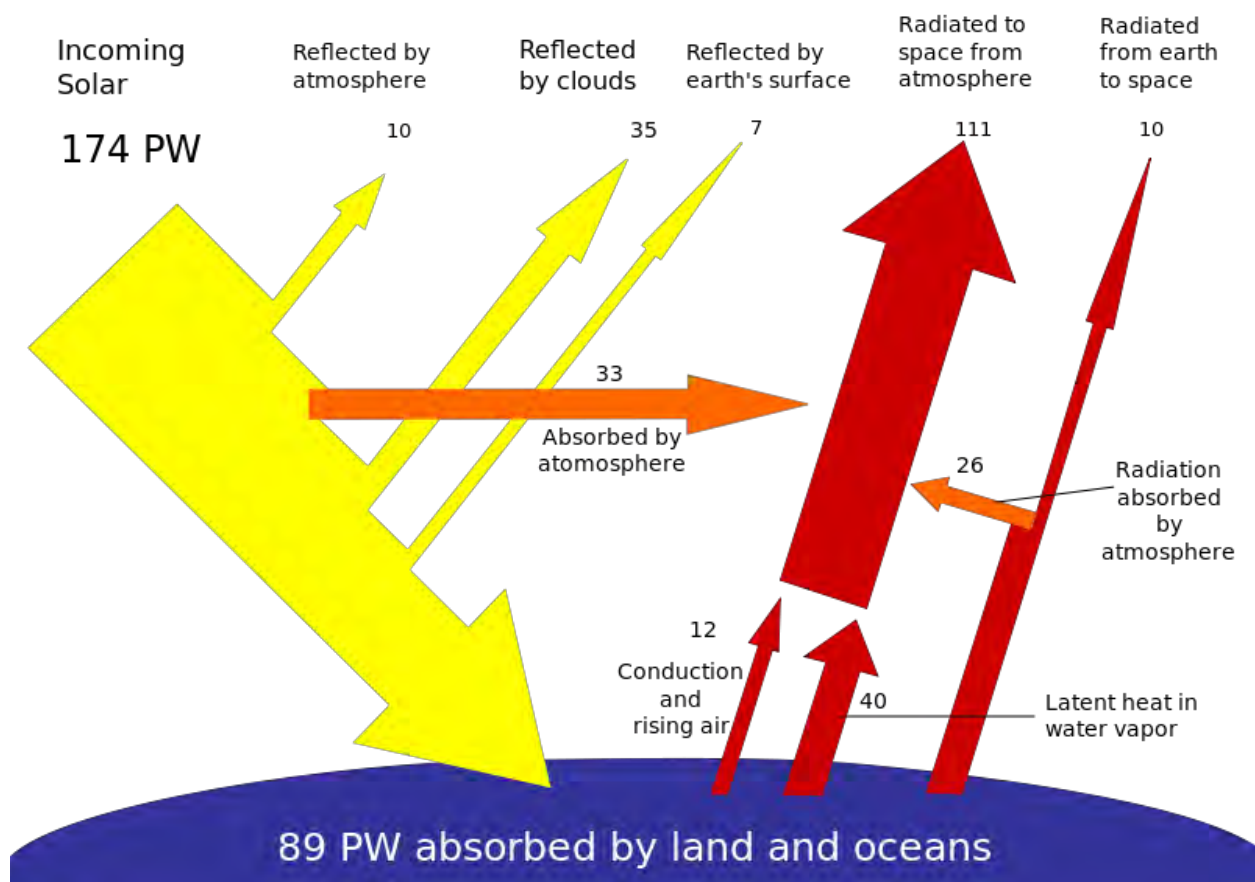
With the ever – growing trend of urbanization and industrialization, there is a pressing need for more fuel and energy resources. Today, the most commonly used resources to meet the world's energy and fuel demands are the fossil fuels. Once upon a time, abundantly available, now these fossil fuels are non-renewable and they take millions of years to form. Furthermore, burning fossil fuels is not environmentally viable due to the emission of greenhouse gases (GHGs) like Carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>) and so on.

While a majority of the world's current electricity supply is generated from fossil fuels such as coal, oil and natural gas, these traditional energy sources face a number of challenges including rising prices, security concerns over dependence on imports from a limited number of countries which have significant fossil fuel supplies, and growing environmental concerns over the climate change risks associated with power generation using fossil fuels. As a result of these and other challenges facing traditional energy sources, governments, businesses and consumers are increasingly supporting the development of alternative energy sources and new technologies for electricity generation. Renewable energy sources such as solar, biomass, geothermal, hydroelectric and wind power generation have emerged as potential alternatives which address some of these concerns. As opposed to fossil fuels, which draw on finite resources that may eventually become too expensive to retrieve, renewable energy sources are generally unlimited in availability.

Every day, the world produces carbon dioxide that is released to the earth's atmosphere and which will still be present even after many centuries. This increased content of Carbon Dioxide increases the warmth of our planet and is the main cause of the so called “Global Warming Effect”. One answer to global warming is to replace and retrofit current technologies with alternatives that have comparable or better performance, but do not emit carbon dioxide.

Solar Energy is the most plentiful and largest available source of energy ever known to man. Till now the harnessing of solar energy used to be uneconomical and less efficient.

Due to development of high efficient solar cells over the past century made harnessing the Solar Energy much more economical and it thought to be one of most eco-friendly and abundant form of clean usable energy available along with wind, hydal and other form of renewable energy. A 1.5 kilowatt PV system will keep more than 110,000 pounds of carbon dioxide, the chief greenhouse gas, out of the atmosphere over the next 25 years. The same solar system will also prevent the need to burn 60,000 pounds of coal. With solar, there's no acid rain, no urban smog, no pollution of any kind.



**Fig 1.1 Breakdown of the incoming solar energy**

(Source: -Vaclav Smil., 2003)

### 1.2. Purpose of project

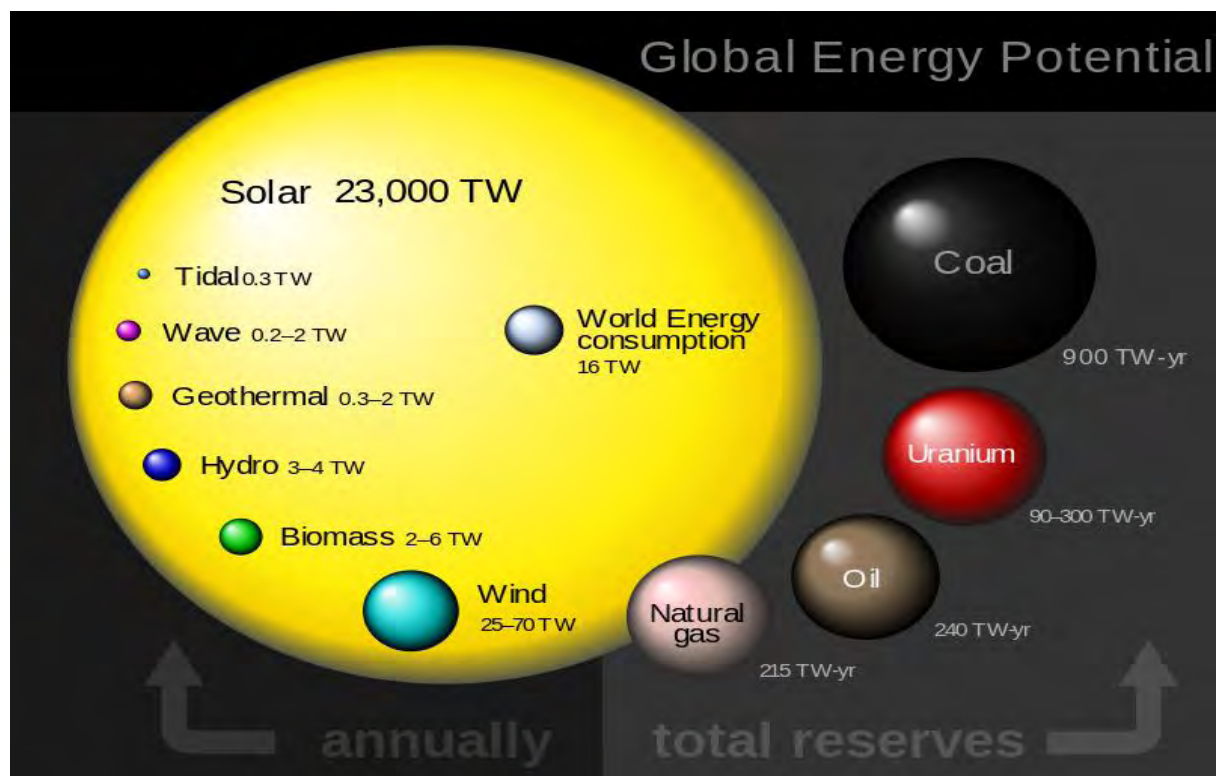
To create a completely off grid system to meet all the lighting requirements of a building by utilising Solar cells, LEDs and Optical fiber cables. The main objective of this project is to harness solar energy for lighting purpose. Growing energy demand is causing concern among the people due to pollution load on the environment. So it is necessary that

we take measures so as to reduce the load on the environment by utilizing alternative energy sources which has minimum harmful effect on the environment.

Reduction in utilization of electricity generated from conventional sources like Coal, Oil, and Gas etc. can reduce the pollution impacts on environment by reducing the release of harmful pollutants into the environment due to burning of above said fuels.

### 1.3. Global Energy Potential

The following figure helps us understand the Energy potential



**Fig 1.2: Global Energy Potential (Source: [www.renewablegreenenergypower.com](http://www.renewablegreenenergypower.com))**

Comparison of renewable and conventional planetary energy reserves. While for renewable the yearly potential is shown in terawatts (TW), conventional sources display their total recoverable reserves in terawatt-years (TW-yr). The volume of the spheres is proportional to the amount of energy they represent. Global solar power of 23,000 TW refers to the earth's total land mass with atmospheric losses taken into account, and corresponds to 200 million TWh per year. Worldwide energy consumption of 16 TW during year 2009 translates into 140,000 TWh.