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1. ABSTRACT

The 21st century has reached various milestones in terms of science and technology, defense, economy and in many more fields. However it has also caused drastic changes to our environment which we depend on. Our quality of life and standard of living have increased at the expense of our valuable resources. Earth's natural resources are being depleted at an alarming rate which is not sustainable. Moreover we are burning more and more fossil fuels to generate energy in order to satisfy our needs.

On the other hand the world's population is increasing rapidly in almost every country which cause further trauma to our natural resources as they are finite. Our wants are exceeding our needs and this is where all problems start with. The demand for natural resources increase day by day, but the supply is limited. As a result the world has to face the issue of energy crisis and climate change. These are two pillars which go hand in hand. We need to produce energy to meet the demand, however it should be carried out in such a way that it does not harm and pollute our environment.

We need to understand the importance of our valuable earth and the natural resources that are available in order to sustain them for future use. If not there will not be any resources remaining for the generations to come ahead. In addition our resources should be used in a sustainable way to ensure that we care for our planet earth. There are wide ranges of solutions already discovered to tackle the problem of energy crisis and climate change. However these need to be improved in terms of efficiency and productivity. They should start from the regional, national and international level. All people should contribute towards achieving sustainability, thereby ensuring the planet we live in become a peaceful and cleanliest place to be in.

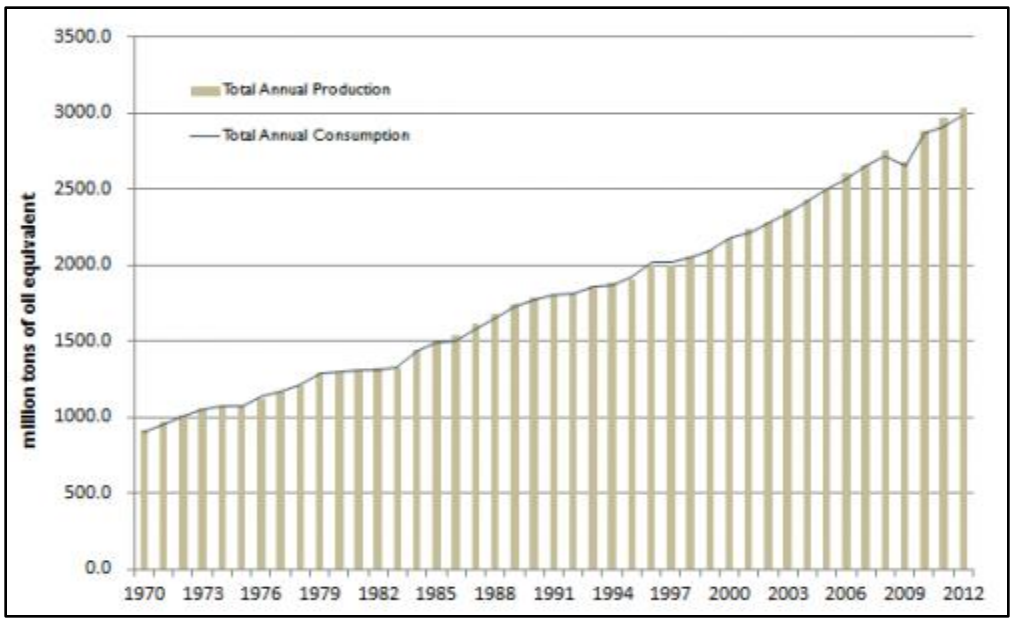

Figure1: Global natural gas consumption and production, 1970-2011

2.3 GLOBAL PRODUCTION AND CONSUMPTION OF FOSSIL FUEL

The global consumption of fossil fuels is growing at an increasing rate however by the end of this century this will be significantly altered. The following graph indicates how the production of fossil fuel has changed since 1800 and the predictions for future production.

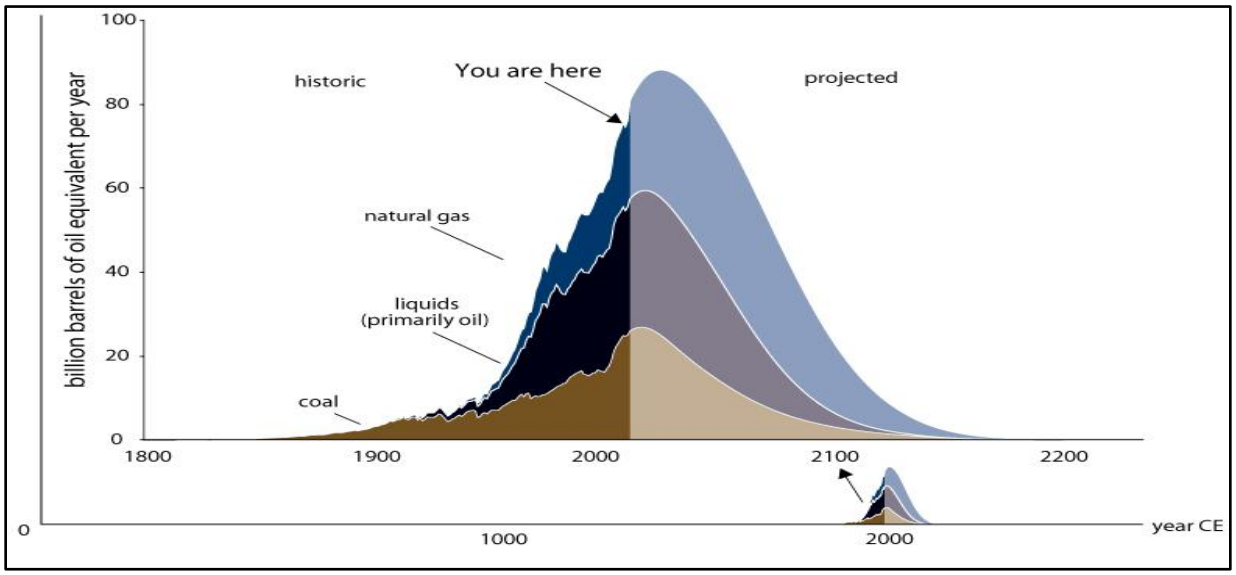

Figure2: fossil fuel global productions 1800-2200

7. Wars and attacks-the energy supply gets hampered due to conflicts between countries and this can be worsening if conflicts happen in major oil producing countries. If we look back at history this is what exactly happened in 1990 Gulf war. During the Gulf war oil price reached its peak and caused global shortages and created major problem for consumers.

8. Miscellaneous factors-extreme weather events such as hot summers or cold winters, political happenings, strikes and tax hikes can cause a sudden increase in demand for energy and this can reduce the supply.

9. Major accidents and natural calamities-severe accidents such as pipeline rupture and natural catastrophes like earthquakes, floods and storms can cause interruption to energy supply.

10. Poor distribution system-the lack of infrastructure for distributing energy has resulted in shortage of energy.

Figure 6: causes for pipeline accidents across the world

3.7 RENEWABLE ENERGY SOURCES

Texas Renewable Energy Industry Alliance (TREIA) define renewable energy as "any energy resource that is naturally regenerated over a short period of time and derived directly from the sun (thermal, photochemical and photoelectric), indirectly from the sun (wind, hydropower and photosynthetic energy stored in biomass) or from other natural movements and mechanism of the environment (geothermal and tidal energy).

2.7.1 Solar energy

The energy produced by sunlight. Solar panels covert sun's light in to useful solar energy using N-type and P-type semiconductor material. These semiconductors convert light into electricity and this is called photovoltaic effect. There are a variety of technologies that have been developed to take advantage of solar energy.

3.7.4 Geothermal energy

Geothermal energy is the heat from earth. Geothermal energy can be obtained from shallow ground, hot water and hot rock, and from molten rock called magma. This type of energy is widely used in and around volcanic sites where the surface temperature is more than 4000°C in the core and mantle boundary. The heat from the surface can be harnessed to produce electricity.

According to Geothermal Energy Association 21 new geothermal plants have been installed and this industry is growing at 5% every year. Since 2005 more than 160 geothermal power projects have been built adding additional power to electricity grids.

3.7.4.1 Advantages of geothermal energy

- It is a renewable energy source
- It is non-polluting and environment friendly
- No wastage or generation of by-products
- Maintenance cost is less
- Geothermal energy does not depend on weather conditions, unlike solar energy
- Geothermal energy can be used directly to heat houses and for cooking

3.7.4.2 Disadvantages of geothermal energy

- Only few sites have the potential of geothermal energy
- Total power output of this source is less
- There is always a danger of eruption of volcano
- Most of the sites where geothermal energy is produced are far from cities or towns where it needs to be consumed
- Installation cost of steam power plant is very high