

# Solar and wind energy as alternative sources to crude oil research paper sample

[Environment](#), [Electricity](#)



Energy is a requirement for the creation of finished goods from natural resources and for the provision of various services. It is therefore, a major building block for any society (Hinrich and Kleinbach, 2006 p. 1).

In the world we live in, about 85% of energy resources used commercially come from fossil fuels such as natural gas and crude oil (Hinrich and Kleinbach, 2006 p. 26). Asphund (2008) says that fossil fuels have provided great service to the world by providing a cheap fuel supply that has driven two centuries of industrialization.

However, fossil fuels have several problems associated with them and these include environmental pollution, resource control, global warming and the fact that they are diminishing in supply. The power industry according to the Global Wind Energy Council (2009b) is the single largest source of these emissions.

The global economy is thus vulnerable to random shocks in the supply and pricing of fossil fuels such as crude oil, which can single-handedly threaten global economic growth and development (Asphund, 2008. p. 27). This is because much of the world's energy (about 40%) comes from crude oil imported by industrialized countries. Any substantial restrictions to crude oil sources would result to considerable economic damage of these countries and would also be felt on a global scale (Hinrich and Kleinbach, 2006 p. 32). According to the Global Wind Energy Council, the greatest environmental threat currently facing the world is climate change and policy makers' greatest concerns at this juncture are keeping our planet's temperatures at sustainable levels. Recent studies indicate that the 21st Century is by far the warmest period than in the last 100 years due to global warming (Hinrich

and Kleinbach, 2006).

The high cost and unpredictability, combined with the urgency of combating climate change and the battle for crude oil fuel resources have serious implications indeed (Asphund, 2008 p. 32). According to the European Wind Energy Association (2009), it is crucial for Europe to switch to alternative energy sources and deploy renewable energy in large scale to ensure sustainability of Europe's economy and energy independence. Switching to improved energy efficiency practices is also a key factor to ensure proper management of this energy.

The predicted rise in global temperatures by 1.5-4.5°C could be catastrophic to the environment causing a rise in sea levels, increased cases of extreme weather events, drought and floods (Omer, 2006). This shows that the cost of crude oil fuel resources is not just the price paid for this fuel itself but also the external costs paid in terms of global warming, emission of greenhouse gases, geographical dependence of energy, limitations in the supply of oil and price shocks as well as the new health risks imposed by use of crude oil and other fossil fuels (Asphund, 2008. p. 69).

The sudden changes in the trend of oil prices observed in 2008, and the Eastern Europe gas crisis of 2009 were also key motivators to discussions on the future of alternative sources of energy (Kiss, Varga and Janosi, 2009. p. 1).

### **Alternative energy sources: Renewable Energy**

According to Omer (2006), sustainable energy is that which has minimal negative impact on the normal balance and functioning of ecosystems including the environment and human health.

Duchin (1995) depicts renewable sources of energy as secure, diverse, abundant and locally found. However, despite the many benefits accrued from their use, the contribution of renewable energy to the total amount of energy consumed still lags significantly due to high costs of development, local impacts concerns, lack of funds for research and poor economic and institutional arrangements.

Renewable sources of energy offer many advantages to an energy hungry world and in the minimization of environmental problems. Again, these sources will continue to be available long after we run out of crude oil and natural gas reserves, and it is politically and economically less risky to use these sources than conventional supplies and again, starting to use them now would prolong the life of natural gas and oil reserves.

Solar, wind, geothermal and biomass present an alternative to the usual energy resources: coal, natural gas, crude oil, hydropower and nuclear power. For the sake of this study, consideration will be put on solar and wind power as alternative sources of energy to crude oil.

### **Wind Energy:**

Wind power has been used in electricity generation since the early 1980's in California. The use of electric energy generated from wind has aroused governments and public interest. Wind energy has been the fastest growing energy form today and in the US, up to 400% capacity had been installed from 1990 to 2004 (Hinrichs and Kleinbash, 2006).

The numbers and names of investors in wind energy reflects the increased acceptability and growing confidence in wind power and governments

around the world now recognize the benefits of wind energy (Global Wind Energy Council, 2008b).

Compared to other energy forms, wind energy is far much better since it is available worldwide both and night and is generally more cost effective. It offers an immediate and long lasting solution to the various climate and energy challenges experienced globally due to the use of crude oil. It is also clean, omnipresent, abundant and an inexhaustible energy source (American Wind Energy Association 2008).

### **Issues in the development of wind energy:**

Despite the many advantages of wind energy, its facilities do pose some impact on natural resources. Primary concerns include it impacts on bats and birds but again this can be reduced by locating wind farms in areas with low bird populations (Morison 2006 p. 6).

While large scale wind power does not seemingly reduce dependency on other fuels, stabilize energy prices or reduce emissions, it has drastically reduced greenhouse gases. Producing the same amount of electricity generated annually by wind turbines in the US would require over 110 million barrels of crude oil or 36 million tons of coal.

The main environmental impact of wind power is quite insignificant being only visual intrusion. While noise pollution and interference with communication concerns have been tabled, the few impacts are local and minimal at best (Western Wind Energy 2009b).

Soil erosion is a concern in desert regions where the hard packed desert soil must be disturbed for turbine installation, but there exist standard

engineering practices to curb soil erosion (Western Wind Energy 2009b). Other benefits include job creation and according to the American Wind Energy Association (2008), generation of 20% of electricity in the US in 2030 from wind would create 500, 000 jobs just in the US and an annual average of 100, 000 jobs in related industries. The annual property tax revenues would increase to more than \$1. 5 billion, while rural land owners would have their payments increase to more than \$600 million annually.

### **Solar Energy:**

People have been using the sun's energy for thousands of years to grow foods, dry cereals and clothes etc. However, technological advancements have made it possible to harness the sun's energy and generate power. The use of solar energy for electricity generation may have begun in 1776 when Horace de Saussure built the first solar collector. This attracted the interest of the scientific community all through the 19th Century. In 1861, Auguste Mouchout built a solar powered steam engine that was expensive to reproduce and maintain hence quickly forgotten.

In the late 1950's the first commercial application of solar energy, a solar water heated office building was built by an architect, Frank Bridgers. Shortly after this, a solar cell with a rating less than one watt was used to power a small satellite from the US Vanguard. However, the use of solar energy never took off since oil prices were low, but in the 1970's, oil prices had increased significantly and interest in solar power was revamped. The US Department of Energy financed the Federal Photovoltaic Utilization Program responsible for testing and installation of more than 3000 photovoltaic systems.

## **Solar energy has continuously grown as a cheaper and cleaner alternative to crude oil products since then.**

Types of Solar Power:

1. Solar thermal: This type of solar power is by harnessing the sun's heat energy. Solar thermal power is mainly used in households and workplaces to reduce heating costs. In most cases, solar thermal power powers water heating systems at home.
2. Solar electricity: This refers to the use of solar panels, technically known as photovoltaic cells to convert sunlight to electrical energy. These cells are made of semi-conductor material, which when hit by sunlight, have electrons knocked off from their atoms thus generating an electric current. This electricity is used to power appliances and even industrial systems.

### **Benefits of solar power:**

Solar power is a renewable energy source, and the sun is available all over the world and for free. While the sun may be hidden by clouds at times or set in the evening, it is still consistently available enough to provide the energy we require. In fact, even when hidden by clouds, the sun's luminous intensity is adequate enough to produce solar electricity.

Solar energy is also clean in that it does not pollute the environment in any way since it is not to greenhouse gases and toxic material. Another overlooked part of solar energy is that it is silent in terms of operation since it only uses sunlight. This means there is no need for heavy machinery that produces noise pollution and emissions.

## **The future of solar power:**

While solar energy has in the past one way or another, the future of solar energy still remains open for innovation, expansion and development of new concepts and uses. This is simply due to the fact that many variables associated with mainstream usage of solar energy exist and the only limiting factor in the future of solar energy will be cost.

Current solar energy critics argue that the overall price of crude oil and other fossil fuels is cheaper. While this may be true and crude oil is economical in the short term, environmental damage is still a consideration.

Fortunately, due to availability of cheap raw materials and new production methods, the cost of solar power is lowering which implies that the future of solar power will be good. How quick solar energy picks up and becomes dominant all depends on the cost. The more governments push consumers towards fossil a free future and the more attention given to solar power, the more attempts to reduce costs and increase solar power production will be .

## **Conclusion:**

Conclusively, the advantages of solar and wind energy over crude oil and other fossil fuels are far reaching. This type of power does not only benefit individuals and their homes, but the entire environment.

Solar energy may not cause plummeting of energy costs, but in the long run it could make the earth a better place to live. Wind energy on the other hand, provides an opportunity for industrializing and industrialized countries to plan their futures based on predictable and known energy costs derived from indigenous sources of wind energy, free from all political, security



related, economic and environmental disadvantages associated with the current structure of energy supply. The nature of wind energy as a ubiquitous source of energy makes it a suitable energy source globally irrespective of country location, wealth and strength.

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