

Free essay on energy conversion

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Energy Conversion is Critical to the Study of Energy

Energy is an integral component of a society. Energy is used in homes, industries and various sectors of the economy. Though energy is derived from many sources and is usually in many forms, it is the conversion of energy from one form to another that makes it usable. For example, energy from coal cannot be useful if it is not converted to electricity. Much of the energy that is used is usually converted from fossil fuels. According to key figures by the European Commission (2011), fossil fuels account for about three quarters of the EU's energy mix. For example, the EU gross inland energy consumption by fuel in the year 2009 comprised of 37% oil, 24% gas, 16% coal, 14% nuclear and 9% renewable. Therefore, the burning of fossil fuels converts energy from its stored form to a usable form. Also, the production of energy sources from renewable sources such as the sun and wind require energy conversion from one form to another. Therefore, this conversion of energy from one form to another usually affects the environment and the air breathed in many ways, and must be considered when studying energy.

Fossil fuels are used both for mass energy production and in motor vehicles. Burning of petroleum, coal and other fossil fuels at very high temperatures is the fundamental way in which electricity is produced. This is known as combustion. Coal-fired power plants and diesel-powered power plants are used to produce electricity through the burning of coal and oil respectively. According to EEA (2011), coal and lignite account for about 30 percent of EU electricity generation. Germany is ranked as the leading major hard coal importer followed by the United Kingdom. Therefore coal and oil, as well as

other fossil fuels are the major sources of energy for many European countries. However, this manner of energy production often results in by-products such as soot, smoke and other substances that pollute the environment.

Some of the primary air pollutants that result from the combustion of fossil fuels include carbon monoxide, sulfur oxides, nitrogen oxides, particulate matter, and unburned hydrocarbons. Carbon monoxide is a highly poisonous gas, and is the primary constituent of smog. Carbon monoxide pollution is caused by urban automobiles and transportation vehicles. According to ACEA (2010), as of 2010, there were more than 250 million automobiles on European roads. About 34 percent of these cars are older than 10 years, and the car density per a thousand inhabitants was 458 in Western Europe in 2007. What this means is that these older cars are likely to have incomplete combustion of fuel leading to the production of carbon monoxide as well as sulfur dioxides and particulate matter. Considering that there are about 458 cars per 1000 habitants, the health effects resulting from this air pollution can be adverse. These pollutants can cause respiratory problems such as bronchitis and also irritate the lungs. Also, nitrogen oxides and sulfur oxides combine with water to form acid rain, which can harm aquatic ecosystems as well as crops and forests.

In addition to these forms of pollution, the burning of fossil fuels has created the greater problem of global warming. Carbon dioxide is one of the gases that are emitted during the combustion of fossil fuels. Carbon dioxide traps heat in the atmosphere, and this has resulted in increasing global temperatures. Also, the emission of other greenhouse gases such as

fluorinated gases, nitrous oxide and methane has led to the destruction of ozone layer. For example, the 2010's European GHG emissions rose by 2.4 percent (Harvey, 2012). Global warming has led to climate change, resulting in altered weather patterns that have seen led to extreme weather events such as Tsunamis as well as droughts. However, there have been efforts aimed at ensuring that the conversion of energy is done in a clean and sustainable way. One of the most notable agreements is the Kyoto Protocol. Under this protocol, 15 EU member states committed themselves to reducing their collective emissions in the 2008-2012 period to 8 percent below the 1990 level. More recently, the parties made a commitment to reduce GHG emissions by about 18% below levels in 1990 in the 8-year period between 2013 and 2020 (EEA, 2011). It is the Intergovernmental Panel on Climate Change (IPCC) that creates a standard reporting format for GHG emissions from countries.

In order to achieve these commitments made in the agreement, there is a need for the adoption of Green energy governmental policies such as subsidies on renewable energy production. For example, in 2007, European leaders put a signature on a binding EU-wide target to source 20 percent of their energy needs from renewable sources of energy such as solar, hydro, biomass and wind power. As a member state, Ireland has a National Renewable Energy Action Plan aimed at meeting the renewable energy targets set by the European Union.

For example, Wien Energy built the largest wood biomass power plant in Europe in the year 2006. The plant provides electricity for about 48000 households and heat for 12000 households. The power plants maximum

capacity is 66 MW and it operates at an efficiency of 80%. According to DAC (2012), generating the same amount of electricity and heat is equivalent to using 45000 tons of fuel oil or 72000 tons of hard coal. The power plant reduces an estimated 144000 tons of carbon dioxide emissions annually. The success of this project can be attributed to subsidies guaranteed by a higher feed-in tariff. In addition to these policies and programs, there is also a need to explore clean ways of converting fossil fuels from one form to another. For example, there are a number of technological developments in coal-fired generation. Such technologies include supercritical-pressure pulverized coal combustion, integrated gasification combined cycle and carbon capture and storage. Incentives for econ-innovation have also led to new car technologies that reduce carbon dioxide emissions. Therefore, there is a need to consider the effects of energy conversion methods when studying energy.

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