Fossil Fuel Use and Global Warming

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The burning of fossil fuels is on the rise in most countries. Particularly in the United States, this use of oil as energy is controversial from an environmental standpoint. Currently, the primary motive for finding alternative sources of energy in the United States is the worry that the oil supply is diminishing and will some day be too small to support the world's energy needs. There is also, to a lesser degree, though, a growing concern with the harmful environmental effects of fossil fuel usage. With studies published in the past few decades on the changing world environment, more and more countries are becoming aware of the need to explore alternative fuel sources to prevent the harmful effects of global warming and ozone depletion. It is necessary to explore in terms of geographic locations the leading contributors to greenhouse gas emissions and also what actions are being taken to prevent the growing threat of global warming. This analysis will contrast the United States with European Union countries and Japan.

What is Global Warming?

To begin with, one must understand what, exactly, global warming is, why it is a threat, and what causes this phenomenon. Gases, now called "greenhouse gases" normally accumulate in the atmosphere and are responsible for trapping heat from the sun's rays. This effect is known as the "natural greenhouse effect" as it keeps the Earth's average temperature 33 degrees C warmer than it would otherwise be without the trapping of this heat. The natural greenhouse effect creates a climate in which life can thrive and man can live

under relatively benign conditions. Otherwise, the Earth would be a very frigid and inhospitable place[1].

The complex scientific process through which this interaction occurs is detailed here and pictorially in figure 1 below:

> Shortwave solar radiation can pass through the clear atmosphere relatively unimpeded, but longwave infrared radiation emitted by the warm surface of the Earth is absorbed partially and then re-emitted by a number of trace gases--particularly water vapor and carbon dioxide--in the cooler atmosphere above.[2]

Because, on average, the outgoing infrared radiation balances the incoming solar radiation, both the atmosphere and the surface will be warmer than they would be without the greenhouse gases. However, it is necessary to examine the harmful “enhanced” greenhouse effect that the Earth is facing now. One should distinguish between the "natural" and a possible "enhanced" greenhouse effect. An enhanced greenhouse effect refers to the increased average temperature of the Earth's surface above that occurring due to the natural greenhouse effect.[3] Enhanced greenhouse effects are seen because of an increase in the concentrations of greenhouse gases due to human activities. It is this global warming that brings other detrimental changes in climate; for example, changes in precipitation, storm patterns, and the level of the oceans. The word "enhanced" is usually omitted and we will assume for the purposes of this analysis that “greenhouse effects” refer to the enhanced and not the normal state of this process.

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[1] www.globalwarming.org
[2] www.globalwarming.org
[3] www.globalwarming.org

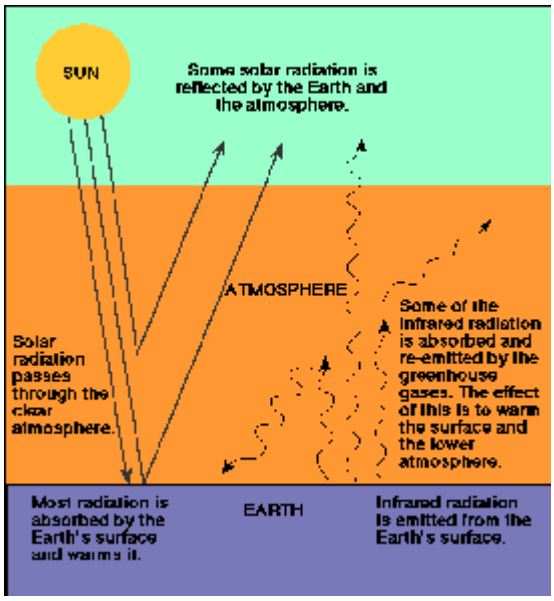

Figure 1
Source: http://www.maui.net/~jstark/nasa.html

Understanding the process that leads to this increase in global temperatures inevitably leads one to wonder how it is that the level of greenhouse gases has risen to such a high level that plants on the Earth's surface are unable to absorb them. Human activities are primarily responsible for this increase. The burning of fossil fuels is the leading contributor to carbon dioxide emissions in the world, perhaps the most important gases in the trapping of excessive heat in the atmosphere. In the United States, oil use for transportation accounted for 33 percent of CO2 emissions in 2000.[4] Total CO2 emissions in America measured 1,517 million metric tons in 1999.[5]

Who is Responsible?

It is highly important to understand that the United States is, by far, the leading contributor to greenhouse gas emissions in the world. Although the

[4] Federal Transit Administration

[5] U.S. Department of Energy, Energy Information Administration, *International Energy Outlook 2001*, Washington, DC, March 2002, Tables A10 and A11.

country has a population of only 260 million people, it is responsible for over one fifth of the world's greenhouse gas production.[6] This is an extremely disproportionate amount given that the United States comprises only 5 percent of the world's population. Even China, with approximately one sixth of the total world population emits by far less carbon dioxide than the United States, emitting 669 million metric tons in 1999. Other developed nations such as Germany, which has a population approximately one third that of the United States, emit a more proportional, though still harmfully large, 230 million metric tons in 1999. Japan's CO2 emissions for 1999 amounted to 307 million metric tons.[7] It is no exaggeration to state that America's role in causing global warming is the greatest of any nation.

There are many reasons behind the United States' outrageously disproportionate CO2 emissions. To compare Germany as a typical European Union country with America is one way to see the major factors that lead to this high creation of greenhouse gases. It is estimated by the Federal Transit Administration that 10 million Americans use mass transit each working day. Germany's use of mass transit on a daily basis is 25 million people.[8] Comparing population sizes, this means that 1 in 26 people in America use mass transit, while 1 in 3 Germans does so daily. America's reliance on private cars would not be as detrimental to the environment if they had greater fuel efficiency. The prevalence of sport utility vehicles driven on American roads only adds to the

[6] U.S. Department of Energy, Energy Information Administration, *International Energy Outlook 2001*, Washington, DC, March 2002, Tables A10 and A11.
[7] U.S. Department of Energy, Energy Information Administration, *International Energy Outlook 2001*, Washington, DC, March 2002, Tables A10 and A11.
[8] Federal Transit Administration

problem of global warming. Germany's greater use of smaller vehicles, such as the SmartCar, manufactured by DaimerChrysler, increases the average fuel efficiency of automobiles on German roads. Additionally, their is a greater reliance on the use of city buses and subway systems in German cities.

What is Being Done?

With the knowledge that the current state of the world's environment is worsening readily agreed upon by over 2,500 of the world's leading experts, it is no leap to say that countries must make a concerted effort to alter their oil use and CO2 emissions. In examining current policy addressing global warming, one finds the Kyoto Protocol to be perhaps the most comprehensive piece of legislation created by the United Nations environmental commission. Although many countries signed the Protocol, named after the city it was constructed in, not all have ratified and enacted its stipulations into law. In particular, the United States under President Clinton signed the act, but was later completely removed from any participation with President Bush. American participation is most vital to stopping global warming because of the share of greenhouse gases produced by Americans. The Kyoto Protocol was ratified on June 1 of 2002 by the European Union and Japan. EU countries legally commit themselves to reducing greenhouse gases by 8% from 1990 levels in the period 2008 to 2012, and Japan commits to a 6% decrease during this time period.[9]

After President Bush walked away from the Kyoto Protocol, European nations tried to get him to agree to an aggressive target of aiding the developing world to generate 15 percent of its energy from renewable sources over the next

[9] The Guardian

decade, but the Bush administration teamed up with OPEC at the 2002 Johannesburg Summit on Sustainable Development to block the proposal.[10] This fact brings up an interesting question: what are the OPEC countries themselves doing to curb CO2 emissions in light of the growing knowledge about global warming?

www.OPEC.org, the website for the Organization of the Petroleum Exporting Countries, has a section of commentary on the issue of climate change in which they state how glad they were to see this topic as a part of the Summit at which they only hurt the world's hopes of decreasing emissions:

> We welcomed the inclusion of the climate change issue into the discussions at the World Summit in Johannesburg, which focused on the objectives of poverty eradication and the promotion of economic development, in harmony with social development and the protection of the environment.[11]

Their weak position on the responsibility of the product they sell is summed up later in this statement with:

> However, while there is the understandable call to develop renewables, the fact remains that the technology is still in its infancy. Therefore, while the renewable energy industry is being developed, all other available resources, which are friendly to the environment, must also be accessed, enhanced and utilised to tackle the dire problems of mankind and ensure sustainable development.[12]

Clearly concerned with the profits their countries receive from the sale of oil to countries such as the United States, OPEC's statement later goes on to state that the advances towards finding energy sources that are renewable and less conducive to the production of greenhouse gases must "do this in a way which

[10] The Guardian
[11] www.OPEC.org
[12] www.OPEC.org

avoids a net detrimental impact on fossil fuel producers."[13] Unfortunately for the already extremely wealthy families reaping the benefits of the sale of fossil fuel from their countries, most environmentalists concerned with the increase in greenhouse gas production advocate for the phasing out of petroleum in favor of cleaner fuels.

Simple Ways to Reduce CO2 Emissions

Although OPEC propaganda would have their readers believe that the science behind development of alternative energy is far down the road, there are many ways in which nations can protect the environment through legislation. To begin with, the Kyoto Protocol, if ratified by more countries, would lead to a decrease in CO2 emissions and more stringent emissions standards for automotive industries. Earth Day's website suggests everyday useful tips for individuals to make small contributions to the reduction of greenhouse gas emissions. They argue that even small changes in individual's behavior would lead to a fairly substantial reduction in oil use:

> If America's light trucks achieved the same average fuel economy as automobiles, oil consumption would be reduced by 336 million barrel per year, almost one million barrel per day.[14]

While it is not easy for an average American to change the fuel economy of light trucks, Earth Day spokespersons also value the seemingly small contribution of keeping cars well tuned, stating that this is the "easiest way to go the same distance on less gas. A well-tuned car uses up to 9% less gasoline."[15] Also

[13] www.OPEC.org
[14] www.EarthDayresources.com
[15] www.EarthDayresources.com

important, experts state, is keeping tires well inflated: “Americans waste up to 2 billion gallons of gasoline each year because of under-inflated tires.”[16]

Burning garbage also pollutes the environment with additional greenhouse gases. Thus, recycling is another way to keep emissions low. Here Germany serves as an example of the path America and other developed nations should head down in their efforts to reduce harmful pollutants. The United Nations has created a “Blue Angel” program to reward the manufacturers of packaging products for using materials that are more easily recyclable than similar products in their category. German stores must pay back their customers for redeeming a blue token which accompanies the purchase of these Blue Angel products, of which over 4,000 are sold in Germany today. There is a greater prevalence of recycling in the EU and Japan than there is in the United States, most likely due to the lack of incentives for customers to participate in recycling programs. By contrast, German grocery stores double as hubs of recycling, where many customers often redeem their plastic and glass bottles to pay for a large portion of their groceries. In Berlin, where a one-liter bottle of sparkling water costs on average 25 euro cents, the 15-euro-cent recycling tax added on seems an extraordinary waste and encourages consumers to bring back their containers. However, in the United States, where in California a one-liter bottle of sparkling water costs on average 1 dollar, the 5-cent recycling tax is too low a percentage of the total purchase price to affect consumers recycling habits. If grocery stores played a larger role in the recycling process, making it easy and cost-effective for

[16] www.EarthDayresources.com

consumers to bring back their beverage and other containers, there would be an increase in recycling.

Wind-powered energy is also being researched at present as is solar-power as alternatives to oil use. Although American soybean farmers profit largely from selling their beans to cattle and dairy farmers to feed to their cows, these beans lead to bovine flatulence. This seemingly innocuous condition harms the ozone and could be reduced by feeding cows rapeseed instead. Rapeseed has also been found to produce an effective oil that can also be used to generate energy without the harmful greenhouse gases commonly associated with fossil fuels.

What Can Be Expected if the Current Situation Remains Unchanged?

Heat trapped in the Earth's atmosphere will lead to a rise in sea levels due to an increase in polar ice cap melting, which will also cause more extreme weather. The higher temperatures will make swamp-born diseases, such as malaria, exponentially more common. Droughts and tornadoes have also been predicted as a consequence of global warming. These are only the short-term problems. Soon, the environment will resemble nothing of what it is today, and will become uninhabitable by organisms unable to adapt to the heat.

References:

1. http://www.OPEC.org

2. http://www.EarthDayResources.com

3. http://www.theGuardian.uk.com

4. http://www.globalwarming.org

5. http://www.FTA.gov

6. U.S. Department of Energy, Energy Information Administration, *International Energy Outlook 2001*, Washington, DC, March 2002, Tables A10 and A11.

7. http://www.maui.net/~jstark/nasa.html