

GLOBAL WARMING AND ENERGY ALTERNATIVES

(Reducing our dependence on foreign oil and global warming are two sides of the same coin.)

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Based on the reaction to my recent paper *Global Warming and Common Sense* (which was distributed by EEA's Newsletter, September 1998), I feel there is a need to expand and update my first paper.

What is the Greenhouse Effect: In 1824, a French scientist, Jean Fourier, hypothesized that the average temperature of the planet is warmer because of the existence of the Earth's atmosphere. He claimed that the warming effect of the atmosphere on the surface was similar to how a plant warms when it is encased in a house of glass. Fourier called this phenomenon the greenhouse effect.

The composition of the Earth's atmosphere governs the climate of the planet and establishes conditions vital for life. Although the atmosphere is primarily composed of nitrogen (78%) and oxygen (21%), these gases do not interact with the long thermal radiation emitted by the earth. This task is left to the greenhouse gases which account for less than 3% in the atmosphere. Greenhouse gases include: carbon dioxide, methane, nitrous oxides and water vapor which are very effective at absorbing thermal radiation expelled from the Earth's surface.

After greenhouse gases absorb thermal radiation emitted from the Earth's surface, they re-radiate this energy back to the surface of the Earth, which warms the earth in the same way that a blanket traps body heat on a cold night. While greenhouse gases absorb and emit thermal radiation, they are essentially transparent to solar radiation and allow additional heat into the Earth's atmosphere, where it is trapped by the greenhouse gases. This system permits the livable conditions on the Earth's surface. However, small changes in the concentration of these gases can drastically alter the heat trapping capabilities of the atmosphere resulting in acute changes in climate and all the possible consequences.

There are many who believe that global warming is not due to man-made emissions, but is a natural phenomenon. This position is held by the Heartland Institute which supports a nongovernmental international panel on climate change. This panel is comprised of many rational and important scientists.

- The man-made contribution to the current global warming is insignificant. The observed temperature trends disagree sharply with those calculated from existing greenhouse models. There are many shortcomings inherent in the models that try to simulate what is happening in the real atmosphere and predict climate changes.

- The scientists have traced changes in the climate since the last ice age ended about 10,000 years ago. These scientists found extensive periods that were warmer than today and colder than today, on a timescale of decades and centuries.
- Their most viable argument is that climate and solar warning models are not reliable and one cannot predict the effects of global warming on climate change.

The warming of the Earth's surface is not necessarily harmful. This is overlooked by many activists who preach the Gospel of CO₂ reduction.

- Generally warmer temperatures are beneficial, increasing bio-diversity. Higher concentrations of CO₂ in the atmosphere are beneficial to plant life. High levels of CO₂ in the air enable plants to grow bigger and produce more branches and leaves.

However, the above minor benefits are no reason not to reduce greenhouse gases and simultaneously reduce our dependence on foreign oil.

Global warming is real and will have a serious effect on the environment towards the end of the century or sooner. However, all our efforts to reduce carbon emissions will be dwarfed by China and India. China is building 400 coal-fired power plants every year. Chinese manufacturing is much less efficient than in the industrialized countries. Most of all their energy is derived from the use of coal, which produces more carbon than any other type of fossil fuel. In order to meet our obligations to reduce greenhouse gases, many in the new administration have proposed carbon tax and/or a carbon cap.

Carbon Tax

A carbon tax is a way to charge for dumping carbon dioxide into the atmosphere. It fixes a problem that such pollution is currently free. If taxes are higher, it discourages businesses and consumers from polluting. It applies to all carbon used in the economy and raises revenue for the government.

The big problem with carbon tax is that it has to be very high to decrease pollution sufficiently. When people are addicted to substances or a source of energy, they will be willing to pay a lot more before they stop using it. This is as true of fossil fuel as it is of alcohol and tobacco. A second problem is that even if a carbon tax discourages individual consumption, a growing population can still generate more pollution. The third problem is a carbon tax hurts poor people. In theory, it can be mitigated by funneling rebates to the poor, but in practice, most tax breaks favor the rich. The ultimate problem though is that tax hikes must be approved by politicians and politicians in America do not like voting for them. When any energy prices rise, as they must, our politicians are unlikely to raise them further by adding taxes.

Imposing an economical carbon tax of two dollars per ton would have very little effect on the overall climate change anticipated from global warming. Increasing the carbon tax to \$14 per ton will greatly increase the cost of fossil fuel which gives us low cost electricity, travel, air conditioning, etc. It would lower the standard of living for all but the rich.

Carbon Caps

A carbon cap is a physical limit on the rate of emission if imposed. It fixes the problem that such emissions are currently unlimited.

To implement a carbon tax cap, the government must issue a gradually declining number of emission permits. Once issued, these permits can be traded. Trading lets the market allocate emission rights among companies that need or want them the most. Trading also establishes a variable price for the declining supply of permits.

The big question raised by carbon caps is will the government sell emission permits or give them away free? Another question is: If the government gives permits away, to whom shall it give them to? These questions have huge economic significance since they determine who pays whom to use the atmosphere. The big advantage of carbon caps is that it limits total carbon emissions. Even if the population grows, carbon pollution will decline.

The chief problem with carbon caps is that they can lead to higher prices for consumers and windfall profits for certain companies.

Like a carbon tax, a decreasing carbon cap will up the price of fossil fuels and decrease the standard of living.

A carbon tax or capping is an economist's dream, but a politician's nightmare. The economist imagines that politicians will keep raising taxes until it reduces pollution sufficiently to solve the climate problem. That assumes heroic behavior by a majority of Congress members for several decades, an assumption not grounded in reality.

The funds for research and development for renewable energy is at its lowest point in 25 years. We need to find ways to allow us to develop a science and technology, which is beneficial and will enable us to provide alternate energy technologies at reasonable prices. It is being suggested that all nations commit themselves through spending .05% of GDP on research and development of low carbon emitted energy technology. This has been proposed by Bjorn Lomborg, who is a noted environmental author and economist. This would cost about \$25 billion, seven times cheaper than Kyoto and many times cheaper than Kyoto II.

It would embrace all nations and yet have the richer nations pay the larger share. It would let each nation focus on its own vision of energy alternatives (renewable sources, nuclear energy, fusion, conservation. etc.)

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Smart Options

Re-establishing a sensible and fact-based dialogue on climate will mean that we can start doing the smart things first.

- Dealing with global warming will take a century and need a political will spanning parties, continents, and generations. We need to be in for the long haul and find a cost-effective strategy that does not splinter from over-arching ambitions.
- We should cut CO₂ by more than what the emasculated Kyoto will manage.
- We should increase our R&D in low-carbon energy ten-fold. Using 0.05 percent of GDP, (or \$25 billion annually) would enable us to stabilize climate at a reasonable level.
- Implement the options outlined in *Global Warming and Common Sense*.

But we should also realize that how good we make the twenty-first century is not primarily a function of how we tackle global warming. The global warming debate has become so fixated on CO₂ cuts that it neglects what presumably is our primary objective: to improve the quality of life and the environment. In the battles over whether we should cut four percent or 96 percent, we might easily forget that in the short and medium term, we can help people much better through alternative policies. We can cut diseases, malnutrition and lack of access to clean drinking water and sanitation while improving the economy with much cheaper policies that will have much greater impact.

In the long-term, our goal should be to make a transition to a low-carbon future so inexpensive that our children and grandchildren will want to do it and that China and India will want to as well. This is why we need to focus on R&D to improve the future.

I hope we will not have to tell our grandchildren that we went for a long series of essentially unsuccessful command-and-control Kyotos that had little or no effect on the

climate but left them poorer and less able to deal with problems of the future. I also hope we will not have to say that we focused monomaniacally on global warming, neglecting most or all of our other challenges.

We should be able to look our grandchildren in the eyes and say we have managed the first part of the century-long effort to tackle climate change by making low-carbon energy technologies much cheaper and much more accessible. We should be able to tell our children that our decisions have left them a world better equipped to deal with the future: richer, better fed, healthier, and with a better environment.

Energy Alternatives

Currently our energy policy consists of borrowing money from China and sending it to the Middle East to support terrorism. Our government, past and present, has done nothing to discourage the use of imported oil. Alternatives to imported oil are many. Unfortunately, there is little we can do to change the present situation. Four dollars a gallon gasoline is going to be around for a long time.

Renewable energy sources, such as wind and solar, currently provide less than 1% of our current energy needs. Increasing the use of renewable energy requires basic changes to the infrastructure to bring the energy to the ultimate user. Connecting to the grid of power companies is a major obstacle. This is a situation that can change drastically if large wind farms and solar plants are implemented.

Drilling for new sources of oil in Alaska or offshore is certainly a viable option (however not a green one). It will do nothing to reduce global warming. There is a three-year wait for offshore drill rigs and at least a one-year wait for a land-based rig. Their infrastructure problems, pipelines have to be built, and refineries have to be built and expanded.

It is my belief that the quickest way to accomplish oil independence is by building new atomic power plants. Most experts believe that the pressurized water reactor is the best technology to be employed. If the AEC could come up with a standard design as stated safety precautions and specifications for a generic nuclear plant, this would decrease the regulatory review process and the implementation of atomic powered plants. This is an old idea. It was advocated by the Atomic Industries forum ¹ in the 1970s. It would be possible to build 75 new atomic energy plants in the next 10 years. Twenty-five (25) plants could come online in the next five years.

Let us remember that Western Europe, Europe produces about 75 to 80 percent of their energy needs by nuclear power plants that are currently operational. These plants are safe and produce minimal impacts to the environment. There have been no major safety violations or accidents reported in the last 45 years.

¹ A utility lobby for the nuclear industry active since 1964. (They publish a monthly magazine.)

As far as the use of automobiles that do not require gasoline from refined oil, there are many alternatives, economics and innovative technologies that will determine the car of the future (electric hybrid, fuel-cell driven, all electric, natural gas vehicles, etc.).

There may be a grace period in the next three to four years before oil reaches \$200 a barrel. This may be due to worldwide slowdown and the realization by Americans that they have to cut back on the driving and start using smaller and more efficient vehicles.