A Paper Presented to the Thursday Club
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Greenland ... Again

In 1996, three honorees shared the Tyler Prize for Environmental Achievement, "the premier award for environmental science, environmental health and energy conferring great benefit upon mankind" – an award regarded by some in the field as equivalent to a Nobel Prize. What achievements merited this honor?

Well, in 1984, two of the honorees, Willi Dandsgaard of Denmark and Hans Oeschger of Switzerland, published their analysis of data gleaned from the first ice cores extracted from Greenland. The Greenland Ice Sheet Project began in 1971, with subsequent annual expeditions to drill cores from the glacial ice. Ice cores are an archive of temperature and atmospheric components that give scientists an historic picture of climate variations. The Greenland Ice Sheet Project eventually yielded ice cores over 2000 meters long, looking back more than 100,000 years in time.

Most school children are aware that tree rings can tell a story about the environment to which a tree was exposed, from hot and dry to cool and wet weather, to forest fires, disease and insect infestations. Ice cores, coral reefs, boreholes and ocean sediments are also proxies that help scientists reconstruct climatic conditions prior to the 1880's, when systematic highly detailed record-keeping began.

Most ice sheets form from snow, layers upon layers of snow. There are air gaps between the snowflakes, and as snow accumulates, the lower layers compress more and more until finally all gaps are sealed and the air bubbles, and other materials, such as dust and ash, are permanently sealed in as the ice forms.

I learned a little bit about ice formation as I researched this paper. Snow which

partially melts, refreezes and gets compacted is called *Névé*. This is the stuff you run into on the ski slope – the hard icy areas that make you lose control. If the *Névé* survives to the next year or years, it is more compacted, denser, and classified as *Firn*. *Firn* is an intermediate stage between snow and glacial ice. As the upper snow pack builds and the *Firn* is further compacted, air bubbles are squeezed out or trapped within what becomes the glacial ice. (I was disappointed to find out that Eskimos *don't* have an extensive list of individual words that describe all possible variations of snow texture and types; that turns out to be an urban legend ... or maybe a wilderness legend.)

So the *Firn* is compacted and becomes glacial ice. By analyzing the materials within the glacial ice, a climatic record can be reconstructed. Comparatively, ice cores contain more climatic information than other proxy indicators. This allows a detailed look back through the centuries of climate variations in the area where the ice was formed.

Our two Tyler Prize award winners, Dansgaard and Oeschger, looked at the gas bubbles from ancient atmospheres found trapped in the ice cores. Recovering these gasses and measuring them through isotopic analysis, they compared, among other things, the ratio of two different oxygen isotopes which are indicators of the temperatures at the time the snow was falling: heavier oxygen-18 isotopes indicate warmer temperatures while lighter oxygen-16 isotopes indicate colder temperatures.

Along with the oxygen isotopes, the measured levels of deuterium (heavy hydrogen) and carbon dioxide trapped in the ice gave the scientists added climatic data and the potential source of environment influences on climate change.

Dansgaard and Oeschger expected to find evidence past ice ages, times when North American glaciers extended across all of New England, and New York, down into

Pennsylvania and across Ohio, Indiana and Illinois. (Perhaps these long ice ages represent Earth's "natural" climate, and we should be focusing on a return to *that* "natural" state.) Dansgaard and Oeschger also expected to see evidence of the interglacial periods, with the warmer climates more hospitable to flora and fauna, especially humans.

What surprised the researchers was the evidence of regular millennial temperature cycles – a "regular" rise and fall of global temperatures that occurred every 1,000 – 2,000 years. (I used the word "regular" advisedly – we are talking about periods reaching back to the time when modern humans were beginning to displace Neanderthal Man.) This analysis was regarded, in climatological circles, as so significant that abrupt climate swings associated with the changes in atmospheric greenhouse gasses are known as "Dansgaard-Oeschger" events.

The third recipient of the Tyler Prize for Environmental Achievement was a Frenchman, Claude Lorius, the lead scientist involved in drilling an ice core from the Vostok glacier in Antarctica. The Vostok Core drilling, completed in 1998, was the longest ice core ever drilled, reaching over 3600 meters down into the glacier, allowing scientists to look back over 400,000 years. By analyzing CO_2 and methane variations over the past 150,000 years, Lorius and his team were able to reconstruct the chemical composition of the atmosphere and thus get a picture of the area's climate over the millennia.

The Vostok Core was pulled from the Antarctic, on the opposite side of the world from the Greenland Ice Sheet Project. However, the information gleaned from the Vostok Core indicated the same "Dansgaard-Oeschger" events, with cyclical temperature swings that occurred every 1,000 – 2,000 years.

Last June's *National Geographic* magazine's cover story was "Greenland: Ground Zero for Global Warming". To quote the opening lines, "As Greenland returns to the warm climate that allowed Vikings to colonize it in the Middle Ages, its isolated and dependent people dream of greener fields and pastures – and also of oil from ice-free waters."

Warmer weather, year after year, means longer growing seasons for Greenland's farmers and a potential reduction in the country's reliance on imported food. Additionally, the receding glaciers are opening greater possibilities for exploration for and extraction of oil and gas as well as huge mineral resources, including perhaps the world's largest deposits of the rare earth metals that have become so crucial to modern technology – the "green" technologies that produce "hybrid car batteries, wind turbines, and compact florescent light bulbs." (Right now, China controls 95% of the world's supply of rare earth metals.)

Greenland has increasing opportunities to be self-sufficient and fully independent of Denmark, which has ruled Greenland for almost 300 years, mostly benignly. This desire for independent self-sufficiency is the same sort of motivation that brought Erik the Red and his followers to Greenland in 982 A.D., when they found the receding glaciers and ice free waters had made the land more hospitable to settlement, farming, herding and hunting.

About 900 A.D. began a period that became known as the Medieval Warming, which lasted until approximately 1300 A.D. Northern Europe warmed about 2° Celsius higher than it had been during the preceding years. For nearly 400 years the Norse population enjoyed the benefits of the warmer climate, but it all came to an end as the climate began cooling, the weather became harsher, the glaciers returned, and the ice-

filled waters became increasingly dangerous to navigate. The last written record of the Viking presence in Greenland was in 1408. The land was abandoned by them as the world entered the 500 year period of the Little Ice Age.

Now we are over a century into the current Warming Period, and Greenland's character is changing again, becoming warmer and more hospitable to human habitation and culture. The history of Greenland allows us to see "Dansgaard-Oeschger" events in our recent history, the cyclical warming and cooling of the world within a relatively small range, only 2° or 3° Celsius above or below the mean.

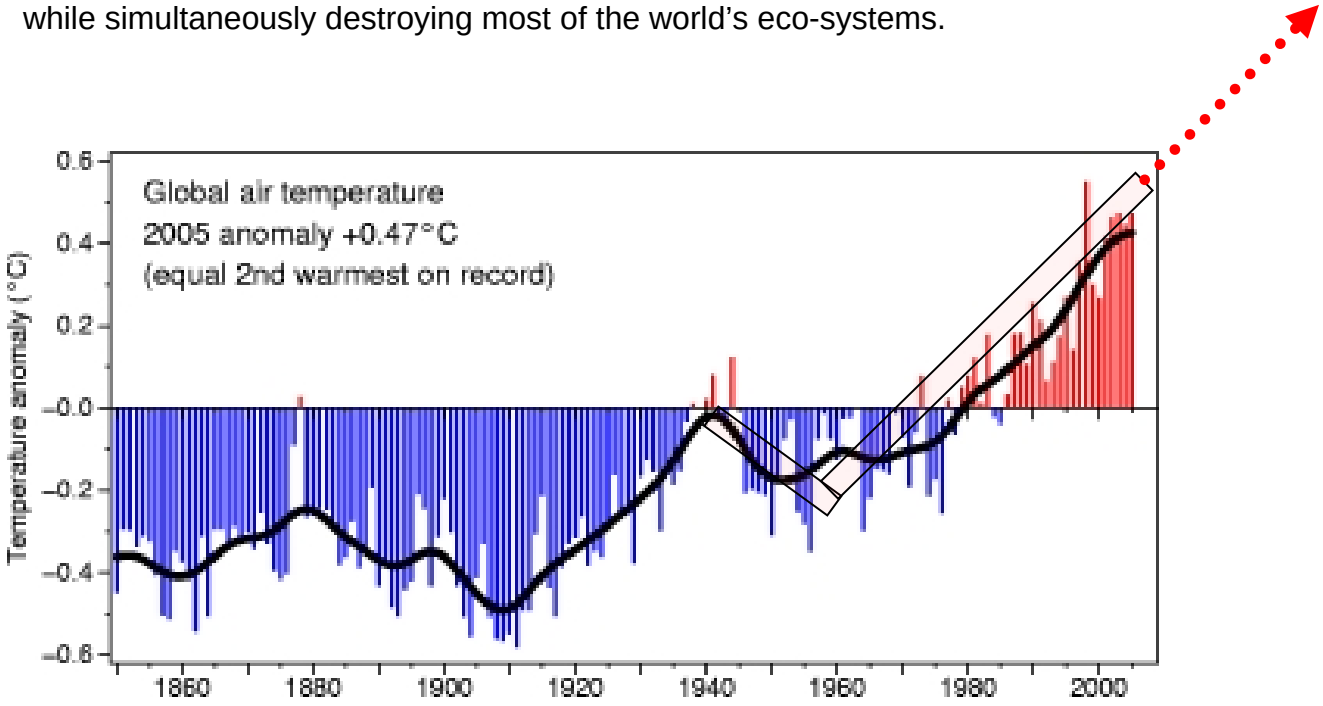
If the evidence of ice cores, seabed sediment, and historic human migrations does establish that our world goes through natural cycles of climate change (most notoriously measured by temperature changes), what does this mean for us, and should we invest our efforts to prevent these changes from occurring?

Climate is what you expect; weather is what you get.

Four years ago, my paper dealt with the heresy of scientists, past and present, for questioning the dogma or consensus of the time, for using scientific method to determine causes and effects. "Global Warming" was the danger to the future of life on this planet. In just four short years, the warning has changed from "Global Warming" to "Global Climate Change." In either case, ***MAN*** (with capital letters, underlined, italicized and in bold) has been accused of being the agent of drastic climate change, and ***MAN*** must make drastic adjustments in order to save not just himself, but all the other species on the planet which will suffer, dwindle, and even become extinct.

Should we be worried about Global Climate Change? If you look at the first graph below, you will see the recorded temperature changes that were used to raise the

alarm of a drastic shift in global temperatures. The famous “hockey stick graph” was used to extrapolate the temperatures as rising consistently into the future, with no end in sight, resulting in the melting of all ice on the planet, causing sea levels to rise and flood the continents, submerge islands, and cause world-wide death, starvation, and disease, while simultaneously destroying most of the world’s eco-systems.



If you look at the next graph, you will see that, historically, we are halfway through a climatic warming cycle. It should get one or two degrees warmer in the next few hundred years. What would current day sensationalist science have predicted seven hundred years ago – in the yellow shaded area? From the evidence in Greenland alone it would have to be “predicted” that the global ice age was returning and that, soon, 40% of the earth would once again be covered with glacial ice.

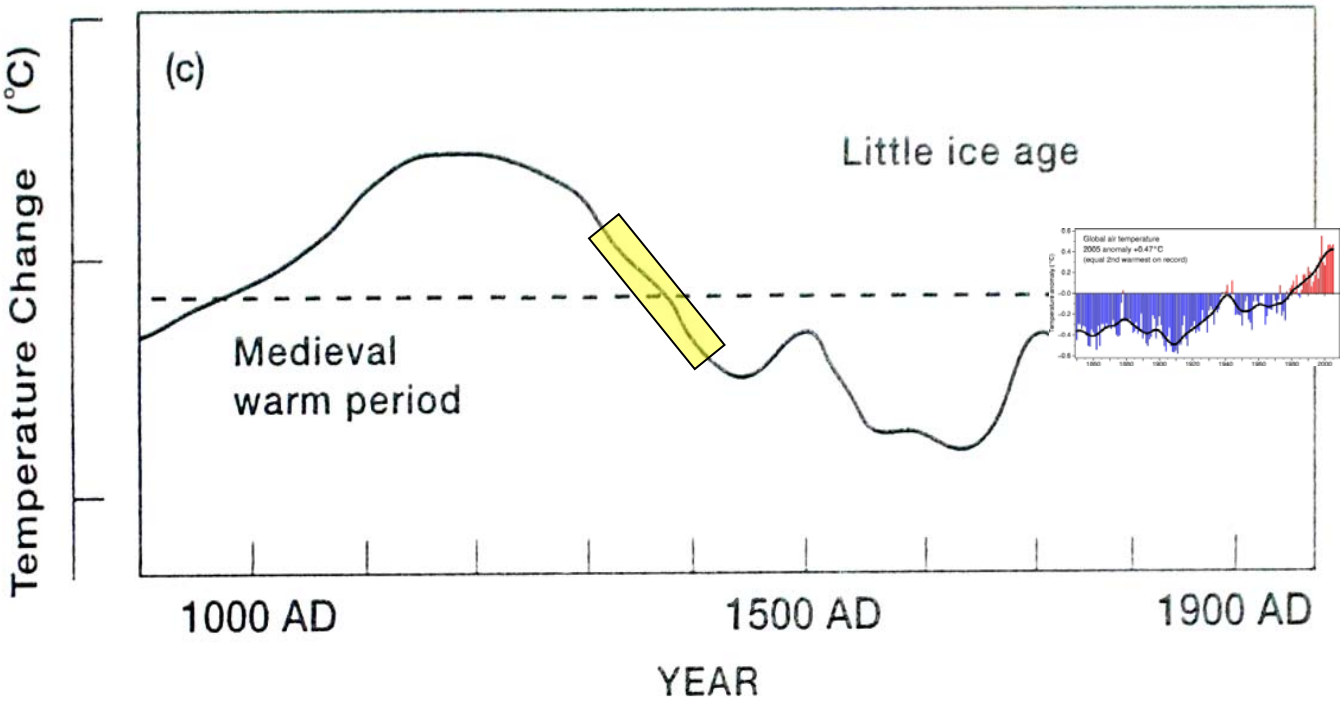


Figure 5.1. The Last 1,000 Years of Earth Temperatures from Tree Rings, Ice Cores, and Thermometers.

(Figure 22 in the IPCC's *Climate Change*, 1995.)

As always, I will concede that the world is getting warmer. Although Dallas Super Bowl fans – and many Western New Yorkers this winter – might question the warming trend, it is occurring, climatically. Again, *climate is what you expect; weather is what you get*. But, after the earth's climate finishes getting warmer, it will start getting cooler. It has been happening for tens and hundreds of thousands of years, and I do not believe that your and my actions can or will have a significant effect of the course of Global Climate Change.

Yes, we should conserve energy. Yes, we should avoid putting pollutants into the air. The earth survived and recovered from the massive volcanic pollution of Krakatoa in 1883 and of the Tambour volcano in 1815 (also in Indonesia), which injected into the atmosphere four times the dust and pollutants of Krakatoa. Mount

Saint Helen's and the Iceland volcano are more recent occurrences, but earth's volcanic eruptions during the past few thousand years alone have spewed more pollutants and "greenhouse gases" into our atmosphere than all our human activities have produced, and the earth has continued through its climate cycles. (You can see the global post-Krakatoa temperature drop on the first graph of the handout – climate is what you expect; weather is what you get.)

Mark Twain observed that "everyone talks about the weather, but no one does anything about it." Well now "we" are trying to do something about the weather, and politicians and governments have allocated and continue to allocate vast amounts of resources, directly and indirectly, in their outward attempts to alter the future climate on this planet. (I say "outward attempts" because of suspicions that, at some levels, the efforts to affect climate change are about controlling resources and energy, locally and globally, for social, not scientific, reasons. In 1998, Christine Stewart, the Canadian Minister of Environment, said "No matter if the science of global warming is all phony ... climate change [provides] the greatest opportunity to bring about justice and equality in the world." There are the continued entreaties from some environmental groups for climate control to be based in social action: "A climate change response must have at its heart a redistribution of wealth and resources." *(Emma Brindal, a climate justice campaign coordinator for Friends of the Earth)*; more radical: "The answer to global warming is in the abolition of private property and production for human need." *(Louis Proyect, Columbia University)* and from another vantage point, "The only hope for the world is to make sure there is not another United States. We can't let other countries have the same number of cars, the amount of industrialization, we have in the US. We have to stop these Third World countries right where they are." *(Michael Oppenheimer, EDF & Princeton University)*)

However, even if I grant all our leaders and governments as having the most benign and altruistic motives in their attempts to influence the world's climate, it still boils down to how we allocate and use the available resources on this planet. The nineteenth century economist Lionel Robbins defined "economics" as "the study of the use of scarce resources which have alternate uses." How are we using our resources? Are we allocating resources to their "best and highest use", and who determines that? Let's look at just one resource: corn.

Right now, nearly five billion bushels of corn, almost 40% of all U.S. corn production, is currently purchased for U.S. ethanol production. This is twice the amount that is exported to the rest of world. The mandates of the U.S. and European governments for bio-fuels are diverting huge amounts of food and agriculture production into these new energy markets. This means that we are burning, as transportation fuel, huge amounts of food *and* driving up the costs of the remaining stocks. With current food costs at an all time high, what is going to happen when ethanol is mandated to go up to 15% of the gasoline blend – that's a 50% increase from the current 10%!

Corn has a myriad of uses, here in the U.S. and around the world. It's used in cereals and snack foods. Corn syrup is a major sweetener for soft drinks and is used for cooking, in chewing gum, cough syrups, antacids – and for tanning leather. And, it serves as feed stock for cattle, pigs and poultry. When corn prices rise, so do the cost of all the products made from corn, including meat, and of all the products made from by-products of those products. Our company uses stearic acid in the production of our emulsions, and our stearic acid comes from cow fat (beef tallow). When the cost of corn rises, so does our price for stearic acid – and so does the cost of our emulsions, so we have to raise the prices of our coatings. ("And this is the house that Jack built ...")

Ethanol blended gasoline has been mandated by our government in order to lower pollution levels and reduce “greenhouse gases”, so that our activities will decrease our effect on global climate changes. Is this a good policy? Is the program meeting its objectives?

Corn production uses more insecticides, herbicides and nitrogen fertilizers than any other crop. Corn production also causes more total soil erosion than any other crop. *(Pimentel, Cornell University)* There is an environmental cost here that goes beyond the dollars expended for the extra corn production.

In terms of energy, all the energy costs of corn production – lots of fossil fuels, transportation and other energy consumed – *plus* the energy needed to convert every 20 lbs. of corn into a gallon of ethanol, consumes over 130,000 BTUs of energy for each gallon produced – and gives you a product with an energy value of only 77,000 BTUs per gallon. You need 70% *more* energy to produce ethanol than you get from the product.

The dollar costs of ethanol production make it a losing proposition without the forty-five cent per gallon federal subsidies that you and I pay in our taxes. With 12 billion gallons produced last year, we paid more than 5 billion dollars to artificially lower the price. Multiply that by 150% to get the new price tag when the ethanol mix goes up to 15%. Last year, even Al Gore was a bit contrite about his tie-breaking vote in the 1994 Senate to establish ethanol subsidies. "One of the reasons I made that mistake is that I paid particular attention to the farmers in my home state of Tennessee, and I had certain fondness of the farmers in the state of Iowa because I was about to run for president." Later he elaborated, "It is not a good policy to have these massive subsidies for first-generation ethanol. ... The benefits are "trivial" ... It's hard once such a program

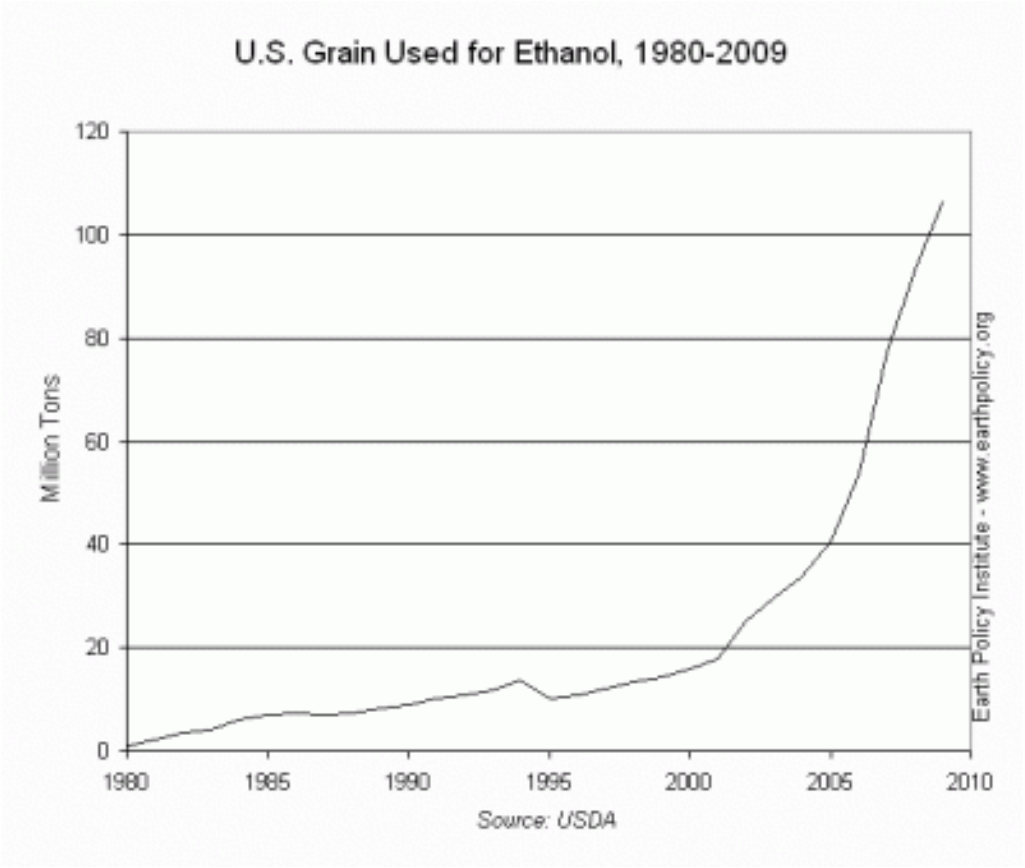
is put in place to deal with the lobbies that keep it going."

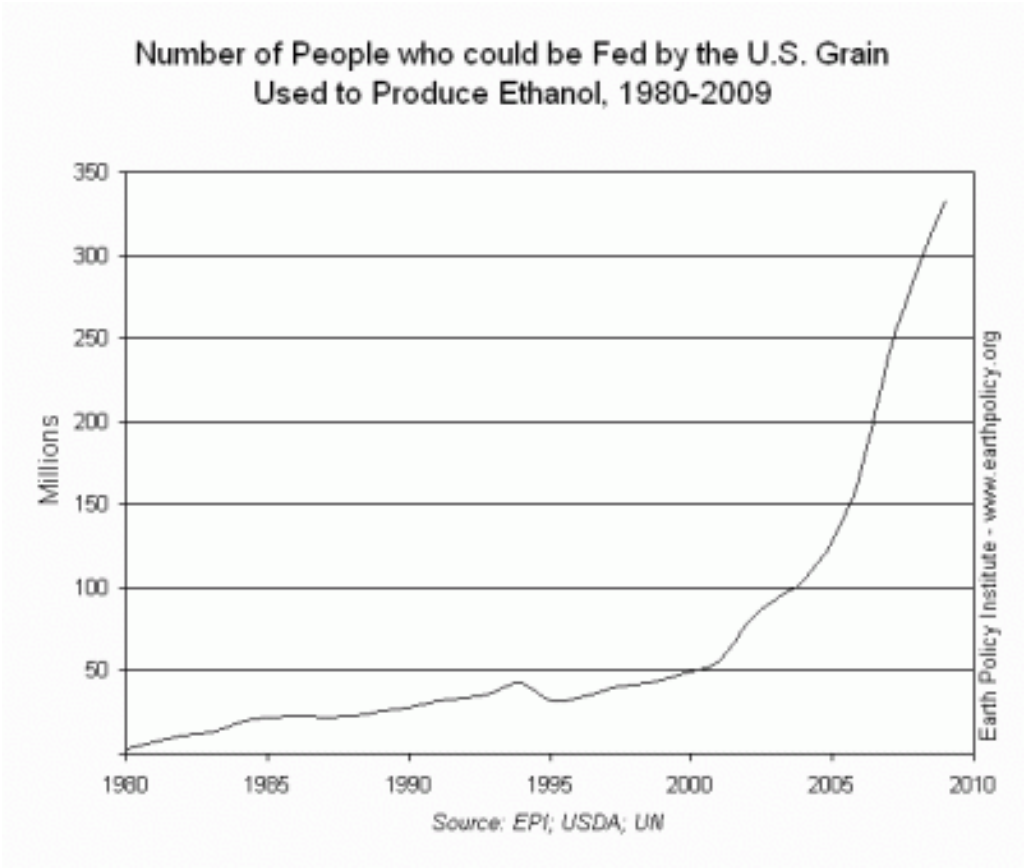
Unfortunately, not only do you need 70% *more* energy to produce ethanol than you get from the product, but the energy value of ethanol is *less* than the energy value of gasoline. The higher the percentage of ethanol required to be blended with gasoline, the less efficient the fuel becomes, so you have to burn more blended fuel to generate the same amount of energy.

“The law of unintended consequences” is that actions of people—and especially of government—always have effects that are unanticipated or unintended. Economists and other social scientists have acknowledged its power for centuries; for just as long, politicians have largely ignored it. A reasonable idea, using ethanol to replace MTBE in gasoline as an oxygenate, has turned into a labyrinth of subsidies, *increased* energy usage, and *added* pollution of the environment and air as the push to use more and more ethanol is powered by political and *individual* economic benefits.

Energy experts at the Argonne National Laboratory say that corn production can’t be expanded enough to produce more than about 15 billion gallons of ethanol, putting us near capacity right now. So, to meet the *36 billion gallon* future mandate will require new sources of ethanol. Even our own government says that corn is not a good long-term fuel source because it diverts corn from the food supply.

On that subject, if you look at the next page of graphs, you will see the millions of tons of grains that the U.S. has used to produce ethanol in the past 30 years. At the bottom you will also see the hundreds of millions of people that could have been fed by that same grain. The more ethanol we *require* to be produced, the greater the demand for the corn (and other grains), and the higher the price. Because the ethanol usage is mandated, the producers will pay whatever price is required and be subsidized by you


U.S. Grain Used for Ethanol, 1980-2009
Million Tons
120
100
80
60
40
20
0
1980
1985
1990
1995
2000
2005
2010
Earth Policy Institute - www.earthpolicy.org
Source: USDA


Number of People who could be Fed by the U.S. Grain Used to Produce Ethanol, 1980-2009
Millions
350
300
250
200
150
100
50
1980
1985
1990
1995
2000
2005
2010
Earth Policy Institute - www.earthpolicy.org
Source: EPI; USDA; UN

and me. The food producers, on the other hand, will have to pass on the higher prices, to you and me. Food will cost more and more. Here in the U.S., some will have to make the difficult choices about what to sacrifice in order to buy their food. In some parts of the world, it will mean people cannot afford food at all.

Corn is just one resource of many caught up in regulation, restriction or over-stimulation due to government policies. Looking at just one aspect of resource use, and establishing policy or regulations based on that one aspect, will usually result in unintended consequences – or intentionally foster a host of economic benefits aimed at one narrow segment of business or society.

How we use our resources goes beyond whether or not we think we are affecting the climate on this planet. With human activity accounting for only a small fraction of existing “greenhouse gases”, approximately 3%, and the scientific evidence indicating that our planet goes through regular cycles of warming and cooling, how much of our effort, ingenuity and resources is it reasonable and prudent to focus on trying to change the climate. By my lights, none! We would be much better off focusing our resources on working to improve the human condition – to change the human climate, not tomorrow’s weather.