

THE ENERGY ADVOCATE

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Saved From the Sun in Worship Week

Earth Day has become a full week of environmental worship in many places — entirely too many. The good news is that the school board of Federal Way, Washington, has ruled that schools may not show Al Gore's *An Inconvenient Truth (AIT)* unless “credible, legitimate’ opposing views are also presented,” according to the April issue of *Environment and Climate News* (see www.heartland.org). “School board member David Larson told the January 11 Seattle Post-Intelligencer, ‘the principal reason for that is to make sure that the public schools are not used for indoctrination.’”

“I am shocked that a school district would come to this decision. There is no opposing view to science, which is fact, and the facts are clear that global warming is here, now.”

Laurie David, Co-producer of *An Inconvenient Truth*

The bad news, of course, is more extensive. Gore's docu-mendacity has been shown in schools, colleges, churches, and every other place where save-the-earthers think they ought to spread propaganda. Added to that is the *PBS NOVA* show, “Saved by the Sun” (*SBtS*), foisted off on the public as if it were a science show. It's slightly more sophisticated than Gore's film, but propaganda nonetheless. *NOVA* allows a few voices trying to tell *PBS* that we're not going to run the world on sunbeams, breezes, and chicken manure, but the critics are given no time for elaboration and are quickly shoved side by the voice-over whose first word is “But.”

The main “problem” that both shows are “trying to “solve” is the global warming “crisis” that is just around the corner because of our release of greenhouse gases into the air. (They say CO₂, but their *pictures* of chimneys and cooling towers show water vapor because CO₂ is invisible. There is some irony here, for H₂O is in fact the major greenhouse gas.) Never mind that the sun has been more active during the last 60 years than during the last 1150 years, it is *humans* that are responsible for the warming of the earth. We need to be saved from that human-induced solar activity.

PBS is greatly enamored of using taxpayers' money to subsidize the rich, as they repeatedly showed in *SBtS*. They applaud a Massachusetts program that paid (with taxpayers' money, of course) half the \$24,000 tab for a solar installation in Somerville (a region in Boston) for a two-professional-income family that is able to reduce their electricity bill to

only \$129 a month. Nova was probably too embarrassed to say how much Maine taxpayers paid for a \$50,000 solar installation on a large-tract mansion in Kennebunkport (the village with the summer home of George H. W. Bush). (Also, *SBtS* says nothing about generous *federal* subsidies.)

PBS, like Al Gore, can spew garbage a lot faster than one can look up data to refute it. For example, the *SBtS* voiceover says, “All the solar plants in America produce only two coal plants' worth of electricity.” The normal viewer may justifiably wonder just how that compares with US electrical production, but they are not likely to question the veracity of the claim. Let's address both questions.

In 2005, the US generated 4,038 billion kWh, including 0.5 billion kWh generated by solar. In other words, solar generated 0.01 percent of our electricity, the same fraction as one penny out of 100 dollars.

The solar contribution includes electricity produced at the solar/thermal/electric plants at Daggett, Kramer Junction, and Harper, California. These plants usually produce about 0.66 billion kWh [1], of which about 80% comes from sunlight and 20% comes from natural gas. So the solar part is about 0.53 billion kWh (give or take), which (given the round-off error) is indistinguishable from the 0.5 billion kWh produced by all solar installations considered together. But the main thrust of the *NOVA* show was how wonderful PV cells are. The numbers show that PV produces an absolutely piddling amount, too small even to register in the least-significant digit.

Now let's examine what *NOVA* said, namely that “All the solar plants in America produce only two coal plants' worth of electricity.” They have included Kramer Junction and its sister facilities in order to make solar (which for most of *SBtS* is photovoltaics) look important. Coal-fired power plants are typically in the 500-MW to 1000-MW range, and they run nearly full time. Two of them will have an annual production of approximately 10 billion kWh, which *NOVA* finds approximately equal to 0.5 billion kWh.

What's a factor of 20 among friends?

- [1] http://www.ornl.gov/sci/engineering_science_technology/world/renewable/Trough%20Technology%20-%20Algeria2.pdf

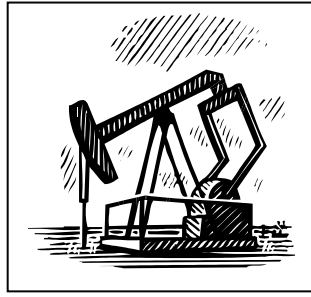
The NOVA Sun-Worship Continues

High Pressure

One thing that *NOVA* says is that solar energy help solve is the problems in the madhouse called the Dispatch Center,

where engineers work to keep the grid supplied with electricity at exactly the right voltage and frequency from all the sources available. When the demand is so high that the system is strained, the job is less fun than being an air traffic controller at an overloaded airport.

“Saved By the Sun” has a dramatic segment in which dispatchers worry at length about how to meet the crisis, but says nothing about the cause, which is *governmental* failure to allow the utilities to provide adequate supply, transmission, and distribution infrastructure. They end the segment with a cheesy look at a buxom blonde jogging on the beach, followed by the bobbing of an oil well pump. Welcome to *NOVA*.



Kramer Junction

The main thrust of *SBtS* is that the government ought to be spending taxpayers’ money on solar stuff, and the secondary thrust is that photovoltaic cells (PV) are the answer to the world’s energy problems, global warming, and unemployment. Without a whit of understanding what they mean, they say that the Kramer Junction facility (the solar/thermal/electric system with therminol running in tubes along the axis of parabolic reflectors) is the largest facility in the world. The inescapable conclusion is that every one of their super-expensive, highly touted PV systems is smaller.

Kramer Junction, says the voiceover, has “no emissions except water vapor,” a statement that is blatantly false. In fact, Kramer Junction gets about 20% of its primary energy from natural gas. (Note: It would have been smarter to build the power plant so that the *primary* source of energy was natural gas, and use solar energy as a supplement, because they could use the facility around the clock; however, they would not have qualified for generous tax benefits, because those benefits would disappear if the 20% figure was exceeded.)

Economics for the Mentally Defective

NOVA’s idea of a good way to solve the world’s problems is to follow the paradigm of Germany, which heavily subsidizes solar energy installations. An owner of a German PV farm is able to sell a kilowatt-hour of electricity at 50 cents, whereas users of electricity buy it off the grid at 20 cents. (No, I am not kidding!) Believe it or not, a pig farmer featured on *SBtS* is happy to use a large part of his land to station the PV panels, which pump out a million kWh per year (the average power being about 110 kW) in exchange for a 20-year fixed-price contract extracting \$500,000 to \$600,000 dollars a year from hapless taxpayers and ratepayers.

Before that, his place was merely an *Animal Farm*. Now some pigs are more equal than others.

NOVA’s voiceover says that Germany’s massively subsidized solar and wind installations “could provide one-third of Germany’s electricity. “By contrast, the United States currently *gets only one percent of its energy from solar and wind*” [emphasis added]. It is not entirely apparent what *NOVA* is trying to convey here, but their choice of numbers seems to indicate that the US really needs to get moving on this solar stuff and that we have made a start. Solar itself (overwhelmingly due to the Kramer facility and its sisters) generated about one one-hundredth of one percent of our electricity,

But the *NOVA* folks did slip in the word “wind” so they could avoid calling attention to the minuscule solar contribution. Wind generated 14.6 billion kWh in 2005, making the total of wind and solar equal to 0.36 percent, which rational people would round off to zero instead of 1%.

As long as they’re interested in the non-CO₂ production of electricity, they should have included the nuclear contribution — 788.6 billion kW in 2004 — which amounts to 19.3 percent of our net electrical generation.

And what about Germany getting 30% of its electricity from wind and solar? Again, the solar is nothing but an extremely expensive add-on, but *NOVA* failed to say enough about wind. To put it bluntly, when wind is more than a small fraction of the power on the grid, its fluctuations are a massive headache to the hapless dispatchers who are trying to keep the grid stable. In truth, Germany has to sell their highly fluctuating product to other countries at much less than it costs to produce it.

Variable Physical Constants

Physicists have various methods for attempting to discover whether fundamental physical constants remain constant in time and space. (Was Planck’s Constant the same 13 million years ago, in galaxies that are thirteen million lights years away?) They needn’t look so far away or so far back in time. Global warming alarmists have evidently changed one physical constant right here on earth.

The highest temperature ever recorded at the South Pole research station was -14 °C (+7 °F), which is well below the melting point of water. All the rest of the time, the place is colder, the record being -83 °C (-118°F). Somehow, Antarctica and Greenland are supposed to melt, raising sea level to devastating heights, according to Harvard’s Daniel Schrag, who says on *SBtS* (with the full grammatical competence of the bimbos reading the evening news from teleprompters), “Once the oceans start to warm, once the ice starts to melt, very difficult to reverse those trends.”

That whole scenario is made much easier to understand, once you realize that the melting point of ice is much lower in Greenland and Antarctica.

All Gore, Everywhere!

It is a good idea to distrust anything that comes out of either Washington, D.C. or Hollywood. Al Gore’s *An Inconvenient Truth* comes out of both. Hold onto your wallets.

With a version of Fig. 1 (CO₂ and temperature for the last 400,000 years) running across the panoramic screen, Al Gore makes the pronouncement, “You can see how well they fit together,” then proceeds to announce the cause-and-effect relationship:

“There is one relationship that is more powerful than all the others, and it is this: when there is more carbon dioxide, the temperature gets warmer.” [*sic*. Air gets warmer or colder, but temperatures do not.]

And World War II caused the Little Ice Age, for that is how badly Al Gore has messed up the concept of causality. In fact, it is the temperature rises that have caused the increase in CO₂ concentration and the falls have caused the decrease.

A rational person looking at Fig. 1 ought to ask, “What is the source of the CO₂ that allegedly caused the temperature to rise?” Wile E. Coyote’s back pocket seems the most likely candidate. But we don’t really have to guess. The data are in the ice cores.

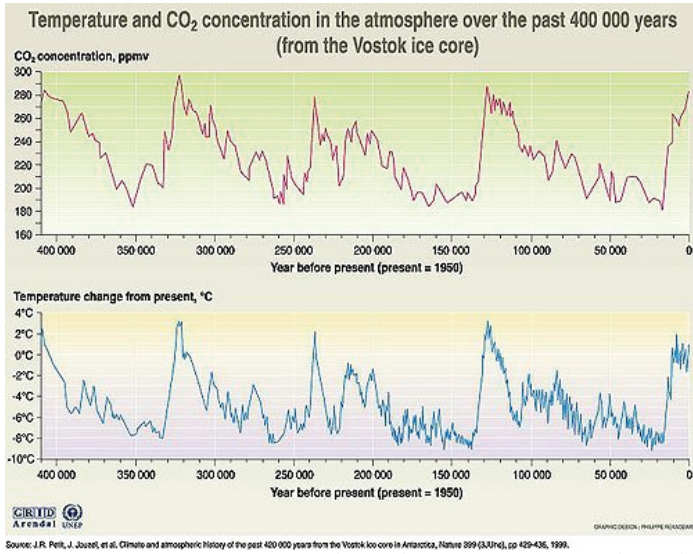


Figure 1: CO₂ concentration (upper) and temperature (lower) measured at Vostok, Antarctica, with the record extending back 400,000 years.

Because Vostok, being very near the South Pole, gets very little snow, it is difficult to establish a high-resolution time scale. The data are given at 1000-year intervals. However, places nearer the oceans receive much more snow, so it is easier to distinguish one century from the next. Fischer *et al* [2] and Caillon *et al* [3] have done such studies and found unequivocal evidence that temperature changes occur *before* the CO₂ changes — hundreds of years before. Since the fundamental principle of causality is that the cause must occur *before* the effect, Gore’s claim that rising CO₂ was the cause of the warming in Fig. 1 is *FALSE*.

But can the other claim be made? Is there a mechanism by which changing temperature can cause changes in CO₂ concentration? Certainly. The *major* source of CO₂ going into the atmosphere is the warm ocean surface. Warm-water respiration is another, and so is soil respiration. The major sinks are land photosynthesis, absorption by cold ocean surfaces, and photosynthesis in warm water. *All CO₂ production by combustion of coal, oil, and natural gas combined is only a few percent of the total CO₂ emissions.* When the earth warms up, the oceans warm up and emit more CO₂; when the earth cools, the oceans cool and absorb more.

The processes by which the oceans absorb and emit CO₂ are not as simple as those involved in warm and cold soda pop, for they involve changing acidity, leaching (or deposition) of carbonate rock, much biological activity, and the simple fact that the warming and cooling of the oceans takes a long time. Hence, there is a long time lag. Fischer *et al* [2] find the time lag to be 600 ± 400 years. Caillon *et al* [3] find a time lag of 800 years.

But warming of the earth and its oceans also causes the *main* greenhouse gas — water vapor — to increase. Higher absolute humidity is possible with higher air temperature, and higher emissions occur naturally from warmer water.

The Greenhouse Effect

None of this is to say that there is no greenhouse effect or that CO₂ is not a greenhouse gas. The greenhouse effect is real, making the earth about 10 degrees Celsius warmer than a black stone in the same orbit would be, and about 33 degrees Celsius warmer than a stone of 30% reflectivity would be. But the *major* greenhouse gas is not — repeat, *not* — carbon dioxide, despite the pronouncements one hears repeatedly, such as this one from the *New York Times*. It is water vapor.

“At the moment, hydrogen seems to be the most practical way to power vehicles that do not emit *carbon dioxide, the principal greenhouse gas.*” [emphasis added]
 Jim Motavalli, *New York Times* [4]

This quarrel with reality is not limited to the scribblers at the *New York Times*. Figure 2 shows IPCC’s attempt to put things into perspective. Totally lacking is the much larger effect of water vapor. Water vapor is typically 3% to 4% of the atmosphere, versus 0.03% to 0.04% for CO₂.

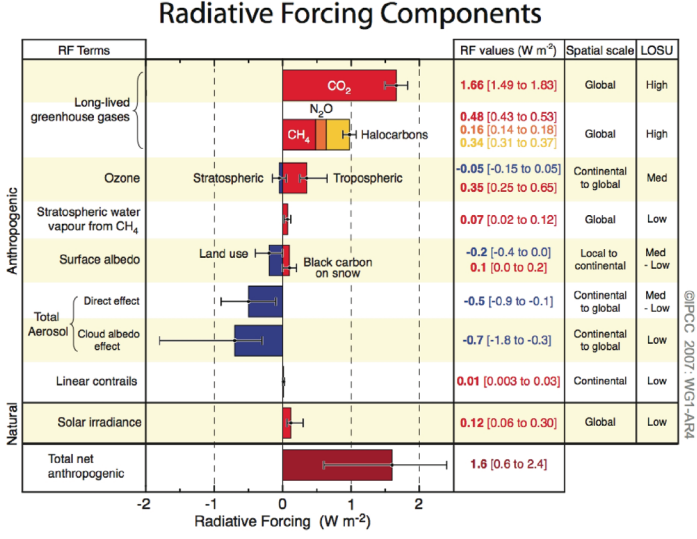


Figure 2: Radiative forcing components, according to the Intergovernmental Panel on Climate Change, a clear example of ignoring the huge in favor of the small. There is no mention whatsoever of water vapor, either as invisible infrared-absorbing gas or as heat-blocking clouds.

In truth, the IPCC has no idea how to deal with the water cycle. Snow under a clear sky radiates sunlight back into space, and cloud cover can do the same. Here in the semi-arid desert of Pueblo, Colorado, radiational cooling usually allows the temperature to drop by 20 °C (35 °F) at night (30 °C will set no records), but cloud cover cuts that drop to 8 °C, which is typical of high-humidity locations. Evaporation of water reduces the temperature at ground level, and condensation of water vapor into droplets at high altitude deposits that heat there, amounting to tremendous heat transport; the warmed atmosphere radiates infrared out into space. I quote from the National Energy Technology Laboratory Q&A section on the web:

What is the global warming potential of water vapor? Are the anthropogenic water vapor emissions significant?
 Water vapor is a very important part of the earth’s natural greenhouse gas effect and the chemical species that exerts

the largest heat trapping effect. Water has the biggest heat trapping effect because of its large concentration compared to carbon dioxide and other greenhouse gases. Water vapor is present in the atmosphere in concentrations of 3-4% whereas carbon dioxide is at 387 ppm or 0.0386%. Clouds absorb a portion of the energy incident sunlight and water vapor absorbs reflected heat as well.

Q&A from NETL [5]

Rather than say honestly that the IPCC is totally befuddled about the most important non-solar contributor to weather and climate, the IPCC prefers to raise the specter of imminent disaster, and blame civilization for the “global-warming problem.”

And what about the solar influence? Sami Solanki, head of the Max Planck Institute, looked at the quantity of beryllium-10 in Greenland ice cores. Be-10 is created by cosmic rays in the upper atmosphere. When solar activity is high, the sun’s magnetic field stretches far past Earth’s orbit, and deflects incoming cosmic rays (which come from all points in space), thereby reducing their number. He says,

“Looking at the past 1,150 years the Sun has never been as active as it has been during the past 60 years.”

Sami Solanki [6]

Weeping Widow Segments

It is an *obligato* of news broadcasts to have a weeping widow or other sad character to try to drum up sympathy; such segments are evidently good for ratings. Accordingly Al Gore’s horror movie has at least six of them.

At one point Gore whines that Congress wouldn’t listen to him. (Sheesh! I thought *I* was arrogant! Just exactly what makes him so well qualified that Congress should listen to him? He had one course in college physics?). He has a tearjerker about his son being hit by a car. He bemoans losing the election in which he won the popular vote. He laments “all the bad things they’ve said about Al Gore.” He presents a heart-wrenching story about how the family used to grow tobacco. Absolutely none of this garbage is about global warming. It’s about Al Gore.

And then Gore says,

“I’ve seen scientists persecuted, ridiculed, deprived of their jobs ... simply because the facts they discovered led them to an inconvenient truth.”

Oh? Tom Bethell (in the May issue of *The American Spectator*) says, “NASA’s media darling and warming advocate James Hansen claims martyr status for having been silenced, yet has given 1,400 interviews to the press.” Many of those interviews, of course, contain the message the “the science is settled,” and that the global warming skeptics ought to shut up. There is more than a little irony here.

A Subtle Change

In retrospect, I did notice one tiny step toward rationality in the IPCC Summary for Policy Makers, as it was quoted in a presentation at a high school global-warming preach-in. I’m still unable to assimilate the importance of the change. The IPCC has decided that there is a human influence on climate dating back to about 1750. Perhaps this is admission that CO₂ isn’t really the villain, since (for example) the glaciers began receding about that time. Perhaps it is an early indica-

tion that the climate-change crowd is about to rail against land-use changes or other human activities that might affect climate. Perhaps it will be an attempt to say that the rise of CO₂, which extends back that far, was due to early human use of coal, and that even that minuscule use caused climate change — so we’d *really* better change our ways to avoid utter catastrophic climate change.

But three things will remain the same, the same three that have been foremost in the attitudes of the alarmists regardless of the circumstances.

- Climate change is bad.
 - Humans are responsible.
 - We have to act ***NOW*** in order to avoid catastrophe.
- [2] Hubertus Fischer, Martin Wahlen, Jesse Smith, Derek Mastroianni, Bruce Deck, “Ice Core Records of Atmospheric CO₂ Around the Last Three Glacial Terminations,” *Science*, vol. **283**, no. 5408, pp. 1712 – 1714 (12 March 1999).
 - [3] Nicolas Caillon, Jeffrey P. Severinghaus, Jean Jouzel, Jean-Marc Barnola, Jiancheng Kang, Volodya Y. Lipenkov, “Timing of Atmospheric CO₂ and Antarctic Temperature Changes Across Termination III,” *Science*, vol. **299**, no. 5613, pp. 1728 - 1731 (14 March 2003)
 - [4] Jim Motavalli, “A Universe of Promise (and a Tankful of Caveats,” *New York Times* series called ‘Hydrogen’s Second Coming,” April 29, 2007.
 - [5] National Energy technology Laboratory (NETL) at http://www.netl.doe.gov/KeyIssues/climate_change3.html, referenced by Thayer Watkins at <http://www.applet-magic.com/radiativeff.htm>
 - [6] *BBC* *News*
<http://news.bbc.co.uk/2/hi/science/nature/3869753.stm>

Some Good News

It was my pleasure last week to be a guest of the College Republicans at Colby College in Waterville, Maine, presenting a physicist’s contrarian view of global warming. Almost everybody in the audience had seen *An Inconvenient Truth*, and some were certainly inclined to believe that they had heard the unvarnished truth from Al Gore. But they did listen, and they did ask good questions.

The day after that, I was participating in a global-warming preach-in at E. O. Smith High School in Storrs, Connecticut, with the only other contrarian, Professor Larry Gould from the University of Hartford. After Larry’s talk, a teacher confided in me that she was very happy to have some relief from the barrage of global warming propaganda she’d heard during the week. Another teacher quietly expressed thanks for opening his eyes to some realities.

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