



## Global Warming FAQ

**Overview.** Alarm over the prospect of the Earth warming is not warranted by the agreed science or economics of the issue. Global warming is happening and man is responsible for at least some of it. Yet this does not mean that global warming will cause enough damage to the Earth and humanity to require drastic cuts in energy use, a policy that would have damaging consequences of its own. Moreover, science cannot answer questions that are at heart economic or political, such as whether the Kyoto Protocol is worthwhile

### 1. The Science

Isn't there a scientific consensus that global warming is real and bad for us?

- There is no “scientific consensus” that global warming will cause damaging climate change. Claims that there is mischaracterize the scientific research of bodies like the United Nations Intergovernmental Panel on Climate Change (IPCC) and the U.S. National Academy of Sciences (NAS).

What do scientists agree on?

- Scientists do agree that: (1) global average temperature is about 0.6°Celsius—or just over 1°Fahrenheit—higher than it was a century ago; (2) atmospheric levels of carbon dioxide (CO<sub>2</sub>) have risen by about 30 percent over past 200 years; and (3) carbon dioxide, like water vapor, is a greenhouse gas whose increase is likely to warm the Earth's atmosphere.<sup>1</sup>

What don't scientists know yet?

- Scientists do not agree on whether: (1) we know enough to ascribe past temperature changes to carbon dioxide levels; (2) we have enough data to

confidently predict future temperature levels; and (3) at what level temperature change might be more damaging than beneficial to life on Earth.

Didn't the National Academy of Science say greenhouse gases cause global warming?

- The NAS reported in 2001 that, "Because of the large and still uncertain level of natural variability inherent in the climate record and the uncertainties in the time histories of the various forcing agents...a causal linkage between the buildup of greenhouse gases in the atmosphere and the observed climate changes during the 20th century cannot be unequivocally established." It also noted that 20 years' worth of data is not long enough to estimate long-term trends.<sup>2</sup>

Hasn't the Earth warmed alarmingly over the past 100 years?

- The temperature rise of 0.6°C over the last century is at the bottom end of what climate models suggest should have happened. This suggests that either the climate is less sensitive to greenhouse gases than previously thought or that some unknown factor is depressing the temperature.<sup>3</sup>

Don't climate models warn of alarming future warming?

- Predictions of 6°C temperature rises over the next 100 years are at the extreme end of the IPCC range, and are the result of faulty economic modeling, not science (see economics section below).

What are the realistic current estimates of future warming?

- Both James Hansen of NASA (the father of greenhouse theory) and Richard Lindzen of MIT (the most renowned climatologist in the world) agree that, even if nothing is done to restrict greenhouse gases, the world will only see a global temperature increase of about 1°C in the next 50-100 years. Hansen and his colleagues "predict additional warming in the next 50 years of  $0.5 \pm 0.2^\circ\text{C}$ , a warming rate of  $0.1 \pm 0.04^\circ\text{C}$  per decade."<sup>4</sup>

What about satellite temperature measurements?

- Evidence from satellite and weather balloon soundings suggests that the atmosphere has warmed considerably less than greenhouse theory suggests.<sup>5</sup> There is a disparity between the surface temperature measurements, which cover only a small fraction of the Earth but show sustained warming, and these measurements, which cover the whole atmosphere and show only a very slight warming.

Hasn't the disagreement between satellite and surface temperatures been resolved?

- No. There is still substantial disagreement between the mid-range of the satellite measurements and the mid-range of the surface measurements. This is a problem for climate models.

Are there other man-made factors besides greenhouse gases that influence temperature?

- New research also suggests that the role of greenhouse gases in warming has been overestimated, as factors like atmospheric soot,<sup>6</sup> land use change,<sup>7</sup> and solar variation<sup>8</sup> all appear to have played significant parts in recent warming.

### Specific Scare Stories

Is the world in danger of plunging into a new ice age, as in *The Day After Tomorrow*?

- No. The scenario presented in *The Day After Tomorrow* is physically impossible. While research does suggest that the Gulf Stream has switched on and off in the past, causing temperature drops in Europe, oceanographers are convinced that global warming does not present any such danger.<sup>9</sup>

Is the world in severe danger from sea level rise?

- No. Research from Nils-Axel Mörner of Stockholm University demonstrates that current sea levels are within the range of sea level oscillation over the past 300 years, while the satellite data show virtually no rise over the past decade.<sup>10</sup> The IPCC foresees sea-level rise of between 0.1 and 0.9m by 2100. The Earth experienced a sea-level rise of 0.2m over the past century with no noticeable ill effects.
- Update 1/1/06: Another study relevant to this controversy is Zwally et al. (2005), which examined changes in ice mass "from elevation changes derived from 10.5 years (Greenland) and 9 years (Antarctica) of satellite radar altimetry data from the European Remote-sensing Satellites ERS-1 and -2." The researchers report a net contribution of the three ice sheets to sea level of  $+0.05 \pm 0.03$  mm per year. CO2Science.Org puts this in perspective:

“At the current sea-level-equivalent ice-loss rate of 0.05 millimeters per year, it would take a full *millennium* to raise global sea level by *just 5 cm*, and it would take fully *20,000 years* to raise it a *single meter*.”

Weren't recent extreme weather events caused by global warming?

- There is no provable link to global warming. For example, research by German scientists has demonstrated that the devastating floods in central Europe in 2002 were perfectly normal when compared against the historical record.<sup>11</sup> Allegations that extreme weather has been more damaging recently do not take into account the fact that mankind is now living and investing resources in more dangerous

areas. The World Meteorological Organization has acknowledged that increases in the recorded number of extreme weather events may well be due to better observation and reporting.<sup>12</sup> A top expert from the IPCC resigned in January 2005 in protest that IPCC science was being misrepresented by claims that last year's hurricane season was exacerbated by global warming. Most hurricane scientists agree that there is no way that Hurricane Katrina can be blamed on global warming.

- Update 6/1/06: Recent published research casts extreme doubt on the influence of warming on hurricanes. Kotzbach<sup>13</sup> finds “The data indicate a large increasing trend in tropical cyclone intensity and longevity for the North Atlantic basin and a considerable decreasing trend for the Northeast Pacific. All other basins showed small trends, and there has been no significant change in global net tropical cyclone activity. There has been a small increase in global Category 4–5 hurricanes from the period 1986–1995 to the period 1996–2005. Most of this increase is likely due to improved observational technology. These findings indicate that other important factors govern intensity and frequency of tropical cyclones besides SSTs [sea surface temperatures].”

Update 1/1/06: Aren't the snows of Kilimanjaro disappearing because of global warming?

- That's not the verdict of scientists who study Mount Kilimanjaro most closely. In “Modern Glacier Retreat on Kilimanjaro as Evidence of Climate Change: Observations and Facts<sup>14</sup>,” Kaser et al. “develop a new concept for investigating the retreat of Kilimanjaro's glaciers, based on the physical understanding of glacier–climate interactions.” They say, “The concept considers the peculiarities of the mountain and implies that climatological processes other than air temperature control the ice recession in a direct manner. A drastic drop in atmospheric moisture at the end of the 19th century and the ensuing drier climatic conditions are likely forcing glacier retreat on Kilimanjaro.”

Won't global warming lead to the spread of malaria?

- Climate is not a significant factor in the recent growth of vector-borne diseases such as *malaria*. Most experts on this subject agree that other factors are much more important in predicting future spread of these diseases.<sup>15</sup>

Didn't the Pentagon conclude global warming poses a national security threat?

- The *Pentagon* is not convinced that global warming represents a major security threat to the United States. The “secret paper” that garnered much publicity in Europe was a self-admitted speculative exercise that went beyond the bounds of measured research and had been released to the press long before the sensationalist stories surfaced in Europe. Nor did the paper recommend “immediate action” beyond better climate modeling.<sup>16</sup>

Haven't recent climate models found that global warming will be much worse than previously thought?

- The news that Oxford University has found that temperatures may increase by up to  $11^{\circ}\text{C}$  severely misrepresents the scientific findings. According to the actual scientific paper,<sup>17</sup> the frequency distribution of the results suggests that the lower end of temperature rises, in the  $2^{\circ}\text{C}$  to  $4^{\circ}\text{C}$  range, is the most likely.

Haven't the National Academies of all the major countries agreed that global warming is a serious threat?

- Claims that the scientific consensus is represented by a statement drafted by the Royal Society of London and signed by the *national scientific academies* of the G8 countries plus India, Brazil and China ignore the politicized nature of the statement. The climate change committee of the Russian Academy of Sciences says its president should not have signed the statement, while the use to which it was put was condemned by the outgoing president of the U.S. National Academy of Sciences, Bruce Alberts, who called the Royal Society's presentation of the statement "quite misleading."<sup>18</sup>

Aren't polar bears drowning because of melting ice?

- These claims are overblown. A leading Canadian polar bear biologist wrote recently, "Climate change is having an effect on the west Hudson population of polar bears, but really, there is no need to panic. Of the 13 populations of polar bears in Canada, 11 are stable or increasing in number. They are not going extinct, or even appear to be affected at present."<sup>19</sup>

Update 1/1/06: Isn't there a scientific consensus such that one researcher found no disagreement about global warming in the literature?

- The research by Naomi Orsekes published in Science in December 2004 was flawed. She studied about 1000 scientific abstracts, but admitted to a sympathetic journalist that she made a major mistake in her search terms. In fact, she should have reviewed about 12,000 abstracts. Even taking her sample, another researcher who tried to replicate her study came to quite different conclusions<sup>20</sup>.
- In addition, the most recent survey of climate scientists, following the same methodology as a published study from 1996, found that while there had been a move towards acceptance of anthropogenic global warming, found that only 9.4% of respondents "strongly agree" that climate change is mostly the result of anthropogenic sources. A similar proportion "strongly disagree." Furthermore, only 22.8% of respondents "strongly agree" that the IPCC reports accurately reflect a consensus within climate science<sup>21</sup>.

## So what is the state of play with global warming science?

There is scientific agreement that the world has warmed and that man is at least partly responsible for the warming—though there is no consensus on the precise extent of man’s effect on the climate. There is ongoing scientific debate over the parameters used by the computer models that project future climatic conditions. We cannot be certain whether the world will warm significantly and we do not know how damaging—if at all—even significant warming will be.

## 2. The Economics

Why is economics important to the study of global warming?

- Predictions of global warming catastrophe are based on models that rely on economics as much as on science. If the science of greenhouse theory is right, then we can only assess its consequences by estimating future production of greenhouse gases from estimates of economic activity.

Is there anything wrong with the economics underlying warming projections?

- The economic modeling by the U.N. Intergovernmental Panel on Climate Change (IPCC) is badly flawed (*The Economist* called it “dangerously incompetent”), relying on economic forecasts that show much faster growth rates for developing countries than is justified.<sup>22</sup> The IPCC economic scenarios show significantly greater economic development globally than other recognized, comparable scenarios.

What will the Kyoto Protocol do to reduce warming?

- The Kyoto Protocol, most observers agree, will have virtually no effect on temperature increase, as it imposes no restrictions on greenhouse gas emissions upon major developing nations like China and India. These nations have publicly refused to accept any restrictions now or in the future.<sup>23</sup>

Can’t we reduce emissions without affecting the economy?

- Greenhouse gas emissions derive from energy use which in turn derives from economic growth. Therefore, nations that restrict emissions are almost certain to reduce their rate of economic growth.

Update 1/1/06: Isn’t global warming all cost and no benefit?

- Even substantial global warming is likely to be of benefit to the United States. As eminent Yale professor Robert Mendelsohn testified to the Senate in 2000<sup>24</sup>, “Climate change is likely to result in small net benefits for the United States over the next century. The primary sector that will benefit is agriculture. The large

gains in this sector will more than compensate for damages expected in the coastal, energy, and water sectors, unless warming is unexpectedly severe. Forestry is also expected to enjoy small gains. Added together, the United States will likely enjoy small benefits of between \$14 and \$23 billion a year and will only suffer damages in the neighborhood of \$13 billion if warming reaches 5C over the next century. Recent predictions of warming by 2100 suggest temperature increases of between 1.5 and 4C, suggesting that impacts are likely to be beneficial in the US.”

Haven't economic models predicted no effect of reducing emissions on growth?

- European models of the effect of greenhouse gas emission restrictions (such as PRIMES) are sectoral models that look at the effects on only one economic sector and therefore badly underestimate the negative effects of emission restrictions on other economic sectors. General equilibrium models, which take into account the effects of emissions restrictions on other economic sectors, show much greater negative economic effects than sectoral models.<sup>25</sup>

What do the better economic models say Kyoto will do?

- Recent research from general equilibrium models suggests strongly negative impacts on European economies from adopting Kyoto targets (or going beyond the targets, as in the case of the United Kingdom). One model shows the economic effects by 2010 of adopting Kyoto targets as follows (remember that the Protocol achieves virtually nothing in reducing global temperature):<sup>26</sup>

Germany	-5.2% GDP	-1,800,000 jobs
Spain	-5.0% GDP	-1,000,000 jobs
United Kingdom	-4.5% GDP	-1,000,000 jobs
Netherlands	-3.8% GDP	-240,000 jobs

Isn't Europe on track to meet its Kyoto targets?

- Kyoto targets are unrealistic. Regardless of announced targets, 11 of the 15 pre-enlargement EU countries are on course to increase their greenhouse gas emissions well beyond their individual Kyoto targets.<sup>27</sup>

## Specific Economic Issues

Isn't President Bush to blame for holding up Kyoto?

- It is not the case that **President Bush** has unilaterally held up ratification of the Kyoto treaty. The United States Senate must ratify any treaty signed by a President. In 1997, during Bill Clinton's presidency, the Senate (including recent Democratic presidential candidate John Kerry) voted 95-0 not to accept any Kyoto-style treaty that would significantly harm the U. S. economy and did not

include participation by major developing countries.<sup>28</sup> The U.S. President has no power to impose Kyoto, or any other treaty, on an unwilling Senate.<sup>29</sup>

Doesn't Russia's participation demonstrate the appeal of Kyoto?

- **Russia** agreed to ratify the Kyoto Protocol only after being pressured by the European Union, which held out the prospect of endorsing Russia's entry into the World Trade Organization. Both the Russian Academy of Sciences and several Duma committees reported that Kyoto has no scientific substantiation and may harm Russia's economy.

Isn't global warming a worse threat than terrorism?

- The charge that global warming is *worse than terrorism* in terms of damage to the world is hyperbole. The implausible and unsubstantiable claim of many deaths each year—the figure is often put at 150,000—owing to global warming ignores the fact that most of those alleged deaths are due to diseases such as malaria, which have historically existed even in cold climates and could easily be controlled if the environmental lobby dropped its opposition to the use of DDT.<sup>30</sup> Moreover, that number is itself dwarfed by the number killed by poverty, which will be increased if the world decides to suppress the use of energy.

Can't we replace fossil fuels cheaply and effectively with renewable energy?

- Alternative sources of energy such as **renewables** are not yet cost-effective and come with environmental costs of their own (the veteran British environmentalist David Bellamy is leading opposition to wind farms).<sup>31</sup> The only currently cost-effective alternative to fossil fuel use is nuclear power, which environmental activists continue to oppose in direct contradiction to their assertions that global warming is the gravest danger the planet faces.

Aren't market-based solutions the way to reduce emissions?

- “**Cap and Trade**” schemes that allow firms and governments to trade the right to emit greenhouse gases up to certain limits are not economically efficient. By creating rent-seeking opportunities, they promote the development of a carbon cartel seeking to exploit the system to make profits. A simple carbon tax would be much more economically efficient, although likely to prove unattractive to voters in democracies.<sup>32</sup> The recent collapse of the carbon market in Europe shows how dependent such markets are on political considerations.

## Summary

Europe and the world face severe economic consequences from currently proposed strategies to deal with global warming. These approaches will produce job losses and consume scarce resources that could be better spent on handling other world problems such as AIDS or access to water.<sup>33</sup> The economic consequences of global warming



mitigation strategies currently proposed will probably be worse than the effects of global warming itself. Therefore, adaptive and resiliency strategies should be considered as a more cost-effective alternative. In addition, “no regrets” strategies that will provide benefits from greater economic growth whether global warming proves to be a problem or not should be adopted at once.<sup>34</sup>

## Notes

<sup>1</sup> Professor Richard Lindzen, testimony to the United States Senate, May 1, 2001.

<sup>2</sup> Committee on the Science of Climate Change [Cicerone et al.], Climate Change Science: An Analysis of Some Key Questions, National Research Council, Washington D.C., 2001.

<sup>3</sup> See testimony of Prof. Richard Lindzen to UK House of Lords Committee on Economic Affairs, January 21, 2005. Available at <http://www.publications.parliament.uk/pa/ld/lduncorr/econ2501p.pdf>.

<sup>4</sup> Sun, S., and J.E. Hansen 2003. Climate simulations for 1951-2050 with a coupled atmosphere-ocean model. *J. Climate* 16, 2807-2826.

<sup>5</sup> Christy, J.R., and R.W. Spencer, *Global Temperature Report: April 2003*, UAH Earth System Science Center, May 9, 2003, Vol. 12, No. 12.

<sup>6</sup> Sato, M. et al., 2003: “Global Atmospheric Black Carbon inferred from AERONET,” *Proceedings of the National Academy of Sciences*, vol. 100, no. 11: 6319-6324.

<sup>7</sup> Pielke et al. 2002, “The Influence of Land-use Change and Landscape Dynamics on the Climate System: Relevance to Climate-change Policy beyond the Radiative Effect of Greenhouse Gases,” *Phil. Trans. R. Soc. Lond. A* (2002) 360, 1705-1719.

<sup>8</sup> Friis-Christensen, E. & Lassen, K. 1991. “Length of the Solar Cycle: An Indicator of Solar Activity Closely Associated with Climate,” *Science* 254, 698-700; Thejil, P. and Lassen, K. 1999, *Solar Forcing of the Northern Hemisphere Land Air Temperature: New Data*, DMI-report #99-9, Danish Meteorological Institute, Copenhagen 1999.

<sup>9</sup> Weaver, A.J., and Hillaire-Marcel, C. 2004, “Global Warming and the Next Ice Age,” *Science*, Vol 304, Issue 5669, 400-402; Wunsch, C. 2004, “Gulf Stream Safe if Wind Blows and Earth turns,” *Nature* 428, 601.

<sup>10</sup> Mörner, N.-A. 2003. “Estimating Future Sea Level Changes from Past Records,” *Global and Planetary Change* 40: 49-54.

<sup>11</sup> Mudelsee, M., et al., 2003. No upward trends in the occurrence of extreme floods in central Europe. *Nature*, 425, 166-169.

<sup>12</sup> The Director of the World Climate Program for the WMO, Ken Davidson, replied to a questioner in Geneva in 2003, “You are correct that the scientific evidence (statistical and empirical) are (sic) not present to conclusively state that the number of events have (sic) increased. However, the number of extreme events that are being reported and are truly extreme events has increased both through the meteorological services and through the aid agencies as well as through the disaster reporting agencies and corporations. So, this could be because of improved monitoring and reporting,” quoted at <http://www.john-daly.com/press/press-03b.htm>.

<sup>13</sup> Klotzbach, P. J. (2006), Trends in global tropical cyclone activity over the past twenty years (1986–2005), *Geophys. Res. Lett.*, 33, L10805, doi:10.1029/2006GL025881.

<sup>14</sup> *International Journal of Climatology* (24; 329-339)

<sup>15</sup> Reiter, P. et al, “Global Warming and Malaria, A Call for Accuracy,” *Lancet Infectious Diseases* 2004 Jun; 4(6):323-4.

<sup>16</sup> Schwartz, P. and Randall, 2003, *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, paper submitted to Pentagon October 2003. Available at [http://www.ems.org/climate/pentagon\\_climate\\_change.html#report](http://www.ems.org/climate/pentagon_climate_change.html#report).

<sup>17</sup> Stainforth, D. et al., “Uncertainty in predictions of the climate response to rising levels of greenhouse gases,” *Nature*, 433, 403-406.

<sup>18</sup> Sam Knight, “Anti-Bush gibe by Royal Society sparks climate change row,” Times Online, July 5, 2005, <http://www.timesonline.co.uk/article/0,,22649-1681145,00.html>

<sup>19</sup> Dr Mitchell Taylor, Dept. of the Environment, Government of Nunavut, in The Toronto Star, May 1, 2006.

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- <sup>20</sup> <http://www.staff.livjm.ac.uk/spsbpeis/Scienceletter.htm>
- <sup>21</sup> <http://w3g.gkss.de/G/Mitarbeiter/bray.html/BrayGKSSsite/BrayGKSS/WedPDFs/Science2.pdf>
- <sup>22</sup> Ian Castles, "Greenhouse Emissions Calculations Quite Wrong," *Canberra Times*, August 29, 2002, available in Castles, I. & Henderson, D. 2003: "The IPCC Emission Scenarios: An Economic-Statistical Critique," *Energy & Environment*, Nos. 2 & 3: 166-168.
- <sup>23</sup> Cooler Heads Newsletter, Nov. 12, 2003. See <http://www.globalwarming.org/article.php?uid=233>.
- <sup>24</sup> <http://64.233.179.104/search?q=cache:ctDw6sczNv0J:www.senate.gov/~commerce>
- <sup>25</sup> Canes, M., *Economic Modeling of Climate Change Policy*, International Council for Capital Formation, October 2002.
- <sup>26</sup> Thorning, M., *Kyoto Protocol and Beyond: Economic Impacts on EU Countries*, International Council for Capital Formation, October 2002.
- <sup>27</sup> Press Release, *EU15 greenhouse gas emissions decline after two years of increases*, European Environment Agency, 15 July 2004.
- <sup>28</sup> S.98 Expressing the sense of the Senate regarding the conditions for the United States becoming a signatory to any international agreement on greenhouse gas emissions under the United Nations, 1997.
- <sup>29</sup> U.S. Constitution, Article II, Section 2, Clause 2.
- <sup>30</sup> Reiter et al.
- <sup>31</sup> Schleede, G. 2004, *Facing up to the True Costs and Benefits of Wind Energy*, paper presented to the owners and members of Associated Electric Cooperative, Inc., at the 2004 Annual Meeting in St. Louis, Missouri. Available at <http://www.globalwarming.org/aecifa.pdf>.
- <sup>32</sup> McKittrick, R. 2001, *What's Wrong With Regulating Carbon Dioxide Emissions?*, Briefing at the United States Congress, October 11, 2001. Available at <http://www.cei.org/gencon/014.02191.cfm>.
- <sup>33</sup> See the work of the Copenhagen Consensus: <http://www.copenhagenconsensus.com>.
- <sup>34</sup> See, for example, Adler et al., *Greenhouse Policy Without Regrets: A Free Market Approach to the Uncertain Risks of Climate Change*, Competitive Enterprise Institute, 2000.