The IPCC 2007 research summary was released Feb 2, 2007.

These papers were mostly gathered during Feb 2007.

How fast has the earth been warming? Page 7

The contents of a report can seem quite different, depending on how we talk about it.

Will countries meet Kyoto promises for 2012? No. Page 20

Swiss glaciers were melted back, 500 – 800 AD. Page 28

Economist says: We have no solution for global warming. Page 30

Information on overselling ethanol, skeptics, etc.

Page 51 Page 52

Ready to scan March 13, 2007 (RJ0403, 62 pages)
Index

1. The IPCC Climate Change report (Daily Camera paper, Boulder, Feb 3, 2007) 3 p
   - Big headline: “It’s later than you think.”
   - Three pages here
   - The IPCC summary for policymakers was released Feb 2, 2007.
   - The news for the public was likely 97% alarmist.

2. How fast has the world been warming? (Jenne, Feb 2007)


4. Climate of opinion (Feb 5, 2007, Wall Street Journal) 2 p
   - The warming debate is far from settled.
   - Important to read this.

5. Boulder scientists key to study (Feb 2, 2007, Daily Camera, Boulder CO) 2 p

6. “You’re so hot” – global warming (University of Colorado, Feb 8, 2007) 2 p
   - They love the political impact the report is having.


8. Senators sound alarm on global warming, 1 p.
   - Some want legislation this year.

9. In Congress, climate talks are starting (Feb 12, 2007) 1 p.

10. Will countries meet Kyoto promises for 2012? 1 p
    - No! 13 of 15 main Kyoto signers will not meet their Kyoto promises.

11. Global warming; Environment politics, USA (Feb 2007) 1 p

12. Nuclear energy as a bridge (Feb 2007) 1 p

13. A simple remedy for global warming (Feb 16, 2007) 1 p
    - By Anne Applebaum, Wash. Post. She is against Kyoto (too complex) and for a carbon tax.

14. Scientists: We are all warming the world (Feb 9, 2007, Science) 1 p

15. Does global warming have a big effect on hurricanes? (No.)

16. UN downgrades man’s impact on the climate (London, Nov 12, 2006) 2 p
    - This was another 2 p summary of the UN research report.
    - This does not aim for max alarm like most recent stories about the summary for policy makers.
17. Swiss glaciers (periods when melted back) such as 500 – 800 AD (300 years) 1 p
   ○ Fever in the Alps (Davos: A global warming meeting)  30
18. Global warming and hot air (Robert Samuelson, economist, Feb 7, 2007) 3 p
   ○ Important to read this.
   ○ The dirty secret about global warming is this: We have no solution.
   -- Emergency (IP) -- 33
19. Are greenhouse gas curbs a good investment? They say no. 1 p
20. World energy use by fuel type, 1971 – 2030, 1 p
   ○ Some stories about the new IPCC summary (7 p here)
   ○ The IPCC report really made skeptics look “marooned and ridiculous”
      The editor is having problems. It is not one-sided.
22. Ten major newspapers in the UK. News about IPCC 2007. 1 p
23. From bad to worse: Earth’s warming to accelerate (Science News, Feb 10, 2007) 1 p
24. Hot house science 1 p
   ○ A commentary. Please see.
   ○ Some of the politics that went on.
27. Monster hype (hype about climate) Jan 29, 2007 (IBP) 1 p
   ○ And a monster has been created.
28. Overselling ethanol (Feb 2007) 1 p
29. Skeptics on selected climate issues, 4 p
   ○ A mood has been growing to beat up on the skeptics.
30. Global warming hotheads would burn skeptics at the stake (The Times of London, 3 Feb 2005, 2 p
   ○ Can scientists (big warmers) talk freely?
   ○ Are skeptics being smeared?
32. Global warming smear (Feb 9, 2007, Wall St Journal) 1 p
33. Global warming and political science (Feb 3-4, 2007, Wall St Journal) 2 p
   ○ We hear from the University of London; good notes.

End

This is Document RJ0403, 62 pages
‘It’s later than you think’

Climate change report pins blame on human race

"Warming of the climate system is unequivocal, and is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level."

— excerpt from Intergovernmental Panel on Climate Change report issued Friday

By Todd Neff

t he years of scientific toil, the thousands of journal articles and countless e-mails, the scores of meetings, the painstaking revisions — they all boiled down to two critical words in the highly anticipated Intergovernmental Panel on Climate Change report issued in Paris on Friday: very likely.

"The warming of the climate system is unequivocal," the report says, and humans, "are very likely responsible for it. We humans are by extension, very likely to cause future warming."

Our impact is so great that even if we halted our collective driving, heating, electrifying and fertilizing in 2001, the world would continue to warm for at least 20 years anyway as the oceans release heat they've stored up. And civilization rolls on.

"Very likely" is a concrete term in "Climate Change 2007: The Physical Science Basis," a 1,600-page draft report with a 21-page summary for policy makers that was released early Friday in Paris. It means there's a 90 percent chance that humans are heating the planet.

In the last major IPCC report in 2001, the word was simply "likely," or a 66 percent chance that humans are responsible.

"It is a very strong statement that global warming is also human warming," said Richard Somerville, a Scripps Institution of Oceanography scientist and one of the lead authors of the report, 10 of whom work in Boulder.

Plea: see CLIMATE ON 4A
Eleven of the warmest years on record since 1850 have occurred in the past 12 years. The years 1998 and 2005 were the warmest on record, and 2006 was the warmest on record in North America, NASA officials say.

**Average temperatures from 1950 to 2000** were higher than during any other 50 years in the past five centuries in the Northern Hemisphere. There is a 66 percent chance that the 50-year period was also the warmest the Earth has seen in 1,300 years.

There is a 90 percent likelihood that the increase in temperature is due to rising amounts of greenhouse gases from human activities.

**Even if greenhouse gas concentrations** stabilized at 2000 levels, the planet would continue to warm for 20 years, and sea levels would continue to rise for centuries.

**Because natural processes take centuries** to remove carbon dioxide from the atmosphere, both past and future emissions will continue to drive warming and sea-level rise for more than a millennium.

The Rocky Mountains will probably see less snow and a shorter snow season as the century wears on, and although precipitation could increase with the additional water vapor, higher temperatures — perhaps an average of 7 degrees warmer, says Linda Mearns, a National Center for Atmospheric Research senior scientist — will probably make for a drier climate.

**Concentrations of carbon dioxide** have increased by more than 35 percent since the dawn of the Industrial Age and are rising at an accelerating rate. The heat-trapping ability of atmospheric carbon dioxide increased 20 percent between 1995 and 2005.

**Variability in solar radiation** contributes less to global climate change than previously believed, and the warming from carbon dioxide and other greenhouse gases far outweighs the cooling effect of atmospheric particles, called aerosols.

The observed rise in sea level accelerated in the last decade of the 20th century. Between 1961 and 2003, sea levels were rising at an average rate of 7 inches every century. Yet between 1993 and 2003, the rate sped up to more than 12 inches per century.

The intensity, although not the frequency, of hurricanes has increased and will continue to rise because of the energy associated with warming oceans and more water vapor from evaporation.

**Changes in Arctic temperatures** and sea ice, global precipitation volumes, ocean salinity, wind patterns and extreme weather have been observed. The extreme weather includes the increased occurrence of heat waves and heavy precipitation, as well as more intense and severe droughts.

---

Scores of runs from 23 global climate models predicted world temperatures to rise from 2 to 12 degrees by the end of the century. Climate modelers concluded there is a 66 percent chance that the increase by 2100 will fall between 3.6 and 8.1 degrees.

**Average Arctic temperatures** have risen at nearly twice the global rate for the past century. The maximum land area covered by seasonally frozen ground has fallen by 7 percent during that time.

**One would have to go back 125,000 years** to find global temperatures that remained significantly higher than today.

---

Compiled by Dan Ray
"There's no doubt that for policy people, the difference between 'likely' and 'very likely' due to human activity is something that's being noticed," Solomon said. "What we're saying is, 'It's later than you think it is,' and that's just a fact that policy people are really paying attention to."

In language agreed upon by 300 delegates from 113 countries in a group line-edit Solomon led, the summary listed higher air and ocean temperatures, rising sea levels, glacial and Arctic thawing, heat waves and drought and more-powerful hurricanes among global warming's proven impacts.

Supercomputers all over the world spent years churning through 23 computer models to determine that, by 2100, there's a two-in-three chance that average global temperatures will be 3.6 to 8.1 degrees warmer.

The report said global human emissions of fossil-fuel carbon rose from 6.4 billion tons a year in the 1990s to 7.2 billion tons in 2005, a heft equivalent to a block of concrete spanning more than 1,000 football fields and as tall as the Empire State Building.

"What it implies, and I think the world is already acting — is that if you do not tackle CO2 emissions, you're not doing anything substantial."

"One out of eight — it's nice, but it's not a lot," Tans said.
How Fast has the Earth been Warming?

Roy Jenne
March 2, 2007

The IPCC reports often quote a wide range of possible temperatures for year 2100 such as increases of 1.8° C to 4.0° C with a likely range up to 6.4° C. During 1979 – 2006 the observed increases have been limited to about 0.15° C per decade. This puts sharp limits on how much warming we are likely to see by 2050 (likely not over 1.0° C).

1. Atlantic currents (a study)
The Gulf Stream which brings heat from the tropics to the North Atlantic weakened by 10% between 1200 and 1850 during the cold spell known as the little Ice Age. Since then the currents have been stronger and the North Atlantic has been warmer and the earth has warmed up some. Be a little careful; different authors use a somewhat different set of dates for the little ice age. See Nature, Vol 444, 601-604, 2006.

2. A study of selected world glaciers, year 1700 – on.
The glaciers were advancing during 1700 – 1750, then they were steady to 1820 when they began their retreat to the present time. (Study by Oerlemans [Europe] in Science, 29 Apr 2005, p 675-677.) It is common knowledge that the world has been warming up.

3. World surface temperature increased to 1945, then it decreased some to 1976 (in the 1970s there was lots of talk about the coming ice age). For 1977 – 2006, we have had a warming trend.
   ▪ The two big shifts in world temperature trends during the past 80 years happened at 1945 and at 1976.
   ▪ These shifts have been happening each 30 or 40 years. Will another shift happen between 2007 – 2015 and give us reduced warming?
   ▪ These up and down natural climate shifts will likely continue, but the effects of more greenhouse gases will be added (from about 1970 – on).

4. How fast is the observed warming in the lower atmosphere (1979 – 2006)?
Christy and Spencer have been processing satellite microwave data for many years to derive temperature in the free atmosphere. This data exists from 1979 – on. On Jan 10, 2007, they had completed the processing of data for 1979 – Dec 2006, giving monthly results for these 28 years.

The warming of the lower atmosphere (about surface to 8 Km) has been increasing at 0.14° C per decade during 1979 – 2006.

Their trend is 0.14° C per decade. This is for the air layer about surface to 8 Km. This agrees well with data from rawinsonde balloons, and with three reanalyses: NCEP/NCAR, ERA-40 by ECMWF, and the Japanese reanalysis. The competing satellite temperature derived by the Wentz group is a little higher (0.18° C per decade). In the next few decades, the IPCC 2007 climate report calls for an increase of 0.2° C per decade. But many model runs have been assuming that greenhouse gases increase at 1% per year which is significantly faster than the actual rates of increase over the past 40 years.
5. What is the trend in world surface temperature during the past few decades (from sfc obs and reanalysis)?
   The surface trend from the UK Hadley Centre is from dataset HadCRU3 which gives +0.171° C/decade. This is based on monthly temperature data compiled from surface observations taken at many worldwide stations with long records of observations.
   Thus world surface observed data gives +0.17° C/decade.

   A global temperature 2 meters above the surface is calculated in reanalysis projects. This is giving a smaller trend. The trend starting 1979 is:
   - From NCEP/NCAR reanalysis, +0.12° C/decade.
   - From ERA-40 (ECMWF), also +0.12° C/decade
   SOURCE: Numbers from John Christy, U of AL – Huntsville.

6. Atlantic region warming and cooling cycles (2500 years)
   Study: Water upwelling off the coast of NW Africa.
   Water temperatures can be estimated from sediment cores taken in the upwelling region. This can be related to air temperature during the Little ice age and the Medieval warm period. These air temperature changes apply to the Atlantic ocean region (Europe, Greenland, etc.), and in fact, to the N. Hemisphere as a whole. Their study showed the following:
   - 20th Century: Increased upwelling, and cooler water temps near NW Africa. And we know that the Atlantic (and Northern Hemisphere) air temps were warmer at this time.
   - During the Little ice age (1450 – 1850 AD): Relatively warm water here (cool air in N. Hemisphere).
   - During the Medieval warm period the water (NW Africa) was relatively cool, as during the 1900s hemispheric warm spell.
   - The time of minimum sea water (SST) temps by NW Africa (while N. Hemisphere air is warm) are at Zero AD and 1150 AD. The latter is at the center of the Medieval warm period. These are two natural warm air periods separated by 1150 years. Another one is now, about 800 to 1000 years later. (see Science, 2 Feb 2007, p 637-639).

   Three warm air periods at Zero AD, 1150 AD, and now.

   NOTE: The talk about the Hockey Stick temp curve for years 1000 – 2000 AD in IPCC 2001 was quite different from this.

7. Warming trends from greenhouse gases.
   For over 20 years, people have been running climate models and talking about the amount of global warming that might occur by year 2050 or 2100 due to increasing greenhouse gases. Some models would say that the earth would warm by 2° C if the greenhouse gases doubled; two others would say about 5° C. Now most models say it is about 2.3° C, but some scientists say that because of cloud feedbacks, it should be even lower. The greenhouse gases could double by about 2100 thus we could get roughly this amount of heating from 2000 to 2100 (about 0.2° C/decade).
   If CO₂ is released faster, we would get more heating. People also have to put a cooling effect into the models due to pollution, aerosols, and volcanic dust. This counteracts some of the greenhouse gas heating. They also have to estimate whether the pollution will change over 100 years.
   - The observed rate of global warming has been about 0.15° C per decade during the past 25 years. This rate would give almost 1.0° C of warming from 2000 to 2050.
Comments on the Carbon Dioxide Issue

Roy Jenne
Feb 10, 2007

Politics are really swirling around the carbon dioxide issue. The IPCC policy summary of the research report was released Feb 2, 2007. It was designed to alarm people.

✓ If we could spend $50b over 20 years and solve 60% of the CO$_2$ issue, many of us would be for the policy.

✓ If the US is forced to join Kyoto, and all countries achieved Kyoto goals by 2012, it would only make a 3 to 5% reduction in CO$_2$ emissions. But really much less effects because countries will not and cannot do their promises.

✓ Now we have a bandwagon effect where many want the world to spend perhaps $300 to $600b or more per year to (perhaps) solve some more of the CO$_2$ issue.

✓ See the paper here, “Global warming and hot air,” by Robert J. Samuelson (noted economist) (pages 30-31 here).

✓ The well-kept secret is that there are no technical options to quickly reduce CO$_2$ emissions by 20 or 60% by 2020 or 2060 which many demand.

✓ The issues are complex and we need honest, skillful problem-solving approaches. Instead, the system is being dominated by loud voices, hype, and politics. Help.

✓ It is not responsible to keep hyping the system to demand a big reduction in carbon dioxide, when that is not possible without forcing poor people to stay poor. (But we can do something.)
Climate of Opinion

Last week’s headlines about the United Nation’s latest report on global warming were typically breathless, predicting doom and human damnation like the most fervent religious evangelicals. Yet the real news in the fourth assessment from the Intergovernmental Panel on Climate Change (IPCC) may be how far it is backpedaling on some key issues. Beware claims that the science of global warming is settled.

The document that caused such a stir was only a short policy report, a summary of the full scientific report due in May. Written mainly by policymakers (not scientists) who have a stake in the issue, the summary was long on dire predictions.

Sea level

Take rising sea levels. In its 2001 report, the U.N.’s best high-end estimate of the rise in sea levels by 2100 was three feet. Lord Monckton notes that the upcoming report’s high-end best estimate is 17 inches, or half the previous prediction. Similarly, the new report shows that the 2001 assessment had overestimated the human influence on climate change since the Industrial Revolution by at least one-third.

There are other problems!

The economic dislocations of such an abrupt policy change could be far more severe than warming itself, especially if it reduces the growth and innovation that would help the world cope with say, rising sea levels. There are also other problems—AIDS, malaria and clean drinking water, for example—whose claims on scarce resources are at least as urgent as climate change.
REVIEW & OUTLOOK

Climate of Opinion

Feb 5, 2007

CLIMATE

Last week's headlines about the United Nations' latest report on global warming were typically breathless, predicting doom and human damnation like the most fervent religious evangelical. Yet the real news in the fourth assessment from the Intergovernmental Panel on Climate Change (IPCC) may be how far it is backpedaling on some key issues. Beware claims that the science of global warming is settled.

The document that caused such a stir was only a short policy report, a summary of the full scientific report due in May. Written mainly by policymakers (not scientists) who have a stake in the issue, the summary was long on dire predictions. The press reported the bullet points, noting that this latest summary pronounced with more than 90% confidence that humans have been the main drivers of warming since the 1950s, and that higher temperatures and rising sea levels would result.

More pertinent is the underlying scientific report. And according to people who have seen that draft, it contains startling revisions of previous U.N. predictions. For example, the Center for Science and Public Policy has just released an illuminating analysis written by Lord Christopher Monckton, a one-time adviser to Margaret Thatcher who has become a voice of sanity on global warming. Sea level

Take rising sea levels. In its 2001 report, the U.N.'s best high-end estimate of the rise in sea levels by 2100 was three feet. Lord Monckton notes that the upcoming report's high-end best estimate is 17 inches, or half the previous prediction. Similarly, the new report shows that the 2001 assessment had overestimated the human influence on climate change since the Industrial Revolution by at least one-third.

Such reversals (and there are more) are remarkable, given that the IPCC's previous reports, in 1990, 1995 and 2001, have been steadily more urgent in their scientific claims and political tone. It's worth noting that many of the policymakers who tinker with the IPCC reports work for governments that have promoted climate fears as a way of justifying carbon-restriction policies. More skeptical scientists are routinely vetoed from contributing to the panel's work. The Pasteur Institute's Paul Reiter, a malaria expert who thinks global warming would have little impact on the spread of that disease, is one example.

U.N. scientists have relied heavily on computer models to predict future climate change, and these crystal balls are notoriously inaccurate. According to the models, for instance, global temperatures were supposed to have risen in recent years. Yet according to the U.S. National Climate Data Center, the world in 2006 was only 0.03 degrees Celsius warmer than it was in 2001—in the range of measurement error and thus not statistically significant.

The models also predicted that sea levels would rise much faster than they actually have. The models didn't predict the significant cooling the oceans have undergone since 2003—which is the opposite of what you'd expect with global warming. Cooler oceans have also put a damper on claims that global warming is the cause of more frequent or intense hurricanes. The models also failed to predict falling concentrations of methane in the atmosphere, another surprise.

Meanwhile, new scientific evidence keeps challenging previous assumptions. The latest report, for instance, takes greater note of the role of pollutant particles, which are thought to reflect sunlight back to space, supplying a cooling effect. More scientists are also studying the effect of solar activity on climate, and some believe it alone is responsible for recent warming. Hockeystick

This appears to be resulting in a more cautious scientific approach, which is largely good news. We're told that the upcoming report is also missing any reference to the infamous "hockey stick," a study by Michael Mann that purported to show 900 years of minor fluctuations in temperature, followed by a dramatic spike over the past century. The IPCC featured the graph in 2001, but it has since been widely rebutted.

While everyone concedes that the Earth is about a degree Celsius warmer than it was a century ago, the debate continues over the cause and consequences. We don't deny that carbon emissions may play a role, but we don't believe that the case is sufficiently proven to justify a revolution in global energy use. The economic dislocations of such an abrupt policy change could be far more severe than warming itself, especially if it reduces the growth and innovation that would help the world cope with, say, rising sea levels. There are other problems—AIDS, malaria and clean drinking water, for example—whose claims on scarce resources are at least as urgent as climate change.

The IPCC report should be understood as one more contribution to the warming debate, not some definitive last word that justifies radical policy change. It can be hard to keep one's head when everyone else is predicting the Apocalypse, but that's all the more reason to keep cool and focus on the actual science.

Lights Out

Venezuela's congress didn't sing the Internationale last week when it granted President Hugo Chávez the power to rule by decree in a ceremony on Caracas's historic Plaza Bolívar. But it did pledge unwavering allegiance to a socialist revolution that rivals the Paris Commune as the moment Venezuelans had been dreading for years: the official installation of the dictatorship.

Mr. Chávez had asked Congress for the power to rule by decree because, he said, "it is necessary to draw up new, modern, and healthier laws that are closer to the people." His opponents are predicting the end of Venezuela as a democracy, as it has been for decades. But that's not what the Chavezistas want. They say they are building a new country, a socialist utopia.

By Mary Anastasia O'Grady
Boulder scientists key to study

Climate change report says global warming likely caused by humans

By Todd Neff 2-2-07
Camera Staff Writer

Ten Boulder scientists served as lead authors on the Intergovernmental Panel on Climate Change report to be released today in Paris, volunteering hundreds of hours each over at least two years in an effort they view as both honor and duty.

The assessment will become a touchstone for scientists and policy makers into the next decade. It is expected to say that global warming has begun, is "very likely" caused by man and will be unstoppable for centuries, according to The Associated Press.

"I think the scientific community as well as the political community are going to be stunned by the body of evidence and how convincing it is," said Elisabeth Holland, a National Center for Atmospheric Research senior scientist and one of the lead authors. "The evidence is compelling in a way that it has never been before because we just simply didn't have all the pieces."

Another Boulder scientist, Susan Solomon, of the National Oceanic and Atmospheric Administration's Earth System Research Laboratory, was co-chairwoman of a 1,600-page report on the scientific basis for climate change — one of four long-awaited IPCC reports due in the coming months. She orchestrated the work of 152 lead authors, 27 review editors and 450 contributing authors.

Today's release of a 12- to 15-page summary for policy makers will be the first major IPCC results since 2001.

The full report, including separate books on "The Physical Science Basis," "Impacts, Adaptation and Vulnerability," "Mitigation of Climate Change" and a synthesis of all three, will be the work of more than 2,000 scientists who evaluated virtually all facets of the world's climate-research output. The final three reports are scheduled for release in April, May and September, IPCC officials say.

Although science has advanced generally, leaps in computing power and modeling skill played perhaps the greatest role in the results' improvement since 2001, several scientists said. Nineteen climate models performed multiple runs of the same input data, providing a much larger sample for future predictions.

"That's a real advance," Solomon said.

NCAR visiting scientist Reto Knutti worked on results related to climate modeling. He said he spent roughly half his time working on the IPCC report for the past two years. The modeling work for the report, such as that done by NCAR in 2004, constituted a "simply amazing" effort, he said.

NCAR scientists worked for years on improving their Community Climate System Model 3 — one of the world's top climate models — and then ran the model on supercomputers during most of 2004 to generate results for the report.

The effort was huge on both global and personal levels. Solomon said the physical science report received 30,000 comments from 600 reviewers around the world, all which got consideration. Martin Manning, an IPCC scientist assisting Solomon in Boulder, called the report "one of the most thoroughly reviewed documents ever in the scientific community by a long way."

David Fahey, a NOAA Earth System Research Lab physicist,
BOULDER’S IPCC LEAD AUTHORS

Each chapter of the IPCC’s Working Group 1 report on “The Physical Science Basis” for climate change has two coordinating lead authors and about a dozen lead authors responsible for writing and incorporating feedback from thousands of comments into the roughly 100-page chapter. They all volunteered their time for the effort.

The authors eventually submitted chapters to working group co-chairs Susan Solomon, a NOAA Earth System Research Laboratory senior scientist in Boulder, and Qin Dahe, a Chinese glaciologist. Other Boulder scientists are working on the other two working groups’ forthcoming reports: “Impacts, Adaptation and Vulnerability” and “Mitigation of Climate Change,” due in April and May, respectively.

NCAR
Guy Brasseur, coordinating lead author, Chapter 7, “Couplings Between Changes in the Climate System and Biogeochemistry.” Brasseur, director of NCAR’s Earth and Sun Systems Laboratory, is an atmospheric chemist who has worked on global models of atmospheric chemistry and chemical transport in the atmosphere.

William Collins, lead author, Chapter 10, “Global Climate Projections.” Collins studies the interactions of sunlight and heat with greenhouse gases and other constituents in Earth’s atmosphere.

Elisabeth Holland, lead author, Chapter 7, “Couplings Between Changes in the Climate System and Biogeochemistry.” Holland, an NCAR senior scientist, studies the link between the chemistry of the atmosphere and ecosystems on Earth.

Reto Knutti, lead author, Chapter 10, “Global Climate Projections.” Knutti, an NCAR visiting scientist, is an expert on climate models. His work focuses on projections of future climate and estimating the uncertainty of model scenarios.

Linda Mearns, lead author, Chapter 11, “Regional Climate Projections.” Mearns, an NCAR senior scientist and director of the center’s Institute for the Study of Society and Environment, specializes in the regional impacts of climate change, the potential effects of global warming on agriculture, and variability and uncertainty in climate change studies.

Gerald Meehl, coordinating lead author, Chapter 10, “Global Climate Projections.” A senior scientist at NCAR, Meehl studies projections of future climate change and tropical climate variability.

Kevin Trenberth, coordinating lead author, Chapter 3, “Observations: Surface and Atmospheric Climate Change.” Trenberth is an NCAR senior scientist and head of the center’s Climate Analysis Section. His specialties include global climate change, climate variability and El Niño, the hydrological cycle, and climate observations.

NOAA Earth System Research Laboratory
David Fahey, lead author, Chapter 2, “Changes in Atmospheric Constituents and in Radiative Forcing.” Fahey, a NOAA ESRL research physicist whose research at NOAA involves using unmanned aircraft systems, wrote about greenhouse gases and the effect of aircraft exhaust on climate in the report.

CU’s National Snow and Ice Data Center
YOU’RE SO HOT

As least, you will be by the end of the century as global warming kicks in

Several local scientists, key contributors to the Intergovernmental Panel on Climate Change report, pleased with heed taken of their warnings. SEE STORY, PAGE 4

Last week, high-ranking scientists from 113 countries issued a summary of the most strongly-worded scientific consensus on climate change to date — the Intergovernmental Panel on Climate Change (IPCC) report.

The full report will come out this summer, but the summary — geared towards policymakers — is a “tipping point” that’s changed the nature of the debate on global warming, say local scientists.

BOULDER SCIENTISTS PLEASED WITH ATTENTION GIVEN TO BREAKTHROUGH CONSENSUS REPORT ON CLIMATE CHANGE
SCIENCE!

Can’t stand the heat? Fix the planet

BOULDER SCIENTISTS PLEASED WITH ATTENTION GIVEN TO BREAKTHROUGH CONSENSUS REPORT ON CLIMATE CHANGE

BY PAULA PANT
Colorado Daily Staff Writer

Top national scientists working in Boulder’s backyard say they’re pleased with the attention a breakthrough international report on climate change has received.

Last week, high-ranking scientists from 113 countries issued a summary of the most strongly-worded scientific consensus on climate change to date — the Intergovernmental Panel on Climate Change (IPCC) report.

The report predicts median temperatures worldwide will rise 3 to 7 degrees, and sea levels will rise 7 to 23 inches, by 2100 as a result of an increase in greenhouse gases caused by human activity. It also predicts hurricanes, tropical cyclones and typhoons will become more intense and more frequent, particularly in the Americas, as a result of human activity. By the end of this century sea ice in the Arctic Circle may almost entirely disappear during the summer months, the report predicts.

The full report will come out this summer, but the summary — geared towards policymakers — is a “tipping point” that’s changed the nature of the debate on global warming, say local scientists.

“This report might be a tipping point where we’re not really debating the science in the large sense... because the science is pretty ironclad at this point,” said Walt Meier, a research scientist at the National Snow and Ice Data Center (NSIDC). “The discussion is going to start to turn to what do we need to do... to mitigate the effects.”

The report is renowned for the consensus it generated among high-ranking scientists: more than 2,000 scientists contributed the report, which took five years to write.

“I’m thrilled with the amount of attention that the report has got,” said Elisabeth Holland, a senior scientist at Boulder’s National Center for Atmospheric Research. “I think it’s really important for what deci-

WARMING: Some say report too conservative

[WARMING, from page A4]

sions we as a society have for our futures.”

Holland, a lead author on a chapter involving couplings between climate, change and biogeochemistry, met with prominent scientists in China, New Zealand, Norway and Italy and responded to 2,500 serious scientific inquiries before finalizing her chapter.

“Writing this sort of consensus document is really an iterative process,” Holland said. Roger Barry, Director of the NSIDC, said the report is “deserving of the attention it got.”

Barry said he’d like to see caps on carbon emissions and other greenhouse gases and improved fuel standards for vehicles and aircraft as a result of this report.

“And then just a general awareness by the populace of the fact that they’re all the time emitting carbon,” Barry said.

Some criticize the report for being too conservative in its estimates.

Recent research has shown the ice sheets in Greenland and Antarctica to be melting more rapidly than previously thought, Meier said. This new research could mean that sea levels will rise more dramatically than predicted in the IPCC report, he said.

But Meier acknowledged that if the report had been more provisional, it wouldn’t have had as much agreement from all corners of the scientific community.

And its consensus is its strength, Meier said.

“I think that makes a stronger statement, even if it is more conservative... that this is something we can be confident in,” Meier said.

Barry said future research will focus on changes in glaciers, the melting of Greenland’s ice sheet, monitoring of permafrost temperatures, monitoring of snow cover and Arctic sea ice.

“It was a surprise when they found out that Greenland was thinning as rapidly as it appears to be,” Barry said.

Contact Paula Pant for regard to this story at pant@coloradodaily.com, or at (303) 443-9508.
Observations and Predictions of the Intergovernmental Panel on Climate Change

**Land**
- Temperatures have increased over land and will continue to do so, reducing snow and ice cover, which can accelerate warming.

**Ocean**
- The ocean has absorbed much of the extra heat from the greenhouse effect. Sea levels have risen and will continue to do so.

**Weather**
- There is evidence that extreme weather has increased, and it is more likely than not that human activities have contributed to the trend.

**METHANE**
- Methane in the atmosphere has more than doubled since pre-industrial times.

**TEMPERATURE**
- Temperature has risen about 1.4 degrees since the late 19th century. Eleven of the 12 warmest years on record have occurred since 1980.

**SNOW AND ICE COVER**
- Mountain glaciers and snow cover have declined in most parts of the world. Ice sheets on Greenland and Antarctica are breaking up, and Greenland's ice is shrinking.

**SEA LEVEL**
- Sea level rose about six inches in the 20th century. The rate of increase in the late 20th century was faster than earlier, though this may not reflect natural variation.

**SEA ICE**
- The average coverage of Arctic sea ice has shrunk 2.7 percent per decade since 1979, with summertime ice decreasing 7.4 percent per decade.

**CYCLONES**
- There is evidence of an increase in hurricane intensity in the North Atlantic since 1970. Long-term trends are more difficult to discern. The number of cyclones shows no clear trend.

**PRECIPITATION**
- Increased precipitation has been seen in the eastern Americas, northern Europe, and parts of Asia. Droughts have become more intense and longer, especially in lower latitudes.

**LOOKING AHEAD**
- The new report says the global climate is likely to warm 3.5 to 5 degrees Fahrenheit if carbon dioxide concentrations in the atmosphere reach twice the levels of 1750, before the Industrial Revolution.

- Glaciers and snow cover will decline. The Greenland ice sheet, under persistent warming, could disappear after several thousand years, raising seas 23 feet globally. The Antarctic ice sheet is expected to fare better.

- In every emission scenario considered, Arctic and Antarctic sea ice continue to shrink. Under some projections, Arctic sea ice disappears entirely in summer by the late 21st century.

- It is very likely that storms with heavy rains will increase. Precipitation will vary likely increase in high latitudes, while decreases in subtropical and arid lands are likely.
Senators sound alarm on global warming

By Christina Bellantoni
THE WASHINGTON TIMES

One-quarter of the Senate on Jan. 30 called global warming a serious threat to the world's future and urged quick action, despite disagreement on how to stem its effects.

During a rare open forum that lasted hours, senators from both major parties — including four seeking the presidency — shared ideas about curbing carbon emissions, which many scientists blame for global warming. The senators also promised substantial legislation this year.

"Global warming is an international problem," Sen. John McCain, Arizona Republican and a candidate in the 2008 presidential race, said. "It's something we can do, and we can do it without hurting the economy." He proposed legislation that would give the federal government the authority to regulate greenhouse gases.

"We have no time to lose," said Sen. Hillary Rodham Clinton, New York Democrat, who also has eyes on the White House. "We need to act." Senator Boxer, California Democrat, called the issue "one of the most urgent challenges we face."

Sen. Christopher S. Bond and a few other Republicans fear that sweeping legislation to restrict carbon emissions will result in economic hardship.

"I'm not from the state of macroeconomics. I'm from the state of Missouri, and I need to know how these proposals will hurt Missourians," Mr. Bond said. "Do not fight climate change on the backs of the poor, on the backs of certain sectors of this country."

Sen. Larry E. Craig, Idaho Republican, questioned the motivation for rushing legislation. "My sense is the rush [...] at this moment, all due apologies to Senator Clinton, is something about an '08 election," he said.

He said drastic federal legislation could crush business in the United States, even while India and China are reviving their economies without taking action against climate change.

"I reject that. We are the most innovative nation in the history of the world," Mrs. Clinton said. "I don't underestimate the task we face, but I am optimistic."

Senators evoked the images of the nation's children and grandchildren.

"This is our generation's test to protect their futures," said Sen. Barack Obama, Illinois Democrat. "The world is going to be watching us over the next several years to see what action we take on this issue."

Mr. Obama compared climate change legislation to an insurance policy. "We don't have to stand helplessly by and accept this future. In fact, we can afford to," he said.

Sen. Lamar Alexander, Tennessee Republican, said that even his conservative district recognizes "it is now time for Congress to take reasonable steps."

Sen. James M. Inhofe of Oklahoma, the ranking Republican on the committee, attended the hearing briefly to give his remarks.

"There is no environmental issue that has been more politicized," he said. "I look forward to vigorously pointing out the lack of scientific consensus, the real economic impact and the effects of unilateral disarmament of our economy if we enact mandatory carbon reductions in the U.S. while the rest of the world is failing to meet its goals."

"I'll mark you down as skeptical," Mrs. Boxer told Mr. Inhofe, who has called global warming a "hoax."
In Congress, Climate Talks Loom

Key Democrat, an Ally Of Auto Makers, Seems Open to Emission Limits

By Greg Hitt

WASHINGTON—As he begins a series of hearings on climate change, the chairman of the House Energy and Commerce Committee said he is open to considering caps on harmful carbon emissions and higher fuel-economy standards for autos.

Many environmentalists worry that Rep. John Dingell (D., Mich.), a pivotal player in the looming climate fight in Congress and an ally of U.S. auto makers, could become a roadblock to meaningful legislation. He has long fought big increases in fuel-economy standards, and as Energy and Commerce chair, he has the power to block strict environmental regulations. His flexibility on such measures would boost the chances of them clearing Congress this year.

"We've got to consider every single option we have," Mr. Dingell said in an interview, making clear that he isn't ruling anything out at this point. "There's no way I can."

Starting tomorrow, Mr. Dingell's panel will convene twice-a-week hearings on climate change, with sessions expected to run through at least mid-April. The hearings will focus on the causes and consequences of climate change, as well as potential remedies. Former Vice President Al Gore, who has an Oscar-nominated movie, "An Inconvenient Truth," on global warming, will testify March 21.

A half-dozen different House committees have a claim on legislation addressing climate change, and Speaker Nancy Pelosi is moving to create a select panel that will cut across jurisdictions to focus public attention on the issue.

The heart of the legislative fight will be in the Energy and Commerce Committee, which has sweeping jurisdiction over environmental and business issues, and Mr. Dingell is moving to frame the debate. In a memo to committee members, Mr. Dingell likened it to the 1990 struggle to enact landmark clean-air legislation. He noted that effort—which he helped shepherd—was "of similar complexity and extremely hard-fought."

Five of the 57 Energy and Commerce Committee members were on the panel in 1990, and Mr. Dingell's aggressive hearing schedule is designed both to educate members and begin sorting out what is politically possible among rank-and-file lawmakers. Beyond the public sessions, Mr. Dingell is convening closed-door briefings for committee aides every Friday. In a session last week, members of the U.N. panel on climate change spoke to the group. Aides said Mr. Dingell also is meeting with other key lawmakers, including Senate Environment and Public Works Committee Chairman Barbara Boxer (D., Calif.), who has made addressing climate change a priority of her panel.

The goal is to produce legislation ready for House floor action by the end of June, a deadline imposed by Ms. Pelosi. "It's going to be very hard," Mr. Dingell said.

Details remain to be worked out. The House appears to be staking out the clearest course for action on the issue. The Senate has yet to stir to action, but Sens. Boxer and Jeff Bingaman (D., N.M.) are pressing the issue.

Mr. Dingell said conservation measures will be considered, as will proposals to encourage use of biofuels. He also vowed to consider measures raising fuel economy standards for autos, along with proposals to cap carbon emissions from plants and factories.

• Lots of 2/week climate hearings
• Last week they heard from the UN IPCC climate research report (released Feb 2-07)
• Dingell also meets with Barbara Boxer (left) of the Senate
• They want legislation ready for action by June 30, 2007.
Legislators Urge Carbon Emissions Cuts

Legislators from the world's largest carbon dioxide (CO₂) emitting countries met on 14–15 February in Washington, D.C., to discuss the future of the global climate and strategies to mitigate temperature increases resulting from global warming.

The world faces a "double challenge—how to reduce damaging carbon emissions while still meeting the energy demand that the world's poor need to escape poverty," said World Bank President Paul Wolfowitz during a keynote talk.

The World Bank estimates that adapting to unavoidable impacts of climate change, much of which will be felt by developing countries, will require US$10–40 billion per year even if immediate action is taken to reduce climate change. "The costs of strong and urgent action are very much less than the cost of inaction," said keynote speaker Nicholas Stern, author of the 2006 Stern Review of the Economics of Climate Change and the head of the U.K. Government Economic Service. Stern estimates that an investment of 1% in world Gross Domestic Product (GDP) now to reduce greenhouse gas emissions will alleviate much of the future costs, which could potentially reduce global GDP by 20% by next century.

At the meeting, government representatives from the Group of Eight (G8) nations of Canada, France, Germany, Italy, Japan, who attended

Russia, the United Kingdom, and the United States, along with leaders from five emerging developing countries (Brazil, China, India, Mexico, and South Africa), together forming the G8+5, issued a statement calling on their governments to take immediate action to curb carbon emissions.

According to the statement, "the goal should be to stabilize concentrations [of greenhouse gases] at a level between 450 and 550 parts per million of CO₂ equivalent." Current concentrations are at 380 parts per million; target levels were chosen to balance economic growth in developing countries with mitigation strategies. Hans Schellnhuber, chief advisor on international climate protection issues to the German government's G8 presidency, stressed that in order to not exceed the European Union's 2°C target for increased global temperatures, greenhouse gases would have to be stabilized at the lower end of this range.

To achieve emissions goals, conference participants urged major world economies to sign a future binding United Nations framework by 2009 that would replace the Kyoto Protocol to the U.N. Framework Convention on Climate Change upon expiration of the protocol. The United States is the sole G8+5 country that has not ratified the Kyoto Protocol. However, legislators said they were encouraged by what they saw as the U.S. government's changing attitude toward human-induced global warming.

The conference statement also stressed that nations must quickly establish a market value for greenhouse gas emissions in order to stimulate private investment in research, development, and deployment of new technologies.

The meeting was organized by the Global Legislators for a Balanced Environment (GLOBE), COM+: Alliance Communicators for Sustainable Development, and the World Bank. The full text of the recent statement is available at http://www.globeinternational.org

—MOHI KUMAR, Staff Writer

This was clearly a high level political meeting to push for quick action on the carbon dioxide issue.
Will Countries Meet Kyoto Promises for 2012?
(Promises to reduce or limit CO$_2$ emissions)

✗ No: 13 of 15 main Kyoto signers will not meet promises

✗ Expected CO$_2$ emission increases:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>13.3%</td>
<td>40.7%</td>
<td>-7.0%</td>
</tr>
<tr>
<td>Canada</td>
<td>18.1%</td>
<td>42.9%</td>
<td>-6.0%</td>
</tr>
<tr>
<td>UK</td>
<td>9.9%</td>
<td>25.1%</td>
<td>-12.5%</td>
</tr>
<tr>
<td>Germany</td>
<td>2.8%</td>
<td>17.0%</td>
<td>-21.0%</td>
</tr>
<tr>
<td>Japan</td>
<td>8.9%</td>
<td>19.2%</td>
<td>-6.0%</td>
</tr>
<tr>
<td>Russia</td>
<td>14.1%</td>
<td>39.2%</td>
<td>0%</td>
</tr>
</tbody>
</table>

NOTE: These are increases from year 2000.

✗ See next pages for similar numbers for other countries

Roy Jenne
Sep 15, 2005
The environment

Green sums

GLOBAL Warming

In search of a compromise on an ever hotter topic

GLOBAL warming, George Bush said in his most recent state-of-the-union address, is a "serious challenge". Congress seems to agree. The Senate alone is already considering four proposals to tackle the problem, and more are on their way. Mr Bush also said that he would like to reduce America's oil consumption. That seems to square with the ambitions of Nancy Pelosi, the new Democratic aide of the House of Representatives, who has set up a select committee to address the subject. But this common interest in environmental issues will not necessarily translate into resolute action. Indeed, the fact that greenery has suddenly become a hot topic may make compromise more difficult:

"There is a time to reap, and a time to sow," says Josh Dorner of the Sierra Club, an environmental pressure group. He and other activists would prefer to spend the next year or so preparing the ground for vigorous environmental legislation under the next president rather than settling for an immediate but meagre harvest. After all, the leading presidential contenders in both parties favour bolder steps than Mr Bush, such as mandatory caps on America's emissions of greenhouse gases. Neither the pressure groups nor the Democrats who control Congress have much interest in defusing an issue that might stir up voters and their money before the next election. Instead, they are likely to push for small, symbolic measures that underline their concern for the environment without jeopardising their future plans.

Legislation on global warming certainly does not fit that category. It is like health care, says Paul Bledsoe, a former Democratic aide who has worked on both issues, in that everyone agrees it is a problem but disagrees about the solution. Like Mr Bush, most Republicans in the Senate dislike the idea of emissions caps. One of them, James Inhofe, has vowed to filibuster any law that includes them. hammering out a deal on such a vexed issue can take ages. Congress has debated the Energy Policy Act it eventually passed in 2005 for four-and-a-half years, for example. That experience, observers say, has left many members suffering "energy fatigue".

There is more common ground on the subject of fuel efficiency. Mr Bush has proposed raising requirements for carmakers by 4% a year, albeit with all sorts of conditions. The same number features in bills with bipartisan backing in both the House and the Senate. Voters are keen too: 72% support stronger standards, according to a forthcoming poll from the Energy Security Leadership Council, a group of anxious grandees. But John Dingell, the chairman of the relevant committee in the House, represents the suburbs of Detroit, America's "motor city". The car industry is already struggling, and unions are implacably opposed to anything that might make matters worse. That will leave Democrats who rely on support from the labour movement in a quandary.

The least controversial idea is the promotion of renewable power, from windmills, solar panels and the like. Bills before both the House and Senate would require America's power firms to generate 20% of their electricity from such sources by 2020. Twenty-three states and Washington, DC, already have "renewable portfolio standards", and many of them seem to be profiting from booming investment in greenery. Politicians see renewables as a vote-winner, judging by the number of uplifting shots of windmills that featured in campaign ads last year. Any downside, in the form of higher power bills, would probably be felt only in the distant future. But there would not be much upside either, since renewable power is already growing like gangbusters, thanks largely to expensive subsidies.

A more useful alternative would be to set up a formal registry of America's emissions of greenhouse gases. Republicans and their backers in industry would accept that more readily than a cap on emissions. But Democrats and their green supporters would see it as clear progress towards such a cap. And if Mr Bush is really worried about global warming, he could hardly veto such an anodyne measure.
Nuclear energy as the bridge

By Jim McNeil

The Intergovernmental Panel on Climate Change reported that human-produced greenhouse gas emissions are "highly likely" to be the cause of the recent rise in global temperatures and predicts significant additional increases in this century with dire consequences. The creeping danger of global warming presents perhaps the greatest challenge to collective political action in human history.

Nuclear power can play a major role in the effort to control carbon emissions, yet many environmental advocates continue to attack it. They would prefer we rely upon conservation, increased efficiency and renewable energy. These are important components of the long-term solution, but they are inadequate when one considers the scale of the effort needed. Nuclear energy is a powerful ally in the fight against global warming, and all strategies will be needed for the planet to have any realistic hope of getting through this century without the major climate impacts foretold in the IPCC report.

To start, we must recognize that we do not actually have an energy crisis. We have plenty of energy in the form of coal, readily available at reasonable cost. We still have a lot of oil, too; we've burned through about half of the estimated recoverable oil, and, even when that runs out, we can use coal to make gasoline substitutes for the foreseeable future.

The true crisis is that every ton of coal burned produces more than three tons of carbon dioxide, the principal greenhouse gas, and we humans are burning coal at a prodigious and rapidly increasing rate, which the IPCC reports as impacting the global climate with potentially disastrous consequences. Sequestering the carbon dioxide after burning is a hopeful possibility, but this technology is not yet economically viable.

Ignoring the climate costs, coal is the most cost-effective way to generate electricity, so any other energy source will require a subsidy or cost premium to be deployed. With zero-sum thinking, any subsidy given to one alternative is seen to come at the expense of another; so renewable energy advocates look at subsidies for nuclear energy as coming at their expense. When the risks of climate change are considered, one quickly sees that this animosity is shortsighted.

The safety issue is discussed here.

Detractors of nuclear energy have played to our fears by raising the specter of Chernobyl and mushroom clouds, but today's nuclear reactor is not your father's. The latest advanced passive designs are extraordinarily safe to operate, and nuclear waste disposal and proliferation mitigation are not the intractable problems that some have argued. Waste and proliferation risks can be minimized through advanced fuel cycle design and reprocessing, and safety storing the remaining waste is possible if we have the political will to overcome the "NIMBY" effect. There are still risks involved with nuclear energy, but at worst they are regional in scale, not global.

Finally, by partnering intermittent renewable-energy systems, like wind or solar, with on-demand nuclear power, one can foresee a cost-effective, reliable, and virtually carbon-free electrical power system. The IPCC's dire warnings provide a powerful incentive to act sooner rather than later, and nuclear power provides the means to do so.

In the long term, as research investments in efficiency, energy storage, sequestration, and renewable energy production make these alternatives viable in cost and scale, the nuclear component can be phased out. The common goal must be to pass to our grandchildren a healthy and sustainable planet as well as the opportunity for a decent quality of life. While nuclear energy need not be part of this ultimate vision, it could play an essential bridging role to get us there without irrevocably altering the planet's ecosystem along the way.

Jim McNeil is a Boulder resident, a nuclear physicist and the head of the Physics Department, Colorado School of Mines, Golden.
A simple remedy for global warming

ANNE APPLEBAUM

WASHINGTON

WORSE THAN WE THOUGHT.” The headline in the British Guardian newspaper the other week was almost gloating about the bad news. The tone of the article that followed was no different: In Paris, a U.N.-sponsored panel, consisting of hundreds of scientists from all over the world, had just declared that average global temperatures will probably rise 4 degrees Celsius over the next century. If so, catastrophic flooding, famine and water shortages may follow, along with the extinction of up to half of existing animal species. Malaria and other tropical diseases may spread. Among the coastal cities threatened by the higher ocean levels caused by melting ice caps, the paper noted — not without a degree of satisfaction — are London, New York, Tokyo and Hong Kong.

Since the Guardian was not the only European paper to feature this story — Germany’s Der Spiegel cautioned “A Tropical Germany by 2100?” — perhaps it’s not surprising that the U.N. report inspired politicians of various hues, across Europe and the world, to seek controls on carbon emissions and the fossil fuels that create them. The British environment minister called for an “international political commitment to take action.” The head of the German environment agency said, “We must all change our environmental behavior considerably.” So much was said about the need for “action” and “change,” in fact, that it’s a wonder the resultant hot air didn’t make temperatures rise higher.

But don’t get me wrong: I was convinced by the reigning consensus on global warming a long time ago, have accepted that human use of fossil fuels has caused it and am very glad that many European politicians take the scientists’ words seriously. The question now is whether these same Europeans will start taking the solutions seriously. If so, they must begin by abandoning the bankrupt Kyoto treaty on climate change and encouraging the United States to do so, too.

The much-vaunted treaty creates a complicated and unenforceable system of international targets for carbon emissions reduction, based on measurements taken in 1990. Critics of the American president have condemned him for failing to sign it, conveniently forgetting that the Senate rejected it 95 to 0 in 1997, a margin that reflects broad bipartisan opposition. At the same time, few of the Asian and European signatories are on track to meet their goals; those that will meet the targets, such as Britain, can do so because their economies rely less on industry than they once did. Canada and Japan aren’t even close to compliance; China and India, whose emissions rates are growing most rapidly, are exempt altogether as “developing” countries — which, given their economic strength, is absurd.

None of which is to say that reduction of carbon emissions is impossible. But limiting fossil fuels cannot be carried out with an unenforceable international regime, using complicated regulations that the United Nations does not have the staff or the mandate to supervise, with the help of a treaty that effectively penalizes those who bother to abide by it. I no longer believe that a complicated carbon trading regime — in which industries trade emissions “credits” — would work within the United States, either: So much is at stake for so many industries that the legislative process to create it would be easily distorted by their various lobbies.

Any lasting solutions will have to be extremely simple, and — because of the cost implicit in reducing the use and emissions of fossil fuels — will also have to benefit those countries that impose them in other ways. Fortunately, there is such a solution, one that is grippingly unoriginal, requires no special knowledge of economics and is easy for any country to implement. It’s called a carbon tax, and it should be applied across the board to every industry that uses fossil fuels, every home or building with a heating system, every motorist, and every public transportation system. Immediately, it would produce a wealth of innovations to save fuel, as well as new incentives to conserve. More to the point, it would produce a big chunk of money that could be used for other things. Anyone for balancing the budget? Fixing Social Security for future generations? As a foreign-policy side benefit, users of the tax would suddenly find themselves less dependent on Persian Gulf oil or Russian natural gas, too.

Most of all, though, the successful use of carbon taxes does not require “American leadership,” or a U.N. committee, or a complicated international effort of any kind. It can be done country by country: If the British environment minister or the German chancellor wants to go ahead with it tomorrow, nothing is preventing them. If a future American president wants to rally the nation around a patriotic and noble cause, then he or she has the perfect opportunity. If the Chinese see that such a tax has produced unexpected benefits in America and Europe, they’ll follow. And when that happens, we’ll know that the apocalyptic climate-change rhetoric has finally been taken seriously.

Anne Applebaum is a member of the editorial board of The Washington Post.

Note: A carbon tax drives too many people to use natural gas. And it could increase energy costs by an unnecessary amount.
They’ve said it before, but this time climate scientists are saying it with feeling: The world is warming; it’s not all natural, it’s us; and if nothing is done, it will get a whole lot worse.

**Scientists Tell Policymakers We’re All Warming the World**

THE LAST TIME THE INTERGOVERNMENTAL Panel on Climate Change (IPCC) assessed the state of the climate, in early 2001, it got a polite enough hearing. The world was warming, it said, and human activity was “likely” to be driving most of the warming. Back then, the committee specified a better-than-60% chance—not exactly a ringing endorsement. And how bad might things get? That depended on a 20-year-old guess about how sensitive the climate system might be to rising greenhouse gases. Given the uncertainties, the IPCC report’s reception was on the tepid side.

Six years of research later, the heightened confidence is obvious. The warming is “unequivocal.” Humans are “very likely” (higher than 90% likelihood) behind the warming. And the climate system is “very unlikely” to be so insensitive as to render future warming inconsequential.

On some hot topics, the IPCC comes down on the conservative side. It sees evidence of more intense hurricane activity in the North Atlantic, something many researchers contest, but paints a murky picture elsewhere, in line with doubters’ reservations (Science, 10 November 2006, p. 910).

*This review, pages 754–757, is by Richard A. Kerr.*

Science 9 Feb 2007
Does Global Warming Have a Big Effect On Hurricanes?

A meeting on 20 Oct 2006 discussed this issue for Congress. Here is the review of the meeting in Science (10 Nov 2006)

Roy Jenne
Nov 18, 20026

Conclusion:

   - The results support the views of the hurricane "climate skeptics."
   - Ocean basins with 85% of world tropical cyclones show modest declines in hurricane strength or no trend (unlike the Webster dataset).

2. The Atlantic hurricanes were reviewed from 1900 – on. The number of hurricanes goes up and down over these 100 years. The portion of the hurricanes classified as "major" shows "no long-term trend, but has oscillated up and down every few decades."
   - This is just what the "hurricane skeptics" have been saying.

3. The text states, "The best theory and modeling still indicate that there is only a minimal direct effect on storms."
   - This has been the argument of the "hurricane skeptics."

4. But the text adds, "as for indirect effects, researchers are just starting to sort them out." Read about these.
   - They forced a model to have the upper air winds and temperature of the real atmosphere for 26 past years. Then they could start to reproduce the ups and downs in Atlantic hurricanes.
   - This is helpful. It does not contradict the ideas of "hurricane skeptics."
     - Both skeptics and the others would be happy with this.

5. A climate model run has been made for about 80 future years. It suggests that the intensity of hurricanes may increase by about 5% during the next 80 to 100 year period.
UN downgrades man's impact on the climate

Richard Gray, Science Correspondent, Sunday Telegraph

Last Updated: 1:37am GMT 11/12/2006

Nov 12, 2006

Mankind has had less effect on global warming than previously supposed, a United Nations report on climate change will claim next year.

The UN Intergovernmental Panel on Climate Change says there can be little doubt that humans are responsible for warming the planet, but the organisation has reduced its overall estimate of this effect by 25 per cent.

In a final draft of its fourth assessment report, to be published in February, the panel reports that the level of carbon dioxide in the atmosphere has accelerated in the past five years. It also predicts that temperatures will rise by up to 4.5 C during the next 100 years, bringing more frequent heat waves and storms.

The panel, however, has lowered predictions of how much sea levels will rise in comparison with its last report in 2001.

Climate change sceptics are expected to seize on the revised figures as evidence that action to combat global warming is less urgent.

Scientists insist that the lower estimates for sea levels and the human impact on global warming are simply a refinement due to better data on how climate works rather than a reduction in the risk posed by global warming.

One leading UK climate scientist, who asked not to be named due to the sensitivity surrounding the report before it is published, said: "The bottom line is that the climate is still warming while our greenhouse gas emissions have accelerated, so we are storing up problems for ourselves in the future."

The IPCC report, seen by The Sunday Telegraph, has been handed to the Government for review before publication.

It warns that carbon dioxide emissions have risen during the past five years by three per cent, well above the 0.4 per cent a year average of the previous two decades. The authors also state that the climate is almost certain to warm by at least 1.5 C during the next 100 years.

Such a rise would be enough to take average summer temperatures in Britain to those seen during the 2003 heatwave, when August temperatures reached a record-breaking 38 C. Unseasonable warmth this year has left many Alpine resorts without snow by the time the ski season started.

Britain can expect more storms of similar ferocity to those that wreaked havoc across the country last week, even bringing a tornado to north-west London.

The IPCC has been forced to halve its predictions for sea-level rise by 2100, one of the key threats from climate change. It says improved data have reduced the upper estimate from 34 in to 17 in.

It also says that the overall human effect on global warming since the industrial revolution is less than had been thought, due to the unexpected levels of cooling caused by aerosol sprays, which reflect heat from the sun.

http://www.telegraph.co.uk/core/Content/displayPrintable.jhtml;jsessionid=KASTMWU... 12/12/2006
Large amounts of heat have been absorbed by the oceans, masking the warming effect.

Prof Rick Battarbee, the director of the Environmental Change Research Centre at University College London, warned these masking effects had helped to delay global warming but would lead to larger changes in the future.

He said: "The oceans have been acting like giant storage heaters by trapping heat and carbon dioxide. They might be bit of a time-bomb as they have been masking the real effects of the carbon dioxide we have been releasing into the atmosphere.

"People are very worried about what will happen in 2030 to 2050, as we think that at that point the oceans will no longer be able to absorb the carbon dioxide being emitted. It will be a tipping point and that is why it is now critical to act to counter any acceleration that will occur when this happens."

The report paints a bleak picture for future generations unless greenhouse gas emissions are reduced. It predicts that the climate will warm by 0.2°C a decade for the next two decades if emissions continue at current levels. Warm by 0.2°C a decade - not 20 yrs.

The report states that snow cover in mountainous regions will contract and permafrost in polar regions will decline.

However, Julian Morris, executive director of the International Policy Network, urged governments to be cautious. "There needs to be better data before billions of pounds are spent on policy measures that may have little impact," he said.

Information appearing on telegraph.co.uk is the copyright of Telegraph Media Group Limited and must not be reproduced in any medium without licence. For the full copyright statement see Copyright
Swiss Glaciers (Periods Melted Back)

<table>
<thead>
<tr>
<th>Warm Period</th>
<th>Time cal year BP (years before 1950)</th>
<th>Duration</th>
<th>Ordinary Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1450 – 1150</td>
<td>300 yrs</td>
<td>500 AD – 800 AD</td>
</tr>
<tr>
<td>2</td>
<td>2300 – 1800</td>
<td>500 yrs</td>
<td>350 BC – 150 AD</td>
</tr>
<tr>
<td>3</td>
<td>2700</td>
<td>100 yrs</td>
<td>Near 750 BC</td>
</tr>
<tr>
<td>4</td>
<td>5200 – 3400</td>
<td>1800 yrs</td>
<td>3250 BC – 1450 BC</td>
</tr>
<tr>
<td>5</td>
<td>5700 – 5500</td>
<td>200 yrs</td>
<td>3750 BC – 3550 BC</td>
</tr>
<tr>
<td>6</td>
<td>6150 – 6000</td>
<td>150 yrs</td>
<td>4200 BC – 4050 BC</td>
</tr>
<tr>
<td>7</td>
<td>7350 – 6500</td>
<td>850 yrs</td>
<td>5400 BC – 4550 BC</td>
</tr>
<tr>
<td>8</td>
<td>7700 – 7500</td>
<td>200 yrs</td>
<td>5750 BC – 5550 BC</td>
</tr>
<tr>
<td>9</td>
<td>9000 – 8050</td>
<td>950 yrs</td>
<td>7050 BC – 6100 BC</td>
</tr>
<tr>
<td>10</td>
<td>9900 – 9550</td>
<td>350 yrs</td>
<td>7950 BC – 7600 BC</td>
</tr>
</tbody>
</table>

NOTE: ~6000 years ago the European summers were about 2° or 3° warmer than now.

Roy Jenne
Nov 7, 2006
The theme this year is global warming.

They do not really outline the issue.

They concentrate on making the climate problem seem much, much worse than it is.

The excess fever on climate change is even worse than I thought.

Energy supply, terror, and climate are all issues.
- Plus poverty, clean water, etc.
- How do we balance priorities and costs?

It could help to outline the climate issue and show how some sensible things can be done first.
- While we analyze cost, efficiency, etc.
- If we cannot get to this stage, we will spend much excess money and accomplish little.

---

**THE WORLD**

**Fever in the Alps**

**Global elites and global warming**

**JAY NORDLINGER**

Every year, the Annual Meeting of the World Economic Forum has a theme, and this year it’s “The Shifting Power Equation.” But the real theme here in Davos is global warming—it’s on everyone’s lips, and everyone’s brain. There are 17—17!—separate sessions on global warming, or, as you’re supposed to call it, “climate change” (because “climate change” covers everything under the sun). You have “The Security Implications of Climate Change,” “The Economics of Climate Change,” “The Legal Landscape Around Climate Change,” etc., etc. And if you’re still feeling climate-changey after hours, you can attend the Climate Change Nightcap, whose hosts include Shimon Peres, the Israeli elder statesman, and Claudia Schiffer, the German supermodel.

Oh, yes, the great and the good attend the meeting, as always. We have heads of government, like Tony Blair, Angela Merkel, and Lula (just one name, please), and captains of industry, like Bill...
Global Warming and Hot Air

By Robert J. Samuelson
Wednesday, February 7, 2007; A17

You could be excused for thinking that we'll soon do something serious about global warming.

Don't be fooled. The dirty secret about global warming is this: We have no solution.

Considering this reality, you should treat the pious exhortations to "do something" with skepticism, disbelief or contempt. These pronouncements are (take your pick) naive, self-interested, misinformed, stupid or dishonest.

- Please read his article.
- Next two pages.

This can bring a touch of reality to the climate debate.

- But sad: fewer than 1 person in 10,000 are likely to see this.
Global Warming and Hot Air

By Robert J. Samuelson

Wednesday, February 7, 2007; A17

You could be excused for thinking that we'll soon do something serious about global warming. Last Friday, the Intergovernmental Panel on Climate Change (IPCC) -- an international group of scientists -- concluded that, to a 90 percent probability, human activity is warming the Earth. Earlier, Democratic congressional leaders made global warming legislation a top priority; and 10 big U.S. companies (including General Electric and DuPont) endorsed federal regulation. Strong action seems at hand.

Don't be fooled. The dirty secret about global warming is this: We have no solution. About 80 percent of the world's energy comes from fossil fuels (coal, oil, natural gas), the main sources of man-made greenhouse gases. Energy use sustains economic growth, which -- in all modern societies -- buttresses political and social stability. Until we can replace fossil fuels or find practical ways to capture their emissions, governments will not sanction the deep energy cuts that would truly affect global warming.

Considering this reality, you should treat the pious exhortations to "do something" with skepticism, disbelief or contempt. These pronouncements are (take your pick) naive, self-interested, misinformed, stupid or dishonest. Politicians mainly want to be seen as reducing global warming. Companies want to polish their images and exploit markets created by new environmental regulations. As for editorialists and pundits, there's no explanation except superficiality or herd behavior.

Anyone who honestly examines global energy trends must reach these harsh conclusions. In 2004, world emissions of carbon dioxide (CO2, the main greenhouse gas) totaled 26 billion metric tons. Under plausible economic and population assumptions, CO2 emissions will grow to 40 billion tons by 2030, projects the International Energy Agency. About three-quarters of the increase is forecast to come from developing countries, two-fifths from China alone. The IEA expects China to pass the United States as the largest source of carbon dioxide by 2009.

Poor countries won't sacrifice economic growth -- lowering poverty, fostering political stability -- to placate the rich world's global warming fears. Why should they? On a per-person basis, their carbon dioxide emissions are only about one-fifth the level of rich countries. In Africa, less than 40 percent of the population even has electricity.

Nor will existing technologies, aggressively deployed, rescue us. The IEA studied an "alternative scenario" that simulated the effect of 1,400 policies to reduce fossil fuel use. Fuel economy for new U.S. vehicles was assumed to increase 30 percent by 2030; the global share of energy from "renewables" (solar, wind, hydropower, biomass) would quadruple, to 8 percent. The result: by 2030, annual carbon dioxide emissions would rise 31 percent instead of 55 percent. The concentration levels of emissions in the atmosphere (which presumably cause warming) would rise.

Since 1850, global temperatures have increased almost 1 degree Celsius. Sea level has risen about seven inches, though the connection is unclear. So far, global warming has been a change, not a calamity. The IPCC projects wide ranges for the next century: temperature increases from 1.1 degrees Celsius to 6.4 degrees; sea level rises from seven inches to almost two feet. People might easily adapt; or there might be costly disruptions (say, frequent flooding of coastal cities resulting from melting polar ice caps).

I do not say we should do nothing, but we should not delude ourselves. In the United States, the favored remedy is "cap and trade." It's environmental grandstanding -- politicians pretending they're doing something.

Companies would receive or buy quotas ("caps") to emit carbon dioxide. To exceed the limits, they'd acquire some other company's unused quotas ("trade"). How simple. Just order companies to cut emissions. Businesses absorb all the costs.

But in practice, no plausible "cap and trade" program would significantly curb global warming. To do that, quotas would have to be set so low as to shut down the economy. Or the cost of scarce quotas would skyrocket and be passed along to consumers through much higher energy prices. Neither outcome seems likely. Quotas would be lax. The program would be a regulatory burden with little benefit. It would also be a bonanza for lobbyists, lawyers and consultants, as industries and localities besieged Washington for exceptions and special treatment. Hello, influence-peddling and sleaze.

What we really need is a more urgent program of research and development, focusing on nuclear power, electric batteries, alternative fuels and the capture of carbon dioxide. Naturally, there's no guarantee that socially acceptable and cost-competitive technologies will result. But without them, global warming is more or less on automatic pilot. Only new technologies would enable countries -- rich and poor -- to reconcile the immediate imperative of economic growth with the potential hazards of climate change.

Meanwhile, we could temper our energy appetite. I've argued before for a high oil tax to prod Americans to buy more fuel-efficient vehicles. The main aim would be to limit insecure oil imports, but it would also check CO2 emissions. Similarly, we might be better off shifting some of the tax burden from wages and profits to a broader tax on energy or carbon. That would favor more fuel-efficient light
bulbs, appliances and industrial processes.

It's a debate we ought to have -- but probably won't. Any realistic response would be costly, uncertain and no doubt unpopular. That's one truth too inconvenient for almost anyone to admit.
February 2007

******AUTO**5-DIGIT 80303 T12 P1
Roy L Jenne
925 Teller Cir
Boulder, CO 80303-2743

Dear Roy:

The coldest winter in over 20 years has greeted us at the outset of 2007. Unfortunately families that struggle to keep their heat on have been greeted with the news that utility payment assistance through governmental programs has been deeply cut according to an article published in the Rocky Mountain News on January 13, 2007. The article stated that:

- The Federal LEAP (Low-income Energy Assistance Program) funds were cut by 28% this year;
- Colorado’s energy assistance fund is down by 40% this year;
- State help has fallen 26% from last year; and
- Xcel energy is raising their rates this month by 10%!

The recent sub-zero weather coupled with the recently announced energy assistance cutbacks create perilous circumstances for lower income families – most of whom are working. EFAA is already seeing the impact. Last week a two parent family with three children moved into EFAA’s Boulder family shelter. The father works in construction and with the two big snow storms and the ongoing weekly snow fall, his hours were cut back suddenly. They ended up falling behind on their rent and were evicted. EFAA was there for them.

What are the impacts created by these cut backs and storms? At EFAA, it means that the need for assistance with basic needs, such as utility assistance and emergency shelter will continue to increase and we need your help.

Last winter EFAA helped over 700 families with utility bills and we expect the need to rise this year. When we help a family we provide an average of $323 in assistance and work with Xcel or the utility provider to make sure the service stays on.

Last year, we provided emergency shelter for 92 unique households, which we expect to exceed 100 this year. When in shelter, EFAA provides the family with everything they need – think about what you use daily in your life. The average cost per 8 week stay is $4,785 per family.

As you know, EFAA helps those in our community whose immediate needs for food, shelter and other basic necessities cannot adequately be met by other means, and supports their efforts toward financial stability or self-sufficiency. For over 80 years, EFAA has been our community’s safety net for low income families, seniors and people with disabilities. We invite you to join us in our efforts to keep families warm and in their homes this winter.

Thank you for your support.

Sincerely,

Terry Benjamin
Executive Director

---

3. Yes, we need technology development for various needs including climate, but the purse should not be wide open.

4. There are now unreasonable levels of subsidies for solar that increase energy costs. These are not likely to be balanced.

---

P.S. You can make a gift today at www.efaa.org and learn more about the services provided by Emergency Family Assistance Association and other ways you can help.

---

PS I have worked in the area of climate science and climate data for a very long time. – R. Janne
DEVELOPMENT SPENDING

Economists Rate Greenhouse Gas Curbs a Poor Investment

COPENHAGEN—Feel like throwing your tax money away? Invest in measures to rein in global warming. That's the controversial conclusion, at least, of a workshop here last week that brought together a varied group of economists, including three Nobel laureates, to analyze spending on global problems.

University of Chicago, Douglas North of Washington University in St. Louis, Missouri, and Vernon Smith of George Mason University in

Science exiled

How the complexities of science suffer in the arena of public policy.

| Politicizing Science: The Alchemy of Policymaking |
| edited by Michael Gough |
| Hoover Institution: 2003. 313 pp. $15 |
| Paul M. Grant |

This is not suitable bedtime reading — not if you want to fall asleep, that is. Those who think that public policy should be based on sound science will be left in despair that such a goal can ever be achieved in the midst of the competing political interests endemic to modern industrialized democratic societies.

The Economist Says:

YOU might think that a policy issue which puts at stake hundreds of billions of dollars' worth of global output would arouse at least the casual interest of the world's economics and finance ministries. You would be wrong.

Demonizing utilities for fun and political profit.

Wall Street Journal, editorial page
Aug 26, 2003

And in Doc RJO379, page 79

Roy Jana
The IPCC Science Report was released on 2 Feb 2007 (Friday)

See the Nature editorial (next page)

They claim the IPCC report has removed the last ground from the sceptics feet, leaving them looking marooned and ridiculous.

They also say: "So then, the enemy is vanquished and the victors can rejoice? Hardly!"
Light at the end of the tunnel

An emphatic and clear status report on global warming opens the way for action — presenting new risks.

The release of the 2007 report of the Intergovernmental Panel on Climate Change (IPCC) last Friday marks an important milestone (see pages 578–585 and 595–598). Following the scientific consensus that has been apparent for some time, a solid political consensus that acknowledges the problem finally seems to be within reach. But achieving this outcome brings its own risks.

Until quite recently (perhaps even until last week), the general global narrative of the great climate-change debate has been deceptively straightforward. The climate-science community, together with the entire environmental movement and a broad alliance of opinion leaders ranging from Greenpeace and Ralph Nader to Senator John McCain and many US evangelical Christians, has been advocating meaningful action to curtail greenhouse-gas emissions. This requirement has been disputed by a collection of money-men and some isolated scientists, in alliance with the current president of the United States and a handful of like-minded ideologues such as Australia’s prime minister John Howard.

The IPCC report, released in Paris, has served a useful purpose in removing the last ground from under the climate-change sceptics’ feet, leaving them looking marooned and ridiculous. However, this predicament was already clear enough. Opinion in business circles, in particular, has moved on. A report released on 19 January by Citigroup, Climatic Consequences — the sort of eloquently written, big-picture stuff that the well-informed chief executive reads on a Sunday afternoon — states even more firmly than the IPCC that anthropogenic climate change is a fact that world governments are moving to confront. It leaves no question at all that large businesses need to get to grips with this situation — something that many of them are already doing.

**Tough choices**

So then, the enemy is vanquished and the victors can rejoice! Hardly. In fact, the pending retreat from the stage of the president of the United States and his allies leaves those who do acknowledge the severity of the problem facing an even greater challenge than before. The world now broadly accepts that we have a problem, if not a crisis. So what is to be done?

The policy choices that lie ahead are more daunting than political leaders (or the media) have thus far been ready to acknowledge. In a sense, twenty years of frustrating trench-warfare with the sceptics has prevented a rational discussion about what needs to be done from even taking place.

At present, the political response to the situation is, in large part, incongruous. We need to restrict emissions in the developed world, and some steps are being undertaken to do just that, chiefly through the much-maligned Kyoto Protocol. We need to develop clean energy sources, and these are being pushed ahead quite rapidly, although each one — nuclear power, biofuels, wind power and hydropower, for example — creates its own environmental battlefield. Steps are also being taken to build systems for large-scale carbon capture and storage, and to improve the efficiency with which energy is used (see pages 586–591).

The trouble is, none of this is even close to being sufficient to meet the challenge. Hybrid cars are being purchased (and often allow their lucky drivers special access to empty highway lanes). David Cameron, the leader of Britain’s Conservative Party, has sought planning permission to erect a wind turbine in his back garden. And Pink Floyd and Pearl Jam have declared that their most recent world tours would be ‘carbon neutral’. But we are all vaguely aware that all of this is nowhere near enough.

**Economic sacrifice**

Even the most progressive governments continue to put the issue of climate change on the back seat behind their fundamental commitment to strong economic growth, which is needed to ensure political survival (in developed countries) and to enable human dignity (in developing countries). So in a typical European nation, for example, governments are calling for strenuous emissions cuts while also planning airport expansions that anticipate a further tripling over the next twenty years of air travel — the fastest-growing source of emissions, and one not capped by the Kyoto Protocol.

The fundamental difficulty here is that it has been politically impossible to accept that fighting global warming may involve some economic sacrifice, at least while the sceptics were in the picture. As these are vanquished, it becomes possible — and indeed necessary — to start the discussion.

Similarly, it has been hard to talk about actions that need to be taken to mitigate the damage already certain to be caused by climate change and associated rises in the sea level, as such steps were regarded as a capitulation to those who just want to keep emitting greenhouse gases. This is no longer the case (see page 597). Mitigation, which can take many forms ranging from the Thames Barrier in London to the introduction of drought-resistant crop strains in the Sahel and the establishment of a proposed climate-change adaptation fund, needs to be squarely on the agenda, alongside emissions cuts.

A similar relaxation arises with regard to revised negotiations for the second stage of the Kyoto Protocol. There is a case for opening the second phase beyond a simple extension of the cap-and-trade proposals that made up the core of the first. US President George W. Bush will remain a participant in such negotiations until the end of 2008. But even before then, talks should include all the options open to a planet that is now ready, at last, to acknowledge the fix it is in.
What we don’t know about climate change

The 4th Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) has a finely calibrated lexicon of certainty. “Virtually certain”, it blares when it assigns a 99% probability to hot days getting hotter and more frequent. “Very likely”, or more than 90% probable, are heavier rains. And so on down the list — including the wishy-washy “more likely than not” when assigning a greater than 50% probability, such as the chance that human activities are affecting the intensity of hurricanes.

Such care is crucial in a field that is still, in some areas, shot through with uncertainty. The IPCC has gone far in tightening up some key scientific unknowns about climate change (see page 578), but many still remain. Some conclusions — such as the effect on particular regions of the world, or exactly how much sea level will rise — remain more uncertain than others. This means that there’s plenty of work left for the climate scientists on whom the IPCC process depends.

Perhaps most critically, researchers know relatively little about feedback effects that might enhance — or weaken — the pace and effects of climate change. The complex flow of carbon between soils, plants, the oceans and the atmosphere is still being pinned down by large-scale climate experiments. Some experts predict that, in a warmer world, ecosystems that are currently sinks for carbon, such as the Arctic tundra, may turn into carbon sources. But no one can yet accurately predict how this might pan out.

“The IPCC report is not the leading — or bleeding — edge of the science.”

Another major source of uncertainty — and of debate at the Paris meeting where the IPCC report was finalized — is the rise in sea level. In 2001, the IPCC predicted a rise of between 9 and 88 millimetres by 2100, as a result of melting ice caps and the thermal expansion of the ocean. This time around, the group has narrowed that range to between 19 and 58 centimetres. But some scientists say that this is an underestimate.

Extreme weather is another example of the remaining uncertainties. Climate researchers believe that storms and heavy rainfall will become more frequent as the planet warms. But pinning down where and when that might happen is not so simple.

In the tropics, rising sea-surface temperatures can be linked in a relatively straightforward manner to storm formation, and the case for more intense storms seems more or less settled. But in the mid-latitudes, where atmospheric processes are more complex, some climate models predict more storms whereas others do not.

“Other big unknowns are the effects of the take-up of carbon dioxide by the oceans, which removes the gas from the atmosphere and locks it away in the calcium carbonate of the shells and skeletons of marine organisms.”

Regions of the world

For the first time, the IPCC report predicts how changing climate might affect particular regions of the world. But these forecasts are only in their infancy, modellers warn. For some areas, models predict specific and well-understood effects, such as hotter summers in Spain and smaller snowpacks (the accumulation of snow each season) in the Rocky Mountains in Cold climate, spring flooding in floodplains of the Mississippi, and the retreat of coastal glaciers such as the Canadian coast and the Alps.

“The IPCC report is a consensus report, and one that develops over nearly three years,” he says. “This means that it is not the leading — or bleeding — edge of the science.”

Quirin Schiermeier
Lifting the taboo on adaptation

Renewed attention to policies for adapting to climate change cannot come too soon for Roger Pielke, Jr, Gwyn Prins, Steve Rayner and Daniel Sarewitz.

During the early policy discussions on climate change in the 1980s, adaptation was understood to be an important option for society. Yet for much of the past two decades the mere idea of adapting to climate change became problematic for those advocating emissions reductions, and was treated "with the same distaste that the religious right reserves for sex education in schools. That is, both constitute ethical compromises that in any case will only encourage dangerous experimentation with the undesired behaviour". Indeed, former US vice-president Al Gore forcefully declared his opposition to adaptation in 1992, explaining that it represented a "kind of laziness, an arrogant faith in our ability to react in time to save our skins".

First, there is a timescale mismatch. Whatever actions ultimately lead to the decarbonization of the global energy system, it will be many decades before they have a discernible effect on the climate. Historical emissions dictate that climate change is unavoidable.

Second, vulnerability to climate-related impacts on society are increasing for reasons that have nothing to do with greenhouse-gas emissions, such as rapid population growth along coasts and in areas with limited water supplies.

At the margins
But most projected impacts of anthropogenic climate change are marginal increases on already huge losses. Locating adaptation in this margin creates bizarre distortions in public policy. For example, in the Philippines, policymakers have begun to acknowledge the flood threats posed by the gradual sea-level rise of 1 to 3 millimetres per year, projected to occur with climate change. At the same time, they remain oblivious to, or ignore, the main reason for increasing flood risk: excessive groundwater extraction, which is lowering the land surface by several centimetres to more than a decimetre per year.

"New ways of thinking about, talking about and acting on climate change are necessary if a changing society is to adapt to a changing climate."

"Policy-makers need to understand the limitations of mitigation for reducing vulnerabilities."

Similarly, non-climate factors are by far the most important drivers of increased risk to tropical disease. For instance, one study found that without taking into account climate change, the global population at risk from malaria would increase by 100% by 2080, whereas the effect of climate change would increase the risk of malaria by at most 7% (ref. 8). Yet tropical disease risk is repeatedly invoked by climate-mitigation advocates as a key reason to curb emissions. In a world where political attention is limited, such distortions reinforce the current neglect of adaptation.

A poor fit
But defining adaptation in terms of sustainable development does not fit comfortably into the current political framework of the climate-change problem. By introducing sustainable development, one is forced to consider the missed opportunities of an international regime that for the past 15 years or more has focused enormous intellectual, political, diplomatic and financial resources on mitigation while downplaying adaptation. Until adaptation is institutionalized at a level of intensity and investment at least equal to those of the UNFCCC and Kyoto Protocol, climate impacts will continue to mount unabated, regardless of even the most effective cuts in greenhouse-gas emissions.

Roger Pielke, Jr, is at the University of Colorado, Gwyn Prins is at the London School of Economics and Columbia University. Steve Rayner is at Oxford University's James Martin Institute. Daniel Sarewitz is at Arizona State University. e-mail: pielke@colorado.edu

Malaria risks are increasing for reasons that have nothing to do with climate change.
Climate sceptics switch focus to economics

Reports by the Intergovernmental Panel on Climate Change (IPCC) are held out as a model of consensus science, with thousands of international scientists coming together to present the most detailed look ever at a single scientific topic. Yet a consensus among most of the world’s researchers does not mean that everybody agrees.

"I am one of the 2,000 with their names on [the assessment], but don’t sign me up for that catastrophic view of climate change," says John Christy, a climatologist at the University of Alabama in Huntsville and a contributing author to the report.

And outside the IPCC process there remains a dwindling band of climate sceptics, those who argue that global warming is not linked to human activity and that it would be rash to take drastic action to cut carbon emissions.

“That makes it clear that the issue for them is not the science. Whatever the science is, they will try to find ways to question it.”

The previous IPCC report, for instance, gained infamy for featuring in its summary for policymakers the ‘hockey stick’ palaeo-temperature graph. This shows a sharp rise in temperatures at the end of the last millennium that forms the blade of the hockey stick. Sceptics, notably economist Ross McKitrick of the University of Guelph in Canada and minerals consultant Steven McIntyre, have spent years working to discredit the statistical analysis and temperature proxies that were used to create the graph.

But a host of other studies, including a 2006 review by the US National Academy of Sciences, has reaffirmed that the past decade has seen an unprecedented rise in global temperatures. "This is just one of many lines of evidence," Michael Mann of Pennsylvania State University in University Park told an audience of congressional aides in Washington DC last week. Mann is the originator of one version of the graph.

\[
\text{Economics is very important for climate and energy.}
\]

With less to argue about on the scientific front, climate sceptics have been turning their attention to the economics of adapting to a changing climate.

Christy believes that fostering innovation is the way to decrease reliance on fossil fuels. "We're going to look back in a century and say 'wasn't it quaint, we burned carbon,'" he says. "I'm very optimistic; I see the wealth of the Earth continuing to rise. But suppressing energy is not the way. Keep energy inexpensive and affordable and allow people to do research." As for the Kyoto Protocol on climate change, the international agreement to reduce carbon emissions, Christy calls it "sinister."

Economic arguments also play a strong role in the views of sceptic Patrick Michaels, an environmental scientist at the University of Virginia who argues that taking action on climate change can have dire economic consequences. He sees the current US move towards embracing biofuel as causing corn prices to surge, triggering inflation and leaving many poor people, particularly in Mexico, struggling to buy food. "Small changes in policy can lead to a recession," he says.

It remains to be seen whether these arguments will gain much traction. Alan Thorpe of Britain's Natural Environment Research Council, which hosted an online debate to canvass climate sceptics on their views, says that such views range from lazy to devious.

"I think there is a degree to which there is a mischievous use of scepticism," he says. "Sceptics want to accuse scientific society of wanting a particular policy outcome, but actual policy is up to governments."

\[
\text{I have had 2 huge aids frustrations: (1) The IPCC science is being hyped too much rather than giving the public balanced info and (2) it is just not reasonable to keep hyping for huge reductions in CO2 when many promised solutions do not have good capability & cost. - Roy Home}
\]
Data keep flooding in

The 2007 report of the Intergovernmental Panel on Climate Change (IPCC) represents the work of thousands of researchers, compiled and summarized by hundreds of climatologists. Nominally, the cut-off for inclusion in the assessment was the end of 2005, allowing a year for the panel to make sense of the vast tracts of data. But notable research arising after that date will not have escaped attention. Here is a round-up of some of the most prominent studies.

Alarming

Greenland ice
Greenland is losing ice at an ever-increasing rate, according to data from the GRACE gravity-measuring satellite (J. L. Chen, C. R. Wilson & B. D. Tapley Science 313, 1958-1960; 2006).

Antarctic air
Weather balloons reveal that the troposphere above Antarctica has warmed by 0.5-0.7 °C per decade over the past 30 years, although it is not clear why (J. Turner, T. A. Lachlan-Cope, S. Colwell, G. J. Marshall & W. M. Connolley Science 311, 1914-1917; 2006).

Established forests
Old forests keep soaking up atmospheric carbon long after they reach maturity, according to measurements from China. Soil carbon in a forest reserve in Guangdong increased by 68% in 25 years (G. Zhou et al. Science 314, 1417; 2006).

Atlantic currents
The Gulf Stream, which brings heat from the tropics to the North Atlantic, weakened by 10% between 1200 and 1850, during the cold spell known as the Little Ice Age. The authors suggest that this demonstrates the link between this ocean current and temperatures in northern Europe (D. C. Lund, J. Lynch-Stieglitz & W. B. Curry Nature 444, 601-604; 2006).

Atlantic hurricanes
Rising sea-surface temperatures correlate strongly with the observed increase in the number of category 4 and 5 Atlantic hurricanes between 1970 and 2004. Other factors that affect hurricane formation, such as wind shear, do not seem to have increased in line with the upward trend (C. D. Hoyos, P. A. Aguado, P. J. Webster & J. A. Curry Science 312, 94-97; 2006).

River runoff
More carbon dioxide in the atmosphere leads to plants losing less water by transpiration, a model suggests. This could affect the amount of fresh water available for human use. (N. Gedney et al. Nature 439, 835-838; 2006).

Good one
Polar temperatures
Bubbles dating back 150,000 years in an Antarctic ice core show that warming events have tended to seesaw back and forth between the poles (EPICA Community Members Nature 444, 195-198; 2006).

Ocean temperatures
The upper layers of the oceans cooled, on average, between 2003 and 2005. Factoring in this downturn, the rate of warming in these layers between 1993 and 2005 was equivalent to 0.33 watts per square metre over the whole of the planet's surface (J. M. Lyman, J. K. Willis & G. C. Johnson Geophys. Res. Lett. 33, L18604; 2006).

Sea levels
If the rate of sea-level rise is proportional to the global rise in temperature since pre-industrial times, sea levels could rise by up to 1.4 metres by 2100 (S. Rahmstorf Science 315, 366-370; 2007).

Michael Hopkins

Greenland ice is melting faster than before.
Experimenting with efficiency

In 1971, no one really worried about energy efficiency — certainly not at Fermilab, the US Department of Energy's (DoE) particle- physics laboratory in Batavia, Illinois. A new superconducting ring for the lab's accelerator, designed to push particles closer than ever to the speed of light, was enthusiastically talked up as the 'energy doubler'. A few years on, though, as the lab prepared its funding bid against the backdrop of the oil crisis, the system started being referred to as the 'energy saver', shifting the emphasis from increased performance to reduced power requirements.

When you spend US$1 million a month on electricity, as Fermilab does, such care in presentation is important. Under most circumstances, though, scientists give scant thought to totalling up the wasted power and unnecessary carbon emissions that their work generates. Geoffrey Bell, who works on reducing the energy consumption of Lawrence Berkeley National Laboratory in California, is one of the exceptions. He's eager to point out that a traditional fume cupboard, for example, uses as much energy in a year as three US households. "If you have a laboratory with 50 of those, you've made a town in one building!"

They are also rarer and more diverse in design, making neat, generalized solutions to profligacy hard to find. Add that to concerns about safety and a lack of transparency in costs (few scientists know or care what their lab's electricity bill is), and you get a 'that's just the way they are' mentality. That's the mindset that the Labs21 programme, an initiative started by the DoE and the US Environmental Protection Agency (EPA), exists to challenge.

According to the EPA's Dan Amon, who oversees Labs21, the big beast for energy experts to tame is ventilation: some 60–70% of the energy a lab uses goes on moving, heating and cooling the air, with the rest split about two to one between appliances and lighting.

"The more modern the laboratory, the worse its energy consumption." — Peter James

Although he doesn't put it all down to Labs21, Amon guesses that about a quarter of the labs in the United States now use energy-efficient design principles.

"Only 25% use good design principles"

"This is terrible! We can do better!"

A key to progress here is replacing fume cupboards that replace air constantly with technology that has a variable air volume.

Zoë Corbyn is a freelance science writer based in London. This week, Geoffrey Bell will be answering questions about this subject on the Nature newsblog (http://tinyurl.com/3a3d4f), where you can tell us what your lab is — or isn't — doing about energy efficiency.
Newspaper scare headlines can be counter-productive

SIR — Your coverage of the report from the Intergovernmental Panel on Climate Change (IPCC) working group included some exemplary Editorial and News headlines: "Light at the end of the tunnel", "What we don’t know about climate change" and "From words to action" (Nature 445, 567 & 578–583; 2007). These convey the message about knowledge, ignorance and action that would be expected from a leading journal writing for a scientific readership. Communicating science to wider, public audiences, however — in this case on matters of important public policy — is an art that requires careful message management and tone setting. It seems that confident and salient science, as presented by the IPCC, may be received by the public in non-productive ways, depending on the intervening media.

With this in mind, I examined the coverage of the IPCC report in the ten main national UK newspapers for Saturday 3 February, the day after the report was released. Only one newspaper failed to run at least one story on the report (one newspaper ran seven stories), but what was most striking was the tone.

The four UK 'quality' newspapers all ran front-page headlines conveying a message of rising anxiety: "Final warning", "Worse than we thought", "New fears on climate heat on leaders" and "Only man can stop climate disaster". And all nine newspapers introduced one or more of the adjectives "catastrophic", "shocking", "terrifying" or "devastating" in their various qualifications of climate change. Yet none of these words exist in the report, nor were they used in the scientists' presentations in Paris. Added to the front-page vocabulary of "final", "fears", "worse" and "disaster", they offer an insight into the likely response of the 20 million Britons who read these newspapers.

In contrast, an online search of some leading newspapers in the United States suggests a different media discourse. Thus, on the same day, one finds these headlines: "UN climate panel says warming is man-made", "New tack on global warming", "Warming report builds support for action" and "The basics: ever firmer statements on global warming". This suggests a more neutral representation in the United States of the IPCC's key message, and a tone that facilitates a less loaded or frenzied debate about options for action.

Campaigners, media and some scientists seem to be appealing to fear in order to generate a sense of urgency. If they want to engage the public in responding to climate change, this is unreliable at best and counter-productive at worst. As Susanne Moser and Lisa Dilling point out in Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change (Cambridge Univ. Press, 2007), such appeals often lead to denial, paralysis, apathy or even perverse reactive behaviour.

The journey from producing confident assessments of scientific knowledge to a destination of induced social change is a tortuous one, fraught with dangers and many blind alleys. The challenging policy choices that lie ahead will not be well served by the type of loaded reporting of science seen in the UK media described above.

Mike Hulme
Tyndall Centre, School of Environmental Sciences, University of East Anglia, Norwich NR4 7TJ, UK

22 Feb 2007
Nature
Page 818
This is a helpful letter
Global warming is real and will continue, and there's strong evidence that people are to blame, an international panel of scientists has concluded. Other scientists suggest ways that people might reduce future atmosphere-warming greenhouse-gas emissions and argue that societies will have to adapt to the climate change that's yet to occur.

"The evidence for warming having happened on the planet is unequivocal," says Susan Solomon, an atmospheric scientist at the National Oceanic and Atmospheric Administration in Boulder, Colo. "We can see that in rising air temperatures, we can see it in changes in snow cover in the Northern Hemisphere, we can see it in global sea rise," she says. Solomon and her colleagues on the Intergovernmental Panel on Climate Change (IPCC) released their latest assessment of recent warming trends at a press conference in Paris on Feb. 2.

The average temperatures at Earth's surface for 11 of the past 12 years rank among the dozen highest values recorded since the mid-1800s. Over the past 100 years, global average temperature has risen about 0.74°C, the IPCC researchers report. With 90 percent certainty, scientists link that increase to the rising concentrations of carbon dioxide and other heat-trapping greenhouse gases that human activities have released into Earth's atmosphere.

Carbon dioxide concentrations measured 379 parts per million (ppm) in 2005, far in excess of the fractions inferred from ice core data representing periods going back 650,000 years. The concentration of atmospheric carbon dioxide is now growing at around 1.9 ppm per year, the largest rate of increase ever measured. Accordingly, scientists suggest in the IPCC report that over the next 20 years, the average global temperature will rise by an additional 0.4°C. Today, coal and petroleum combustion each account for about 40 percent of global carbon dioxide emissions, says Daniel P. Schrag, a geochemist at Harvard University. The largest use of coal, burning it to generate electricity, produces about 8 billion tons of carbon dioxide each year—"more than any responsible climate change policy can accommodate," he says in the Feb. 9 Science.

Strategies to decrease carbon dioxide emissions include reducing energy use, capturing carbon dioxide at its sources and sequestering it, or expanding the application of energy sources that don't produce the gas. "It's clear that none of these is a silver bullet," says Schrag.

However, one promising technique is to lock away the gas by injecting it into seafloor sediments or by pumping it into saline aquifers or old oil and gas fields. In ongoing research, scientists at a handful of test sites sequester only about 1 million tons of carbon dioxide each year, Schrag reports. Even the most optimistic projections of emissions limits show global greenhouse-gas concentrations rising for the foreseeable future, says Roger Pielke Jr., a policy analyst at the University of Colorado at Boulder. Future climate change is unavoidable, he and his colleagues report in the Feb. 8 Nature. Therefore, they add, adaptation to the warming yet to come will be as essential to climate policy as greenhouse-gas mitigation.

The IPCC is scheduled to address the mitigation of climate change in an April report. In May, the group will issue an assessment of the societal impact of current and future warming and is to suggest how people might best adjust to the change. —S. PERKINS
COMMENTARY

Hot house science

The Intergovernmental Panel on Climate Change report released last week was billed as 100 percent proof positive that global warming is real, modern man is to blame and anyone who doubts that is a bad human being.

Actually, the IPCC report concluded that while global warming is “unequivocal,” there is at least a nine out of 10 chance that global warming is anthropogenic (caused by man). While I have been a global warming agnostic, that degree of certitude, based on peer-reviewed research, gives me pause.

“There’s a huge scientist community behind this report,” Martin Manning, head of the IPCC Working Group, told me over the phone Monday.

Readers should be aware that the IPCC Summary for Policymakers was not entirely the work of disinterested scientists completely divorced from politics. Manning explained that the final draft was based on peer-reviewed research, then reviewed “line by line by government delegates.”

Please don’t say that every credible scientist agrees with the report, I counter. To which Manning replied, “I don’t think there are really many people who are research scientists who disagree with the fundamental principles of what we’re saying.”

And: “Society always has contrarians. Should that frame public policy?” Of course, public policy will heed the majority of scientists. That said, it would be much easier for me to listen to that majority if I did not see how ruthlessly it imposes conformity by marginalizing any scientist who has a different view on climate change. Conformity, not facts, becomes the argument.

The fact they are heavy-handed, of course, doesn’t mean that they are wrong. It’s no problem if you overhype global warming. The IPCC summary issued a prediction for how much sea level would rise — by 7 to 23 inches by 2100 — a big drop from the 20 feet that former Vice President Al Gore warned about in “An Inconvenient Truth.” Where’s the scorn?

And it’s not as if scientists are infallible. In 2004, scientist Hwang Woo Suk published a paper in the journal Science in which he claimed that he had cloned a human embryo and extracted stem cells from it. Hwang was a fraud, but big biotech and top scientists believed him — because they wanted to believe him.

When it comes to global warming, men of science really want to believe. As in a religion, it is more important that individuals believe that global warming is human-induced than that they curb their greenhouse-gas emissions.

The environmental community has burned the 10 years since the Kyoto global warming pact was negotiated by pressuring nations — most notably the United States — to sign the covenant. Meanwhile, greenhouse gas emissions have risen every year.

Note that the IPCC report concentrated on why the world should believe global warming is anthropogenic, while it puts off setting goals for emissions reductions until later this year.

Of late, green pols such as Gore and Gov. Arnold Schwarzenegger have claimed that fighting global warming will be good for the economy. Magazine articles tell Americans about the little things they can do to fight climate change — buy eco-friendly light bulbs and only pack paperbacks on the plane.

The public is in for a shock. What would a good target be? I asked Manning. His answer: “If one wants to really stabilize, then we actually have to decrease in the end the carbon-dioxide emissions in the atmosphere by more than 50 percent, maybe to 10 percent” although “that doesn’t have to happen overnight.”

It’s one thing to argue that, if there is even a chance global warming is manmade, Americans should cut back when you think you will have to make minor lifestyle changes. It’s another thing to make that argument when your job, your industry, your car, your home — electricity itself — may be at stake. Then you want a more honest debate.

* She makes good points.
* But she is not a part of the climate bandwagon.

Ray James
Emissions targets ‘unrealistic’ says US climate change body

Colin Macilwain, Washington

US climate-change activists are up in arms again. But for once it is not against the fossil-fuel lobby. This time the focus of their ire is one of their strongest supporters — the Pew Center on Global Climate Change.

One of the main organizations working for cuts in US greenhouse-gas emissions, the Pew Center has issued a statement saying that the emissions targets set by the 1997 Kyoto Protocol are unrealistic and will eventually have to be renegotiated. Eileen Clausen, the centre’s president and former chief negotiator on climate change issues at the US state department, says that “few national governments” will reach their targets for 2008–12.

“There is nothing wrong with ambitious targets, but they have to be grounded in reality,” Clausen said in remarks delivered privately in London last month, and repeated publicly in Washington last week at a meeting of scientists and economists who advise the Pew Center.

“The targets in the Kyoto Protocol cannot and will not be met on the established timetable in the United States and elsewhere,” said Clausen. “By adhering to unrealistic targets that will be very difficult, if not impossible to meet, we provide the Protocol’s opponents with additional ammunition in their efforts to shoot the treaty down.”

The Pew Center was established in 1998 by the Pew Charitable Trusts to educate the public on climate-change issues and to encourage reductions in greenhouse-gas emissions. It operates in partnership with a group called the Business Environmental Leadership Council, which includes Boeing and DuPont, but receives no financial support from it.

Clausen still believes that “the good qualities of the Kyoto Protocol vastly outweigh its flaws” and she wants negotiators, who will meet in The Hague this November to finalize the protocol, to implement firm rules on how the treaty will operate before considering revisions to the targets. “If, after ensuring that the framework reflects these priorities, we need to renegotiate the targets or timetables — and I suspect we will — then so be it.”

The remarks were welcomed by some climatologists at the Washington meeting. “I agree with everything she said,” says Tom Wigley, senior scientist at the National Center for Atmospheric Research at Boulder, Colorado. “The targets are too much, too soon. She is echoing what many economists believe, that a more moderate approach is going to be a much better approach.”

But Clausen’s blunt characterization of the targets has alarmed environmental groups, who believe that the Kyoto Protocol is the main driving force for global action by governments and industry to cut emissions. Clausen’s pessimism is not shared, at least in public, by other groups who support action to cut carbon emissions. “We’re making a lot of progress here,” says Dan Lashof, head of the climate-change programme at the Natural Resources Defense Council, pointing to recent bipartisan calls in the Congress for reductions in power-plant emissions.

Jennifer Morgan, director of the World Wildlife Fund’s climate-change campaign, also believes the Kyoto Protocol can work. “We should be focusing on a domestic plan to meet the targets, not on changing them,” she says.

But the Global Climate Coalition, the industry group that has opposed binding action to cut carbon emissions, said that Clausen’s statements bore out its early warnings about the Kyoto Protocol. “We agree with her that the targets are simply unrealistic,” says Connie Holmes, chair of the coalition’s board. “In the last three years, they have become more unrealistic — and not just for the United States.”

† http://www.pewclimate.org/media/transcript_ria.html

27 July 2000
Nature mag.
Compare two IPCC Climate Research reports (1995 and 2001)

1) Temperatures for a century

1) Report out 1995 (said 1.5 to 4.0°C)
2) Report out early 2001 (said 1.5 to 6.0°C)

2) Background info

1) Report on Doc 4) Trumbaut said that there must have been a mistake in the 2001 numbers above and they should not have been used.

2) Doc 5 talks about the big upward temperature adjustment in the 2001 report. And a big U.S. election was held Nov 2000.
   - They had to scare people!

Rory Janne
Feb 9, 2007
Humans linked to climate change

Boulder scientists contributed to study of Earth’s environmental ills

By Jim Erickson 1-21-07

Rocky Mountain News

A long-awaited report by an international scientific team will provide the strongest evidence to date that humans are changing the planet’s climate by pumping heat-trapping gases into the air, according to Boulder scientists involved in the study.

On Feb. 2 in Paris, the Intergovernmental Panel on Climate Change will summarize the key findings from its latest assessment of global climate change.

The report will discuss observed changes — retreating mountain glaciers, melting polar ice sheets, rising sea levels and shrinking summer arctic sea ice, for example — as well as projections for the future.

The projections are based on 23 computer climate models operated by 16 research groups worldwide.

All 23 models agree that the planet will continue to warm as levels of carbon dioxide and other heat-trapping “greenhouse” gases rise in the coming decades, said William Collins, of the National Center for Atmospheric Research in Boulder.

“This report will provide the most compelling evidence to date that climate is changing and that mankind is responsible for that change,” said Collins, a lead author of the report’s climate projections chapter.

“Children being born at the point in the 21st century will experience — we believe, under certain projections — significant climate change,” he said. “I personally hope that this report stimulates people to take action to slow our influence on climate.”

The report will be issued as momentum to limit U.S. greenhouse gas emissions builds on several fronts. Just this month, Congressional Democrats announced four bills, with more expected, to control carbon dioxide emissions.

House Speaker Nancy Pelosi said she wants to create a special committee on climate.

Leading scientists joined evangelical pastors to declare their intention to fight the causes of climate change, as well as public confusion on the subject.

Ten major U.S.-based corporations — including General Electric, DuPont and Alcoa — joined leading environmental groups to call for a firm nationwide limit on carbon dioxide emissions.

And next week, in his State of the Union address, President Bush will lay out his policy on global warming. But the plan will not include mandatory emissions caps, according to press secretary Tony Snow.

Evidence in greater detail

Collins was one of several Boulder scientists who contributed to the latest IPCC report, “Climate Change 2007: The Physical Science Basis.” Boulder atmospheric scientist Susan Solomon is one of two co-chairs of the team that produced the first of four volumes in this year’s update.

The IPCC’s last major update, in 2001, said the planet warmed 1 degree Fahrenheit over the past century and is likely to warm another 2.5 to 10.4 degrees by 2100.

In the 2007 update, that temperature range will be narrowed a bit, largely because of improvements in the climate models, NCAR’s Kevin Trenberth said.

“I think probably the low value (in the 2001 report) and also the high value came from models that probably had mistakes in them,” Trenberth said Friday.

“The confidence in those numbers was probably not that good, and they probably never should have been used in the way in which they were used,” said Trenberth, who worked on the atmospheric observations chapter in the upcoming IPCC report.

“And I think you will find, then, that the numbers are probably narrowed,” he said.

The 2001 report also stated that most of the warming over the past 50 years was likely because of buildup of greenhouse gases, largely from burning fossil fuels.

“That’s a pretty strong smoking-gun statement that directly ties human activity to climate change,” said NCAR’s Gerald Meehl, another leading participant in the upcoming report.

“And I think we’ve got more evidence that supports that conclusion in greater detail now,” Meehl said. “And when you really connect a cause and effect like that, I think it’s a pretty powerful kind of argument.”

Meehl said the upcoming report shares a sense of urgency.

“The longer you wait, the worse it gets,” he said. “So really, if you’re going to do something about this problem, the sooner the better.”

Meehl and other IPCC authors are barred from discussing details until the report’s release. But it assesses studies recently published in peer-reviewed journals. Some major themes have emerged in recent research, Meehl said.

A role in extreme weather

One topic that’s received a lot of attention is extreme weather.

In an October study titled Going to Extremes, Meehl and his co-authors concluded that extreme weather — heat waves, droughts and heavy rains, for example — will likely become more frequent and more intense in coming decades. Dry spells could lengthen significantly across the western United States, southern Europe and other areas.

“I can’t say what’s going to be in the next report, but that’s the type of research that’s assessed for the IPCC,” Meehl said.

Trenberth said a section in his chapter explores possible links between intense hurricanes and global warming. The drought plaguing the West for much of this decade also is discussed.

Another topic examined in recently published climate studies is “climate-change commitment.” Because heat-trapping carbon dioxide has a lifetime of about a century, gases pumped into the air today will continue trapping heat far into the future.

That heat will warm the air, land surfaces and oceans. As the heat creeps deeper into the ocean, the warmed water expands, resulting in sea level rise.

Change will last centuries

The concept of climate change commitment has been around for about 20 years. What’s new is that some of the latest, most sophisticated climate models now confirm the dire predictions of earlier, crud- der simulations.

In a 2005 report in the journal Science, NCAR researcher Tom Wigley said that even if greenhouse gas levels could be magically stabilized today, sea levels would rise 10 to 20 inches per century for the next 400 years or more, imperiling coastal regions.

Because of carbon dioxide’s long lifetime, actions taken today to reduce emissions “mainly benefit the next generation and the generation after that,” Trenberth said.

“That’s one of the things which I’m not sure is fully realized,” he said. “This is a long-term problem, and that’s why you really want to get ahead of it.

“The other side of that is that it means we’ve got to live with climate change, and that means we should plan for it.”
Perhaps to counter this trend of decreasing warmth in "best estimates" projections, the IPCC avoided these in its most recent report (IPCC, 2001a) and introduced the concept of "storylines" instead. Storylines are constructed to depict future states, replacing 'scenarios' used in the SAR (Houghton et al., 1996), which in turn replaced 'predictions' and 'projections' used even earlier. Some see it as a means of keeping global warming estimates, in 1995, put the average global temperature increase by the end of this century at 1.5 to 4.0 °C. This newest estimate is 1.5 to 6.0 °C. The second surprise is that a firmer association between human activities and climate has emerged. Even the most sceptical climatologist in the IPCC group now concedes that warming bears an anthropogenic handprint.

And

Even without an unpleasant surprise, the new IPCC report raises the prospect of serious risk to a new level. And it's about time: Right now, climate change has drifted off the radar screen, warranting scarcely a glance in this season of electoral politics.

Source: C.R. De Freitas, "The climate change debate revealed."
In: Bulletin of the Canadian Petroleum Geology Vol. 50 No. 2 (June 2002)
Freitas works at:
School of Geography & Envi Science
Univ. of Auckland, PB 92019, Auckland, NZ

Editorial in Science, 10 Nov 2000
Monster Hype

Environment: The sky is falling. Well, actually it’s just getting warmer. Hotter, really. So hot that we’ll all wish we had never burned a drop of fossil fuel. So hot that we’re all going to wish the sky really were falling.

Those aren’t exactly the words the United Nations’ Intergovernmental Panel on Climate Change will use in its upcoming scare report. But that’s the effect its Chicken Little authors are aiming for.

“I hope this report will shock people and governments into taking more serious action, as you really can’t get a more authentic and a more credible piece of scientific work,” said IPCC Chairman R.K. Pachauri. “So I hope this will be taken for what it’s worth.”

We have the same hope — because we expect this report will turn out to be worth less than the paper it’s printed on. Flash back to the October 1989 issue of Discover magazine and the statements of Stanford University environmentalist Stephen Schneider:

“We’d like to see the world a better place. . . . To avert the risk (posed by global warming) we need to get some broad-based support, to capture the public imagination. That, of course, entails getting loads of media coverage.

“So we have to offer up scary scenarios, make simplified, dramatic statements and make little mention of any doubts we might have. . . . Each of us has to decide what the right balance is between being effective and being honest.”

Schneider is not alone in his compulsion to promote what he believes to be greater good. Al Gore, who seems himself to have been far out of balance for decades, once admitted to Grist, an environmentalist magazine, that taking liberties with the truth is acceptable if doing so results in a convert to his side of the debate — which, despite his claims to the contrary, is not over.

“I believe,” Gore said, “it is appropriate to have an overrepresentation of factual presentations on how dangerous it is, as a predicate for opening up the audience.”

In 2003, James Hansen, the NASA scientist who raised global warming fears with his 1988 testimony before Congress, was driven by similar ethics. He wrote in the online journal Natural Science, “Emphasis on extreme scenarios may have been appropriate at one time, when the public and decision makers were relatively unaware of the global warming issue.”

Given that Pachauri is relying on the shock factor of the IPCC’s report, due to be released Thursday, it seems that focusing on extremes is still appropriate. Consider that Reuters is saying that the report will claim that the IPCC is “at least 90% sure that human activities, led by the burning of fossil fuels, are to blame for global warming over the past 50 years.”

Ninety percent, huh? That’s a bold statement. Can any of the 2,500 scientists who worked on the report be 90% sure of next week’s weather? And what about the bigger question — what’s their measure of certainty that Earth will grow so warm that catastrophe is inevitable?

If they were honest, they would have to say the uncertainty is great, considering the number and degrees of the variables that their climate models must sift through, the still-not-understood complexities of weather systems, the effects of solar activity and the impacts of the El Nino and La Nina phenomena, to name a few things that should cause some skepticism among those who have been ringing the climate change alarms.

Not that Gore would admit it, but there are scientists, even among those not considered to be skeptical of the global warming theory, who are not comfortable with the fear mongering and unequivocal certainty of the faithful.

“Some of us are wondering if we have created a monster,” University of Colorado climate scientist Kevin Vranes, himself a global warming believer, recently told the Houston Chronicle.

Wonder no more, professor. The monster lives and is, like Dr. Frankenstein’s gone-wrong creation, terrifying the villagers. He needs to be destroyed before somebody gets hurt.
ENERGY
Gas tanks could
guzzle half of U.S.
corn yields

In his Jan. 23 State of the Union Address, President Bush called for ramping up production of biofuels, such as ethanol from corn, to help cut U.S. dependency on foreign oil. A new report describes an ethanol-industry expansion already under way that is poised to boost corn-ethanol production by 150 percent within 2 years.

However, such an increase may carry a high cost, says the report's author, agricultural economist Lester Brown of the Earth Policy Institute in Washington, D.C.

The 116 existing U.S. ethanol-fuel distilleries now use 53 million tons of corn. The 90 distilleries under or planned for construction would boost that demand to 139 million metric tons of corn, half of the projected 2008 U.S. harvest.

U.S. farmers produce 40 percent of the world's corn and export 55 million tons. Brown argues that any change in the crop's availability for food and feed will propel world grain prices—including those of wheat and rice—to levels never seen before. He explains, "These three crops compete for much of the same land." —J.R.

REVIEW & OUTLOOK
Very, Very Big Corn

President Bush made a big push for alternative fuels in his State of the Union speech Tuesday night, calling on Americans to reduce gasoline consumption by 20% over 10 years. And as soon as the sun rose on Wednesday, he set out to tour a DuPont facility in Delaware to tout the virtues of "cellulosic ethanol" and propose $2 billion in loans to promote the stuff. For a man who famously hasn't taken a drink for 20 years, that's a considerable intake of alcohol.

Ethanol and its consequences.

Corn Craze
Futures price in cents per bushel

Source: WSJ Market Data Group
Skeptics cite being ‘treated like a pariah’

By Eric Pfeiffer
THE WASHINGTON TIMES

Scientists skeptical of climate-change theories say they are increasingly coming under attack—treatment that may make other analysts less likely to present contrarian views about global warming.

"In general, if you do not agree with the consensus that we are headed toward disaster, you are treated like a pariah."

Keep it fair, keep it clean

CONFLICT and science are inseparable partners. Having thought up a bold idea and a way to test it, researchers must convince other scientists that their idea is better than the prevailing one. This is an exacting, time-consuming and often painful business — and sometimes it goes awry.

(4) GLOBAL WARMING HOTHEADS WOULD BURN SCEPTICS AT THE STAKE

The Times, 3 February 2005

Role of state climatologist comes under scrutiny

Many climate scientists get frustrated with those who don't believe that human activity is causing global warming, but should having such views be a sackable offence?
Western droughts could become norm

Climate models suggest Colorado to get hotter, drier

By Jim Erickson
ROCKY MOUNTAIN NEWS

Average temperatures in the West could rise 7 degrees by the end of the century because of global warming, with drought-like conditions becoming the new norm, climate scientists said Friday.

Some of the world's most advanced climate models suggest that Colorado precipitation levels will remain roughly constant as temperatures climb.

If that happens, the state will get drier, with less mountain snow in the winter, lower stream flows in the summer, and an increased threat of wildfires.

"I think the drought that we've been in since 1999, on and off, is a great preview of what's going to happen in the future — and you won't have to wait too long," said Jonathan Overpeck, a University of Arizona paleoclimatologist and an author of the latest Intergovernmental Panel on Climate Change report.

A 21-page summary of the 11-chapter report was released Friday in Paris. The IPCC's periodic updates are considered the world's most authoritative assessments of climate science.

The new report projects a global temperature increase of 3.2 to 7.2 degrees Fahrenheit by the end of the century.

The planet warmed slightly more than 1 degree Fahrenheit over the past century. IPCC scientists see a greater than 60 percent likelihood that most warming over the last 50 years has occurred because of human-caused emissions of heat-trapping "greenhouse" gases.

"If we don't dial back the greenhouse gas emissions, what we've seen so far is nothing compared to what we'll get," Overpeck said Friday from Paris.

Continued on next page
clobber climate skeptics

Without claiming any real knowledge of the matter, we have always supposed the world of professional meteorologists to be a calm and collegial sort of place, where earnest weatherpersons chat quietly about isobars, dew points, and orographic precipitation while sipping from cups of herbal tea with pinkies extended. We are therefore sorry to hear that the soft totalitarism of the larger culture has invaded the staid precincts of the American Meteorological Society (AMS). Weather Channel hostess Heidi Cullen has urged the AMS to decertify any TV weathermen who express doubt that human activity is leading to climatic catastrophe. At the just-concluded AMS annual conference in San Antonio, temperatures rose and storm clouds gathered as confeerees discussed Ms. Cullen’s proposal. Elsewhere the Thought Police have been busy adjusting the language in which climate change is discussed. A correspondent for CBS’s 60 Minutes has compared global-warming skeptics to Holocaust deniers. Al Gore has helpfully chimed in with the term “global-warming deniers.” Can “climate Nazis” be far away? Down with enemies of the people!

Bad leader during 1974-1991
Ethiopia 1974-1991

One of the lesser-known of the 20th century’s gangster-despots was Mengistu Haile Mariam, who ran Ethiopia as a Leninist-style “people’s republic” from 1974 to 1991, complete with nationalization of industry and commerce, secret-police terror, mass killings of “class enemies,” and famines brought on by forced collectivization of agriculture. It is probable that Mengistu murdered the former monarch, 83-year-old Haile Selassie. After fleeing Ethiopia following a coup in 1991, Mengistu was given asylum by Robert Mugabe of Zimbabwe. Since then he has been living in an upscale suburb of Zimbabwe’s capital city. For the past twelve years a special Ethiopian court has been trying Mengistu in absentia. The court convicted him of genocide at the end of 2006. Now a sentence of life imprisonment has been pronounced on the 69-year-old ex-dictator. Whether Mengistu will have to serve any of his sentence depends on how long Mugabe, who is 82, stays in power, and what attitude Mugabe’s successors take toward Leninist mass murderers. Let us hope for the best—that is, for Mengistu, the worst.
Light at the end of the tunnel

An emphatic and clear status report on global warming opens the way for action — presenting new risks.

What does Nature think of Skeptics?

The IPCC report, released in Paris, has served a useful purpose in removing the last ground from under the climate-change sceptics' feet, leaving them looking marooned and ridiculous. However, this predicament was already clear enough. Opinion in business circles, in particular, has moved on.

Tough choices

So then, the enemy is vanquished and the victors can rejoice? Hardly. In fact, the pending retreat from the stage of the president of the United States and his allies leaves those who do acknowledge the severity of the problem facing an even greater challenge than before. The world now broadly accepts that we have a problem, if not a crisis. So what is to be done?

We need to restrict emissions in the developed world, and some steps are being undertaken to do just that, chiefly through the much-maligned Kyoto Protocol. We need to develop clean energy sources, and these are being pushed ahead quite rapidly, although each one — nuclear power, biofuels, wind power and hydropower, for example — creates its own environmental battlefield. Steps are

Similarly, it has been hard to talk about actions that need to be taken to mitigate the damage already certain to be caused by climate change and associated rises in the sea level, as such steps were regarded as a capitulation to those who just want to keep emitting greenhouse gases. This is no longer the case (see page 597). Mitigation, which can take many forms ranging from the Thames Barrier in London to the introduction of drought-resistant crop

Some skeptics in Business Week

(This was the only global warming report in this issue.)

QUESTION OF THE WEEK

A new U.N. report on global warming states with 90% certainty that human activity is the culprit. As a skeptic about policies to cut CO₂ emissions, what's your response?

"The report had nothing to lead me to change my view that global warming cannot, at this stage, be distinguished from natural, unforced internal variability. These 'certainties' are bogus."

Richard Lindzen, Alfred P. Sloan Professor of Meteorology, Massachusetts Institute of Technology

"Saying that humans have a significant role in the warming is like saying there's gambling in Las Vegas. What can you do about it? A lot of politically possible solutions will do less than nothing."

Patrick Michaels, environmental sciences professor, University of Virginia

"Yes, humans have caused the earth to be slightly warmer, but much less than the report says. Many natural forces are not accounted for. I'd make a big bet that in the next 5 to 10 years the globe will start to cool."

William Gray, emeritus professor, atmospheric science, Colorado State University
(4) GLOBAL WARMING HOTEADS WOULD BURN SCEPTICS AT THE STAKE

The Times, 3 February 2005
http://www.timesonlineonline.co.uk/article/0,,1054-1469711,00.html

By Mick Hume

NEVER MIND the posters of Michael Howard as a flying pig, or the advertisements that expose our children to the stunted genitals of that Crazy Frog from the mobile ringtone. The most shocking advert today is the one about the apocalyptic dangers of climate change from the government-funded Carbon Trust. Unlike the other two ads it has not provoked public controversy, but to my mind its message is as crude as a Tory pig or an amphibian flasher.

The Carbon Trust advert on television begins with an actor playing Robert Oppenheimer, "father of the A-bomb". The portentous voiceover tells us: "One man has been where we all are today...When he saw what he had done, he said, 'I am become the destroyer of worlds' (cue shot of atomic explosion). Now we all have to face up to what we've done. Our climate is changing..."

To make us feel guilty about "what we have done", we are shown cities, electricity pylons, personal computers and cars, followed by violent storms, huge waves and flooded towns. The message is that we are destroying the world through climate change, which has been brought about by modern industry and technology. So we must change the way we live and work in order to repent of our sins - or as they put it now, "reduce our emissions". Others predicting doom via man-made global warming are becoming similarly heated; one international body suggests we might be just ten years from catastrophe.

What we ignorant laymen are rarely told is that there remain serious uncertainties about the extent and causes of climate change - as even some
scientists working with the Intergovernmental Panel on Climate Change will quietly concede. Yet woe betide any expert who tries to raise such questions in public.

skeptics – a dirty word

When it comes to climate change, "sceptic" is a dirty word. Scientists who dissent from the strict orthodoxy on man-made global warming have been shouted down, labelled dupes of the US oil industry, even branded "climate change deniers" - a label with obvious historical connotations. Instead of taking up the sceptics' case, the accepted response of our illiberal age is to yell: "You can't say that!"

But is not scepticism crucial to scientific inquiry? Timothy Ball, a leading climatologist, says that those trying to test the theory of anthropogenic climate change - "a normal course of action in any real scientific endeavour" - are now being "chastised for not being in agreement with some sort of scientific consensus, as if a worldwide poll of climate experts had been taken, and as if such a consensus would represent scientific fact. Nothing could be farther from the truth; science advances by questioning, probing and re-examining existing beliefs."

We need to separate the science from the politics. Let the experts thrash out the evidence. But let them do so free from the pressures of a political climate in which human intervention is always seen as the problem rather than the solution, precaution is always privileged over risk, and the worst possible outcome is always assumed to be the best bet.

Perhaps those commanding us to "face up to what we have done" to the world might first face up to the dangers of reducing complex scientific issues to a simplistic political message, and presenting moralistic sermons as scientific laws. Whatever the true impact on the environment of burning fossil fuels, there seems a real risk of damaging the atmosphere of scientific inquiry by burning sceptics at the stake.

Copyright 2005, The Times

(5) STREET FIGHTING

Science Policy, 4 February 2005
http://sciencepolicy.colorado.edu/prometheus/archives/climate_change/000340street_fightin

If anyone wants to understand why science is coming to be viewed as increasingly political one need only look to a quote from Kevin Trenberth in an article in the current issue of the Economist.

"For example, when Kevin Trenberth, head of the IPCC’s panel on hurricanes, recently suggested that there exists a link between climate change and the wave of powerful hurricanes last year, he was immediately challenged. Christopher Landsea, a hurricane expert at America's National Oceanic and Atmospheric
Junk Science (and hurricanes)

- There were four stories from Jan – Feb 2006.
- Some were saying the junk science was all from skeptics.

   - Said: The US government is trying to silence climate scientists in NOAA and NASA.
   - A few scientists said that the government did not allow them to express their science views (of big effects from global warming).
     - For this they got lots of news.
     - They did not seem hesitant to express their views.

   This may be 10% of our problem.

2. Climate science, skeptics, and balance
   - A number of competent climate skeptics are beaten up on.
     - And this problem is getting worse.
     - The skeptics included senior people in 3 NOAA facilities.
   - “Official science that is driven by politics can be a big problem.”
     - People seem to agree that climate change has become too political.
     - Best to have more balance in global warming science.
   - A number of science leaders seem to like some exaggeration in the talk about climate. This can also be said of policy people and maybe 80% of news people.
   - There is a need for competent skepticism to get us closer to the truth.
   - We still have an opportunity to present a balanced and interesting story about climate change.
   - Too much hype gets in the way of solving actions on the energy and climate issues.

   This is about 90% of our problem now.
Mark Twain once complained that a lie can make it half way around the world before the truth gets its boots on. That’s been the case late in the climate change debate, as political and media activists attempt to stigmatize anyone who doesn’t pay homage to their “scientific consensus.”

Last week the London Guardian published a story headlined, “Scientists Offer Cash to Dispute Climate Study.” The story alleges that the American Enterprise Institute (AEI), a conservative-leaning think tank in Washington, collected contributions from ExxonMobil and then offered climate scholars $10,000 so they could lobby against global warming legislation.

Another newspaper, the British Independent, picked up on the story and claimed: “It has come to light that one of the world’s largest oil companies, ExxonMobil, is attempting to bribe scientists to pick holes in the IPCC’s assessment.” (The IPCC is the United Nations climate change panel.)

It would be easy to dismiss all this as propaganda from British tabloids, except that a few days ago the “news” crossed the Atlantic where more respectable media outlets, including the Washington Post, are reporting the story in what has become all too typical pack fashion. A CNNMoney.com report offered that, “A think tank partly funded by ExxonMobil sent letters to scientists offering them up to $10,000 to critique findings in a major global warming study released Friday which found that global warming was real and likely caused by burning fossil fuels.”

Here are the facts as we’ve been able to collect them. AEI doesn’t lobby, didn’t offer money to scientists to question global warming, and the money it did pay for climate research didn’t come from Exxon.

What AEI did was send a letter to several leading climate scientists asking them to participate in a symposium that would present a “range of policy prescriptions that should be considered for climate change of uncertain dimension.” Some of the scholars asked to participate, including Steve Schroeder of Texas A&M, are climatologists who believe that global warming is a major problem.

AEI President Chris DeMuth says, “What the Guardian essentially characterizes as a bribe is the conventional practice of AEI—and Brookings, Harvard and the University of Manchester—to pay individuals for commissioned work. He says that Exxon has contributed less than 1% of AEI’s budget over the last decade.

As for Exxon, Lauren Kerr, director of its Washington office, says that “none of us here had ever heard of this AEI climate change project until we read about it in the London newspapers.” By the way, commissioning such research is also standard practice at NASA and other government agencies and at liberal groups such as the Pew Charitable Trusts, which have among them spent billions of dollars attempting to link fossil fuels to global warming.

We don’t know where the Brits first got this “news,” but the leading suspects are the reliable sources at Greenpeace. They have been peddling these allegations for months, and the London newspaper sleuths seem to have swallowed them like pints on a Fleet Street lunch hour.

So, apparently, have several members of the U.S. Senate. Yesterday Senators Bernard Sanders, Patrick Leahy, Dianne Feinstein and John Kerry sent a letter to Mr. DeMuth complaining that “should these reports be accurate,” then “it would highlight the extent to which moneyed interests distort honest scientific and public policy discussions.” Does your donors’ self-interest trump an honest discussion over the well-being of the planet?”

Every member of AEI’s board of directors was graciously copied on the missive. We’re told the Senators never bothered to contact AEI about the veracity of the reports, and by repeating the distortions, these four Democratic senators, unwittingly or not, gave credence to falsehood.

For its part, Exxon appears unwilling to take this smear campaign lying down. Bribery can be a crime, and falsely accusing someone of a crime may well be defamation. A company spokesman says Exxon has written a letter to the Independent demanding a retraction.

One can only conclude from this episode that the environmental left and their political and media supporters now believe it is legitimate to quash debate on climate change and its consequences. This is known as orthodoxy, and, until now, science accepted the legitimacy of challenging it.

Stop debate.
Ground Virgin Air

Climate Change: British entrepreneur Richard Branson is offering a $25 million award for the best idea to curb global warming. OK, here's our entry: Shut down Branson's company, Virgin Atlantic Airways.

Last year, the world put out about 28 billion tons of greenhouse gases. Branson's goal is to cut 1 billion. Unfortunately, grounding Virgin nets you only about 7.4 million, according to calculations done by British journalist George Monbiot.

But why not close all airlines? End the jet age altogether? Airlines account for about 2% of all CO2 emissions. So we'll be saving 560 million metric tons, getting us more than halfway there!

Because methane from cows is considered to be a bigger contributor to global warming than humans, we can get the rest of the cuts we need by slaughtering several hundred thousand head.

Never mind that hundreds of millions of people travel by plane each year. Or that, according to the U.S. Department of Transportation, air transport employs 30 million people and contributes $1.7 trillion annually to the world economy. Five hundred sixty million tons is a lot of pollution. As for the cows, higher prices for beef and milk seem like a small price to pay for a cooler climate.

Yes, we're kidding — sort of — in an effort to show the kind of sacrifice that global warming doomsayers seek on our behalf almost every time they open their mouths. Meeting their "goals" would entail enormous economic cost — as much as 5% of global GDP — just to maintain the status quo, according to current U.N. forecasts.

Next month, the U.N. will reveal the science behind its recent alarmist report calling for a hugely expensive effort to curb greenhouse gases. A number of very thoughtful critiques of the basic science have already emerged from eminent scientists at Harvard, MIT, the University of London and other institutions.

The points about the report's faulty science are all different. But all agree that the U.N. and environmental activists have politicized what should be a scientific issue, demonizing opponents and making rational debate nearly impossible.

They note that the scientists picked to work on the report were sure to toe the U.N.'s official political line. Predictably, celebrities, leftist politicians and green activists are all lining up in lock step, pretending there is no dispute.

It's now clear, however, that their real agenda isn't to curb global warming, as Branson naively wishes. It's to exert control over America's rich and unruly system of capitalism — a system that's both envied and hated by socialist thinkers and that is singled out for draconian restrictions under all global warming scenarios.

This explains why House Speaker Nancy Pelosi, even as she negotiates for a larger, CO2-spewing jet for her own use, told Congress last week that greenhouse cuts must be "mandatory."

It also explains why liberal columnist Ellen Goodman could liken those who question global warming science — a speculative theory based on questionable math models — to Holocaust deniers.

Which gets us back to Branson. The reward he's offering is based on his own certainty that global warming will occur and, as the U.N. says, have devastating consequences. But at least he's in the private sector, putting his money where his mouth is.

We hope he'll consider us for his prize. Sure, our proposal would destroy his industry. But it would do a lot less damage than what the U.N.'s recommending.
Global Warming
Feb 3-4, 2007

By Philip Stott

I confess I was afflicted by a profound world-weariness following the release yesterday of the latest gloomy machinations from the Intergovernmental Panel on Climate Change (IPCC). The U.N.'s global-warming caravanserai, founded in 1988 by the World Meteorological Organization and the United Nations Environment Program, had this time pitched camp in Paris, in order to issue the "Summary for Policy Makers" relating to Working Group One of its "Fourth Assessment Report: Climate Change 2007." This is the group that focuses on "The Physical Science Basis" of climate change, and its summary was greeted with the usual razzmatazz, the Eiffel Tower's 20,000 flashing bulbs being symbolically blacked out on the evening before. Further IPCC reports are due this year, one in April from Working Group Two, on the impacts of, and adaptation to, climate change, and another in May, from Working Group Three on climate-change mitigation.

But it is the science summary that always gives rise to the jamboree with journalists, politicians and eager environmentalists desperate to claim that this particular report is the last word on climate change, that it represents a true consensus, that the world is doomed, and that we must recant our fossil-fuel ways. Moreover, as in 2001 with the Third Assessment Report, Friday's release was preceded by speculative leaks, the political shenanigans and spinning beginning even before the final text had been haggled over and agreed upon.

Unfortunately, the IPCC represents science by supercommittee, as rule 10 of its procedures states: "In taking decisions, and approving, adopting and accepting reports, the Panel, its Working Groups and any Task Forces shall use all best endeavors to reach consensus." I bet Galileo would have had a rough time with that.

In this context, it is vital to remember that science progresses by skepticism and by paradigm shifts. A consensus early last century would have given us eugenics. Moreover, the IPCC does no original research, nor does it monitor climate-related data; its evidence is instead from selected secondary sources. But, above all, this supercommittee is more political than is often recognized, rule three firmly reminding delegates that: "documents should involve both peer review by experts and review by governments."

Friday's summary and "best estimates" of temperature-rise by 2100 (as compared to pre-industrial times) are thus little more than a committee compromise chewed over by governments with different agendas: an average potential rise of three degrees Celsius (up from 2.5 degrees in 2001); a probable rise of between 1.8 to 4 degrees; a possible rise of between 1.1 to 6.4 degrees.

So you can take your pick, also bearing in mind that there are groups outside the IPCC predicting cooling by one or two degrees Celsius. Moreover, the conclusion that climate changes seen in the world are "very likely" to have a human cause is wonderful Alice-through-the-Looking-Glass talk.

Unsurprisingly, the report will please neither a Humean skeptic nor a ravid apocalyptic. Indeed, even before it appeared, environmentalists were incensed that predictions for the rise in sea levels this century have been lowered to between 28 and 43 cm (11 to 17 inches). They want the polar bears to be drowning now!

For the skeptic, however, the problem remains, as ever, water vapor and clouds. Enormous uncertainties persist with respect to the role of clouds in climate change. Moreover, models that strive to incorporate everything, from aerosols to vegetation and volcanoes to ocean currents, may look convincing, but the error range associated with each additional factor results in near-total uncertainty. Yet, there is a greater concern. Throughout the history of science,
given us eugenics. Moreover, the IPCC does no original research, nor does it monitor climate-related data; its evidence is instead from selected secondary sources. But, above all, this supercommittee is more political than is often recognized, rule three firmly reminding delegates that: "documents should involve both peer review by experts and review by governments."

Friday's summary and "best estimates" of temperature-rise by 2100 (as compared to pre-industrial times) are thus little more than a committee compromise chewed over by governments with different agendas: an average potential rise of three degrees Celsius (up from 2.5 degrees in 2001): a possible rise of between 1.8 and 4 degrees; a possible rise of between 1.1 to 6.4 degrees. So you can take your pick, also bearing in mind that there are groups outside the IPCC predicting cooling by one or two degrees Celsius. Moreover, the conclusion that climate changes seen around the world are "very likely" to have a human cause is wonderful Alice-through-the-Looking-Glass talk.

Unsurprisingly, the report will please neither a Humean skeptic nor a rabid apocalyptical. Indeed, even before it appeared, environmentalists were incensed that predictions for the rise in sea levels this century have been lowered to between 28 and 43 cm (11 to 17 inches). They want the polar bears to be drowning now!

For the skeptic, however, the problem remains, as ever, water vapor and clouds. Enormous uncertainties persist with respect to the role of clouds in climate change. Moreover, models that strive to incorporate everything, from aerosols to vegetation and volcanoes to ocean currents, may look convincing, but the error range associated with each additional factor results in near-total uncertainty. Yet, there is a greater concern. Throughout the history of science, monocausal explanations that overemphasize the dominance of one factor in immensely complex processes (in this case, the human-induced emissions of greenhouse gases) have been inevitably replaced by more powerful theories.

Worryingly for the IPCC's "consensus," there is a counterparadigm, relating to the serious uncertainties of water vapor and clouds, now waiting in the wings. In the words of Dr. Henrik Svensmark, director of the Center for Sun-Climat Research at the Danish National Space Center: "The greenhouse effect must play some role. But those who are absolutely certain that the rise in temperatures is due solely to carbon dioxide have no scientific justification. It's pure guesswork." A key piece of research in this emerging new paradigm was published in the Proceedings of the Royal Society A (October 2006): "Do electrons help to make the clouds?"

Using a box of air in a Copenhagen lab, physicists managed to trace the growth of clusters of molecules of the kind that build cloud condensation nuclei. These are specks of sulfuric acid on which cloud droplets form. High-energy particles driven through the laboratory ceiling by exploded stars far away in the galaxy—cosmic rays—liberated electrons in the air, which helped the molecular clusters to form much faster than atmospheric scientists have predicted. This process could well explain a long-touted link between cosmic rays, cloudiness and climate change.

The implications for climate physics, solar-terrestrial physics and terrestrial-galactic physics are enormous. This experiment ties in elegantly with the work of certain geophysicists and astronomers, who for some time have been implicating cosmic rays and water vapor, rather than carbon dioxide, as the main drivers of climate change. Indeed, they have put down up to 75% of all change to these drivers.

Cosmic rays are known to boost cloud formation—and, in turn, reduce earth temperatures—by creating ions that cause water droplets to condense. Calculating temperature changes at the earth's surface—by studying oxygen isotopes trapped in rocks formed by ancient marine fossils—scientists then compared these with variations in cosmic-ray activity, determined by looking at how cosmic rays have affected iron isotopes in meteorites. Their results suggest that temperature fluctuations are more likely to relate to cosmic-ray activity than to carbon dioxide. By contrast, they found no correlation between temperature variation and the changing patterns of CO₂ in the atmosphere. But the mechanism remained far from understood—until last October, that is, when the team in the Copenhagen lab may have discovered it.

Who knows where this exciting research will lead? What it unquestionably shows, however, is that the science of climate change is far from settled, and most certainly not by a government-vested committee policy "summary" from a U.N. supercommittee.

The inconvenient truth remains that climate is the most complex, coupled, nonlinear, chaotic system known. In such a system, both "doing something" (emitting human-induced gases) and "not doing something" (not emitting) at the margins are equally unpredictable. What climate will we produce? Will it be better? And, if we get there, won't it, too, change?

This is the fatal flaw at the heart of the whole global-warming debate. Climate change must be accepted as the norm, not as an exception, and it must be seen primarily as a political and economic issue, focusing on how best humanity can continue to adapt to constant change, hot, wet, cold or dry. The concept of achieving a "stable climate" is a dangerous oxymoron.

We must hope that IPCC Working Group Two on adaptation will set a wiser agenda in their April report.

Mr. Stott, professor emeritus of biogeography at the University of London, is co-editor of "Political Ecology: Science, Myth and Power" (Oxford University Press, 2000).