Putting Texas's New Coal-Fired Power Plants in Perspective

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Texas Public Policy Foundation Forum
Austin, 13th November 2006

Rising electricity demand: What are the alternatives?

1. Natural gas power plants
2. Conservation, including efficiency
3. Windmills
4. Nuclear power
5. New coal technologies
6. Conventional coal-fired power plants

Natural gas

Advantages

- Proven technology
- Can be built quickly
- Relatively clean

Disadvantages

- **Political obstacles to supply**
- Texas energy mix already too dependent on gas
- Greenhouse gas emissions (but only half of coal's)

Conservation, including efficiency

Advantages

- Doesn't require building new capacity
- Clean
- No or low greenhouse gas emissions

Disadvantages

- Higher electricity prices for consumers
- Dampens economic growth
- Demand keeps rising

Windmills

Advantage

- West and north Texas plains have lots of wind
- No greenhouse gas emissions
- Big federal subsidies

Disadvantage

- **The wind doesn't blow on the Texas plains in the summer**

Nuclear power

Advantages

- No air pollution
- No greenhouse gas emissions

Disadvantages

- Public opinion, environmental pressure group opposition, and regulatory obstacles make new nuclear plants uncertain
- Even if current obstacles are overcome, new plants are more than a decade away in the U. S.

New coal technologies—
Coal to gas, IGCC, carbon sequestration

Advantages

- Relatively cleaner than conventional coal
- Relatively lower greenhouse gas emissions than conventional coal, or no emissions with sequestration

Disadvantages

- New unproven technologies are still in development stage. Test plants opening 2010-12.
- Commercially viable after 2015 at the earliest.

Conventional coal

Disadvantage

- Highest greenhouse gas emissions of any hydrocarbon fuel

Advantages

- Cheaper than any alternative
- Reliable domestic supply
- Conventional technology that can be built quickly

Isn't conventional coal yesterday's fuel?

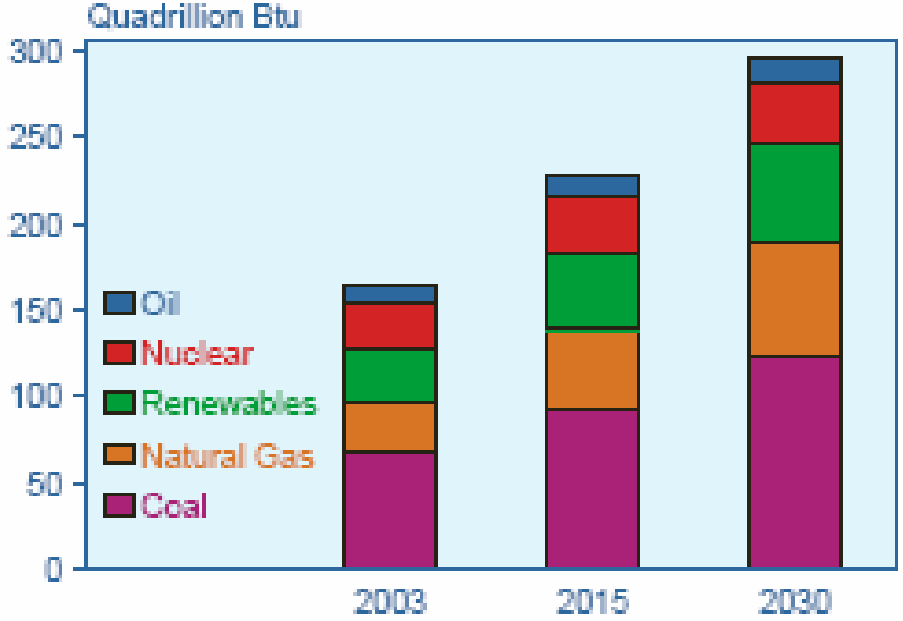
- Texas will be out of step with California, the new Congress, and the rest of the world
- Carbon constraints are inevitable
- The U. S. must catch up with the European Union and other countries that have ratified the Kyoto Protocol
- Global warming must be addressed now

Texas is not out of step

- Coal is making an enormous revival.
- Approximately 150 new coal-fired power plants proposed in the U. S., most conventional
- Over 800 new coal-fired power plants being built or proposed worldwide
- China is building approximately one new coal-fired power plant a week
- Significant return to coal in Japan, Germany, and United Kingdom

Energy Information Administration International Energy Outlook 2006

Figure 5. World Energy Consumption for Electricity Generation by Fuel Type, 2003, 2015, and 2030

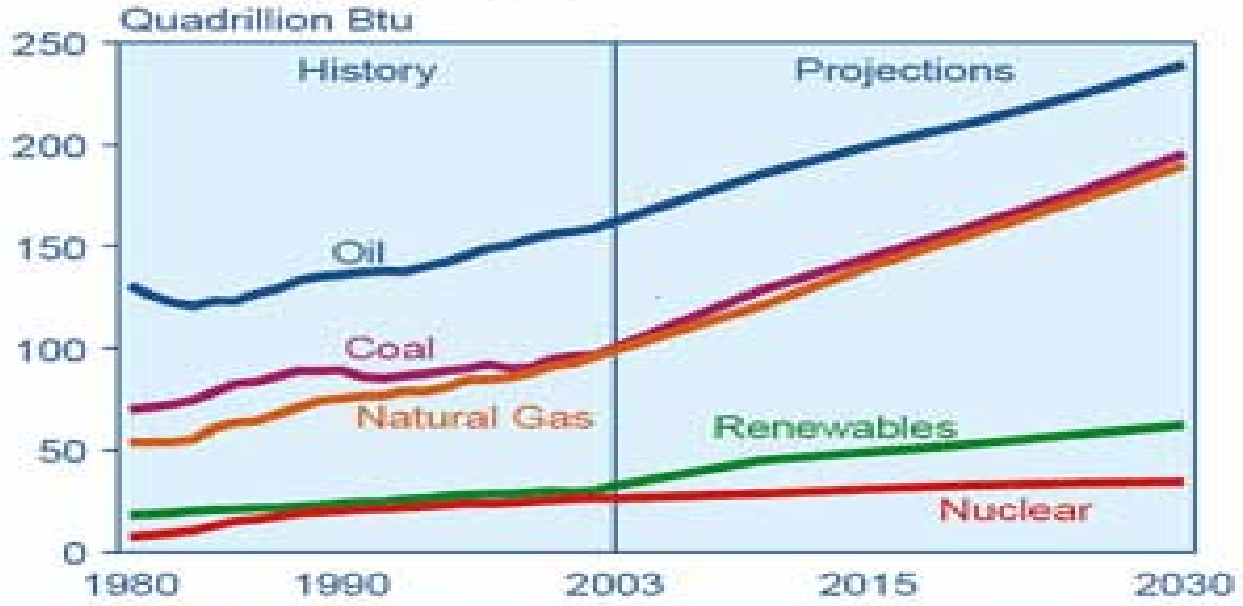


Sources: **2003**: Derived from Energy Information Administration (EIA), *International Energy Annual 2003* (May-July 2005), web site www.eia.doe.gov/iea/. **2010-2030**: EIA, System for the Analysis of Global Energy Markets (2006).

Global energy demand 2003-2030, +71 %

(from EIA's 2006 International Energy Outlook)

Figure 3. World Marketed Energy Use by Energy Type, 1980-2030



Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2003* (May-July 2005), web site www.eia.doe.gov/iea/. **Projections:** EIA, System for the Analysis of Global Energy Markets (2006).

The received wisdom:

Carbon constraints are inevitable

Thu Oct 5, 2006 9:01 PM ET
By Scott Malone

IRVING, Texas (Reuters) - The head of a large California natural gas and electric utility on Thursday called for national legislation to cap greenhouse gap emissions.

In an interview on the sidelines of a Business Council meeting in this Dallas suburb, Peter Darbee, chairman, president, and CEO of PG&E, said "The probability of legislation at the national level approaches 100 percent within the next five years."

The fact is…

- That greenhouse gas emissions have gone up in every nation that ratified the Kyoto Protocol and undertook to reduce greenhouse gas emissions since 1997, the year Kyoto was negotiated.
- That emissions have been rising much faster in the major rapidly developing nations, such as China (+190% economic growth since 1990) and India (+120% economic growth since 1990). That's why China is building one new coal-fired power plant a month.

Kyoto baseline comparisons

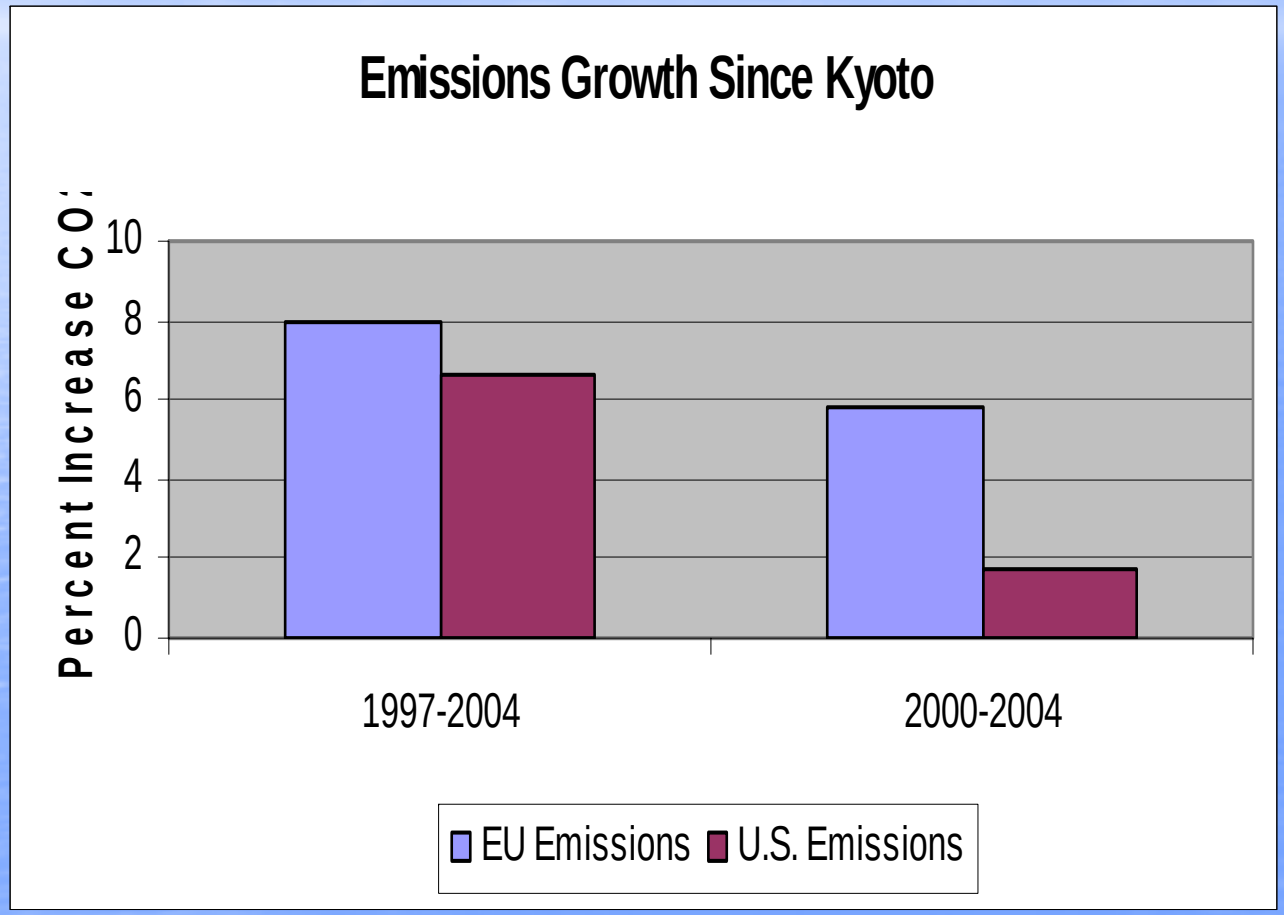
Greenhouse Gas emissions since 1990

The U. S. is about in the middle, even though our economic growth has been among the highest.

Poland	-30%
Russia	-24%
Germany	-17%
United Kingdom	-14%
Sweden	-4%
Japan	+14%

United States	+17%
Ireland	+23%
Canada	+27%
Australia	+33%
Portugal	+40%
Spain	+48%

EU-15 and U. S. emissions compared



New York Times
China to Pass U.S. in 2009 in Emissions
by Keith Bradsher

- LONDON, Nov. 6 — China will surpass the United States in 2009, nearly a decade ahead of previous predictions, as the biggest emitter of the main gas linked to global warming, the International Energy Agency has concluded in a report to be released Tuesday.
- China's rise, fueled heavily by coal....

Green Prices: Business Edition nr. 31 7 November 2006

- European Environment Agency: EU will not meet collective Kyoto target. The European Environment Agency (EEA) stated in a recently released report that 'all EU Member States must seriously tackle greenhouse gas emissions immediately to meet its collective Kyoto target'. If the EU-15 does not take action, emissions reduction in 2010 will only be 0.6% below the level in 1990, while the target is to reduce emissions by an average of 8% compared to 1990 emissions levels during the period 2008-2012.

Conclusion:

Emissions will rise substantially, Kyoto or No-Kyoto

Figure 6. World Carbon Dioxide Emissions in Two Cases, 1990, 2010, and 2030

Sources: **1990:** Energy Information Administration (EIA), *International Energy Annual 2003* (May-July 2005), web site www.eia.doe.gov/iea/. **2010 and 2030:** EIA, System for the Analysis of Global Energy Markets (2006).

Kyoto may be a dead end, but what about global warming?

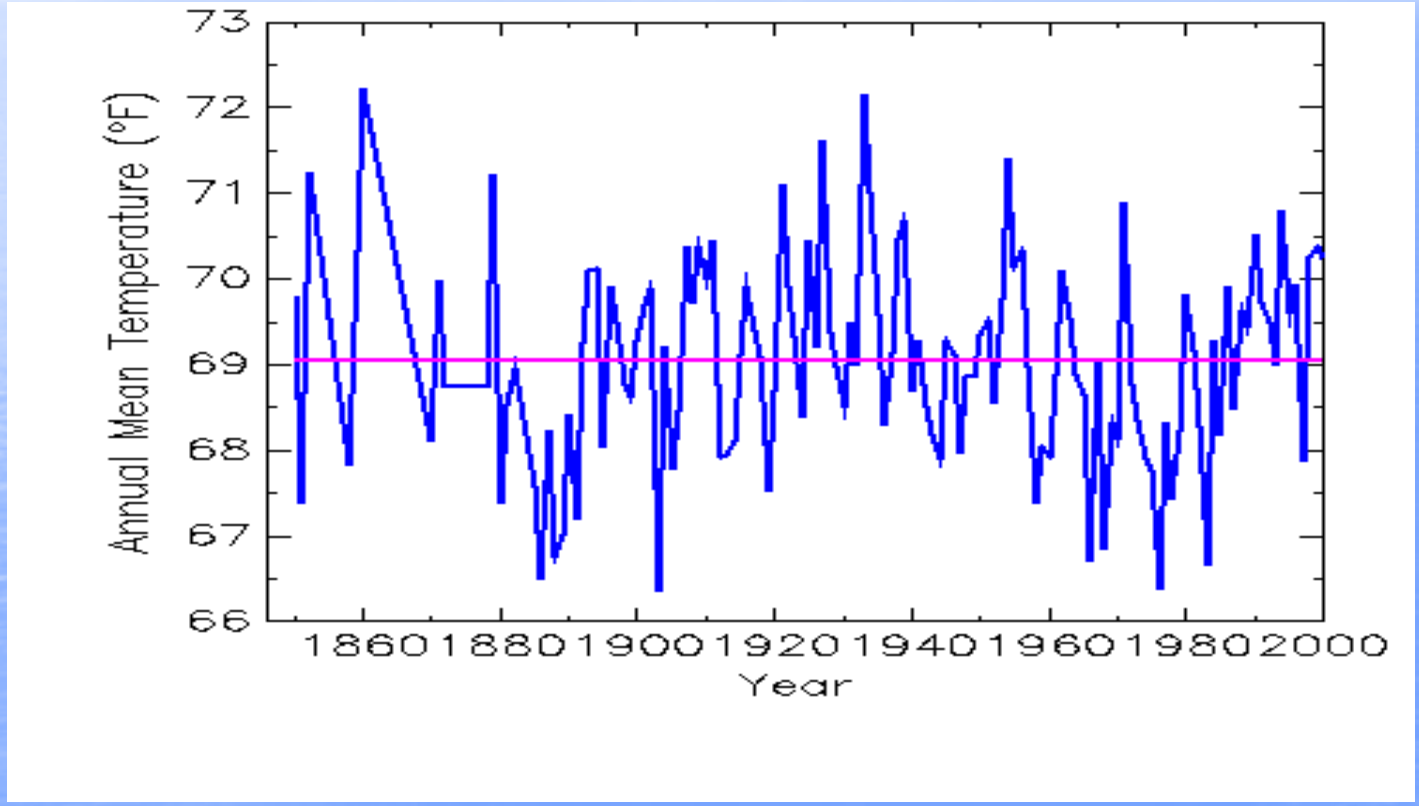
- The current rate of warming is modest
- The projected rate of future warming is based on highly speculative computer models that use implausible assumptions

Global Warming in San Antonio

1846-2000 Mean Annual Temperature Time Series

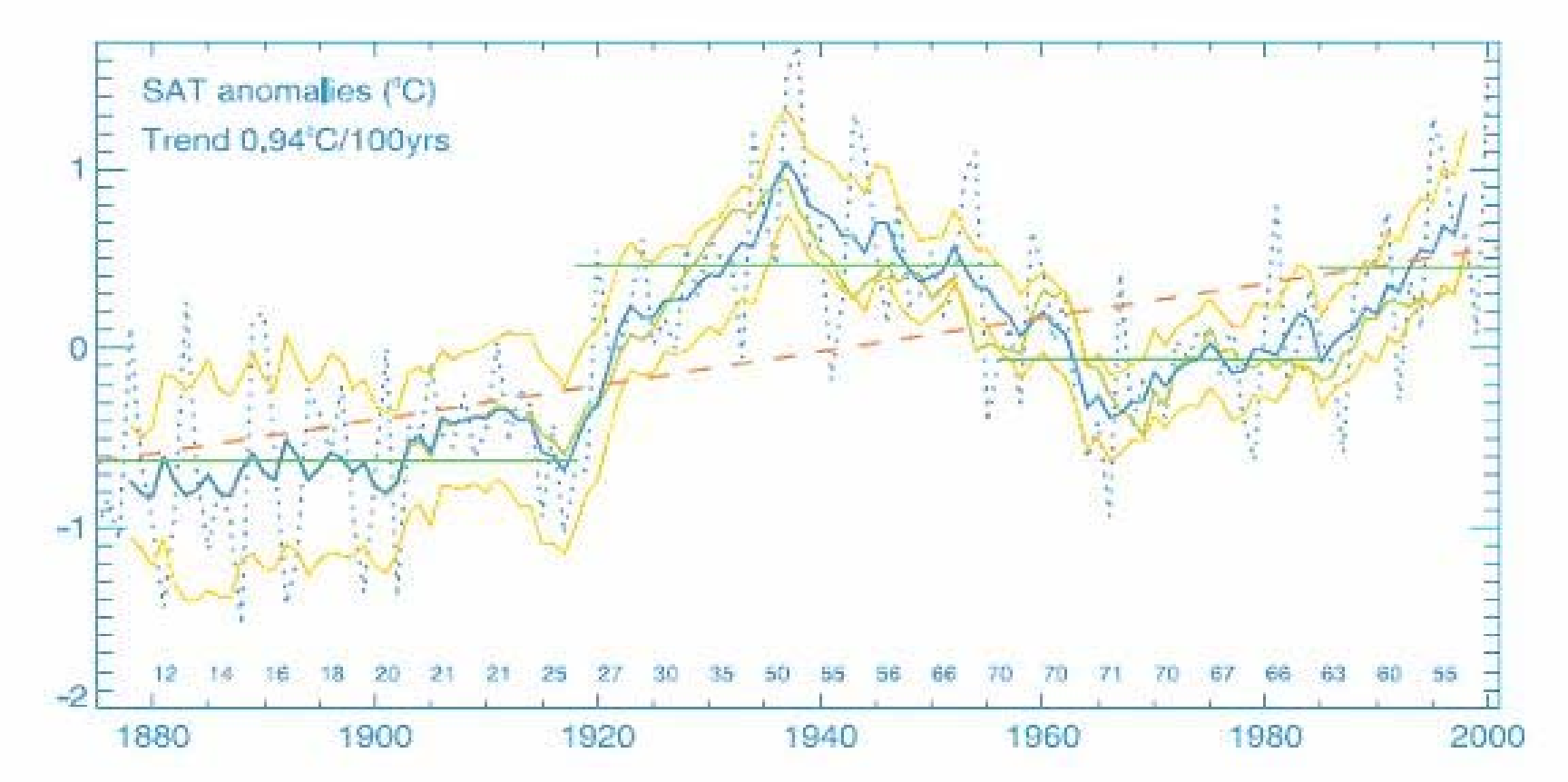
Station: SAN_ANTONIO, TX

(from the United States Historical Climatology Network dataset)

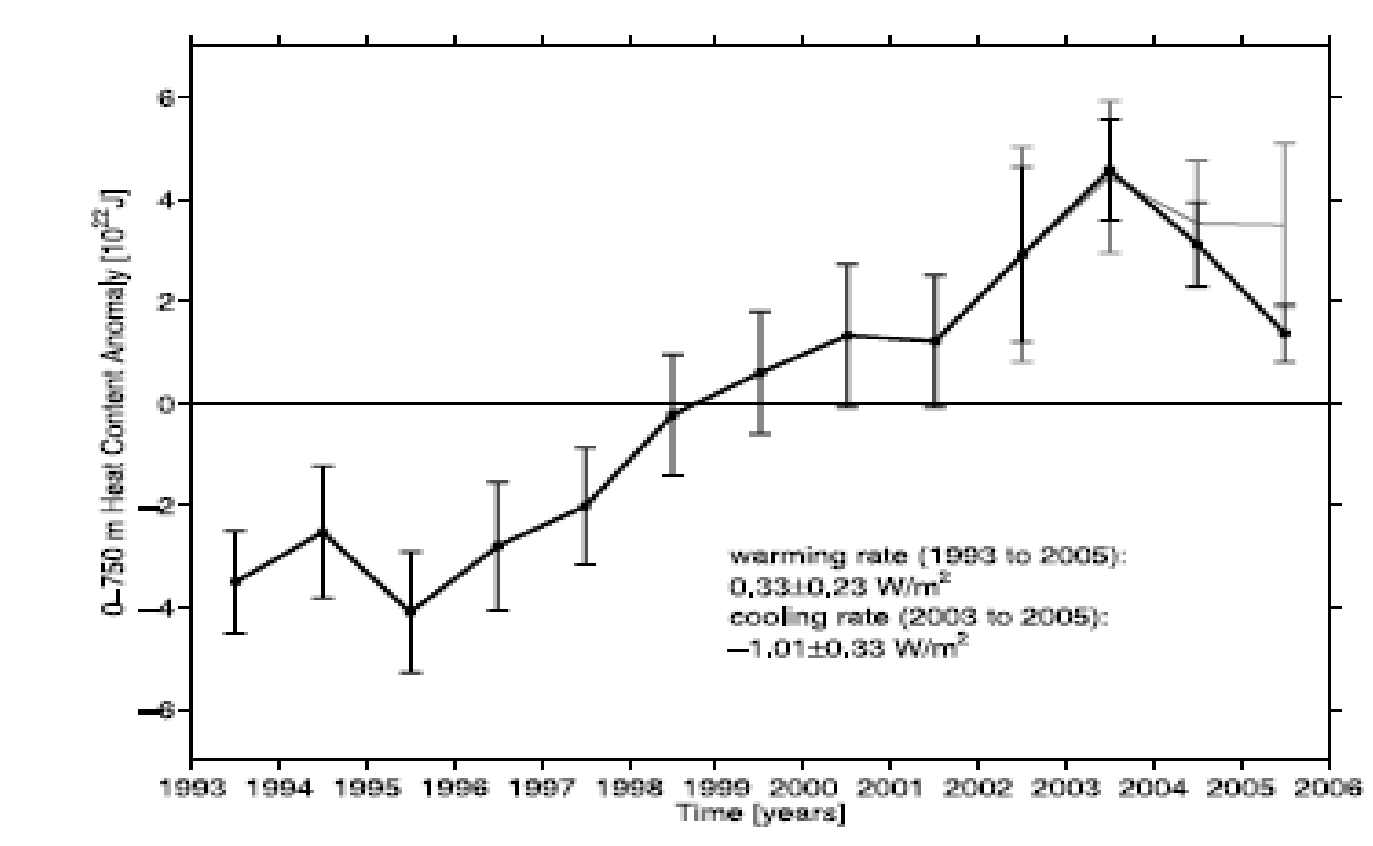


But the Arctic is warming up, **right?**

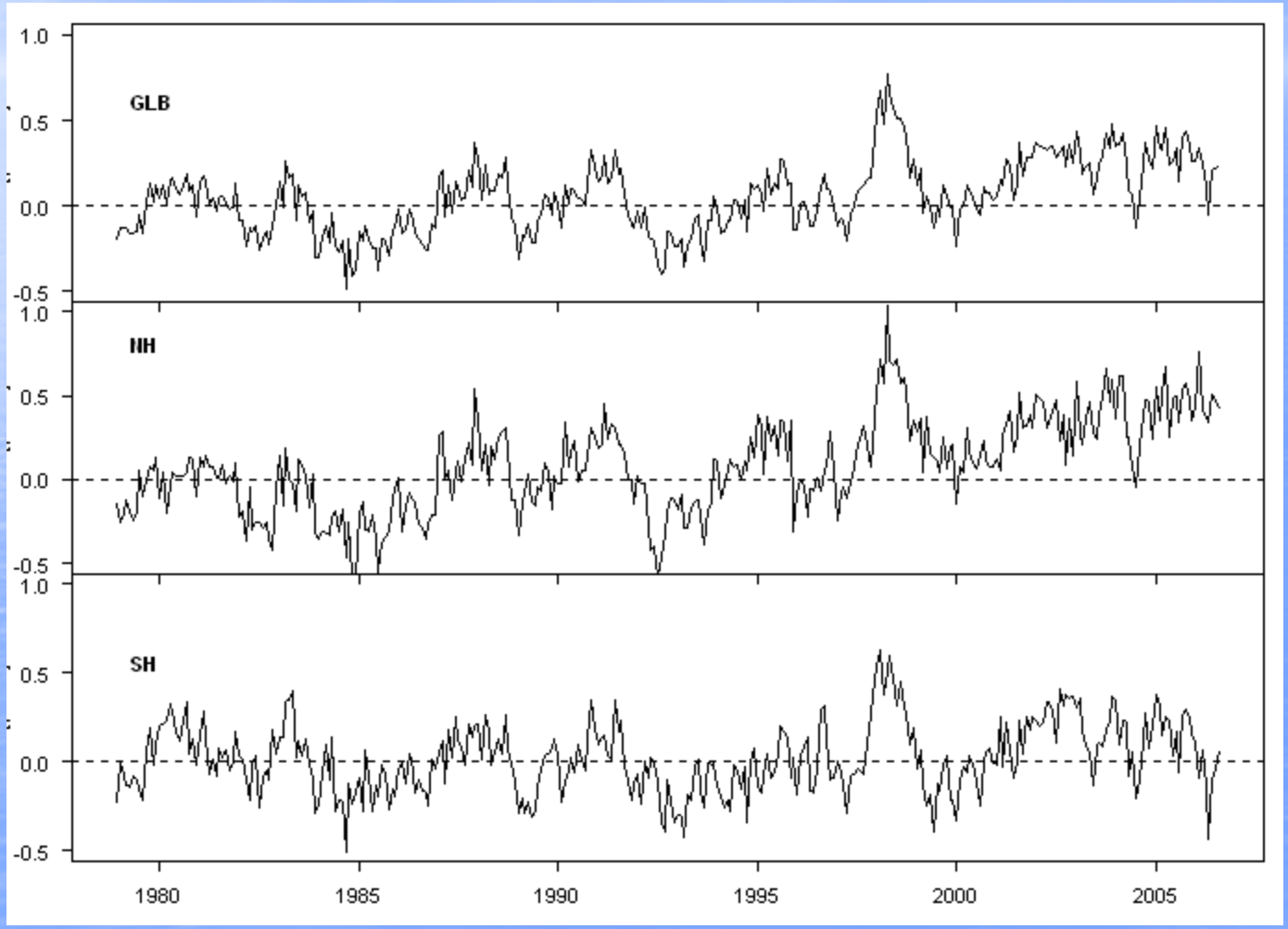
(Source: Polyakov et al., 2003)



New research concludes that 20% of the ocean warming in the past twenty years was lost in the past two years. ***(Source: Lyman et al., Geophysical Research Letters, vol 33, L18604, 20 Sept 2006)***



Christy-Spencer Weather Satellite Global Temperature Record, 1979-2006



However:
The precautionary principle

Better safe than sorry.

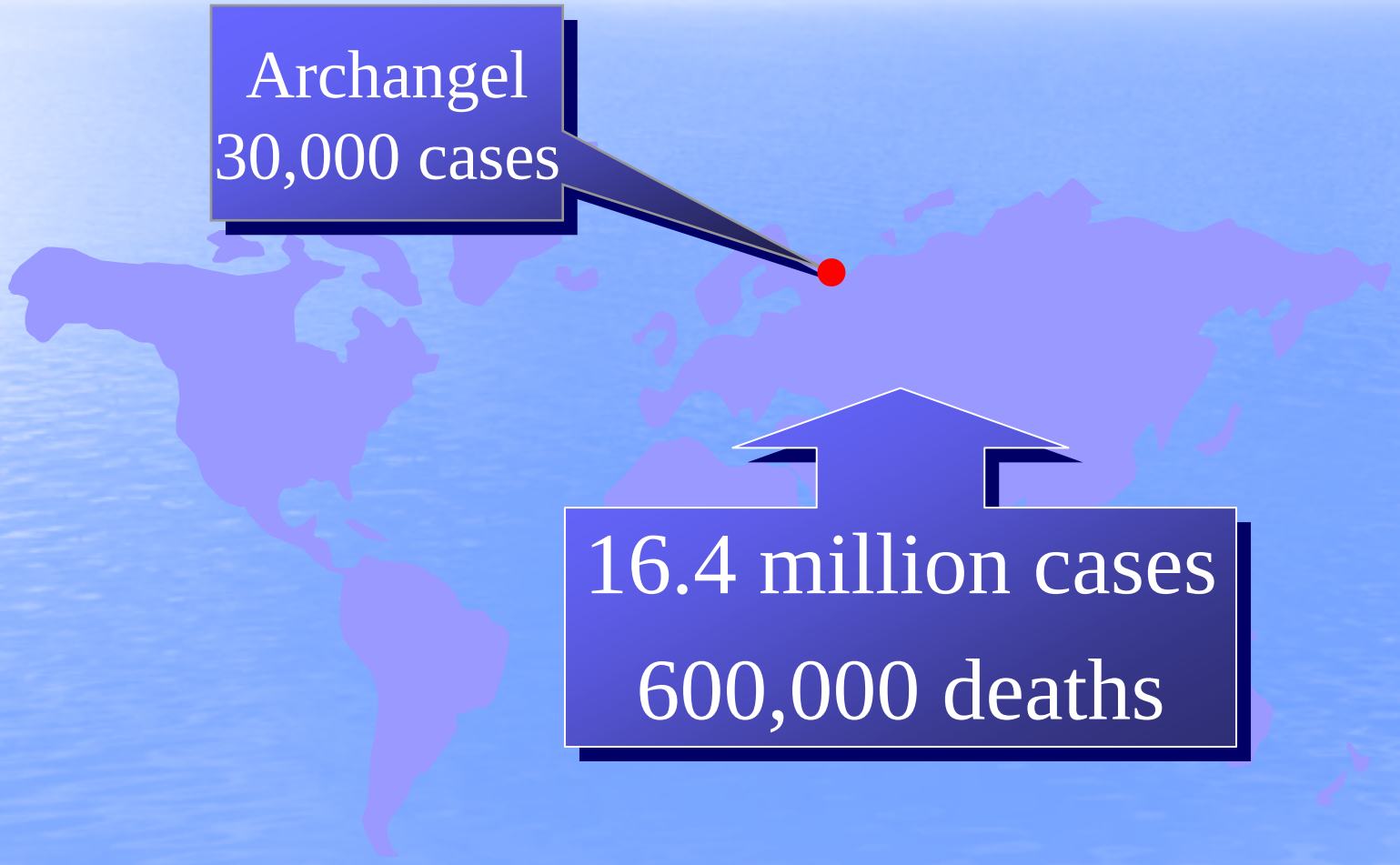
Even if it is unlikely that global warming will turn out to be a serious problem, we must take action anyway because of the remote chance that if there is significant warming there could be significant adverse impacts.

Sea level rise predictions

- Sir David King, chief scientific adviser to Her Britannic Majesty's Government: 20 feet.
- Dr. James Hansen, director of NASA's Goddard Institute for Space Studies: 80 feet.
- Former Vice President Al Gore, Jr., in *An Inconvenient Truth*: 20 feet.
- The *Third Assessment Report* of the U. N. Intergovernmental Panel on Climate change:

  4 to 35 inches, with a best guess of 20 inches.

Malaria, Soviet Union, 1923-1925



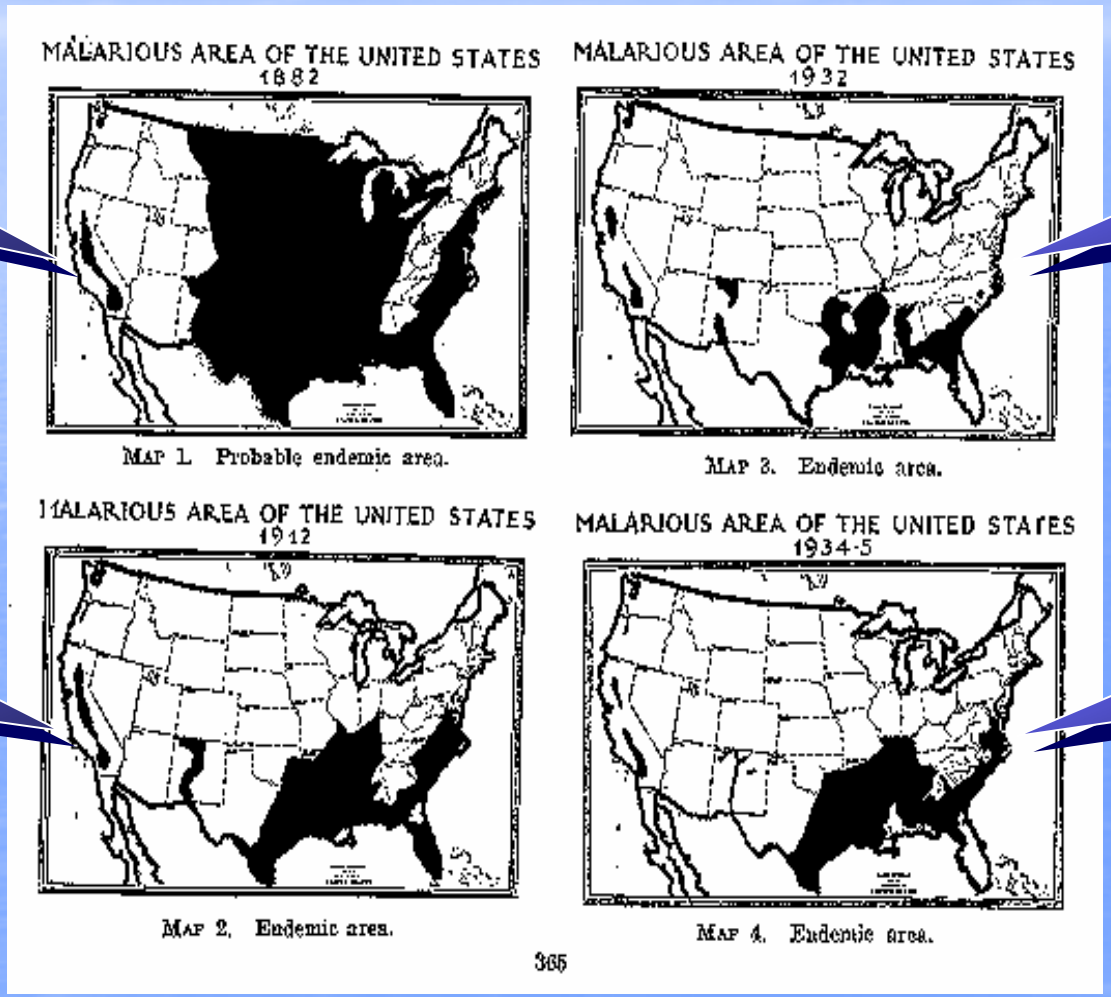
Malaria in the United States

1882

1932

1912

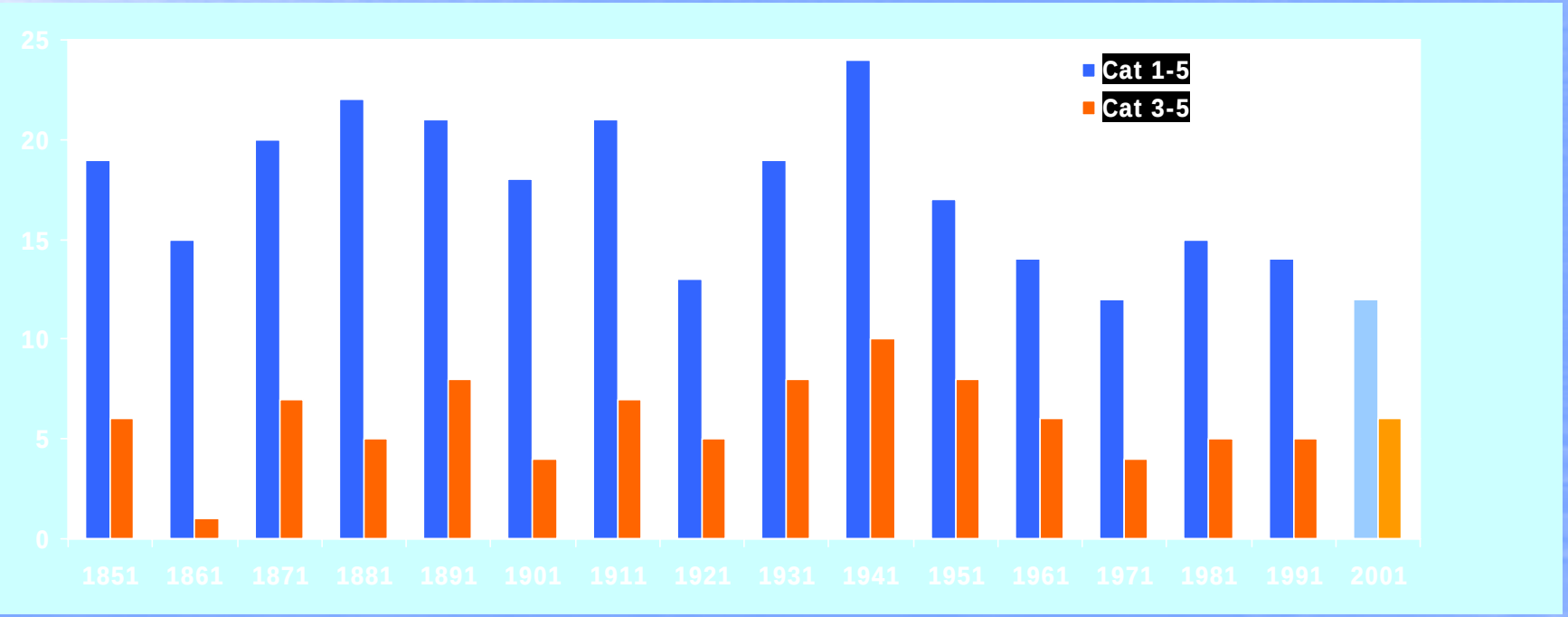
1934-5



US Hurricane Strikes

(Decades, 2001-05 through Rita)

- **Decade Average**
- **Cat 1-5 12.2**
- **Cat 3-5 6.0**



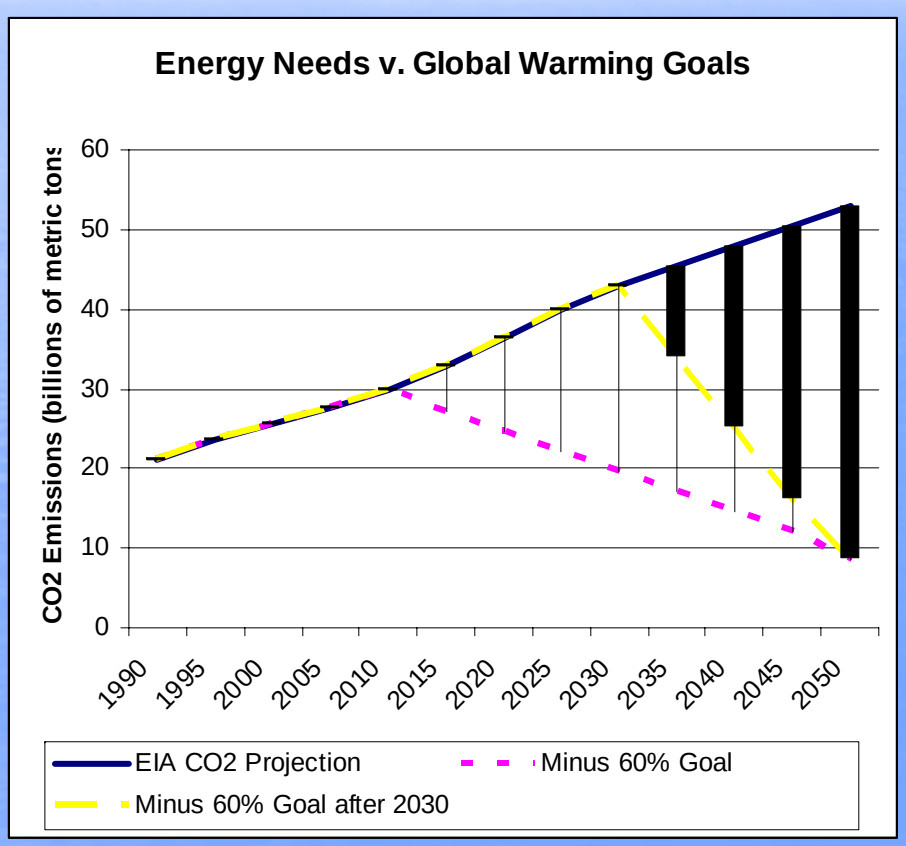
Summary

- Texas is not out of step. Coal will be a growing energy source globally for the next generation.
- Kyoto and similar attempts to put the world on an energy diet are a very expensive dead end.
- That's because the world is not energy rich—it is energy poor.
- Luckily, the current hyperventilating over global warming catastrophe is unwarranted.
- The apocalypse delayed means that we have time for technology to catch up.

The train wreck

- The Kyoto Protocol is just the first step in putting humanity on an ever tighter hydrocarbon energy rationing diet. Leading alarmists are now in general agreement that global greenhouse gas **emissions must be reduced by at least 60% by 2050.** Full compliance with the Kyoto Protocol would only reduce emissions by 5%.

The train wreck:
Global Energy Needs versus *Global Warming Goals*



Outcomes and conclusions

- The Kyoto Protocol and all similar attempts to put the world on a hydrocarbon energy diet are a dead end.
- But they may be an expensive dead end. Global warming policies are much more dangerous than any potential global warming.
- Also, opportunity costs matter.
- If global warming turns out to be a problem, then the only practical solution is to develop and deploy transformational energy technologies in the long term.

Wisdom from Al Gore

"And that is what is at stake. Our ability to live on planet Earth—to have a future as a civilization.

"I believe this is a moral issue."

—*An Inconvenient Truth* (2006, page 298)

Al Gore is right—it is a moral issue.

- **The global warming debate is really about whether we are going to have a world of energy starvation or abundance.** In a world where nearly two billion people lack access to electricity, the world is not energy rich—it is energy poor. By producing affordable electricity, the benefits of coal to humanity are immense and are immensely greater than all the negative environmental externalities combined, including greenhouse gas emissions.
- To oppose taxes or cap-and-trade schemes on greenhouse gas emissions is a matter of self interest for coal producers and burners. But it is not merely a matter of self-interest. **Whether we create a future of energy poverty or plenty is of the greatest importance to humanity.** Instead of being apologetic and defensive, coal producers and burners should be proud of what they do.