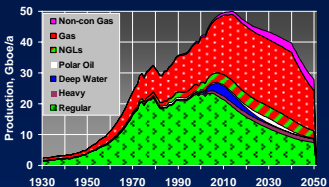


Energy, Environment and Public Transportation

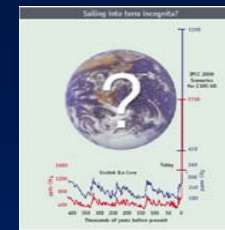
August 17, 2006

Tony Noerpel





Problems and Solutions



The Problem Space

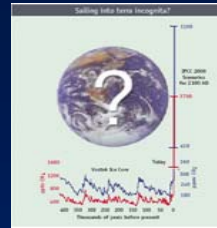
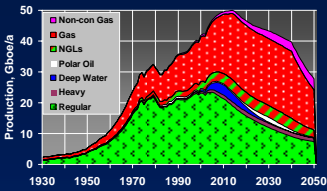


The Solution Space



Freight trains use 10% of the fuel that trucks use.
 Light rail and other forms of mass transportation are more efficient
 and more economic than cars.

Example: Africa



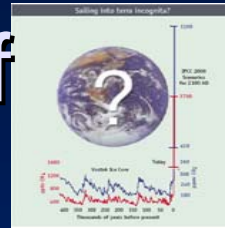
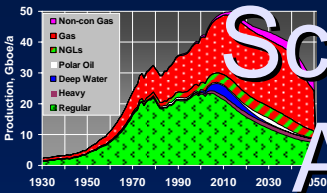
- Debt relief for sub-Saharan Africa will save those countries \$1 Billion per year, however...
- Oil prices of \$55 pbl will cost an additional \$10.5 Billion per year over 2002 average price of \$26.^{1,2}
- Desertification and draught caused by global warming threaten all agriculture in region.³

1 Financial Times, July 2, 2005, p. 2

2 War of the Future- Oil Drives the Genocide in Darfur by David Morse; TomDispatch; August 18, 2005

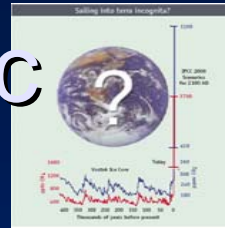
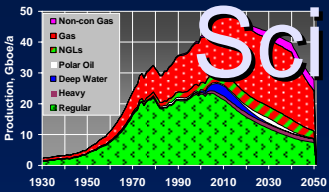
3 Thomas, Knight, Wiggs, "Remobilization of southern African desert dune systems by twenty-first century global warming," Nature, June, 2005

Scientific Support for the Theory of Anthropogenic Global Warming



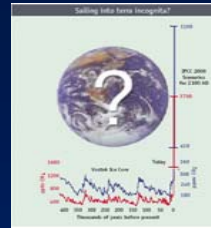
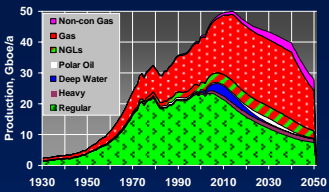
- 1995 IPCC Report
- 2001 IPCC Report
- 2005 World Bank Millennium Ecosystem Assessment
- Arctic Climate Impact Assessment
- The American Meteorological Society, the American Geophysical Union, the American Association for the Advancement of Science and the National Academy of Science
- Pentagon report on global warming "An Abrupt Climate Change Scenario and Its Implications for United States National Security"
- Joint Science Academy Statement, 2005

Scientific Support for Anthropogenic Global Warming Theory



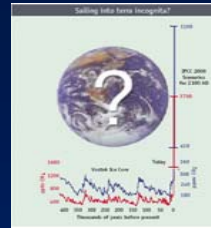
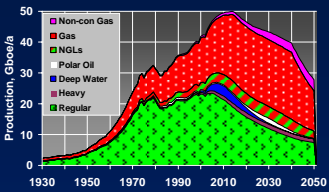
	Peer-reviewed articles in science journals	Articles in popular press
	928	636
Percentage in doubt as to cause of global warming	0%	53%

Naomi Oreskes, "The scientific consensus on climate change", Science 306, 5702 #686, 2004, see also Washington Post Sunday, December 26, 2004



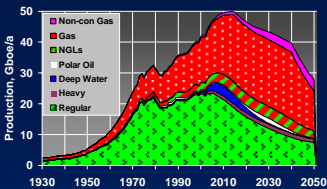
Ignorance more frequently
begets confidence than does
knowledge

Charles Darwin

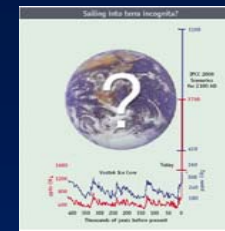


Prediction is difficult, especially of the future.

Niels Bohr

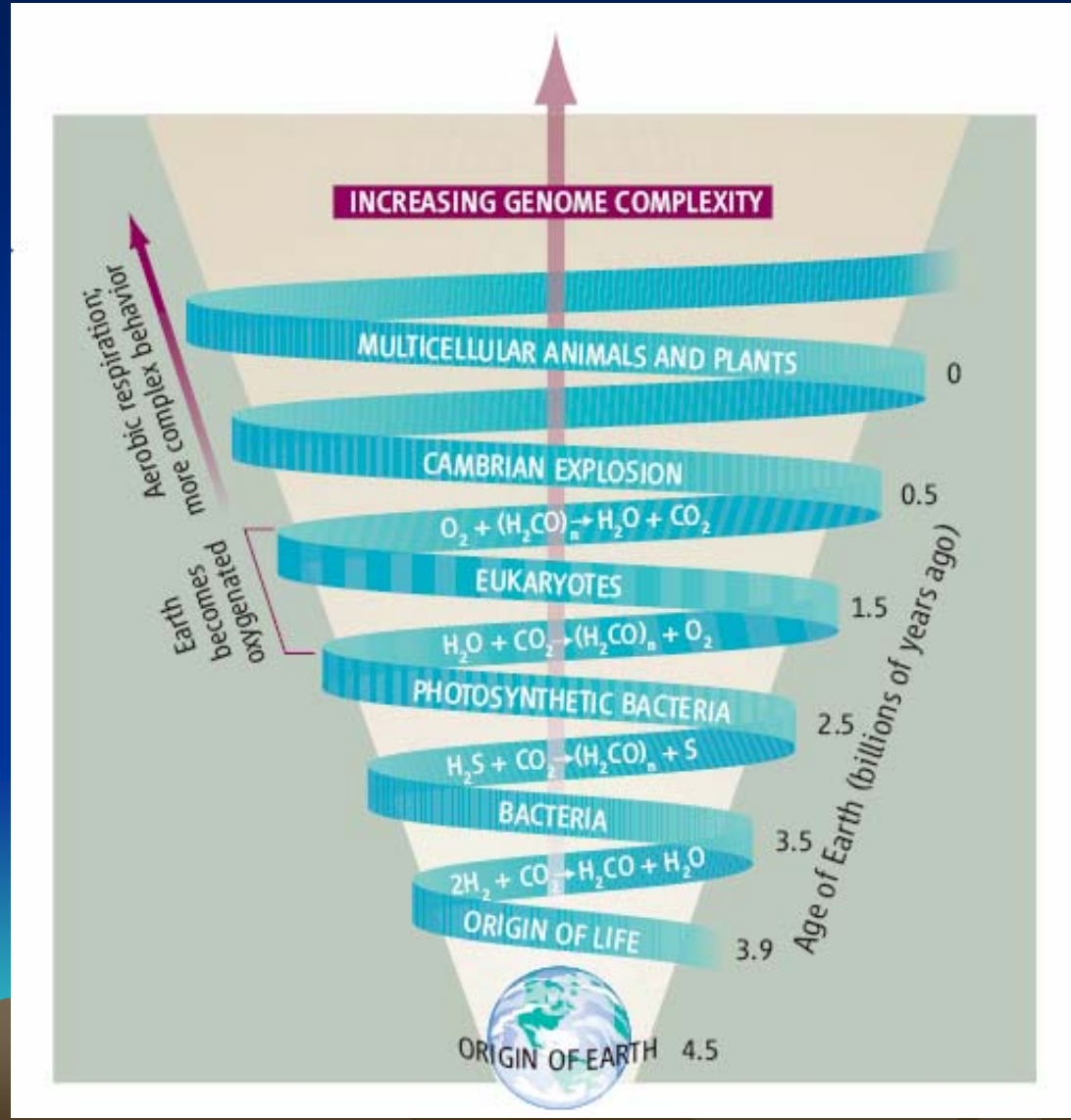
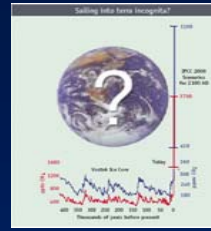
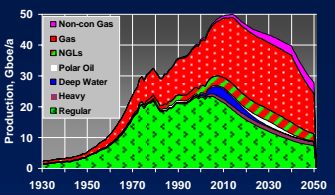


Patterson's Method

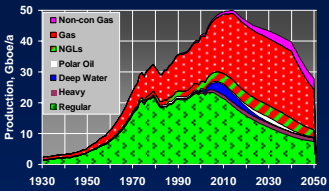


Uranium deteriorates to lead at a fixed rate with a half life of about 4 billion years (uranium-238, thorium-234, protactinium-234, uranium-234, thorium-230, radium-226, radon-222, polonium-218, lead-214, bismuth-214, polonium-214, lead-210, bismuth-210, polonium-210 and finally non-radioactive lead-206). The ratios of lead and uranium have been used not just to determine the age of the Earth but also to date geological ages and past extinction events.

The evolution of genomic complexity and metabolic pathways during Earth's history.

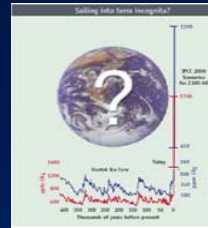
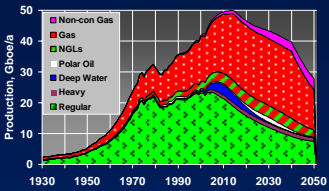


Earth Extinction Events

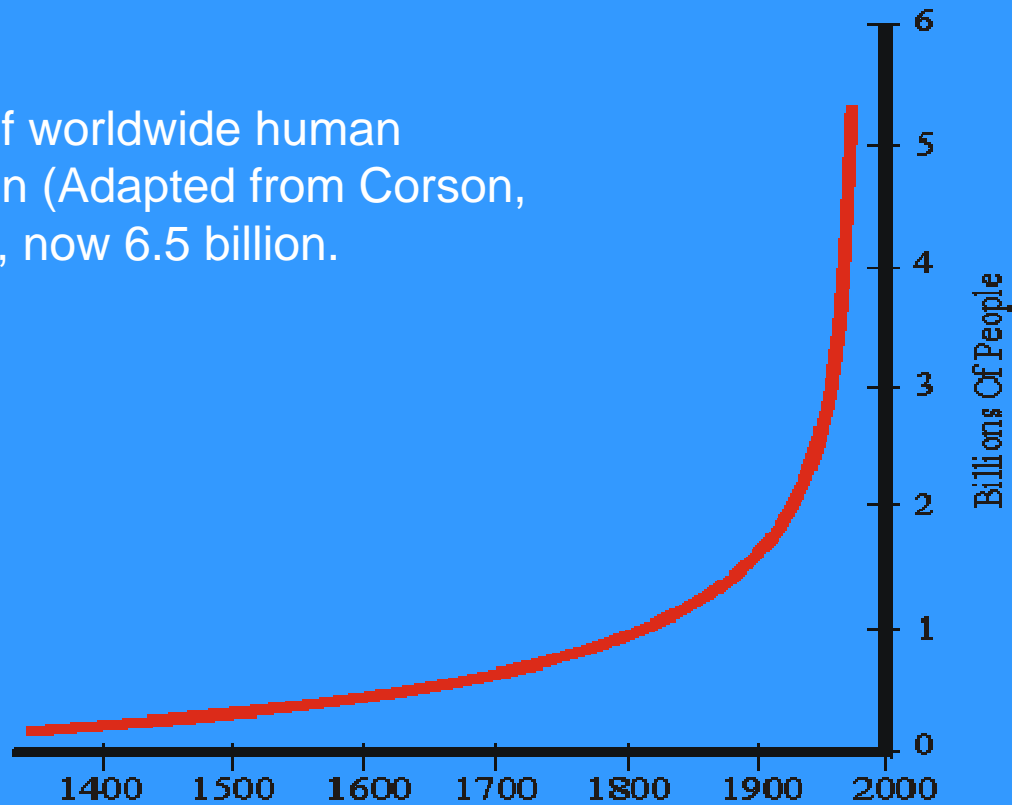


Event	when	severity
Holocene	now	50% of all species – it is also a fast extinction event ¹
Paleocene-Eocene thermal maximum	55	30% of marine species, many mammals
Cretaceous-Tertiary	65	47 percent of marine genera and 18 percent of land vertebrate families
End Triassic	200	22 percent of marine families, 52 percent of marine genera
Permian	251	95 percent of all species
Late Devonian	364	22 percent of marine families and 57 percent of marine genera
Ordovician-Silurian	439	25 percent of marine families and 60 percent of marine genera

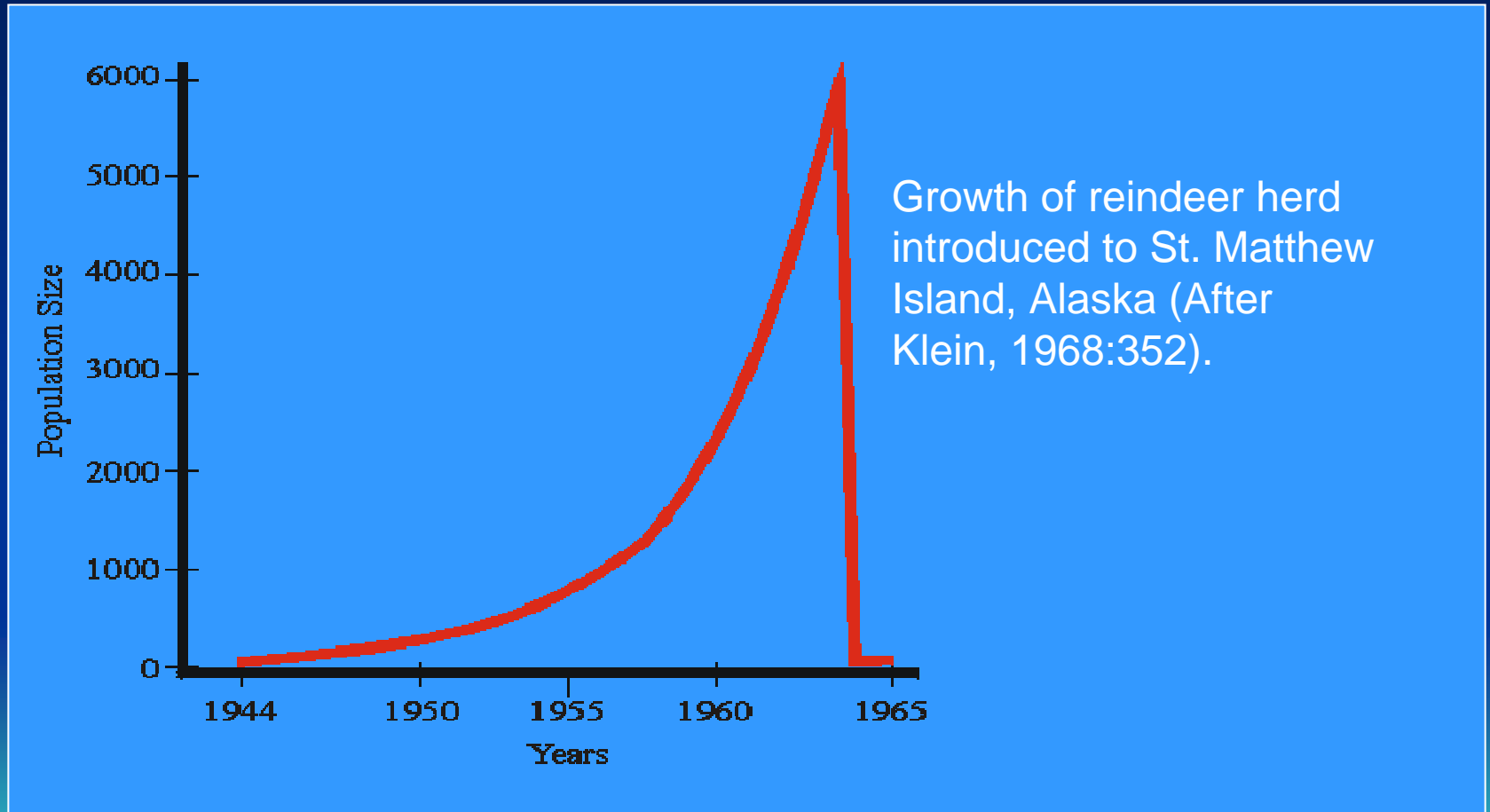
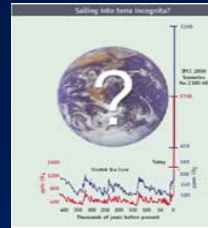
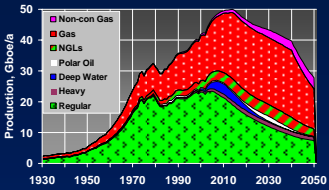
Growth of human population



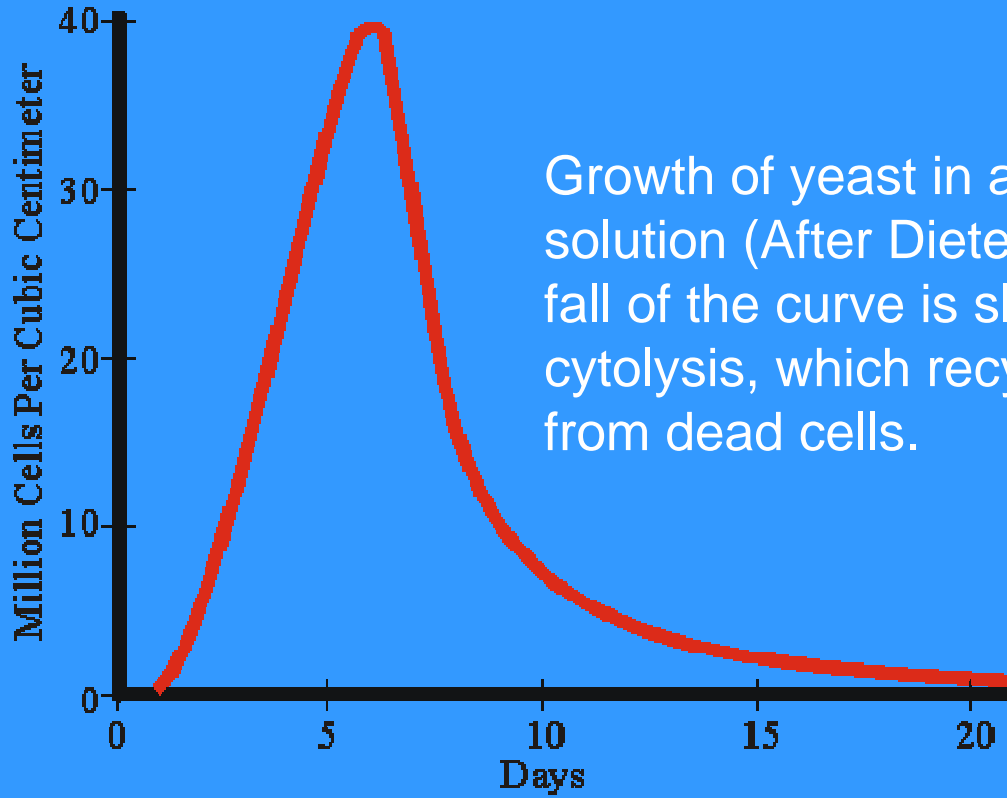
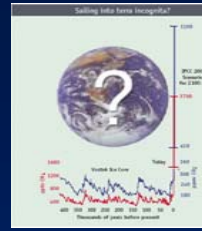
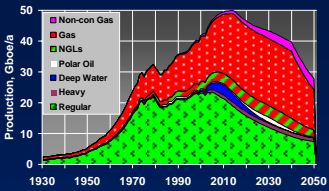
Growth of worldwide human population (Adapted from Corson, 1990:25), now 6.5 billion.



Growth of reindeer herd

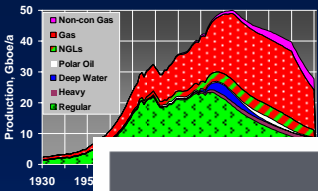


Growth of yeast

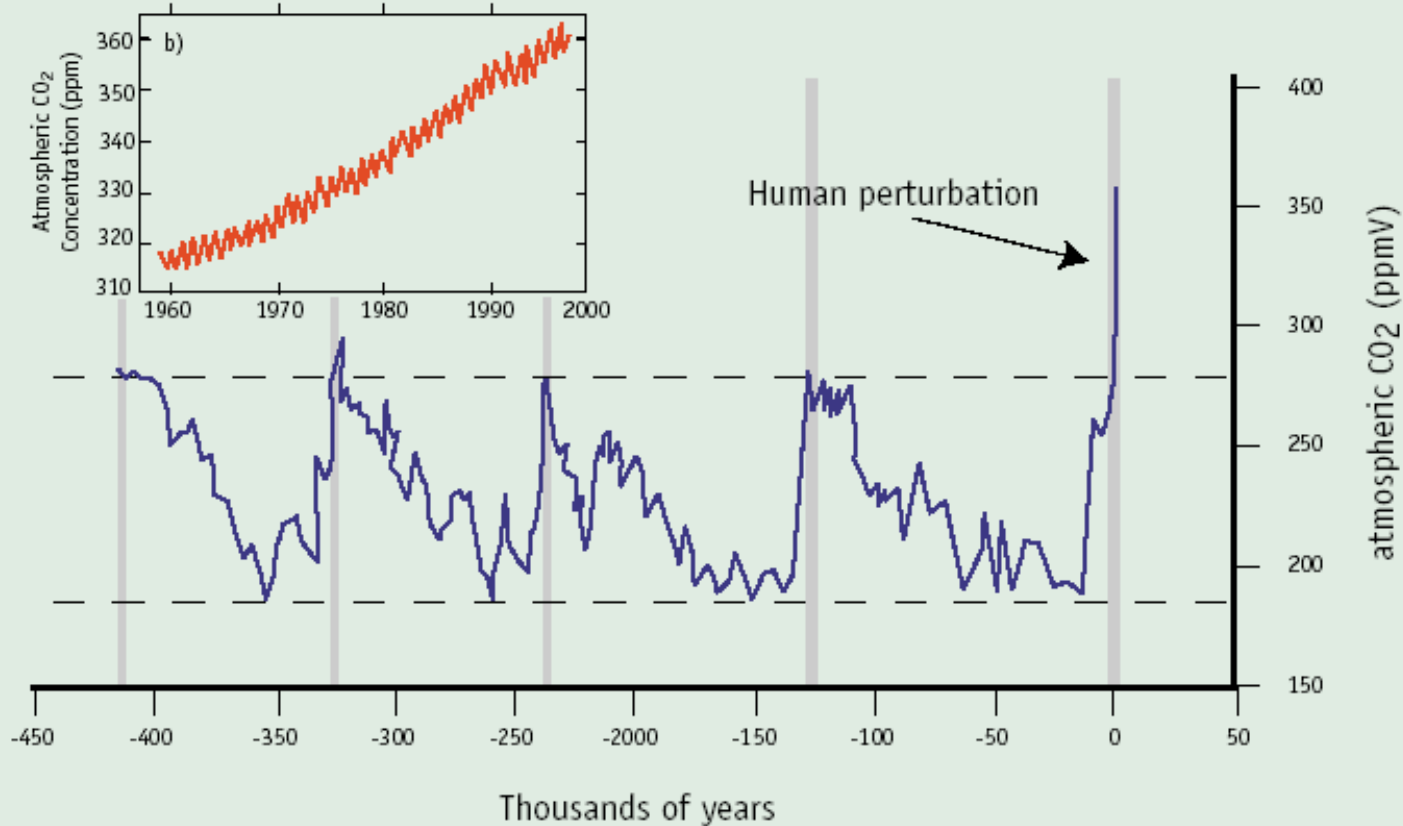


Growth of yeast in a 10% sugar solution (After Dieter, 1962:45). The fall of the curve is slowed by cytolysis, which recycles nutrients from dead cells.

Atmospheric Carbon



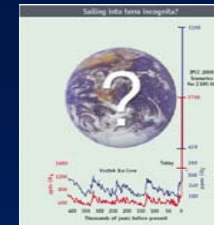
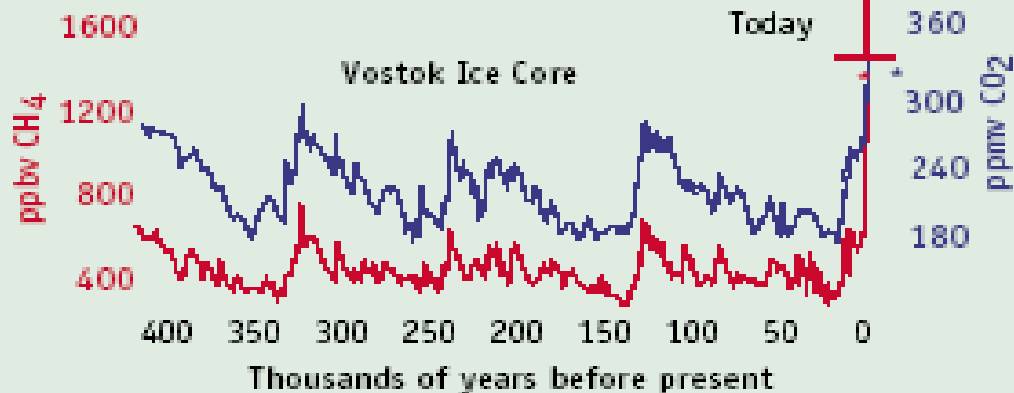
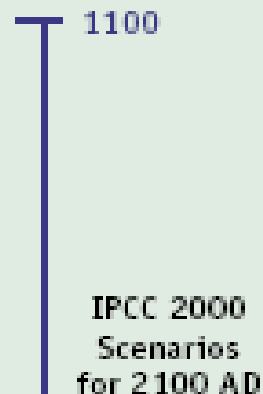
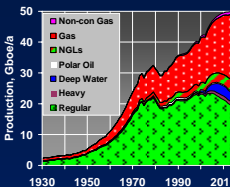
The recent human influence on the carbon cycle



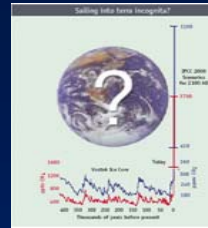
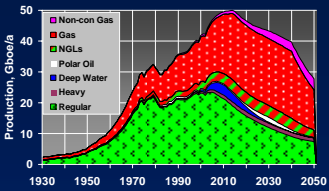
Sources: Petit et al. (1999) Nature 399, 429-436 and National Oceanic and Atmospheric Administration (NOAA), USA

Sailing into terra incognita?

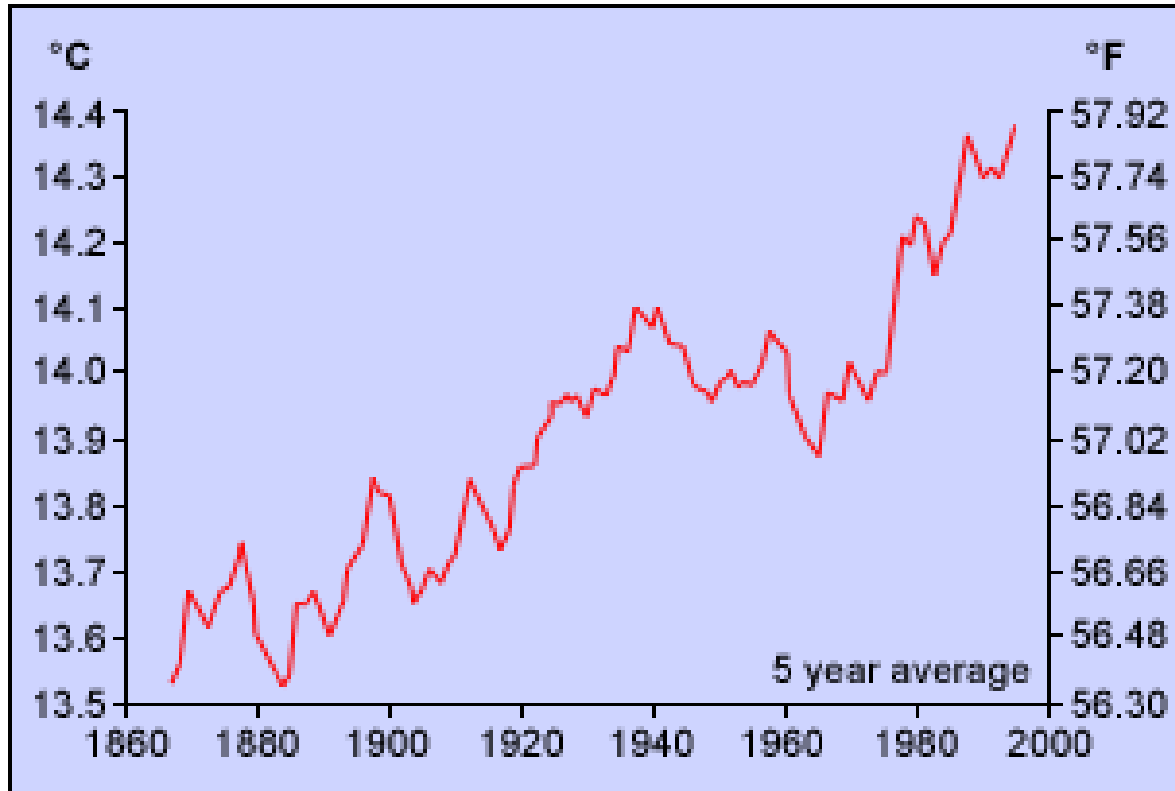
Adapted from Petit et al. (1999) Nature 399, 429-436 and the IPCC (Intergovernmental Panel on Climate Change) Third Assessment Report by the PAGES (Past Global Changes) International Project Office.



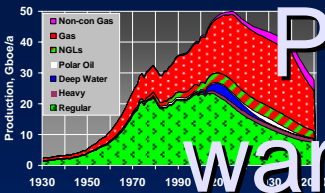
Global Average Temperature



Global Average Temperature



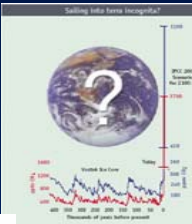
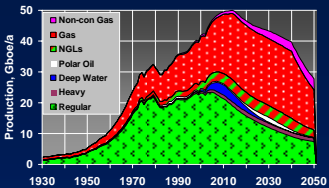
NOAA/UCAR



Positive Feedback or why global warming is worse than the estimates

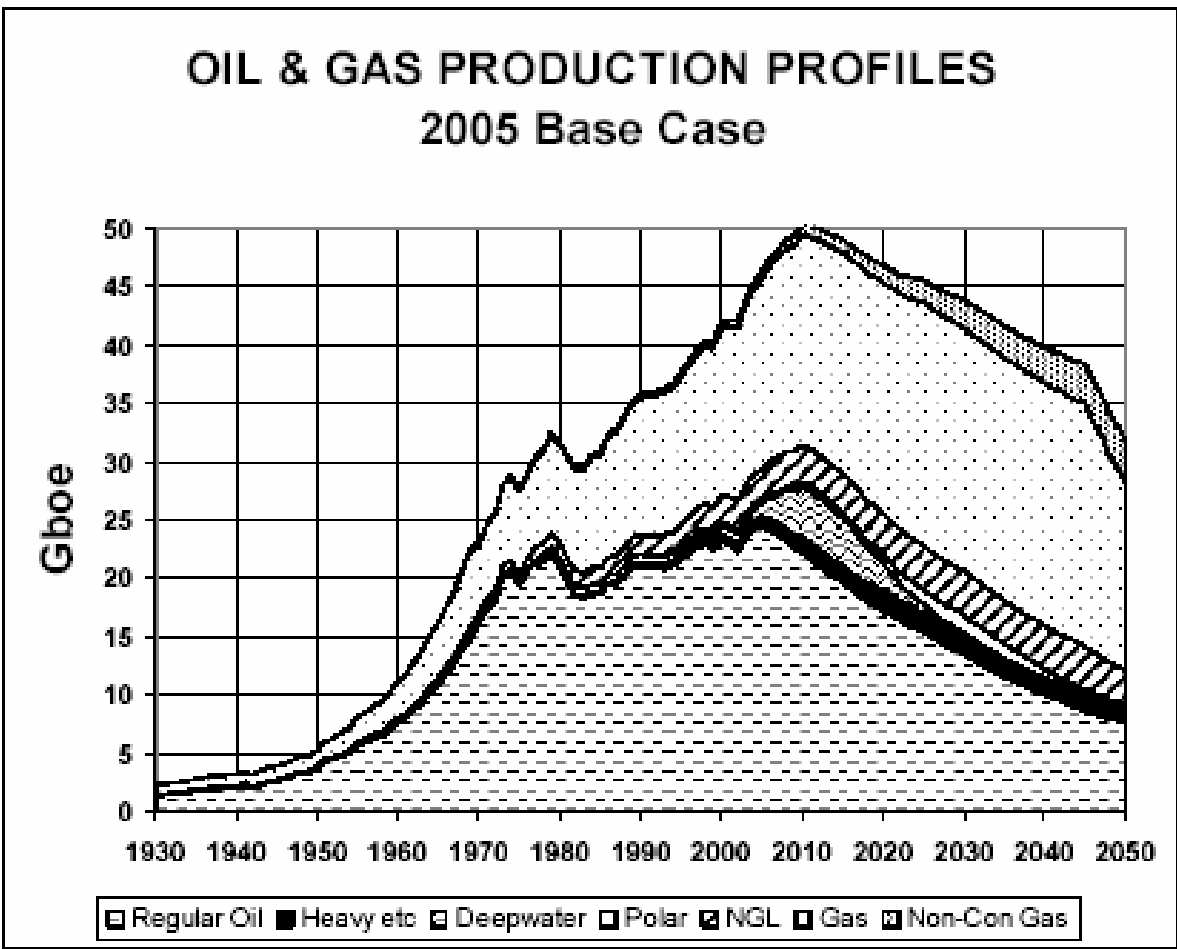
- Albedo effect
- Melting of the permafrost in Alaska and Russia results in release of methane (effect unaccounted in 2001 IPCC report)
- Spread of bark beetles and draught causing forest fires releasing huge quantities of carbon into the atmosphere
- Hotter atmosphere is capable of absorbing more water vapor – also a green house gas which acts as an amplifier¹
- Anthropogenic deforestation not just in Amazon but in West Virginia coal belt

¹ Soden et. Al. Science, The Radiative Signature of Upper Tropospheric Moistening, October 6 2005; 10.1126/ science.1115602

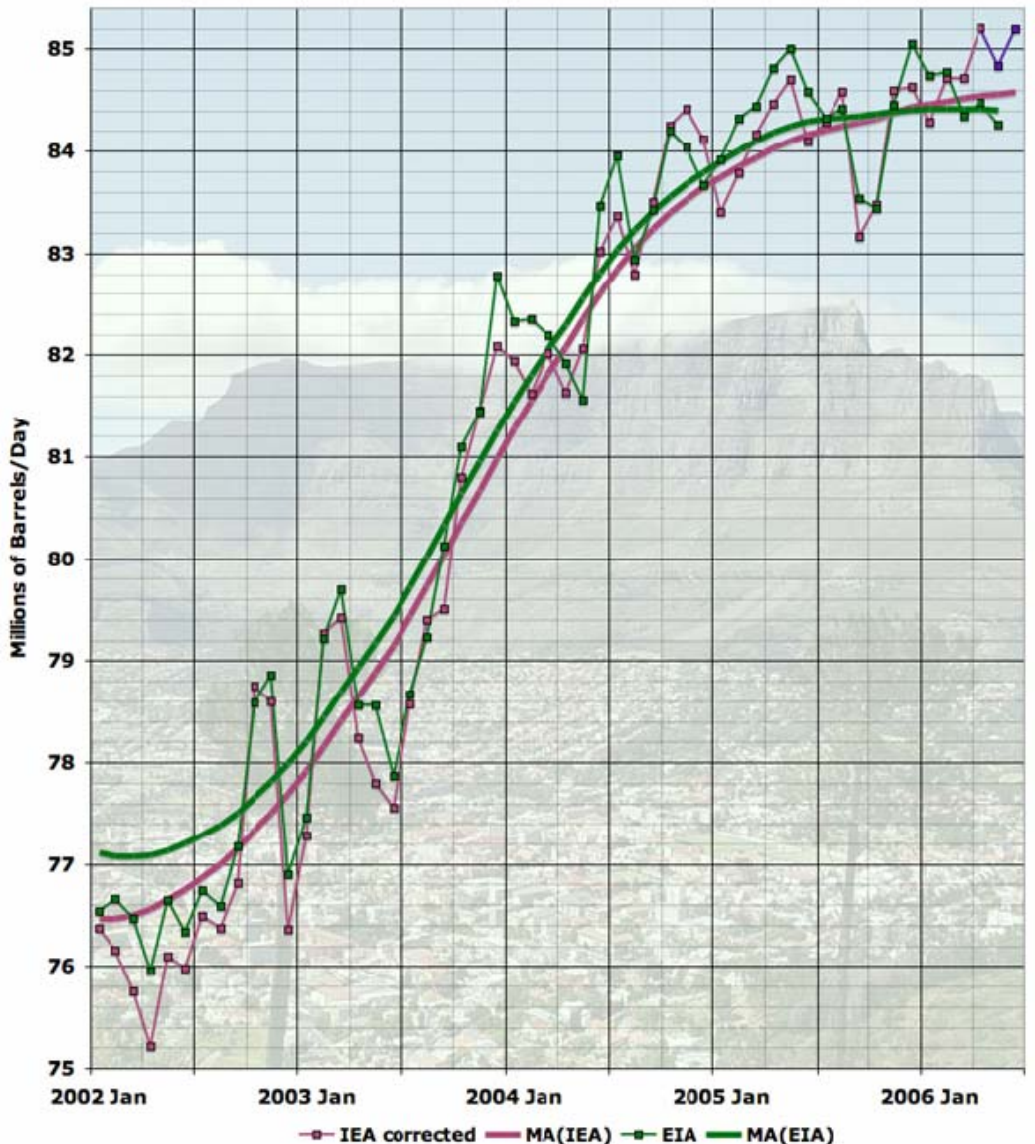
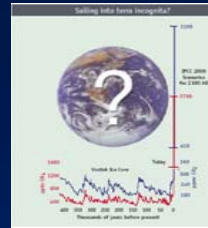
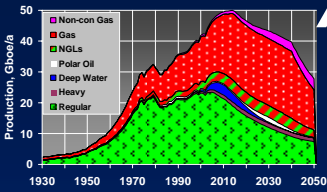


The General Depletion Picture

OIL & GAS PRODUCTION PROFILES 2005 Base Case

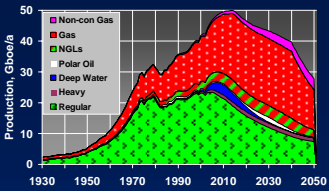


Average daily oil production, by month, from EIA and IEA



with 13 month centered moving averages. Believed to be all liquids. Source: [IEA Oil Market Reports](#), and [EIA International Petroleum Monthly Table 1.4](#).

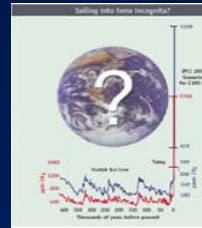
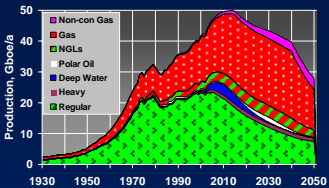
Profit in Kyoto



	Japan		US	
MPG CAFÉ requirements	45		23	
	Toyota	Honda	GM	Ford
% change in market cap 2/05-11/05	+12%	+3%	-36%	-33%

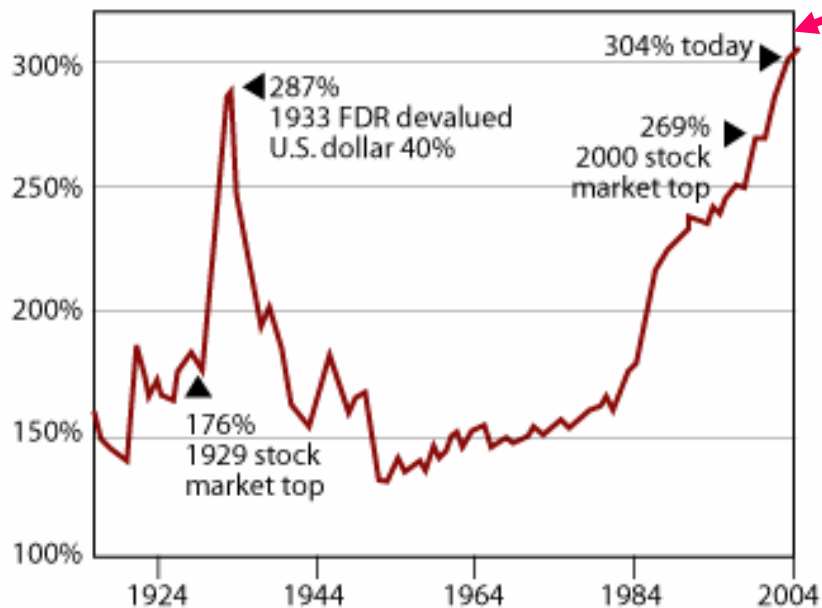
This is a time where environmental improvement is going to lead toward profitability – Jeff Immelt, CEO, GE

Our Economy



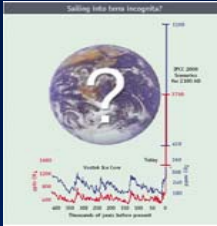
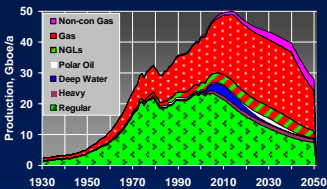
Credit Crazy?

Total U.S. Credit Market Debt as % of GDP



Source: the Wall Street Journal

That was a year ago. As of 1Q, 2006, ratio was 316%.

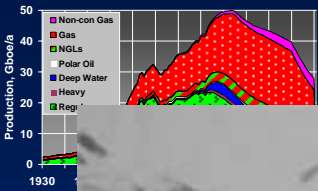


It is difficult to get a man to understand something when his salary depends upon his not understanding it

Upton Sinclair



Portage Glacier Alaska



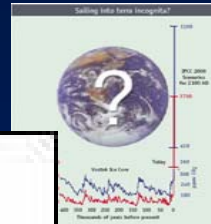
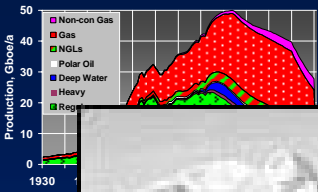
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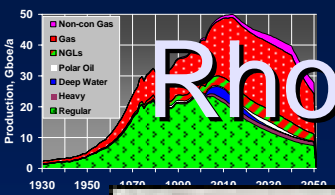
2004 copyright Gary Braasch ->

<http://www.worldviewofglobalwarming.org/pages/glaciers.html>

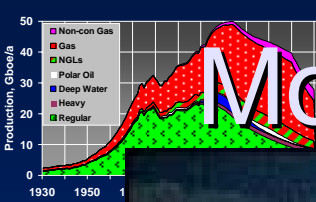
Greenpeace



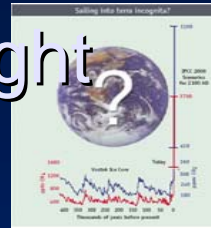
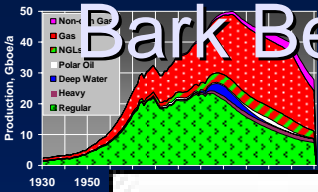
Rhone Glacier – Braasch copyright?



Mount Hood – Braasch copyright

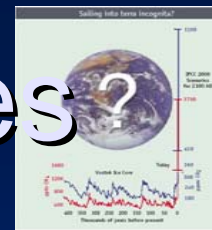
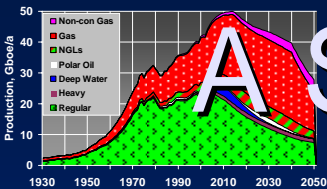


Bark Beetle destruction Alaska – Braasch copyright



© GARY BRAASCH

A Smaller Ice Cap - NY Times

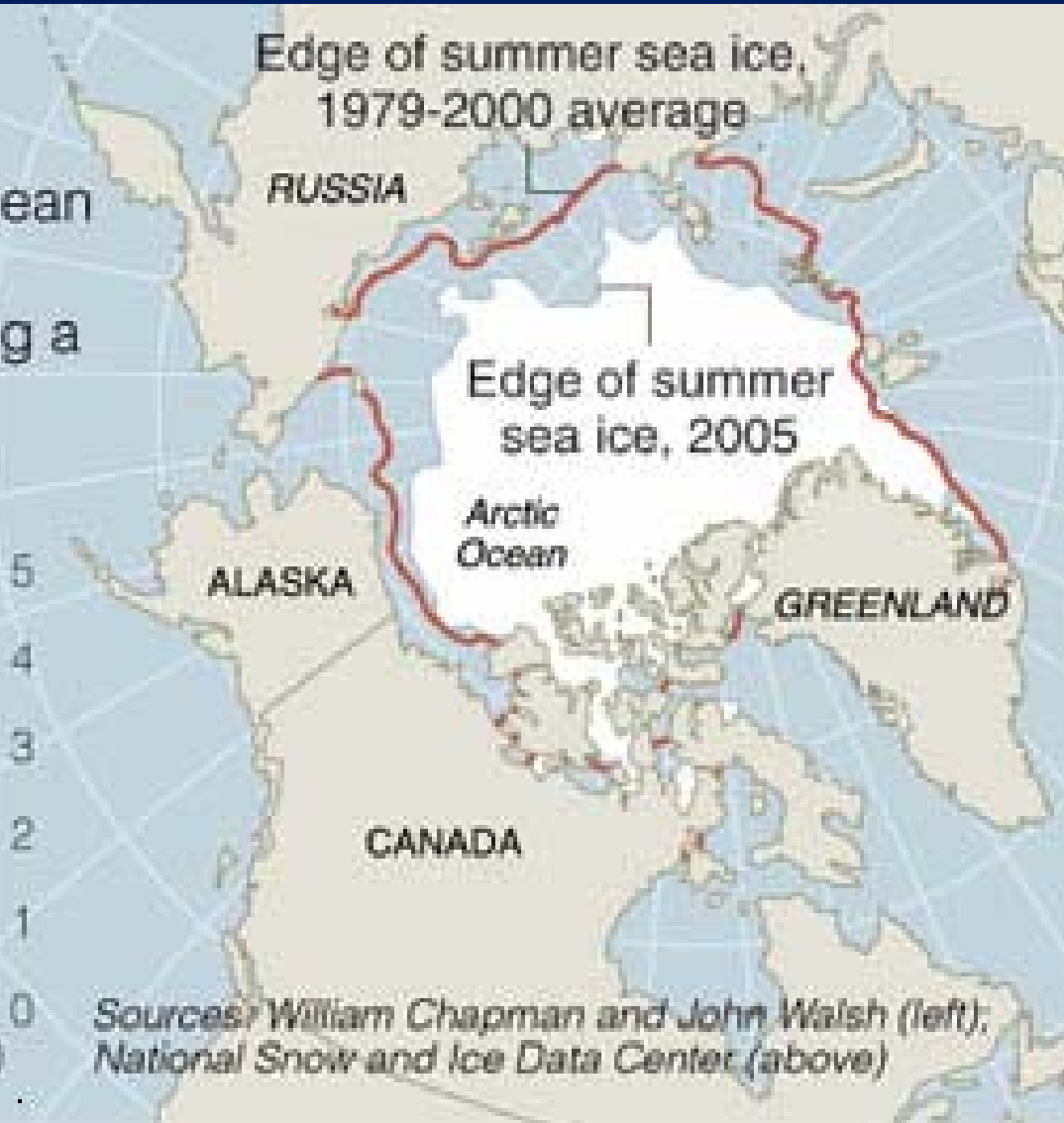
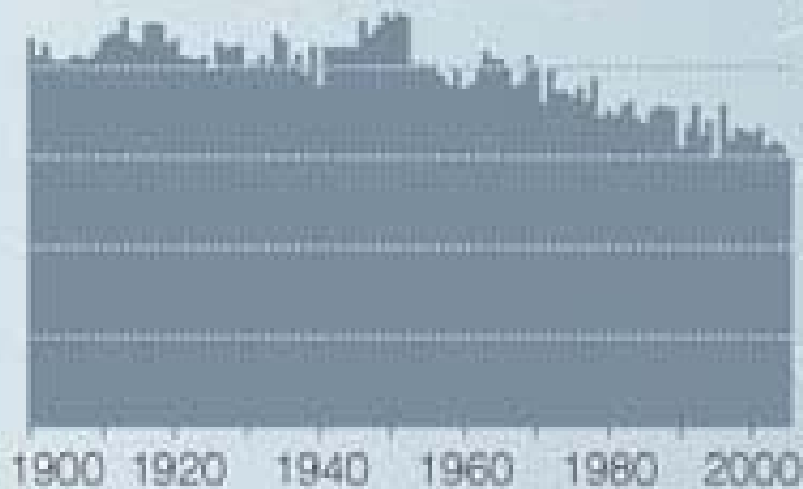


A Smaller Ice Cap

The ice covering the Arctic Ocean shrank to its smallest size in a century this summer, continuing a trend of decades.

EXTENT OF SUMMER SEA ICE

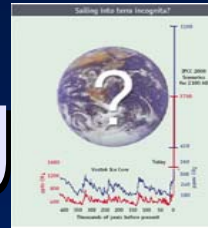
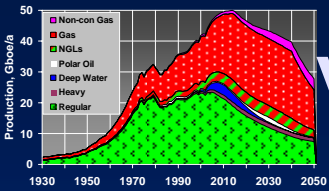
In millions of square miles



Sources: William Chapman and John Walsh (left); National Snow and Ice Data Center (above)



Victims of Global Warming





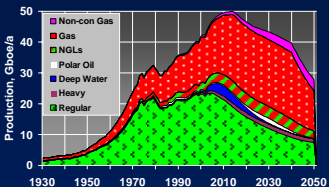




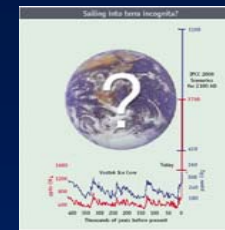








Problems and Solutions



The Problem Space



The Solution Space



Freight trains use 10% of the fuel that trucks use.
Light rail and other forms of mass transportation are more efficient and more economic than cars.



**“Our mothers give us birth, but the land gives us life”
Larry Gibson**