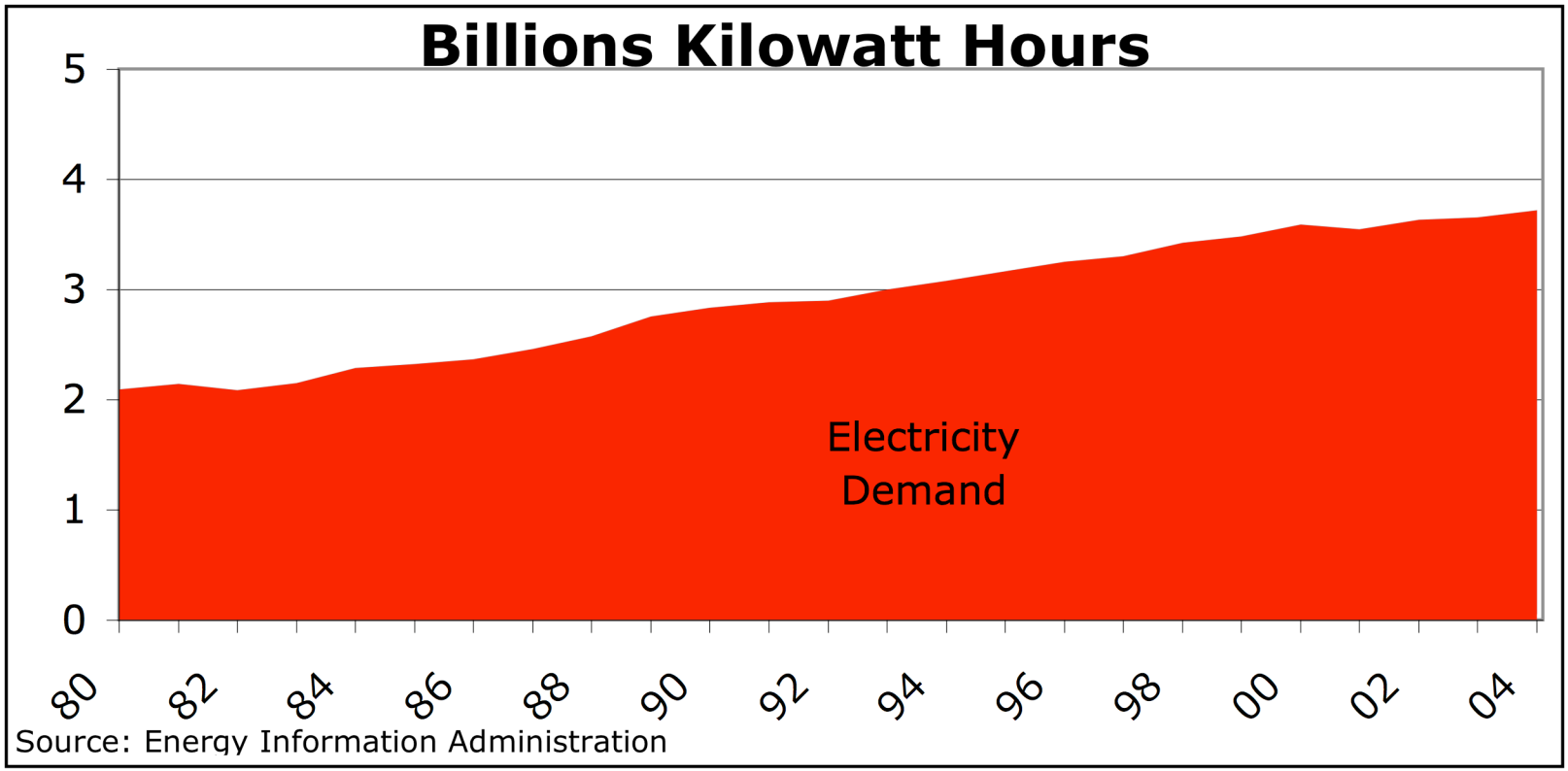
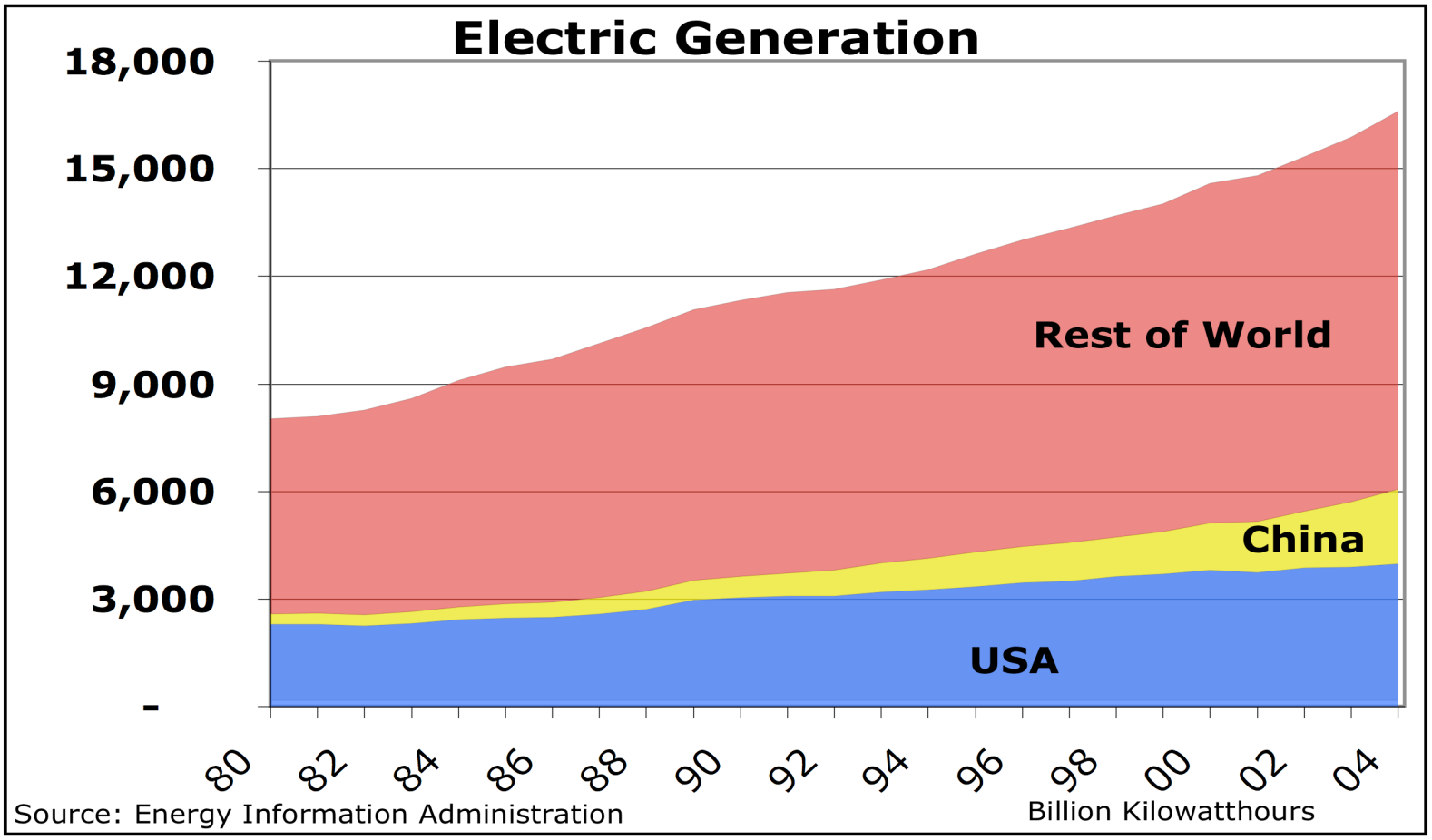
Energy Analysis

U.S. Electricity Usage



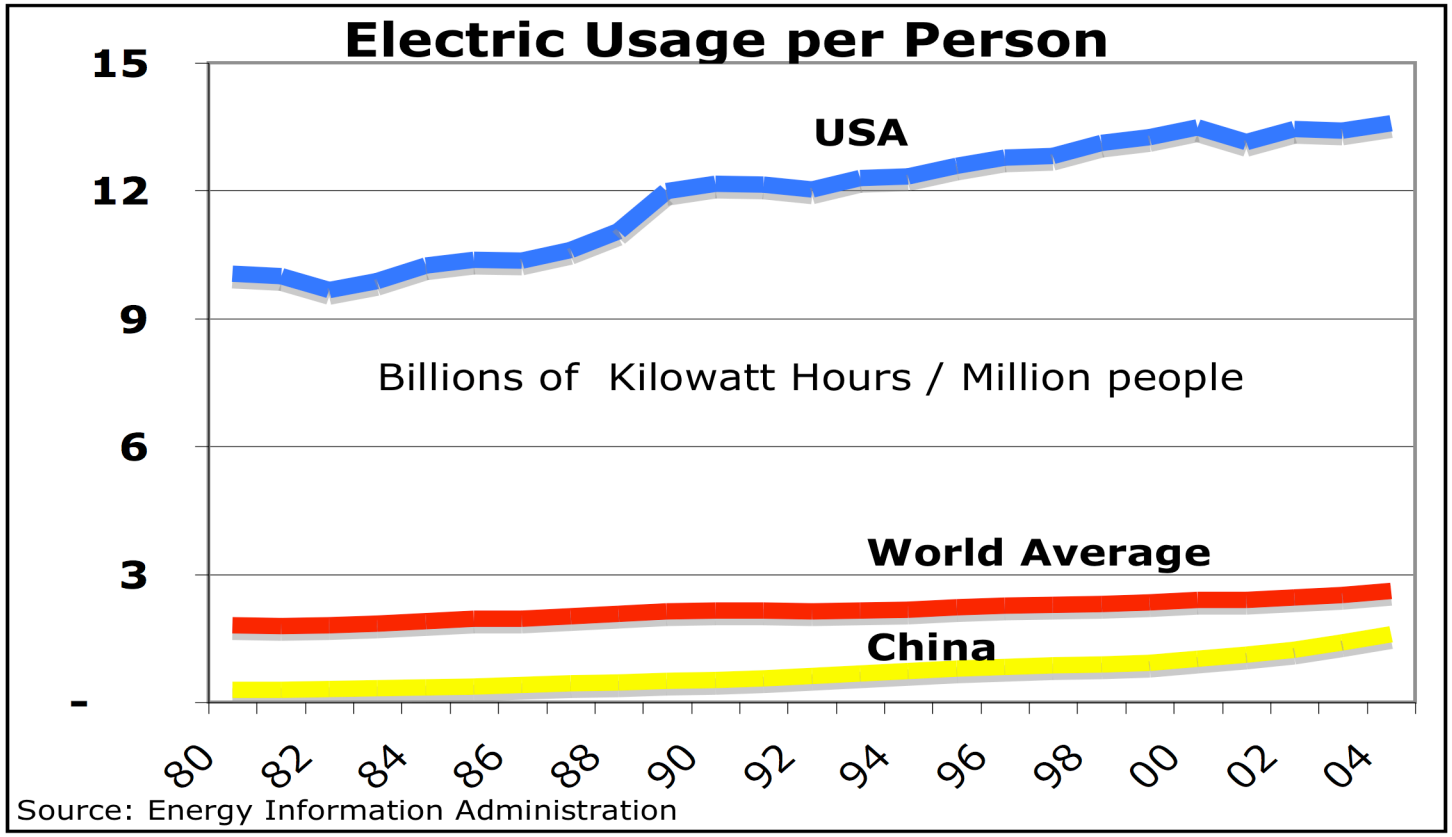
Demand for electricity has grown significantly over the last several decades.

World Electric Generation



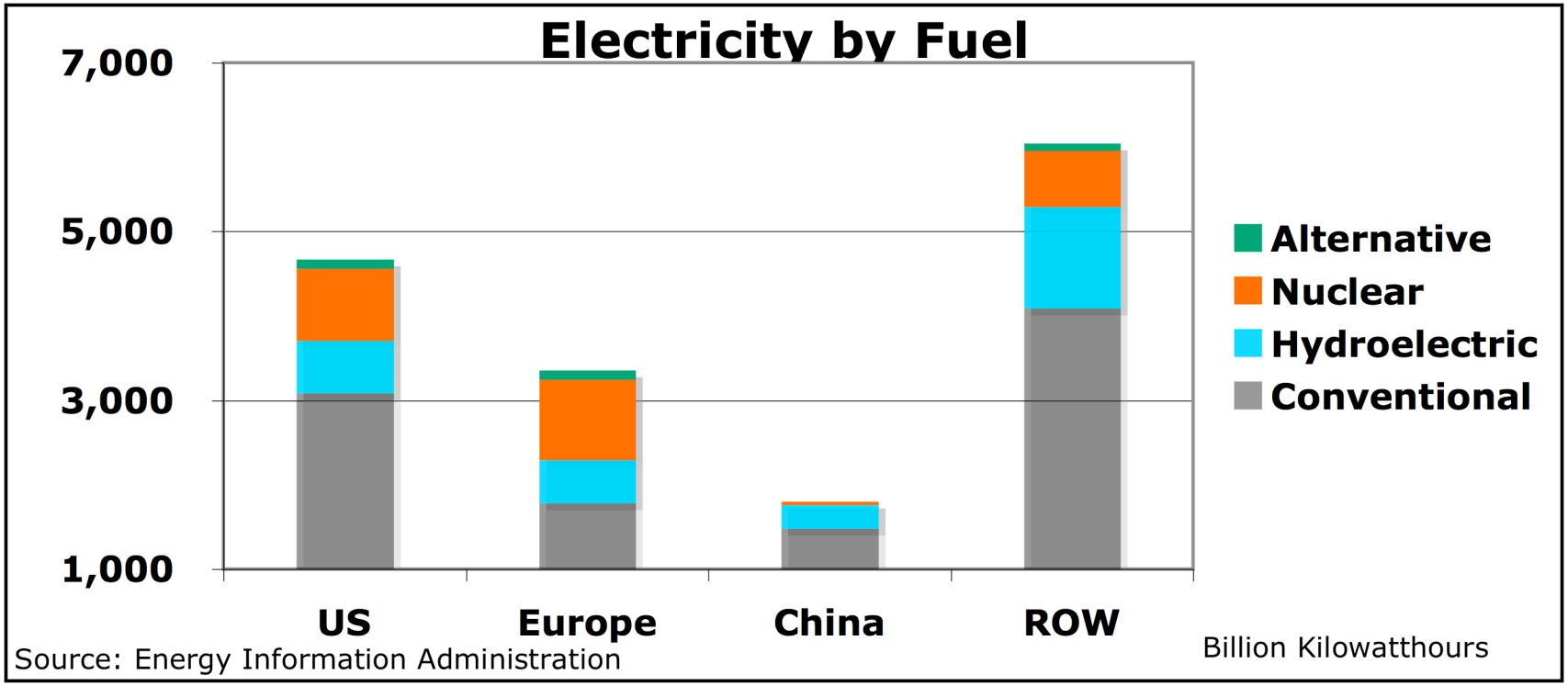
On a global basis, demand for electricity has grown even more dramatically over the last several decades.

Electric Usage per Person



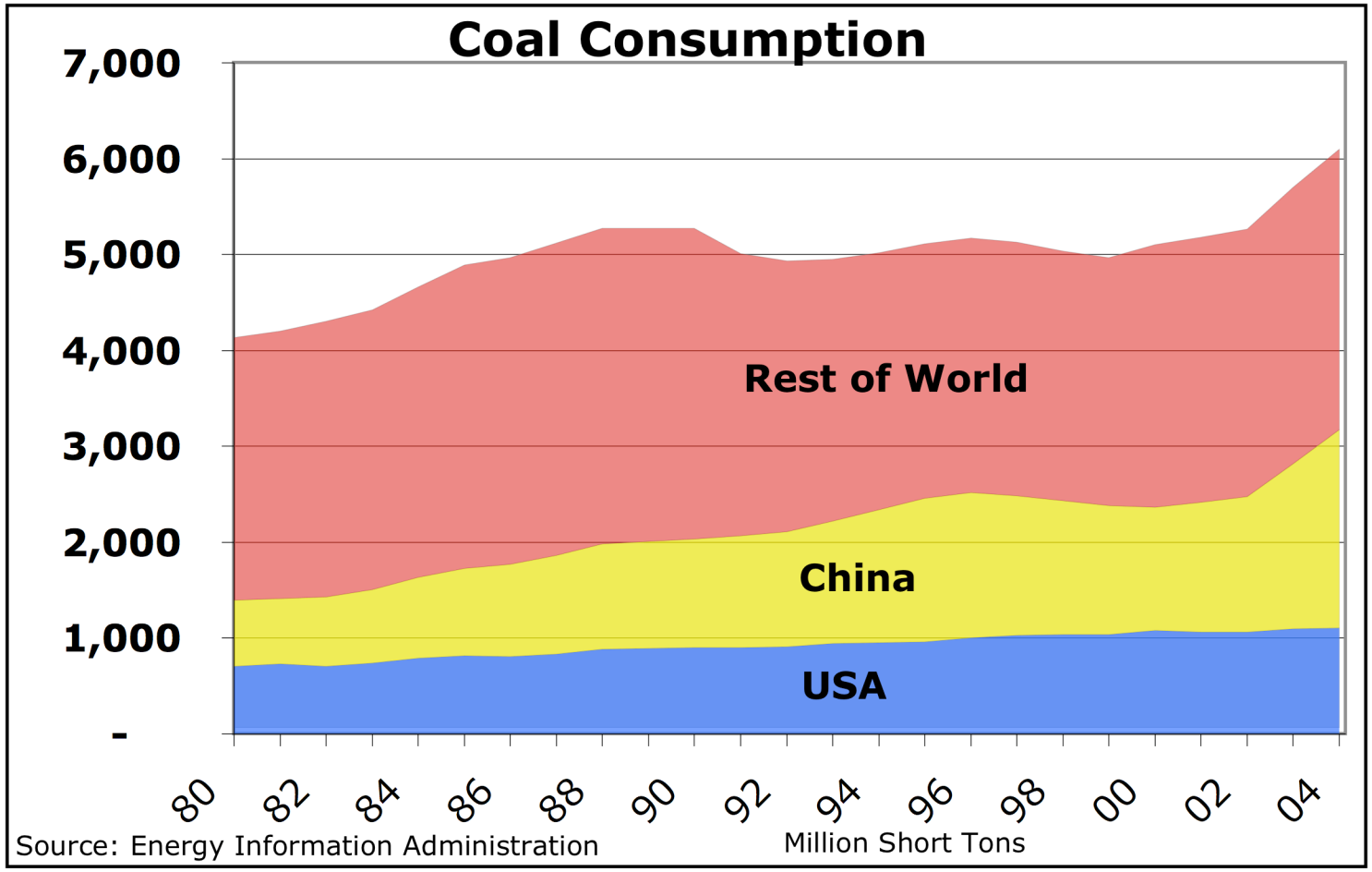
Despite gains with more energy efficient appliances, electric usage per person is increasing faster than population growth.

Electric Generation



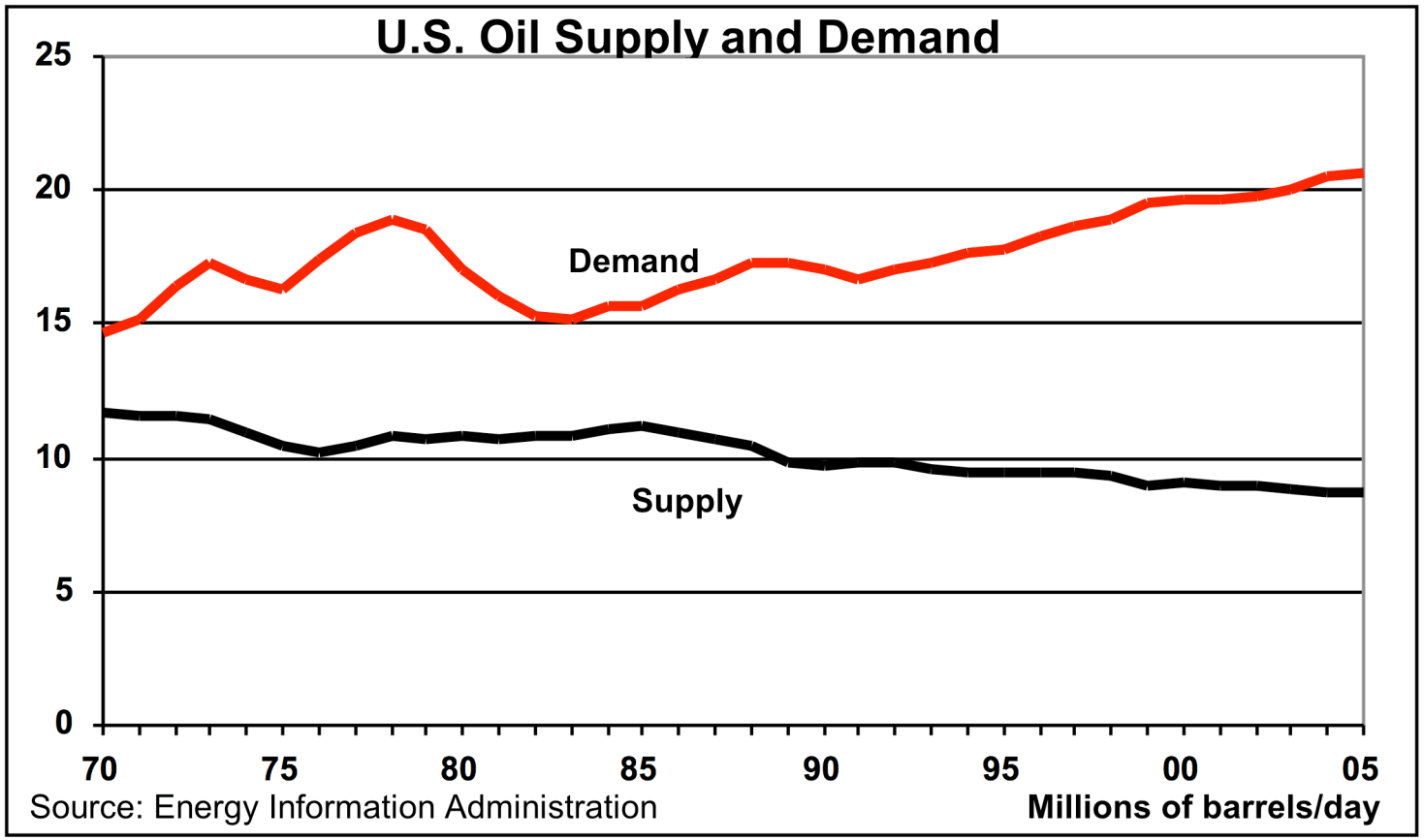
Coal accounts for 49% of utility electric generation in the U.S. while is China coal accounts for more than 80% of electric generation. Alternative energy such as solar and wind energy are a small fraction of electric power.

Coal Consumption



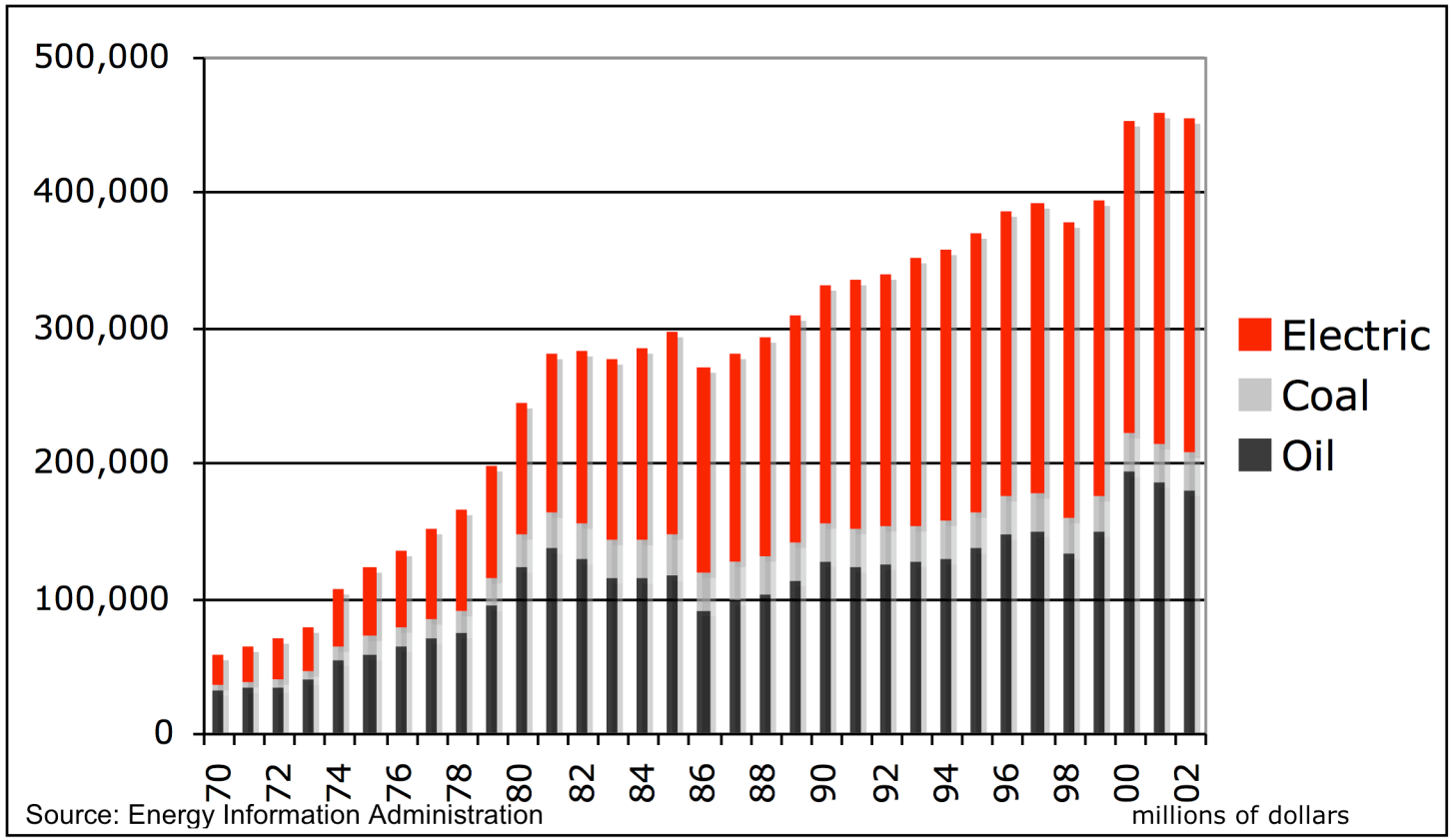
As China has begun to modernize its economy, demand for coal has increased significantly over the last decade.

Oil Consumption and Production



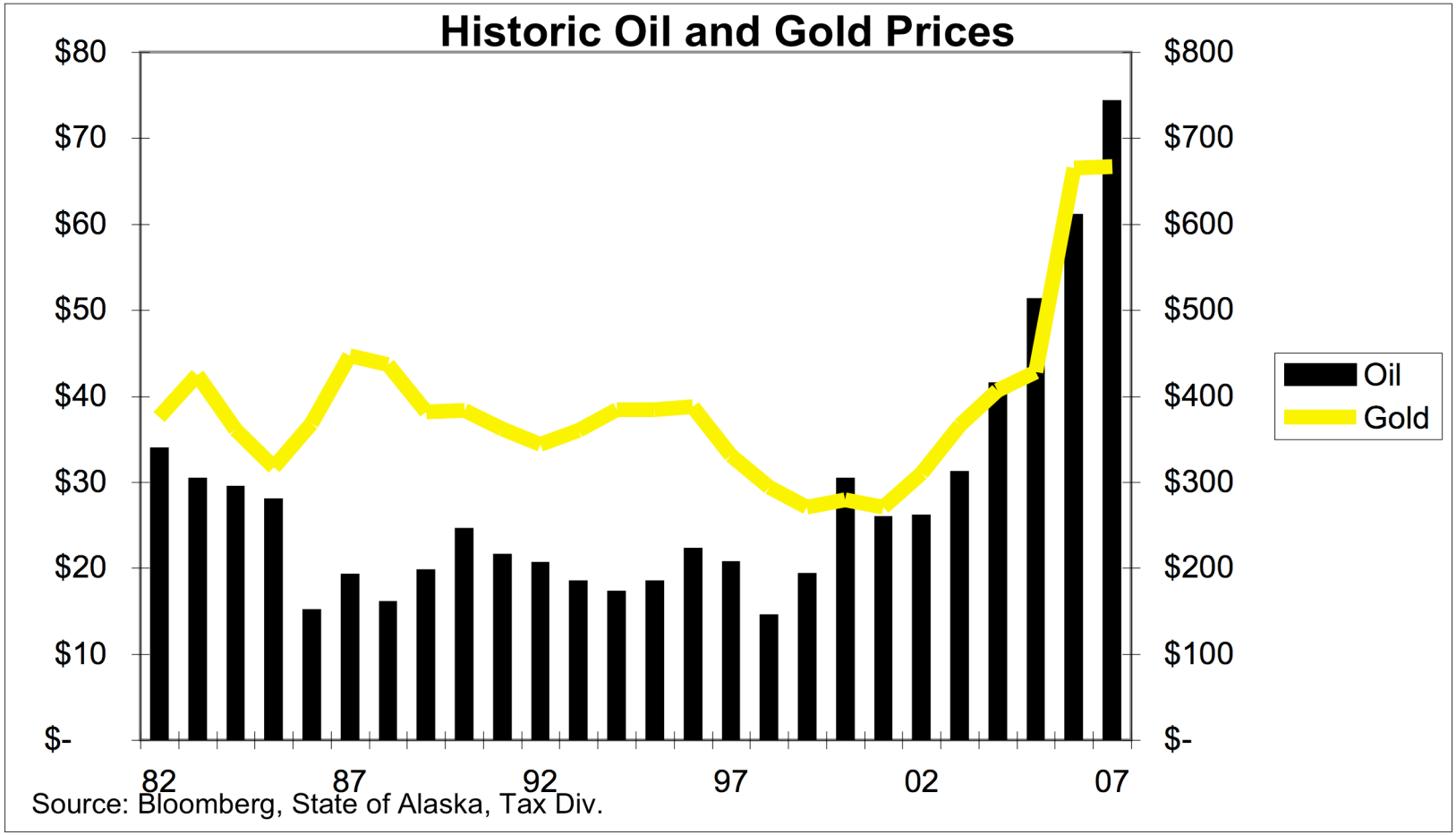
The real issue is the energy gap in the U.S. continues to widen with more oil being supplied from foreign countries.

U.S. Expenditures on Energy



Our energy bill is over $400 billion and that was in 2002 when oil was under $30 per barrel.

Oil and Gold Prices

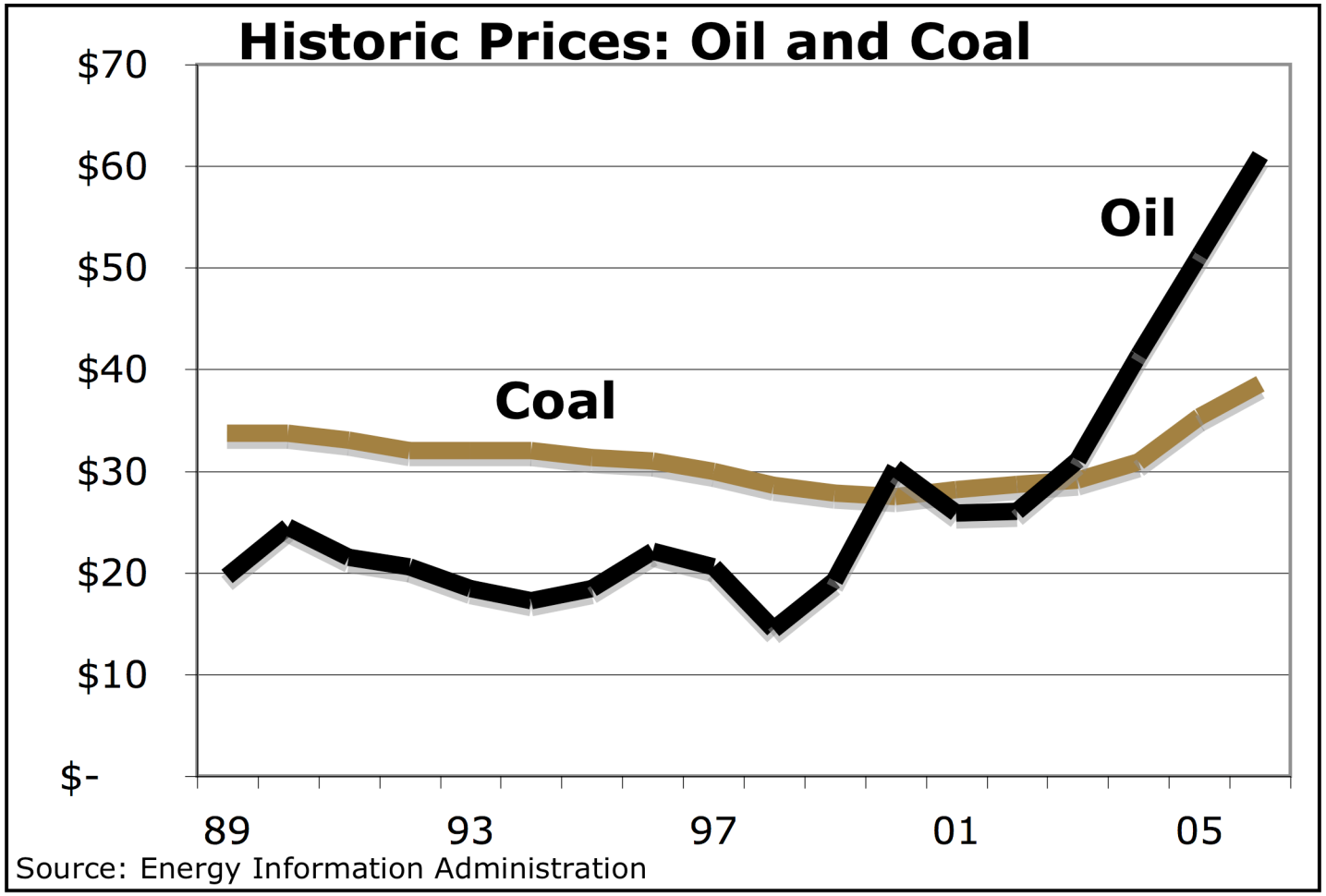


The continuing increase in the price of oil, driven by supply constraints and growing demand influence other commodity prices.

Why Oil Impacts the Economy

- Oil translates into inflation - 6 out of the last 7 spikes in oil have led to recessions
- Oil accounts for half of all electrical production
- 70% of oil consumption goes to cars
- US consumes 20 million bpd - ¼ of world oil production and need to import 70% of our oil
- A decline in new oil finds since 1980s - only 1/10th of new structures produce oil
- Remaining oil reserves are more difficult to extract and at a greater cost
- OPEC holds all the easy oil and new oil is more difficult to find
- China's growing oil appetite changes everything: rising costs and greater CO2 production

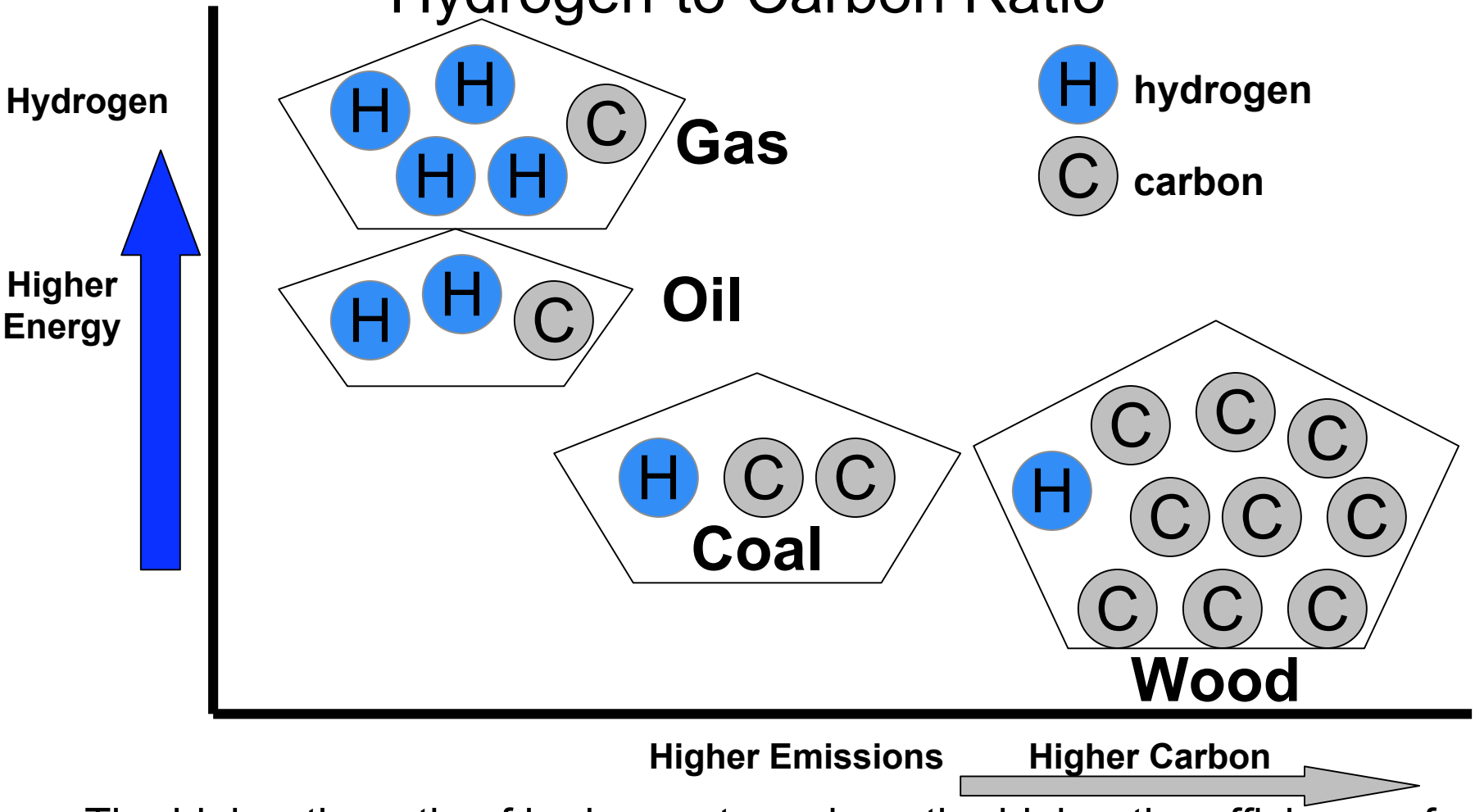
Oil and Coal Prices



Coal prices remain relatively stable in comparison to oil. Despite its growing consumption of coal, China still exports coal and supply is fairly abundant in the U.S. and China.

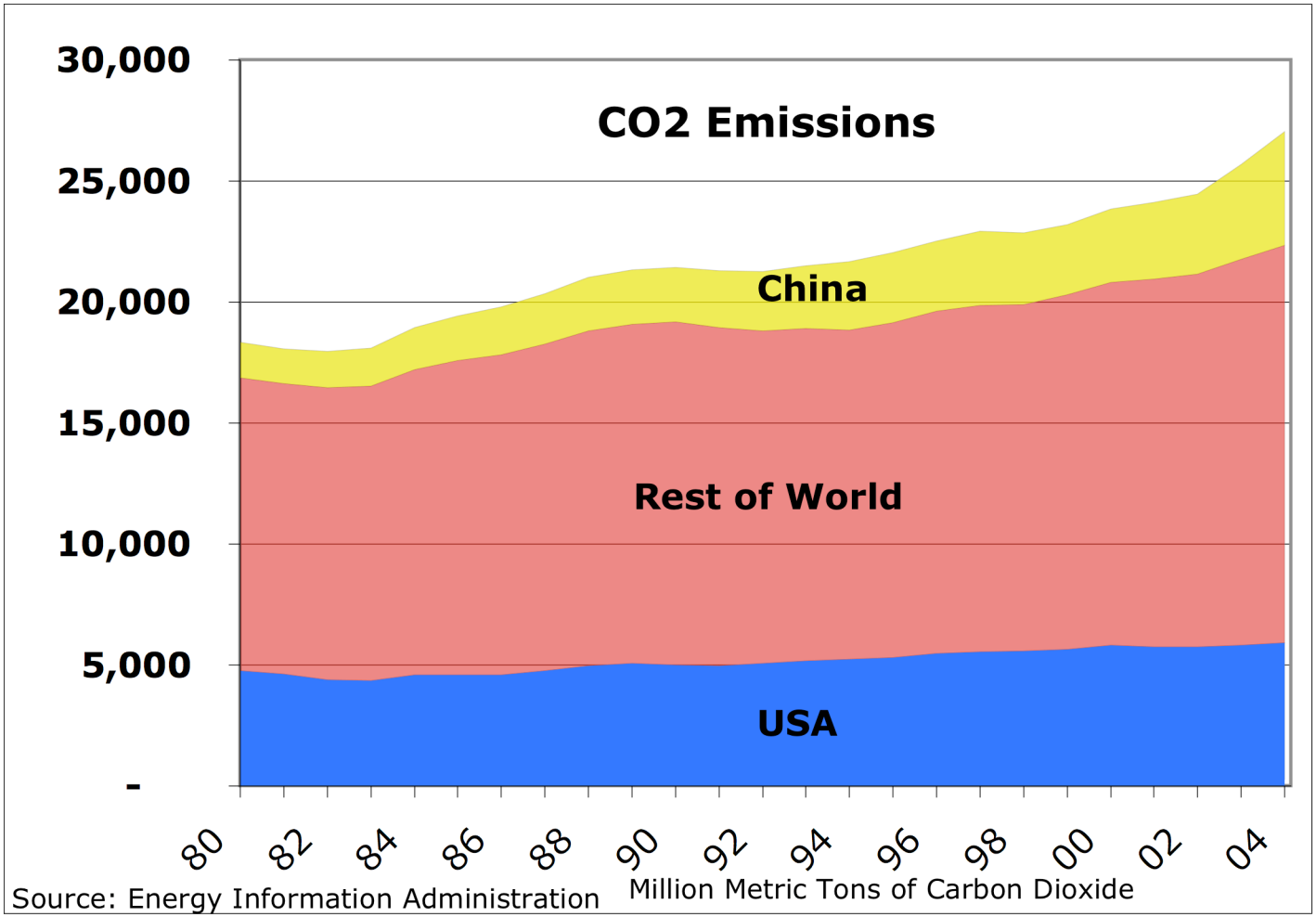
Fuel Efficiency

Hydrogen to Carbon Ratio



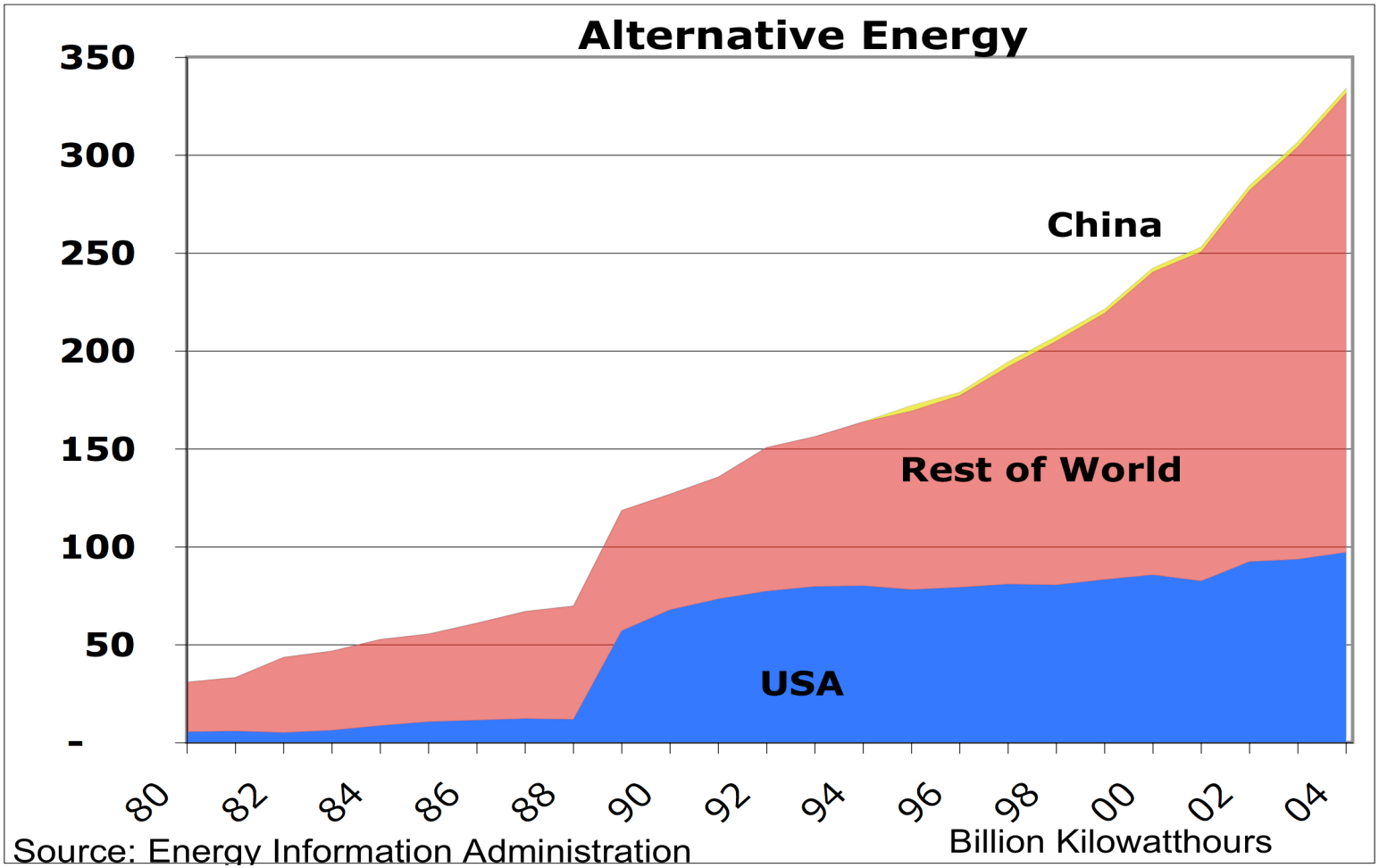
The higher the ratio of hydrogen to carbon, the higher the efficiency of the fuel. Coal has twice the amount of carbon than oil adding more CO2 emissions.

CO2 Production



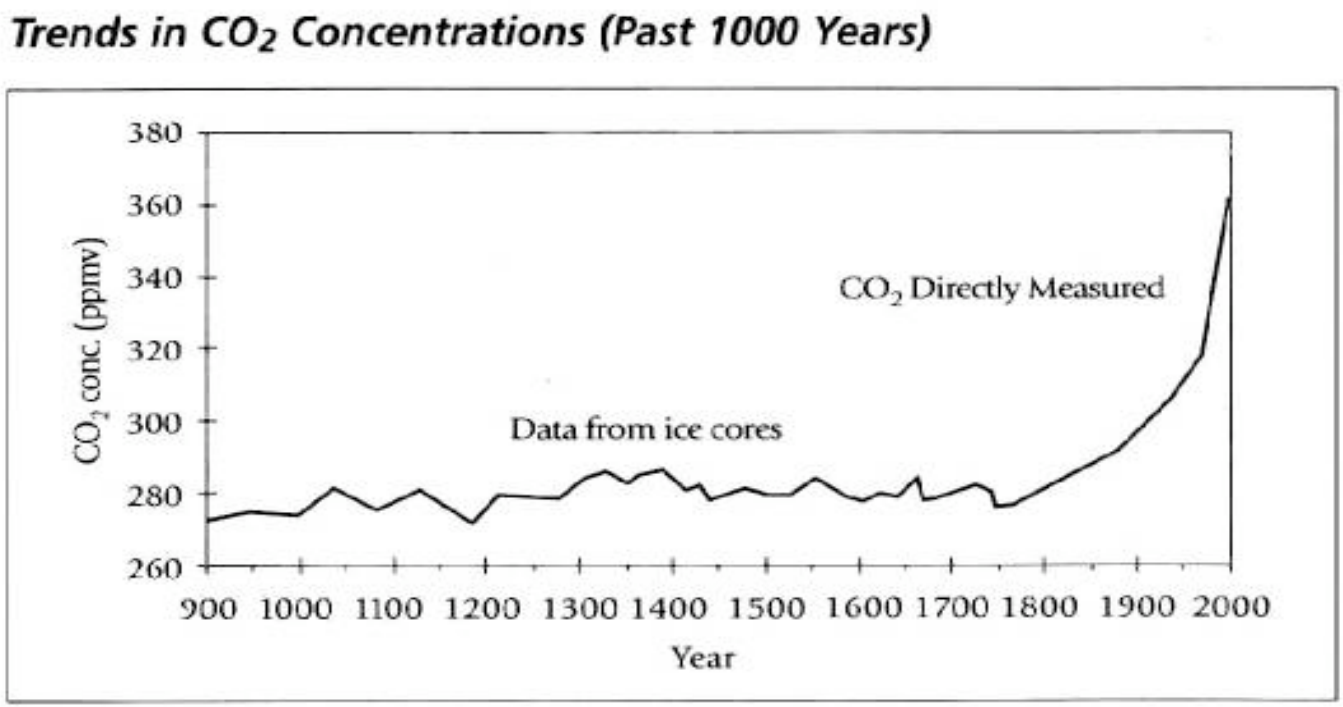
Emissions of CO2 from developing countries is steadily rising. China CO2 emissions are up an 10% over the last five years as consumption of coal grew 9%.

Alternative Electric Generation



Government incentives for alternative energy sources along with declining prices and improving efficiencies translate into rapid growth for solar and wind energy systems.

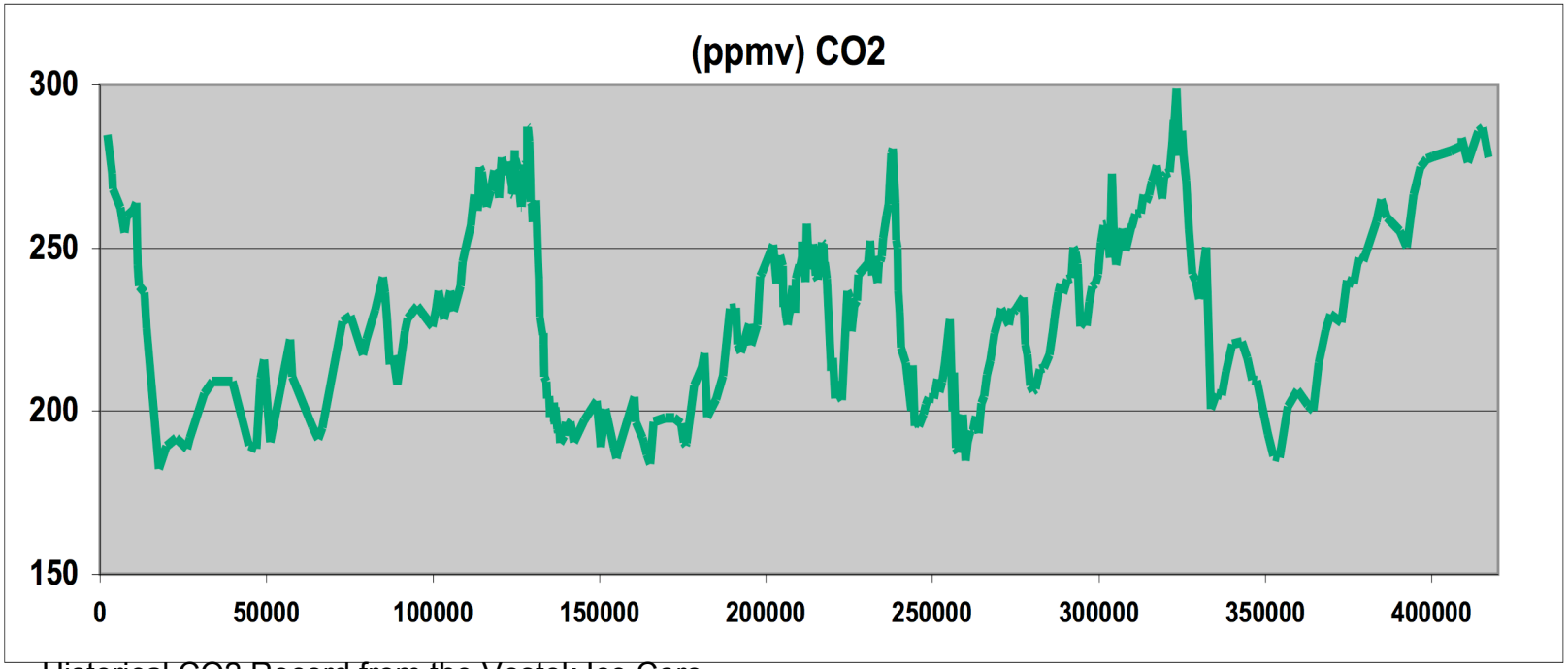
CO2 in Atmosphere



A Primer on Climate Change (from Environment Canada)
http://www.greengrasscutters.com/id2.html

Studies done on CO2 concentration in the atmosphere demonstrate a dramatic increase in CO2 levels.

Historic Atmospheric CO2

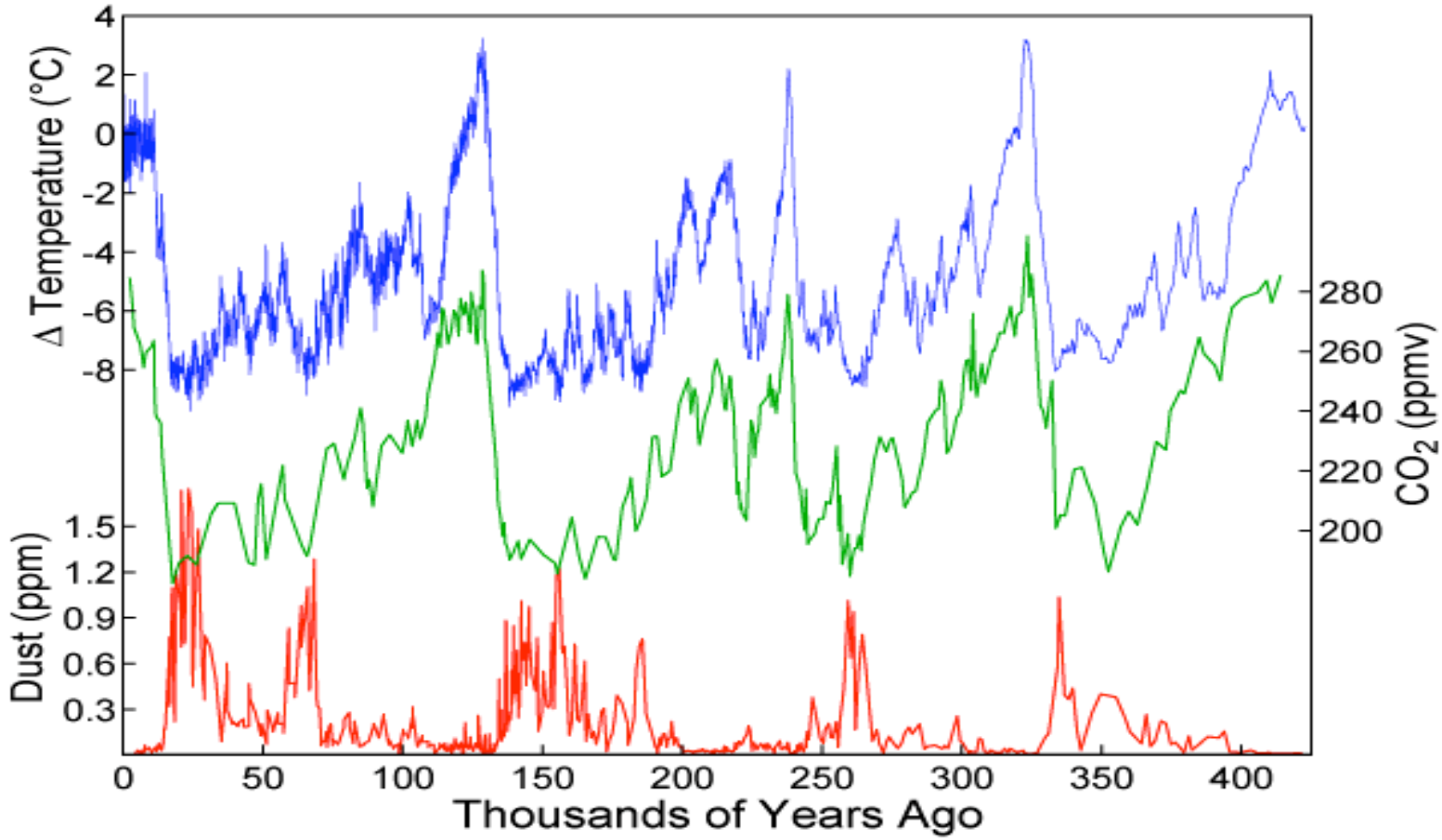


Historical CO2 Record from the Vostok Ice Core
Source: J.M. Barnola
D. Raynaud
C. Lorius
Laboratoire de Glaciologie et de Geophysique de l'Environnement

N. I. Barkov
Arctic and Antarctic Research Institute
http://www.climate.org/topics/climate/co2jump.shtml

Ice core samples from Antarctica and Greenland provide clues to atmospheric conditions over 400,000 years ago illustrate that CO2 level varied, but never exceeding 300 part per million.

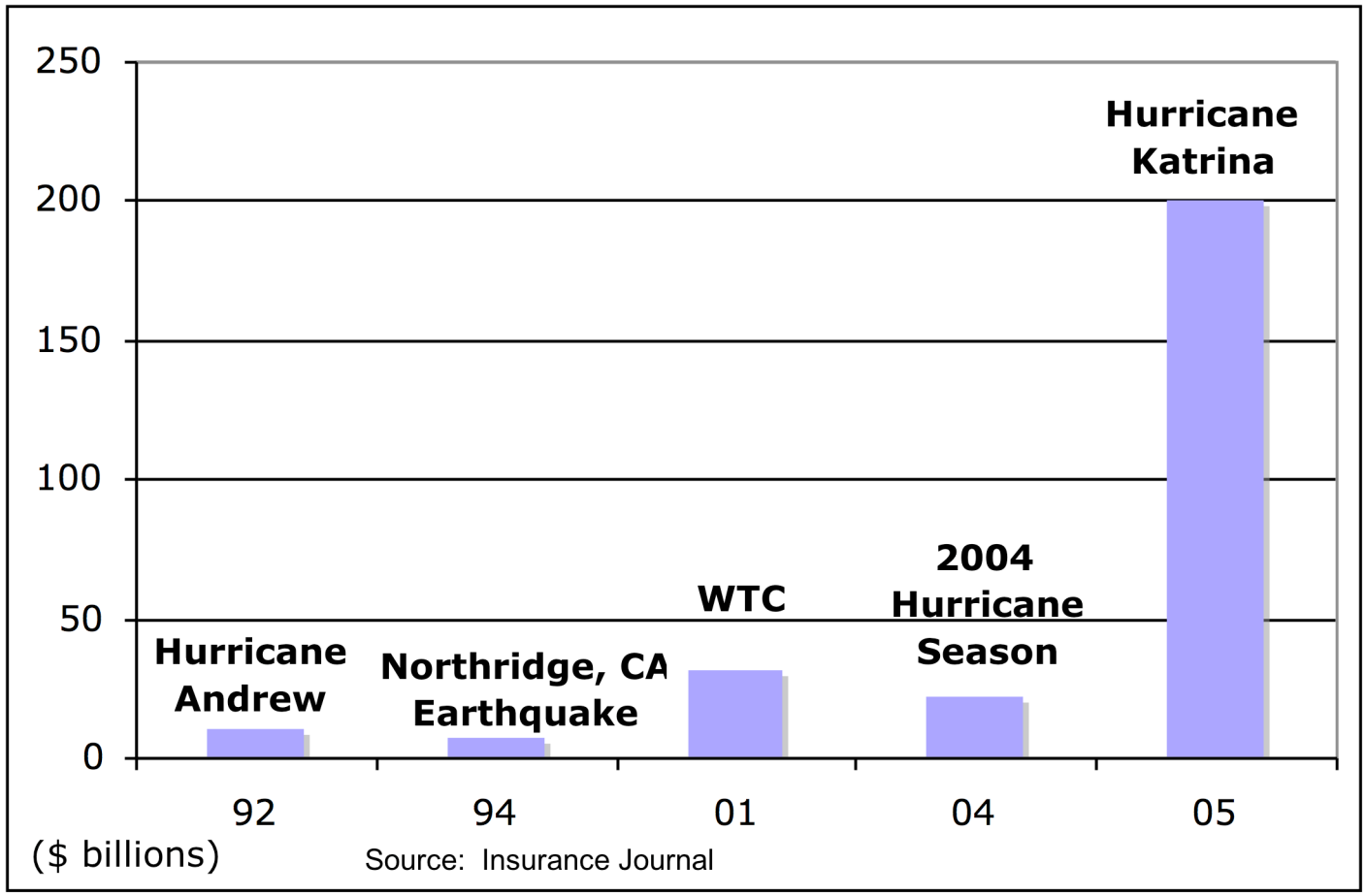
Historic CO2 and Temperature



Historical CO2 Record from the Vostok Ice Core
Vostok, Antarctica ice core as reported by Petit et al., 1999.
http://cdiac.ornl.gov/trends/co2/vostok.htm

CO2 concentration levels and temperature are highly correlated

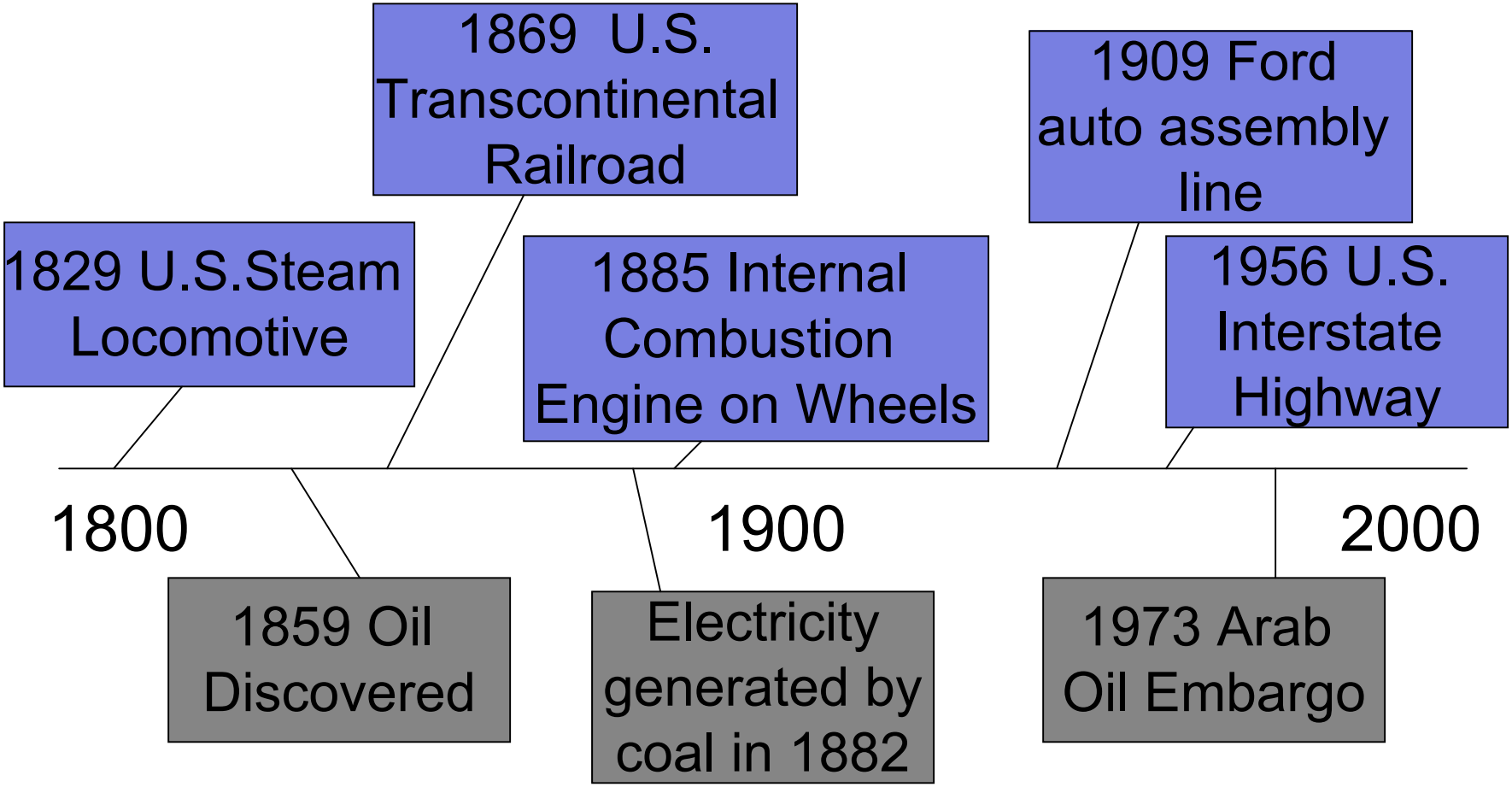
Major Insurance Losses



http://www.insurancejournal.com/

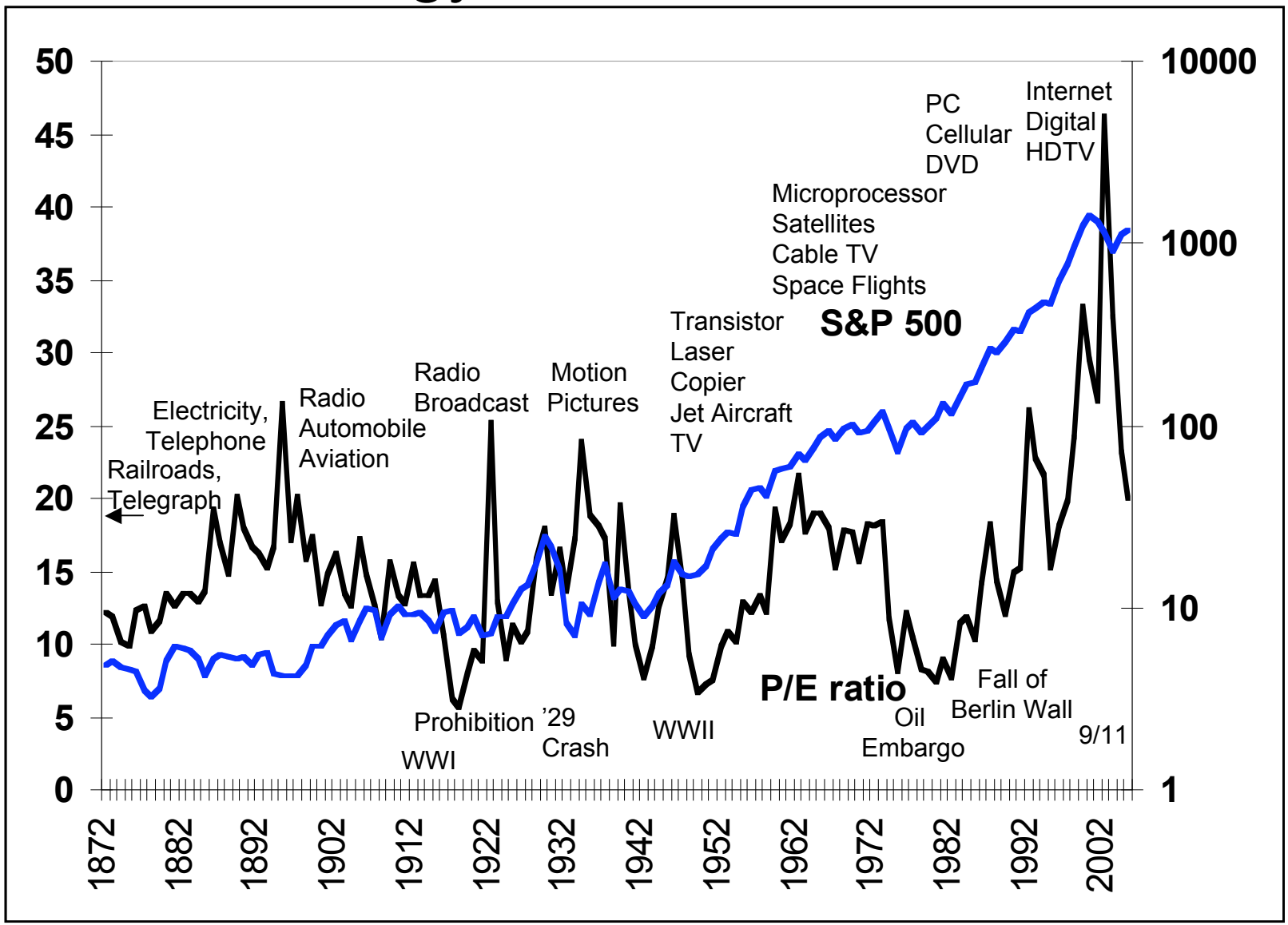
The losses from Hurricane Katrina are a magnitude higher than any other disaster.

Energy and Transportation



The primary ingredients for the Industrial Revolution were: the availability of risk capital, advances in technology, an available labor force, and access to **energy**.

Energy and Economics



Source: Standard & Poors