

## U.S. Foreign Policy and Climate Change

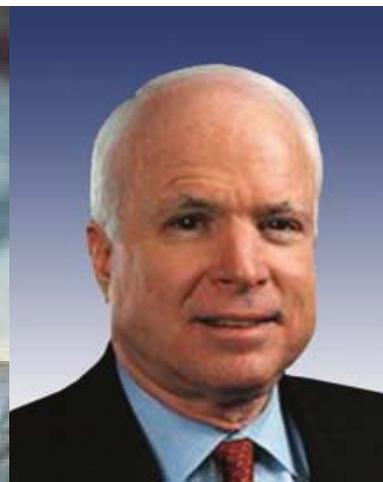
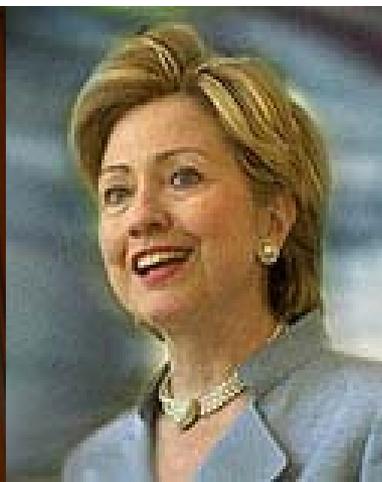
May 21, 2008

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Our paper is **not** a discussion of the scientific evidence about climate change.

We accept the 2007 findings of the Inter-governmental Panel on Climate Change (IPCC) as the best science available.

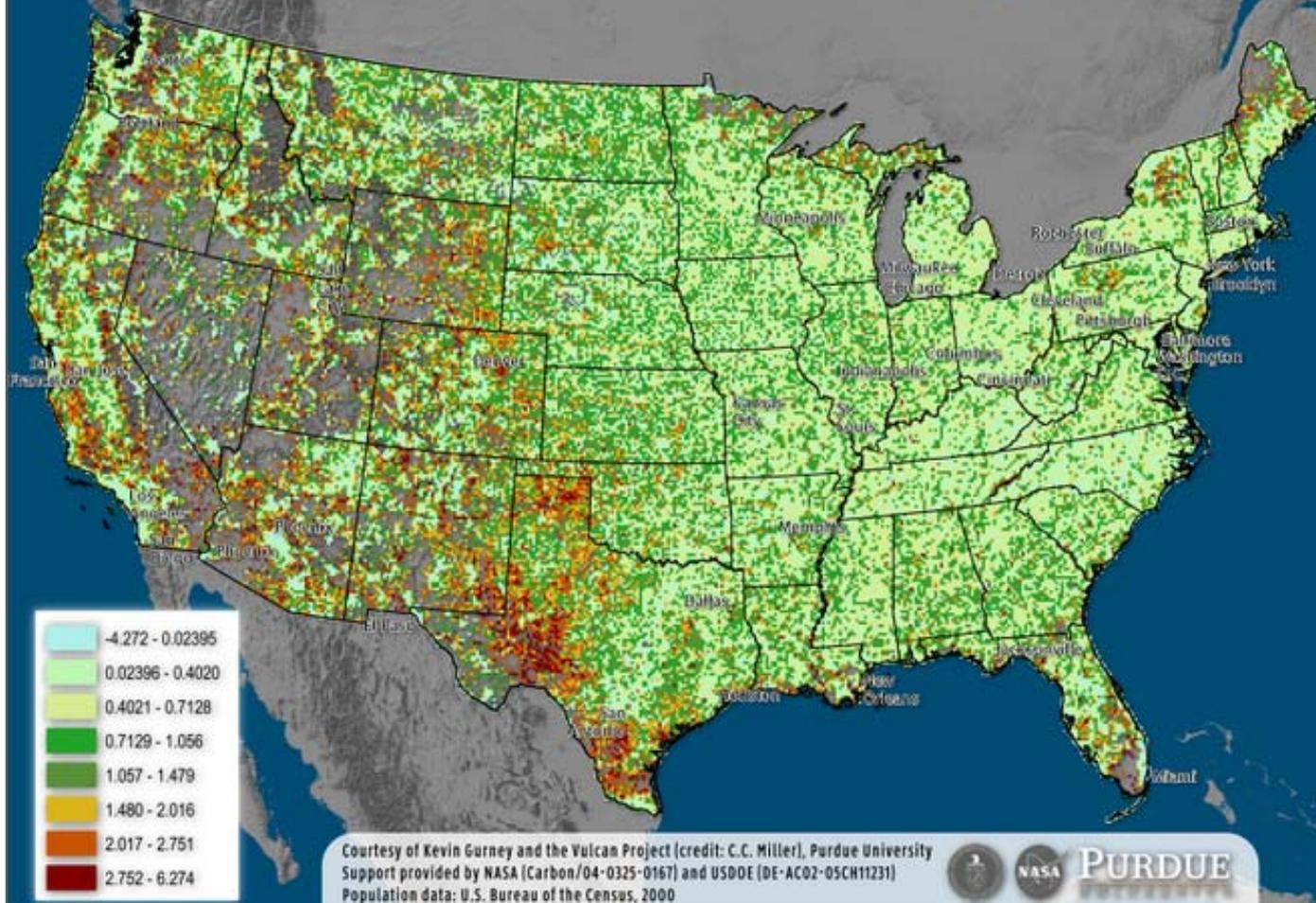
- 2-3° C increase: dangerous threshold?
- 380 ppm CO<sub>2</sub>e concentration today
- 450-550 ppm CO<sub>2</sub>e = stabilization?

## Part I: Federal, Regional, State and Local Climate Policy in the United States

Note: President Bill Clinton's administration signed the Kyoto Protocol in 1998, but President George W. Bush's administration withdrew the U.S. signature in 2001.

## Total Carbon Dioxide Emissions per Capita 2002

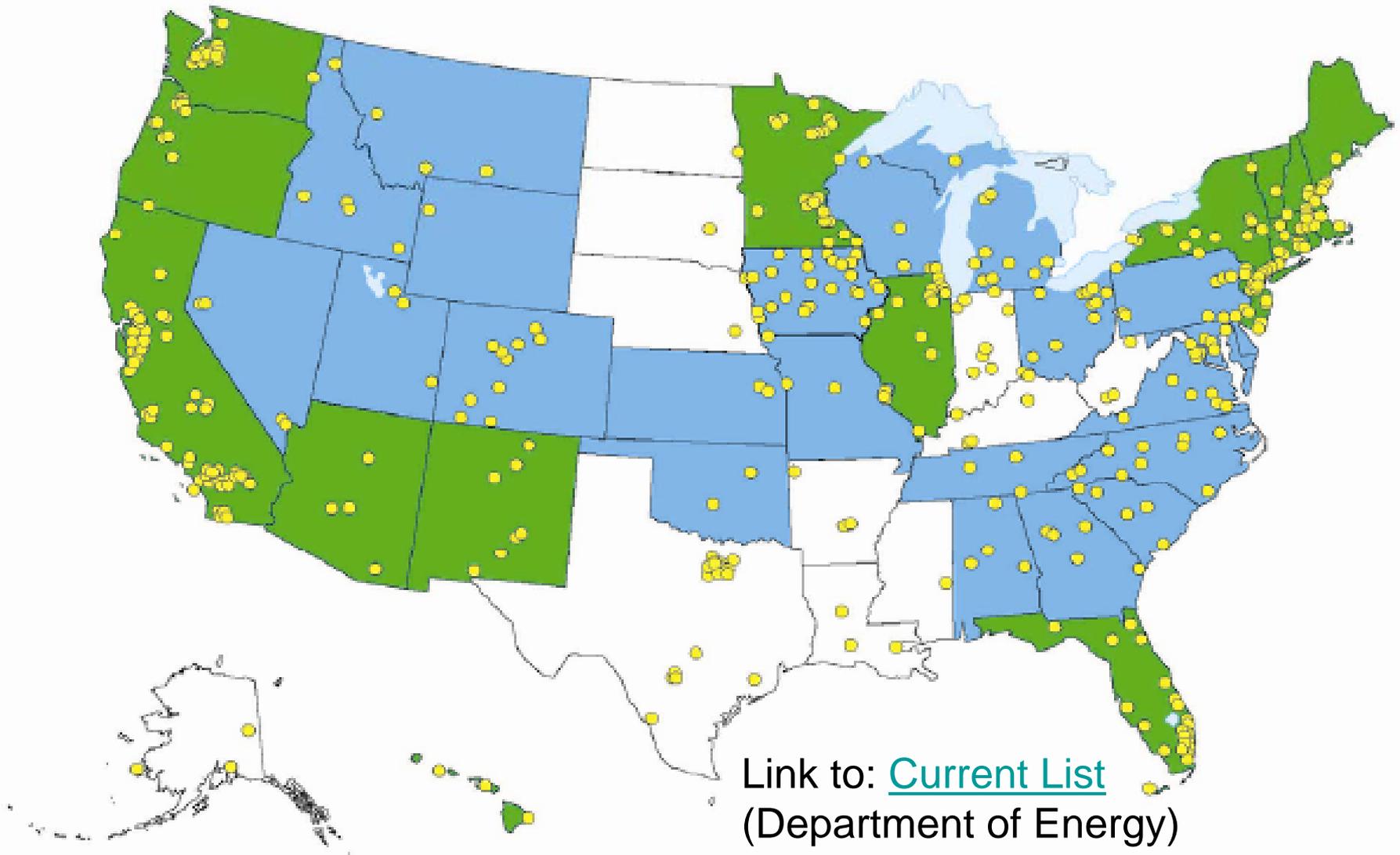
Units: log base 10 of tonnes of carbon/100 km<sup>2</sup>/year/person



NOTE: This map is a "quick" recalculation of the Vulcan 2002 fossil fuel CO<sub>2</sub> emissions inventory in order to achieve a per capita quantity. Please note the methods employed to produce this map and the intrinsic caveats. We are currently developing a more accurate assessment of per capita emissions for the Vulcan inventory. However, this map gives a reasonable approximation of per capita emissions and should serve to adequately inform discussions on that basis.

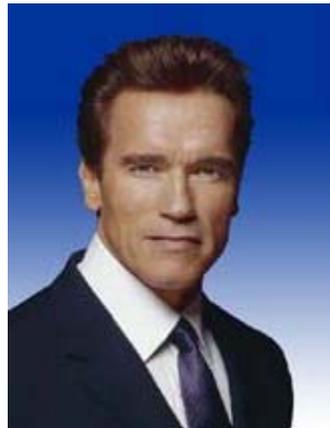
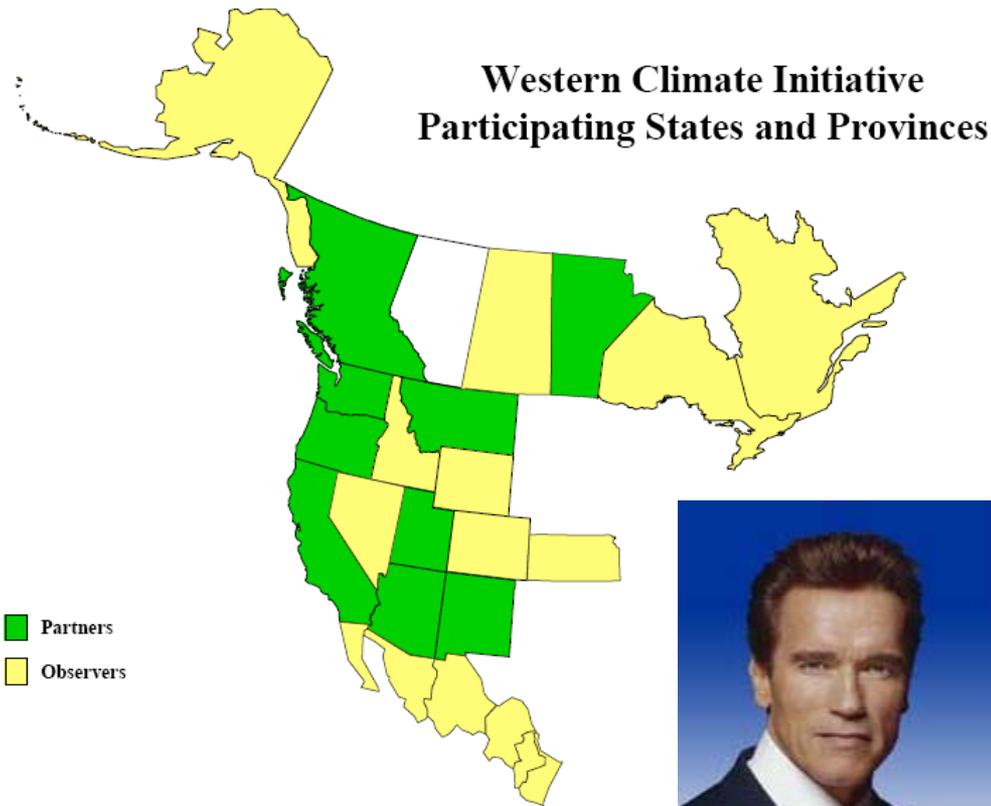
METHOD: Vulcan emissions in each 10 km x 10 km grid cell were divided by the total population of all U.S. Census Blocks (Decennial Census 2000) found within the cells' boundaries. For simplicity, only the centroids of Census blocks (not their polygons) were used to determine which blocks' populations were summed into any given grid cell. In the likely scenario in which many blocks lie within a single grid cell, the blocks' populations were summed into the cell before the per capita value was calculated. In the fewer cases where a Census block overlaps several grid cells, only the grid cell containing the block's centroid is given that block's population. Vulcan grid cells with no emissions or which overlaid areas with no population were omitted.

# State and Local Participation in Selected Climate Change Initiatives



-  States with Greenhouse Gas Emission Targets and Participating in the Climate Registry (17)
-  States Participating in the Climate Registry without a Greenhouse Gas Emissions Target (22)
-  Cities Participating in the U.S. Mayors' Climate Protection Agreement (780)

## Sub-National/Regional Mitigation Efforts



*The Carbonator!*



New England  
and Mid-Atlantic  
States (RGGI)

## **The Regional Greenhouse Gas Initiative (RGGI)**

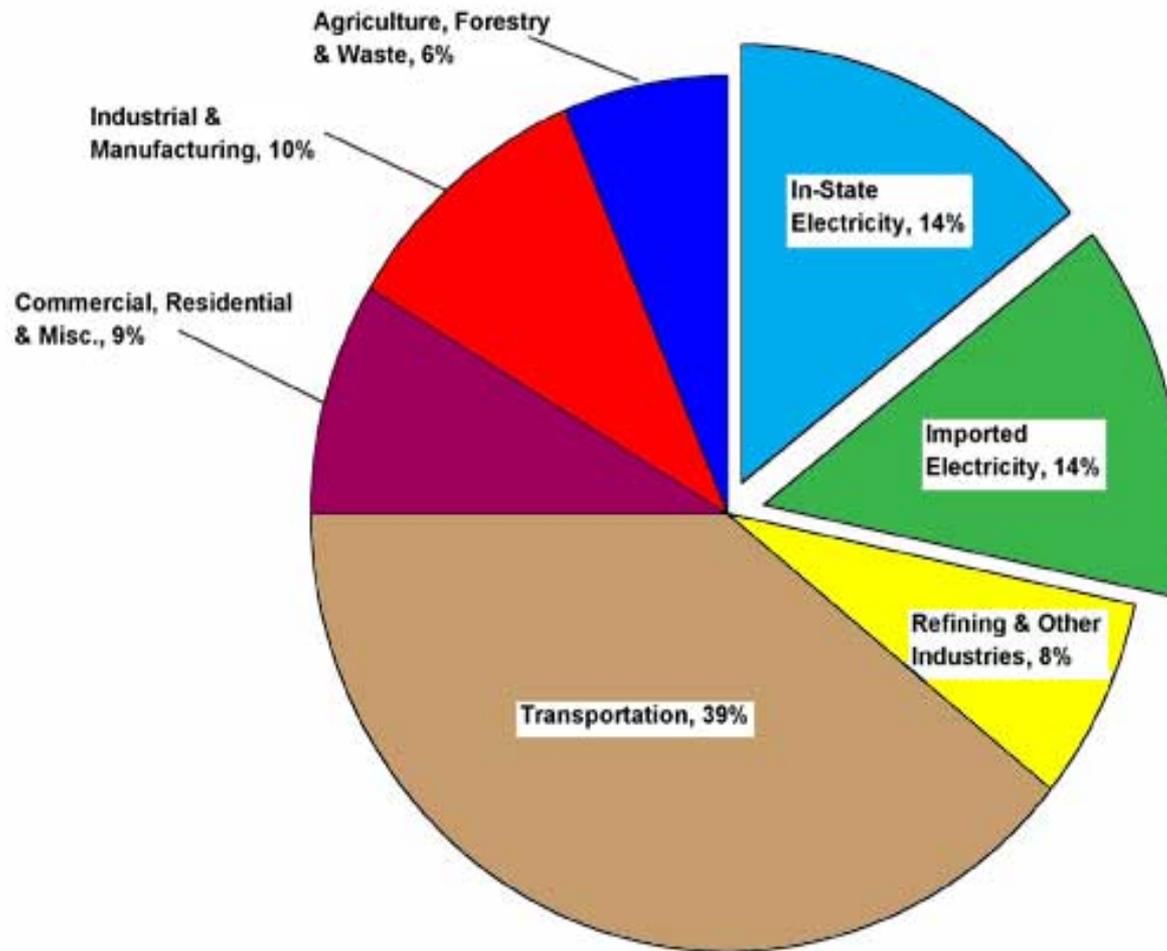
- The core of the RGGI is “a multi-state cap-and-trade program with a market-based emissions trading system [...] after the cap-and-trade program for power plants is implemented, the states may consider expanding the program to other kinds of sources.”
- States’ aim: “to stabilize carbon dioxide emissions from their power plants at 151 million short tons (137 metric tons)” in the years 2009-2015.
- “Between 2015 and 2020, the RGGI plan calls for a 10% emissions reduction below the cap.”
- RGGI’s participating states have announced that they will sell—rather than give away for free—the first carbon permits under the system in September 2008.

## California's Carbon Cap

- Global Warming Solutions Act (2006)/AB 32
  - Carbon cap: reduce GHG emissions to 1990 levels by 2020.
- California Air Resources Board (CARB) will create a regulatory framework in which to implement the carbon cap and monitor and measure emissions levels.
  - Takes effect in 2012 and will become more stringent over time.
  - Emissions trading is only one of many possible regulatory mechanisms being considered by the state government.
  - “I would say that more than half, probably 60 percent of the CO2 reductions that we're going to achieve in California will come from programs that are aimed at particular sectors.”
  - “I think it's the first time that we really have a ... legal tool to use to get transportation planning established, to acknowledge the need for more compact roads, reducing growth and VMT.”  
(CARB Chairwoman Mary Nichols)

## California's Gross GHG Emissions in 2004

(Based Upon 8-13-07 Draft of ARB GHG Emissions Inventory)



Source: California Energy Commission

## Federalism and Fuel Economy

- [U.S. Energy Independence and Security Act of 2007](#)
  - Requires that corporate average fuel economy standards rise to 35 miles per gallon by 2020 under federal law for the model years 2011-2020.
- The U.S. Environmental Protection Agency has been locked in a legal dispute with California over the state's push to regulate GHG emissions from cars (as opposed to fuel economy standards).
  - CA law would cut exhaust from cars and light trucks by 25 percent and from larger vehicles by 18 percent.
- Under the state's law, the auto industry would have to begin introducing cleaner technology by 2009 and comply with the exhaust reductions by 2016.

## U.S. Congress: Proposed Climate Legislation

- The Climate Security Act (S.2191), Senators Joe Lieberman & John Warner
- America's Energy Security Trust Fund Act of 2007 (H.R. 3416), Rep. J. Larson
- Clean Air/Climate Change Act of 2007 (S.1168), Sen. Lamar Alexander
- Clean Air Planning Act of 2007 (S. 1177), Sen. Thomas Carper
- Climate Stewardship and Innovation Act of 2007 (S. 280 / H.R.620) McCain
- Electric Utility Cap and Trade Act of 2007 (S.317), Sen. Dianne Feinstein
- Global Warming Pollution Reduction Act (S.309), Sen. Bernard Sanders
- Global Warming Reduction Act (S. 485), Sen. John Kerry
- Low Carbon Economy Act (S.1766), Sen. Jeff Bingaman & Sen. Arlen Specter
- Safe Climate Act of 2007 (H.R.1590), Rep. Henry Waxman
- Save Our Climate Act of 2007 (H.R. 2069), Rep. Pete Stark [Source: AAAS, [Link](#)]

## The Climate Security Act, 2008

- Would create a cap-and-trade system administered by the EPA.
  - 30 percent of commitments could be met by offsets and international trading.
  - Boxer amendment: "If the price of carbon allowances reaches a certain price range, there is a [cost containment] mechanism that will automatically release additional emission allowances onto the market to lower the price." (May 2008)
- Total GHG emissions reduced 62-66%--under 2005 levels--by 2050.
  - Targets emissions from 87% of GHG sources (or "targeted facilities").
    - Electric power, transportation, manufacturing, natural gas, oil refiners, etc.
- Auctioned credits: from 26.5% in 2012 to 69.5% in 2031.
  - Less ambitious than Democratic candidates' proposals for 100% auction.
    - <http://lieberman.senate.gov/documents/acsaemission.pdf>
- EPA, EIA, CBO have published detailed economic impact analyses.
  - Estimated reductions range from 0.5% of GDP to 2% of GDP by 2030.
    - Low-impact scenarios rest on assumptions, e.g., growth in nuclear power, "clean coal."
  - Electricity prices could rise 44% and gasoline could rise 53 cents by 2030 (EPA).
    - <http://www.epa.gov/climatechange/economics/economicanalyses.html>
    - <http://www.eia.doe.gov/oiaf/service/rpt/s2191/index.html>
    - <http://www.cbo.gov/doc.cfm?index=8769>

## U.S. Senate Votes on Climate Change Bills

- 2003: McCain-Lieberman bill: 43 votes in favor → Failed.
- 2005: McCain-Lieberman bill: 38 votes in favor → Failed.
  - Included nuclear subsidies opposed by more senators
- 2007: Lieberman-Warner bill sent to the Senate for haggling, debate
  - Approved by Senate EPW Committee vote of 11-8 in December 2007
- Friday, May 16, 2008: Senator Jim DeMint (R-SC) introduced an amendment to the FY2009 budget bill that would have restricted legislation addressing climate change until China and India acted.
  - The DeMint amendment failed with 61 votes against.
- Senator Barbara Boxer (D-CA) responded with an amendment expressing support for cap-and-trade in concept.
  - The Boxer amendment passed with 55 votes in favor.

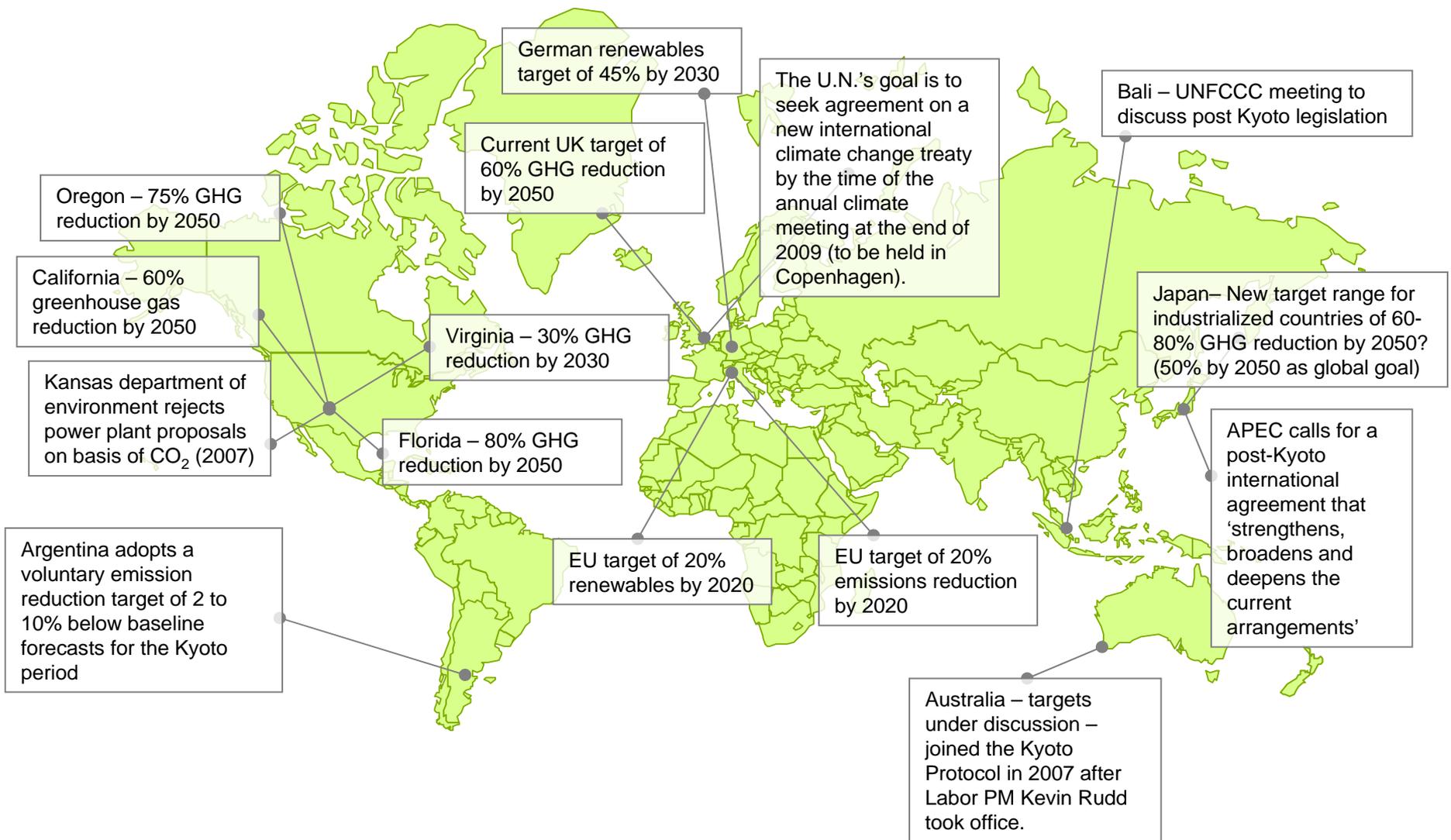
## Part II: International Climate Policy

## Climate Change Policy: 1988-2009

Ronald Reagan	IPCC formed by the UN in 1988
George HW Bush	Rio Declaration/Earth Summit, 1992
William J. Clinton	UNFCCC in 1994; signed KP in 1998
U.S. Senate	Opposed Kyoto Protocol (95-0 vote)
GW Bush (2001-07)	Rejected U.S. participation in Kyoto <GHG intensity 18% through 2012
GW Bush (2008-09)	Halt emissions growth by 2025
Bali Meeting 12-2007	<25-40% CO <sub>2</sub> by 2020 proposed
The Next President	Likelihood of emissions cap, trading

## Climate Change and International Relations

- 5/20/2008: USA suggests that China join the IEA.
  - "China's participation in the IEA's collective emergency response system would make the system stronger." [\*Daniel S. Sullivan, State Dept.\*](#)
  - IEA Charter could be re-written to admit China and India, separate from OECD.
- Kyoto Protocol to the UNFCCC binds 37 countries to cut GHG 5.2% by 2012 (<1990). Created in 1997.
- Entered into force in 2005 following ratification by the Russian Federation but will expire in 2012.
- Australia's new government under its Labor PM, Kevin Rudd, joined the Kyoto Protocol in 2007.
- The European Union, the G-77, and China have said that industrialized countries should cut emissions by 25%-40% by 2020 but the USA has resisted this.



Source: Accenture  
(Modified from Original)

## A Fossil Fuel Future?

- World energy demand could grow 50% by 2030!
- “Despite all the attention that is given to biofuels, wind and solar, the reality is that we are still heading for a fossil fuel future.”
- “Oil, natural gas and coal will remain the largest sources of energy worldwide, accounting for 84% of the overall increase.”
- “Oil subsidies in China, India, and the Middle East totaled \$50 billion last year [2007].”

*Nobuo Tanaka, Executive Director, International Energy Agency*

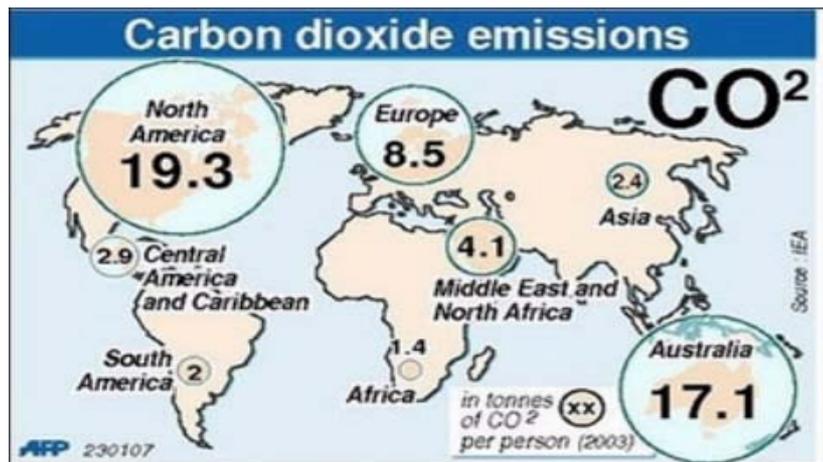
*Quoted in Middle East Economic Survey (MEES), April 28, 2008, p. 7.*

## Climate Security vs. Energy Security?

1. If fossil fuel demand is projected to increase by 50% worldwide, and greenhouse gas regulation proceeds, what does that mean for global climate and U.S. energy security, respectively? (Hartley/Medlock, Baker Institute, 2008)
2. Are climate and energy security really “two sides of the same coin” as former PM Tony Blair has said?
  - Reliance on imported natural gas? Can solar electricity be scaled up at reasonable cost?
  - DOE report (2008) argues that wind energy could provide 20% of U.S. electricity by 2030. What about issues such as intermittency, shadow capacity, transmission, and storage?
3. New NIMBY? Example: transmission lines in CA.

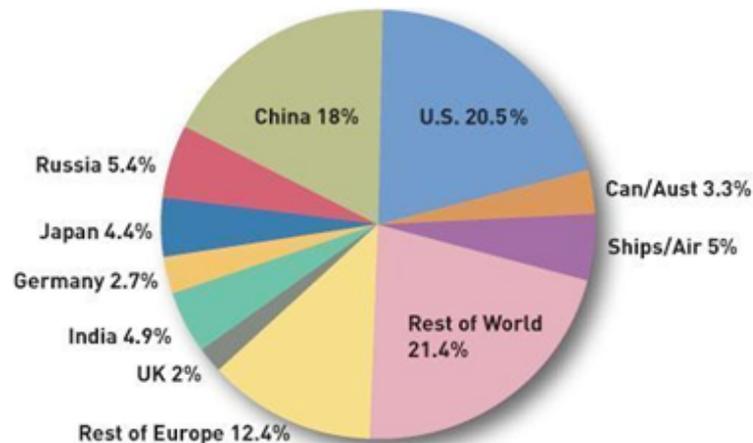
## Part III: Charting Emissions

## A Look at International GHG Emissions

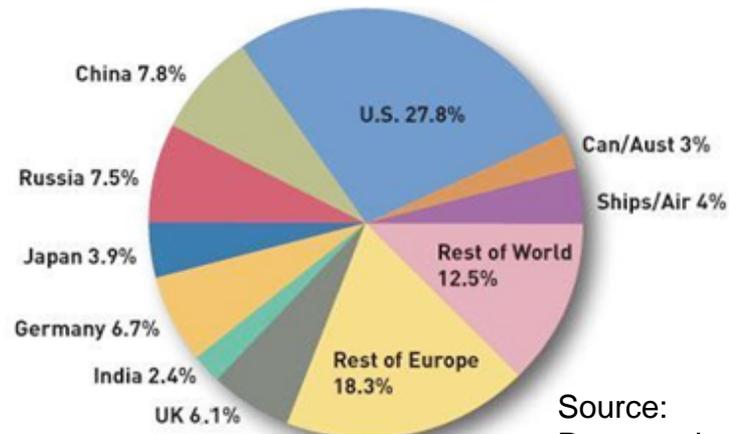


(Emissions Per Capita)

### 2005 ANNUAL EMISSIONS

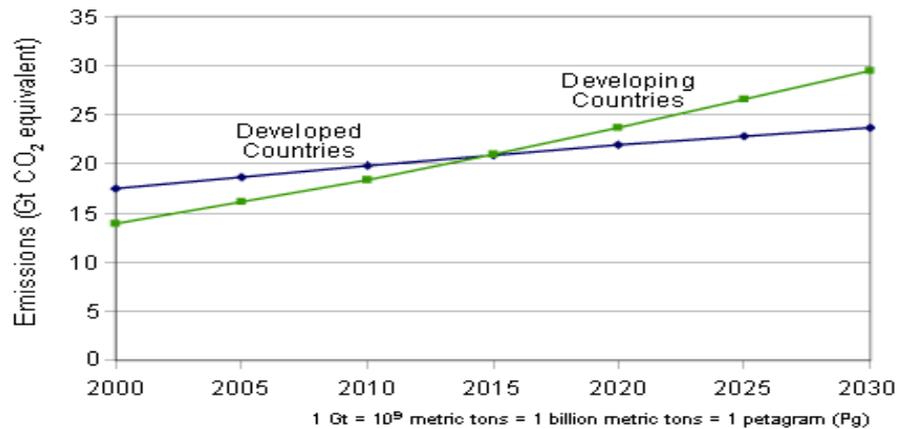


### 1750-2005 ACCUMULATED EMISSIONS



Source:  
Presentation by  
James Hansen, PhD

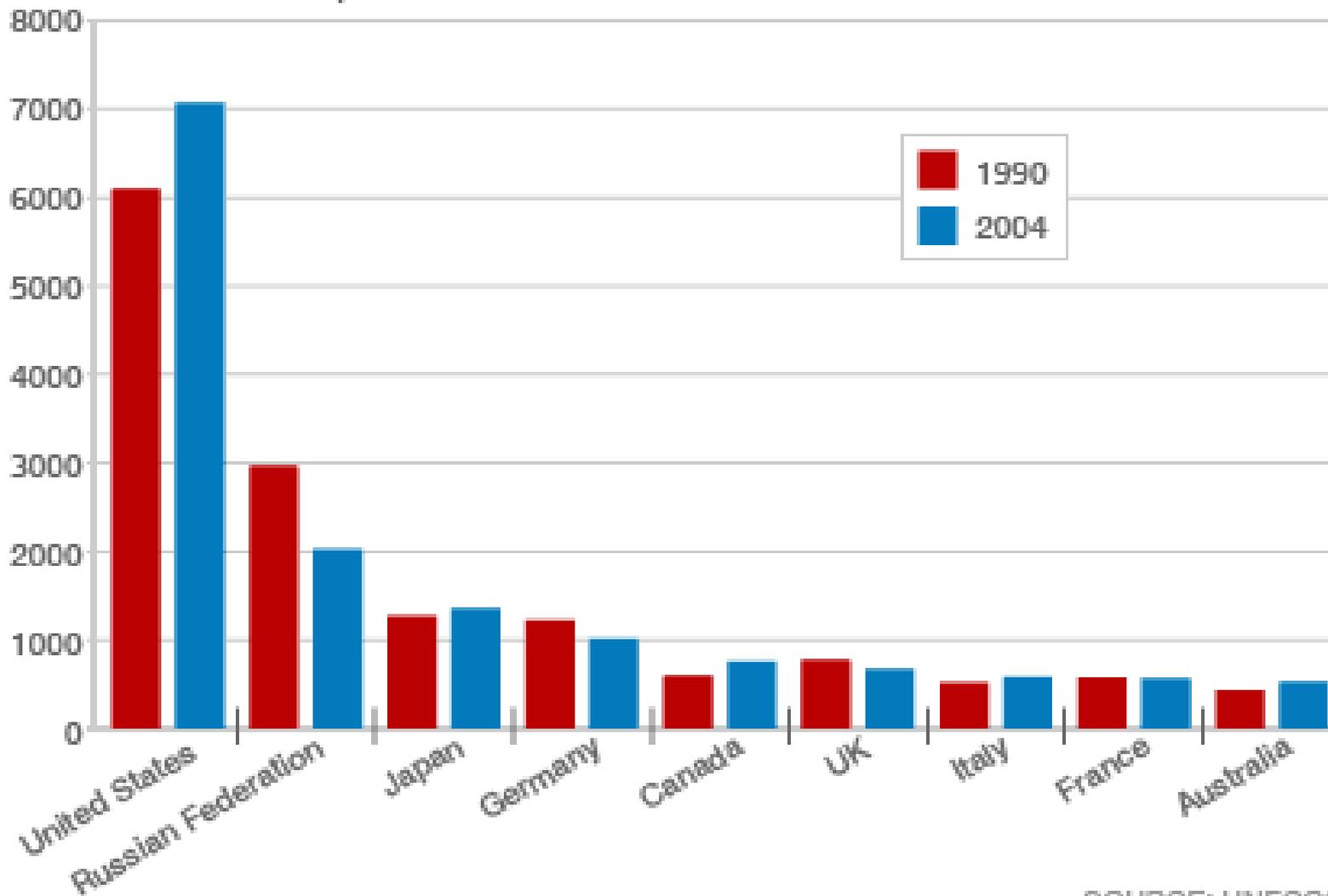
**Figure 3: Total Greenhouse Gas Emissions by Region**



Source: U.S. Environmental Protection Agency (EPA)

## TOTAL GREENHOUSE GAS EMISSIONS

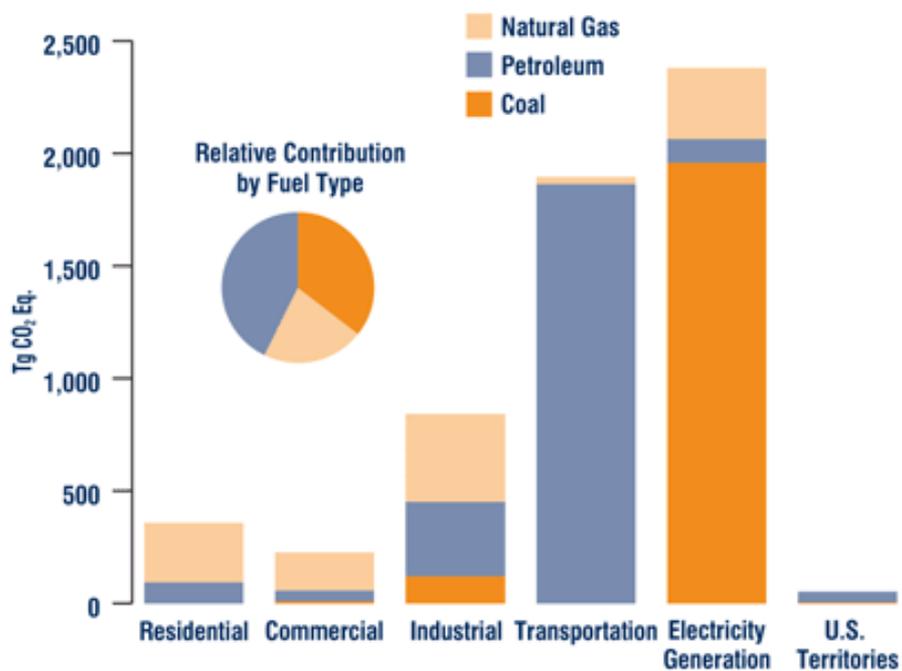
Million tonnes CO<sub>2</sub> equivalent



SOURCE: UNFCCC

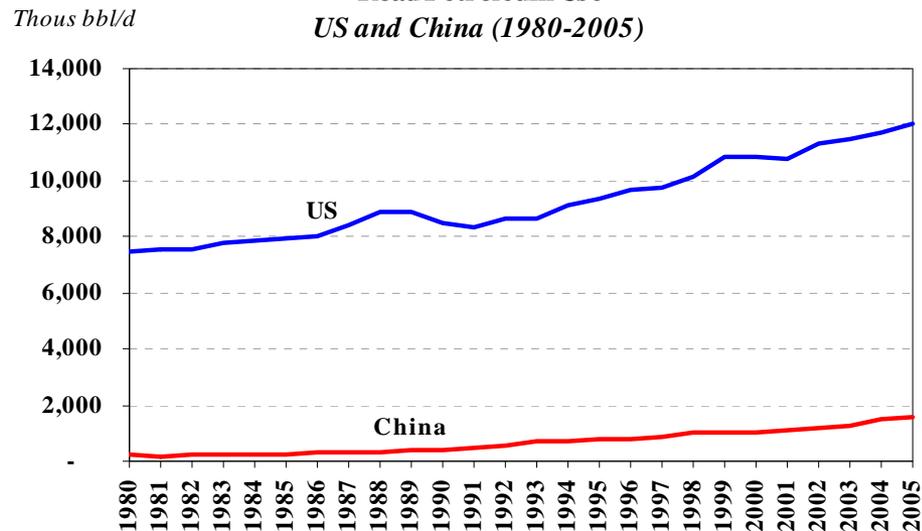
## U.S. Emissions in 2005

### 2005 CO<sub>2</sub> Emissions from Fossil Fuel Combustion by Sector and Fuel Type

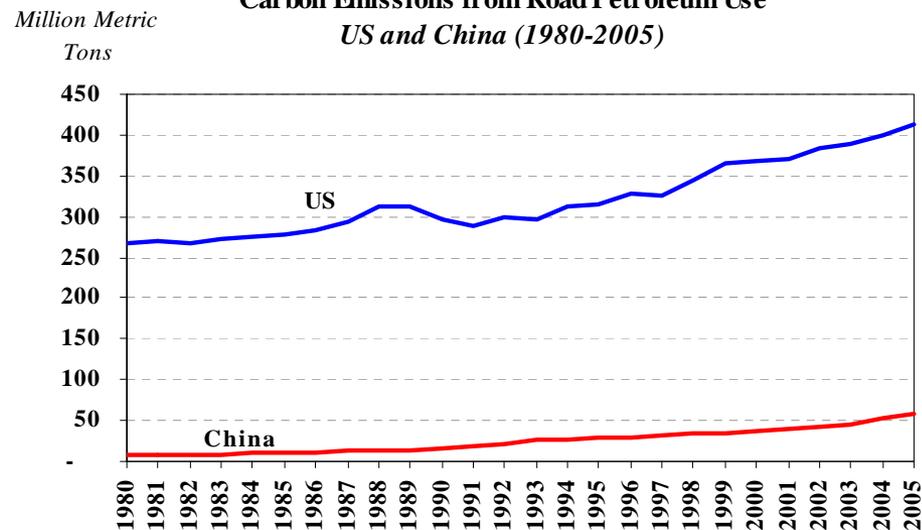


Note: Electricity generation also includes emissions of less than 1 Tg CO<sub>2</sub> Eq. from geothermal-based electricity generation.

### Road Petroleum Use US and China (1980-2005)



### Carbon Emissions from Road Petroleum Use US and China (1980-2005)

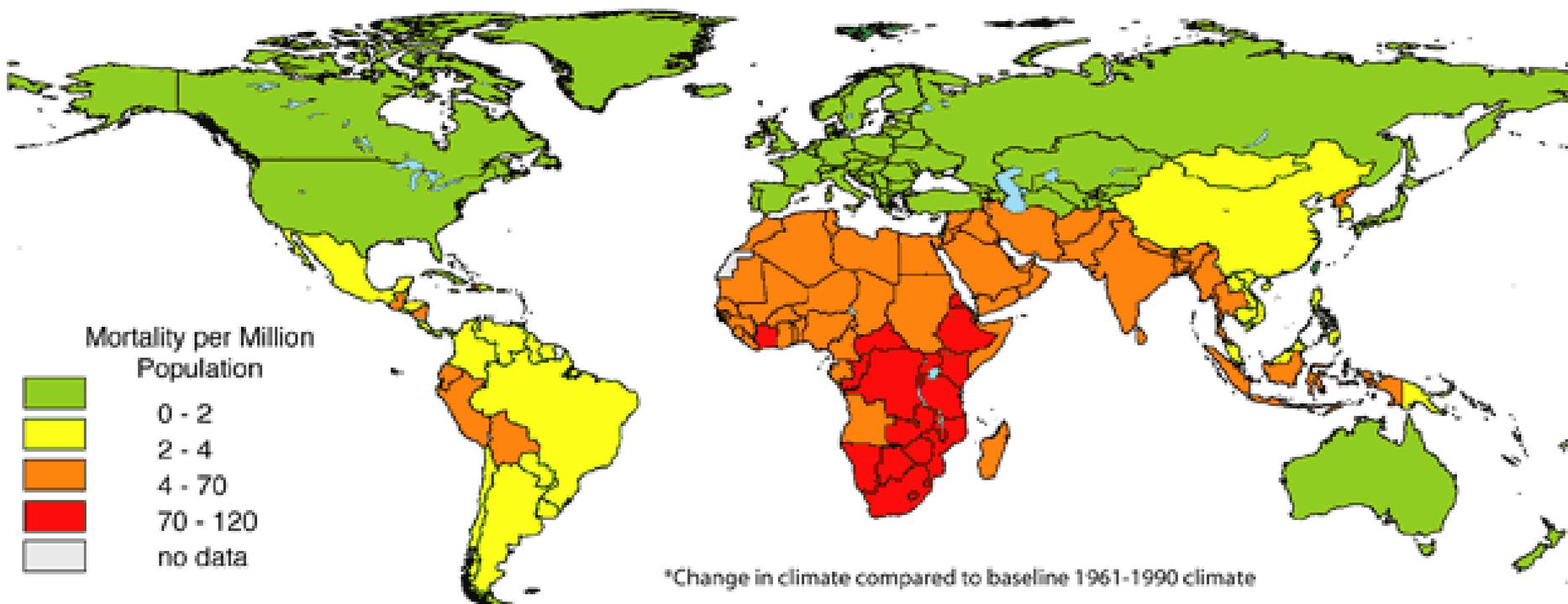


Source: Baker Institute Energy Forum

Source: United States Environmental Protection Agency (EPA)

## Part IV: International Adaptation Issues

## Estimated Deaths Attributed to Climate Change in the Year 2000, by Subregion\*



Data Source:

McMichael, JJ, Campbell-Lendrum D, Kovats RS, et al. Global Climate Change. In Comparative Quantification of Health Risks: Global and Regional Burden of Disease due to Selected Major Risk Factors. M. Ezzati, Lopez, AD, Rodgers A., Murray CJL. Geneva, World Health Organization, 2004

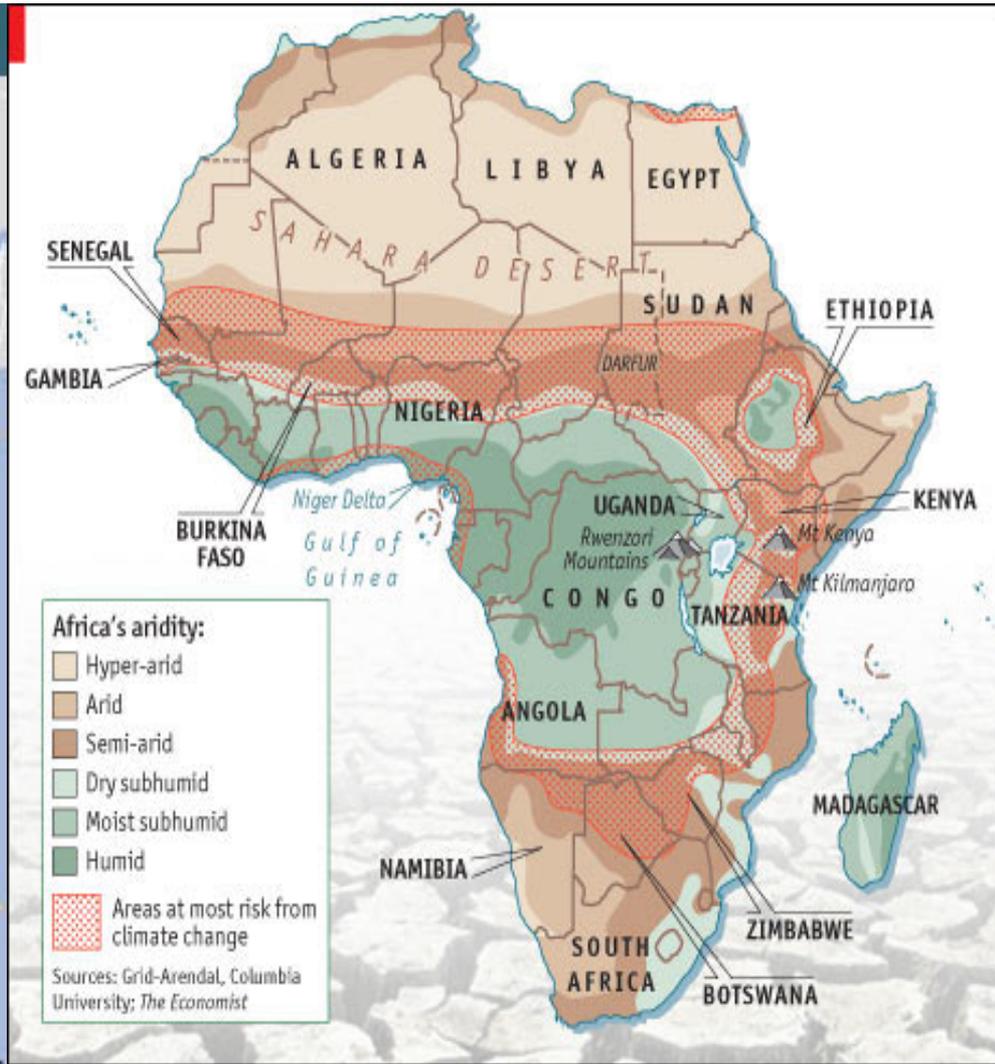
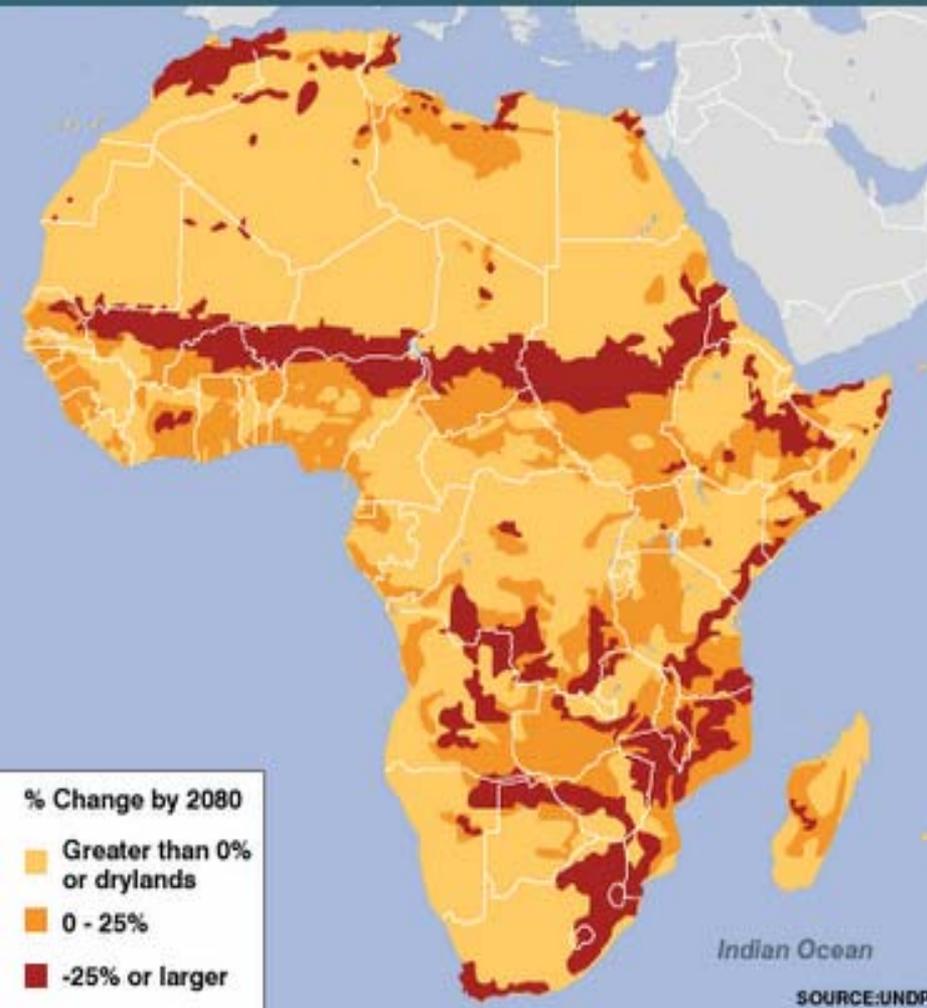


Maps produced by the Center for Sustainability and the Global Environment (SAGE)

# RICE UNIVERSITY

“Amid the diverse social and political causes, the Darfur conflict began as an ecological crisis, arising at least in part from climate change.” – [Ban Ki Moon, U.N. Secretary General](#)

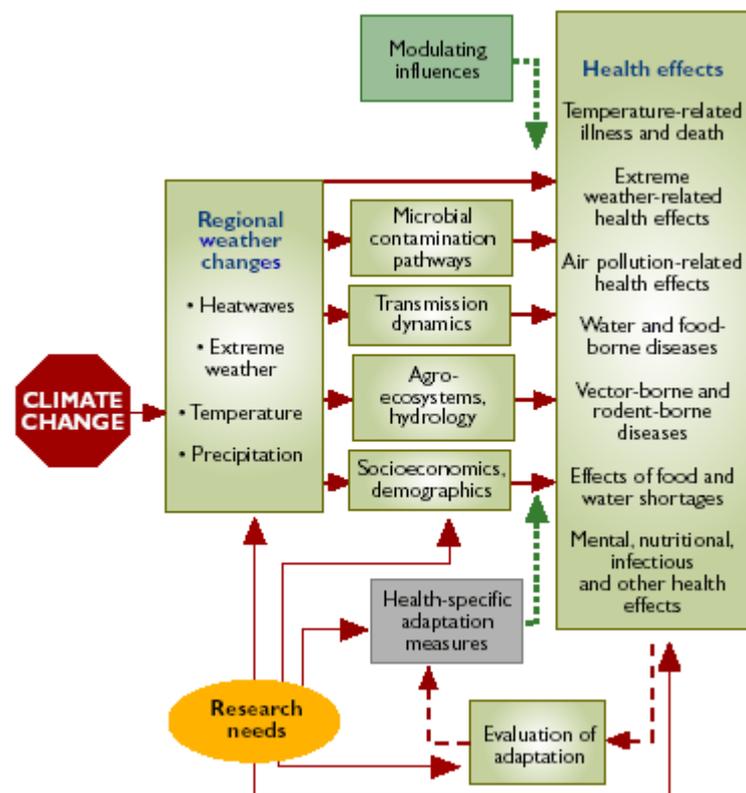
PROJECTED IMPACT OF CLIMATE CHANGE ON CEREAL PRODUCTIVITY IN AFRICA



Source: [Economist.com](http://Economist.com)

## World Health Organization (WHO) on Climate Change

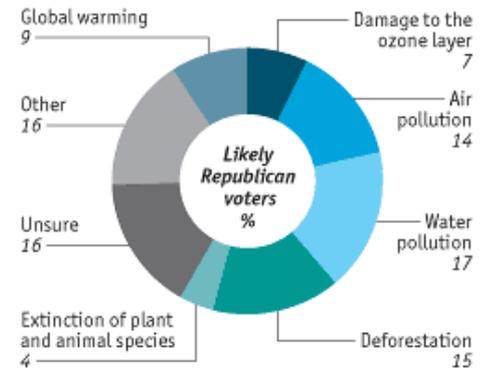
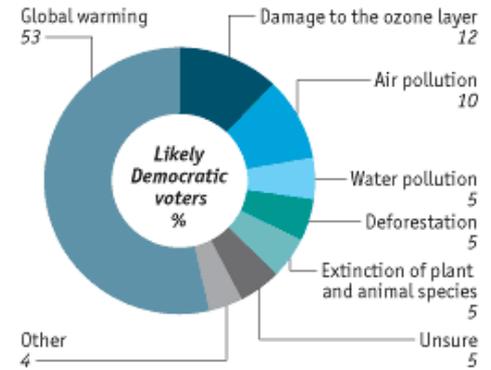
- “Measurement of health effects from climate change can only be very approximate.
- “Nevertheless, a WHO quantitative assessment, taking into account only a subset of the possible health impacts, concluded that the effects of the climate change that has occurred since the mid-1970s may have caused over 150,000 deaths in 2000.
- “The assessment also concluded that these impacts are likely to increase in the future.”



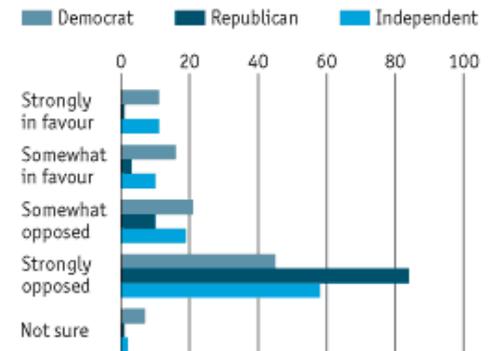
Part V: The 2008 Presidential Election  
and U.S. Climate Policy

- **Mitigating** climate change and **adapting** to its effects represents a complex collective action problem, perhaps the most difficult in modern international history.
- Bush opposes carbon credit systems that would unduly reward the FSU due to emissions reductions from the collapse of USSR.
- State and municipal authorities have led domestic efforts to address climate change in the United States.
  - 24 states plus D.C. have RPS standards with CA leading the way.
  - USCAP and ICAP represent efforts to prod, bypass Washington.
  - Have state and local actions affected federal actions?
- How will the 2008 presidential campaign and its outcome affect U.S. policies toward a new climate change regime?
  - What are the leading candidates' key positions?
- What are the major options that the U.S. might support?
- What might the central elements of a new regime look like?

What do you consider to be the most serious environmental problem facing the world today?



Do you favour higher petrol taxes to reduce carbon dioxide emissions? %



## Presidential Candidates on Climate Change

	Cap and Trade	Higher CAFE	U.S. Renewable Energy Standard	Drill Offshore?
<b>Clinton</b> 	<80% by 2050 with 100% auction	40 mpg by 2020 55 mpg by 2030	25% by 2025	No
<b>Obama</b> 	<80% by 2050 with 100% auction	52 mpg by 2026	25% by 2025	No
<b>Romney (dropped out)</b>	No, unless global cap	No	No articulated position	Yes and in ANWR
<b>McCain</b> 	1990 levels by 2020 and mixed allocation/auction <60% by 2050 (Introduced a climate change bill with Sen. Lieberman in 2003)	Support increases in principle	No national standard but support state targets	Says states should decide and would offer incentives to drill; but does not support drilling in ANWR.
<b>Huckabee (dropped out)</b>	Maybe	35 mpg by 2020	15% by 2025 with nuclear, clean coal	Unclear

## Democrats' Climate Policies

- Create a “Global Energy Forum” with G8+5 to seek a climate agreement that can be merged into the UNFCCC treaty negotiation process.
  - Develop technology transfer programs with newly industrializing countries.
- Invest \$150 billion in Clean Energy RD&D (over 10 years).
  - Clinton would collect \$50 billion thru a windfall profits tax and ending oil co. tax breaks; she would deposit the money into a “strategic energy fund.”
  - Obama’s plan mentions “repealing tax breaks for the oil and gas industry.”
  - Obama wants a low carbon fuel standard to cut lifecycle GHG 10% by 2020.
- Efficiency: tight standards/retrofits for federal buildings, updated appliance standards, efficiency goals for buildings, utility “decoupling” to incentivize efficiency, and investments to develop a smart grid.
- Both Democrats back commercialization of plug-in cars, renewable energy, modernization of the electricity grid, and green jobs training.
- Both want to double spending on basic energy research to \$6 billion.
- Coal: Both Democrats support “clean coal” with subtle differences.
  - Clinton: phased-in requirement for coal plants to employ CCS technology.
  - Obama: moratorium OK if cap/trade doesn’t stop new coal plants w/o CCS.

## Sen. John McCain's Climate Policy

- Pledges U.S. leadership at the U.N. climate negotiations.
  - Allows purchase of both domestic and international offsets from outside the proposed United States cap-and-trade system to “increase array of rewards for reduced emissions and reduce costs of compliance.”
  - McCain strongly supports nuclear power as a “carbon free” energy source.
- Proportion of auctions vs. free allocations would rise over time.
  - Revenue from auctioned credits could be used, with other federal funds, to support new energy infrastructure, coal CCS technology, and renewables.
  - Would “add to current federal efforts”—primarily R&D, not regulation—to develop new vehicle technologies (plug-ins, hybrids, flex-fuel, hydrogen).
- “In my approach to global climate-control efforts, we will apply the principle of equal treatment. We will apply the same environmental standards to industries in China, India, and elsewhere that we apply to our own industries. And if industrializing countries seek an economic advantage by evading those standards, I would work with the European Union and other like-minded governments that plan to address the global warming problem to develop effective diplomacy, effect a transfer of technology, or other means to engage those countries that decline to enact a similar cap.” [emphasis added]
  - Remarks as delivered left out talk of a “**cost equalization mechanism**” that was mentioned in the originally authorized text. (May 12, 2008 speech)

## Further Reading

- Intergovernmental Panel on Climate Change
  - <http://www.ipcc.ch/>
- International Energy Agency
  - <http://www.iea.org/>
- “20% by 2030” – U.S. Department of Energy
  - <http://www.eere.energy.gov/>
- Republican Party: Senator McCain
  - <http://www.johnmccain.com/climatechange/>
- Democratic Party: Senators Clinton and Obama
  - <http://www.hillaryclinton.com/Issues/energy/>
  - <http://www.barackobama.com/issues/energy/>

