U.S. Foreign Policy and Climate Change

May 21, 2008

Matthew E. Chen
Research Associate

Joe Barnes
Bonner Means Baker
Research Fellow

James A. Baker III
Institute for Public Policy
Rice University
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$_2$e concentration today

• 450-550 ppm CO$_2$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 km²/year/person

NOTE: This map is a "quick" recalculation of the Vulcan 2002 fossil fuel CO2 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.

METHODOLOGY: 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

Link to: [Current List](https://www.energy.gov) (Department of Energy)

- **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

Western Climate Initiative
Participating States and Provinces

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)

- In-State Electricity, 14%
- Imported Electricity, 14%
- Refining & Other Industries, 8%
- Transportation, 39%
- Commercial, Residential & Misc., 9%
- Industrial & Manufacturing, 10%
- Agriculture, Forestry & Waste, 6%

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
- 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
- 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.

• 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.epa.gov/climatechange/economics/economicanalyses.html)
U.S. Senate Votes on Climate Change Bills


  – 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

<table>
<thead>
<tr>
<th>President/Event</th>
<th>Action/Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ronald Reagan</td>
<td>IPCC formed by the UN in 1988</td>
</tr>
<tr>
<td>George HW Bush</td>
<td>Rio Declaration/Earth Summit, 1992</td>
</tr>
<tr>
<td>William J. Clinton</td>
<td>UNFCCC in 1994; signed KP in 1998</td>
</tr>
<tr>
<td>U.S. Senate</td>
<td>Opposed Kyoto Protocol (95-0 vote)</td>
</tr>
<tr>
<td>GW Bush (2001-07)</td>
<td>Rejected U.S. participation in Kyoto</td>
</tr>
<tr>
<td></td>
<td>&lt;GHG intensity 18% through 2012</td>
</tr>
<tr>
<td>GW Bush (2008-09)</td>
<td>Halt emissions growth by 2025</td>
</tr>
<tr>
<td>Bali Meeting 12-2007</td>
<td>&lt;25-40% CO₂ by 2020 proposed</td>
</tr>
<tr>
<td>The Next President</td>
<td>Likelihood of emissions cap, trading</td>
</tr>
</tbody>
</table>
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.
The U.N.'s goal is to seek agreement on a new international climate change treaty by the time of the annual climate meeting at the end of 2009 (to be held in Copenhagen).

The EU target is 20% renewables by 2020.

California has a target of 60% greenhouse gas reduction by 2050.

Oregon aims for a 75% reduction in greenhouse gas emissions by 2050.

In the United States, the state of Kansas has rejected power plant proposals based on CO2 emissions (2007).

Virginia targets a 30% reduction in greenhouse gas emissions by 2030.

Florida is looking for an 80% reduction in greenhouse gas emissions by 2050.

The current UK target is 60% reduction in greenhouse gas (GHG) emissions by 2050.

Germany wants to reach a renewables target of 45% by 2030.

Japan has set a new target range for industrialized countries of 60-80% reduction in greenhouse gas emissions by 2050 (50% by 2050 as global goal).

Argentina has adopted a voluntary emission reduction target of 2 to 10% below baseline forecasts for the Kyoto period.

The APEC calls for a post-Kyoto international agreement that ‘strengthens, broadens and deepens the current arrangements’.

Bali is hosting a UNFCCC meeting to discuss post-Kyoto legislation.

Australia’s targets are under discussion – joined the Kyoto Protocol in 2007 after Labor PM Kevin Rudd took office.

Oregon - 75% GHG reduction by 2050

California - 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Virginia - 30% GHG reduction by 2030

Florida - 80% GHG reduction by 2050

EU target of 20% renewables by 2020

EU target of 20% emissions reduction by 2020

German renewables target of 45% by 2030

Argentina adopts a voluntary emission reduction target of 2 to 10% below baseline forecasts for the Kyoto period.

Japan - New target range for industrialized countries of 60-80% GHG reduction by 2050? (50% by 2050 as global goal)

German renewables target of 45% by 2030

Current UK target of 60% GHG reduction by 2050

The U.N.'s goal is to seek agreement on a new international climate change treaty by the time of the annual climate meeting at the end of 2009 (to be held in Copenhagen).

APEC calls for a post-Kyoto international agreement that ‘strengthens, broadens and deepens the current arrangements’

Bali – UNFCCC meeting to discuss post Kyoto legislation

Australia – targets under discussion – joined the Kyoto Protocol in 2007 after Labor PM Kevin Rudd took office.

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)

Oregon – 75% GHG reduction by 2050

California – 60% greenhouse gas reduction by 2050

Kansas department of environment rejects power plant proposals on basis of CO2 (2007)
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

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

2005 ANNUAL EMISSIONS

1750-2005 ACCUMULATED EMISSIONS

Source: Presentation by James Hansen, PhD
U.S. Emissions in 2005

2005 CO₂ Emissions from Fossil Fuel Combustion by Sector and Fuel Type

Source: United States Environmental Protection Agency (EPA)

Thous bbl/d

Million Metric Tons

Road Petroleum Use
US and China (1980-2005)

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

Note: Electricity generation also includes emissions of less than 1 Tg CO₂ Eq. from geothermal-based electricity generation.

Source: Baker Institute Energy Forum
Part IV: International Adaptation Issues
Estimated Deaths Attributed to Climate Change in the Year 2000, by Subregion*

Data Source:

Maps produced by the Center for Sustainability and the Global Environment (SAGE)
“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
“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?
### Presidential Candidates on Climate Change

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

### The Economist/YouGov poll: climate change

- **Global warming**: 53% Likely Democratic voters, 9% Likely Republican voters, 16% Unsure
- **Damage to the ozone layer**: 12% Likely Democratic voters, 7% Likely Republican voters, 14% Unsure
- **Air pollution**: 16% Likely Democratic voters, 17% Likely Republican voters, 15% Unsure
- **Water pollution**: 5% Likely Democratic voters, 4% Likely Republican voters, 5% Unsure
- **Deforestation**: 5% Likely Democratic voters, 5% Likely Republican voters, 4% Unsure
- **Extinction of plant and animal species**: 5% Likely Democratic voters, 4% Likely Republican voters, 5% Unsure

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

- **Strongly in favour**: Democrat 20, Republican 40, Independent 60
- **Somewhat in favour**: Democrat 10, Republican 30, Independent 50
- **Somewhat opposed**: Democrat 20, Republican 40, Independent 60
- **Strongly opposed**: Democrat 10, Republican 30, Independent 50
- **Not sure**: Democrat 0, Republican 0, Independent 0

Full poll details are available at [www.economist.com/yougov](http://www.economist.com/yougov)
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.barackobama.com/issues/energy/