Ending the Energy Stalemate

A Bipartisan Strategy
To Meet America's Energy Challenges

The 2004 and 2007 Recommendations of
the National Commission on Energy Policy

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The National Commission on Energy Policy

- Launched in 2002, the Commission…
  - is bipartisan & multisectoral: 16 initial members with backgrounds in business, state & federal gov't, academia, labor, NGOs;
  - met a dozen times, sponsored & digested some 35 background & research papers on key issues before issuing recommendations in December 2004.
- Continuing from 2005 with some changes in membership…
  - issued an updated set of recommendations in April 2007
- Has been funded by…
  - the William and Flora Hewlett Foundation with minority participation from MacArthur, Pew, Packard, Energy Foundations.

Original members of the commission

John P. Holdren, *Co-Chair*, Heinz Professor of Env't Policy, Harvard

William Reilly, *Co-Chair*, former Administrator, EPA

John W. Rowe, *Co-Chair*, CEO, Exelon Corp.

Philip R. Sharp, *Congressional Chair*, former member of Congress, IN

Marilyn Brown, Director, Energy Efficiency & Renewables, ORNL

Ralph Cavanagh, Co-Director, Energy Programs, NRDC

Archie Dunham, CEO, Conoco-Phillips (1999-2004)

Rodney Ellis, State Senator, Texas

Leo W. Gerard, President, United Steel Workers of America

Henry Habicht, former Deputy Administrator, USEPA

Mario Molina, Institute Professor & Nobel Laureate in Chemistry, MIT

Sharon Nelson, Chief, Consumer Protection, Washington; Chair of the Board, Consumers Union

Linda Stuntz, former Deputy Secretary of Energy

Susan Tierney, former Assistant Secretary of Energy, EERE

R. James Woolsey, former Director of Central Intelligence

Martin B. Zimmerman, VP for Corporate Affairs, Ford (2001-4)

Jason Grumet, Executive Director

Elements of the US energy stalemate as of 2004

- Gap between rising oil demand and declining domestic production widening since 1985, with little policy action to address it on either supply side or demand side.
- Corporate average fuel economy (CAFE) standards unchanged since 1985 for “passenger cars”, constant from 1987 to 2005 for “light duty trucks” (pickups, vans, & SUVs). Whole-fleet average 24 mpg in 2003 (≈ 1981).
- Thirteen years after USA ratified UN Framework Convention on Climate Change (Rio), no requirement or incentive to reduce CO_2 emissions from energy sector in place.
- No new nuclear reactor ordered in the USA since 1978; siting of new LNG terminals and even wind farms increasingly stymied by NIMBY → BANANA.
- Real 2004 Federal spending on energy-technology research, development, & demonstration same as in 1987.

The Commission's overarching objective

Develop recommendations that can…

- Ensure ample, clean, reliable, and affordable energy for the United States in the 21st century while responding to growing concerns about the nation's energy security and the risks of global climate change.
- Command the bipartisan support necessary to be break the long-running energy-policy stalemate in the Congress and be enacted.

The Commission's principles for policy

- Prefer markets and market-based solutions
- Prefer gradual adjustments to dramatic interventions
- Appreciate the law of unintended consequences
- Aim for…
  - economic efficiency
  - high cost-effectiveness
  - low consumer impacts
  - appropriate incentives for future action
  - flexibility for adjustment w experience & new info
  - equity
  - political viability
  - ease of implementation, monitoring, & measurement
- Achieve revenue neutrality in recommended measures.

2004 recommendations: expanding oil & gas supply and strategic petroleum reserves

- Encourage nations with underdeveloped oil reserves to allow foreign investment in their energy sectors.
- Support R&D on technologies to mitigate environmental impacts of developing unconventional oil resources.
- Fill Strategic Petroleum Reserve & encourage other nations to establish publicly owned reserves.
- Adopt effective public incentives for construction of an Alaskan natural gas pipeline (loan guarantees, accelerated depreciation, tax credits, protection for investors against low-price contingencies).
- Address hurdles to siting & construction of LNG facilities.
- Increase resources for public land planning & permitting.
- Increase federal support for R&D on methane hydrates.

2004 recommendations: dampening growth of demand for liquid fuels

- Significantly strengthen federal fuel economy standards for cars and light trucks while also reforming CAFE program.

  Range explored was 10-20 mpg increase by 2015; proposed Congress ask NHTSA to recommend figure.

- Provide manufacturer & consumer incentives to promote domestic production and increased use of highly efficient advanced diesel & hybrid-electric vehicles.

- Pursue efficiency opportunities in heavy-duty truck fleet and existing passenger vehicle fleet.

2004 recommendations: addressing climate-change risks with mandatory greenhouse-gas restraints

- Initiate in 2010 a mandatory, economy-wide, tradable-permits system to limit greenhouse gas emissions.
  - Number of permits based on reducing GHG intensity of the economy (tons of carbon-equivalent emissions per million dollars of real GDP) at 2.4% per year.
  - Cap initial costs to the U.S. economy at $7 per metric ton of CO_2-equivalent ($26/tC) via a "safety valve" mechanism; safety valve to increase at 5%/yr in nominal terms.
- Link subsequent U.S. action with comparable efforts by other developed and developing nations via a program review in 2015 and every five years thereafter.

2004 recommendations: protecting critical energy infrastructure

- Address vulnerability of electricity grid to attack on the essential, difficult to replace, extra-high-voltage (EHV) transformers scattered throughout the grid.
  - Explore the feasibility of developing a modular, universal EHV transformer that would be smaller, cheaper, more versatile, and more transportable than typical transformers.
- Improve security against cyber-attack on supervisory control and data acquisition (SCADA) systems that manage the power grid
- Examine whether surveillance technologies developed for defense and intelligence purposes could be applied to widely distributed energy systems.
  - Examples include drone aircraft, satellite surveillance, intelligent software analysis of surveillance images, change-detection sensors, and intrusion-detection cables.

2004 recommendations: accelerating energy-technology innovation

- Revise the tax code to increase private-sector incentives to invest in energy research, development, demonstration, & early deployment.
- Roughly double annual real federal expenditures for energy research, development, & demonstration (ERD&D) in next 5 years (reaching ~3.3 billion 2004$ per yr in 2010).
  - Within this effort, triple the funding for international cooperation on ERD&D, to $750 million per year.
- Complement the increased RD&D activity with a tripling of federal expenditures supporting accelerated deployment of the most promising technologies that successfully pass the demonstration phase (reaching ~$2 billion/year in 2010).

Key focuses of the technology-innovation effort

CLEANER COAL TECHNOLOGY

- Speed up the commercialization of integrated gasification-combined-cycle multipurpose coal plants with $400 million per year in federal early-deployment incentives over the next decade. These plants can…
  - sharply reduce emissions of criteria air pollutants,
  - produce liquid and gaseous fuels as well as electricity,
  - be more easily retrofitted than conventional coal-burning plants to capture carbon dioxide.
- Accelerate the development and commercial-scale demonstration of CO_2 capture and sequestration technologies with $300 million per year in federal support over the next decade.

Key focuses of the technology-innovation effort

NUCLEAR ENERGY TECHNOLOGIES

- Provide $2 billion over ten years from federal RDD&D budgets for 1-2 “first mover” advanced nuclear power plants to demonstrate improved safety & economics.
- Move expeditiously to establish a project for centralized, interim, engineered storage of spent fuel at no fewer than two U.S. locations.

Key focuses of the technology-innovation effort

NUCLEAR ENERGY TECHNOLOGIES (continued)

- In parallel, work to reduce links of nuclear energy to weapon proliferation by…
  - reiterating commitment to continue indefinitely the long-standing US moratoria on commercial reprocessing of spent nuclear fuel and construction of commercial breeder reactors;
  - pursuing more actively than before the long-standing US policy of discouraging the accumulation of separated plutonium in civil fuel cycles elsewhere;
  - actively working to prevent the deployment of uranium-enrichment and spent-fuel-reprocessing capacity in additional countries.

Key focuses of the technology-innovation effort

RENEWABLE ENERGY TECHNOLOGIES

- Accelerate development & deployment of non-petroleum transportation fuel alternatives, especially cellulosic ethanol and diesel from biomass and wastes.

  Increase RD&D from $25M to $150M per year over next 5 yr; provide $0.75 billion in early-deployment incentives 2008-2017.

- Increase RD&D on solar photovoltaic and solar thermal energy systems from $83M to $300M per year.
- Extend the renewable production tax credit through 2009 and expand eligibility to all non-carbon energy sources, including hydropower, next-generation nuclear power plants, and fossil-fuel power plants with carbon capture & sequestration.

Key focuses of the technology-innovation effort

ENERGY END-USE EFFICIENCY TECHNOLOGIES

- Increase manufacturer & consumer incentives for more efficient vehicles from $80M/yr in 2004 (consumers only) to $300M/yr.
- Increase federal RD&D on efficiency improvements in buildings and appliances from $60M/yr in 2004 to $300 M/yr.
- Increase federal RD&D on improved efficiency in industrial processes from $93M/yr in 2004 to $200M/yr.

Analysis of economic impacts

Study released April 2005 by DOE/EIA confirmed NCEP estimates of low impact on the U.S. economy.

- Impact of NCEP carbon-emission-permit system alone would not exceed 0.15% of U.S. GDP in 2025.

  2025 reference-case GDP is $20.8 trillion in 2000$; estimated GDP loss in that year is $27 billion.

- Full NCEP policy package reduces GDP no more than 0.4% in 2025 (≈$80 billion) and…
  - reduces covered GHG emissions 11% from ref case in 2025,
  - while coal use in 2025 is 10% below ref case, it's still 22% above 2003.

The 2005 energy legislation…

- Embraced most of the Commission's recommendations about
  - oil & gas supply
  - strengthening energy infrastructure
  - deployment incentives for renewables, nuclear, clean-coal technology
  - R&D incentives for industry
- Failed to embrace the recommendations about…
  - strengthening the CAFE standards
  - significantly increasing federal energy R&D
  - mandatory, economy-wide GHG restraints

Sense of the Senate Resolution, 6-22-05

It is the sense of the Senate that Congress should enact a comprehensive and effective national program of mandatory, market-based limits and incentives on emissions of green-house gases that slow, stop, and reverse the growth of such emissions at a rate and in a manner that--

(1) will not significantly harm the United States economy; and

(2) will encourage comparable action by other nations that are major trading partners and key contributors to global emissions.

Round 2 NCEP membership

John P. Holdren
Co-Chair
Teresa and John Heinz Professor of Environmental Policy, Harvard University; Director of the Woods Hole Research Center

William K. Reilly
Co-Chair
Senior Advisor, TPG, Inc.; Former Administrator, U.S. Environmental Protection Agency

John W. Rowe
Co-Chair
Chairman and CEO, Exelon Corporation

Philip R. Sharp
Congressional Chair
President, Resources for the Future; Former U.S. Representative, IN

Marilyn Brown
Visiting Distinguished Scientist, Oak Ridge National Laboratory; Professor, School of Public Policy, Georgia Institute of Technology

John E. Bryson*
Chairman, President and Chief Executive Officer, Edison International; Chairman, Southern California Edison

Ralph Cavanagh
Senior Attorney and Co-Director, Energy Program, Natural Resources Defense Council

Erroll B. Davis*
Chancellor of the University System of Georgia

Rodney Ellis
State Senator, Texas

Leo W. Gerard
International President, United Steelworkers of America

Robert E. Grady*
Managing Partner, Carlyle Venture Partners, The Carlyle Group; Former Executive Associate Director of the OMB

F. Henry Habicht
Managing Partner of SAIL Venture Partners, LLC; Former Deputy Administrator of the U.S. Environmental Protection Agency

Frank Keating*
CEO of the American Council of Life Insurers; Former Governor of Oklahoma

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Mario Molina
Professor, University of California, San Diego

Sharon L. Nelson
Chair, Board of Directors, Consumers Union; Former Chief, Consumer Protection Division, Washington Attorney General's Office

Richard L. Schmalensee*
Professor of Economics, MIT; John C. Head III Dean, MIT Sloan School of Management

Norm Szydlowski*
President and CEO, Colonial Pipeline Company

Susan Tierney
Managing Principal, The Analysis Group; Former Assistant Secretary of Energy

R. James Woolsey
Vice President, Booz Allen Hamilton; Former Director of Central Intelligence

Martin B. Zimmerman
Clinical Professor of Business, Ross School of Business, University of Michigan; Former Group Vice President, Corporate Affairs, Ford Motor Company

The April 2007 NCEP recommendations

OIL DEPENDENCE

- 4%/yr target for CAFE improvement
  - with NHTSA authorized to modify up or down and encouraged to reform for greater cost-effectiveness, responsiveness to competitiveness concerns; and
  - targeted consumer & manufacturer incentives to promote advanced automotive technologies
- other cost-effective reductions in transport energy
  - heavy-truck fuel economy
  - efficiency standards for light-duty-vehicle replacement tires

The April 2007 NCEP recommendations

CLIMATE CHANGE

"Adopt legislation this Congress to implement a mandatory, market-based program to limit economy-wide U.S. greenhouse gas emissions"…

- targeted at return to 2006 levels by 2020 and 15% below those levels by 2030, and with
- initial "safety-valve" price of \$10/tCO_2, escalating at 5%/yr in real terms, upstream point of regulation
- initially distributing ~50% of permits to affected industries, with the rest auctioned and used to increase incentives for advanced technologies & reduce impacts on the poor.

(Incentives for coal CCS via bonus allowances to be at least equal in value to renewable production tax credits.)

The April 2007 NCEP recommendations

CLIMATE CHANGE (continued)

Create stronger incentives for comparable action on the part of key trading partners by

- providing technical & financial resources for low-C tech transfer,
- signaling determination to address trade, competitiveness concerns
- linking future commitments to international progress

The April 2007 NCEP recommendations

EFFICIENCY

- Enhance and extend tax incentives for efficiency investments introduced under the Energy Policy Act of 2005
- Ensure DOE follows through on issuing efficiency standards for 22 categories of appliances and equipment to capture technically feasible & cost-effective energy savings.

RENEWABLES

- Extend eligibility period for federal production tax credits in 5-year rather than 1- or 2-year increments.
- Adopt a federal renewable portfolio standard (RPS) that increases the share of electricity generated by renewable resources nationwide to at least 15 percent by 2020.

The April 2007 NCEP recommendations

NATURAL GAS AND COAL

- Follow through on EPAct05 commitments re Alaska pipeline, LNG infrastructure, market transparency, and permitting & leasing.
- Condition eligibility for public funding or subsidies on actual inclusion of CCS with any new advanced coal projects.
- Ensure that new coal plants built without CCS are not “grandfathered” under future GHG regulations.
- Include CCS from the outset in any taxpayer supported efforts to develop coal-to-liquids technology.
- Ensure that EPA completes a rigorous, formal public process to formulate effective regulatory protocols governing long-term carbon storage as soon as possible.

The April 2007 NCEP recommendations

NUCLEAR

Amend the Nuclear Waste Policy Act to:

- align its requirements with human engineering & scientific capabilities while adequately protecting health, environment
- require DOE to site and operate consolidated national or regional interim storage options
- codify that interim storage & federal responsibility for disposal of nuclear waste is sufficient to satisfy the NRC's waste confidence requirement
- require DOE to take possession of and/or remove fuel from reactor sites that have been, or are in the process of being fully decommissioned
- require R&D on alternatives to geologic disposal of once-through spent fuel

The April 2007 NCEP recommendations

BIOFUELS

- Re-evaluate ethanol subsidies & tariffs in light of current fuel mandates and rationalize existing policies to direct a greater share of public resources to more promising options, such as cellulosic ethanol. biobutanol, & clean diesel fuel from organic wastes.
- Address other hurdles to biofuels deployment, including deployment of critical supporting infrastructures and compatible vehicle technologies.
- Take steps to ensure that policies aimed at reducing U.S. oil dependence do not promote environmentally unsustainable fuel alternatives.

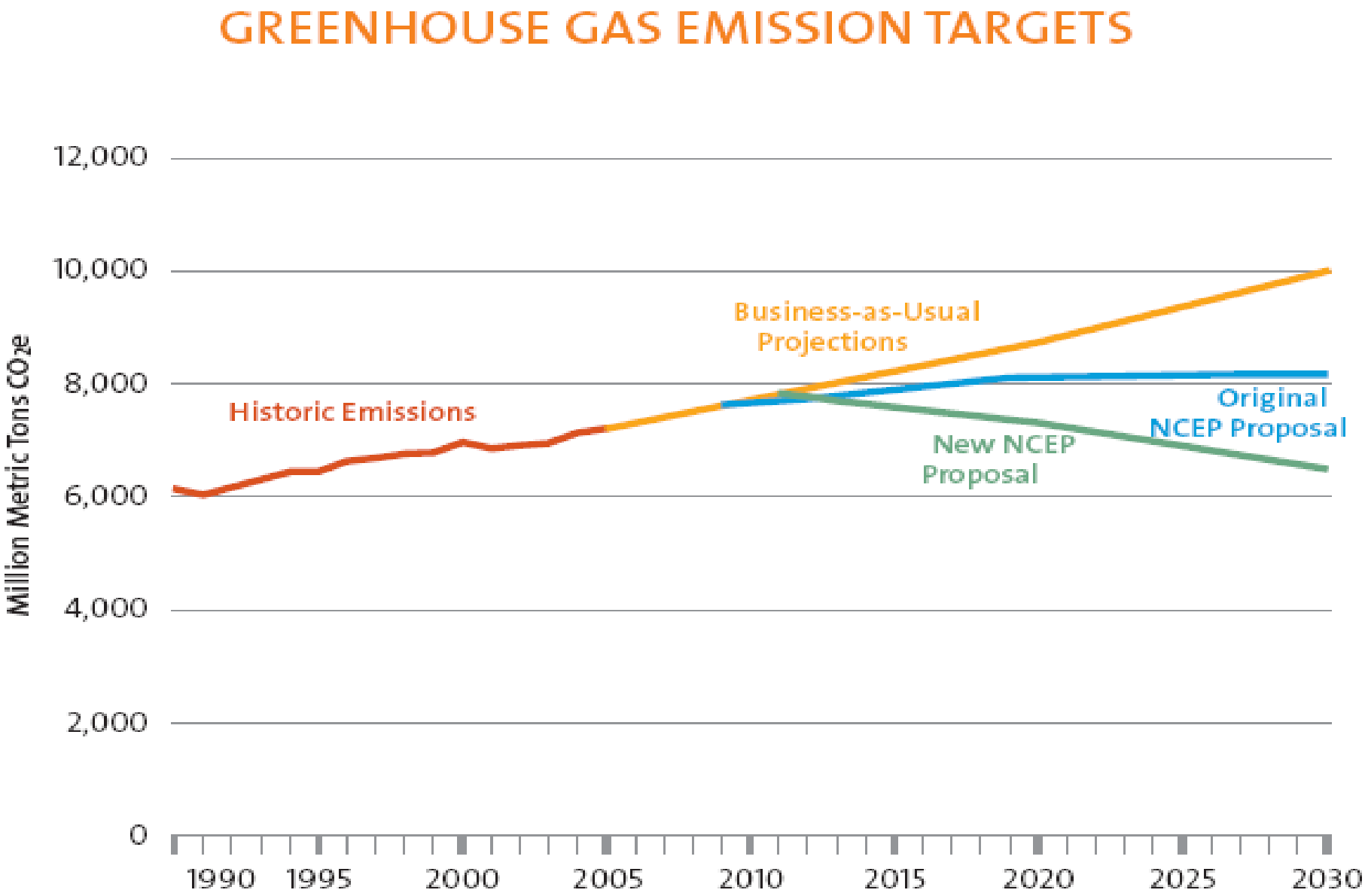
The April 2007 NCEP recommendations

ENERGY TECHNOLOGY INNOVATION

Reiterated Dec 2004 recommendations to…

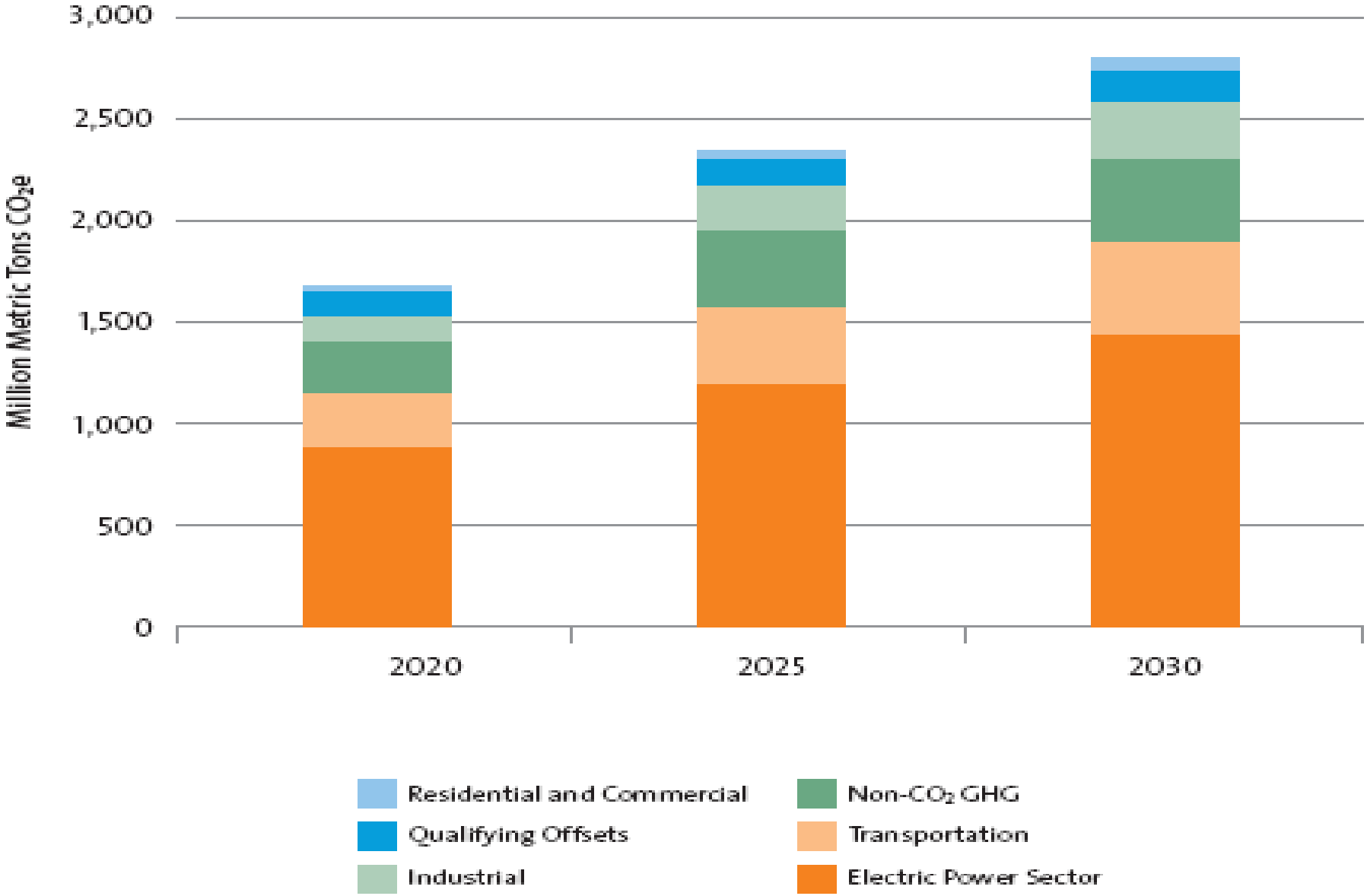
- Double real annual direct federal expenditures on energy-technology RD&D, with increases emphasizing public-private partnerships, international cooperation, technologies offering high potential leverage against multiple challenges.
- Within this increase, triple funding for international cooperation on energy-technology research, development, demonstration, deployment.

The April 2007 NCEP recommendations



Modeled emission reductions to 2030

NCEP 2007 climate recommendations & supplementary policies (CAFE, RPS)



The most controversial NCEP recommendation: the GHG permit-price "safety valve"

- If safety-valve price is reached in market, gov't sells as many additional permits as demanded at that fixed price.

  In effect, cap-and-trade turns into a carbon tax at indicated price if safety valve is triggered.
- It finesses argument between optimists & pessimists concerning availability of affordable reduction options.
  - Pessimists are assured there's a limit to the program's cost.
  - Optimists believe targets will be met without triggering safety valve.
- This feature was essential to bipartisan consensus in Commission on mandatory, economy-wide program; might be essential to same in Congress.

The “safety valve” controversy (continued)

- Safety valve has been sharply criticized by some in environmental community as
  - unduly weakening the program,
  - sacrificing assurance of reaching target,
  - compromising market principle with “price controls”.
- Counter arguments:
  - Key issues are safety-valve trigger price and rate of escalation over time, in relation to target.
  - Getting it right means low chance it will be triggered. In any case, Congress can adjust it over time.
  - What’s so bad about a carbon tax as the “worst case”?
  - Getting started soon with a mandatory, economy-wide program is crucial to global progress. Insisting on an uncompromising form that can’t get enough votes is folly.

The December 2007 energy legislation

Key provisions of 2007 Energy Independence & Security Act:

- CAFE standards ramp up to 35 mpg for combined fleet of cars & light trucks by model year 2020.
- Renewable Fuels Standard (RFS) modified to start at 9 billion gallons in 2008, rising to 36 billion gallons by 2022 (of which 21 billion gal from “advanced biofuels”).
- New Energy Efficiency Equipment Standards include lighting, residential refrigerators, freezers, refrigerator-freezers, and commercial walk-in coolers & freezers.
- Repeal of two (but not most) oil & gas subsidies in order to pay for implementation of CAFÉ provisions.

Energy Independence & Security Act (continued)

Among many other provisions, the legislation also…

- expands DOE's RD&D on CCS; directs DOE to engage NAS to review program;
- directs DOE to work with NAS to develop interdisciplinary graduate-degree programs in geologic sequestration science; establishes university-based R&D grant program to study CCS with types of coal;
- creates new energy efficiency & conservation block grants, funded at $2B/yr for 5 years.

"Funding is to supplement, not replace, funding provided by DOE under the Weatherization and State Energy programs" (which, however, the FY2009 Bush budget request zeroes out).

Energy Independence & Security Act (continued)

Provisions of H.R. 6 not included in the enacted law:

- a Renewable Portfolio Standard (RPS)

  Last House version, stripped out by Senate, called for 15% by 2020, of which 1/4 could be met by efficiency measures.

- other incentives for energy efficiency & renewables

  Items stripped out by Senate included a 4-year extension of the renewable electricity production tax credit.

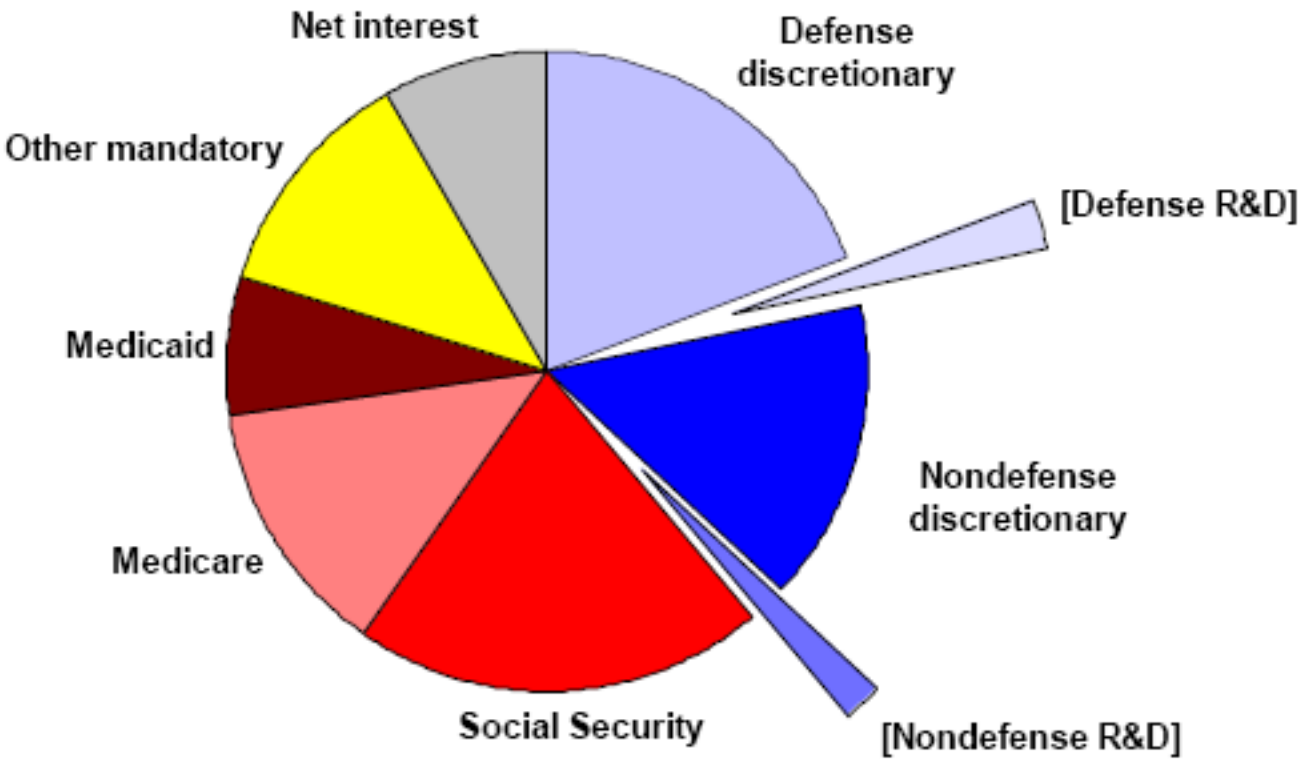
- repeal of most oil & gas subsidies

  House version called for repeal of $22 billion/year in tax subsidies for oil & gas, in order to pay for efficiency & renewables incentives and CAFÉ implementation; Senate version repealed only $1 billion worth (just enough to pay for CAFE).

Senate's excuse was the threatened veto.

What's really happening? Follow the money!

Composition of the Proposed FY 2009 Budget
Total Outlays = $3.1 trillion



Note: Projected Unified deficit is $407 billion.
Figures exclude most Iraq and Afghanistan military costs.
Source: AAAS, based on *Budget of the United States Government FY 2009.*
FEB. '08 © 2008 AAAS

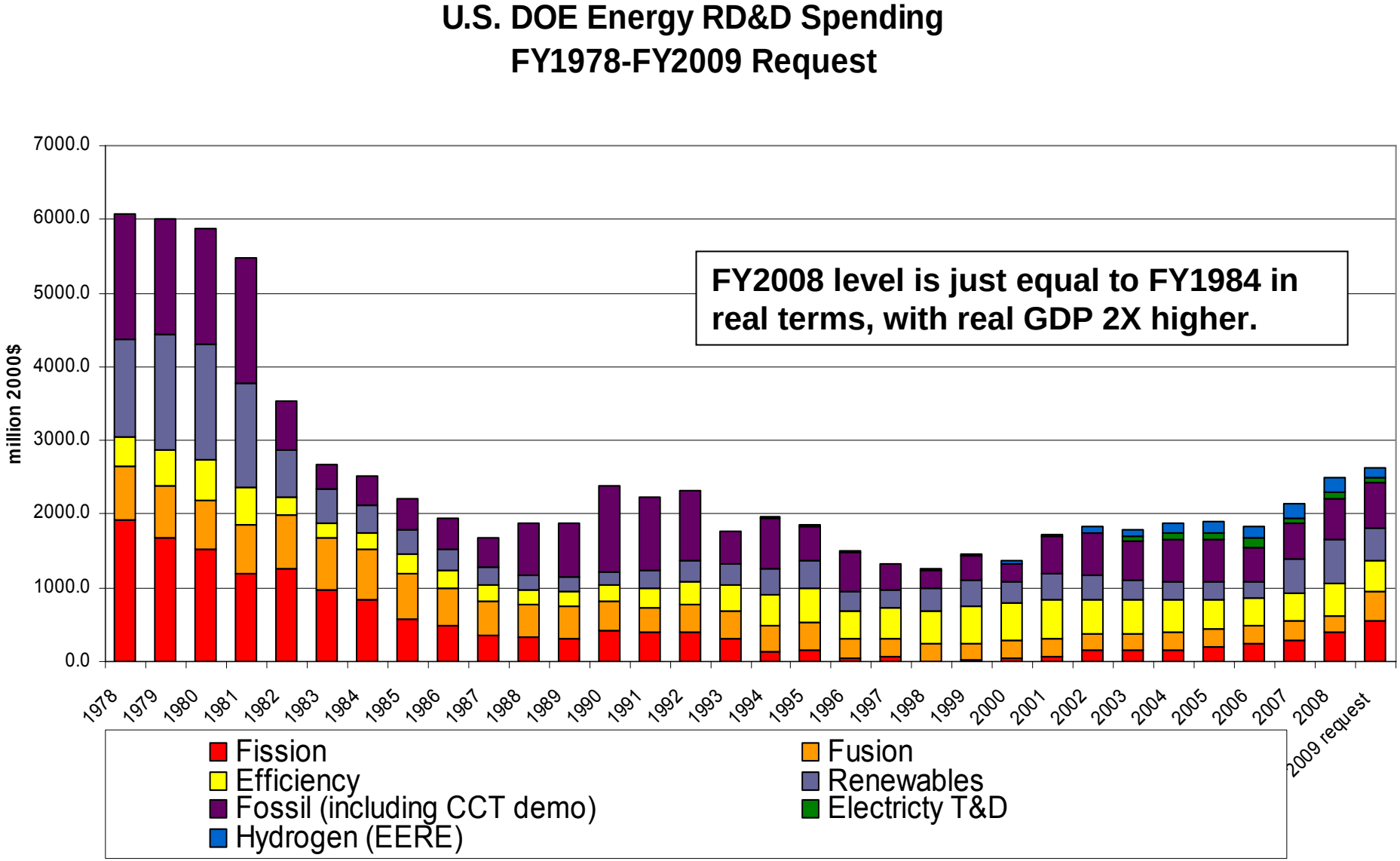
AAAS

The FY2009 Federal budget request

A few relevant ingredients:

- Federal Railroad Administration budget falls ~33% from FY2008, FY2007 levels; grants to Amtrak fall from $1.3 billion to $0.8 billion.
- Weatherization Assistance Program ($227M) eliminated.
- Energy-technology RD&D would go up 6% (real) compared to FY2008, 44% above the FY2006 low.
- But, within this, energy-efficiency RD&D would go down 2.5% and renewable-energy RD&D down 28% compared to FY2008.

US federal energy-technology RD&D, 1978-2009



Kelly Gallagher, Harvard U, 2-14-08

DOE Energy RD&D, selected years (constant 2000$)

	2001	2006	2008	2009R
Efficiency	548.5	382.5	426.8	416.8
Fossil	518.1	472.8	554.3	598.2
Hydrogen	26.0	131.8	173.1	117.6
Nuclear fission	61.9	236.2	387.5	554.3
Nuclear fusion	236.4	241.1	235.5	396.6
Renewables	335.7	222.8	599.0	452.4
T&D	--	125.3	83.4	69.7
Total	1726.5	1812.6	2461.5	2605.5

Climate bills in the 110th Congress

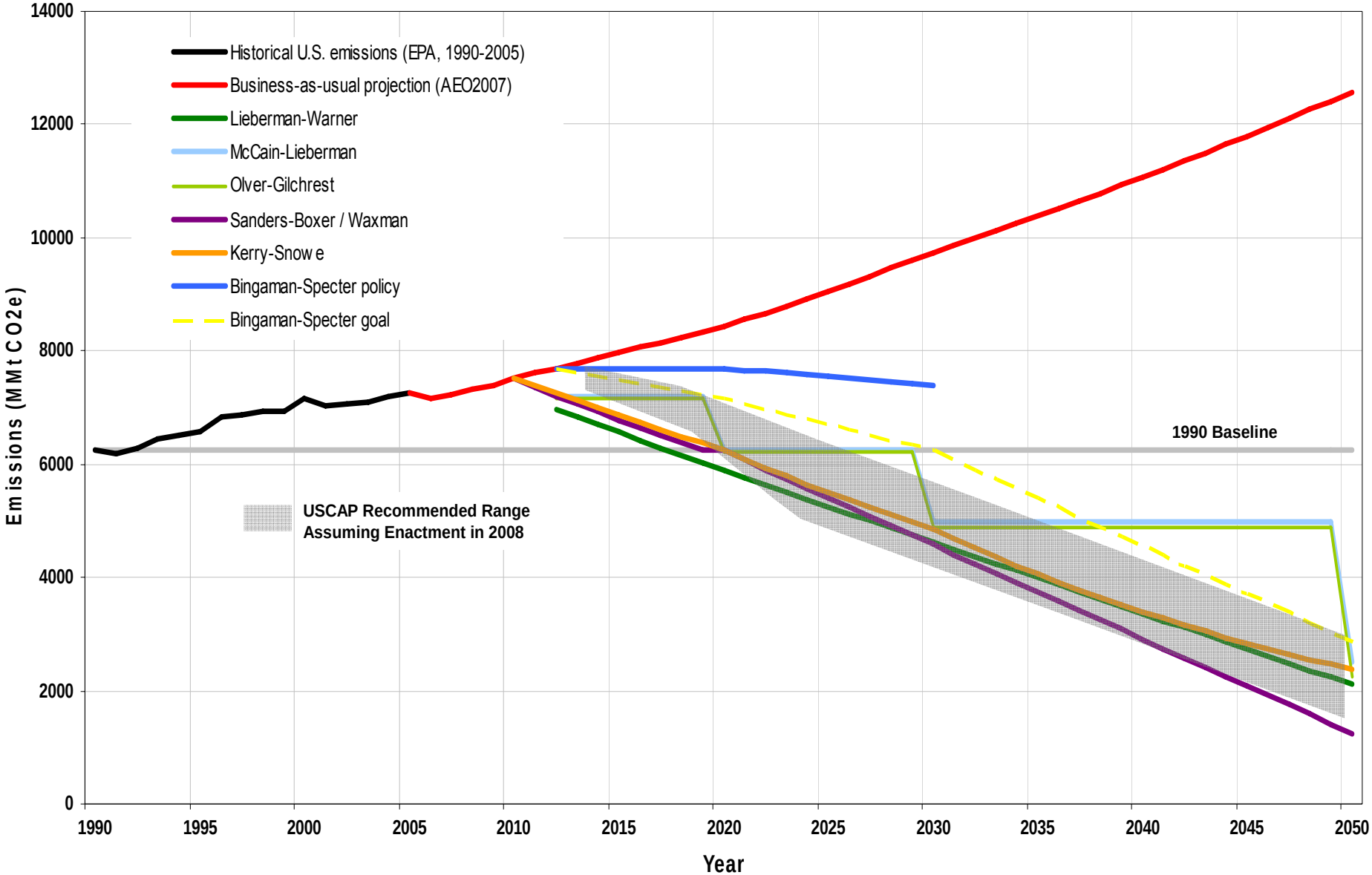
Senate

- Lieberman-Warner: economy-wide, offsets, funds for technology, adaptation, and mitigating impacts. Approximately 63% below total U.S. 2005 emissions levels by 2050
- Bingaman-Specter: offsets, "safety valve" of $12/ton rising 5%/year above inflation, funds and bonus allowances for tech R&D. Aspires to ≥ 60% below current by 2050. Requires aggressive external policies to avoid safety valve
- Lieberman-McCain: economy-wide, offsets, technology title. 60% below 1990 in 2050
- Sanders-Boxer: economy-wide, cap & trade permitted but not required, offsets not specified, other sectoral standards. 80% below 1990 in 2050
- Feinstein-Carper: electricity sector only, some offsets, funds for tech R&D. 25% below 1990 in 2050
- Kerry-Snowe: economy-wide, offsets and cost-control not specified, other sectoral standards, funds for tech R&D. 62% below 1990 in 2050

House

- Olver-Gilchrest: economy-wide, offsets, 60% below 1990 in 2050
- Waxman: economy-wide, cap & trade permitted but not required, offsets not specified, funds for tech R&D, other sectoral standards. 80% below 1990 in 2050

Climate bills: modeled reductions



Pew Center on Global Climate Change, 2008

For more information about the Commission's recommendations & their impact…

- Go to http://www.energycommission.org, where the 2004 & 2007 reports are available in PDF.
- In addition to these reports, staff & outside expert analyses sponsored by Commission (>3,000 pages) are on the site, plus links to EIA economic analyses.