



Low Carbon Energy Transitions:

An Institutional Perspective

Eric Zusman
Institute for Global Environmental Strategies
Transition towards Low Carbon Societies in
Thailand and Asia
17-18 November 2010,
Bangkok, Thailand

Outline

1. LCS Research

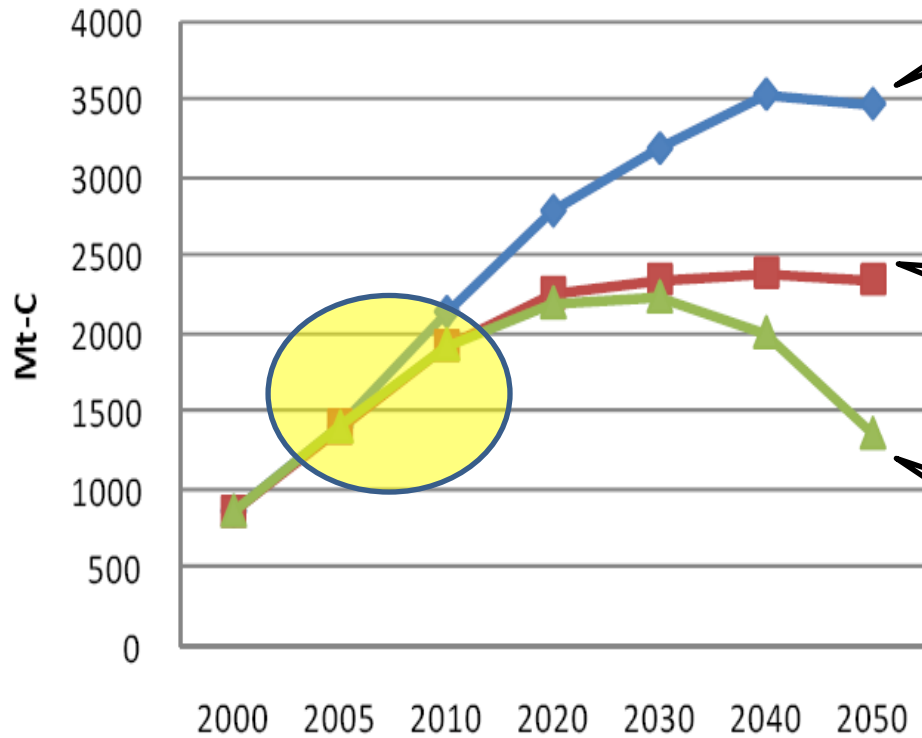
2. Bringing in Institutions

- **China Energy Policy (efficiency target)**
- **US Climate Policy (cap and trade)**

3. Key Messages

LCS Research: Previous Studies

CO2 Emission in China



BAU

- Per capita energy consumption to reach mid developed country level of today by 2050.
- Energy efficiency shall be 10% lower than that of world's top level as of 2005.
- Industrialization further advances and energy use efficiency will improve via technological development but overall energy consumption will reach 7.8 billion tce.

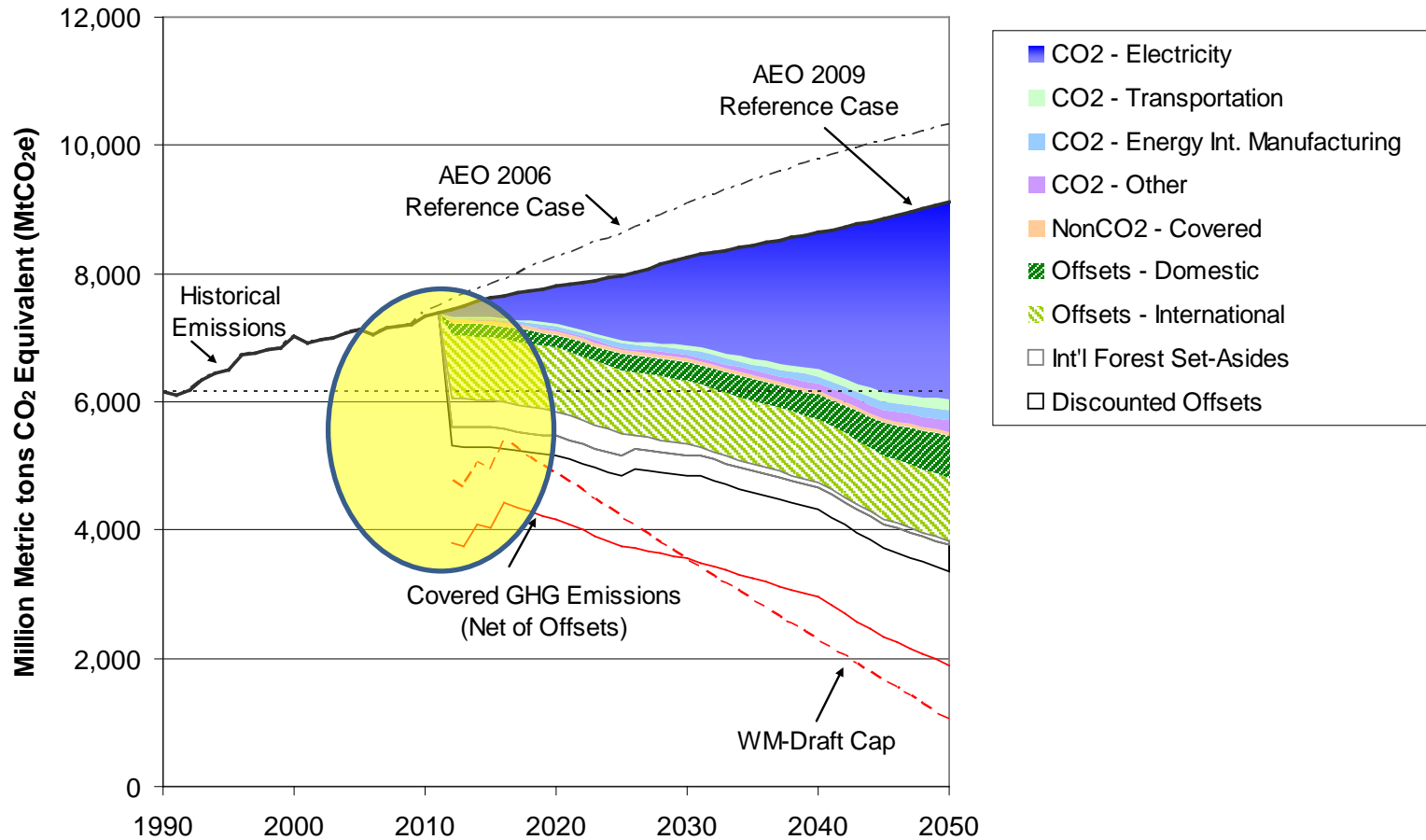
Low Carbon Society

- Fully integrate sustainable development, energy security, international competitiveness, etc.
- Shift in production and consumption patterns and technology development.
- Accelerate the development of energy saving equipment manufacturing, nuclear renewable, etc.
- CCS technology in power industry.
- Expand investment in LC development.
- Disseminate energy saving and life style.

Enhanced Low Carbon

- International cooperation.
- New technology development. Cost reduction in existing technologies. Dissemination of LC technologies.
- Research and development and capital investment to support LCS.
- Advanced energy diversification.
- Significant dissemination of clean coal technology and CCS.

LCS Research: Previous Studies






Source: USEPA, 2009

LCS Research: Previous Studies

Study	Type of Model	Scenarios	Carbon-plus \$/tCO ₂ and % change in CO ₂	Remarks
Fujino et al 2008 Japan	Linked models	<ul style="list-style-type: none"> •BAU •Nature-oriented •Technology-oriented 	-.83% to -.90% -.96% to -1.06%	Feasibility of long-term stringent reductions
Shrestha et al 2008 Thailand	AIM	<ul style="list-style-type: none"> •BAU •Three Carbon Tax Scenarios 	runs only up to \$100/t CO ₂	Technological change The model shows significant potential for CO ₂ emission reduction through modal shift to electrified MRTS
Shukla 2008 India	AIM CGE Model Top Down Markal Answer Model AIM Snapshot Model	<ul style="list-style-type: none"> •BAU •Carbon Tax •Sustainability 	-.35% to -1.35%	Return to 2000 levels by 2050 Embed mitigation in development planning Reduce intermediate demand

LCS Research: Bringing in Institutions

- Models focus on long-term equilibria (Crassous and Hourcade, 2009) 
 - Short-term transitions can influence long-term development paths
- Models assume policies designed well and implemented effectively 
 - The policy and its effectiveness depends on political incentives for policy change
- Models stress technical and economic feasibility (Sugiyama, 2009) 
 - Low carbon research can usefully bring in institutions

China Energy Efficiency: Efficiency Targets

**Progress initially slow with 20% energy intensity...but
10.1% improvement between 2006-2008**

2005

11th Five Year Plan-
20% energy
intensity

2006

Improved
by 1.33%

2007

Improved
by 3.27%

2009

Copenhagen Pledge-40-45%
reduction in carbon
intensity by 2020

2010

12th Five Year Plan-
Possible 16% energy
intensity reduction target



China Energy Policy:

Economic Incentives

Well designed economic incentives
contributed to the progress



2004

- Differentiated electricity pricing policy
- Encouraged
- Permitted
- Restricted
- Eliminated

2007

- Local provincial authorities given right to retain collected revenue
- 23.5 billion (B) RMB¥ (\$3.4B) to improve energy efficiency
- enterprises need energy metering and measuring systems document proven savings of at least 10,000 tce (0.29 PJ)

2008

41.8B RMB¥ (\$6B) to promote saving energy

China Energy Policy: Political Incentives

- China's Nomenklatura System
- Officials who do not meet energy targets can be denied:
 - annual rewards
 - honorary titles
 - or promotion

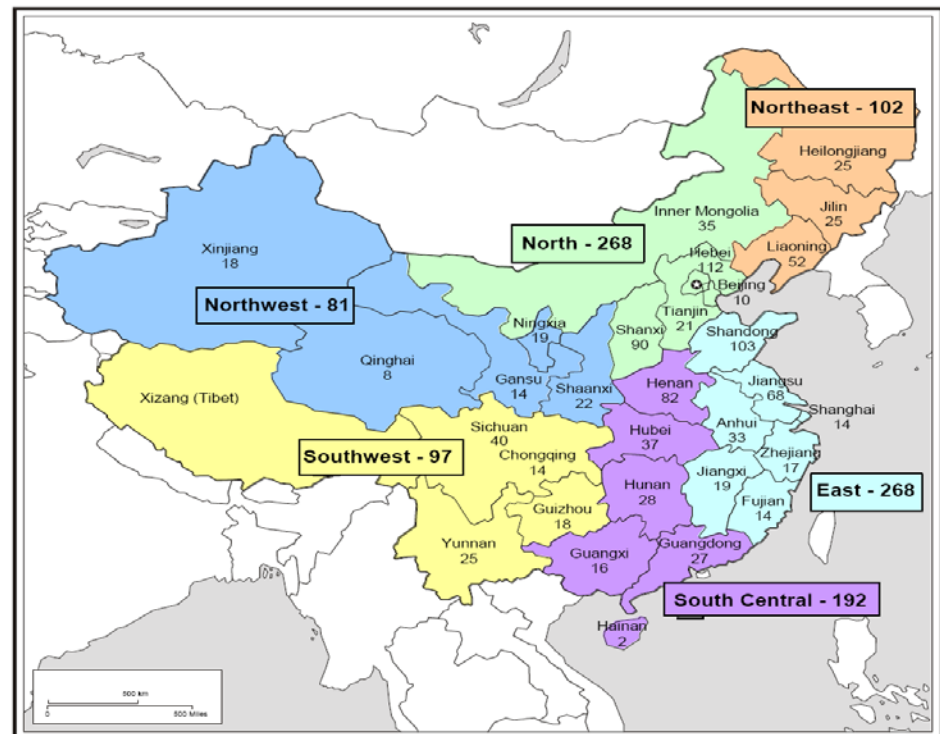


Figure 4. Geographic Location of Top-1000 Energy-Consuming Enterprises, 2004

China Energy Policy:

Political Incentives

Assessment Indicators	No.	Examination Content	Points	Scoring Standards
Energy-Intensity Target (40 points)	1	Reduction of Energy Consumption per 10,000 RMB of GDP	40	If the annual target is reached, 40 points will be allocated; if only 90% of the target was reached, 36 points will be allocated; if only 80% of the target was reached, 32 points will be allocated; if only 70% of the target was reached, 28 points will be allocated; if only 60% of the target was reached, 24 points will be allocated; if only 50% of the target was reached, 20 points will be allocated. If the target is exceeded, then for every 10% exceeded, an additional 3 points will be allocated for a maximum of 9 points. This indicator has veto power such that if the target set for the year is not fully achieved, then a failing grade will be assessed.
Energy-Saving Measures (60 points)	2	The Energy Efficiency Work of Organizations and Officials	2	1. Establishing the region's energy intensity statistics, monitoring and evaluation system: 1 point. 2. Establishing an energy-efficiency coordination mechanism, a clear division of responsibilities, and regular meetings to study the major issues: 1 point.
	3	Allocation and Implementation of Energy-Efficiency Target	3	1. Allocation of energy saving target: 1 point; 2. Carrying out an investigation and evaluation of progress in achieving the energy saving target: 1 point; 3. Regularly publishing energy consumption indicators: 1 point
	4	Adjusting and Optimizing the Condition of the Industrial Structure	20	1. If the service sector accounted for an increased proportion of the region's GDP: 4 points; 2. If the high-tech industry accounted for an increased proportion of the region's industrial added-value: 4 points; 3. Developing and implementing energy efficiency assessment and review procedures for fixed asset investment projects: 4 points; 4. Completing the year's goal of eliminating retrograde production capacity: 8 points.
	5	Energy-Saving Investment and Implementation of Key Projects	10	1. Establishing special funds for energy efficiency and sufficient implementation: 3 points; 2. Increasing the proportion of annual fiscal revenue allocated for special energy-efficiency funds: 4 points; 3. Organizing and implementing key energy-efficiency projects: 3 points.
	6	The Development and Expansion of Energy-Efficiency Technology	9	1. Including the development of energy-efficient technologies in the annual science and technology plan: 2 points; 2. Increasing the proportion of annual fiscal revenue spent on energy-efficient technology R & D: 3 points; 3. Implementing energy-efficient technology demonstration projects: 2 points; 4. Organizing and developing mechanisms to promote energy-efficient products and technologies and energy-efficiency services: 2 points.
	7	Managing the Energy-Efficiency of Key Enterprises and Industries	8	1. If key energy-intensive enterprises (including the Top-1000 program) meet their annual energy intensity targets: 3 points; 2. Implementing the annual energy-saving monitoring plan: 1 point; 3. Meeting the annual target rate of implementation for mandatory energy-efficiency standards in newly constructed buildings: 4 points; if 80% of the target is achieved then 2 points; if less than 70% of the target is achieved then no points will be received.
	8	Implementation of Laws and Regulations	3	1. Issuing and improving supporting regulations for the Energy Conservation Law: 1 point; 2. Monitoring, inspecting and enforcing the law with respect to energy-efficiency: 1 point; 3. Implementing standards that limit the energy consumption of energy-intensive products: 1 point
	9	Implementation of Basic Energy-Efficiency Work	5	1. Strengthening energy-efficiency monitoring teams and institutional capacity building: 1 point 2. Improving the system for energy statistics and strengthening energy statistics capacity: 1 point; 3. Installing energy measuring devices in accordance with the requirements: 1 point; 4. Carrying out energy-efficiency awareness and training: 1 point; 5. Implementing the energy-efficiency incentive system: 1 point.
	Subtotal			100

US Energy Policy: Political Incentives

ONE HUNDRED ELEVENTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON ENERGY AND COMMERCE

2125 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, DC 20515-6115

Minority (202) 225-3907

Facsimile (202) 225-2300

Minority (202) 225-3941

energycommerce.house.gov

February 27, 2009

HENRY A. WAXMAN, CALIFORNIA
CHAIRMAN

JOHN D. DINGELL, MICHIGAN
CHARYAMAN CARRUTOS
EDWARD J. MARKEY, MASSACHUSETTS
RICK BOEHRER, VIRGINIA
FRANK PALLONE, JR., NEW JERSEY
BART ODROON, TENNESSEE
ROBBY L. RUBIN, ILLINOIS
ANNA G. ESHOO, CALIFORNIA
BART STUPAK, MICHIGAN
ELIOT L. ENGEL, NEW YORK
GENE GREEN, TEXAS
DIANA BUGETTE, COLORADO
VICI COVATSIAN
LOIS CAPPS, CALIFORNIA
MIKE DOWLE, PENNSYLVANIA
JANE HARMAN, CALIFORNIA
JAN SCHAKOWSKY, ILLINOIS
CHARLES A. GONZALEZ, TEXAS
JAY INSLEE, WASHINGTON
TAMMY BALDWIN, WISCONSIN
MIKE ROSS, ARKANSAS
ANTHONY D. WIENER, NEW YORK
JIM MATHESON, UTAH
G.K. BUTTERFIELD, NORTH CAROLINA
CHARLE MELANCON, LOUISIANA
JOHN BARRON, GEORGIA
BARON P. HILL, INDIANA
DORIS D. MATSUI, CALIFORNIA
DONNA CHRISTENSEN, VIRGIN ISLANDS
KATHY CASTOR, FLORIDA
JOHN SARBANES, MARYLAND
CHRISTOPHER MURPHY, CONNECTICUT
ZACHARY T. SPACE, OHIO
JERRY MCNEENEY, CALIFORNIA
BETTY SUTTON, OHIO
BRUCE BRALEY, IOWA
PETER WELCH, VERMONT

JOE BARTON, TEXAS
RANKING MEMBER

RALPH M. HALL, TEXAS
FRED LIPTON, MICHIGAN
CLIFF STEARNS, FLORIDA
NATHAN DEAL, GEORGIA
ED WHITFIELD, KENTUCKY
JOHN SHIMKUS, ILLINOIS
JOHN R. SHADDOX, ARIZONA
ROY BLUNT, MISSOURI
STEVE BUYER, INDIANA
GEORGE RADANOVICH, CALIFORNIA
JOSEPH R. PITTS, PENNSYLVANIA
MARY BONO MACK, CALIFORNIA
ERIC WALLEN, OREGON
LEE TERRY, NEBRASKA
MIKE ROGERS, MICHIGAN
SUB WILKINS KYRKE, NORTH CAROLINA
JOHN SULLIVAN, DELAWARE
TIM MURPHY, PENNSYLVANIA
MICHAEL C. BURGESS, TEXAS
MARSHA BLACKBURN, TENNESSEE
PHIL GINGREY, GEORGIA
STEVE SCALISE, LOUISIANA

- Cap-and-trade
- new renewable requirements for utilities
- studies and incentives for carbon capture and sequestration technologies
- energy efficiency incentives for homes and buildings
- grants for green jobs
- eight Republicans supported it.

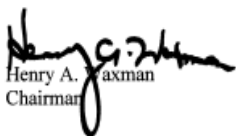
The Honorable Lisa Jackson
Administrator
Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington DC, 20460


Dear Administrator Jackson:

One of the top priorities of the Committee on Energy and Commerce is to pass comprehensive climate change legislation. To facilitate this effort, we are requesting technical assistance from the Environmental Protection Agency (EPA). In particular, we request that EPA estimate the economic impacts of our draft legislation as it is developed. EPA's analysis of the draft legislation would prove useful to us and other members of the House as we craft measures to combat global climate change.

We ask that EPA begin this process by meeting with our staff to discuss the parameters, methods, and duration of the analysis. Please call Alexandra Teitz, Lorie Schmidt or Joel Beauvais at (202) 225-4407.

Sincerely,


Henry A. Waxman
Chairman


Edward J. Markey
Chairman
Subcommittee on Energy and
Environment

US Energy Policy: Political Incentives

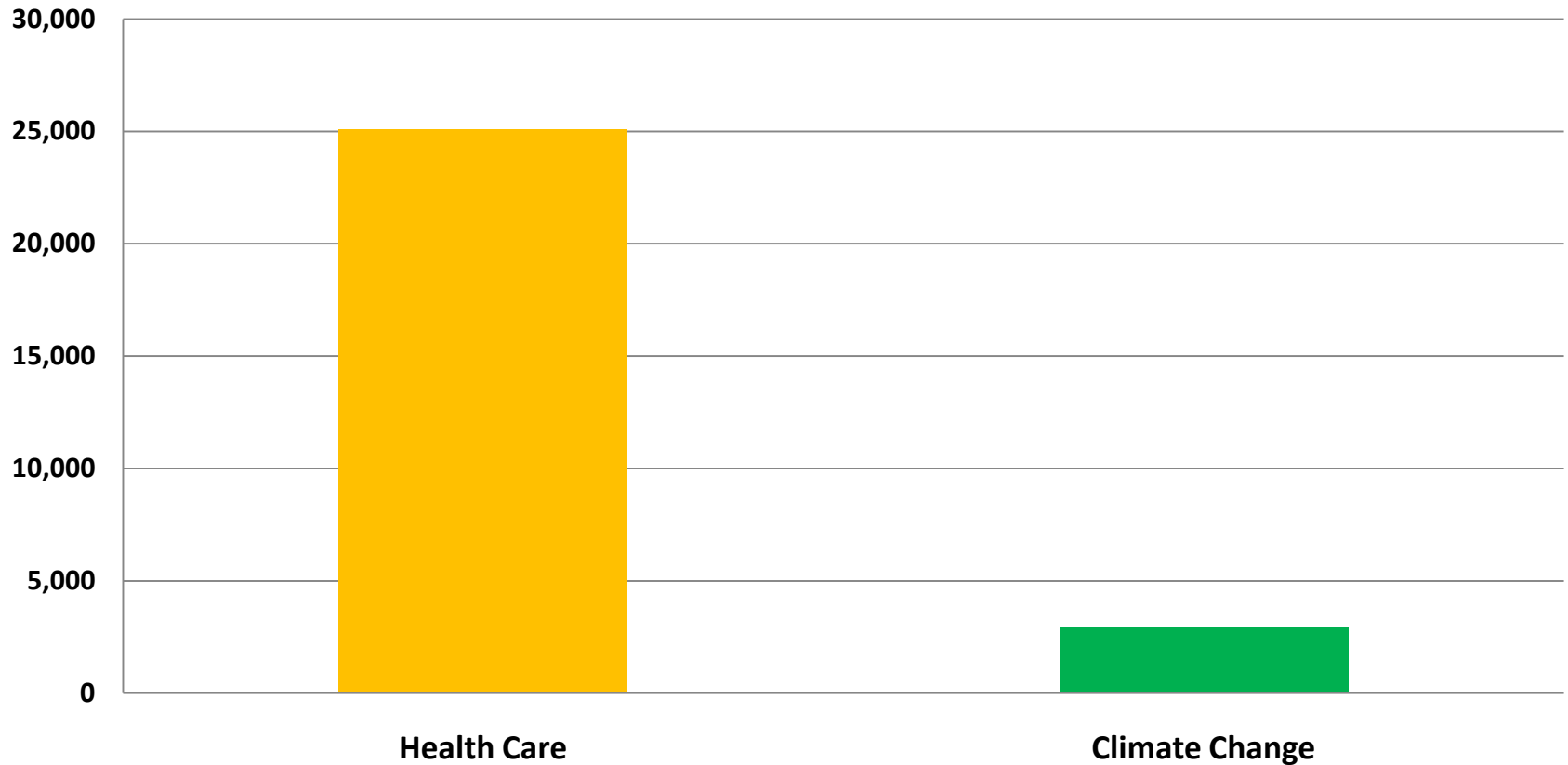
-I am absolutely certain that generations from now, we will be able to look back and tell our children that this was the moment when we began to provide care for the sick and good jobs to the jobless; this was the moment when the rise of the oceans began to slow and our planet began to heal...



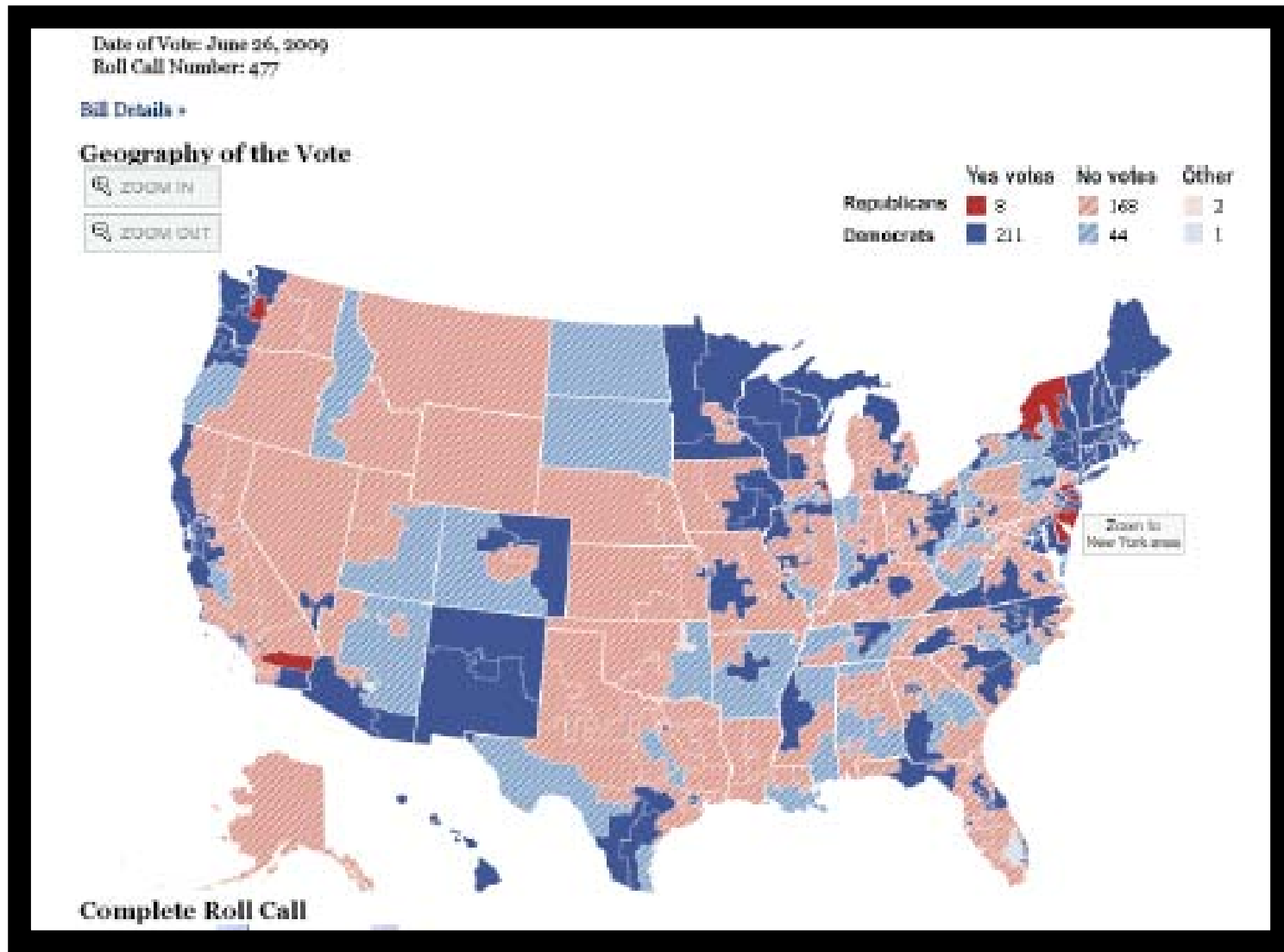
Barack Obama, Victory Speech in St. Paul, Minnesota, June 3, 2008.

US Energy Policy: Political Incentives

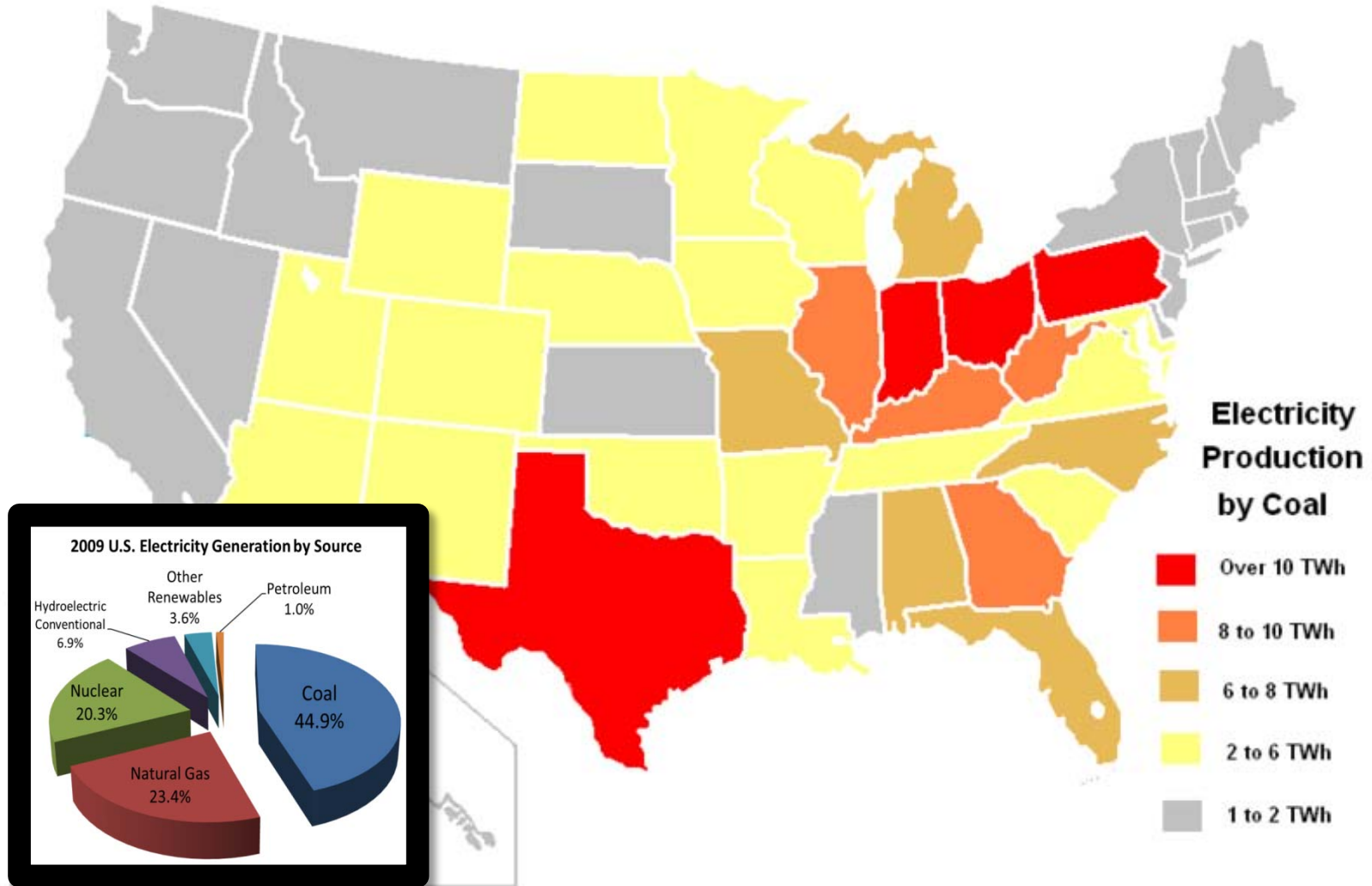
Number of Hits on the www.whitehouse.gov website



US Energy Policy: Political Incentives



US Energy Policy: Political Incentives



US Energy Policy: Political Incentives

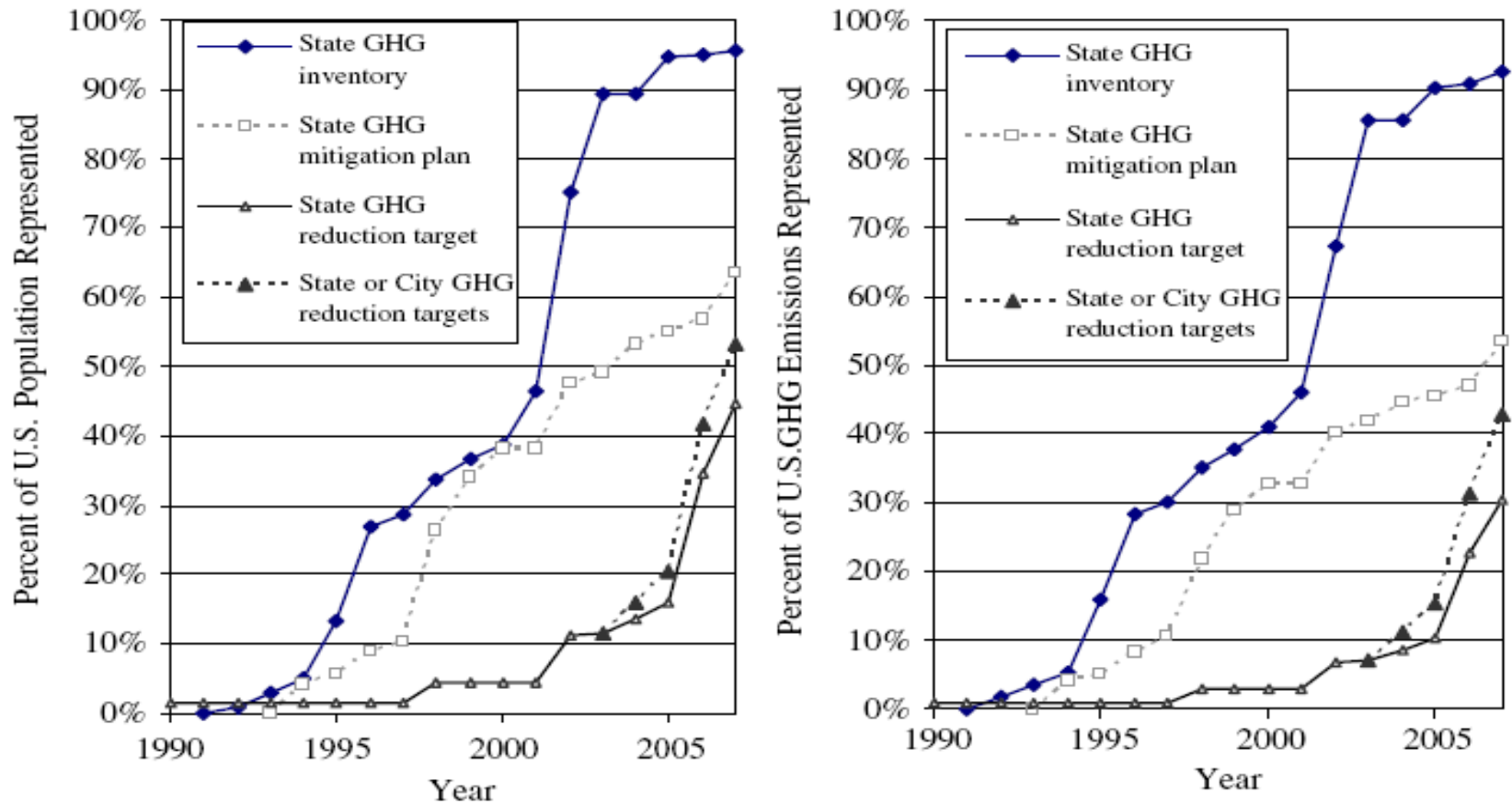
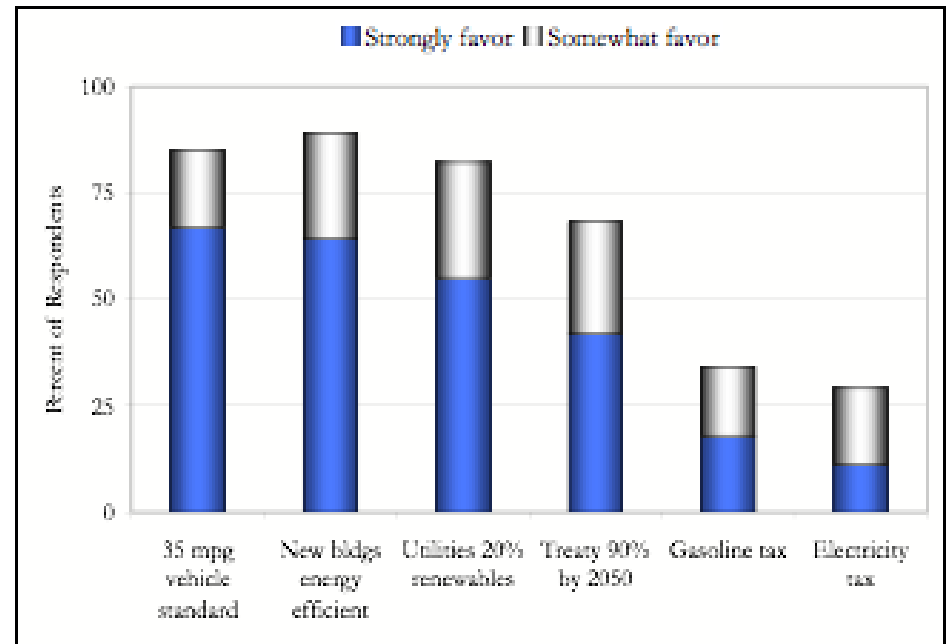
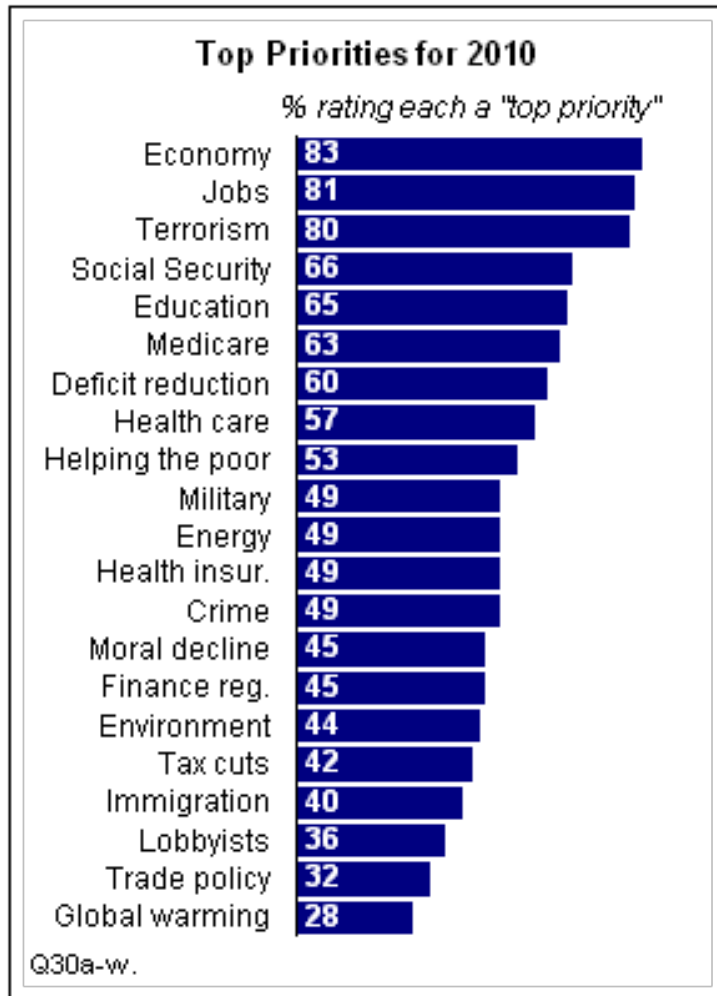


Fig. 1. Trends in US involvement in climate change actions, 1990–2007.

Key Messages

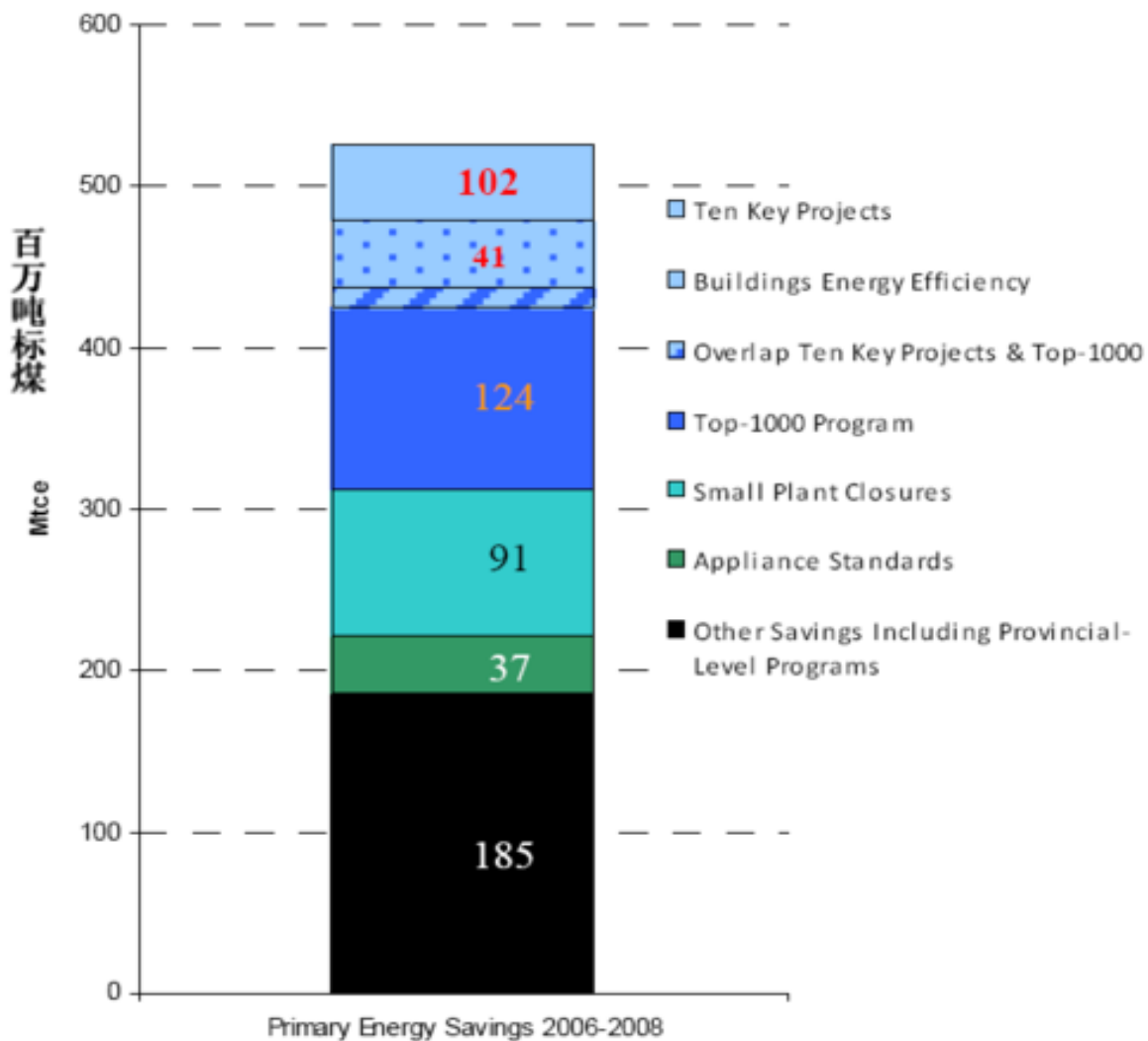
- Low carbon energy **transitions** are critical to low carbon development
- Institutions can **incentivize—or inhibit—those transitions** as evidenced by China's energy efficiency targets and US climate legislation
- This has both **positive implications for LCS research** and **normative implications for it associated recommendations**
- On the positive side, there is a need to **integrate institutional analysis into LCS models and scenario building**
- On the normative side, there is a need to **embed recommendations into institutional arrangements** that incentivize policy change

Appendix



Appendix:

China Energy Savings



Appendix:

Evaluation of Leaders

Table 2: Evaluation Score Sheet for 1000 Enterprise Program

Energy conservation target (40 points maximum)	100% of target achieved: 40 points; 90% achieved: 35; 80% achieved: 30; 70% achieved: 25; 60% achieved: 20; 50% achieved: 0
Energy conservation measures (60 points maximum)	Energy conservation leading group: 3 points Energy conservation management department: 2 Decomposition of target to unit and person 3 Assessment of energy conservation target 3 Reward and punishment system 4 Energy efficiency performance in 1000 enterprises: 10 for top 10% and 5 for top 50%. Energy conservation R&D fund 4 Annual energy conservation plan 4 Closure of backward equipment 7 Retirement of outdated equipment Implementation of local regulation 2 Implementation of energy consumption norm 4 Norm management for energy consuming equipments 2 Implementation of energy conservation design 2 Energy audit and monitoring system 2 Energy statistics manger and account 3 Energy monitoring appliance 3 Energy conservation training 2