

Climate Change and Energy

National Conference of State Legislatures

Brian McLean, Director
Office of Atmospheric Programs
Environmental Protection Agency
July 22, 2008



Outline



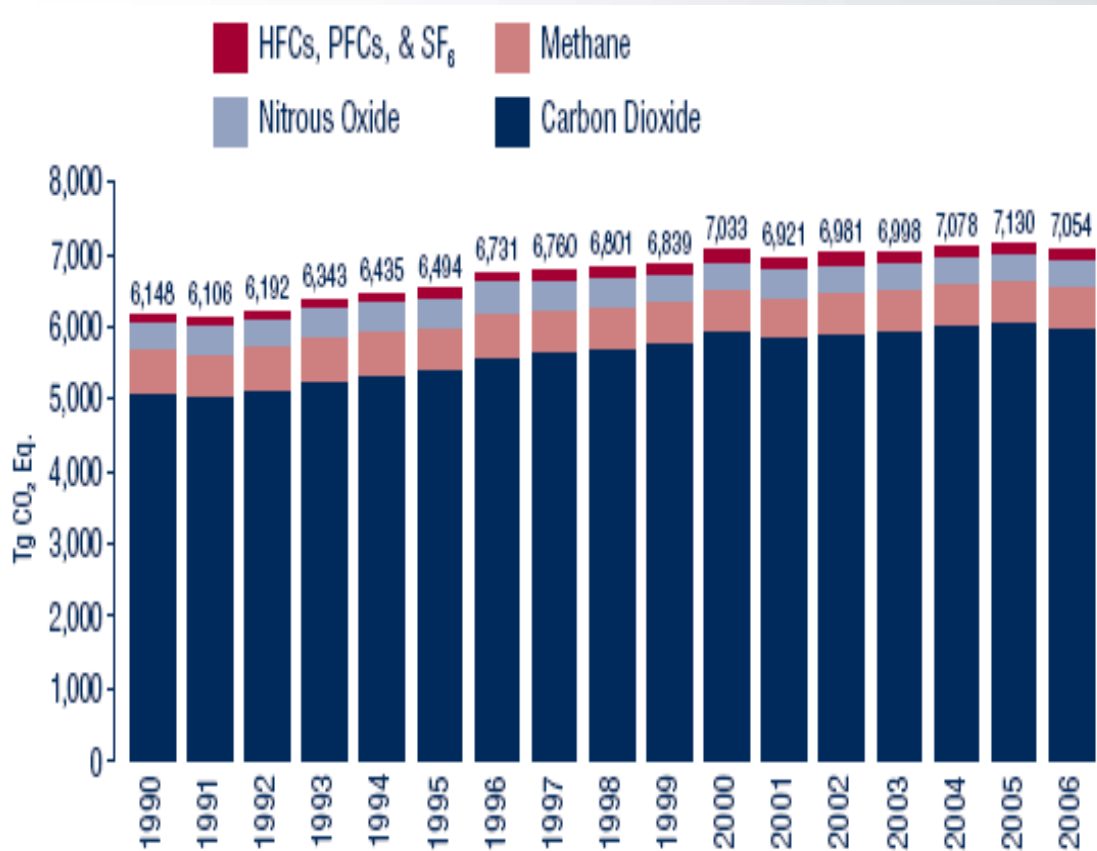
- Understanding the problem
- Responding to the challenge
 - Cap and trade
 - Complementary policies
 - Data and analytical needs
 - International context
 - State actions
- Conclusions

Climate Change Science



- Recent reports from Intergovernmental Panel on Climate Change (IPCC) and the U.S. Climate Change Science Program (CCSP) have detailed key findings:
 - Temperature: Most of North America likely to warm more than global average. More hot days and warmer nights
 - Precipitation: Projected to be less frequent but more intense
 - Sea level: Projected rise virtually certain to inundate dry land of U.S.
 - Human health: More frequent and intense heat waves; vulnerable subpopulations
 - Agriculture: Certain crop yields more susceptible to climate change than others
 - Water: Melting snowpack expected to exacerbate stressed resources
 - Energy: Changes to heating and cooling demand
 - Transportation: Effects on rail and roads from heat waves, permafrost melting in AK
 - Ecosystems: Resilience of many ecosystems likely to be exceeded
 - Extremes: In addition to temperature extremes, hurricanes likely to become more intense

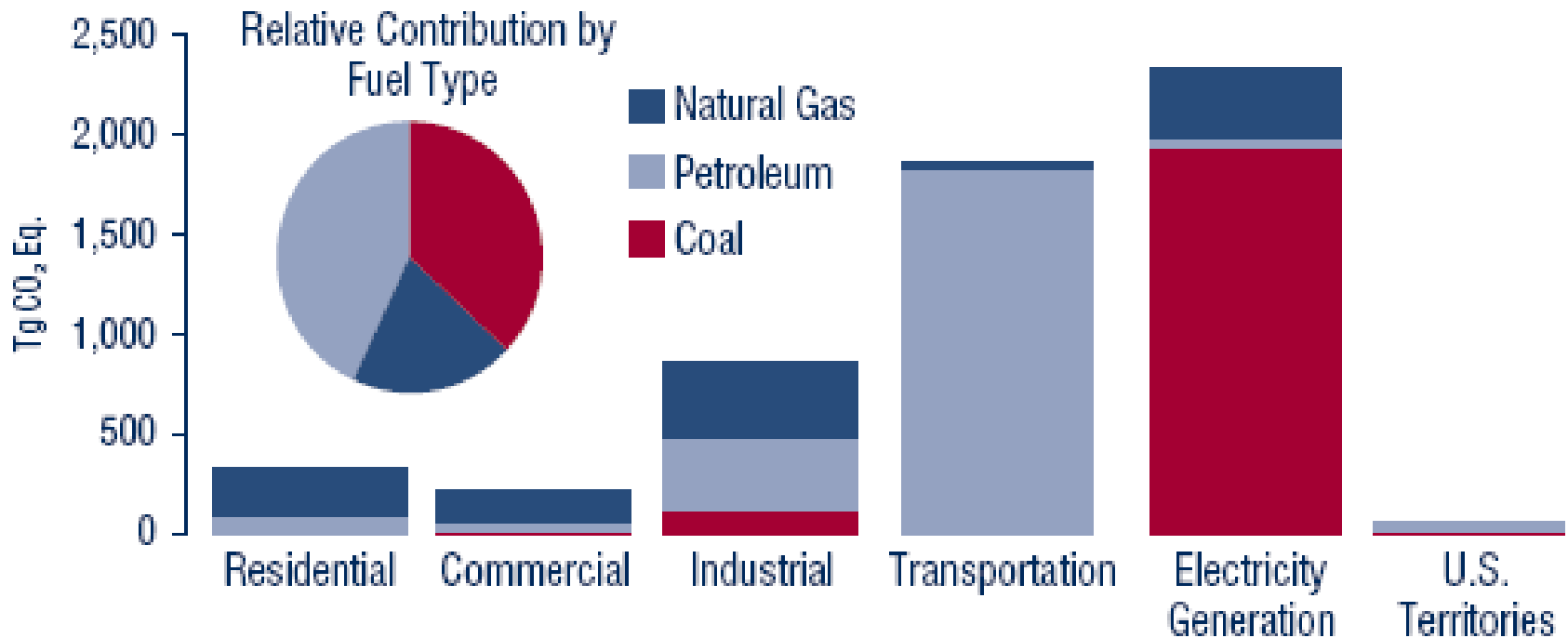
Greenhouse Gas Emissions



U.S. GHG Inventory

- Submitted annually to the UNFCCC
- Six GHGs: CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆
- Weighted by global warming potential (GWP)
- 14.7% growth in emissions 1990-2006
- 84.8% CO₂
- 7.9% methane
- 5.2% N₂O

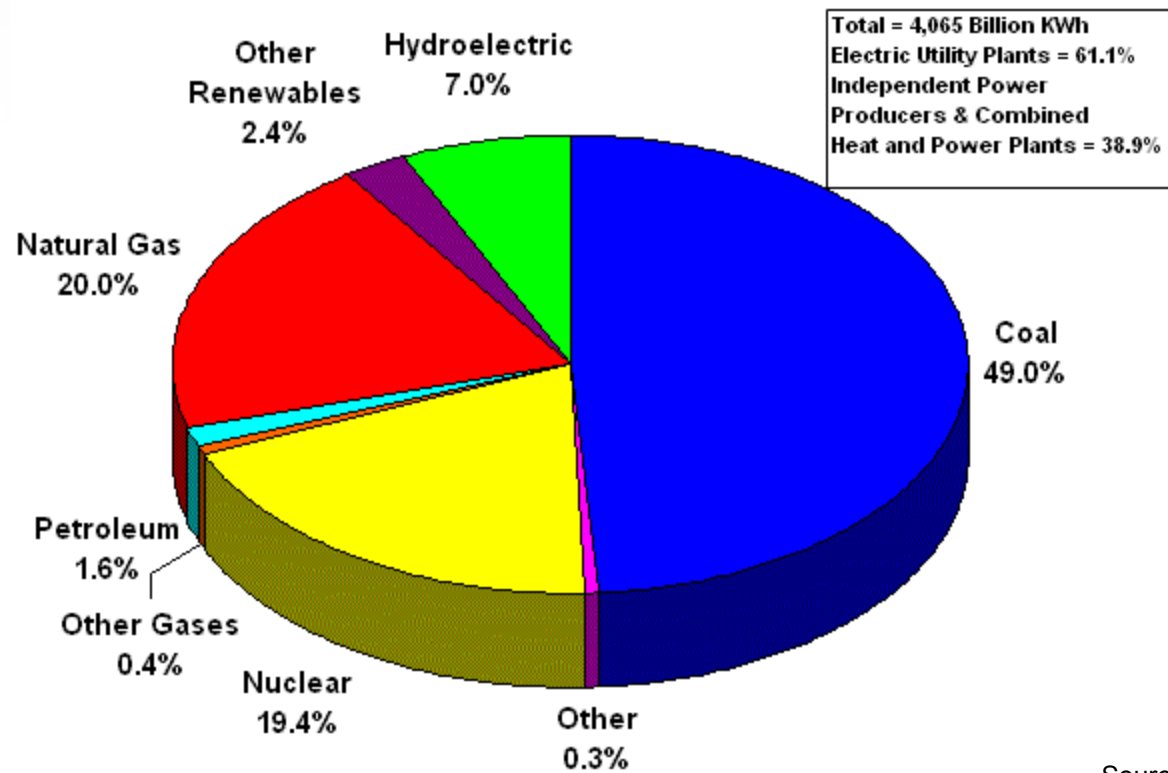
CO₂ emissions by Fuel/Sector



Electricity

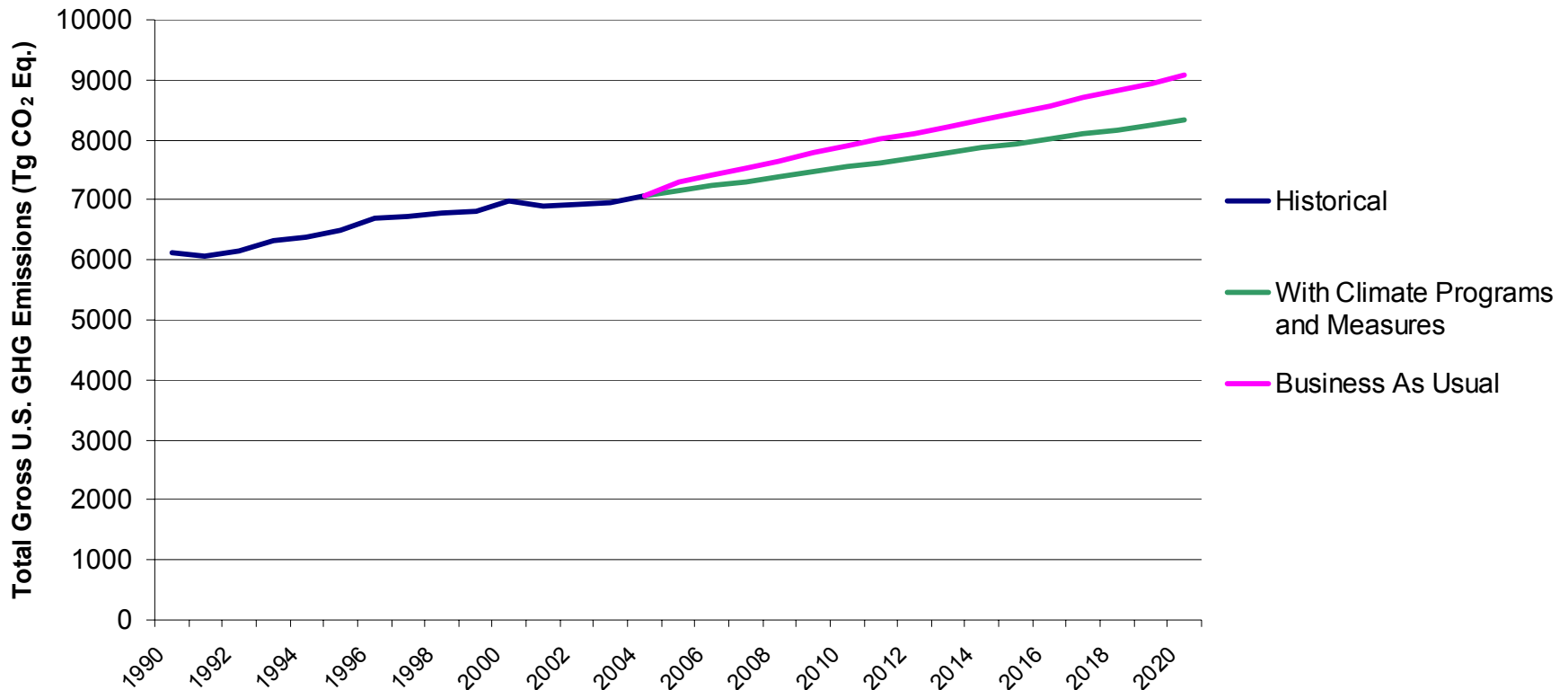


U.S Electric Power Industry Net Generation



Source: EIA, Electric Power Annual 2006

U.S. GHG Projections



•Total gross GHG emissions for the U.S. are expected to grow from 2000 levels by 19% to 8,307 Tg CO₂ Eq. in 2020 under Full Implementation of Climate Programs and Measures.

•Source: U.S. Climate Action Report – Fourth National Communication (2006).

<http://www.state.gov/documents/organization/89651.pdf>

Cap and trade



- Effective policy tool if conditions are right
 - Firm cap
 - Includes all existing and new sources within a sector
 - Strong emissions monitoring and reporting
 - Flexibility in compliance
 - Clear consequences for non-compliance
 - Government does not micro-manage
- Not the only tool

Complementary Policies



- Other tools may be more appropriate or could complement a cap and trade program (e.g., energy efficiency, building standards, vehicle standards, etc.)
- Actions needed to address adaptation
- EPA experience
 - Energy efficiency (e.g., Energy STAR, National Action Plan on Energy Efficiency)
 - Partnership programs (e.g., Climate Leaders, methane)
 - Transportation programs - fuels, vehicles, VMT
 - Non-CO₂ greenhouse gas reduction programs
 - Agriculture, forestry and other land-use, analysis and programs
 - Carbon capture and storage (CCS)
 - Regulatory framework for CCS to build public acceptance and confidence necessary for large-scale deployment
 - Climate Ready Estuaries

Data and Analysis



- Credible emissions data
 - Clean Air Act Title IV CO₂ data
 - Annual US. GHG Inventory
 - Development of federal mandatory GHG reporting rule
- Economic analysis
 - Modeling
 - Economy-wide models
 - Detailed sector models (e.g., electricity sector)
 - Non-CO₂, agriculture and land-use mitigation analyses
 - Analysis of Congressional proposals, e.g.,
 - Lieberman-Warner
 - Bingaman-Specter

Key Results & Insights from Analysis of Lieberman-Warner Bill



- Emissions Impacts
 - U.S. GHG emissions are approximately 40% lower than reference case emissions in 2030, and 56% lower in 2050
- Sector Impacts
 - The greatest emission abatement occurs in CO₂ emissions from the electricity sector.
 - The transportation sector provides a relatively small proportion of CO₂ emissions abatement. (~\$0.53 increase in the price of gasoline in 2030)
- Economic Impacts
 - Use or limitation of offsets and international credits has a larger impact on allowance prices than key enabling technologies.
 - GDP to be between 0.9% and 3.8% lower in 2030 and between 2.4% and 6.9% lower in 2050 than in the Reference Scenario.
 - Electricity prices are projected to increase 44% in 2030 and 26% in 2050 (assuming costs are passed through to consumers)

International Engagement



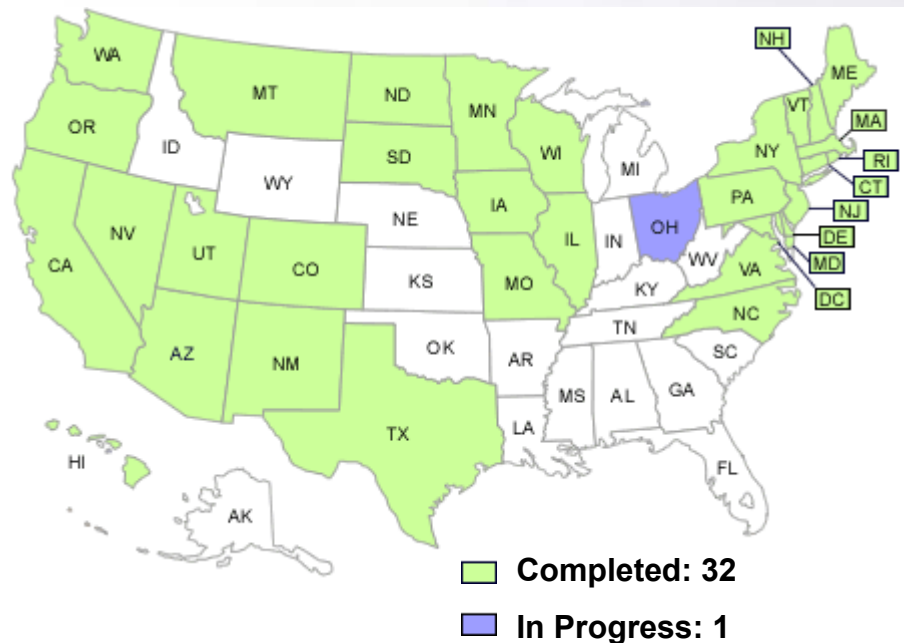
- International engagement critical for success of long-term effort to address climate change
- Significant experience internationally:
 - Montreal Protocol
 - UNFCCC
 - International partnerships, cooperation (e.g., Methane to Markets, European Commission, China)
 - U.S.-Canada Air Quality Agreement
 - Work with developing countries
 - Capacity-building for data and economic analysis (e.g., emissions trading, national inventories, avoided deforestation)
- Need to bring U.S. domestic experience into international discussions

Current State Efforts



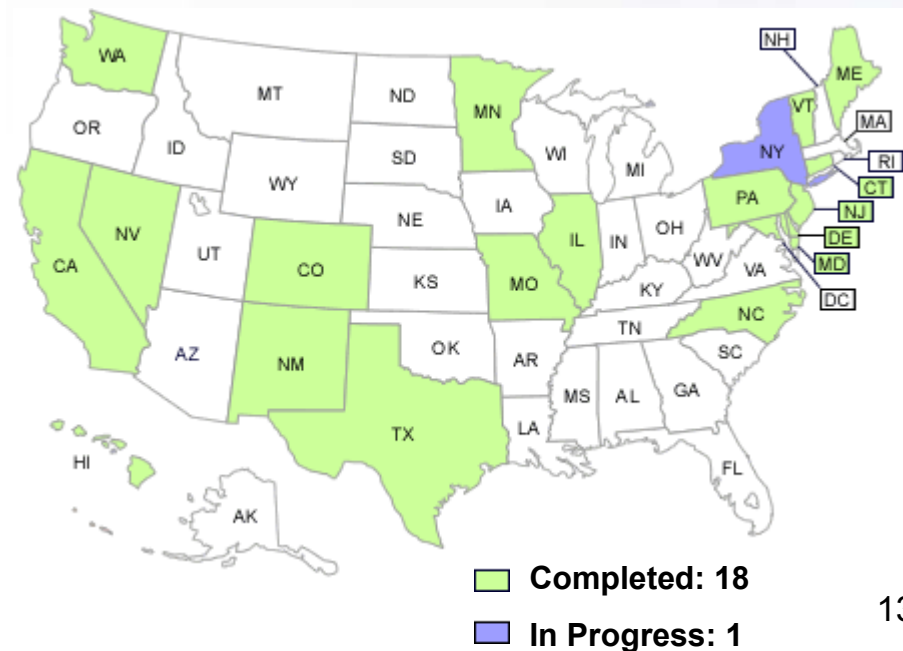
Renewable Portfolio Standards

Information current as of May 2008.



Energy Efficiency Portfolio Standards

Information current as of May 2008.

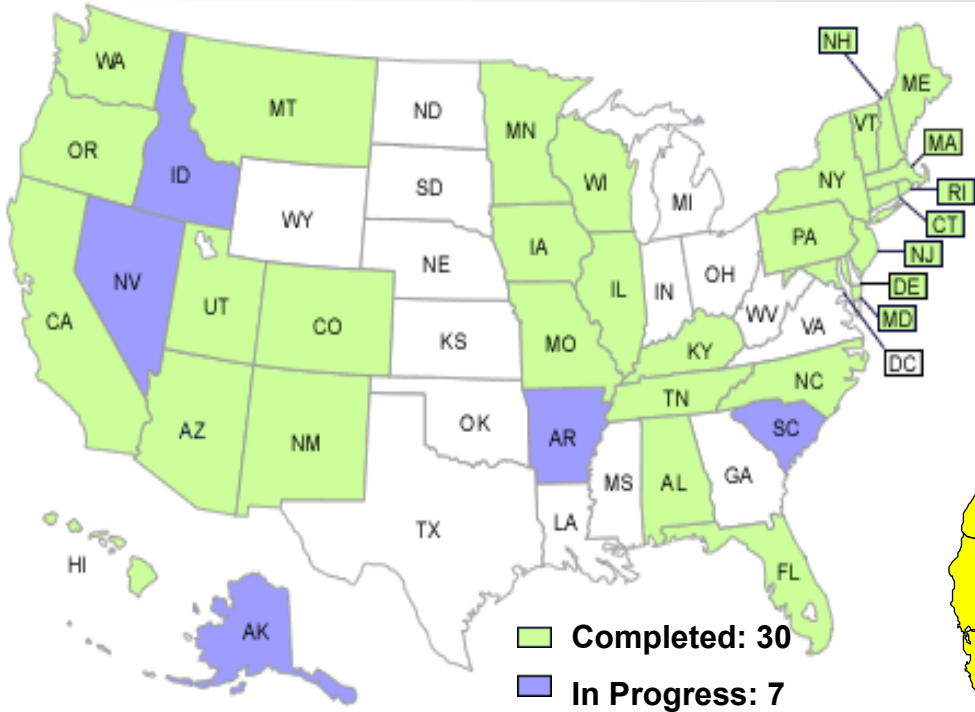


Current State Efforts

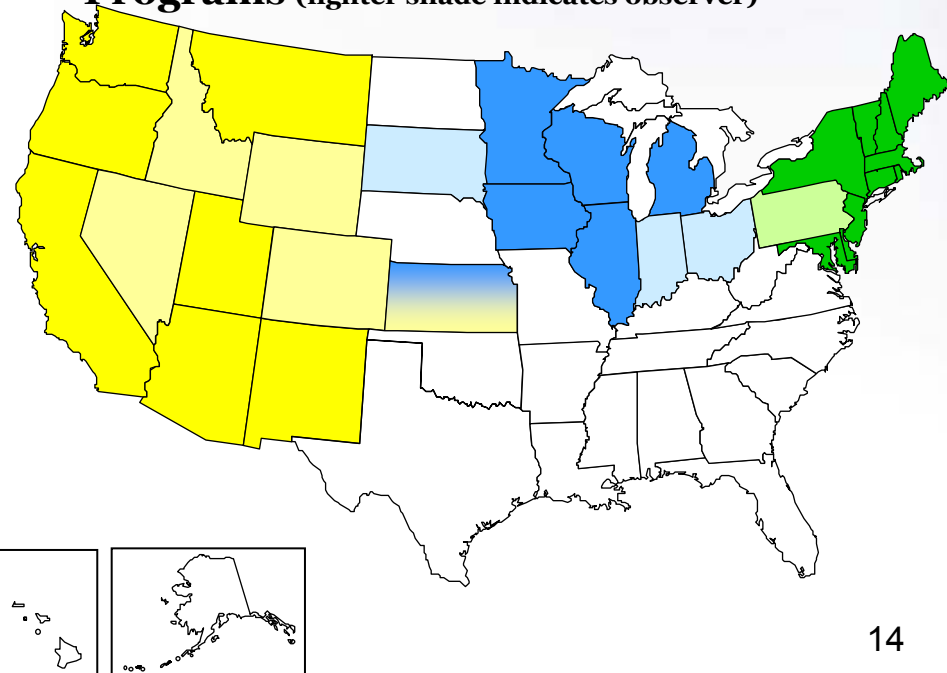


Climate Change Action Plans

Information current as of May 2008.



States Participating in GHG Cap & Trade Programs (lighter shade indicates observer)



Clean Energy Policy Options



Number of states with policy

- **State Planning and Incentive Structures**
 - Energy Efficiency Savings Goals for Public Facilities (38)
 - Energy Efficient Appliance and Equipment Purchase Requirements for Public Facilities (24)
 - Clean Energy Goals for Public Facilities (18)
 - Energy Efficiency and Alternative Fuel Goals for Public Fleets (40)
 - State and Regional Energy Planning (47)
 - Determining the Air Quality Benefits of Clean Energy (NO_x SIP / CAIR) (8 / 11)
- **Energy Efficiency Actions**
 - Energy Efficiency Portfolio Standards (EEPS) (18)
 - Public Benefits Funds (PBF) for Energy Efficiency (21)
 - Building Codes for Energy Efficiency (Commercial / Residential) (32 / 27)
 - State Appliance Efficiency Standards (14)
- **Energy Supply Actions**
 - Renewable Portfolio Standards (RPS) (32)
 - Public Benefits Funds (PBF) for State Clean Energy Supply (18)
 - Output-Based Environmental Regulation to Support Clean Energy (18)
 - Interconnection Standards for Clean Distributed Generation (23)
 - Net Metering (44)

Climate Change Policy Options



Number of states with policy

- **Planning and Measurement**
 - State Advisory Board (28)
 - Regional Initiatives (30)
 - GHG Inventory (48)
 - Climate Change Action Plan (30)
- **Targets and Caps**
 - Lead by Example Target (4)
 - Statewide GHG Target (19)
 - Statewide GHG Cap (6)
- **Reporting**
 - Electricity Disclosure (18)
 - GHG Registry (4)
 - Mandatory GHG Reporting (12)
- **Power Sector**
 - CO₂ Offset Requirements (3)
 - GHG Performance Standard (4)
 - Advanced Coal Technology (14)
 - Power Sector GHG Cap and Trade (1)
- **Transportation Sector**
 - GHG Auto Standards (15 in progress)
 - Low Carbon Fuel Standard (1 in progress)

Existing State/Local Authorities



- Public transportation
- Land use / zoning
- Sales / use taxes
- Utility rate regulation / efficiency programs
- Electric power generation / transmission siting
- Building codes
- Appliance efficiency standards

Broad Participation



- Addressing climate change will require comprehensive response
- Action will be needed by federal, state, and local governments, industry, and individuals
- We will need to work together to be effective
- Ultimately, climate legislation should aim to capitalize on the strengths of each level of government and the private sector in addressing both mitigation and adaptation

References



- Selected CCSP Reports (<http://www.climate-science.gov/>)
 - National Science and Technology Council (May 2008) - *Scientific Assessment of the Effects of Global Change on the United States*.
 - <http://www.climate-science.gov/Library/scientific-assessment/Scientific-AssessmentFINAL.pdf>
 - CCSP (2007) *PART A: Scenarios of Greenhouse Gas Emissions and Atmospheric Concentrations*
 - <http://www.climate-science.gov/Library/sap/sap2-1/finalreport/sap2-1a-final-all.pdf>
 - CCSP (2008): *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands*.
 - <http://downloads.climate-science.gov/sap/sap3-3/sap3-3-final-all.pdf>
 - CCSP (2008), The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States
 - <http://downloads.climate-science.gov/sap/sap3-3/sap3-3-final-all.pdf>
- Selected IPCC Reports (www.ipcc.ch)
 - IPCC, 2007: *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change
 - <http://www.ipcc.ch/ipccreports/ar4-wg1.htm>
 - IPCC, 2007: *Impacts, Adaptation and Vulnerability*: Contribution of Working Group II to the Fourth Assessment Report of the IPCC
 - <http://www.ipcc.ch/ipccreports/ar4-wg2.htm>
- Selected EPA Documents
 - EPA, Endangerment assessment in ANPR.
 - <http://www.regulations.gov/fdmspublic/component/main?main=DocumentDetail&o=09000064806691e8>.
 - EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*. (April 2008) USEPA #430-R-08-005.
 - <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>

For More Information



- Web sites for OAP
 - Climate Change Division
 - <http://www.epa.gov/climatechange/>
 - Clean Air Markets Division
 - <http://www.epa.gov/airmarkets>
 - Climate Protection Partnerships Division
 - <http://www.epa.gov/cppd>
 - Stratospheric Protection Division
 - <http://www.epa.gov/ozone/strathome.html>

Extra Slide Options



Many Opportunities for State Policies/Promotion



- Energy Efficiency
 - Energy efficiency portfolio standards
 - Requirements to procure all cost-effective energy efficiency
 - Building codes
 - Appliance standards
 - Climate friendly codes/standards
 - Energy efficiency retrofit at sale
 - Building energy use disclosure at sale
 - Product energy use disclosure
 - Energy efficiency requirements for state buildings and procurement
 - R&D
 - Financial support
 - Loan/grant programs
 - Tax incentives
 - Rebates

Many Opportunities for State Policies/Promotion



- Renewable Energy
 - Renewable portfolio standards
 - Clean energy purchase requirements for state agencies
 - Favorable (or improved) interconnection standards
 - Net metering
 - Favorable standby rates
 - R&D
 - Financial support
 - Loan/grant programs
 - Tax incentives for production and investment
 - Rebates
 - Time-of-use pricing
 - Siting and permitting of renewable facilities (and transmission)