

Climate Change: Costs of Prevention and Abatement

Glen Andersen

**Presentation before the North Carolina Climate Change
Commission**

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NATIONAL CONFERENCE
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The Forum for America's Ideas



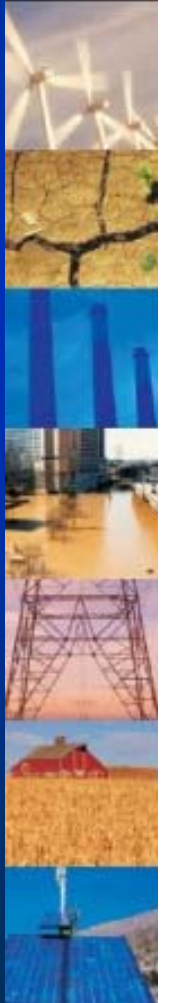
Goals of the Presentation

- Explore the potential economic impacts of climate change
- Explore the potential costs of abatement
- Offer an update on the latest developments in state climate change policy.
- Review how a new federal climate policy could affect the state policy landscape.



Costs of Climate Change

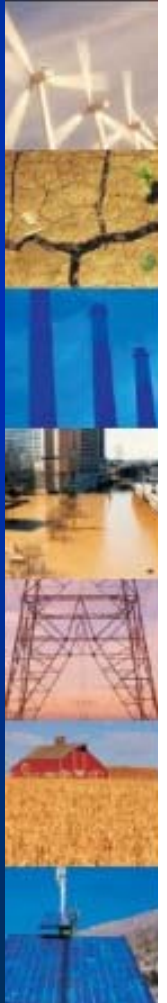
- Multiple forecasts for the costs of greenhouse gas reductions have been made
- Few studies explore the economic costs of climate change
- NCSL & the University of Maryland targeted 12 states in the “Assessing the Costs of Climate Change” series.





Costs of Climate Change in North Carolina

- Predicted 4 degree increase by 2100 for southeastern U.S.
- 7 to 23 inch global rise in sea level
- More than half the state's shoreline at very high risk
- Potential for increased severe storms and flooding
- Agricultural productivity, coastal infrastructure and drinking water supplies may be at risk





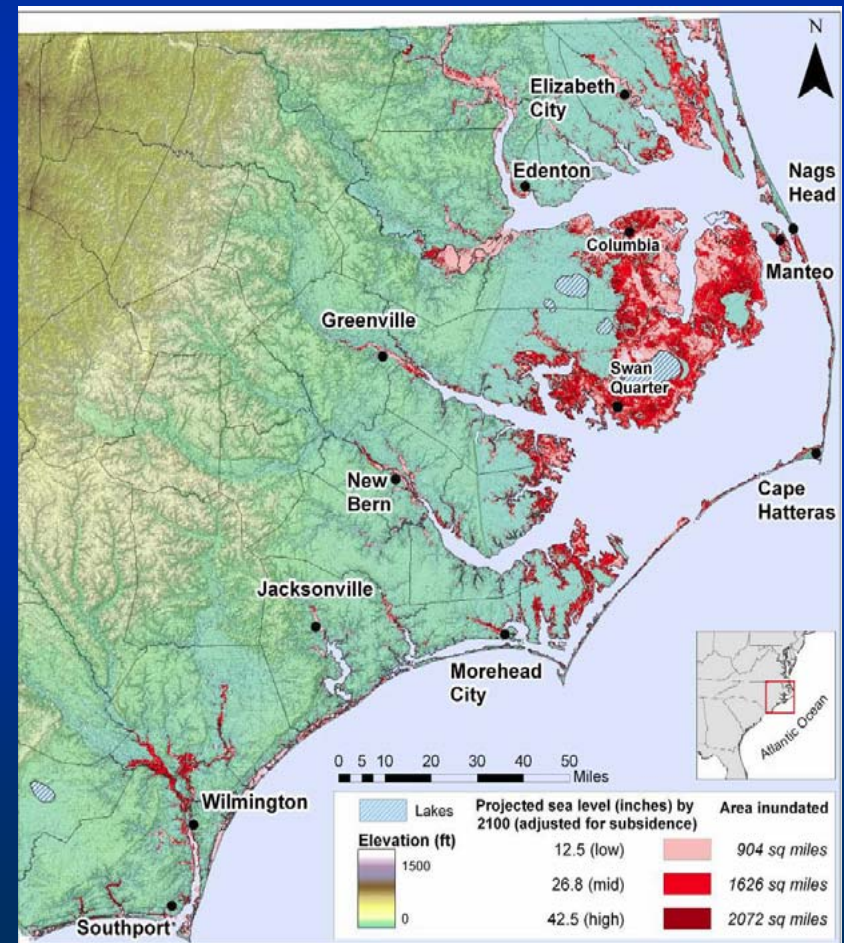
Costs of Climate Change

Coastal North Carolina

- Dark Red Areas at highest risk
- Lighter areas at risk from higher sea level increases.
- More than half of coastline in the highest risk area. (USGS)

Sea Level rise

- Under the 18 inch sea level rise scenario, losses for North Carolina by 2080 have been estimated at \$10 billion.





Costs of Climate Change

Estimates of lost coastal property value by 2080 under an 18-inch sea level rise scenario for four counties in North Carolina.

County	Residential Property Value Loss	Nonresidential Property Value Loss
New Hanover	\$99 million	\$35 million
Dare	\$988 million	\$1.42 billion
Cataret	\$100 million	\$183 million
Bertie	\$5.45 million	\$3.8 million

Source: Bin et al., National Commission on Energy Policy (2007).



Costs of Climate Change

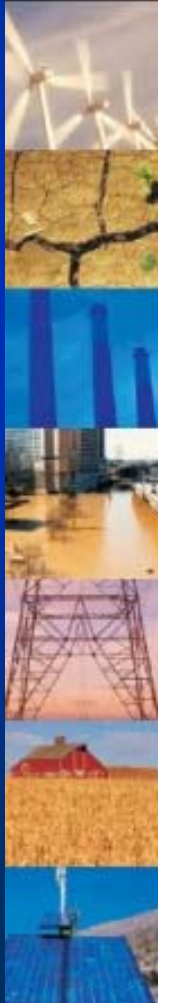
- Potential increase in hurricanes and severe weather
 - Hurricanes cost NC agriculture \$2.4 billion between 1996 and 2006.
 - Hurricane Fran caused \$1.7 billion in forest damages were. (The forest sector generates about \$3 billion/year for NC)





Costs of Climate Change

- Public Health
 - Higher temperatures increase ozone smog formation.
 - Charlotte-Gastonia-Salisbury area have some of the highest ozone levels in the U.S.
 - Asthma and other respiratory diseases worsened by ozone.
- Water
 - Increased temperatures may increase incidence of drought.
 - More high rainfall events.
 - Threatened water quality.





Costs of Climate Change

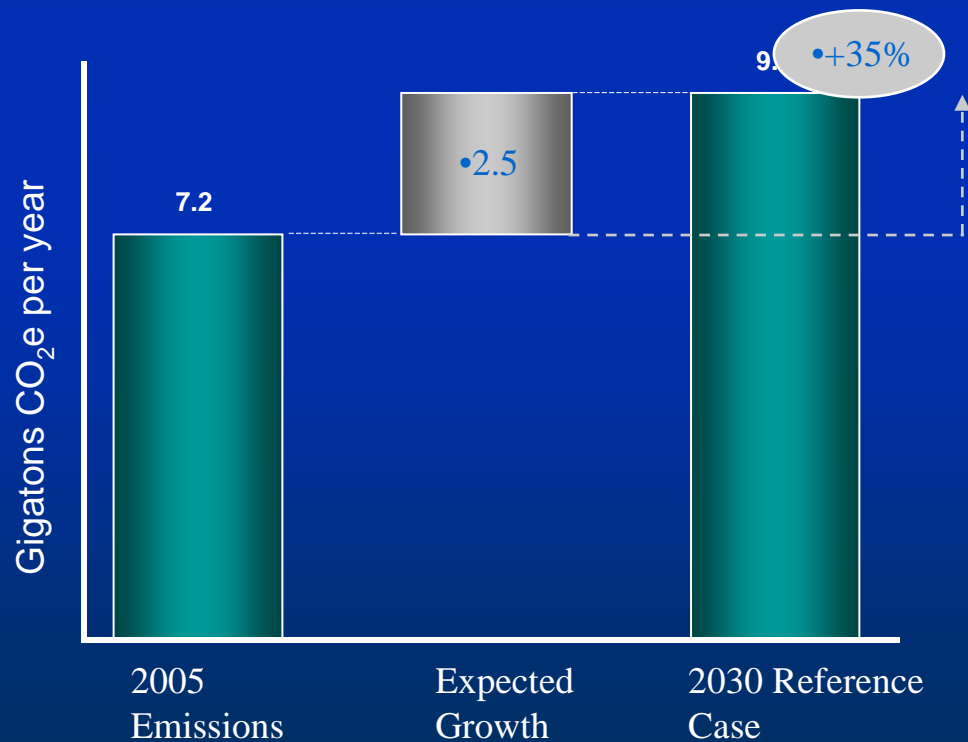
- Summary
 - North Carolina faces large challenges in adapting to climate change along its coastline.
 - Some sea level rise is inevitable.
 - More research on the impact of climate change on coastal development, freshwater supplies, flooding, and agriculture is needed.
 - Adapting coastal development plans, habitat protection plans, and emergency response plans to include sea level rise and potential flooding may be useful.





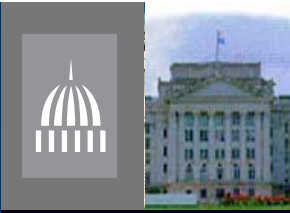
US Emissions Will Rise 35% by 2030 (Business as Usual)

Projected GHG emissions

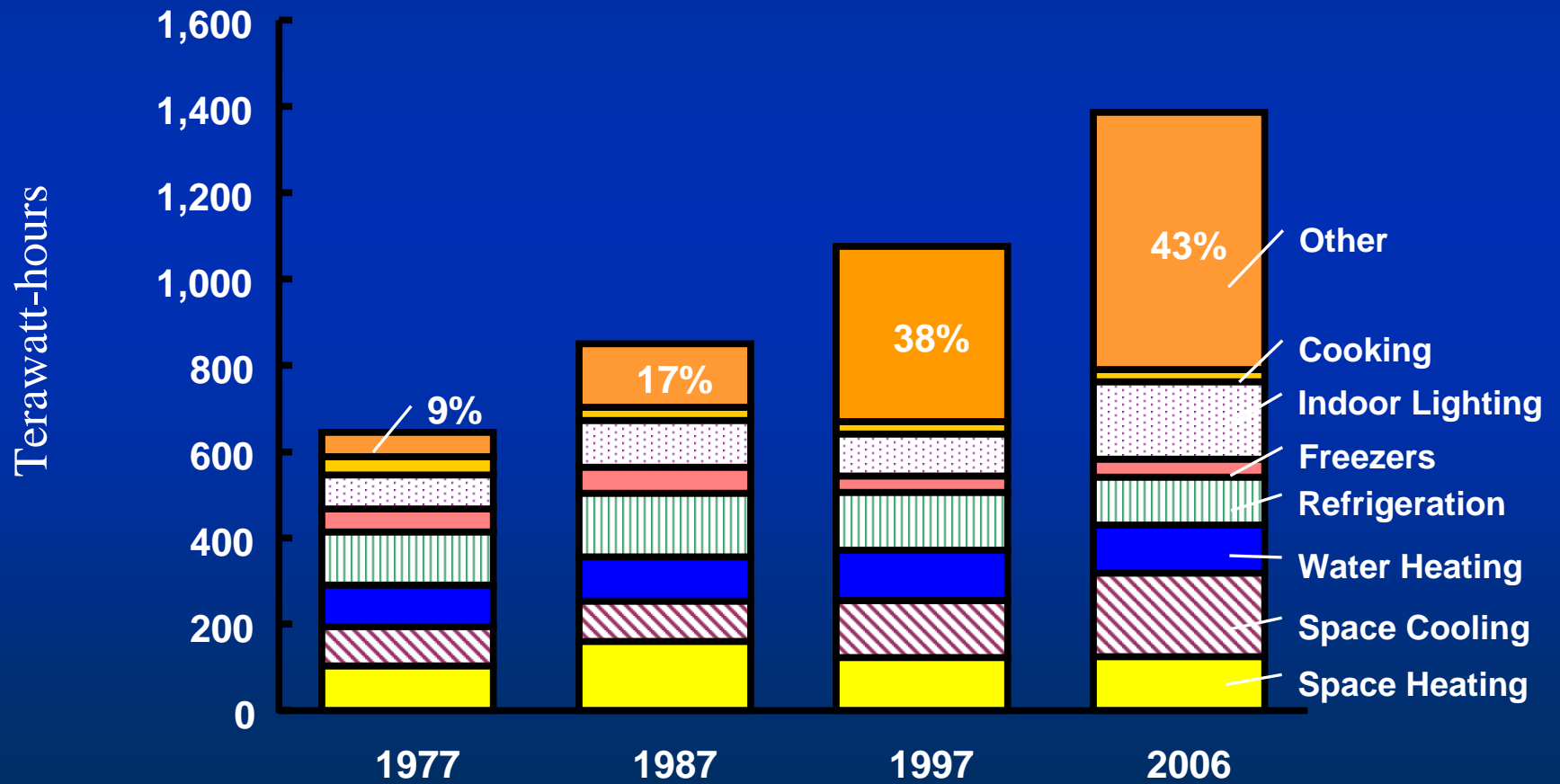


Key Drivers

- Growth of US economy and population
- Above-average growth in buildings and appliances
- Increased coal-fired power generation (without CCS)

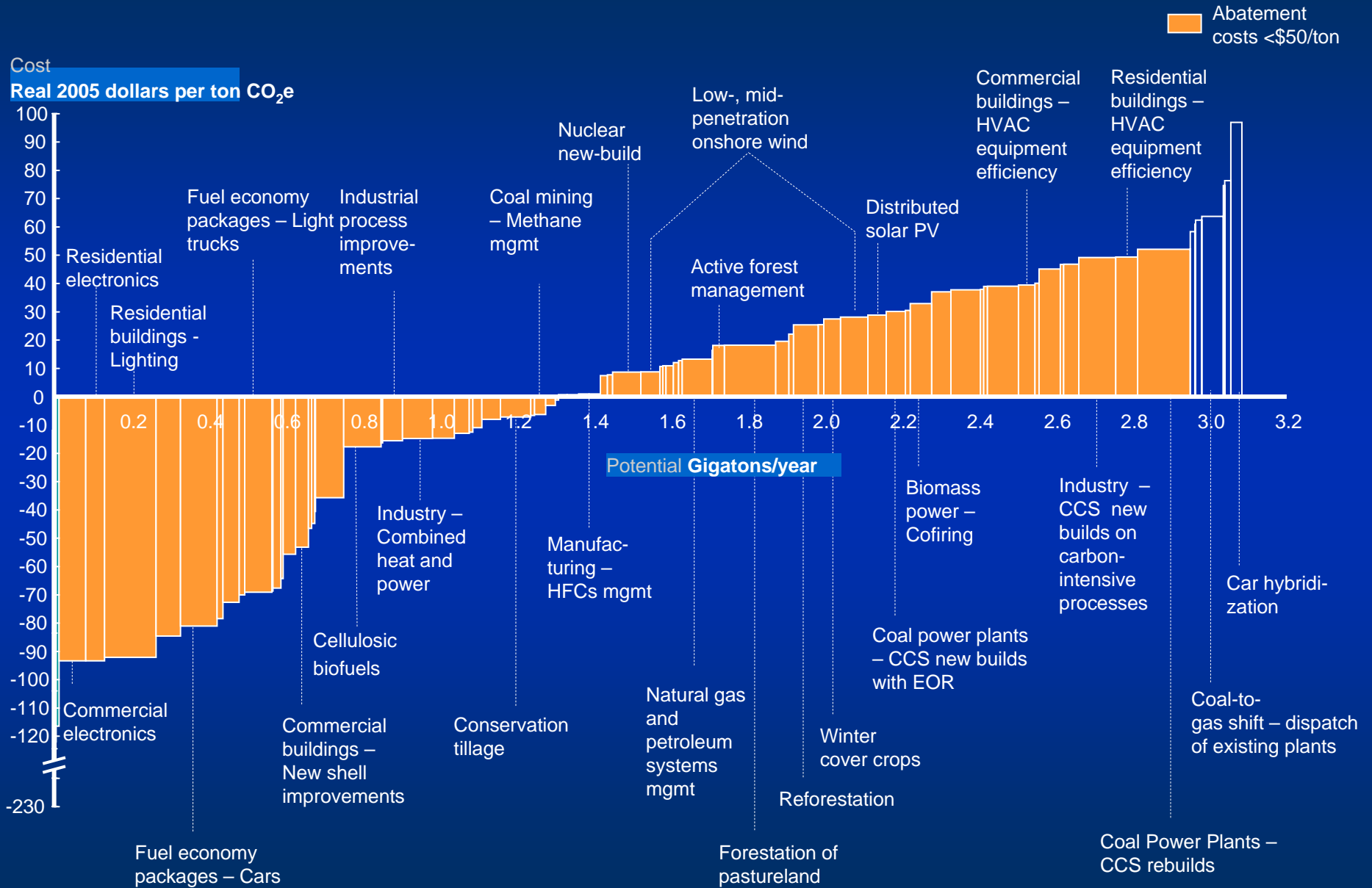


US Residential Electricity Consumption



Source: Cambridge Energy Research Associates and US Department of Energy.

GHG reduction opportunities widely distributed – 2030 mid-range case





Arguments for a Federal Approach

- Fuel and emissions standards should be federal, since these laws are subject to federal regulation and preemption.
- Creates a national market for carbon credits.
- Offers a level playing field for citizens and businesses.
- Many businesses, industries and utilities prefer national standards to a variety of state requirements.
- Addresses the need for a coherent and comprehensive national and international action.



Arguments for a State Approach

- Most GHG emissions reductions come at the state level under the jurisdiction of state laws.
- States are best prepared to understand which policies are most effective.
- States have varied resources and best understand how they can be used to achieve goals.
- The Clean Air Act provides emissions floor and relies on state implementation.



Options for Federal Policy

1. Federal Law sets state emissions level and deadline, allowing states to design the necessary policies.
2. Federal law regulates sectors equally and rate of reduction is fixed.
3. Combination of above options.
 - Recent federal climate bills give implementation responsibility to the EPA.
 - Who gets the money from the sale of credits or carbon tax?





Carbon Tax

What is it?

- Direct fee on CO₂ emissions
- Raised over time until goal is reached
- Producer taxed, consumer pays through increased prices
- Widely supported by economists
- Easy to understand, perceived as transparent
- Operating in 5 countries and 2 U.S. cities



Carbon Tax Pros and Cons

Pros

- A revenue neutral carbon tax option
- Revenue can be used for carbon emissions reduction incentives.
- Revenue neutral tax could be used to reduce sales tax, relieving distortions caused by regressive taxes.
- A slow increase in the tax could allow for transitional investment, adjustment, and technological development.
- Revenue recycling returns money to the economy.

Cons

- New taxes are politically unfavorable.
- Unpredictable Outcome
- Revenue from carbon taxation will be go to other governmental
- Will burden low income families.
- A carbon tax is regressive and will distort the economy.
- Heavy carbon taxes will slow the economy



Cap and Trade

What is it?

- Economy-wide emissions cap
- Credits allotted/auctioned to larger carbon emitters
- Emitters can sell or buy carbon credits on the market
- Cap is reduced over time to reach emissions goals
- Emitters with low cost reductions act first, sell to those with high cost reductions.
- As carbon prices increases, reduction becomes more attractive than credit purchases





Cap and Trade

Pros

- The cap guarantees that emissions reduction targets will be met.
- Banking, auctioning, and safety valves may reduce price fluctuations.
- Permit auctioning provides revenues that can be recycled back into the economy through clean energy incentives and to ease burden in lower income brackets.
- Auctioning and revenue recycling can increase economic efficiency.

Cons

- Large fluctuations and unpredictability in permit prices could make it difficult to decide on best strategies.
- Complexity of a trading regime could foster difficulties with enforcement.
- Allocating credits is challenging and may provide windfall profits for polluters.
- A comprehensive program will have to cross many sectors, complicating the trading system.
- Trading regimes may be less efficient than carbon taxes.
- Low income families may suffer



States Climate Policies

- Economy-Wide Cap on Emissions Reductions
- Regional Cap and Trade
- GHG Emissions limits for Power Plants
- Carbon Emissions Trading
- Tailpipe emissions Standards
- Energy Efficiency Policies
- Clean Energy Policies
- Community Design
- Renewable Fuels Standards
- Forest and Agricultural management policies





Policy Design Issues to Consider

- What portion of carbon emissions will come from cap and trade versus RPS, energy efficiency and other mechanisms
- California, for example, expects cap and trade to contribute less than 40 percent to overall GHG reductions.
- Carbon caps will not reach all sectors equally.
- Visible, sustained signals are necessary for the private sector to plan accordingly



California Global Warming Solutions Act

- AB 32 (2006)
 - Caps California's greenhouse gas emissions at 1990 levels by 2020, 80 % below by 2050.
 - First mandatory, enforceable emissions cap program.
 - Requires reporting and monitoring to enforce compliance.
 - Authorizes the state air quality board to adopt market-based compliance mechanisms



California Global Warming Solutions Act

- Implementation began Jan. 2007.
 - Funding to hire 120-140 full time staff
 - Early action plan to be implemented by 2009:
 - Greenhouse gas emissions control regulations for mobile sources
 - Low Carbon Fuel Standard
 - Landfill Methane Capture - Set statewide standards
 - Energy efficient building Requirements
 - Ban sale of incandescent bulbs/require compact flourescents
 - Increase building insulation standards
 - Increase demand side management for power

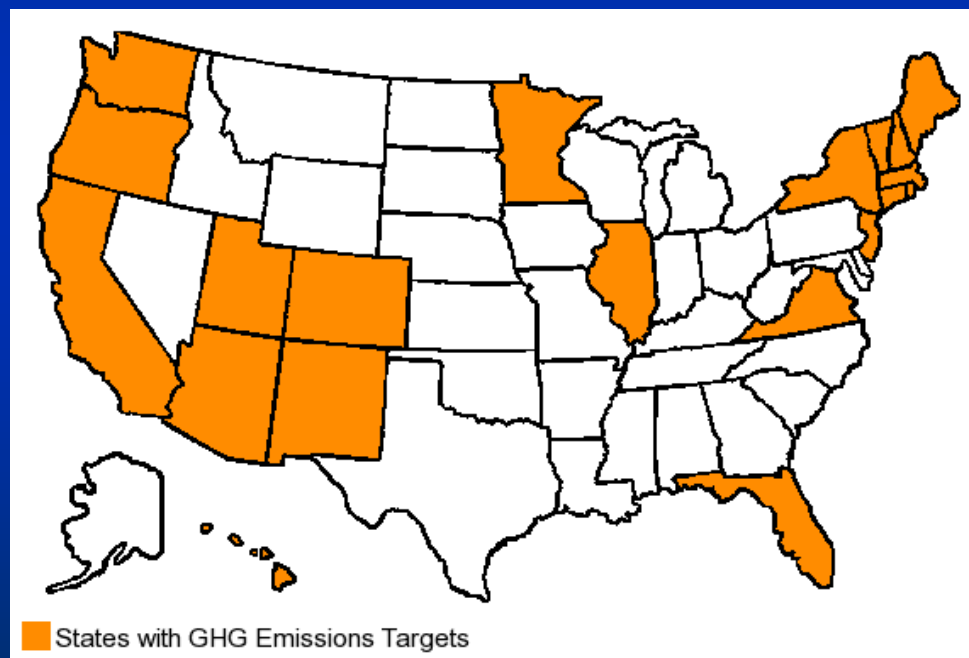


California Global Warming Solutions Act

- Scoping Plan (longer term)
 - Carbon Tax consideration
 - Reporting Requirements
- Involves many Departments:
 - The Department of Food and Agriculture
 - Public Utilities Commission (e.g., California solar initiative),
 - Resources Agency and Energy Commission (e.g., municipal utility combined heat and power),
 - Department of Transportation (e.g., congestion reduction measures)
 - Many others.



States With Emissions Targets





Mandatory Targets

- HI HB 226 (2007)
 - 1990 levels by 2020
- MN SB 145 Next Generation Energy Act (2007)
 - 80 percent below 2005 levels by 2050
- WA SB 6001 (2007)
 - 1990 levels by 2020, 50% below by 2050.
 - Sets greenhouse gases emissions performance standard for utilities
- NJ A3301 (2007)
 - 1990 GHG emissions levels by 2020 and 80 percent below 2006 levels by 2050.

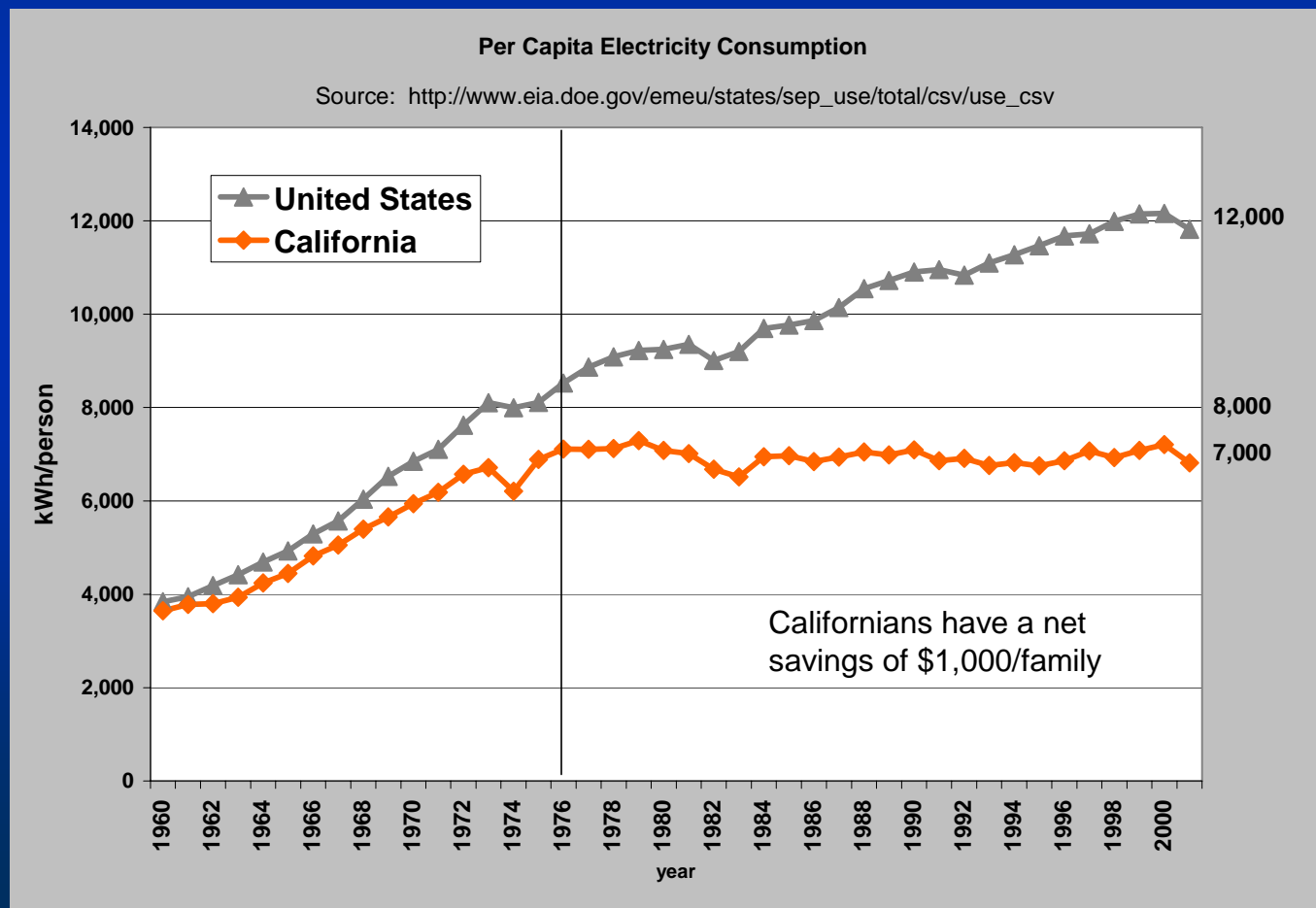


Other CA Climate Policies

- Low Carbon Fuel standard
 - Reduces carbon intensity of California's vehicle fuels by > 10 % by 2020.
- Appliance/Efficiency Standards
- Green Building Action Plans
- Vehicle GHG emissions standards: 30% reduction by 2016
- GHG Performance Standards (SB 1368, 2006)
 - Compels electricity generators to comply with a GHG emission performance standard established by the Energy Commission
- All State agencies are involved.



CA Energy Efficiency Efforts





States that will Follow CA GHG Vehicle Emission Standard





Community Design

- CA SB 375 (September 2008)
 - Metropolitan planning organization to adopt a sustainable communities strategy as part of its regional transportation plan.
 - Must meet greenhouse gas emissions reduction goals for automobiles and light trucks in a region.
 - State Air Resources Board provides each region with greenhouse gas emission reduction targets for the automobile and light truck sector.



Carbon Sequestration

- Washington (WA S.B. 6679, introduced 2008)
 - Creates a Forestry Carbon Offset Program
 - Establishes voluntary allowances and accounting systems for carbon storage within the forest industry.
 - Vehicle owners must purchase carbon credits based on a greenhouse gas vehicle emissions annually.
- Minnesota, Vermont, Washington and others exploring carbon sequestration in forests.



Regional Approaches

- The Northeast Regional Greenhouse Gas Initiative (RGGI)
- Southwest Climate Change Initiative
- West Coast Governor's Global Warming Initiative
- Powering the Plains
- Western Governors' Association Clean and Diversified Energy Initiative



RGGI



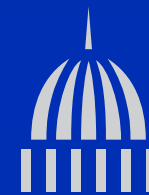
Considerations

- Energy efficiency is the least-cost GHG reduction approach
- Visible, sustained signals required so the market can incorporate least cost emissions reductions.
- A coordinated approach tackling the many abatement options.
- Verification and enforcement are essential
- Infrastructure needs



Contact Information

Glen Andersen
7700 East First Street
Denver, CO 80230
Phone (303) 364-7700
glen.andersen@ncsl.org



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