

US CO₂ Policies: Moving Towards Ambitious Reductions?

All photos NREL

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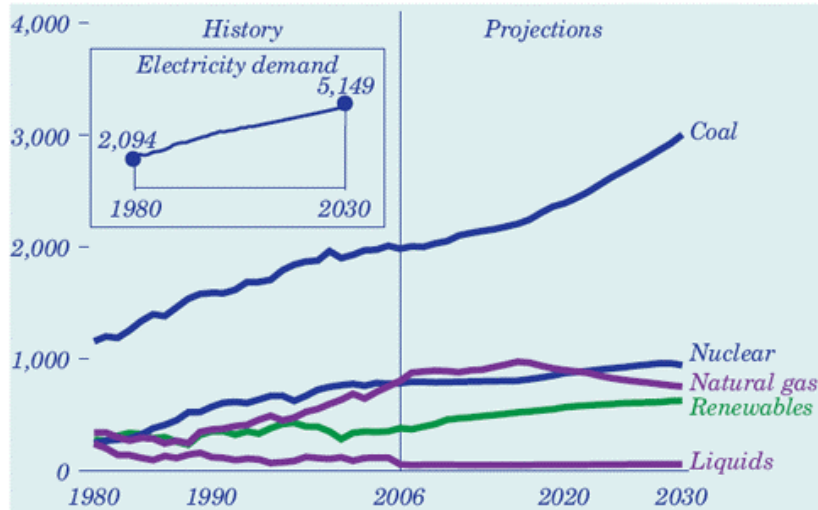


Outline

- I. WHO is taking action?*
- II. WHAT mechanisms & targets are they using?*
- III. HOW are they being implemented?*

- **Power: ~60% of U.S. CO₂ emissions from energy**

Figure 4. Electricity generation by fuel, 1980-2030 (billion kilowatthours)



USDOE EIA, 2008 Annual Energy Outlook (draft)

- **Cost (@1-2% of GDP) ~ all other environmental laws**

I. G8 Committed to 80% Reduction by 2050: WHO in the U.S. Is Doing Something About It?

➤ Congress

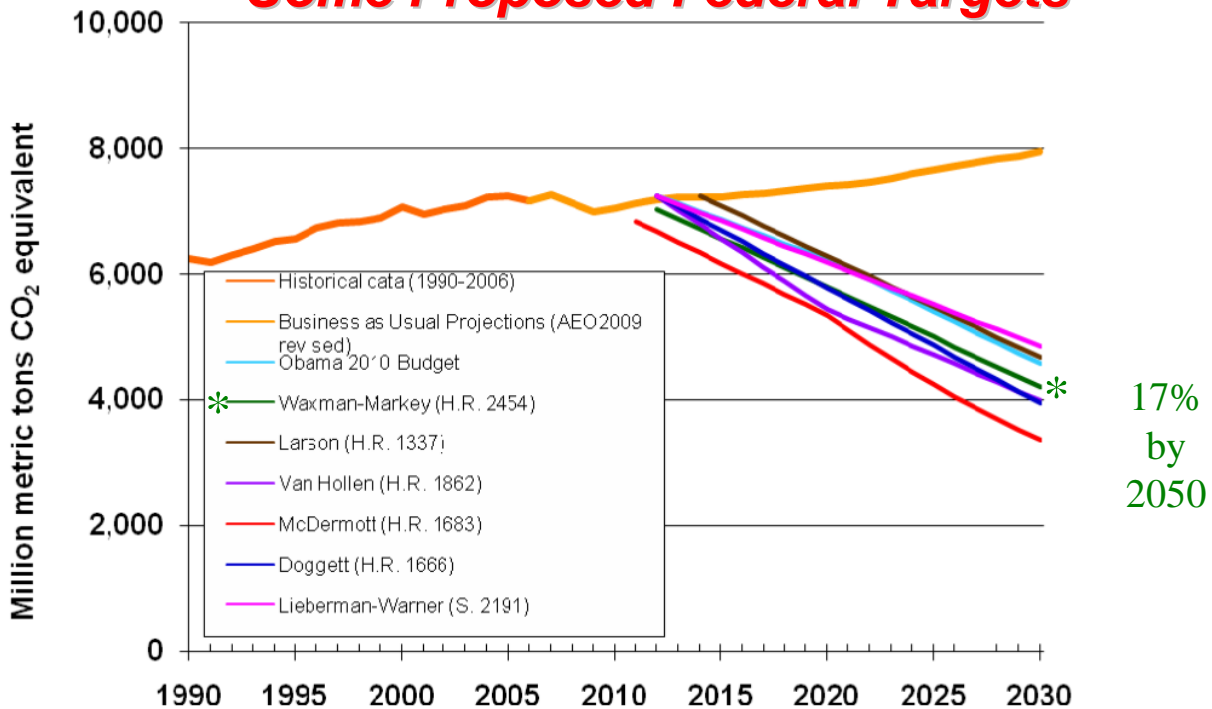
- “American Clean Energy and Security Act of 2009” (Waxman-Markey) passed 219-212 in the House (June 29)



- Senate (Late September)?
 - Republican delay tactics
- Conference?

- **USEPA Poised to Act if Congress Doesn't**
 - “Endangerment” finding: mobile sources, maybe stationary
 - ... If Congress doesn't tie EPA's hands
- **States**
 - Since 1988
 - Regional Cap-and-Trade
 - Other State actions
 - Renewable portfolio standards
 - Clean transport fuels
 - Land use
 - Energy efficiency

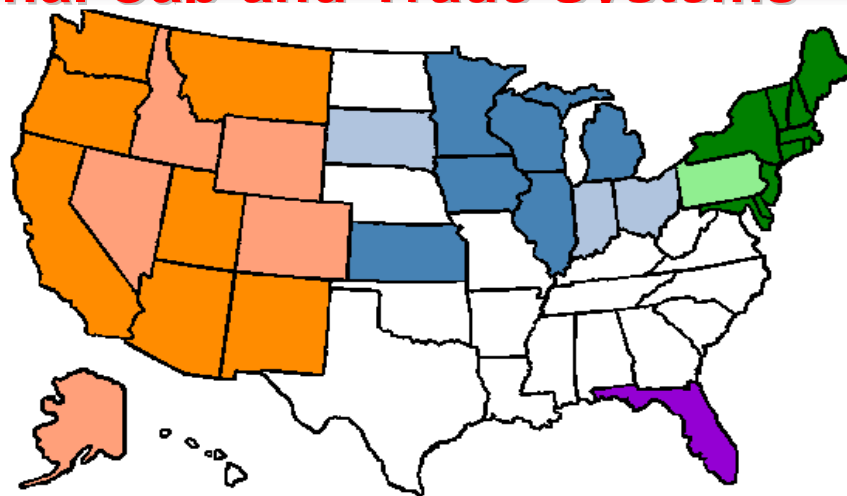
JHU **II. WHAT: Targets and Mechanisms**
Some Proposed Federal Targets



- **Economy-wide cap:**
 - 85% of GHG emissions
- **Responsibility:**
 - **Source:** Producers, importers of fossil fuels (2012)
 - **Intermediate:** Natural gas distributors (2016)
 - **End-user:** Power (2012), industrial facilities (2014)
- **Exemption:**
 - Entities emitting $\leq 25,000$ tons CO₂e/yr
- **HFCs, black carbon, etc. regulated separately**

Waxman-Markey: Other Power Sector GHG Provisions

- **20% renewable energy & energy efficiency standard by 2020**
 - Utilities to achieve 5% load reduction from energy efficiency
 - Utilities to obtain $\geq 15\%$ from renewable energy
 - Governors can certify impossibility, and substitute up to 3% with more efficiency
- **Performance standard for new coal power plants**
 - 65% reduction if built ≥ 2020 ; 50% for 2009-2019 plants
 - Comply 4 yrs after CCS is “proven,” or 2025 if later
 - “Proven”: US 4 GW in commercial operation, capturing 12 MT/yr, other conditions
- **National building codes**



Also several Canadian provinces, Mexican states

- Regional Greenhouse Gas Initiative RGGI
- RGGI Observer
- Midwest GHG Reduction Accord
- MGGRA Observer
- Western Climate Initiative
- Western Climate Initiative Observer
- Individual State Cap-and-Trade Program

Source: Pew Center, www.pewclimate.org/what_s_being_done/in_the_states/regional_initiatives.cfm

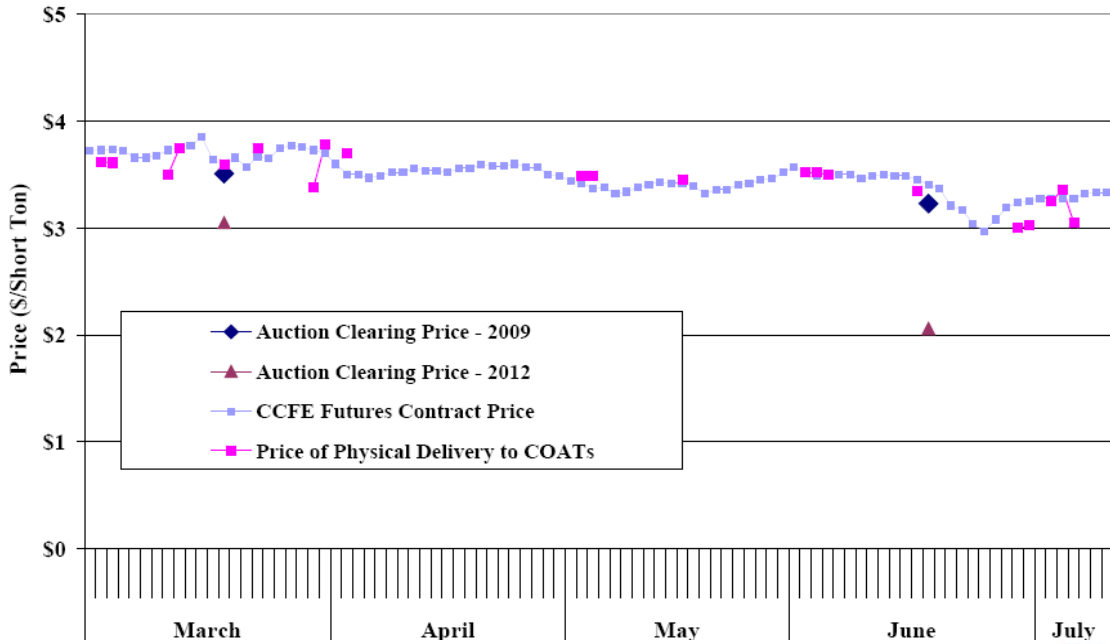
Ten Northeastern States: RGGI

➤ Regional cap in effect 2009

- Power plants only (≥ 25 MW)
 - 24% of region's CO₂
 - 188 MT/yr
- Target:
 - Projected 2009 levels, until 2014
 - Then decrease 2.5%/yr through 2018
- Allowance prices: ~ 112MT sold so far, @ ~\$3/ton
 - Some secondary trading
 - Active futures market

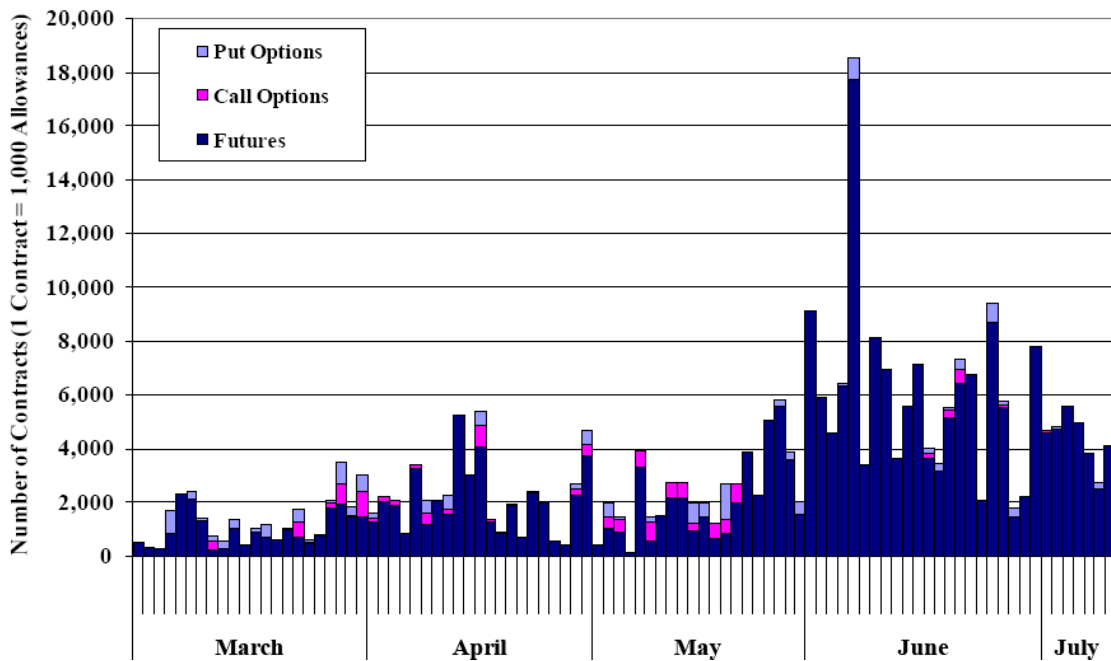
RGGI Price Stability

Figure 1: Prices in the Secondary Market for RGGI Allowances
March 2, 2009 to July 10, 2009



RGGI Volume of Secondary Trading

Figure 3: Volume of Trading of CCFE Futures and Options
March 2, 2009 to July 10, 2009



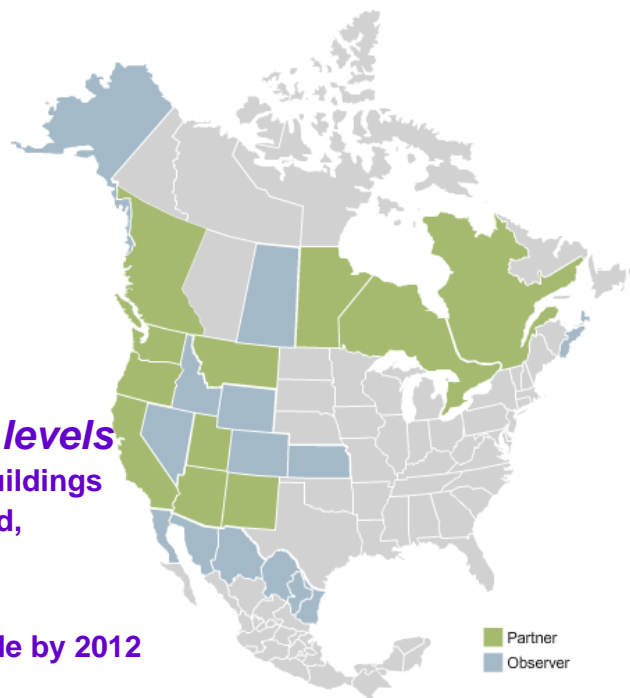
- **"RGGI's reliable auction process continues to set an example for the nation. RGGI proves that auction-based cap-and-trade works, and can lead us to a new economy with green jobs, a clean energy infrastructure and a better environment."**
 - Pete Grannis, Commissioner of the New York State Department of Environmental Conservation and Chair of the RGGI Board of Directors

- **"While a modest program that will produce emissions reductions from only one sector of the economy, RGGI is an essential step towards a lower carbon future that will drive technological innovation and spur investment in low- and non-carbon energy sources and in energy efficiency while preserving economic growth and minimizing ratepayer impacts."**
 - From "Lessons Learned from RGGI A review of key components of the nation's first mandatory greenhouse gas cap & trade system," Summary Developed and Endorsed By: Environment Northeast, Environment America, Conservation Law Foundation, Union of Concerned Scientists, Clean Water Action, Natural Resources Council of Maine, Natural Resources Defense Council, Appalachian Mountain Club, Environmental Advocates of New York, The Commons, ACEEE, Pacific Forest Trust, Northeast Energy Efficiency Partnerships

JHU State Initiatives in Progress: California (AB32, 2006) - Western Climate Initiative (2007)



Gov. Schwarzenegger is joined by international leaders with a consistent record of addressing the global threat of climate change, New York Governor George Pataki and other environmental and industry leaders at a bill signing for AB 32 on Treasure Island in San Francisco on Tuesday, September 27, 2006.



- **By 2020: 15% below 2005 levels**
 - Power, transport, industrial, buildings
 - 90% of GHG emissions covered, including non-CO₂
- **Timetable**
 - California (AB32): cap-and-trade by 2012 for large stationary sources
 - WCI fully implemented by 2015

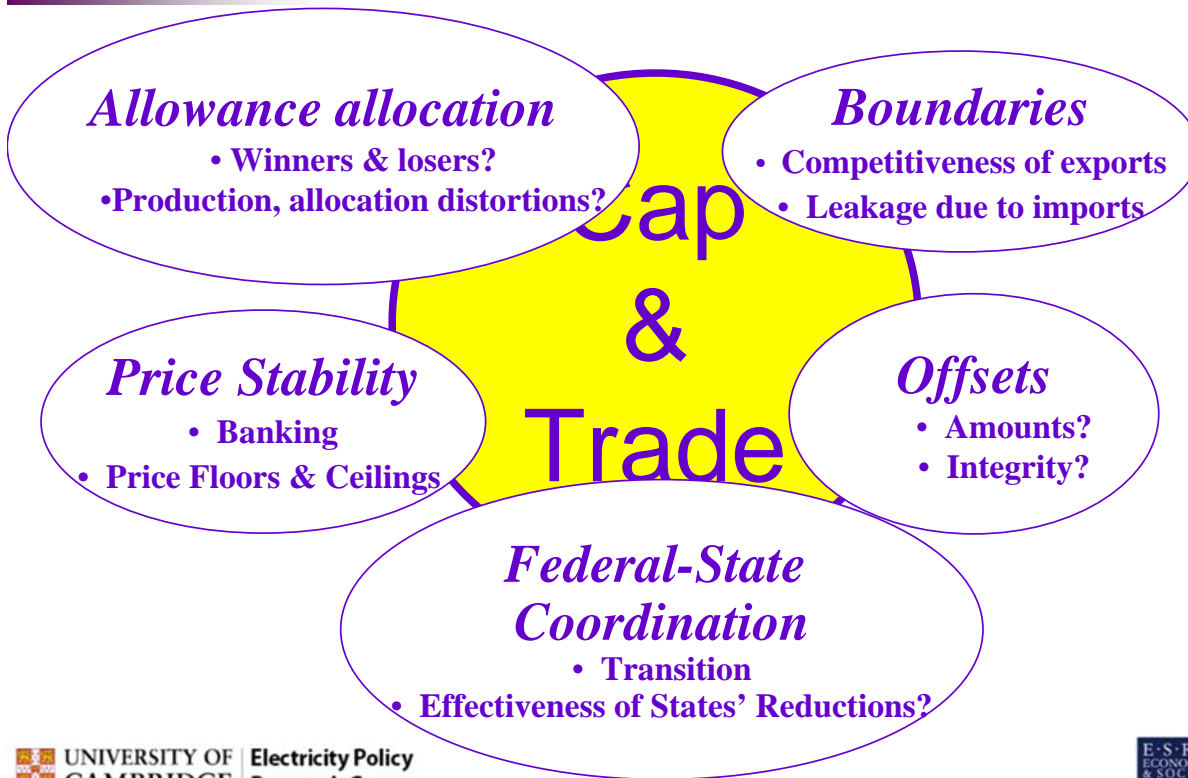
Midwest Greenhouse Gas Reduction Accord (MGGRA)

- **2007 Agreement**
- **Advisory Group Recommendations (6/09):**
 - Broad coverage
 - 2020: 20% below 2005
 - 80% drop by 2050
 - Cap-and-trade. Responsibility:
 - *Source:* Producers, importers of transport/building fuels
 - *End-user:* Power, industrial combustion/process
- **Next: State review and (?) approval**



Other State Actions

- **Florida Climate Protection Act of 2008**
 - Authorizes cap-and-trade for power generation
 - Reduce to:
 - 2017: 2000 levels
 - 2025: 1995 levels
 - 2050: 20% of 1990 levels
- **Maryland GHG Emissions Reduction Act of 2009**
 - 2020: 25% below 2006 levels
 - Massive expansion of state environmental agency
- **15 states impose fleet-wide CO₂ standards for autos (de facto mileage standards)**
 - California: 30% reduction by 2016
 - Noncarbon fuel standards
- **Strong Renewable Portfolio Standards**



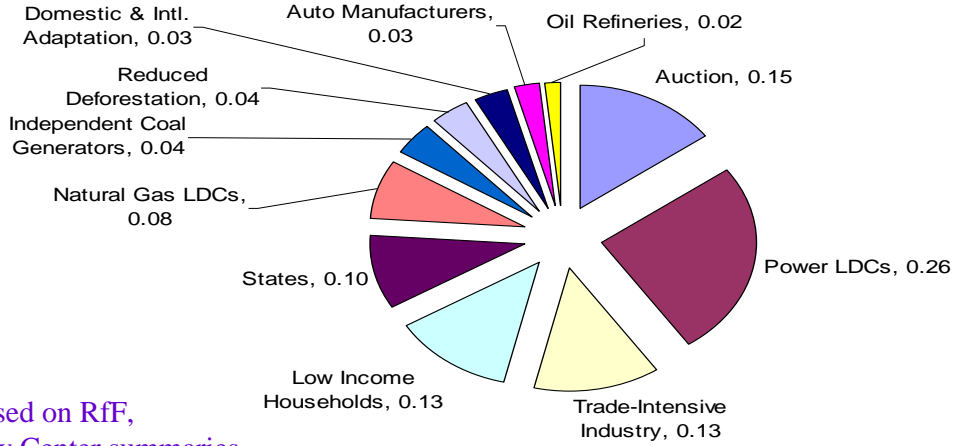
- **Who learned the lessons from Phase 1 of ET?**
 - Auctioning preferred: minimize distortions & windfall profits
 - 50-70% of EU ETS $\Delta\pi$ from free allowances (Lise et al., EAERE 2009)
- **Why lesson differs from US Acid Rain program?**
 - Size of rents
 - Small reduction in CO₂ emissions
 - ⇒ value of allowances >> compliance costs
- **RGGI learned lesson:**
 - “If emitters are seen to benefit while consumers gain nothing, then the system loses legitimacy. This exact scenario has played out in Europe ...” (Environment Northeast et al., op. cit.)
 - 85% of allowances auctioned (→90%)
- **RGGI Proceeds used for:**
 - Subsidies of energy efficiency, direct rebates to ratepayers

Which most benefits ratepayers? (See M. Ruth et al., Energy Policy, 2008)

III.1 Allowance allocation

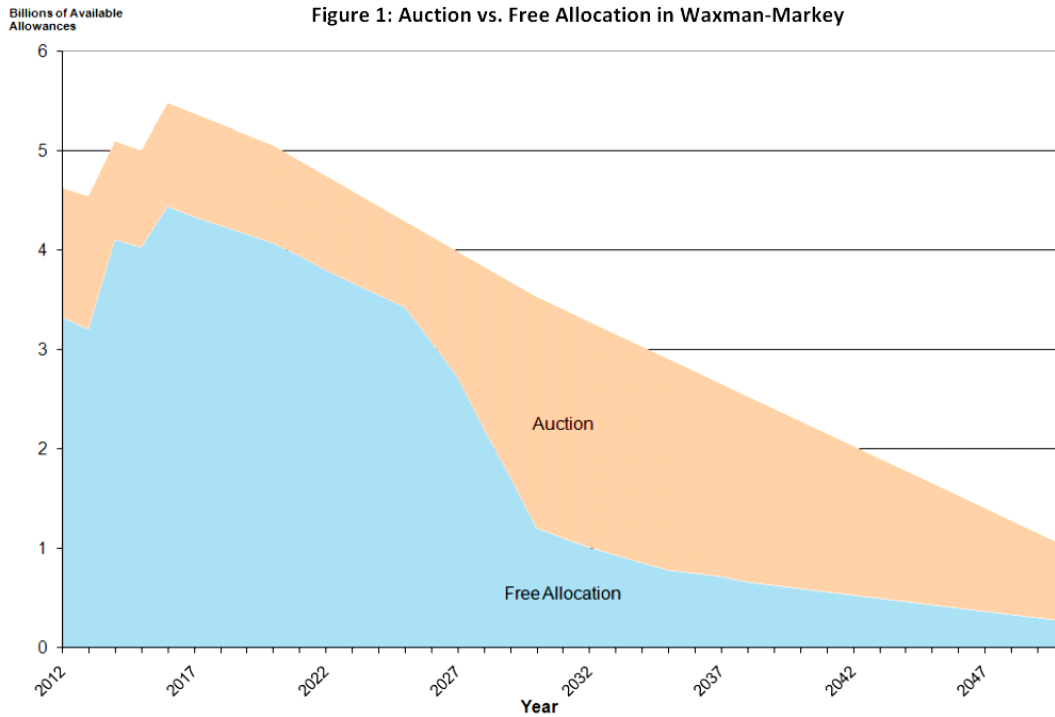
➤ **Waxman-Markey did not learn the lesson**

- At start: Auction 15%
- 22% to industry shareholders
- 26% to electric utilities \propto past CO₂ emissions, sales



Based on RfF, Pew Center summaries

Auction vs. Free Split over Time



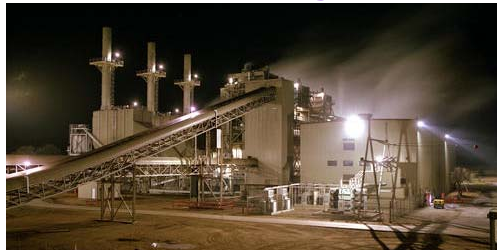
- **Price Floor (RGGI):**
 - \$1.86/ton
- **Banking (all)**
- **Reserve auction (Waxman):**
 - Released if $P >$ threshold
 - Start: \$28/t
 - Then 160% of 3 yr rolling avg price
 - 5% of cap in 2012 → 10% by 2015
 - Borrowed from future allocations
- **Increase allowable offsets (RGGI):**
 - Limit relaxed if price hits upper bound
- **Borrowing (Waxman):**
 - 15% borrowing
 - 5-yr limit
 - 8%/yr interest
- **Can buy from ETS markets (Waxman)**



- **Waxman-Markey**
 - 1 offset = 1 allowance until 2018
 - afterwards, 1 international offset = 0.8 allowance
 - Offsets \leq 2B tons/yr (50:50 domestic:international)
 - International → 1.5B if domestic limit not reached
 - Offset Integrity Advisory Board to monitor integrity
 - US Dept. Agriculture oversees US farming, forestry
- **RGGI**
 - Offsets \leq 3.3% of generator's obligation
 - Types:
 - Landfill & agricultural CH₄
 - afforestation
 - fossil fuel end-use efficiency
 - SF₆ emission reductions

➤ *Leakage (Imports)*

- RGGI ignores (leakage ~ 50%, Ruth et al., op. cit.)
- California: imports must buy allowances
 - Yet “contract shuffling” will yield no reductions in rest of west (Chen, Liu, Hobbs, 2009)
- WCI
 - “Individual Boundary” approach due to legal issues
 - Each state calculates imports from non-WCI states
- Waxman-Markey:
 - Threat: 2020 requirement for “International Reserves Allowances” for energy-intensive imports
 - Unless President finds that there is an agreement or other considerations

➤ *Competitiveness (Exports)*

- Maryland (RGGI member):
 - Regulations cannot affect state’s manufacturers
 - No required GHG reductions
 - No significant cost increases
- Waxman-Markey
 - Rebates (15% of free allowances) to energy or trade-intensive industries, depending on:
 - Direct compliance effects
 - Emission intensity
 - Electricity efficiency
 - Worker retraining
 - Exempt fuel exports from needing allowances



III.5 Federal-State Coordination

- **Stringency of caps**
 - Waxman-Markey pre-empts State limits
 - States lobbying for right to have tighter limits
- **States lower national emissions only if:**
 - Federal allowances retired, or
 - Affects noncovered GHG emissions
- **Otherwise, state efforts only:**
 - Rearrange emissions
 - Increase costs
 - Depress federal allowance prices
- **Need incentives for actions by states (Burtraw, 2009):**
 - Infrastructure: Land use, transport, buildings
 - Proposes to reward performance with allowances

Conclusions

- **Proposals build on previous US cap-and-trade success, enactment likely**
 - If not, states will continue prodding!
- **Evaluation of Waxman & Markey by criteria (Aldy & Pizer, 2008) for good CC policy:**
 - Broad scope (sectors/gasses)? 
 - Single price for everyone? 
 - Price stabilization? 
 - Recognize leakage/competitiveness? 
 - Address R&D market failures? 

