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Carbon Management

Carbon Legislation and Cap and Trade Update

Presentation to:

*The Engineering Founder Societies
Workshop on Carbon Measurement*

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Agenda

- U.S. Climate Change and Energy Bills
- Waxman-Markey Bill at a Glance
- Drill Down into Reducing Global Warming Pollution
- Discussion



Anthropogenic Climate Change ?

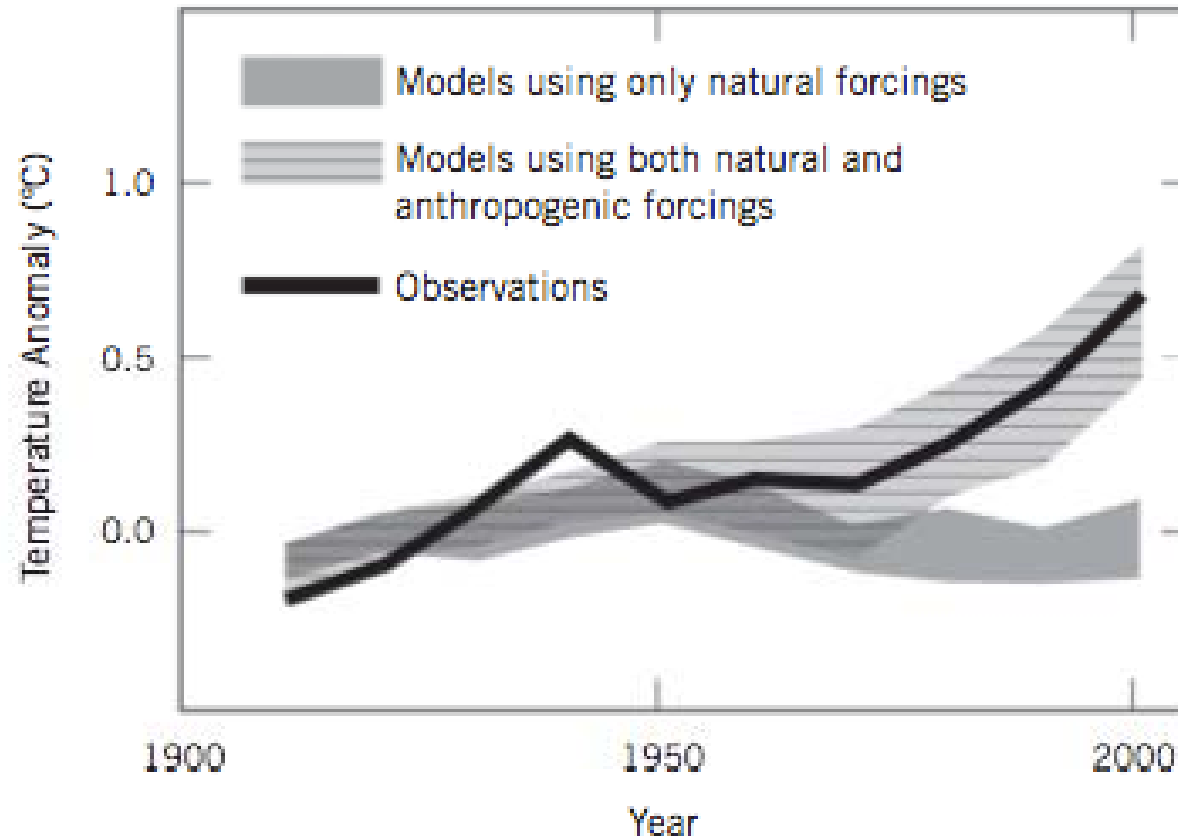
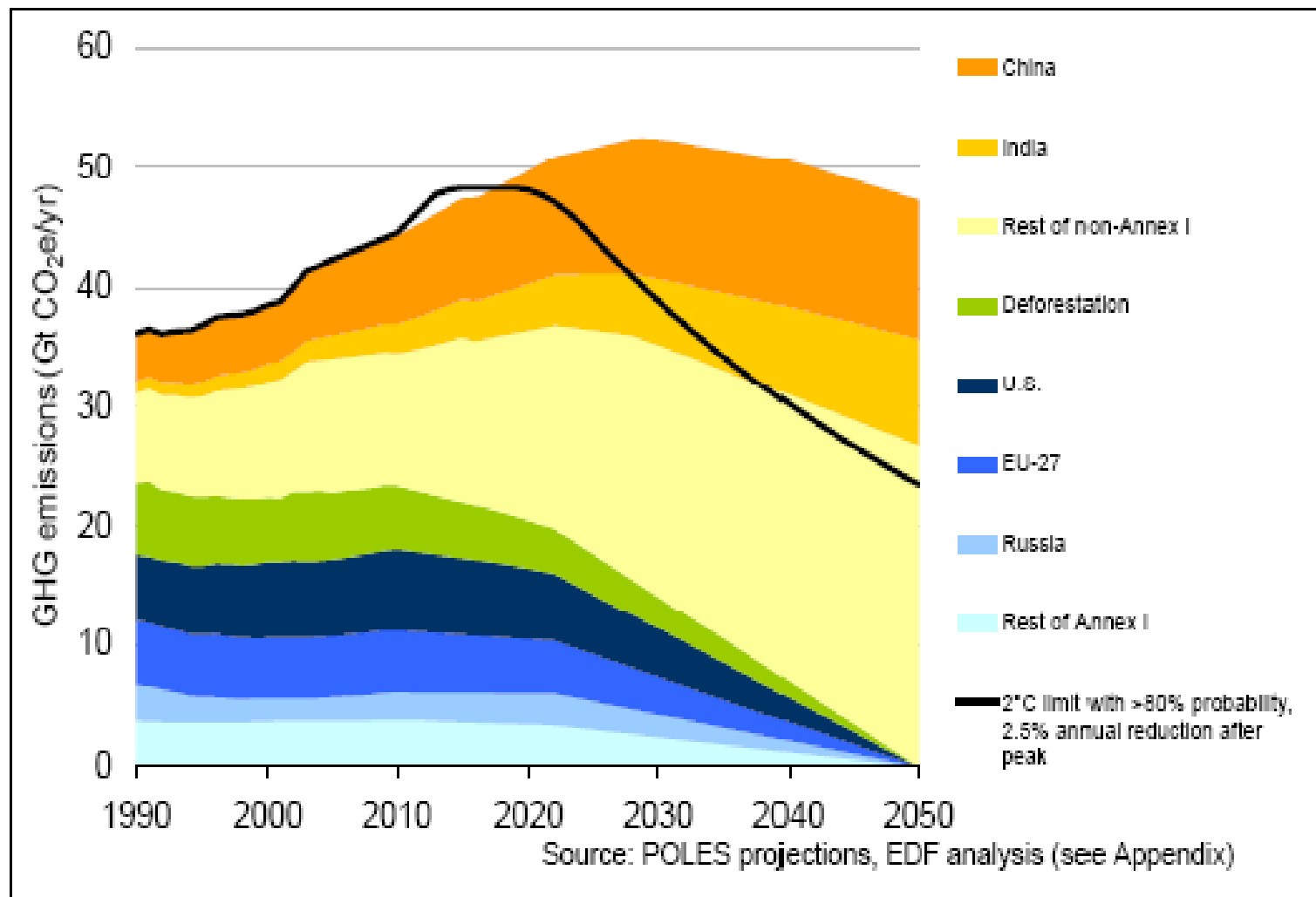


FIGURE 2-4 Comparison of observed global change in surface temperature with simulations by climate models using natural and anthropogenic forcings.

(Source:IPCC 2007, Figure SPM-4, p. 18.)



FIGURE 1: Projection of developing countries' GHG emissions through 2050, with "Two-Degree Emissions Pathway", and industrialized nations' emissions and emissions from deforestation declining to zero by 2050

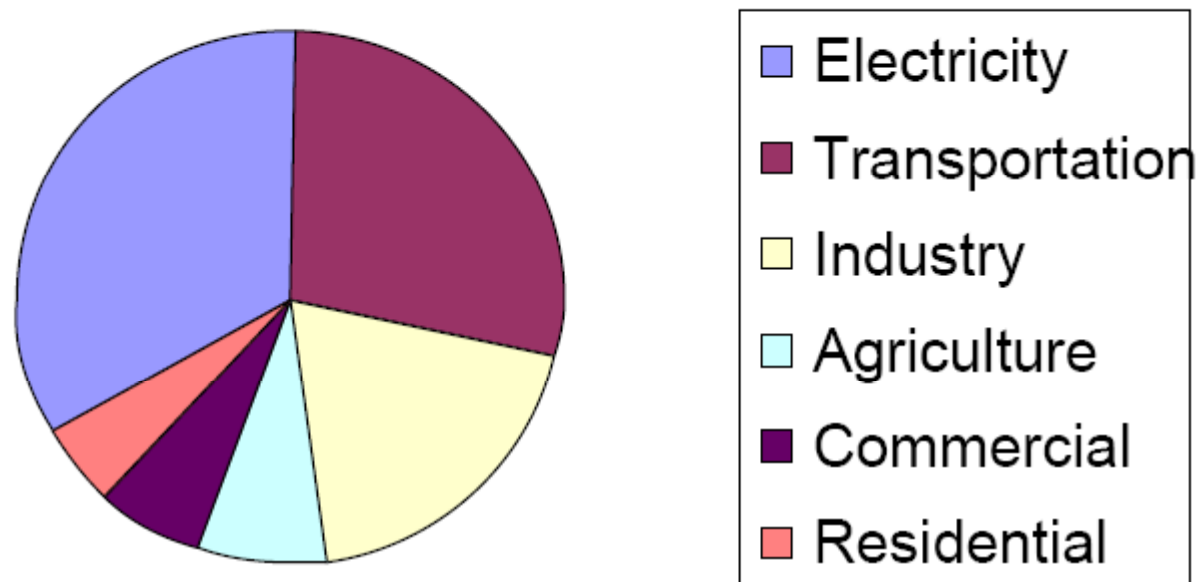


Source: Environmental Defense Fund



US Starting Point – What Produces Emissions?

Figure VI-1
U.S. GHG Emissions Allocated to
Economic Sectors (2006)



U.S. Climate Change & Energy Bills

111th Congress



- American Clean Energy and Security Act of 2009 (H.R.2454)
 - Reps. Henry Waxman (D-CA) and Edward Markey (D-MA)
 - Passed the House on June 26, 2009.
- Clean Energy Jobs and American Power Act (S.1733)
 - Senators John Kerry (D-MA) and Barbara Boxer (D-CA) chairs of the Foreign Relations & Environment and Public Works Committees introduced bill on September 30, 2009.
 - EPW Committee recommended it be considered by the Senate as a whole on November 5, 2009.



Waxman-Markey Bill at a Glance

Title I – Clean Energy

Title II – Energy Efficiency

Title III – Reducing Global Warming Pollution

Title IV – Transitioning to a Clean Energy Economy

Title V – Offsets from Domestic Forestry & Agriculture



Waxman-Markey: *Clean Energy*

- Combined efficiency and renewable electricity standard: 20% renewable by 2020.
- Carbon Capture and Sequestration
 - R&DD, commercial deployment, linked to coal-fueled electric.
- Clean transportation
 - Utilities to plan for electric vehicle grid integration
 - Funding for vehicle/battery manufacturers/fleet owners/smart grid.
- State Energy & Environment Development (SEED) funds.
- Transmission & Distribution: smart grid.



Waxman-Markey: *Energy Efficiency*

- New building standards – 50% improvement by 2016.
- Standards for lighting products, commercial furnaces and appliances.
- Transportation efficiency – fuel standards for heavy vehicles.
- Industrial efficiency program – DOE to establish certification standards to be ANSI recognized.



Waxman-Markey: *Global Warming Pollution Reduction*

- *Emission Allowances*: cap on GHG emissions from specified activities.
- *Compliance Obligation*: “covered entities” must hold or submit emission allowances \geq GHGs they emit.
- *Trading*: no restriction on who can hold, purchase, sell, transact with allowances.
- *Banking and Borrowing*: for future/current compliance.
- *Penalty for Noncompliance*: establishes penalties.
- *Strategic Reserve*: 2.5 billion metric tons of emission allowances from monthly set asides by Administrator from each year’s tonnage limit.
- *Permits*: obligations of stationary sources under the Clean Air Act’s Title V operating permit program under the newly-established Title VII program.
- *International Emission Allowances*: criteria to meet before allowances from foreign programs can be used for compliance by covered entities.



The power of a simple idea

Behind cap and trade lies a simple idea: the market can be a powerful tool for achieving environmental progress. Congress—backed by science—sets the targets. The market figures out how to achieve them at the lowest possible cost.

The trading system creates a strong profit incentive for firms to develop new and innovative technologies. The cap-and-trade program we designed to curb acid rain has cut sulfur dioxide pollution faster than expected, at a fraction of the predicted cost.

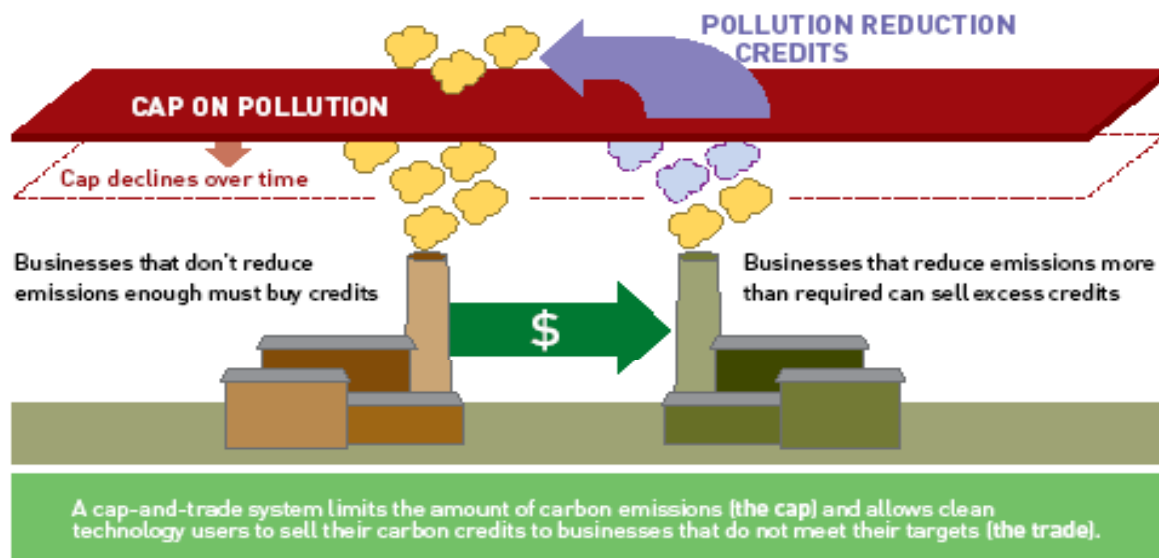
CAP and TRADE

The cap is what ensures the environmental goals of the program are met. It establishes a mandatory limit on total greenhouse gases released into the atmosphere.

In the first few years of a cap-and-trade program, the cap could be set just below where emissions are today. Over time, the cap would be lowered, allowing for low-carbon infrastructure to be put in place. The near-term targets ensure that we start reducing emissions right away.

- Trading is the key to keeping costs down. It lets the market, not the government, figure out where and when to cut emissions and who can do it most cheaply. Since the overall cap is in place, we can be sure that total emissions are reduced.
- Cap-and-trade programs also allow firms to bank and even borrow allowances—essentially permitting firms to trade among themselves. This system keeps costs down by letting firms determine the timing of emissions reductions that makes the most sense for them.

How cap and trade works



Getting to less A SIMPLE EXAMPLE

Consider the case of two hypothetical power plants. Utility A can cut emissions for \$5/ton by improving its operating efficiency; Utility B can improve its efficiency some, but needs to spend \$40/ton to switch from coal to natural gas in order to make equivalent reductions. If both are required to reduce emissions by the same amount, the result will be higher costs than necessary—since it would have been cheaper for Utility A to take on a larger share.

Trading enables emissions reductions to be made by the firms that can do them at the lowest cost. Let's say the market price for allowances is \$20/ton. Since Utility A can cut emissions for only \$5/ton, it will do much more than required—selling the extra tons on the market, at a profit of \$15/ton. Utility B, meanwhile, finds it attractive to buy allowances on the market. It saves \$20/ton, without having to switch to natural gas.

The result? Overall **costs go down**, because abatement is done at lower cost. In addition, **both companies gain from trade**. The low-cost Utility A profits from selling its extra allowances on the market, and the higher-cost Utility B gains because it can comply at lower cost.

Best of all, because the declining cap keeps a lid on total emissions, they are guaranteed to go down. By keeping costs low, a cap-and-trade program means that we can afford more ambitious emissions reductions. **The environment wins as well.**

Source: Environmental Defense Fund



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Lessons from EU's carbon trading experiment

The EU ETS tested the waters for a large-scale carbon market, established a long-term price for CO₂ emissions and set Europe on a path toward crucial innovation in its energy sector.

The EU ETS is the most comprehensive cap-and-trade system for carbon emissions anywhere in the world. It caps around 2 billion ton of CO₂ emissions from 10,000 power generators and the most polluting factories. All told, the cap covers 50% of the region's CO₂ and 40% of overall greenhouse gas emissions.

The system ensures that it is no longer free to pollute. Although far from perfect, this system is blazing a path for future comprehensive trading schemes in Europe, the United States and elsewhere.

Has Europe's ETS decreased emissions?

The program didn't fully get underway until January 2008. However, it seems to have made a difference even in the first year. A preliminary analysis suggests that EU ETS decreased emissions by 3% in 2008, relative to 2007.¹

Between 2008 and 2012, overall allocations are 10% below previous emission levels, virtually guaranteeing further reductions.

¹ Actual emissions were 5% lower. The difference of 2% is explained by the economic crisis in the second half of 2008. Source: New Carbon Finance (16 February 2009): "Emissions from EU ETS down 3% in 2008".

² Dechezleprêtre et al. (ICERNA 2009): "Investment and Transfer of Climate Change Mitigation Technologies on a Global Scale: A Study Drawing on Patent Data".

Europe forges ahead of U.S. in clean energy innovation

The largest solar and wind plants and manufacturers can all be found in Europe. The continent is also pulling ahead in clean tech patents.² The reasons are clear: the EU and many individual countries have put into place policy frameworks to reward investment in renewable energy. The cornerstone of this approach is the EU ETS.

By putting a price on carbon, the cap-and-trade program is releasing a flood of entrepreneurial activity across the EU, sparking investment in research and development to decrease emissions even further. Once CO₂ has a price, emitting less of it pays.

Europe carbon allowance price



Source: Environmental Defense Fund

Spotlight on CARBON PRICES

The most important achievement of the EU ETS has been to put a price on CO₂. For most European power generators and key industries, pollution is no longer free. This has helped to drive emissions down, even in the trial period.

Many observers have pointed to the market crash that occurred in the spring of 2006 as evidence that carbon markets are too volatile to work well. (See chart at left.) The truth is much simpler: The EU handed out too many allowances for the trial phase—and then made them all expire at the end of 2007. Therefore allowance prices had to fall to zero; the only question was when that would happen.

Meanwhile, prices for allowances good in 2008 and beyond (the blue line in the chart) have remained strong in line with economic growth. Prices fell once the world economy hit the brakes, again just as we would expect and also hope to happen in a functioning market. As demand for allowances goes down, so does the price. All projections point to increased prices once the economy picks up and because allowances will become increasingly scarce.




GHG Emissions Reporting

- Within 6 months of enactment, EPA must establish a federal GHG registry
 - Based on best practices from federal, state, tribal, international protocols, incl. protocols from the Climate Registry and other mandatory state or multi-state authorized programs.
 - Reporting begins in 2011 for the years 2007-2010, with mandatory quarterly starting in 2011.
- Covered gases: 5 Kyoto gases (not HFCs)
 - CO₂, CH₄, N₂O, PFCs, SF₆ (NF₃, HFE).



www.epa.gov/climatechange/emissions/ghgrulemaking.html



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In response to the FY2008 [Consolidated Appropriations Act](#) (H.R. 2764; Public Law 110-161), EPA has issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule requires reporting of greenhouse gas (GHG) emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions.

Under the rule, suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to EPA. The gases covered by the proposed rule are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF₆), and other fluorinated gases including nitrogen trifluoride (NF₃) and hydrofluorinated ethers (HFE).

The final rule was signed by the Administrator on September 22, 2009. On October 30, 2009, the final rule was published in the *Federal Register* (www.regulations.gov) under Docket ID No. EPA-HQ-OAR-2008-0508-2278. The rule will be effective December 29, 2009. This action includes final reporting requirements for 31 of the 42 emission sources listed in the proposal. At this time, EPA is not finalizing the remaining source categories as we further consider comments and options.

EPA's new reporting system will provide a better understanding of where GHGs are coming from and will guide development of the best possible policies and programs to reduce emissions.

Climate Change Home

Regulatory Initiatives Home


Endangerment Findings

Proposed GHG Permitting Requirements on Large Industrial Facilities

Final Mandatory Reporting of GHGs Rule

EPA and NHTSA Propose National Program to Cut GHG and Improve Fuel Economy for Cars and Trucks

Waste Energy Recovery Registry



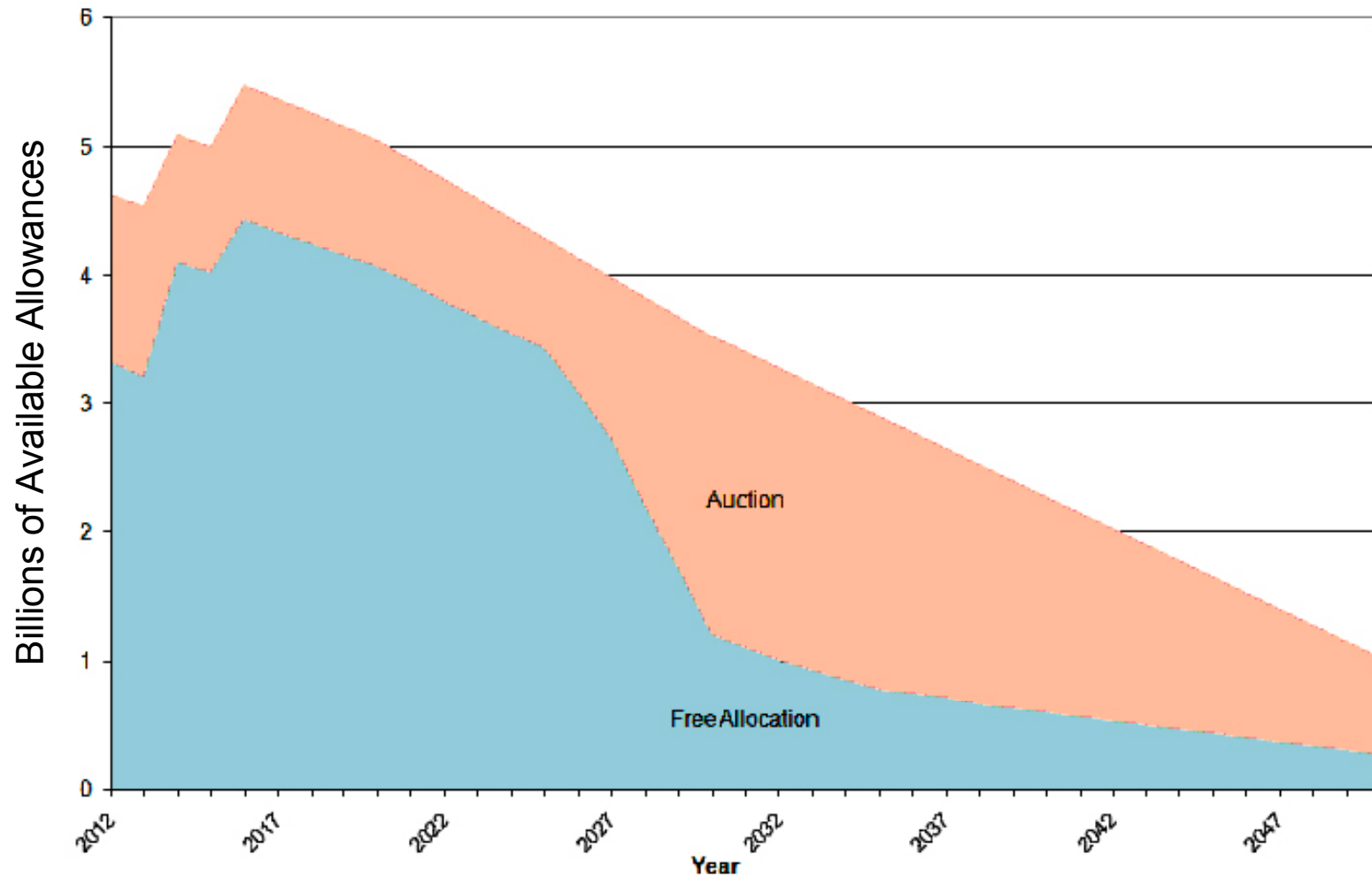
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Waxman-Markey: *Global Warming Pollution Reduction*

- National greenhouse gas (GHG) *cap-and-trade program*
 - 2012: 3% < 2005 emissions level (~12% > 1990 levels)
 - 2020: 17% < 2005 (~ 4% < 1990 levels)
 - 2030: 42% < 2005 (~33% < 1990 levels)
 - 2050: 83% < 2005 (~80% < 1990 levels).
- Consumption cap on all HFCs (under Title VI CAA)
 - 2012: 10% < average between 2004-2006
 - 2020: 33%
 - 2030: 75%
 - 2032 and onward 85%.



Auction vs. Free Allocation



Source: Pew Center for Global Climate Change

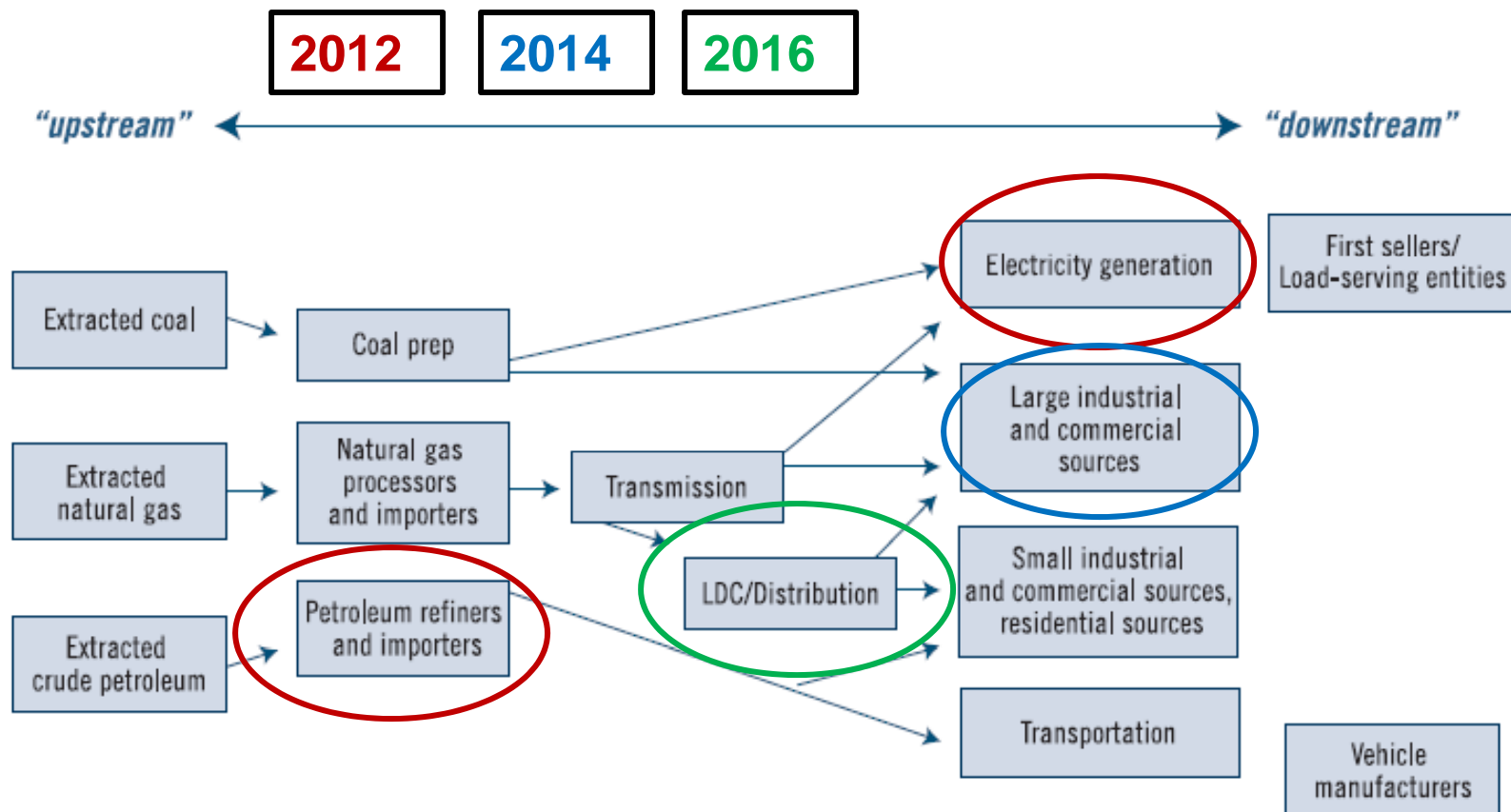


Waxman-Markey: Covered Entities

- Sec. 722 prohibits GHG emissions unless the following *covered entities*' owner or operator holds necessary allowances for “capped emissions”:
 - Electricity sources
 - Fuel producers and importers (>25,000 tonnes/year)
 - Industrial gas producers and importers (>25,000)
 - Nitrogen trifluoride sources (>25,000)
 - Geological sequestration sites
 - Industrial stationary sources (see 700(12)(F)-(H))
 - Industrial fossil fuel-fired combustion devices (>25,000)
 - Natural gas local distribution companies
 - Algae-based fuels
 - Fugitive emissions.



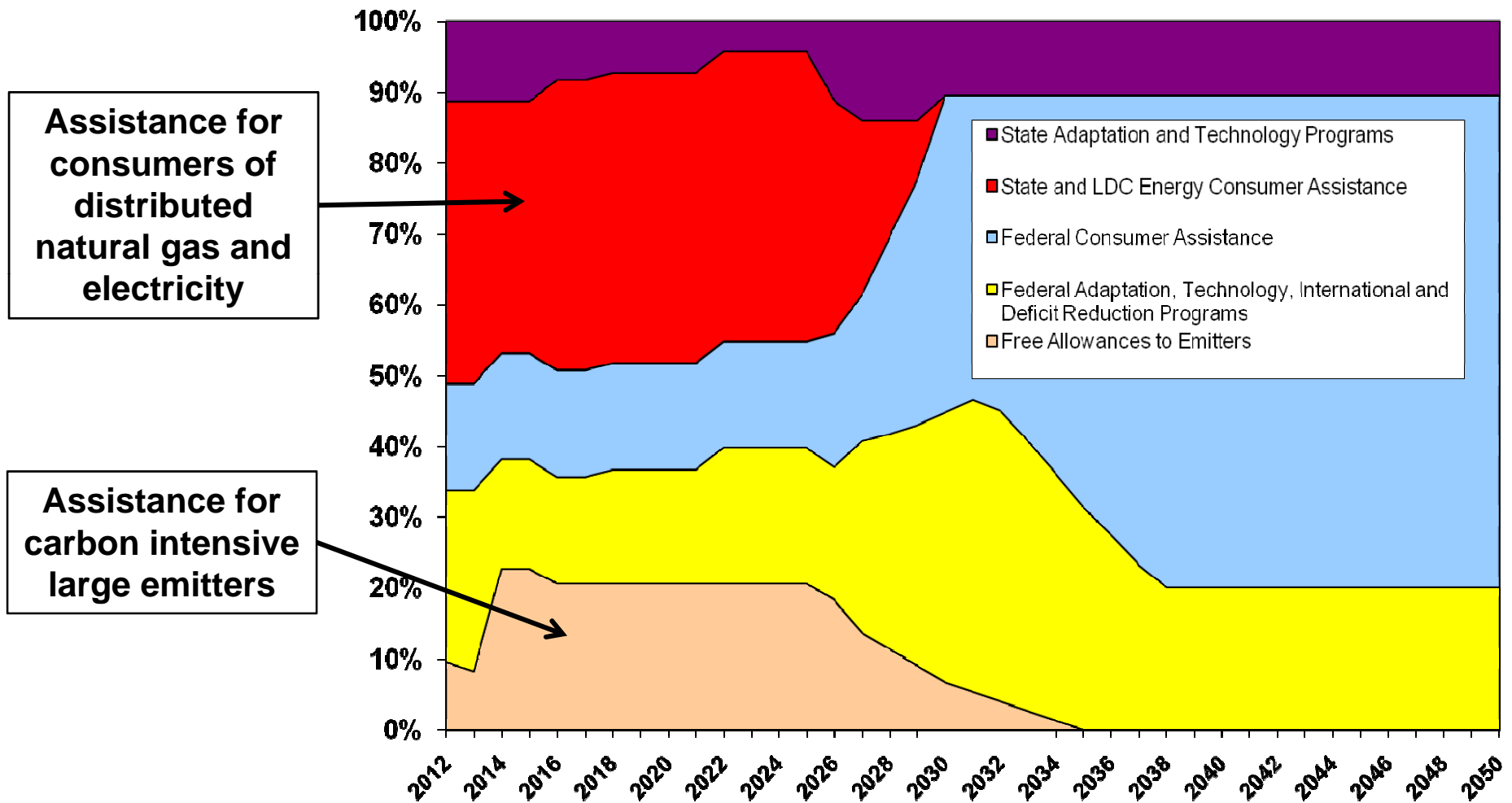
Waxman-Markey: Phases in Points of Regulation Along the GHG Supply Chain



Comprehensive summary of the bill available at:
http://pdf.wri.org/wri_summary_of_aces_0731.pdf



Waxman-Markey: Allowance Distribution



Clean Energy Economy Transition

- Funding to reduce impacts on low- and medium income earners.
- Funding to offset energy price increases.
- Funding for domestic adaptation, prevention of tropical deforestation, and international technology transfer.
- Entitlements and retraining for displaced workers.



Offsets from Domestic Forestry & Agriculture

- Regulated companies would be allowed to purchase carbon offsets to meet a portion of their required emission reductions
 - Fund other clean-energy projects rather than cut their own emissions.
- Offsets could account for up to 2 billion tons of total emission reductions each year under the entire cap
 - Some estimate $\leq 15\%$, in 2012; $\leq 33\%$ by 2050
 - Half of permitted offsets would be domestic, half international (or $\leq 75\%$ international sources if domestic offsets are insufficient).
- EPA defers to Offsets Integrity Advisory Board.



GHG Questions to Consider

- How prepared is your firm to comply with GHG reporting?
- How much can your firm pass carbon costs through your supply chains?
- Will carbon costs affect demand for your products?
- Will allowance value be available to mitigate costs?
- What technologies or processes can your firm employ to mitigate your GHG emissions?
- What offset options are available to your firm?

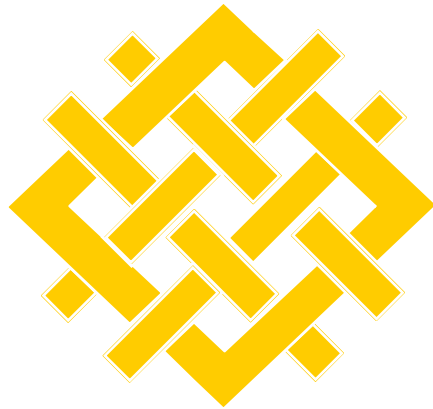


Thank You!

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