

# Overview of recent Climate Legislation: *Overall Impacts and Opportunities for the Agriculture and Forestry Sectors*

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## 3 Key Questions

- What are the overall efficiency costs of cap-and-trade programs?
- What are the distributional costs of cap-and-trade programs?
  - - interested primarily on the distribution of costs across different income groups
- What are the opportunities and challenges for unregulated sectors, such as Agriculture and Forestry?



# The American Clean Energy and Security Act of 2009 (Waxman-Markey Bill)

- Establishes an economy wide cap & trade program.
- Creates incentives and standards for clean energy and energy efficiency.
- Establishes GHG standards for vehicles, stationary sources, and fuels.



## Overall Target of GHG emissions reductions

The cap gradually reduces covered greenhouse gas emissions to 17 percent below 2005 levels by 2020, and 83 percent below 2005 levels by 2050.

# Offsets

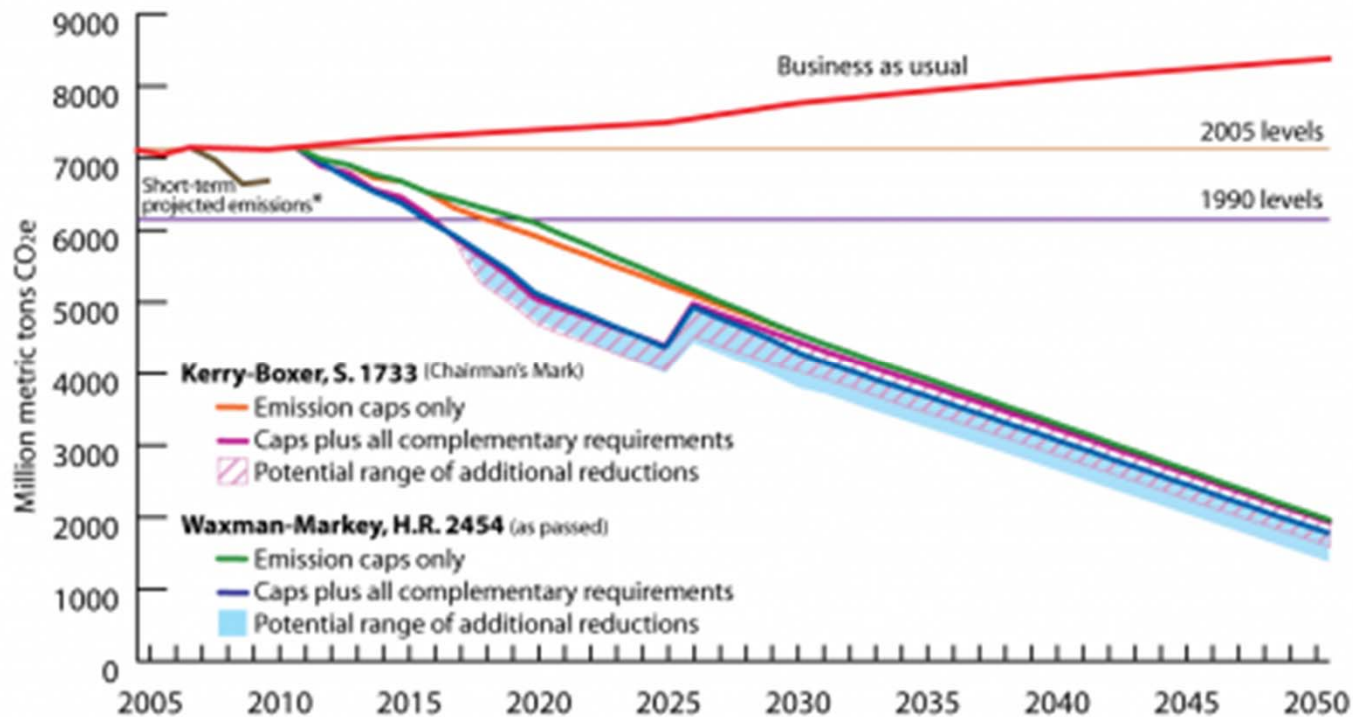
Offsets are limited to 2,000 million metric tons CO<sub>2</sub> equivalent (MtCO<sub>2</sub> e) per year split evenly between domestic and international.

Offsets discounting requires entities using International offsets to submit 1.25 tons of offsets credits for each ton of emissions being offset.

Supplemental emissions reductions from reduced deforestation through allowance set-asides


# U.S. Proposed Pathways Follow the Policy Ramp

Emission Reductions Under Cap-and-Trade Proposals in the 111th Congress, 2005-2050  
October 28, 2009



WORLD RESOURCES INSTITUTE

For a full discussion of underlying methodology, assumptions and references, please see <http://www.wri.org/usclimatetargets>.  
\* "Business as usual" emission projections are from EPA's reference case for its analysis of the Waxman Markey Discussion Draft. "Short-term projected emissions" represent EIA's most recent estimates of emissions for 2008-2010.



## Behavioral Changes resulting from Carbon Regulations

- regulation for GHG emissions means that firms and individuals will have to change their behavior from business as usual
- Polluting facilities respond to regulations by:
  - - reducing output;
  - -altering input mix
  - -investing in abatement technologies
- Prices of polluting goods tend to increase creating incentives for consumers to substitute towards cleaner goods



## Allowance Prices

- Allowance prices are expected to range from \$13 to \$17 per metric ton CO<sub>2</sub> equivalents (tCO<sub>2</sub>e) in 2015 and from \$17 to \$22/tCO<sub>2</sub>e in 2020 in the core scenario
- Importance of allowing for offsets: Allowance prices would be substantially higher in the absence of offsets



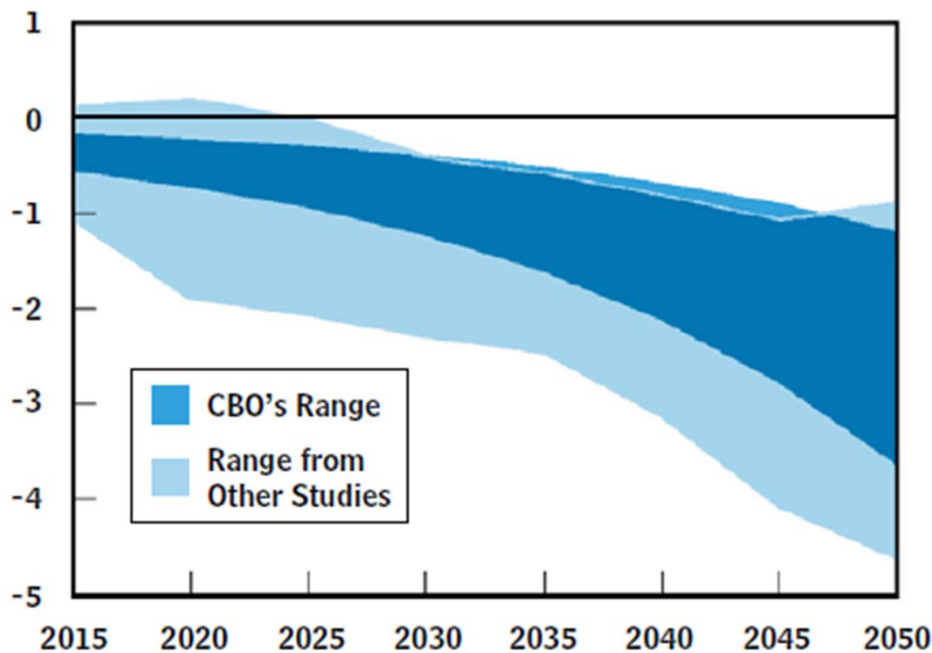
## Overall GDP Effects

On average, the effects of the bill is to reduce GDP by at most 1% annually

Example, in the reference case, GDP is \$22.6 trillion in 2030. Under the policy, *GDP reaches \$22.6 trillion approximately three months later*

# Costs Will Vary Over Time and Stringency

Percentage Change in Real Gross Domestic Product



Date	CBO	Other
2020	-0.25 to -0.75%	0.2 to -2.0%
2050	-1.0 to -3.5%	0.9 to -4.6%

Source: CBO Nov. 23, 2009



The cap & trade policy has a relatively modest impact on U.S. consumers

Average annual household consumption is estimated to decline in a range of \$98 to \$140 dollars per year relative to reference scenario

These costs include the effects of higher energy prices, price changes for other goods and services, impacts on wages and returns to capital.

Cost estimates also reflect the value of emissions allowances returned lump sum to households which offsets much of the cap & trade program's effect on household consumption.

# Cost to Households of Waxman-Markey

- Without Rebates

- \$890/year in 2020 (CBO, June 19, 2009)
- \$1,870/year in 2020, rising to \$6,800/year in 2035 (Heritage Foundation, cited in the Wall Street Journal, June 26, 2009)

- With Rebates

- \$175/year in 2020 (CBO, June 19, 2009)
- Distribution across income classes, \$ (% of income): (CBO, June 19, 2009)

Lowest Quintile	- \$40	(-0.2)
Second Quintile	\$40	(0.1)
Middle Quintile	\$235	(0.4)
Fourth Quintile	\$340	(0.4)
Highest Quintile	\$245	(0.1)

## Cap-and-Trade Policies generate revenues....

- When auctioned, allowances will generate revenues
- Alternative Use of revenues:
  - -Part of the revenues can be used to reduce income taxes or design low-income provisions to correct the potential regressivity of the program
  - -Part of the revenues can be earmarked to investments in cleaner technologies and renewable energy (solar, wind, advanced biofuels)
  - Set aside of allowance value to provide incentives for projects that may not qualify for offsets



# Impacts on Ag and Forestry

- Ag and forestry will not be regulated directly
  - -these sectors will be indirectly affected, as the prices of energy intense goods will increase
- Offsets can provide an additional source of income
- agriculture and forestry sectors are expected to experience a positive output as a result of mitigation (but there are distributional concerns)



# Sources of Important Agricultural and Forestry Reduction Opportunities

- Emissions Reductions
  - Agricultural Methane Emissions Reductions
    - Manure Management
    - Enteric Fermentation
  - Agricultural Nitrous Oxide Emissions Reductions
    - Fertilizer Practices
    - Manure Management

# Sources of Important Agricultural and Forestry Reduction Opportunities

- **Biological Sequestration Fluxes**
  - **Agricultural CO<sub>2</sub> in Soils**
    - Tillage, Crop Rotations, Cover Crops, Grazing Practices
  - **Forestry CO<sub>2</sub> in Forests and Wood Products**
    - Afforestation, Reforestation, Deforestation, Forest Management

# Sources of Important Agricultural and Forestry Reduction Opportunities

- **Avoided Fossil Fuel Emissions**
  - **Emissions Avoided from Substitution for Fossil Fuel Combustion**
    - Liquid Transportation Biofuels (ethanol, biodiesel)
    - Thermal Biopower/Bioheat
    - Renewable Electrical Power (biogas, wood, grasses, other cellulose)
  - **Emissions Avoided from Efficiency Improvements**



# Challenges in the creation of offsets

- Are offsets permanent? (potential for reversals)
- How do you measure additionality?
- Are there leakages in the production of offsets?
- Who bears the cost of verification?
  - Concerns about the distributional Impacts

# Permanence

- When addressing impermanence one objective is to ensure that net contributions to the global GHG balance are accurately recorded. This implies that credits granted to projects should take potential reversibility into consideration. Another objective is to provide sufficient economic incentives for people to engage in beneficial ASCS projects

# Policy Options to deal with permanence

- (1) ex-ante discounting – estimate the expected amount and timing of the reversal and discount the value of the project upfront
- (2) ‘pay-as-you-go’ – take carbon stock measurements at regular time intervals and impute the net credit as the change in stock between periods
- (3) offset reserve (provide a safeguard against catastrophic losses)
- (4) Insurance

# Additionality - Two methods

- Cohort Group Baseline (aka “Performance Standard” or “Regional”) - This approach uses historic regional land use change data to estimate the probability that a certain type of land use change (e.g., ASCS, afforestation, deforestation) might occur under “natural” (non- project) conditions. It is based on the comparative performance of a cohort group such as other farm holdings in the same region.



## Additionality: Two methods

- **Project-specific Baseline:** Directly evaluates all of the biophysical, economic, and institutional factors affecting the project in question and determines through some combination of quantitative analysis and qualitative reasoning whether the project activity would have been undertaken anyway.

# Leakages

- Need for quantitative studies of the leakages that result from altering tillage practices and rotation systems
- ‘CRP-type’ set-asides – Wu (2000) estimated that CRP has approximately a 20% slippage effect, that is each acre of cropland that enters the program results in 0.2 acres elsewhere reverting to cropland



## Offsets can provide additional sources of income, but...

- The distributional impacts to the Ag and forestry sector will not be uniform and are depend on the costs of producing offsets and the scale of the farm operation
- There may be a variety of barriers to the production of offsets:
  - Need for outreach and extension programs to educate farmers about the different processes to generate offsets
  - Need more details on the costs of verification

# Role for State Level Green Payments

- offsets are only one way in which agriculture and forestry have incentives to reduce emission
- a set aside of allowance value to provide can incentives for projects that might not qualify for offset credits. These set asides can support the practices with more flexibility for farmers because less stringency is required with respect to the long-term impact on the atmosphere.
- Examples of green-payments: payments to demonstrated reductions in N applications or introduction of renewable energy at the farm