

EMISSION REDUCTIONS UNDER CAP-AND-TRADE PROPOSALS IN THE 111TH CONGRESS

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This analysis provides an assessment of reductions in greenhouse gas (GHG) emissions relative to total U.S. emissions that could be achieved by cap-and-trade proposals currently submitted in the 111th Congress. This assessment is an update to a previous analysis released on May 19, 2009 and includes an assessment of the substitute to H.R. 2454¹, the American Clean Energy and Security Act of 2009 (ACESA) and H.R. 1862, the Cap and Dividend Act of 2009 (CDA) sponsored by Congressman Van Hollen. To account for the effects of different components of these proposals, reduction estimates are divided into three scenarios:

- Total emission reductions under just the proposed emissions caps. This scenario is applied to both proposals considered in this analysis.
- The remaining two scenarios are applied only to the ACESA as the CDA does not contain complimentary policies:
 - Total emission reductions under the caps and all other complementary requirements, including emission performance standards for uncapped sources and required components of the supplemental reduction program through 2025.
 - A range of potential additional reductions that could be achieved through the 1.25 offset requirement for international offsets and supplemental reductions beyond 2025.

Key findings:

- The emissions caps in the ACESA and the CDA achieve reductions of 15 and 14 percent respectively relative to 2005 levels in 2020, roughly equal to 1990 levels. By 2050, the ACESA achieves reductions of 73 percent relative to 2005 levels and the CDA achieves reductions of 66 percent relative to 2005 levels.
- All of the emission reduction components contained in the recent substitute to the ACESA remain consistent with previous iterations of the proposal and in turn result in the same emission reduction estimates as have been reported previously. Specifically:
 - When all complementary requirements of the ACESA are considered in addition to the caps, GHG emissions would be reduced 28 percent relative to 2005 levels by 2020 and 75 percent relative to 2005 levels by 2050.
 - When additional potential emission reductions are considered, the ACESA could achieve maximum reductions of up to 33 percent relative to 2005 levels by 2020 and up to 81 percent relative to 2005 levels by 2050. The actual amount of reductions will depend on the quantity of international offsets used for compliance.

“Emission Reductions Under Cap-and-Trade Proposals in the 111th Congress, 2005-2050” (see page 2) graphically presents total GHG reductions achieved by H.R.1862 and H.R.2454 relative to U.S. historic and projected emissions under the three reduction scenarios. “Estimates of Total GHG Emissions and Emission Reductions Achieved by Cap-and-Trade Proposals in the 111th Congress, 2005-2050” (see page 3) presents a table of total GHG reductions by these proposals for selected years. A full description of the methods and assumptions behind this analysis can be found beginning on page 4.

¹ Released on June 22, 2009

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

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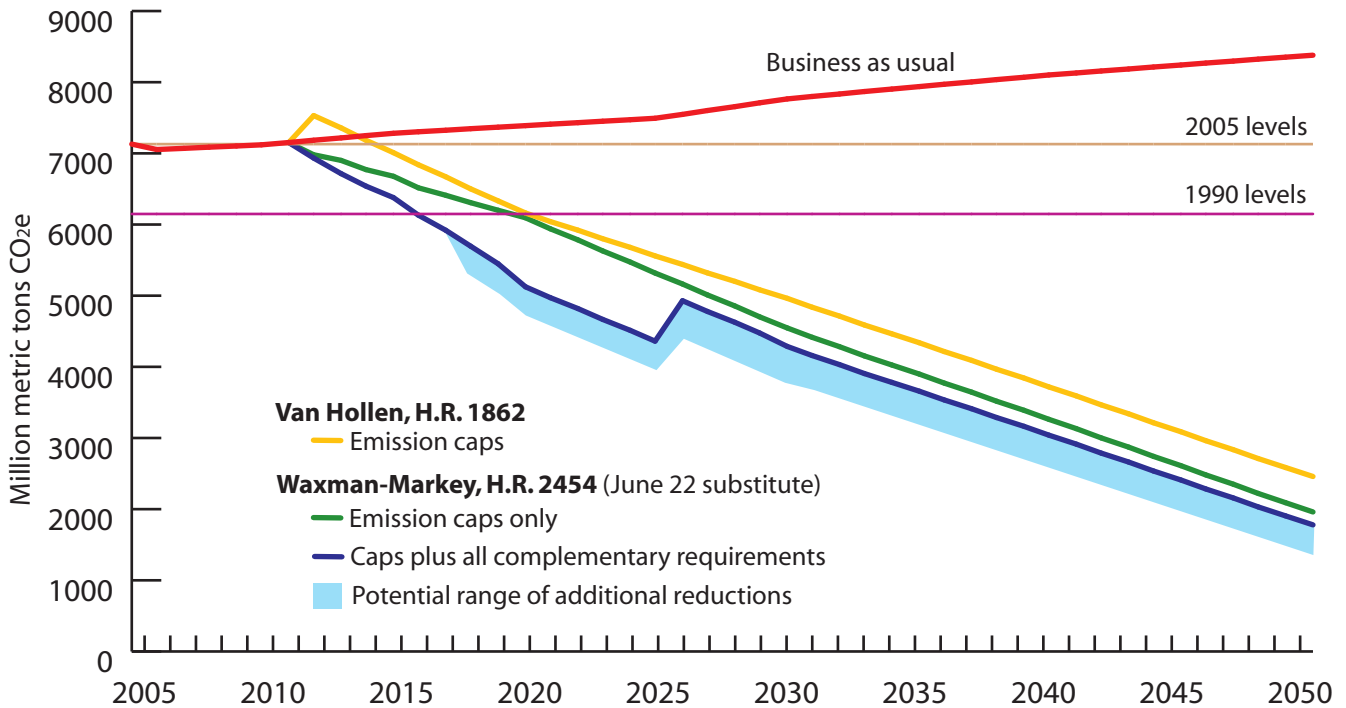


Table 1. Estimates of Total GHG Emissions and Emission Reductions Achieved by Cap-and-Trade Proposals in the 111th Congress.

Absolute Emissions (Million Metric Tons CO ₂ eq)					
	2012	2020	2030	2040	2050
Business as usual emissions	7,185	7,390	7,765	8,102	8,379
H.R.1862 emissions caps only	7,531	6,162	4,963	3,718	2,459
H.R.2454 emissions caps only	6,980	6,095	4,547	3,262	1,961
H.R.2454 caps plus all complementary requirements	6,934	5,125	4,287	3,040	1,779
H.R.2454 potential range of additional reductions	6,934	4,750	3,809	2,621	1,384
Percent change relative to 2005 emissions					
	2012	2020	2030	2040	2050
Business as usual emissions	1	4	9	14	18
H.R.1862 emissions caps only	6	-14	-30	-48	-66
H.R.2454 emissions caps only	-2	-15	-36	-54	-73
H.R.2454 caps plus all complementary requirements	-3	-28	-40	-57	-75
H.R.2454 potential range of additional reductions	-3	-33	-47	-63	-81
Percent change relative to 1990 emissions					
	2012	2020	2030	2040	2050
Business as usual emissions	17	20	26	32	36
H.R.1862 emissions caps only	22	0	-19	-40	-60
H.R.2454 emissions caps only	14	-1	-26	-47	-68
H.R.2454 caps plus all complementary requirements	13	-17	-30	-51	-71
H.R.2454 potential range of additional reductions	13	-23	-38	-57	-77

Bills analyzed include the substitute to H.R.2454 released on June 22, 2009 and the H.R. 1862 as introduced. Business as usual emission projections are from EPA's reference case for its analysis of the Waxman Markey Discussion Draft.

ASSUMPTIONS AND METHODOLOGY

Many assumptions have been made to simplify this analysis and should not be taken as statements of fact. In many situations, these assumptions highlight contentious issues which must be resolved to ensure the environmental integrity of a market-based approach to addressing the threat of climate change. WRI will update this analysis to reflect new legislation as well as new analyses of emissions or economic and technical considerations published by the Environmental Protection Agency, the Department of Energy or other relevant organizations.

This is an analysis of all cap-and-trade proposals submitted in the 111th Congress. Methods and assumptions that apply to the entire analysis are included below followed by descriptions of specific information relevant to each proposal.

For this analysis, the following general assumptions and methods apply:

- All proposals are enacted in 2009. Where annual data are unavailable, years between targets or projections are interpolated using a simple linear formula.
- Caps will impact only capped sectors.
 - Caps are calculated and applied according to the legislative language in each proposal
 - Bills that define which sectors or entities will be capped are assumed to impact only covered sectors. Estimates of emissions coverage for each proposal are generated based on legislative language and the EPA inventory. Emissions from the rest of the economy are assumed to increase at annual rates derived from the EPA's ADAGE reference case projections of the Waxman-Markey proposal as reported,
 - This analysis does not take into account potential leakage of emissions from capped sources to uncapped sources either within sectors or between sectors.
- Some complementary policies may achieve emission reductions in non-covered sectors beyond what would result from the cap. First, a scenario that considers just the emission caps without complementary policies is provided and labeled as “emission caps only.” Policies that have clear mandates for additional reductions are depicted in the solid, “caps plus all complementary requirements” scenario, while policies with less clear requirements or less certain outcomes are depicted in the “potential range of additional reductions.”
 - Complementary policies aimed at reducing emissions from capped sectors and entities, such as increased fuel economy standards or renewable electricity standards, may affect the price of emissions allowances but would not lower economy-wide GHG emissions below the mandated cap.
 - Complementary policies aimed at reducing emissions from uncapped sectors and entities, such as performance standards for landfills, are included where reasonable, robust estimates can be calculated.
 - Supplemental reduction programs funded through allowance allocations that require a specific amount of emission reduction be achieved are assumed to meet their requirements. Where no reduction requirements exist, we assume a tonne of GHG reductions is achieved for every tonne allocated.
 - Additional offset rules such as a requirement to turn in 5 offsets for every 4 tonnes of GHGs emitted are assumed to generate potential additional reductions.
- Offsets will be real, permanent and additional.
 - This representation assumes offsets represent a real reduction in total global GHG emissions. As a result, emissions under each bill are portrayed as total emissions minus offsets. If the environmental integrity of offsets is not completely real, permanent and additional then the emission reduction estimates included in this analysis would be diminished proportionately.
- Borrowing and banking will not allow increases in cumulative GHG emissions.
 - Annual emissions may stray above or below the cap, but cumulative GHG emissions over the life of the program would be the same with or without borrowing or banking.

Methodologies for Legislative Proposals

Business as Usual

Projections of total U.S. emissions under no federal action (referred to here as business as usual) are sourced from EPA's reference case projections from the ADAGE model as published in its economic analyses of H.R.2454.

Substitute to H.R.2454, Waxman-Markey American Clean Energy and Security Act 2009 (ACESA) (released June 22,2009)

Cap and coverage: The ACESA proposes the creation of two caps – one to phase down U.S. HFC consumption and another to reduce all other GHG emissions. These two caps combined represent the “emissions caps only” scenario,

- Coverage of non-HFC GHG emissions is phased in over the first 4 years of the program.
 - The initial 2012 cap, set at 4,627 million tonnes of emissions, is estimated to cover approximately 67 percent of total 2005 U.S. emissions.
 - In 2014, the cap is expanded to include most industrial emissions – increasing coverage to an estimated 78 percent of 2005 U.S. emissions.
 - In 2016, the cap is again expanded to include emissions from natural gas sold by local distribution companies – increasing coverage to an estimated 85 percent of 2005 US emissions.
 - The ACESA requires a one-time small adjustment to the size of the cap in the event that the bill's assumed estimates of coverage do not match EPA's final coverage estimates during implementation. WRI's estimates of coverage differ slightly compared to the assumptions contained in the bill and so this analysis incorporates the bill's prescribed cap adjustments.
- The HFC cap would go into effect in 2012, covering the production of specifically identified HFCs. These HFCs were responsible for approximately 2 percent of 2005 emissions.
- When combined with the HFC cap, the draft bill would cover up to 87 percent of 2005 U.S. emissions.
- The strategic reserve represents a fixed amount of reductions that will take place in addition to reductions made to meet the cap. If the strategic reserve trigger price is not reached, allowances in this reserve (2,692 million) will not be released – in effect tightening the cap. Even if the trigger price is reached, forest tonnes are used to refill the reserve. We assume that these purchases are designed to maintain a constant level of credits that are fungible with normal allowances (either allowances or forest tonnes discounted at the rate outlined in the legislation). We distribute these reductions depending on the years in which the allowances are withdrawn from the cap to fill the reserve (we do not credit the reductions until the allowance withdrawals force abatement among covered sectors). Additional reductions could occur through the forest tonne purchasing component of the reserve; these are not taken into account in this analysis.

Growth of uncovered emissions: The remaining 13 percent of U.S. emissions not covered by the caps from 2016 onward are increased in line with EPA projections of business as usual for uncovered emissions under the proposal. These annual growth rates, while varying from year to year, average -0.05 percent annually through 2050. Adjustments are made to these rates between 2012 and 2014 to account for varying degrees of emissions coverage as the cap is phased in,

Mandatory provisions: In addition to the two caps outlined above, the draft includes a variety of policies that require additional reductions from uncapped sources. The combination of these provisions and the caps represent the “caps plus all complementary requirements” scenario and include:

- Supplemental greenhouse gas reduction program: The ACESA requires the program administrator to use allowances from the cap to fund international forestry projects to achieve 720 million tonnes of additional emission reductions in 2020 and a total of 6,000 million tonnes of reductions by 2025. To distribute these reductions among individual years, we assume an acceleration of the program between 2012 and 2020 to reach the required 720 million tonnes in 2020. After 2020, we assume a leveling off of reductions to achieve the required cumulative reduction between 2012 and 2025 of 6,000 million.

- **New Source Performance Standards:** The proposal phases in industrial performance standards between 2012 and 2019. EPA is instructed to cover 95 percent of total industrial emissions (including industrial process and F-gas emissions) with a combination of the cap and performance standards. WRI estimates that 84 percent of these emissions are covered under the cap leaving 11 percent subject to standards. Since the structure of these standards is to be designed by the administrator, it is unknown precisely how much mitigation the standards would achieve. This analysis assumes emissions subject to performance standards are reduced by 50 percent and then held constant from the effective year onward. Performance standards for other uncapped sources are assumed to achieve additional reductions of approximately 115 million tonnes CO₂e derived from estimates conducted by the EPA. These regulations are assumed to take effect in 2013. This estimate may be conservative as it does not take into account improvements in technology over time.
- The vast majority of mandatory energy efficiency programs would further regulate capped sectors and thus not achieve additional reductions. However, some programs such as residential home efficiency standards would achieve reductions in natural gas consumption and resulting GHG emissions prior to the inclusion of residential natural gas usage in the cap in 2016. Due to a lack of data, these reductions were not quantified. Based on our analysis of the natural gas savings due to the EERS included in the Waxman-Markey Discussion Draft we are fairly certain that emission reductions achieved by HR 2454 prior to 2016 would be negligible – roughly 10 million tonnes on average annually from 2012 through 2015.

Potential range of additional reductions: The lower bound of the range represents the “range of potential additional reductions” scenario and incorporates additional emission reductions that may be achieved through the implementation of the proposal, but are not mandated. Such policies include:

- **1.25 offset requirement for international offsets:** The ACESA requires 1.25 international offsets to be submitted for compliance for every tonne of regulated emissions beginning in 2018. This requirement would yield additional reductions contingent on the number offsets used. In addition, under certain circumstances the international offset limit may be increased from 1 billion tonnes to up to 1.5 billion tonnes. This extends the maximum potential emission reductions of the 1.25 offset requirement if this limit is expanded. A range of additional emission reductions in uncovered international emissions are included in this analysis to represent this provision. The range starts at zero and increases to 375 million tonnes per year.
- **Supplemental greenhouse gas reduction program:** After 2025, the explicit reduction requirements as well as the authority to increase the amount of allocations dedicated to the program are dropped from the supplemental GHG reduction program. After this date, we assume that each tonne allocated has the potential to generate up to one tonne of forest reductions.

H.R.1862, Van Hollen, Cap and Dividend Act of 2009 (CDA)

Caps and coverage: The cap is applied to all entities that make the first sale of fossil fuel into the U.S. economy based on the emissions that will occur after that fuel is combusted. WRI calculates total emissions coverage to equal 81 percent of total U.S. emissions in 2005 or roughly 5,687 million tonnes.

- The emissions cap is set in 2012 to equal total CO₂ emissions in 2005. This is a greater amount than covered emissions due to the fact that only CO₂ emissions from fossil fuel combustion (as opposed to CO₂ emissions from all sources such as industrial processes) are covered. Therefore, the cap is set at roughly 6,074 million tonnes in 2012. The cap is reduced at the schedule specified in the legislative language resulting in 2050 emissions limits of 911 million tonnes.
- Note that our analysis shows total U.S. emissions to be above business as usual in the early years of this proposal. This is a result of the analytical assumption that no allowance banking takes place. In reality, entities would bank these excess allowances and use them for compliance in future years thus actual emissions would be below business as usual in 2012.

Growth of uncovered emissions: The remaining 19 percent of U.S. emissions not covered by the cap are increased in line with EPA projections of business as usual for all non-fossil fuel GHG emissions. These annual growth rates, while varying from year to year, average 0.3 percent annually through 2050.

Other complementary policies: The CDA does include any additional complementary policies that may affect GHG emissions.

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