

# House and Senate Both Consider Climate Change Legislation; How Would Cap and Trade Actually Work?

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Writing an article on proposed climate change legislation is tricky, since the landscape can change dramatically between submission and publication. But the actual cap and trade mechanism in all of the proposals that Congress is considering has remained surprisingly consistent, but for the most part the details have been ignored. This article will attempt to give a basic understanding of what Congress actually means by "cap and trade" and why this is critical to understanding the debate.

The American Clean Energy and Security Act (originally called the Waxman/Markey Bill after its main sponsors), H.R. 2454, was passed by the House on June 26, 2009. The Clean Energy Jobs and American Power Act, S. 1733, has been proposed by Senators Boxer and Kerry. (For convenience, I will refer to them as either the House or Senate Bills, or collectively as the "Climate Bills" or "Bills"). The Senate Committee on Environment and Public Works, which is chaired by Senator Boxer, held hearings and markups of S. 1733 at the end of October and the beginning of November. On November 5, 2009, Senate Environment voted to report out S. 1733 with an amendment in the nature of a substitute. No further action has been taken on the Climate Bills and recent comments by Senate Majority Leader Reid and Senator Boxer indicate Senate floor action will occur in 2010.

Each of the Bills consists of hundreds of pages of provisions dealing with energy, climate change, and countless other related and unrelated topics. Both Climate Bills set forth requirements for increased utilization of renewable electricity generation, increased energy efficiency, increased use of biofuels, and other energy related provisions, and even deal with "naked credit default swaps." However, the main focus of both Climate Bills is to combat climate change by reducing future emissions of carbon dioxide and its equivalents into the atmosphere. Both Bills do this by creating similar "cap and trade" systems. Interestingly, it is difficult to find any summary or discussion of how the cap and trade system would actually work. There is a tremendous amount of discussion on the allocation of allowances and who will bear the costs of reducing carbon, on forest and farming offsets, on jobs moving overseas because industry will not be able to compete if an allowance system is imposed, and on the risks of derivatives and speculation by financial players, but much of the debate suffers from the lack of a basic understanding of how carbon cap and trade will work. This article will focus on these proposed cap and trade provisions, and will also include some benchmark price impacts that may allow for more enlightened discussion.

*Establishing the "Cap": Setting the Level of Allowed Emissions*

The Climate Bills establish a "baseline" for carbon emissions at 2005 levels, and both require that there be an 83-percent reduction in carbon emissions by 2050 based on this 2005 baseline. Both Bills require that reductions begin in 2012, with the House Bill phasing in compliance over several years. The Bills differ in the level of reductions that would be required by 2020, with the Senate Bill being more stringent. Each would allow a specific number of tons of carbon to be emitted each year beginning in 2012 (the "cap"), and the cap is reduced each year, such that under the House Bill, for example, it is reduced by 17 percent of 2005 emissions in 2020, and under the Senate Bill by 20 percent. Thereafter, both Climate Bills further gradually reduce emissions to 83 percent of 2005 emissions by 2050.

The Bills create the concept of "allowances," and create one allowance for each ton of carbon allowed to be emitted under the cap. Since the cap is reduced each year, the number of allowances available each year also goes down.

In simple terms, under a cap system each regulated source must obtain one allowance for every ton of carbon emitted. A covered entity must demonstrate that it is in compliance by April 1 of each year after 2012.<sup>1</sup> In other words, on April 1 of each year, every emission source will have to show that it has acquired one emission allowance for each ton of carbon dioxide actually emitted, or it will be penalized for every ton of emissions released that is not covered by an allowance.

It is important to note that there is no new permit limit imposed on emissions from any particular source. There is no new permit "cap" on an individual source based on 2005 levels. The cap is on the nation as a whole, and it requires that every "covered source" obtain one allowance for each ton of carbon dioxide emitted, regardless of whether the amount is more or less than what might have been emitted by that source in a prior year.

*Affected Industries and Sources: Who is Covered?*

A "covered source" is any emission source emitting 25,000 tons of carbon dioxide per year or more. The Climate Bills have a much broader focus than the Northeast's current Regional Greenhouse Gas Initiative which focuses only on larger power plants.<sup>2</sup> The Climate Bills impact all major sources of carbon, including commercial and industrial facilities, all activities combusting gas and coal, and include heating and transportation uses. However, not all combustion units need to acquire allowances directly.

While the Climate Bills provide generally that all sources emitting in excess of 25,000 tons of carbon dioxide per year must comply with the cap requirements, how this effects any particular facility varies tremendously based on several other provisions of the Bills. For instance, while the Bills require that a coal fired plant acquire one allowance for each ton of carbon dioxide emitted, for oil, the obligation to acquire allowances is imposed at the oil refinery or importer level, not on the individual unit

that burns oil. Natural gas burning units have to acquire allowances if they generate in excess of 25,000 tons of carbon dioxide, while a local gas distribution company has to acquire allowances for its customers, but can carve out units emitting over 25,000 tons (which have to acquire their own allowances).

#### *Effects of Allowance Requirements on Various Sources of Emissions*

The Climate Bills impose requirements on all major sources of carbon dioxide and other global warming compounds or processes. The three main sources, oil, natural gas and coal, will be discussed in this article, since these most directly impact most people.

#### *Effects of Allowance Requirements on Oil Producers*

As stated above, oil combusting units, be they electric power plants, oil furnaces, or automobiles, do not need to acquire allowances for each ton of carbon produced when the oil fuel is combusted. Instead, allowances must be acquired by the refinery or importer of refined oil products. The Environmental Protection Agency (EPA) will determine the volume of carbon dioxide that will be emitted when the fuel is ultimately consumed (i.e. combusted), and one allowance must be acquired by the oil refinery or importer for each projected ton of emissions.<sup>3</sup> Since every producer will have to add the same percentage of allowances, the price can likely be passed on to consumers, and this part of "cap and trade" will act much as a variable tax. The cost of some fraction of an allowance will be added to the ultimate price a consumer or power plant pays for each gallon of gasoline or each barrel of oil. In this way, the "allowance" is already embedded into the gallon of gasoline used to power an automobile, and individual automobile drivers do not need to acquire allowances. In the same way, a power plant burning oil will not need to acquire allowances for the carbon emitted when that oil is combusted, and a homeowner buying heating oil will already have the allowance "embedded" in the price paid. Therefore, for this major group of carbon emitters, be they automobiles, oil heating systems, or oil power plants, the workings of the cap and trade system will be invisible, except for an increase in the price of gasoline or oil.

#### *Effects of Allowance Requirements on Coal and Natural Gas Sources of Emissions*

Power plants that burn coal or natural gas instead of oil, or boilers at factories powered by coal or gas, will have to acquire one allowance for each ton of carbon dioxide emitted. Facilities that burn both oil and coal will have to acquire allowances only for the coal combusted, and not for the oil, since the price of oil already will have the allowance acquired at the refinery level embedded in it.

Large natural gas facilities (be they electric generating plants or heating or processing units) emitting in excess of 25,000 tons will have to acquire allowances individually. In other words, for each ton of carbon emitted, a corresponding allowance must be obtained by the natural gas burning unit.

However, natural gas distribution companies (i.e., your local gas utility) are handled in a slightly different manner. These utilities supply natural gas to both large and small users. Since large users of natural gas (gas power plants or boilers which emit more than 25,000 tons per year) already have to acquire allowances on their own, it would be unfair to require the natural gas distribution companies to require any additional allowance on account of these large users. However, it would also be unfair for oil heat consumers and electric heat consumers to have the price of an allowance already included in their fuel cost, while natural gas customers avoided this increased cost. Therefore, to avoid this unbalanced result, the gas distribution company will first have to figure how much gas is going to facilities which have to purchase allowances on their own account (large industrial boilers and electric generation facilities over the 25,000 ton threshold) and how much of the gas they deliver is going to customers who are below the 25,000 ton per year threshold. The gas utility then must acquire allowances equal to the carbon content of the fuel delivered to end users who do not, on their own, have to acquire allowances, and the utility will pass that cost through to its customers. In other words, if you heat your home with gas, the cost of an allowance will be embedded in the price you pay in the same manner as customers using oil heat, as discussed above.

If you heat your home with electricity, the cost of carbon allowances will also be embedded in the cost of the electricity generated since the power plant has to acquire allowances to offset emissions. However, if the source of the power is a generation unit that produces few or no carbon emissions (such as nuclear or renewable), the price of that electricity should be relatively cheaper than sources of electricity that emit higher amounts of carbon. Hence, there should be an economic incentive to shift to less-carbon-intensive fuels, which is the whole point of imposing this cap and trade system.<sup>4</sup>

The Climate Bills also set up various allowance acquisition requirements for facilities emitting other types of carbon sources, such as factories that produce or emit other chemicals that cause global warming, since other compounds emitted can have even greater impacts on the climate than carbon dioxide.

#### *Establishing the "Trade" System: The Process to Acquire Allowances*

Most users of carbon based fuels will have to acquire allowances covering their emissions, or will have the price of allowances embedded in the cost of fuel because someone "higher up" on the value chain had to acquire an allowance. But where do those companies buy allowances? The answer is either that the government gives them away, or they must buy them from the government at auction, or they must buy from someone who does not use all of the allowances that the government has given to them.<sup>5</sup>

One of the big controversies in the Climate Bills involves the distribution of the initial allowances during the first years of the program. Proposals being considered range from auctioning all allowances, so that any carbon emitter would have to pay the full cost of these allowances (and presumably pass the added cost on to consumers), to

various proposals that give the allowances to emitters free of charge (with the hope of cushioning the economic impacts).

The House Climate Bill allocates 100 percent of the allowances in the first years to various groups, primarily with the goal of cushioning impacts on either industries or consumers. While in some ways, "cushioning the impacts to consumers" could negate the economic incentive to change behavior, the House Bill attempts to distribute these allowances in a way that does not have that end result. For example, while initially 44 percent of the allowances are given to electric distribution companies that are then directed to utilize the allowances to reduce consumer impacts, the House Bill requires that the reduction in costs to consumers be done in a way that reduces a fixed portion of the customer's bill, rather than a portion of the bill which is based on the amount of electricity used. In other words, most electric rate structures include a fixed fee each month (usually small) and a separate charge per kilowatt hour consumed. The result of the House Bill's provision is that every consumer should receive a uniform reduction or rebate in the fixed fee portion, while the per-kilowatt fee portion will increase by roughly an equal amount. Therefore, consumers, "on average," will be made whole, but consumers who can reduce their usage will benefit more than consumers who do not reduce their usage. Put more simply, conservation and efficiency will be incentivized.

However, other allowances are proposed to simply be given to adversely impacted industries, such as coal and oil producers, and other allowances are given as rewards to industries the Congress desires to benefit. This method of allocation could grant a windfall to those given these allowances. As demonstrated by the cap and trade systems established by the Kyoto Protocol and Regional Greenhouse Gas Initiative, the distribution of the initial allowances is a hotly debated issue, and yet is a critical aspect to developing an effective program that achieves a balance between unfairly crippling affected industries and incentivizing conservation and efficiency.

Another source of allowances will be new allowances created through the development of offset projects. Offsets are reductions in carbon emissions that occur outside of the regulatory framework. New allowances can be created if carbon that would otherwise be emitted (from a landfill, for example) is captured. These projects must be proven and certified and the allowances created are, for the most part, identical to allowances created under the cap. Offset allowances cost money to produce, but they are seen as a cost reducing mechanism that gives companies an alternative method of compliance when emissions cannot be reduced.

Once the government either issues or auctions the available allowances in any year, those allowances, along with any offset allowances created, can be either "traded" or used for direct compliance. Entities that need to demonstrate compliance each year will need to acquire sufficient allowances by buying (or trading) allowances from entities that do not need all of their allowances. Initially, it is likely to be the electric distribution companies that have excess allowances to sell.

Exchanges or brokers will handle most allowance transactions. A significant concern centers around the dollar value of these allowances and whether market manipulation will be a problem. Rules are being developed to control any such manipulation or speculation.

### *A Look at Potential Cost Impacts*

The Climate Bills also establish a minimum price for allowances, starting at \$10 per ton in the House Bill, escalating both by inflation and by a fixed percentage. The Senate Bill sets the minimum at \$11, and also initially establishes a maximum of \$28 per ton.

To get a flavor of the projected costs of a cap and trade system, the following calculations are presented (and assume a \$10 per ton carbon allowance):

- One gallon of gasoline produces approximately 20 pounds of carbon, which equates to one-hundredth of a ton. Therefore, a \$10 per ton carbon allowance added to the cost of gallon of gasoline will equate approximately to an increase of 10 cents to the cost of that gallon of gasoline.
- An average coal electric generating facility produces approximately 2 pounds of carbon for every kilowatt hour of electricity produced. An average home in the United States uses approximately 1,000 kilowatt hours of electricity per month, which would equate to approximately 2,000 pounds of carbon emitted if a coal-fired plant produces the electricity, or one ton per month. Therefore, the electric bill for a home using 1,000 kW/hr powered solely by electricity from coal power plants would pay approximately \$10 more per month. (Since no utility is likely to provide power solely from coal generation, the actual cost will never be this high.)
- A wind turbine or a nuclear plant does not produce carbon emissions and therefore would not have to buy any carbon allowances. If coal plants now have to acquire allowances and wind and nuclear facilities do not, wind turbines and nuclear plants will be able to sell more electricity while coal plants sell less, and overall carbon emissions will be reduced.

### *Some Topics to Consider*

- Both Bills attempt to relieve potential economic impacts by giving away allowances to various industries. However, the unspoken purpose of the Climate Bills is to increase costs of carbon intensive fuels and therefore, giving allowances to carbon intensive industries negates this purpose. However, if the purpose of a climate bill in the early years is simply to get consumers and industry used to the idea of a carbon cap and trade system, then this proposal may make sense.
- Attempting to cushion economic impacts should be done in a way that still incentivizes the shift toward less carbon intensive fuels. The Climate Bill passed by the House takes a step toward this goal when it allocates allowances to electric utilities but requires that they be passed on to consumers by some mechanism other than usage. In other words, if the price of electricity goes up by a certain amount per kilowatt, but the total price increase is returned to consumers so that

each consuming unit gets the same amount, consumers as a group are not significantly impacted. However, in reality, since the price of an individual unit of electricity has increased in cost, those consumers who use proportionately less electricity will be better off than those who use more.

- Certain industries are clamoring for their "share" of allowances. For example, oil refineries are arguing that they will be hurt unless more allowances are provided to them. However, they try to confuse the issue by arguing that they are responsible for approximately 40 percent of carbon emissions (since they have to buy one-hundredth of an allowance for each gallon of gasoline produced) and therefore, have to pay for 40 percent of the allowances. Because they are only allocated 2.5 percent of allowances under the House Bill, refineries are implying that they are subject to an unfair economic burden. But since every gallon of gasoline sold will have the same one-hundredth of an allowance embedded in the ultimate price, no particular oil refinery will be discriminately impacted. In other words, since all oil products in the United States will have to acquire the same level of allowances, there is no more justification to saying that the oil industry will be "hurt" by this system, than to say that they are unfairly hurt if a 10-cent-per-gallon increase in the gasoline tax were imposed. In fact, requiring that the refinery acquire one-hundredth of an allowance for each gallon of gasoline is no different than adding a tax of 10 cents to each gallon. The only difference is that the level of the "tax" is set by the market, not regulators, and varies with the cost (and scarcity) of allowances. Yes, the oil industry might be hurt if people began using less oil, but this is not a particularly good reason to subsidize the oil industry, since a primary goal of the Climate Bills are to reduce our dependence on oil.<sup>6</sup> Oil refineries do produce their own carbon emissions in the refining process, accounting for about 4 percent of the nation's total carbon emissions, and these will have to be offset by the acquisition of allowances. However, the oil refineries are already proposed to be allocated 2.5 percent of free allowances under the House Bill to help ease this burden, and will have to become proportionately more efficient or purchase additional allowances. This is the "burden" on oil refineries, but it is the same that all industrial sources will face. The fact that they have to include a fraction of an allowance in each gallon will not be their "burden," since it will just be passed on to consumers.

### *Summary*

With the passage of the American Clean Energy and Security Act by the House and the Clean Energy Jobs and American Power Act by Senate Environment, legislators in the United States seem to be on board with the idea that global warming requires a national response; however, the likelihood of passage of a climate bill this year appears to be dimming. The EPA is beginning the process to adopt regulations on various sources using its authority under the Clean Air Act as a second best alternative, but such an approach would result in increased regulatory uncertainty for American businesses, and would likely result in years of litigation. However, it also could be the impetus for industry to push for something more like what is being proposed. All that is certain is that the debate will be fierce and the stakes will be high. Senate floor action on cap and trade legislation is not expected until next year.

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<sup>1</sup> Certain entities, namely stationary industrial sources and natural gas distribution companies, have an additional two years to comply with these requirements under the House Bill.

<sup>2</sup> More information on the Regional Greenhouse Gas Initiative can be found by visiting <http://www.rggi.org>.

<sup>3</sup> This is not a difficult formula, and is based on the molecular weight of the fuel and the number of carbons atoms. For example, a gallon of gasoline produces around 20 pounds of carbon dioxide when combusted and so, every 100 gallons of gasoline must have one carbon allowance "embedded" in it. (In other words, the refinery will have to acquire one allowance for every 100 gallons of gasoline produced.)

<sup>4</sup> But note that, if an electric distribution company is simply passing on the costs of power, and there is little ability for the end user to switch suppliers (i.e., if the utility is a monopoly) or if the electric utility is not allowed to make a profit on the quantity of electricity sold, the utility may be indifferent to the level of costs being passed through.

<sup>5</sup> Another way to get allowances is to undertake some sort of "offset" project, which is a project sanctioned by the government which reduces the amount of carbon emitted into the atmosphere from sources which otherwise do not have to restrict carbon emissions. Offsets are a huge potential additional "market" and offer an alternative way of complying with part of the requirement to match emissions with allowances. However, verification and certification of offsets will be its own complicated and controversial process, which in many ways will dwarf the complexity of the allowance market.

<sup>6</sup> In fact, Saudi Arabia is apparently arguing that they should be given financial help because they will be hurt if people stop using so much oil!