WRI ISSUE BRIEF

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Keeping the Lights on in the State Laboratory:

Enabling U.S. States to Achieve Greenhouse Gas Emissions Reductions through Retirement of Federal Cap-and-Trade Allowances

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Executive Summary

In the United States, state governments have been leaders in addressing climate change through a wide range of energy, environmental, land use and transportation policies. As the United States Congress moves closer to enacting federal cap-and-trade legislation for greenhouse gases, lawmakers should carefully consider how to preserve robust state action. If states are to continue to innovate and achieve reductions in emissions from capped entities after a federal cap-and-trade program is implemented, such state action will need to be accounted for within the federal program. In practical terms, this will require retiring federal greenhouse gas emission allowances, rendering them ineligible for trading or future use, to reflect state-achieved reductions. If allowances are not retired to reflect these emission reductions, then state actions would merely free up allowances for sale in another state, resulting in no net environmental benefit from state actions.[1] This dynamic, depicted in Figure 1, is sometimes referred to as emissions "leakage."

I. Evaluating Options for Effective Retirement of Allowances

Policymakers can employ a number of approaches to allow states to contribute to real greenhouse gas reductions—reductions that result in a net decrease in emissions. Each approach provides a different balance of potential allowance price impact, impact on the value of federal allowance pools and pools allocated to non-acting states, administrative ease, and likelihood of being used. In formulating options, three primary questions must be asked:

- Where do allowances come from?
- How does supply and demand of allowances relate to their price?
- How do changes in allowance price affect the value of allowance pools?

This brief examines these questions. It then evaluates the following five approaches to account for state-achieved reductions and address the state-to-state "leakage" problem under a federal cap-and-trade program:

1. If states are allocated greenhouse gas emission allowances, then let states retire these allowances at their discretion.
2. Provide for the retirement of allowances from federal allowance pools, perhaps through a set-aside, upon a demonstration by the state that it has achieved reductions beyond those achieved by the federal cap-and-trade program.
3. Combine the above two options.
4. Allow states to require regulated entities to surrender additional allowances for each ton of emissions (e.g., each 1 ton of emissions would require the submission of 1 allowance to the federal government, and 0.1 allowance to the state).
5. Allow states to require regulated entities to surrender additional offsets for each ton of emissions (e.g., each 1 ton of emissions would require the submissions of 1 allowance to the federal government, and 0.1 offset to the state).

Our findings are summarized in Table 1.

BOX 1 Key Terms Defined

Allowance – A government-issued limited authorization for a regulated entity to emit up to one ton of carbon dioxide equivalent emissions. Allowances are issued up to the total number of tons allowed by the mandatory emissions cap.

Allowance price – The price of an allowance as established by market forces—a function of supply and demand.

Allowance value – The total value of allowances, calculated as the product of the number of allowances and the allowance price.

Federal allowance pool – All allowances not allocated to states. These allowances can be used for any number of programs, including allocation to regulated entities.

State allowance pool – Allowances allocated to states to use at their discretion.

State-achieved reduction – A reduction resulting from a state action that is beyond the reduction achieved by the federal cap-and-trade program alone.

Leakage – When emission reductions in one state free up allowances from under the federal emissions cap, allowing for increased emissions in another, non-acting state.

Retirement – The process by which an allowance is permanently rendered ineligible for trading or future use.

Offset – A government-issued limited authorization for a regulated entity to emit up to one ton of carbon dioxide equivalent emissions, awarded in exchange for projects that reduce or sequester emissions of greenhouse gases in uncapped sectors (i.e., sectors that do not need to submit allowances under the cap-and-trade program).

Program cost – The impact on the value of state or federal allowance pools, calculated as the product of the changes in allowance price and the size of the allowance pool.

Real emission reduction – An actual net reduction in greenhouse gas emissions. A reduction is not real if it is compromised through leakage.

II. Toward a State-Federal Climate Partnership: Concerns and Approaches

States have played an early and important role in reducing greenhouse gas emissions in the United States.[2] Given the scale of the climate challenge, this role should continue alongside federal action. President Obama and congressional leaders have pledged to work closely with states as partners in the long-term effort to tackle climate change.[3] These pledges rest on the recognition that states have long contributed to advancing environmental issues, both before and after the federal government has acted on an issue.[4] States can be important partners in policy when they innovate and develop different approaches to problem-solving and adapt federal mandates to local circumstances. In the climate arena, states can continue their critical role by reducing emissions beyond the reductions achieved by the federal government. But these additional reductions will not occur unless the federal cap-and-trade program provides a method for protecting state reductions. This means removing emission allowances from the system to reflect state-achieved reductions (see Figure 1).

The public debate around this issue reveals the inherent tensions in crafting a state-federal partnership that allows the actions of an individual state to reduce the number of federal allowances in circulation. On one hand, officials from progressive states and environmental advocacy groups want to ensure that states can retire emission allowances to speed emission

FIGURE 1 Key Preventing Leakage Through Retirement of Federal Allowances

In the absence of a state retirement provision in federal legislation, any state-level policies that are aimed at reducing emissions at sources covered by the federal cap simply free up federal allowances to be "burned" in other states. Such leakage is illustrated in the following example:

Assume a federal cap-and-trade program covers power plants and other sectors in all states. If the federal cap is 100 tons of greenhouse gases, the total number of allowances in circulation is 100. If state X implements a policy—any policy—to reduce emissions at power plant A by 5 tons, emissions at plant A will decrease by 5 tons, but the total number of allowances available nationwide remains 100. This means that the allowances no longer needed by plant A are simply available to other emissions sources, such as plant B in state Y. If, however, the program calls for the retirement of 5 allowances to reflect the state-achieved 5-ton reduction, then the integrity of the emissions reduction at plant A is assured, and the state-achieved reduction is real.

TABLE 1 Summary of Options to Account for State-Achieved Emission Reductions

	OPTION 1. State Retires From Its Own Pool of Allowances	OPTION 2. Retirement From Federal Allowance Pool Upon Demonstration That Reductions are Beyond Those Achieved by Federal Program	OPTION 3. Combination of State and Federal Allowance Retirement Pools (Options 1 & 2)	OPTION 4. State Requires Surrender of Additional Allowances by Regulated Entities	OPTION 5. State Requires Surrender of Additional Offsets by Regulated Entities
Likelihood States Will Implement	Low	High	See Options 1 & 2	Moderate	Moderate
Impact on Allowance Prices	May increase if retirements do not correspond with actual reductions	No impact	May increase if retirements from state pools do not correspond with actual reductions	May increase or decrease	May increase or decrease
Impact on Value of Allowance Pools for Non-Acting States and Federal Allowance Pools	Value may increase or remain constant	No impact on non-acting states. Federal pools will decrease	Depends on relative mix of Options 1 & 2	May increase or decrease	May increase or decrease
Administrative Burden	Low	High unless pre-approved list of eligible state reductions is developed	Mixed, see Options 1 & 2	Low	Low

reductions and to preserve the states' ability to innovate with new policy mechanisms. On the other hand, businesses and some other state officials are concerned about the potential impacts of allowing an individual state to affect the supply of allowances, mostly out of fear of increasing allowance prices nationwide. Some state officials counter by noting that state decisions to site high-emitting sources, such as a new coal power plant, also impose costs on other states by increasing demand for allowances.[5]

One often-cited concern is that retiring federal allowances to account for state-achieved reductions will raise federal allowance prices by decreasing the supply of allowances. However, a retirement provision can be designed to avoid this result. First, state-achieved reductions would need to be distinguished from reductions the federal program would have achieved in the absence of state action. Second, the retirement provision would need to cover only state-achieved reductions. If this were done, the supply of allowances would be reduced precisely by the decrease in demand for the allowances, resulting in no upward pressure on prices.

State-achieved emissions reductions through energy efficiency investments provide a clear example of such an approach. When a state invests in end-use electricity efficiency, the amount of electricity consumed in the state decreases along with the emissions from power plants serving the state's electricity consumers. If one assumes that reductions through end-use energy efficiency are not likely to be achieved through a price signal alone, then it is fair to conclude that the state has achieved emissions reductions that would not have occurred by virtue of the federal price on greenhouse gas emissions. If federal allowances are retired to account for these incremental reductions from the state energy efficiency program, then federal allowance prices will not increase. This is because the state-achieved reductions have simultaneously reduced demand for federal allowances.

As this example demonstrates, policymakers can employ a number of approaches to allow states to contribute to real greenhouse gas reductions. Choosing among these options is a challenge for lawmakers working on a federal climate bill. Each provides a different balance of price impact, cost impacts, administrative ease, and the likelihood of being adopted. In formulating options, policymakers should seek answers to three primary questions:

- Where do allowances come from?
- How does supply and demand of allowances relate to their price?
- How do changes in allowance price affect the value of allowance pools?

Section III explores these key questions for policymakers. Section IV then outlines several options for accounting for state-achieved reductions. It evaluates their impact on allowance price and the value of state and federal allowance pools (the program cost[6]), and considers their relative administrative burden and likelihood of employment.

III. Key Considerations for Policymakers

Where Do Allowances Come From?

A federal cap and trade program is likely to reserve some number of allowances for federal programs, such as worker transition and research and development of low carbon technologies, and may allocate allowances to regulated entities (instead of leaving that role to states). It may also allocate some number of allowances to states to support climate-related programs or for allocation to in-state regulated entities. Allowances could be retired from either state allowance pools (Option 1 in Section IV) or federal allowance pools (Option 2 in Section IV) to account for state reductions.

Because allowances have value that can be realized through allocation or auction, states are likely to see any retirement of their own allowances as a forfeiture of value they could direct towards their state interests. These could include energy efficiency programs, research and development, electricity and natural gas consumer rate relief, or cost compensation to regulated industries through allowance allocation. However, the disincentives for state-level retirement are avoided if the retired allowances come from federal allowance pools. This could occur through the establishment of a set-aside, or by reducing the number of allowances auctioned.

Alternatively, states could simply require capped entities to turn in additional allowances (Option 4 in Section IV) or additional offsets (Option 5 in Section IV) at the end of a control period, when they demonstrate compliance with state and federal emission requirements. For example, a source could be required to submit 1 ton of allowances for every ton of emissions to demonstrate compliance with the federal program, and 0.1 allowances for every ton of emissions to demonstrate compliance with the state program. This approach does not reduce the number of allowances in state or federal allowance pools.

What Affects Allowance Prices?

As with any commodity, the price of allowances is tied to the balance of supply and demand. Therefore, decreases in allowance supply without commensurate reductions in demand will lead to price increases, and reductions in demand for allowances without reductions in supply will lead to allowance price decreases. It also follows that equal reductions in supply and demand will hold prices constant. This relationship is depicted in Box 2.

The supply of allowances can be reduced through retirement of allowances to reflect state-achieved reductions. State policies also have the ability to reduce out-of-stack emissions beyond what would have been achieved by the federal program alone. This, in turn, reduces demand for allowances. Linking the number of allowances that are retired to the actual reductions achieved by the state program will leave allowance prices relatively unaffected since both supply and demand will decrease in equal proportion.

How Does Price Relate to the Value of Allowance Pools?

Allowances have value that can be realized through auction, or by allocation to regulated entities or institutions who subsequently sell off those allowances. The total value of those allowance pools is simply the product of allowance price times the number of allowances. The value of these pools will therefore change when the number of allowances changes, and may increase or decrease as allowance price increases or decreases. This means that while increased prices will lead to increased compliance costs, they can also lead to increases in the value of allowance pools so long as the number of allowances they contain does not substantially decrease.

TABLE 2 Allowance Retirement Options Included in Recent Federal Cap-and-Trade Proposals[7,8,9]

Provision	McCain-Lieberman	Lieberman-Warner	Waxman-Markey
State Retires From Its Own Pool of Allowances	✗[1]	✓	✗[2]
Allowances are Retired From Federal Pool on Showing by State That Reductions Exceed Those achieved by Federal Program	✗	✗	✗
State Requires Surrender of Additional Allowances by Regulated Entities	✓	✓	✓
State Requires Surrender of Additional Offsets by Regulated Entities	✓	✓	✓

1. Proposal did not provide for state allocations.
2. Allocations to states are conditional on states using those allowances for designated purposes.

BOX 2 Allowance Price Impacts from Changes in Supply and Demand of Allowances

Figures A, B, and C depict price impacts in response to various changes in the allowance supply and demand. The initial supply of allowances is represented in Figures A, B, and C by the vertical line AB[1]. Retirement of allowances decreases the total number of allowances, and thus shifts the line to the left (line EF). Initial demand is indicated by a declining line (CD) as higher allowance prices would cause regulated entities to pursue more abatement policies and purchase fewer allowances. Reduction in demand caused by the response of capped entities to state policies in Figure B and Figure C is depicted by line GH. Allowance price (P) is equal to the point where the supply and demand lines intersect.

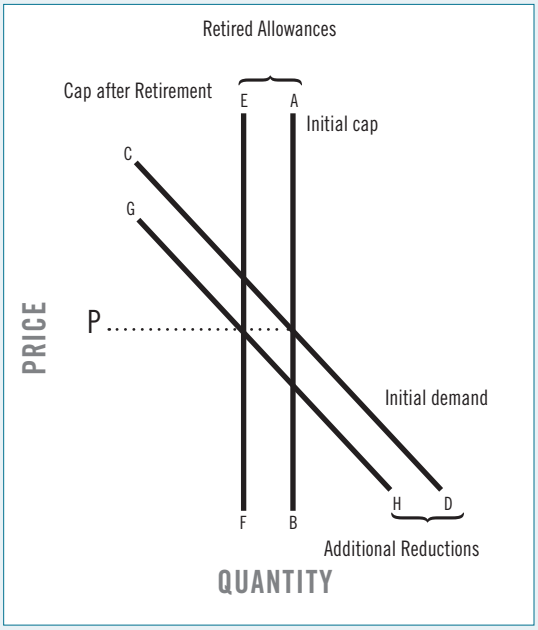

FIGURE B

Allowance Prices Remain Constant When Allowance Retirement is Accompanied by an Equal Level of Emissions Reductions Beyond Those Obtained by the Cap.

The distance between lines AB and EF are equal to the distance between lines CD and GH. Therefore, price remains constant.

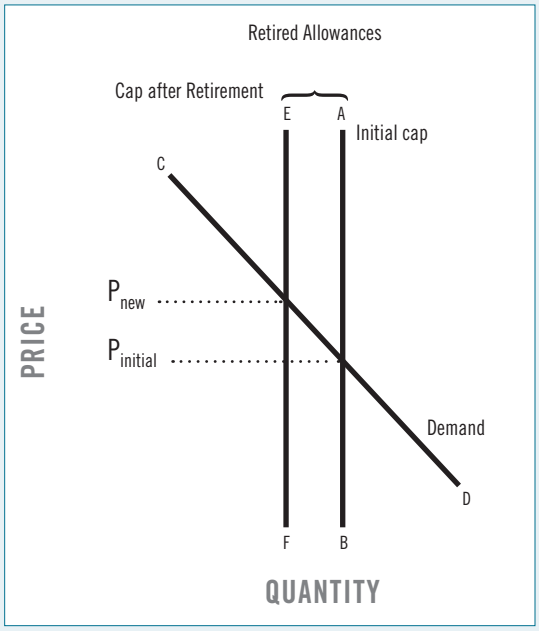

FIGURE A

Price Increases From Retiring Allowances Without Obtaining Emissions Reductions Beyond Those Obtained by the Federal Cap.

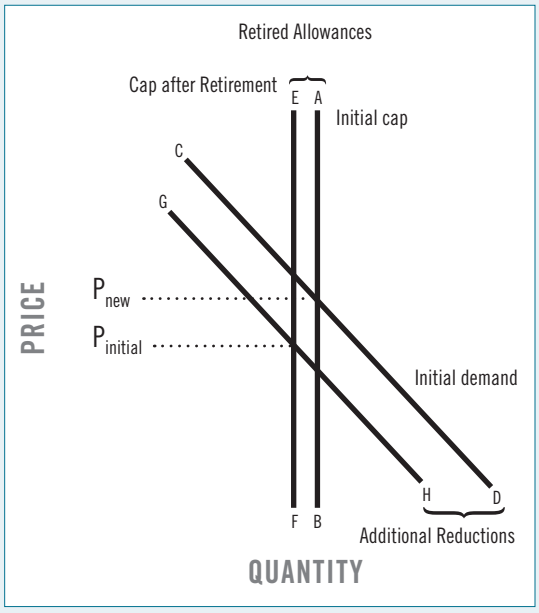

FIGURE C

Allowance Prices Decrease if the Emissions Reductions Produced by the Program Exceed the Allowances Retired Pursuant to State Policies. The distance between lines AB and EF is less than the distance between lines CD and GH. Therefore, price decreases.

Note

1. The allowance supply curve is equal to the cap. Price will not change unless the number of allowances available changes. The number of allowances can change if additional allowances are brought into the system through cost containment mechanisms (such as the cost containment pool employed in H.R. 2454: American Clean Energy and Security Act of 2009), or if offset use limits are not reached (e.g., H.R. 2454 limits the number of offsets that may be used to 2 billion tons annually).

IV. Allowance Retirement Options

To date, no systematic evaluation of allowance retirement options has been conducted. This brief lays out five such options that would retire allowances from state allowance pools (Options 1 & 3), federal allowance pools (Options 2 & 3), and the market (Options 4 & 5). As depicted in Table 2, with the exception of Option 2, all of these Options have been either explicitly or implicitly provided for in one or more federal cap-and-trade proposals.

Option 1: Allow States to Retire Allowances From Their State Allocation Pools

If a federal cap-and-trade program allocates emission allowances to states, then permitting states to retire these allowances would empower them to obtain real emissions reductions. In an effort to hold allowance prices constant, states could be required to prove that such retirements are tied to an equivalent level of emission reductions. However, this may not be necessary because the total number of allowances retired for such purposes is likely to be constrained due to the strong financial disincentives against states forfeiting their own allowance value. Factors that might lead states to take advantage of this option despite the disincentive include: if the federal program results in significantly fewer reductions than are found to be necessary according to science; or if states find that their emission reduction policies will have significant economic co-benefits. If further constraints are desired, lawmakers could impose limits on the number of allowances that states can retire.[10]

Option 2: Allow States to Retire Allowances From Federal Pools to Account for Reductions Achieved at the State Level as a Result of State Policies That Go Beyond the Federal Policy Floor

In order to avoid the financial disincentive that states face for retiring allowances allocated to them, states could be allowed to retire allowances from a set-aside of federal allowances,[11] or the number of allowances auctioned could be reduced. To minimize the impact on other states and federal programs, acting states could be required to demonstrate that these retirements are associated with in-state emission reductions that would not otherwise have occurred under the federal cap. So doing would hold the price of allowances constant.

Retiring allowances from federal pools will reduce allowance value that the federal government could otherwise direct to federal programs. This does not discourage allowance retirement because federal action will not be discretionary, but instead will be based on an evaluation of the merits of each state's request. It is important to note, however, that constraining retirement to reflect actual state reductions in emissions will impose practical limitations on the number of allowances that are retired. In addition, the impact on the value of the federal allowance pool could be further constrained by establishing a maximum annual retirement limit.

Option 3: Allow Retirement From a Combination of State and Federal Allowance Pools

Allowance retirements to reflect state action could come from a combination of state and federal pools. Allowances could be retired under the federal set-aside for state policies where it is easy to demonstrate that reductions are above and beyond those that would have occurred from the federal cap-and-trade program. Such retirements will not present a financial disincentive for acting states, and therefore will likely be their preferred option. However, when it is more challenging to prove that state policies resulted in emissions reductions beyond those achieved by the cap, states could be allowed to retire allowances from their own allocation pools. They might pursue this course when there is much uncertainty surrounding the calculations, or when there is disagreement about whether the reductions were caused by the federal cap-and-trade program or the state program. The financial disincentives for retirement of state pools may limit its use. The net impact on allowance price and the value of state and federal allowance pools will depend on the relative mix of state and federal retirement pursued and the degree to which retirements from state accounts correspond with emissions reductions beyond the cap.

Impact of Retirement From State or Federal Pools (Options 1-3)

Table 3 shows that if states retire federal allowances from their state pool (Option 1), the financial burden for that retirement will fall primarily on them. If those retirements correspond with in-state emissions reductions, then out-of-state entities will not be affected as federal allowance pools and allowance pools for states not making reductions will remain unaffected (both price and quantity will be held constant). If those retirements do not correspond with in-state emission reductions beyond those achieved by the federal cap-and-trade program, then allowance prices will increase. In this case, allowance price increases will raise compliance costs for all regulated entities, but it will also increase the value of federal pools and pools for states NOT taking action. This suggests that some recipients of that allowance value may actually find it advantageous to allow states to retire allowances from their allocation

TABLE 3 Impacts on Allowance Prices and the Value of Allowance Pools From Options 1 and 2

	"Impact When Reductions are NOT Beyond Those Achieved by the Cap"				"Impact When Reductions are Beyond Those Achieved by the Cap"			
	Allowance price	x	Total allowances	= Total value of allowance pools	Allowance price	x	Total allowances	= Total value of allowance pools
Retire from state allocations	Increases		Decrease for states making reductions	Likely will decrease for states making reductions	No impact		Decrease for states making reductions	Decrease for states making reductions
			No impact for states NOT making reductions	Will increase for states NOT making reductions			No change for states NOT making reductions	No impact for states NOT making reductions
			No impact on federal pools	Will increase federal pools			No change in federal pools	No impact on federal pools
Retire from federal allowance pools	Increases		No change for states making reductions	Increase for states making reductions	No impact		No change for states making reductions	No change for states making reductions
			No change for states NOT making reductions	Increase for states NOT making reductions			No change for states NOT making reductions	No change for states NOT making reductions
			Federal pools will decrease	Federal pools may increase or decrease			Federal pools will decrease	Federal pools will decrease

OPTION 1

OPTION 2

pools even if they do not correspond with reductions beyond those that would have been achieved by the cap.

Allowing states to retire allowances from federal pools avoids the state financial disincentives for retiring allowances. If retirements of federal allowances correspond with an equal amount of in-state reductions (Option 2), then allowance prices will remain unaffected. This will hold the value of acting and non-acting state pools constant, while leading to a decrease in the value of federal pools. If some federal allowances are retired for state actions that do not produce reductions beyond those that would have occurred under the federal cap-and-trade program, then allowance prices will increase and so will the value of allowances allocated to acting and non-acting states. However, it will also lead to an increase in compliance costs, and may increase or decrease the value of federal pools.

Option 4: Allow States to Require In-State Capped Facilities to Submit Additional Allowances for Compliance

States could be allowed to require certain in-state facilities to submit additional allowances for compliance. For example, cement manufacturers could be required to submit 1.1 allowances for every ton of emissions (i.e., one allowance to satisfy their federal obligation, and another 0.1 allowance to satisfy their state obligation). This would increase the marginal cost of emitting a ton of carbon dioxide equivalent in the state, and could drive adoption of more advanced emission control technologies. The atmospheric benefit is equal to the number of additional llowances submitted for retirement. This approach has been employed by the U.S. EPA in their Clean Air Interstate Rule for SO_2 emissions,[12] by the State of Connecticut for SO_2 emissions,[13] and is included in the American Clean Energy and Security Act of 2009 . This approach could be pursued for all capped sectors, or it could be targeted to select sectors where the state believes greater reductions are viable, or where additional reductions might have positive economic or environmental spill-over effects (co-benefits).

Impact of Retirement From the Market Via Option 4

The primary cost of Option 4 would be borne inside the state as the marginal cost of emitting a ton of greenhouse gas is increased for the regulated entities there. However, depending on how regulated entities respond to these policies, allowance prices may increase or decrease. The value of federal allowance pools, as well as allowance pools of states not pursuing these policies, may also increase or decrease.

If capped entities do not change their operations in response to this option, then allowance prices will rise as there is increased demand for those allowances. If capped entities reduce their emissions in response to the program, then price impacts will

depend upon the relative balance of additional retirement vs. additional reductions. If this option leads to emissions reductions that exceed the allowances retired pursuant to the state policies, then allowances prices will decrease. This is because demand reduction will exceed supply reduction. The reduction in allowance price will result in a decrease in compliance costs and the value of state and federal allowance pools. On the other hand, if this option leads to emissions reductions that are less than the allowances retired pursuant to state policies, then allowance prices will increase. The increase in allowance price will result in an increase in both compliance costs and the value of state and federal allowance pools.

It is challenging to predict whether or not Option 4 will produce emission reductions greater than or less than the number of additional allowances retired. This is because under this option, facility determinations about whether or not to make emission reductions are based on market forces. Facilities will only reduce emissions if the cost of abatement is lower than the cost of compliance. Increasing the allowance retirement rate increases the marginal compliance cost. It may be possible to predict the retirement ratio necessary to drive the adoption of existing abatement technologies. However, it is more challenging to predict the retirement ratio necessary to drive noticeably increased innovation in reducing emissions.

Driving up the marginal compliance cost will tend to increase total costs for the capped sectors even if new technologies are adopted. This will create a competitive disadvantage for the acting state unless the new technologies are developed in-state—a situation which may discourage states from aggressively pursuing this option.

Option 5: Allow States to Require In-State Facilities to Submit Additional Offsets for Compliance

It may be possible to mitigate any price impacts from Option 4 if states allow regulated entities to substitute offsets for allowances in Option 4. For example, electric generators could be required to submit one allowance (or offset) to satisfy their federal emissions obligation, and 0.1 offsets for every ton of emissions to satisfy their state obligation. An offset is a government-issued limited authorization for a regulated entity to emit up to one ton of carbon dioxide equivalent emissions, awarded in exchange for projects that reduce or sequester emissions of greenhouse gases in uncapped sectors (i.e., sectors that do not need to submit allowances under the cap-and-trade program). Offsets are in addition to the cap, and are can reduce the costs of compliance by providing additional low-cost greenhouse gas abatement opportunities.

Impact of Retirement From the Market Via Option 5

This option will be most effective in limiting price impacts if the potential supply of offsets exceeds demand for offsets. If there are additional low price offsets that are unable to enter the system due to legislatively imposed limits on offsets use by capped entities, then retirement of additional offsets should not increase the price of offsets, but instead allow in new offsets. If the retirement program does not result in a decrease in emissions from capped entities, then allowance prices will remain relatively constant. But, if the retirement program results in a decrease in emissions from capped entities, then allowance prices will fall (supply remains constant and demand goes down). Because offset prices are largely influenced by allowance prices, this may also drive a decrease in offset prices.

TABLE 4 Impacts on Allowance Prices and the Value of Allowance Pools from Options 4 and 5

	Impact When Emission Reductions Exceed Additional Retirements			Impact When Emission Reductions are Lower Than Additional Retirements		
	Allowance price	Total value of allowance pools	Offset price	Allowance price	Total value of allowance pools	Offset price
In-State Facilities Submit Additional Allowances for Compliance	Decreases	Number of allowances in pools are unaffected; since price decreases, value decreases	May be unaffected, or may decrease	Increases	Number of allowances in pools are unaffected; since price increases, value increases	May be unaffected, or may increase
In-State Facilities Submit Additional Offsets for Compliance (Offset Supply is Constrained)	Decreases	Number of allowances in pools are unaffected; since price decreases, value decreases	May increase, decrease, or remain unaffected	Increases	Number of allowances in pools are unaffected; since price increases, value increases	Increases
In-State Facilities Submit Additional Offsets for Compliance (Offset Supply is NOT Constrained)	Decreases	Number of allowances in pools are unaffected; since price decreases, value decreases	May decrease	Decreases	Number of allowances in pools are unaffected; since price decreases, value decreases	May decrease

OPTION 4 OPTION 5

However, if the supply of offsets is constrained (i.e., the supply of offsets is below the legislatively established limits to their use), then retirement of offsets would be expected to have a similar impact to retiring allowances under Option 4. It is worth noting that there currently is much debate in the offset community about the actual number of offsets that will be available in the future.

V. Administrative Considerations

Administration of Options 1, 4, and 5 is straightforward, and the retirement process itself should not create any significant administrative burden. All that is required is that allowances be transferred into retirement accounts to prevent future trading or use.

However, Option 2 – retirement from federal allowance pools – does require that states and the federal government go through a process to determine whether emission reductions are beyond those that would have occurred under the federal cap-and-trade program. Determining whether state programs reduce demand for allowances requires more than simply comparing state emissions reductions to the federal emissions cap. Instead, it requires an analysis of what has occurred compared to what would have occurred in the absence of the state program.

A cap-and-trade program improves the efficiency of system-wide emission reductions by providing regulated entities with flexibility. Some entities will find it advantageous to reduce output or employ emission reducing technologies, while others will find it advantageous to increase output and emissions. Nevertheless, system-wide emissions will decrease. Just as there will be variation among capped entities, there will be variation among states. Therefore, even in the absence of state policies intended to obtain emissions reductions beyond those achieved by the cap, some states will experience greater reductions than others.

The required analysis could be performed by either the acting states or the U.S. Environmental Protection Agency. It could take the form of an economic test or a market barriers test, or could be streamlined by developing a pre-approved list of eligible state emission reductions. These are described below.

Economic Test

A cap and trade system allows covered entities to seek the lowest-cost abatement opportunities. Therefore, emitters are unlikely to invest in emission reductions that are more expensive over the life of the project on a dollar-per-ton basis than the price of allowances. This means that reductions achieved by state programs that cost capped entities more than it would cost them to purchase federal allowances will likely represent emissions reductions beyond those that would have been achieved in the absence of the state program. However, it is worth noting that states might not pursue these more expensive reductions first, or at all. Instead, they may pursue reductions that are cheaper than those that will occur in response to the federal cap-and-trade program, but for which there are market barriers.

Market Barriers Test

As analyses by McKinsey and the Vattenfall Institute of Economic Research demonstrate, there are considerable opportunities to reduce GHG emissions at a negative cost even without carbon pricing.[14,15,16] Since these existing opportunities to save money have not been pursued yet, they are considered to face market barriers to their adoption. An example of such a barrier is where a building tenant pays for energy costs, removing any incentive the landlord has to invest in long-term savings. Other examples include municipal budgeting limitations and lack of access to information. Due to such barriers, economists do not expect a federal cap-and-trade program to encourage adoption of many potential emission-reducing activities. States, however, have a history of targeting these "win-win" reductions, and could be encouraged to continue those activities. Determinations about the eligibility of various policies for the retirement of federal allowances could rely on available studies, or could require a program-by-program evaluation of market barriers.

Pre-Approved List of Eligible State Reductions

In order to lessen the administrative burden and uncertainty of case-by-case determinations of state programs, the administrator of the cap-and-trade program (likely U.S. EPA) could develop a list of pre-approved policies and programs. To further simplify the process, the administrator could also develop standardized methods for evaluating the emissions benefits of approved policies and programs. Eligible state policies might initially include demand-side energy efficiency measures where market barriers have proved an obstacle to realizing cost-effective emissions reductions. They may also include certain types of renewable energy programs, such as feed-in tariffs for solar electricity, so long as any attributable credits generated for that project are not used to satisfy a future federal Renewable Portfolio Standard.[17] Because the economics of emissions reductions are likely to change over the course of a federal cap-and-trade program, it may be appropriate to revise this list from time to time, perhaps every five years.

Other Considerations

If state programs result in significant emissions increases elsewhere in the United States, then they will not reduce total demand for allowances. For example, refusing to site a coal plant in State A may result in the development of a new coal plant in State B rather than the development of in-state low-carbon energy, unless it is accompanied by additional policies such as demand reduction or additional renewable development.

A well-designed program should provide certainty where possible, but it should also retain the ability to adapt over time, to accommodate new innovative state programs. Therefore, it may be appropriate to use some combination of the above assessments.

VI. Conclusion

Both President Obama and Congressional leaders have called for states to serve as partners in meeting the challenge of reducing greenhouse gas emissions. If this partnership is to have meaning and generate real emission reductions, the federal cap-and-trade program will need to account for state-achieved emissions reductions through the retirement of emission allowances. Without a retirement provision, state-achieved reductions will simply free up allowances to be used elsewhere.

A number of workable mechanisms are available to retire the allowances to account for state-achieved reductions. All but one of them has already been included in various federal proposals. The one method not included in legislative proposals to date is perhaps the most promising from the perspective of states. That is the retirement of allowances out of a federal allowance pool upon a showing that the state-achieved reductions are incremental to the reductions that would otherwise have occurred. This method provides states with the ability to make real additional reductions without increasing federal allowance prices. However, because there may be challenges to making such a showing, it may be helpful to provide for several different retirement options in an effort to maximize state innovation.

Notes

1. See *Federalism in the Greenhouse: Defining a Role for States in a Federal Cap-and-Trade Program*, by Franz Litz and Kathryn Zyla, World Resources Institute (2008).
2. See *Toward a Constructive Dialogue on Federal and State Roles in U.S. Climate Change Policy,* by Franz Litz, Pew Center on Global Climate Change (2008); also see *Climate Policy in the State Laboratory*, By Andrew Aulisi et al., World Resources Institute (2007).
3. For example, President Obama chose to make his first post-election pronouncements on climate change at a state climate change conference, and immediately upon taking office directed the Environmental Protection Agency to reconsider the denial of a waiver under the Clean Air Act that would allow states to implement their own vehicle emissions standards for GHG emissions. In the House of Representatives, 152 Members signed a letter to House Speaker Nancy Pelosi in October 2008 outlining principles for climate change legislation, including the principle that "federal global warming requirements must be a floor, not a ceiling, on states' ability to protect their citizens' health and state resources." In February of 2009, Senator Barbara Boxer, chair of the Senate Environment and Public Works Committee, outlined her own principles for climate change legislation, including "ensur[ing] that state and local entities continue pioneering efforts to address global warming."
4. See *Toward a Constructive Dialogue,* (note 3 above) p. 11.
5. This logic extends to other areas, including transportation and land-use planning. For example, decisions to encourage low-density land-use will encourage increased automobile transportation. This will increase demand for allowances and, unless the emissions cap is increased, create upward pressure on allowance prices.
6. In this paper, *program cost* is defined as the change in the value of allowances allocated to states (i.e., in state allowance pools) or in the value of allowances allocated to all other entities (i.e., in federal allowance pools).
7. Climate Stewardship and Innovation Act of 2007. S.280, 110th Congress, 1st session.
8. Lieberman-Warner Climate Security Act of 2008. S.3036, 110th Congress, 2nd Session.
9. American Clean Energy and Security (ACES) Act of 2009. 111th Congress. As passed June 26, 2009.
10. If a set-aside is employed, than any unretired allowances could be auctioned in the following control period, or placed in a cost-containment account for release when prices increase above an established threshold.
11. *Air Pollution Control—Transport of Emissions of Nitrogen Oxides (NOX) and Sulfur Dioxide (SO2); Final Rule.* Environmental Protection Agency. Federal Register Vol. 71, No. 82. Friday, April 28, 2006.
12. Regulations of Connecticut State Agencies (RCSA) 22a-174-19a.
13. American Clean Energy and Security (ACES) Act of 2009. 111th Congress. As passed June 26, 2009.
14. *The Carbon Productivity Challenge: Curbing Climate Change and Sustaining Economic Growth*. McKinsey & Company. June 2008.
15. Regional cap-and-trade programs are pursuing some of these low-cost emission reduction opportunities that appear insensitive to market forces. In these instances, such reductions are not always accompanied by a reduction in the cap, but instead are pursued because they have the ability to significantly moderate the cost of compliance with the cap-and-trade program. States may wish to reserve the right to pursue these types of cost reduction activities in the future. Reducing compliance costs is beneficial in its own right, but it may also allow states to pursue more aggressive emission targets.
16. *Positive Returns: State Energy Efficiency Analyses Can Inform U.S. Energy Policy Assessments.* John A. Laitner and Vanessa McKinney. American Council for an Energy-Efficient Economy. June 2008.
17. It is true that state feed-in tariffs would likely encourage greater investment in solar energy projects than would otherwise occur. However, if those projects were used to satisfy federal renewable portfolio standards, then they would not have achieved reductions beyond what the federal program would have achieved without the state policies.

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