# Clean Power Plan Implementation:
# Single-State Compliance Approaches with Interstate Elements

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## Introduction and Summary

States and stakeholders have indicated significant interest in the possibility of developing single-state compliance plans that would allow for the option of interstate trading of compliance instruments. This document provides an overview of considerations for how such programs could work under both rate-based and mass-based models of compliance.[1] This overview is informed by conversations in and around the Georgetown Climate Center's State, Power Company, and NGO Dialogue series, but should not be understood to reflect views of any participants.[2]

Stakeholders have expressed interest in interstate coordination for several reasons: to consider options to reduce compliance costs; to better reflect the existing interstate nature of the electric grid and existing markets; and to enable state Clean Power Plan compliance programs to align with and build upon existing state programs that have interstate elements (e.g., state Renewable Portfolio Standards (RPSs) that accept renewable energy certificates (RECs) from other states).

EPA's proposed rule explicitly allows multi-state compliance options, and EPA promotes multi-state compliance by providing additional time for plan development if states submit a multi-state plan.[3] However, many stakeholders have suggested that jointly submitting a plan with other states may not be desired or feasible given administrative complexities and political factors. States and stakeholders have instead explored whether coordination of individual components among state plans could provide some of the benefits of regional cooperation without the challenge of developing and submitting a joint multi-state plan.[4]

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[1] For the sake of simplicity, we primarily focus on models of compliance in which the entire compliance obligation falls on electric generating units (EGUs) or utilities, not on state portfolio or state commitment models in which a portion of the compliance obligation falls on states. For information on this distinction, see Georgetown Climate Center, Overview of Potential Compliance Pathways (Jan. 2015), http://www.georgetownclimate.org/an-overview-of-potential-clean-power-plan-compliance-pathways.

[2] More information on the convening series is available at: http://www.georgetownclimate.org/clean-power-plan-implementation-a-state-power-company-and-ngo-dialogue. The Georgetown Climate Center also plans to release a related set of recommendations for EPA to support state plan alignment and trading.
This document is also informed by other analyses of state plan approaches with optional trading or "common elements," including: Franz T. Litz and Jennifer Macedonia, Choosing a Policy Pathway for State 111(d) Plans to Meet State Objectives (April 2015), http://www.betterenergy.org/publications/choosing-policy-pathway-state-111d-plans-meet-state-objectives; Jonas Monast et al., Nicholas Institute, Enhancing Compliance Flexibility under the Clean power Plan: A Common Elements Approach to Capturing Low-Cost Emissions Reductions (March 2015), http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_pb_15-01.pdf.

[3] 79 Fed. Reg. 34,915.

[4] For example, the Midcontinent States Environmental and Energy Regulators (MSEER) suggested in their comments that "EPA should recognize that multi-state collaboration can take numerous forms and allow states to file separate state compliance plans that include or contemplate a connection to other states." MSEER's Comments on the Clean Power Plan (Nov. 21, 2014). Similarly, Western states recommended in their comments that "Not all states will want, or be able, to enter into joint plans

This document explores whether and how states could implement single-state programs designed to allow affected sources the option of using compliance instruments—either emission-rate credits in a rate-based program or emission allowances in a mass-based program—that are common across multiple states and could therefore facilitate interstate trading. Under such a model, states could develop and submit their own individual plans to EPA, but the programs would be designed to allow affected sources in those states to use out-of-state compliance instruments, which could lower the overall cost of compliance without requiring states to submit joint plans.[5] Several overarching elements that might be required for such programs include:

- ***A state plan that accepts out-of-state credits or allowances.*** The state plan would allow affected sources to use common tradable compliance instruments—emission-rate credits under a rate-based system or emission allowances under a mass-based system—created in other states to demonstrate compliance with their obligations. States would identify in their plans which out-of-state compliance instruments could be used for compliance; for example, a state plan might specify that any compliance instruments could be used as long as they were generated by state programs that met certain criteria, or it could identify that compliance instruments from a specific state or group of states would be accepted.

- ***Design alignment among interacting state plans.*** Designing interstate plan elements in a way that takes into account interactions with other states' plans can ensure the environmental integrity of the system of plans and mitigate perverse market interactions. A minimum level of consistency may be required in order to ensure that linked plans are approvable by EPA, for example to ensure that all state goals are met in aggregate without double counting. States may also want to further coordinate plan designs to align with existing electricity and clean energy programs, markets, and infrastructure.

- ***Common or interoperable compliance instrument tracking infrastructure.*** States would need a way to track the credits or allowances generated in different states, for example by using renewable energy generation tracking systems like those used for RPS compliance or emission allowance tracking systems such as those used for compliance with the Acid Rain program.

- ***Certainty that such types of plans would be approvable by EPA.*** Finally, states would likely want guidance from EPA that such plans would be approvable (along with any limitations on approvability), as well as assurance that the plans would not be found inadequate because new participants entered or exited the system.

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covering every aspect of their programs. But many states may be interested in plans which, at a minimum, allow more efficient accounting, and credit, for the effects of renewable energy and/or energy efficiency across state lines…EPA should clarify that states can cooperate regionally without blending state goals, whether rate-based or mass-based, into a regional goal for which all cooperating states are jointly liable." Western States' 111(d) Comments to EPA (Oct. 30, 2014). Finally, environment and energy leaders from 14 states requested in their comments "that in addition to allowing states to submit a single multi-state plan, EPA also allow states the options of: 1) submitting individual plans for state specific elements and including a common submittal that addresses common plan elements, and 2) separate individual submittals that are materially consistent for all common plan elements that apply to all participating states." 14 States' Joint State Comments in Response to EPA's Proposed Carbon Pollution Emission Guidelines (Dec. 1, 2014).

[5] Such programs could be implemented as permit-based programs, similar to other Clean Air Act programs developed and administered by state environmental agencies, such as the Acid Rain Program or NOx SIP Call.

In a rate-based context, this type of program would allow affected sources that are operating above the required $CO_2$ emission rate to purchase emission-rate credits from out-of-state operators of renewable energy generation and energy efficiency programs, and potentially other resources as well.

One fundamental issue with emission-rate crediting is how to determine the appropriate $CO_2$ emission value of an interstate credit. In other words, how much emission reduction credit should be provided for one megawatt hour (MWh) of renewable energy generated in one state but used for compliance in another state? The emission value of a credit could be calculated based on the target rate of either the buying or selling state, on a blended or averaged rate, or on the actual emission rate of the generation being displaced or avoided. Each of these options has different implications for stakeholders and may create different incentives for resources.

Identification of a common methodology at which to credit renewable energy and energy efficiency would be necessary to facilitate interstate trading under a rate-based program, unless states were to submit a joint plan with a single rate for all participating states. In Section I below, we explore approaches for quantifying the emission value of interstate rate-based credits, and some considerations in selecting an approach.

A mass-based approach does not have the same challenges with determining the emission value of the tradable instrument—allowances under a state's mass-based program would likely each allow the emission of one ton of $CO_2$, and would therefore be interchangeable among states. As we discuss in Section II, this allows states to effectively combine their respective emission budgets by designing their programs to accept each other's allowances. Use of centralized allowance tracking infrastructure, together with minimum criteria for program design elements that would facilitate interaction among state plans, could form the basis of a model in which individual states could establish mass-based programs and allow affected sources the option to trade with sources in other states. We discuss actions that would be necessary or helpful to make such an approach feasible, including the development or identification of a central allowance tracking system, confirmation that such state plans would be approvable, and identification of criteria for common elements of state plan design that would facilitate a well-functioning market.

It is important to note that this overview is based on EPA's proposal and subsequent input from stakeholders; we do not yet know whether and how many of the issues raised here may be addressed by EPA's final rule.

## Difference between Emission-Rate Credits and Emission Allowances

***Emission-rate credits*** **used in a rate-based program and** ***emission allowances*** **used in a mass-based program are different types of compliance instruments.**

**Emission-rate credits are based on the nature of EPA's rate-based goals, which reflect the potential both to improve the fossil fuel-fired generation emission rate and to displace carbon-emitting generation. Credits are a "bottom-up" instrument, created only when an action is taken by an eligible party; i.e., when zero- or lower-carbon electricity is generated by producers of renewable energy, creditable nuclear, or affected fossil fuel-fired generation operating below a state's target rate, or by avoiding generation using qualified energy efficiency resources.**

**In contrast, an emission allowance is a tradable permit for a set quantity of emissions. It is a "top-down" compliance instrument, in that the regulator creates a limited number of allowances equal to a budget of allowed emissions and affected sources must hold sufficient allowances to match their emissions at the end of the compliance period.**

# I. Options for Interstate Rate-Based Crediting

In a rate-based context, a state program could allow affected sources to purchase emission-rate credits from out-of-state providers. Allowing such interstate crediting could be particularly important to states that have existing policies, such as RPS programs, that allow compliance entities to import RECs. As discussed above, one key issue is how to determine the appropriate rate at which out-of-state renewable energy or energy efficiency is credited.[6]

Establishing a consistent approach for crediting emission reduction measures may facilitate multi-state coordination. There are several options for determining the emission value of credits, including: a blended rate, the actual emission rate of the generation being displaced or avoided, or the target rate of either the buying or selling state. Without a common approach, or a way to adjust for the differences in rates, the same renewable energy, energy efficiency, and potentially even creditable fossil energy could have very different compliance values in different states.

Given the diversity of state target rates, generation mixes, and existing renewable polices, stakeholders may have varying positions on the appropriate rate at which to credit renewable energy or energy efficiency resources. A consistent approach across states can help to avoid double counting and foster coordination among interested states.

## A. How Rate-Based Crediting Works

In a rate-based compliance program, the owner or operator of each affected electric generating unit (EGU) would be required to have its EGU meet the rate-based emission target, expressed in pounds per megawatt hour (lbs/MWh), after adjusting for any credits held by the owner or operator. Owners or operators of affected EGUs not currently meeting the emission rate target could either take actions to improve the unit's emission rate or purchase credits sufficient to meet the rate for each MWh of electricity that the EGU generates. Credits could be generated either by other affected sources emitting at a rate lower than the standard or through zero-emitting resources and demand-side efficiency measures.

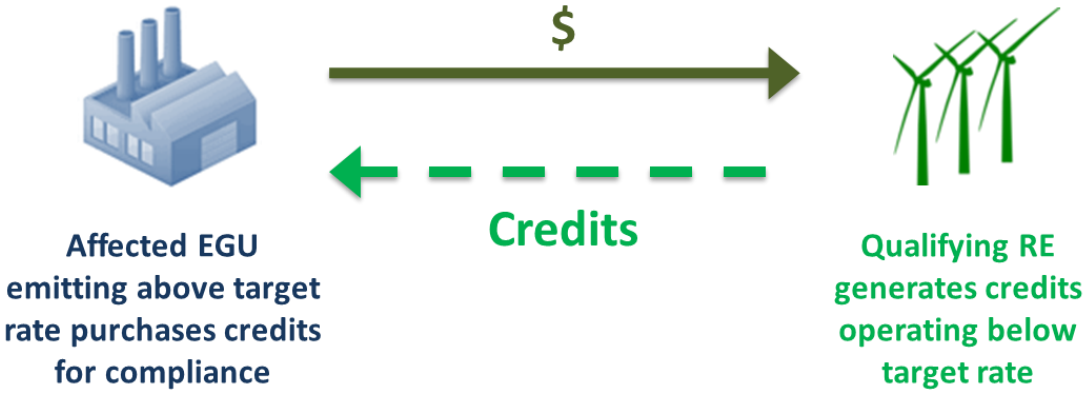
For fossil EGUs emitting at a rate lower than the standard, credits could be calculated as the difference between the actual emission rate of the unit and the compliance target rate, multiplied by generation over the compliance period, which results in credits measured as pounds or tons of $CO_2$ per unit of generation. Credits could also be generated by zero-emitting resources and by demand-side energy efficiency measures. These credits could be denoted in pounds or tons of $CO_2$, consistent with credits generated by fossil resources. To demonstrate compliance, these credits would be subtracted from the numerator of an affected source's emission rate (tons/MWh). Alternatively, credits could be denoted in MWh, which would be added to the denominator of an affected source's emission rate for compliance demonstration.[7]

[6] Even within the context of an individual plan, there could be different approaches for how to credit renewable energy or other creditable resources. Many of the considerations discussed below would also be relevant to the decision of how to credit in a single-state plan.

[7] Either tons or MWh could be used for any of the approaches discussed below; the choice of units does not dictate the methodology used to determine how much credit to assign.

If states elect to credit zero-emitting generation and energy efficiency under a rate-based compliance program, they will be required to include in their plans systems for evaluation, measurement, and verification (EM&V) based on EPA guidance. The energy efficiency or renewable energy actions that are used for crediting "would need to be enforceable components of a state plan" according to EPA's proposal.[8] Figure 1 provides a simple illustration of the mechanics of renewable energy crediting.

*Figure 1. Illustration of Potential Renewable Energy Crediting Under a Rate-Based Trading System*




## B. Rate-Based Crediting of Renewable Energy

While questions about interstate crediting apply to all eligible resources, we focus here on the potential for interstate crediting of renewable energy as an example. In the preamble to the proposed rule, EPA expressed an interest in building on existing renewable energy markets for use in compliance with the Clean Power Plan.[9] States with renewable energy programs and companies with experience in renewable energy markets have also expressed an interest in leveraging these policies and markets for Clean Power Plan compliance purposes. Existing renewable energy markets allow for the interstate transfer of renewable energy attributes through the use of RECs denoted in MWh and tracked through regional tracking systems. Tracking systems issue a uniquely numbered certificate for each MWh of electricity generated by a renewable facility registered in the system, track the ownership of certificates as they are traded, and retire the certificates once they are used. The tracking systems allow REC purchasers and compliance authorities to have confidence that the credits being used for compliance are consistent with policy requirements (e.g., generation by a qualifying resource) and are not being double counted. These systems facilitate the interstate transfer of RECs for compliance, where state rules allow the use of out-of-state resources.

[8] U.S. EPA, State Plan Considerations Technical Support Document (June, 2014), http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule-state-plan-considerations.

[9] *See* 79 Fed. Reg. 34,834.

In the context of the Clean Power Plan, states and stakeholders may be interested in pursuing trading of compliance credits associated with renewable energy for a variety of reasons. For example:

- ***A state's renewable policy extends beyond its borders.*** Many states' existing renewable programs allow in-state compliance entities, usually utilities, to purchase RECs associated with out-of-state renewable generation for use toward renewable targets. Without allowing interstate crediting, compliance entities within a state would not be able to use this out-of-state generation for Clean Power Plan compliance purposes.

- ***Limited (or vast) in-state renewables potential.*** Renewable fuel sources are not evenly distributed among states. Without interstate trading, the market for renewable energy may be limited to states with significant resources.

## C. Interstate Rate-Based Crediting: Options and Challenges

As described above, a key challenge associated with the interstate transfer of renewable energy attributes for Clean Power Plan compliance is agreeing to the appropriate amount of emission-rate credit to assign the resources. If the renewable resource is located in a different state than the affected EGU, and the states decide to allow interstate trading of credits as a compliance strategy, EPA's proposal does not provide specific guidance on the rate at which the renewable resource (or other eligible resource) is credited.[10] There are a number of potential approaches, and each has advantages and disadvantages that may differ for different stakeholders. Considerations for selecting an approach include:

- ***Consistency with EPA's use of renewables in goal-setting formula:*** EPA incorporated renewable energy into each state's rate-based target by adding state-specific potential renewable energy generation in MWh to the denominator of the emission rate (lbs $CO_2$/MWh). In a single-state system, crediting at the state target rate reflects the contribution of renewable energy potential that EPA assumed in the calculation of the state's goal. In a system with interstate trading, crediting renewable energy using a different methodology could effectively change the relative stringency of state goals. In some states it would be relatively easier (or harder) to comply, because renewable energy credits would be valued at a different rate than reflected in EPA's goal calculation. This would also have the effect of changing the incentives for renewable energy as a compliance mechanism in different states.

- ***Changes in resource siting incentives:*** The choice of rate used to credit renewable energy could have implications for siting and development, as the choice of rate could affect where it is most cost effective to locate projects.

- ***Alignment with REC markets:*** Given that there is an existing, functioning market for RECs, states and stakeholders may see value in aligning CPP credit trading with the existing REC market mechanism. These markets currently trade RECs in MWh of electricity generated. A methodology for assigning emission-rate value in terms of MWh may more easily enable use of existing REC trading infrastructure for CPP compliance than other methodologies.

[10] EPA's guidance includes adjustments to EGU $CO_2$ emission rates based on avoided MWh, avoided $CO_2$ emissions, and marginal emissions. U.S. EPA, State Plan Considerations Technical Support Document at 21-27 (June 2014), http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule-state-plan-considerations.

- ***Compatibility with an "opt-in" approach:*** One compliance approach that may be of interest to states is to design their plans to be compatible with other states' plans in a way that provides the option of allowing interstate credit trading, either immediately or by "opting into" such trading at some future date. Such plans would not require coordination with other states during the development of the plan, but would share common infrastructure and design elements that would facilitate trading of standardized compliance instruments between states. States participating in a rate-based approach of this type would need a common methodology for assigning emission-rate credit that would accommodate states deciding to "opt-in" or "opt-out" of the program at different times.

- ***Effect on emission outcomes:*** Different crediting methodologies could result in changes to overall emissions compared to what states' emissions would be if they were meeting their target rates individually. This relates to EPA's goal setting formula, in that a state's goal reflects both the carbon intensity of the fossil generation in the state and the potential for additional renewable energy and other zero-carbon resources. If crediting methodologies do not reflect the same relationship to the carbon intensity of fossil generation in a complying state, this could lead to different overall emission outcomes than EPA anticipates. For example, if a system of states linked through credit trading sited renewable generation largely in the states with relatively low-carbon generation fleets and did not require more credits to make up this difference, overall emissions could increase in comparison to a no-trading scenario. The choice of rate at which to credit renewable energy could increase or decrease the potential for emissions increases relative to single-state programs depending on the methodology chosen. Modeling of specific scenarios is likely required to understand the impact of different methodologies on overall emissions compared to no-trading scenarios.

While the descriptions of the crediting approaches below are focused on renewable energy, they could also be designed to accommodate interstate transfer of credits generated by avoided demand (through demand-side energy efficiency), other zero-emission generation (such as new nuclear generation), or qualifying fossil generation (affected sources that are operating below the applicable emission rate).

### *Approach A: States interested in trading develop joint plans that include blended rates*

EPA has proposed to require two or more states interested in allowing interstate transfer of Clean Power Plan compliance credits on a rate basis to agree on a blended target rate that would apply to affected sources in all participating states.[11] Renewable energy-related credits could be generated by any qualifying resource that is geographically located in the participating states, and would be credited at the blended rate. The mechanisms for crediting and trading would be similar to those described above. However, the market would be limited to states that blend their rates, which would require upfront coordination among interested states. This approach could preclude states from adopting an "opt-in" compliance plan once the program is effective, as the blended rate would require adjustment as participating states joined or exited. This approach would be consistent with EPA's goal-setting formula, in that renewable energy would be credited at a level that reflects the contribution of renewable energy potential to the formulas of participating states (i.e., renewable MWh would be credited at the same effective rate as was used in goal setting).

[11] EPA proposes that states wanting to submit a joint rate-based plan would need to meet a blended rate based on "a weighted (by net energy output) average lb $CO_2$/MWh emission rate." 79 Fed. Reg. 34,952.

### *Approach B: Credit based on the regional marginal fossil rate or regional average rate*

Clean Power Plan compliance credits could be calculated based on the rate of the marginal fossil unit in an electricity balancing region, or other rate reflecting a region's avoided emissions (e.g., the marginal rate projected in dispatch modeling, or the marginal rate calculated using a spreadsheet tool such as AVERT). This approach may better reflect the actual emission rate of the unit being displaced in the region in competitive markets. However, there are uncertainties associated with identifying the appropriate rate and the rate could change over time as states work to comply with the Clean Power Plan. In addition, this approach is not consistent with EPA's goal-setting formula, which could result in some states having a more or less difficult time achieving their goals because EPA anticipated a different degree of "credit" than the marginal emission rate actually provides.

### *Approach C: Credit based on the buyer's state target rate*

Another option is to credit based on the target rate of the state in which credits are being purchased for compliance. This approach would be similar to trading Clean Power Plan compliance credits on a MWh basis, which would effectively value the renewable generation at the target rate of the state where the purchasing EGU is located.[12] Because this approach is equivalent to adding MWh credits to the denominator of an affected source's emission rate, it is consistent with the way EPA valued the contribution of renewable energy to the development of state goals. A MWh of renewable electricity would be valued at the same effective rate as in the EPA's goal calculation. This approach could also align with existing REC markets in that crediting at the buyer's state target rate could be implemented by trading credits on a MWh basis. Crediting at the buyer's rate does not alter incentives for siting renewable energy projects beyond those created by the state targets, because the value of a credit remains constant, independent of where it is generated. This approach would support an "opt-in" model in that it would not require up-front coordination.

### *Approach D: Credit based on the seller's state target rate*

Clean Power Plan compliance credits could instead be based on the target rate of the state in which the renewable energy is generated. This approach would not be consistent with EPA's goal-setting calculation, because states would not necessarily be credited for avoided MWh at the same effective rate that EPA used in setting their targets. This approach also does not align as well with REC markets as does crediting at the buyer's state target rate, because it is not equivalent to simply trading avoided generation in megawatt hours. This approach could support an "opt-in" model in that it would not require up-front coordination. Crediting at the seller's rate creates an incentive to develop renewable energy resources in states with high target rates. States with excellent renewable resources but lower state targets might find it more difficult to develop in-state renewable generation since there would be less demand for their renewable CPP credits.

### *Other Options*

Clean Power Plan compliance credits could also be calculated based on another agreed-upon rate, for example a national or regional average target. This approach would be consistent across states, and could potentially support an "opt-in" rate-based trading system. However, this option would also not necessarily be consistent with EPA's goal-setting calculation. If set at a regional (as opposed to national) scale, it would also raise the same issues when trading between states in different regions.

[12] This assumes that all EGUs in the state are assigned the same compliance rate as the state goal rate.

Table 1 below summarizes the benefits and drawbacks of the three possible crediting approaches.

*Table 1: Considerations of Crediting Approaches*

| Approach | Considerations |
|---|---|
| **Blended Rate** | Consistent across participating states<br>Simple calculation<br>Requires upfront coordination, precluding "opt-in" model<br>Reflects treatment of renewable energy in EPA goal-setting methodology |
| **Marginal Rate** | Difficult to calculate/update<br>Potentially supports "opt-in" model<br>Reflects "actual" emission reductions, but does not reflect EPA's treatment of renewable energy in EPA goal-setting methodology |
| **Buyer's Rate** | Simple calculation<br>Potentially supports "opt-in" model<br>Reflects treatment of renewable energy in EPA goal-setting methodology<br>Consistent with existing REC markets |
| **Seller's Rate** | Simple calculation<br>Potentially supports "opt-in" model<br>Does not reflect treatment of renewable energy in EPA goal-setting methodology<br>Results in changes to renewables siting incentives |

## D. Remaining Questions and Plan Design Considerations

A number of key issues and questions regarding interstate rate-based crediting remain unresolved:

- ***Rate-based credit emission value approach:*** There are benefits and drawbacks to each possible approach, and selection of an approach will have different implications for states depending on their rate-based targets and generation mixes. Although states and stakeholders may have different preferences, a consistent approach for calculating the emission value of interstate rate-based credits would be necessary to facilitate interstate trading. To address these differences and help facilitate coordination among states, EPA could establish a default methodology for states to use if they wish to pursue interstate rate-based trading.

- ***Other plan elements:*** States would benefit from guidance on how to establish an approvable and federally enforceable credit issuance process for both renewable energy and energy efficiency measures. Clarity will also be needed on the requirements for renewable energy and energy efficiency policies to be creditable as state-driven under EPA's guidelines. Additionally, state plans will need to include EM&V protocols to verify that credits are based on real emission reductions. It will also be important that there is a consistent approach for determining how much avoided generation is credited to an energy efficiency program given expected differences in state EM&V programs.

- ***Other interstate considerations:***

    - Under EPA's proposal, energy-importing states are unable to credit all of their energy efficiency activity unless they have an agreement with the state from which they import power.

    - It will be important to understand the impact of these approaches on environmental outcomes and energy markets. A significant simplification in each of the approaches proposed above is that they focus on how the purchasing and selling entity would determine the emission reduction value of renewable energy-associated credits for the purposes of compliance. Given the interconnectedness of the grid, the actual emission impacts from the generated renewable energy could be realized in a third state (i.e., neither the state where the renewable energy was generated nor the state where the associated credit was used for compliance).

    - States interested in implementing interstate rate-based approaches will need to consider how to address differences in state EM&V protocols, consider how their programs interact with other state plans (including mass-based plans), adopt consistent credit tracking systems,[13] and consider whether and how to implement monitoring of emission-rate credit trading markets.

[13] In addition to implementing tracking systems for renewable energy, such approaches would need credit-tracking infrastructure for any other creditable resource, including energy efficiency. The Climate Registry has proposed an approach for tracking avoided emissions from energy efficiency. The Climate Registry, An Energy Efficiency Registry, A Flexible and Transparent way to Track and Report Energy Efficiency under the Clean Power Plan (2014), http://www.ourenergypolicy.org/an-energy-efficiency-registry-a-flexible-and-transparent-way-to-track-and-report-energy-efficiency-under-the-clean-power-plan/.

# II. Opt-In Interstate Mass-Based Trading State Plan Model

In contrast to rate-based systems, mass-based compliance approaches do not pose the same challenges in determining the emission value of the tradable instrument—"a ton is a ton" in every state, and single-state budgets can simply be added together. There are already examples in place (e.g., the Regional Greenhouse Gas Initiative) demonstrating the feasibility of single-state budgets and compliance programs that make use of interstate trading. While some states and stakeholders have raised concerns about potential economic constraints of a mass-based approach if the targets do not appropriately reflect projected demand growth, many continue to see value in the simplicity that mass-based programs offer. However, many states may not want to (or have the resources to) create their own trading programs. Here we present a model mass-based state plan approach in which much of the infrastructure is hosted and maintained centrally, and individual states could choose—or allow affected sources to choose—to participate in an interstate market for mass-based compliance units. Considerations for such an approach include the common elements individual state programs would need to include in order to allow participation in a centralized system, what centralized infrastructure is required, and what guidance or support would be needed from EPA.

## A. How Mass-Based Trading Works

A state that chooses a mass-based approach would adopt an emission budget that would limit the total tons of $CO_2$ emitted by the state's affected sources. Under EPA's proposed rule, the state would choose the methodology for translating the rate-based goal established by EPA into an equivalent mass-based budget.[14]

Under a mass-based approach, the state would issue emission allowances to affected sources—one allowance per ton of $CO_2$ up to the state's budget. There are a variety of ways the state could choose to distribute the allowances, such as by allocation directly to the owners or operators of affected EGUs based on the units' past or expected emissions or generation, or through an auction. The state's method for distributing allowances does not affect its use of trading or participation in a centralized system, although it will have ramifications for the distribution of costs among affected sources and others.

Under a mass-based compliance system, the owner or operator of an affected EGU would be required to hold allowances equal to the annual $CO_2$ emissions from the unit. To demonstrate compliance, each affected source would be required to retire a number of allowances equivalent to its emissions over the compliance period. The affected source would make the economic decision whether it is more cost effective to reduce its emissions or to buy additional allowances; entities that are able to achieve reductions at a lower cost can sell their allowances to those with higher costs.

Unlike the rate-based approaches discussed in the previous section, a mass-based emission budget system using allowances does not require crediting of renewable energy and energy efficiency.[15] An allowance-based program inherently accounts for reductions in generation from fossil fuel-fired EGUs that result from increased zero-emitting and energy efficiency resources, in that fossil fuel-fired EGUs will generate less electricity, causing total

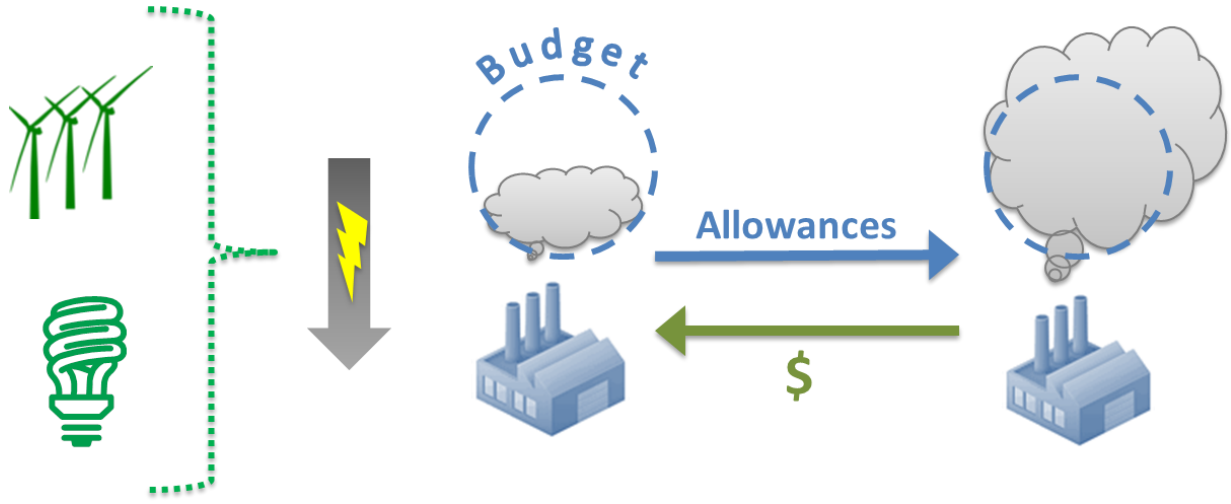
[14] The specific methodology for performing that translation is an issue on which stakeholders have expressed differing opinions; for the purpose of this discussion we will set the issue of translation methodology aside and assume that the state has set an equivalent budget using a methodology acceptable to EPA.

[15] It is also possible to design a mass-based system that credits renewable generation and energy efficiency instead of using an allowance-based system, but this approach is not discussed here.

emissions to decrease. However, depending on the rules governing interactions between rate- and mass-based programs, states using an allowance approach might still use renewable energy and energy efficiency tracking infrastructure if mass-based programs are required to adjust their budgets to avoid double counting. States using an allowance approach may also choose to use renewable energy and energy efficiency tracking infrastructure as components of complementary programs, for example using a renewable energy tracking system as a part of a state RPS program that is not an element of the state's Clean Power Plan compliance plan.

Figure 2 illustrates a very simple mass-based approach with trading, in which a unit emitting below its budget trades allowances to a unit emitting above its budget; renewable energy and energy efficiency are not formally credited, but reduce emissions from the fossil fuel-fired EGUs by reducing demand.

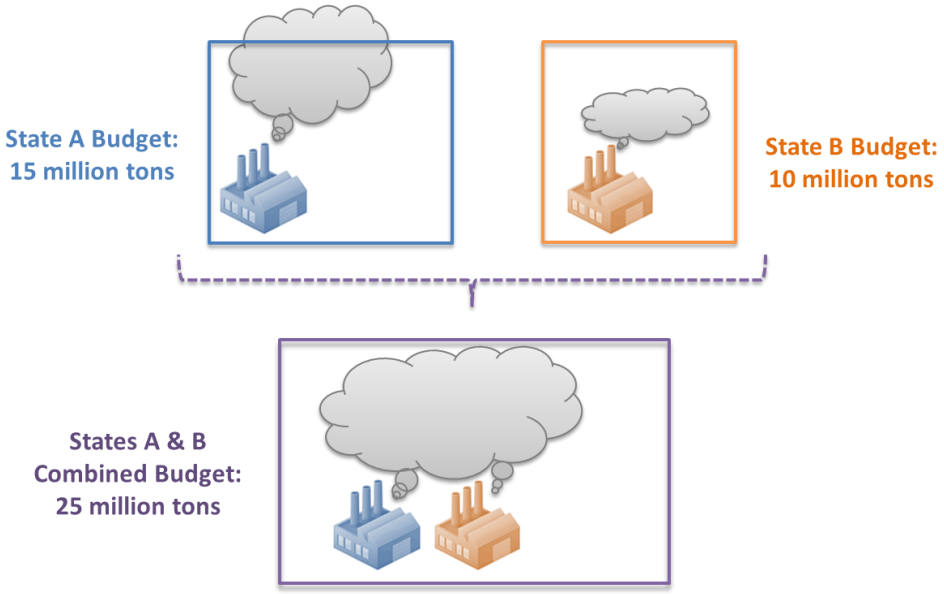
*Figure 2. Illustration of a Simple Mass-Based Trading System*




## B. Linking Mass-Based Programs

A multi-state mass-based system allows for simpler interstate trading than a rate-based system because the units of compliance instruments, tons of $CO_2$, are consistent across states. Linking two mass-based systems together effectively adds the individual state budgets together without the need for adjustments. Figure 3 illustrates the simplicity of adding together the emission budgets of two individual states into one combined budget, allowing units in both states to trade allowances.

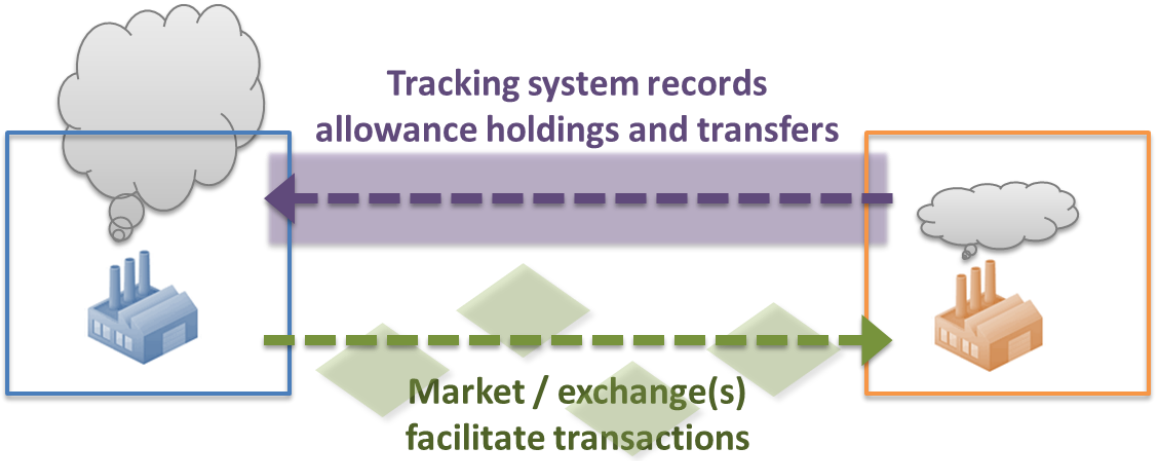
*Figure 3. Illustration of Two States Combining Mass-Based Emission Budgets*




## C. Opt-In Mass-Based Trading Model

The opt-in model described here is an approach in which states would develop individual state plans that make use of a centralized tracking system for allowances and allow affected sources to trade allowances with affected sources in other states. The basic elements necessary for this approach are: provisions in the state plan that allow for trading with entities from other states; a centralized allowance tracking system to facilitate the exchange of allowances; and a forum (or multiple fora) in which trades can be made (a "market").

*Figure 4. Illustration of Opt-In Mass-Based Trading Model*



### *State Plan Design*

Under this model, a state would develop a plan to comply with a mass-based emission budget, and provide its affected sources with the option of trading allowances. The state would issue allowances, each for one ton of $CO_2$, and would choose a method for distributing the allowances. The state would make use of the centralized tracking system to identify ownership of the allowances, and affected sources would comply by holding and retiring allowances in the tracking system.

Under this approach, the state would allow its affected sources to trade allowances with others within the state or in any other states also using the tracking system. It would do so by specifying that allowances issued by other states would be accepted for compliance with the state program. [16] Allowing the state's affected sources the option of buying and selling allowances, as in this model, would give affected units the benefits of trading without necessitating that the state develop its own budget trading program and infrastructure. Trading with a broader group of participants would improve cost-effectiveness by capturing the lowest-cost reduction opportunities over a larger area.

In order to support interstate trading, other aspects of the state plan may have to be aligned. For example, baseline elements necessary to enable trading include consistent allowance units (e.g., tons of $CO_2$) and emissions monitoring and reporting in each state. Additionally, each state's plan must have budget integrity, meaning that the plan will not allow emissions to exceed the state's mass-based budget.

Other more complex plan elements may influence a state's ability to participate in an opt-in market. For example, if a state plan includes a price cap or cost-containment element, such elements may affect the integrity of the state's budget or distort the interstate market.[17] Such compliance flexibility mechanisms need not necessarily be consistent among all states participating in an opt-in system; however, to maintain the integrity of the interstate allowance market, any flexibility elements included in the plan should not allow emissions to exceed the state's mass-based budget.

EPA could facilitate the consistency of individual state plans by establishing a set of minimum plan design criteria necessary for an opt-in trading plan to be approved, as discussed below. Additionally, a model plan could provide a starting point for states interested in developing a mass-based budget approach with opt-in interstate trading. Such a model could be developed by states or a third party, and EPA could indicate that a state plan following the model would be approvable.

[16] A state might specify that it will accept allowances issued by any other state whose plan is approved by EPA and makes use of the tracking system, or might limit the states whose allowances it accepts, either by listing criteria or identifying certain states. Accepting allowances from some states but not others would segment the market and may not be desirable, but would nonetheless be a choice the states could make.

[17] If a state plan includes a price cap or cost containment reserve that, if triggered, would allow emissions to exceed the state's mass-based emission budget, such a plan would likely need a backstop or other corrective measures to meet EPA's requirements.

### *Allowance Tracking Infrastructure*

Under this approach, the state would use a tracking system to account for its allowances. This system could be based on EPA's Emissions and Allowance Tracking System (EATS), which tracks emissions, allowances, compliance assessment, and other relevant information. An allowance tracking system would provide accounts for entities to hold allowances and provide the means of securely allocating allowances, transferring allowances among entities, and retiring allowances for the purposes of compliance. An opt-in interstate trading approach could be most efficiently facilitated if EPA provides a central allowance tracking system that states can choose to use.

### *Allowance Market and Exchange(s)*

The state plan would indicate that parties holding allowances in the tracking system could buy and sell allowances. This could take place through bilateral transactions or on one or more exchanges set up to facilitate trades in this market. Centralized exchanges would help make the price of allowances more transparent (as would auction prices, if the state chooses to auction allowances), and could be operated by third parties. They could also be operated by groups of states or entities within a particular service territory to enable easier compliance. Regardless of the operator of the exchange, its purpose would be to provide a forum for the buying and selling of allowances, and the exchange would move allowances from one entity's account in the tracking system to another. While the exchanges would not have to be centrally operated, states and/or EPA may want to establish a system for monitoring the overall market for allowances to ensure that it is operating smoothly and without manipulation by any party.

### *EPA Approval*

The use of an opt-in mass-based budget trading program could be enabled by EPA providing clarity in its final rule that plans of this type are approvable. Specifically, EPA would need to confirm that a state plan that makes use of the centralized tracking system and accepts allowances issued by other states is approvable, and that the plan would not require revision or re-approval as other market participants join or leave the system.

As discussed above, EPA could establish minimum approvability criteria for plans of this type. Those criteria would include the state plan elements that must be consistent for individual state programs to be compatible and facilitate opt-in trading, and would indicate what plan elements would be necessary to ensure that failure of one state plan to achieve required reductions would not affect the success of other states' plans.

## D. Remaining Questions and Design Considerations

Additional questions and considerations for mass-based opt-in trading remain, including:

- ***EPA guidance and tools:*** EPA can take steps to make sure such programs are viable and approvable. For example, EPA could establish approval criteria to ensure that the necessary plan elements are consistent among participating states. EPA could also indicate that the Agency's approval of a state plan for opt-in trading would certify the integrity of the state's budget; therefore, all allowances traded by affected sources within that state would be freely transferable and could be accepted by any participating state for compliance. EPA could also host a central allowance tracking platform and make it available for states to elect to use.

- ***Interactions between rate- and mass-based programs:*** It is important to note here the potential for issues in the accounting of emissions reductions between rate- and mass-based states if credits are sold between states implementing programs of different types. Another issue in the interaction between rate- and mass-based programs is the potential for leakage of emissions from mass-based states to rate-based states. Mass-based programs create a requirement that affected sources hold an allowance for every ton of $CO_2$ emitted. In contrast, the impact of a rate-based program on an affected source depends on the level of the target emission rate—sources below the rate would earn generation-based credits. This difference could result in generation shifting from mass-based states to rate-based states to take advantage of the potential to earn credits, and such a shift could potentially lessen the emission reductions achieved by the rule and create market distortions. However, allowance allocation strategies could be undertaken by the mass-based state to mitigate the difference in incentives between programs.

- ***Translation methodology:*** Finally, as noted by many stakeholders, additional clarity will be needed from EPA regarding the methodology for translating the rate-based goals established by EPA into equivalent mass-based budgets.

## III. Conclusion

There is widespread interest from states and stakeholders in potential opportunities to design and implement single-state compliance plans that facilitate optional trading of a common compliance instrument by affected sources. The examples presented here are intended to demonstrate how such programs could work under both rate-based and mass-based models, and to raise additional questions and considerations. In a rate-based context, there seems to be no clear path toward an opt-in interstate trading approach, although establishing a default method for determining the emission-value of an interstate rate-based credit would help facilitate interstate rate-based trading. In a mass-based context, there is a more straightforward model for opt-in trading, and we have identified some of the framework elements that could enable a simple opt-in trading program. For either approach, EPA can provide tools and guidance to help states align and coordinate their individual compliance plans.

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