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The Clean Power Plan and Existing Emissions Trading Programs: Aligning National Goals with the Regional Greenhouse Gas Initiative and California's Cap-and-Trade Program

This White Paper was prepared on behalf of the following electric companies: Calpine Corporation, National Grid, New York Power Authority, Los Angeles Department of Water and Power, and Pacific Gas & Electric Company.

Executive Summary

On August 3, 2015, the Environmental Protection Agency (EPA) released the final Clean Power Plan, a regulation on carbon dioxide (CO_2) emissions from existing power plants. Although the U.S. Supreme Court has stayed the rule, many states are continuing to prepare for the Clean Power Plan, including developing a compliance plan to implement the rule in their state. These plans will reflect a number of critical state decisions, such as the type of standard to adopt, the timeline to require reductions, the emissions reduction technologies and mechanisms to pursue in order to reach targets, whether to join with other states and allow trading, and much more.

Some states will need to incorporate one other factor into their planning: how to align their Clean Power Plan compliance programs with existing greenhouse gas (GHG) emissions trading programs. In the northeast, nine states participate in the Regional Greenhouse Gas Initiative (RGGI), which establishes state-by-state CO_2 targets for power plants and a cap-and-trade program to facilitate inter-facility and -state trading. In California, power producers, electricity importers, and other sources of GHGs are subject to a statewide cap-and-trade program; this program is also linked with the Canadian province Québec. Both programs establish caps on emissions through 2020 and have plans to extend them post-2020 such that they would be in place for the duration of the Clean Power Plan's initial program period through 2029, and likely beyond.

Stakeholders in RGGI states and California supported these programs as an initial step toward a national price for CO_2 emissions and as a way to demonstrate that cap-and-trade programs can deliver meaningful and cost-effective emission reductions. Now, with a national carbon-reduction program in development, these states and stakeholders will need to determine how to apply the programmatic elements and lessons learned from their existing programs to Clean Power Plan compliance. Crucial to this process will be evaluating the best means for RGGI states and California to demonstrate compliance with the Clean Power Plan while considering potential means to trade with other states subject to the Clean Power Plan.

This paper provides a general overview of the RGGI and California cap-and-trade programs and these states' general Clean Power Plan compliance options, and then identifies several key issues and questions that these states will need to consider in aligning their existing mass-based GHG trading programs with the Clean Power Plan. The questions include:

- What generators will be affected under state programs compared to the Clean Power Plan?
- How can states maintain and/or increase the stringency of existing programs and what would be the implications of doing so?

- How can states avoid imposing uncoordinated or overlapping emissions obligations on compliance entities?
- What are the implications of states maintaining auction price floors for allowances?
- What should states consider in designing allowance distribution approaches?
- What are the implications if states maintain flexibility provisions such as offsets and price containment reserves?
- What provisions of the existing programs will become federally enforceable under the Clean Power Plan?
- Should states align existing permitting requirements or reporting and compliance timelines with those in the Clean Power Plan?
- Will states participate in the Clean Energy Incentive Program under the Clean Power Plan?

While RGGI and California have made decisions on some of these questions, others will require further engagement with stakeholders and potentially economic modeling. Such decisions are important for ensuring in-state compliance with the Clean Power Plan as well as exploring and allowing for possible trading schemes that involve other states. This will include assessing which states may prove to be administratively simple trading partners that can create efficient markets that help lower a state's cost of compliance (which may include only a selection of states). Because each jurisdiction will need to balance a unique set of local program characteristics and considerations, we do not believe there are necessarily "right answers" to these questions. However, given the leadership of these states, we do expect that there is value in designing a "trading-ready" CCP compliance plan regardless of whether they elect to trade with other states at the start of the program. A "trading-ready" state plan allows these states the flexibility to begin trading with other states whenever it is appropriate to do so, based on an analysis of the questions raised in this paper, without having to revise their state compliance plan. Thus, the goal of this paper is to foster a discussion that will allow stakeholders and policymakers to evaluate options and ultimately arrive at efficient markets to cost effectively achieve emissions reductions. This paper highlights both potential benefits and challenges of various compliance plan approaches under the Clean Power Plan. In conducting this review, we assume that states will need to balance the following objectives:

- Ensure streamlined compliance with Clean Power Plan;
- Maintain environmental and policy integrity of existing state programs; and
- Avoid barriers to linkage and achieve full benefit of broader CO_2 trading markets.

Key Takeaways

The questions above raise complex issues for the RGGI states and California to consider. It will also be critically important to design Clean Power Plan compliance plans that avoid barriers to possible linkage with other states that would prevent a state plan from being "trading-ready." Consideration of these issues as well as RGGI and California's experiences with cap-and-trade programs can be used to evaluate the best means for developing a national carbon market for the electric sector. Some of the key takeaways that this paper highlights include:

- A crucial tool to analyze and consider the issues above will be energy and economic modeling of possible options. Each region should utilize a model that can assess multiple cases and sensitivities in order to gauge the impact of various policy choices (with transparency around key assumptions).

- States should consider how their actions can foster broad trading markets while maintaining the success of existing programs and ensuring meaningful emission reductions.
- To foster broad trading markets, states may want to:
  - evaluate how best to avoid subjecting generators to two separate compliance regimes (e.g., RGGI and the Clean Power Plan) as this could create regulatory and market inefficiencies;
  - model the continuation and elimination of program elements that could create barriers to trading with other states in some configurations, such as price floors and the ability to use offsets; and
  - consider aligning reporting and compliance schedules to ensure that states can easily join interstate trading regimes (if states decide it is appropriate) at any point in the future without needing to revise a Clean Power Plan compliance plan.

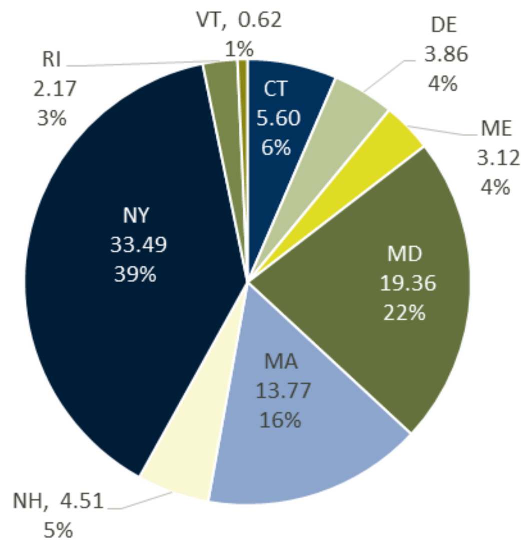
Review: RGGI and California Cap-and-Trade Programs

Both RGGI's and California's cap-and-trade program are fully operational cap-and-trade programs that have resulted in emissions reductions. Below, we provide a brief overview of key components of each program. See Appendix A for a comparison of key program components.

Regional Greenhouse Gas Initiative

The first GHG cap-and-trade program in the country, RGGI, was formed in 2005 when a group of northeast and mid-Atlantic states signed a memorandum of understanding (MOU) that outlined a cap-and-trade model rule. Each of the nine participating states—Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont—has adopted and approved an individual CO_2 Budget Trading Program that applies to all fossil fuel-fired power plants 25 MW or larger. Each state is responsible for establishing state targets in alignment with the overall RGGI targets and issuing associated allowances (each worth one short ton). Regulated entities can use allowances issued by any state, and most allowances are distributed through regional allowance auctions. In this way, the program is a single integrated market for CO_2 allowances. Under current targets, RGGI states will reduce power-sector emissions 45 percent below 2005 levels by 2020. See Figure 1 for the 2015 RGGI state allowance budgets.[1]

Figure 1. Allowance Budgets by State
(million allowances, % of total annual allowances)



RGGI states distribute a majority of allowances through regional quarterly auctions that are open to all parties, including compliance entities, non-profits, corporations, and individuals. The revenue from these auctions is returned to states and invested in "strategic energy and consumer programs."[2] These include renewable energy,

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1 Shown budgets are "base" budgets. This does not account for adjustments made in 2014 to account for accumulated banks of allowances due to faster than expected emissions reductions. These adjustments decreased actual allowances distributed via auction, but did not affect total number of tons that could be emitted, which remain at the base budget level.

2 RGGI Inc., "RGGI Benefits." Available at http://www.rggi.org/rggi_benefits.

energy efficiency, GHG abatement, and customer bill assistance. In addition, a small fraction of allowances are placed in state-run set-asides. The maximum number of allowances that any applicant may bid on in a single auction is 25 percent of the allowances offered for sale in that auction. In addition, there is a floor "reserve price" ($2.10 in 2015, escalating by 2.5 percent each year).

RGGI contains a number of compliance flexibility measures that affect market operations. Regulated entities have three years (called "control periods") to amass allowances in an amount equal to their emissions over that period; in each intervening year, they must surrender allowances for at least 50 percent of the prior year's emissions to demonstrate progress toward compliance. Entities can also bank allowances indefinitely, though no borrowing is allowed. In addition to allowances, a power plant can also use offsets, created through five protocols,[3] to cover up to 3.3 percent of its total compliance obligation; however, to date, no offsets have been issued. Finally, in 2014 RGGI introduced a cost containment reserve (CCR) that holds a supply of additional allowances that are made available if allowance prices exceed pre-set price levels (increasing in price from $4 to $11 between 2014 and 2020).

California Cap-and-Trade

The California cap-and-trade program[4] has been active since 2013. It is part of a suite of GHG emissions reductions programs developed under California Assembly Bill (AB) 32, passed in 2006, which requires the state to reduce total GHG emissions to 1990 levels by 2020. The California program covers not only electricity production and imports but also industrial facilities, transportation fuels, and natural gas distribution. Additionally, it covers seven primary GHGs: CO_2, methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF_3). In total, the California cap-and-trade program places an emissions limit on entities responsible for over 85 percent of the state's GHG emissions. Starting in 2014, the program has been linked with a similar program in Québec. The two jurisdictions hold joint auctions, and allowances from either program can be used for compliance in both jurisdictions.

Allowances (denominated in metric tons) are distributed both through quarterly auctions and through free allocation. Industrial facilities receive an allocation that, for most industries, is based on their previous year's production. Electric and natural gas utilities also receive a free allocation, largely based on historic operation, with the requirement that the value of all allowances be used to benefit customers. Investor-owned electric utilities are required to sell all allocated allowances into auction, and revenues are distributed to customers based on California Public Utilities Commission direction. The remaining allowances are sold at quarterly auctions; revenues from the auction of these general (i.e., non-allocated) allowances are placed in a fund that can be appropriated by the California legislature on projects that support the goals of AB 32. Like RGGI, any party may purchase allowances at auction, and California also imposes auction purchase limits that restrict the portion of allowances that may be purchased by any one entity. The auctions also have a price floor that sets a minimum purchase price (though this is significantly higher than RGGI's floor at just over $12 in 2015). In the most recent auction (February 2016), just over 68 million allowances were sold at the current floor price of $12.73.

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3 Current offset protocols are: (1) landfill methane (CH_4) capture and destruction; (2) sulfur hexafluoride (SF_6) emissions reduction from power transmission; (3) CO_2 sequestration from afforestation projects per U.S. Forest Projects Offset Protocol; (4) CO_2 reductions from end-use energy efficiency; and (5) CH_4 abatement from agricultural manure management operations.

4 For purposes of this paper, we will call this program the "California cap-and-trade" program, though, as we will discuss further, this program has been linked with Québec since 2014.

Clean Power Plan Compliance Pathways: Two Primary Options

The final Clean Power Plan requires that each state develop and submit for EPA approval a state plan that establishes standards of performance for the affected EGUs in its jurisdiction that are consistent with final established targets. States must develop and implement plans that ensure that the power plants in their state—either individually, together or in combination with other measures—achieve the interim and final rate-based goals or mass-based goals.

Though the final rule allows states to adopt either a rate-based or mass-based goal, we assume that all RGGI states and California will pursue a mass-based program. Under this type of program, total allowable CO_2 emissions from all affected EGUs must be equal to or less than the mass-based CO_2 goal. However, there are two possible mass-based options, each with different considerations for aligning with existing emissions trading programs: (1) a mass-based emissions standards approach and (2) a state measures approach. Each of these programs can be designed as "trading ready," which would allow allowances to be traded to other states' trading-ready programs.

1 Emissions Standard Approach

This approach applies federally enforceable mass-based standards on affected EGUs within a state. Under this approach, states must decide whether to apply the emission reduction requirements to only existing EGUs or whether to also include new units. States must also decide whether to allow trading and whether to allow EGUs in their state to submit allowances from other states to demonstrate compliance. States have discretion in allowance allocation, including the option to auction the allowances.

Because the state budget is equivalent to the total allowable emissions under the EPA-established emission standard, and because affected EGUs' emissions are limited to this budget, EPA will assess goal compliance based on an EGU submitting one allowances for every ton of CO_2 emitted. In states that allow trading, EGUs may use allowances from either its own state or from any approved state. EPA allows states to authorize EGUs to bank allowances, including across compliance periods, though there are no offsets allowed.

2 State Measures Approach

A mass-based program that includes sources and measures beyond affected EGUs is called a state measures approach. These types of measures could include renewable portfolio standards, state-administered or third party demand-side energy efficiency programs as well as market-based emission reduction programs that include components beyond emission reduction requirements for EGUs (for example, California's inclusion of non-EGU sources under its cap-and-trade program).

In order to become an EPA-approved plan, the state must demonstrate that the chosen combination of state measures and emission standards will result in achievement of the state's mass-based goal. However, the suite of state measures are not federally enforceable emission standards, and so the plan must also include a backstop of federally enforceable emission standards for all affected EGUs that would be implemented in the event that the plan does not achieve its anticipated level of emission performance. As part of a state measures plan, a state must specify the exact trigger and schedule for any possible future backstop, including state administrative and technical procedure for its implementation. If a backstop is triggered, the state is required to notify EPA, and compliance with a federally enforceable emissions standard must begin no later than 18 months after the trigger. The backstop emissions standards must make up for any shortfall in previous emissions performance, which may require adjusting ongoing emissions standards to account for prior shortfall.

EPA has made clear that states implementing state measures plans are able trade allowances with states that have implemented emissions standards mass-based programs. However, trading between emissions standards and state measures mass programs requires the accounting for "imports" and "exports" of allowances to ensure that EPA can appropriately judge whether affected EGUs in the state measures state have emitted within EPA's state targets.

The California program utilizes many design features similar to those in RGGI. Compliance entities must turn in compliance instruments each year equal to at least 30 percent of the previous year's emissions. At the end of each three year compliance period, entities turn in compliance instruments to cover the remaining allowances from the period. Up to eight percent of these compliance instruments may be offsets (the remaining 92 percent must be covered by allowances from California or Québec).[5] In the 2013 to 2014 compliance period, compliance entities submitted 12.7 million offsets, representing around 4.4 percent of total compliance obligation. Current estimates indicate that another 16.5 million offsets are currently in circulation. The program also includes an Allowance Price Containment Reserve (APCR) that is populated with allowances pulled from each year's budget (one percent of budget years 2013 to 2014, four percent from years 2015 to 2017, and seven percent from years 2018 to 2020). Allowances in the APCR are placed into escalating price tiers (ranging from $40 to $50 at program start, and increasing annually at five percent plus inflation), and offered for sale only to compliance entities in conjunction with each quarterly auction.

Considerations in Designing Clean Power Plan Compliance Programs in RGGI States and California

While these existing programs cover only emissions associated with production within (and, in California, electricity delivered to) the regulated state(s), they were initially conceived as foundational, leadership programs that could provide a framework for federal (or even international) action. For example, the legislative findings of AB 32 noted that its program would "continue [the] tradition of environmental leadership by placing California at the forefront of national and international efforts to reduce emissions of greenhouse gases," and have "far-reaching effects by encouraging other states, the federal government, and other countries to act."[6] The legislation further required that the implementing agency, the Air Resources Board (ARB), "consult with other states, and the federal government, and other nations …**to facilitate the development of integrated and cost-effective regional, national, and international greenhouse gas reduction programs**."[7] Similarly, one of RGGI's key goals is to "provide a **model for a national program** to reduce CO_2 emissions."[8] Furthermore, in the program MOU, states acknowledged that if "a federal program is adopted [that rewards states that are first movers], and it is determined to be comparable to [RGGI], the Signatory States **will transition into the federal program**."[9]

The Clean Power Plan, of course, is a national program to reduce emissions in the power sector, and EPA has strongly encouraged states to link with other states to create broader markets for emissions reductions. In addition to creating more efficient emissions markets, such linkages may help to ensure a consistent market signal across electricity markets, many of which cross state lines.

For these reasons, it is important for states with existing emissions trading programs to evaluate Clean Power Plan compliance options that avoid barriers to linkage and capture the potential benefits of broader CO_2 trading markets. States must balance this objective with two others: ensuring streamlined compliance with the Clean Power Plan and maintaining the environmental and policy integrity of existing state programs. To achieve this balance, RGGI states and California may decide not to trade with other programs in initial program development,

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5 Offsets must be created by projects in the United States and through one of six approved protocols: U.S. forest projects; urban forest projects; livestock projects; ozone depleting substances projects; mine methane capture projects; and rice cultivation projects. To date, allowances have been issued in four of the six approved categories.

6 Cal Health & Safety Code, §38501.

7 Id, §38564 (emphasis added).

8 RGGI Inc., Executive Summary of CRS Revisions (emphasis added). Available at http://www.rggi.org/docs/RGGI_Executive_Summary.pdf.

9 RGGI Inc., Memorandum of Understanding, December 20 2005 (emphasis added). Available at http://rggi.org/docs/mou_final_12_20_05.pdf.

and may wish to limit trading to states that adopt certain program types. Nevertheless, these states may wish to carefully consider how their actions can foster broad markets while maintaining existing programs and ensuring meaningful emissions reductions. And, designing a plan now that is "trading-ready" would allow RGGI and California to begin to trade with other states either at the start of the program or at any later date they determine is appropriate without having to revise the plan.

To balance these three objectives, regulators, affected units, and other stakeholders will need to determine how to apply the programmatic elements and lessons learned from the RGGI and California programs to Clean Power Plan compliance. Below are nine issues and questions that states will need to consider in aligning their existing mass-based GHG trading programs with the Clean Power Plan.

What generators will be affected under state programs compared to the Clean Power Plan?

The Clean Power Plan generally defines affected units as existing natural gas combined cycle and steam generating units greater than 25 MW.[10] These units are called affected electricity generating units, or affected EGUs. Simple cycle gas turbines and new units are not affected EGUs under the Clean Power Plan. Conversely, RGGI covers *all* existing *and* new fossil fuel fired units that are larger than 25 MW, meaning simple cycle turbines as well. The California program covers all new and existing industrial, fuel delivery, and electric generation sources of emissions that release more than 25,000 metric tons of CO_2e each year (which includes some simple cycle turbines, but most are excluded).

Both regions must determine how to address the difference in affected units under their existing programs and the Clean Power Plan. Both existing programs have a more expansive definition of affected or covered units than the Clean Power Plan (i.e., RGGI and California both cover units that the Clean Power Plan does not, and both programs cover almost every unit that is considered an affected EGU by the Clean Power Plan). Therefore, the primary question for these programs is whether to maintain existing covered unit definitions—which include all necessary units required by the Clean Power Plan, but may require additional tracking—or to modify and narrow existing program definitions.

If regions wish to maintain existing program covered units, they can develop a demonstration to EPA that the Clean Power Plan affected units are meeting the Clean Power Plan targets or use a state measures plan. As part of that plan, they must include a backstop that ensures that total emissions from Clean Power Plan affected EGUs are less than total state emissions targets. Because RGGI and California allow affected EGUs to purchase allowances from non-affected EGU sources (e.g., industrial units in California, or new units in RGGI) to cover increased emissions, these programs may result in emissions reductions from non-affected EGU sources while allowing affected EGUs to increase their emissions above Clean Power Plan levels. In this case, the state measures plan backstop would be implemented. One possible backstop design would be for states to create a limited, separate class of allowances that affected EGUs must use, the amount of which may not exceed Clean Power Plan target levels. Such bifurcation of compliance instruments could reduce market efficiency or create gaming opportunities, however, and should be carefully modeled.

How can states maintain and/or increase the stringency of existing programs and what would be implications of doing so?

RGGI and California have set aggressive targets for CO_2 reductions. RGGI has set a 2020 emissions cap of 78.17 short tons, which is already below the Clean Power Plan's combined 2030 target of 80.1 tons for the nine participating states (including new sources). If RGGI continues annual 2.5 percent emissions reductions between 2020 and 2030, total state emissions would be 60.7 tons, or nearly 25 percent below Clean Power Plan targets.

[10] Affected EGUs under the Clean Power Plan are all existing (i.e., with on-line dates before January 8, 2014) fossil steam and natural gas combined cycle units that are 25 MW and above.

Similarly, California has a suite of strong emissions reducing strategies in place in the electricity sector, including a 50 percent renewables portfolio standard by 2030 and over 1.5 percent annual incremental increase in energy efficiency savings. M.J. Bradley IPM modeling of the Clean Power Plan indicates that California business as usual emissions—that take into account these state programs and economic factors, but do not even impose Clean Power Plan emissions targets—would result in California 2030 emissions from affected EGUs of around 40 million tons, compared to a Clean Power Plan target of 52.9 tons (including new sources).

As states that have already started driving emissions reductions, RGGI participants and California may wish to continue the downward trend in emissions resulting from existing emissions trading programs, even if that results in over-compliance with the Clean Power Plan. States could achieve this trajectory in an emission standards plan by adopting targets for Clean Power Plan compliance that are below EPA's requirements but in line with existing programs. For a state measures plan, no adjustment to Clean Power Plan targets is necessary as the budgets from the state trading programs drive emission outcomes.

States may wish to consider how trading with other states could affect in-state and national emission reductions. For example, if RGGI uses an emission standards plan using the Clean Power Plan budgets, and affected EGUs in RGGI significantly over-comply with the Clean Power Plan due to existing programs, this would result in excess allowances that could be sold to other states whose emissions would otherwise exceed available allowances in those states. This sort of trading could help the country as a whole efficiently and cost effectively meet the Clean Power Plan emission reductions requirements, which will help lower costs of emissions reductions activities.

However, a state may not wish to allow others to take advantage of all of its emissions reductions. Instead, states may want to continue to drive further environmental benefits, or may want to ensure those emissions reductions result in further investment in clean technologies through auction revenues. Additionally, states may prefer to focus emissions reductions in state in order to increase in-state economic development and technology investment. California may also need to comply with the requirements of SB 1018, which requires that the state only link with programs that have requirements for greenhouse gas reductions that are "equivalent to or stricter than" those required by AB 32. States will need to balance the economic benefits of trading allowances with these alternative policy objectives. To fully evaluate such considerations, modeling will be necessary to help quantify the costs and benefits of each strategy.

It should be noted that the dynamics are different under a state measures plan, where the state program (e.g., California's cap-and-trade program) rather than the Clean Power Plan defines the emission budget available for interstate trading. In this case, over-compliance with the Clean Power Plan mass emission goals by a state measures state ensures compliance with the Clean Power Plan but does not automatically make available allowances for use by other states. Rather, these outcomes are determined by the trading choices that allow for interactions of the state measures state's cap-and-trade program with other linked programs.

How can states avoid imposing uncoordinated or overlapping emissions obligations on compliance entities?

RGGI and the California cap-and-trade program have introduced a carbon price into electric generator operations. All covered generators within these states now must pay, as part of their normal operation and maintenance, the cost of any carbon emissions. In addition, California has imposed a carbon obligation on all emitting imported electricity. If the source of the power is "unspecified," parties must assign a "default emissions rate" to each MWh that is brought across state lines.[11] This provision was in part added to try to minimize what regulators called "leakage," or replacing in-state generation (which faces a carbon obligation) with imports (which would not

[11] Entities that both export and import power in the same hour may calculate a "net imports" value for which they will incur a compliance obligation.

have faced a carbon obligation without the imports provision before the Clean Power Plan) that might otherwise occur if imports were cheaper due to a lack of carbon cost.

In RGGI, while there were concerns that the program could result in a shift of electricity generation and emissions from sources subject to RGGI to electric generation facilities not subject to RGGI, there was not a carbon price imposed on imported electricity. However, the RGGI MOU requires monitoring of electricity imports into RGGI states and reporting the results of such monitoring on an annual basis.

States under either program will want to ensure that no generator or electricity provider pays twice for carbon compliance costs. In both programs, states will need to consider the potential effects of creating Clean Power Plan allowances that are in addition to RGGI or California program allowances. In most cases, it seems preferable to design programs such that existing program allowances can also be used to comply with Clean Power Plan requirements, and the RGGI states and California have indicated their intent to do so. This would avoid both any double payment by in-state generators and limit administrative and market transaction costs.

In addition, California must carefully consider its imposition of an emission obligation on electricity imports. Under the Clean Power Plan, all states must impose binding carbon limits on affected EGUs within their state, which will likely result in a carbon price incorporated into that electricity production. As long as the Clean Power Plan imposes binding carbon limits on affected EGUs in states exporting to California, leakage that results in higher total carbon emissions would not be expected. California may wish to consider the implications of its import emissions rate given these new carbon constraints and that there will likely be a carbon price associated with compliance with the Clean Power Plan.

What are the implications of states maintaining auction price floors for allowances?

Both California and the RGGI states have auction price floors for their existing programs. Initially, these floors were established to provide a level of market certainty and ensure that the programs imposed a minimum carbon price that would begin to internalize these costs for market participants.

Especially in California, where the auction floor is close to $13, policymakers will need to consider how maintaining such floors may affect the ability to establish broader trading markets. If linked with other states that have lower allowance prices (which many statewide and national Clean Power Plan models have shown), California and out-of-state entities would choose to not purchase in-state allowances until linked state allowance prices rose to at or above California auction price floors. This would not only create market inefficiencies resulting from a bifurcated market with multiple allowance prices (which could complicate trading and open doors for market games), it may lead to allowance revenue deficits as fewer California allowances are sold and less revenue is available for ratepayer relief, clean energy investment, and other planned uses.

What should states consider in designing allowance distribution approaches?

The Clean Power Plan allows significant flexibility in how states distribute allowances to affected EGUs and/or other parties. States with approved state plans may distribute allowances for free or through an auction to any combination of entities. If a state elects not to include new sources, EPA requires that it address leakage, as defined in the final rule, either through the distribution of allowances to appropriately mitigate the risk of emissions leakage to new sources or through a demonstration or approach proposed by the state and approved by EPA.

RGGI and California both have existing systems in place for distributing allowances. In the RGGI MOU, the states agreed that at least 25 percent of each state's allowances would be allocated for consumer benefit or strategic energy purpose, which resulted in the vast majority of allowances sold through regional auctions that are conducted on a quarterly basis. States also have the discretion to design and maintain allowance "set asides" to support specific policy goals. California distributes allowances directly to local distribution companies (all utilities that maintain electric distribution systems) with the requirement that all revenue from the allowances be used for ratepayer benefit. Publicly owned utilities are allowed to use these allowances directly for compliance, while investor owned utilities are required to sell all allowances into quarterly auctions (where the state also places additional allowances) and distribute the revenue to customers per a California Public Utilities Commission Decision.

Because both RGGI and California already include new sources, these states would not need to change allowance allocation and auction procedures in order to comply with the Clean Power Plan. However, if these states wish to facilitate interstate markets, they may wish to consider the implications of trading with states that allocate differently, especially for power producers that operate across state lines. Differing allowance allocation approaches among states could create different operational incentives for affected EGUs (e.g., if an entity receives allowances for free in one state but has to purchase them from auction in another). Additionally, states may wish to consider how trading could affect allowance values, which may influence the total revenue available for ratepayer benefit or to fund state initiatives. For example, some states have discussed whether electing to only trade with other states that elect to include new sources would help mitigate the risk of different operational incentives for EGUs among trading partners..

What are the implications if states maintain flexibility provisions such as offsets and price containment reserves?

As discussed in the previous section, both RGGI and the California cap-and-trade program include flexible compliance provisions such as offsets and price containment reserves. In both programs, the use of offsets, which are in addition to state budgets, would allow compliance entities to emit more tons than allowed under the established budget. Similarly, if utilized, RGGI's CCR could increase the number of allowances in the market, and thus emissions that can be released. (Because the allowances in California's APCR are drawn from under annual budgets, this is not the case for California's cap-and-trade program.)

States will need to consider whether and how to maintain these provisions. For offsets, one option may be to utilize a state measures approach, which allows a state to establish budgets that differ from state emissions targets, so long as total emissions from affected EGUs meet that state mass-based performance standard. If a state pursues this approach, it will need to demonstrate that its overall program is expected to result in affected EGUs meeting Clean Power Plan targets, even given utilization of offsets. Another option for RGGI states may be to adopt a mass emissions standards approach that sets annual allowance budgets that are lower than state Clean Power Plan targets. Thus, even if affected EGUs utilize offsets up to the amounts allowed in existing programs, affected EGU emissions will not exceed Clean Power Plan targets.

In either case, a state will need to consider how offsets may cross state lines through interstate trading. States that link with a state that allows offsets through existing programs may not want to allow offsets for use in their programs. A state could require that any offsets produced through a protocol be restricted in use to affected EGUs within that program's jurisdiction (e.g., an offset created for use in RGGI must only be used by an affected EGU located in the nine RGGI states, regardless of what additional states have linked to those states through the Clean Power Plan). States may also wish to consider whether additional market monitoring would be required to ensure proper functioning of these complex markets.

Similarly, a RGGI state would need to determine whether to maintain the CCR. If so, it may need to establish budgets for affected EGUs that are lower than the applicable EPA targets, or modify its program to ensure that the CCR does not allow excess emissions to be released by creating allowances additional to existing budgets.

What provisions of the existing programs will become federally enforceable under the Clean Power Plan?

Unlike the existing RGGI and California cap-and-trade programs, the Clean Power Plan will require states to establish programs that are federally enforceable. In addition, if provisions of a state plan are not met, EPA has the ability to step in and impose a federal plan to achieve compliance with Clean Power Plan targets.

Under a mass emissions standards program, the total state budget adopted in the Clean Power Plan is federally enforceable. Total emissions may not exceed total allowances distributed, which in turn may not exceed the state's interim or final compliance Clean Power Plan targets. Under a state measures plan, however, a state may choose to include in its plan a number of *state*-enforceable measures, such as renewables portfolio standard programs, energy efficiency standards, or existing emissions trading programs that, collectively, will lower affected EGU emissions to Clean Power Plan levels. A state measures plan, therefore, must also include a *federally* enforceable "backstop provision" that would be triggered if actual CO_2 emission performance by affected EGUs failed to meet the level of emission performance specified in the plan over the interim performance period (2022–2029) or for any two year final goal performance period. This backstop must include fully promulgated regulations (or other policy vehicles) that specify all federally-enforceable emissions requirements and a process for their implementation. Though standards do not need to take effect until 18 months after the reported failure to reach a target, the emissions standards must make up any shortfall in emissions reductions "as expeditiously as practicable."[12]

One set of factors states will need to balance are, on one hand, the flexibility afforded by a state measures plan to accommodate existing programs and, on the other, the administrative requirements to develop a federally enforceable backstop. Because a state measures plan need not include any federally enforceable measures other than the backstop, this type of program allows a state to maintain many of its existing administrative and programmatic elements without significant changes to meet EPA requirements. However, states would need to consider how the backstop itself, which in many ways is a stand-alone mass emissions-standards program, can be designed to align with existing programs and to minimize administrative requirements. States may wish to design this backstop to address the considerations for that program type laid out in this paper, including identifying treatment of flexibility measures, addressing differences in covered units, and any necessary reporting or compliance timelines.

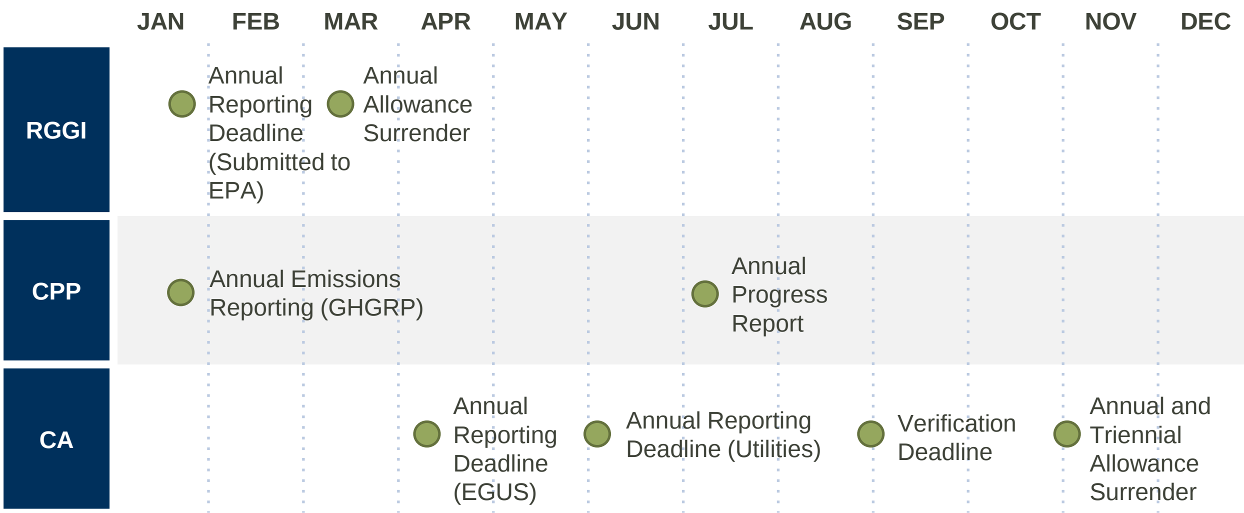
If considering a mass emissions standards approach, a state must submit a plan that accords with the requirements of §60.5790(b). This section requires states to create federally enforceable emission monitoring and reporting requirements, tracking systems, and compliance demonstrations. A state would need to consider how, if at all, it would need to modify or align its existing program with EPA's requirements for these program components.

Should states align existing permitting requirements or reporting and compliance timelines with those in the Clean Power Plan?

Existing programs in RGGI states and California have established reporting, compliance, and permitting requirements. These do not always align with EPA's timelines and requirements. Figure 2, for example, shows the three programs' differing annual timelines for emissions reporting and turning in allowances.

12 80 Fed. Reg. (October 23, 2015) at 64837.

Figure 2. Emissions Reporting and Compliance Timelines



Similarly, each program has established multi-year control / compliance periods that allow compliance entities two to three years to attain allowances to cover past emissions. EPA's proposed Clean Power Plan compliance periods in the proposed Federal Plan are not in step with either RGGI's or California's: EPA has proposed two year periods starting with the final period, while existing programs currently utilize three-year periods. Additionally, while states are not obligated to follow the Federal Plan's compliance structure, states must ensure that emissions are tracked separately between the interim compliance period and final compliance period, which may require that an existing program compliance period end at the same time as the Clean Power Plan interim period.

States will need to ensure that their final Clean Power Plan programs comply with all EPA compliance and reporting timelines. In some cases, states may be able to use existing reporting structures to provide data to EPA. However, if there is misalignment, a state will have to balance the administrative burden of modifying existing program structures with that of requiring multiple emissions reports. Or, a state may want to explore with EPA if it can submit the necessary data to demonstrate compliance even if certain specific deadlines may differ. For example, California requires reporting for EGUs and utilities by April and June, respectively, but also requires that these reports be independently verified by approved third-party verifiers. Since this detailed review must occur before allowances are submitted, California has built in a long gap between reporting and compliance. To accommodate a schedule like this, a state could establish a program to demonstrate progress toward emissions compliance – the initial reporting – before allowance surrender occurs. In the end, states will need to ensure that compliance periods are structured such that emissions from affected EGUs do not exceed interim emissions targets.

Will states participate in the Clean Energy Incentive Program under the Clean Power Plan?

In the final Clean Power Plan, EPA created the Clean Energy Incentive Program (CEIP) that provides additional allowances or emission rate credits (ERCs) to participating states. In these states, wind, solar, and energy efficiency projects that are constructed or operated after a final state plan is submitted and produce or save energy in 2020 or 2021 may earn allowances or ERCs for every MWh produced or saved. A state implementing the CEIP will provide credit to eligible projects, and EPA will reimburse that state for any allowances or ERCs distributed (up to a cap of 300 million tons nationwide). In order for a state to receive allowances from EPA's matching pool, it must have a program in its state plan to award early action credits in a way that maintains the stringency of the state's goal (not including "matching" grants from EPA's pool, which can be incremental to the targets). For example, a state that wished to distribute allowances for early action credit under a mass-based program would have to draw those allowances from under the cap in later years of the program.

States with existing emissions trading programs may wish to utilize the CEIP to credit ongoing emissions reductions activities. If so, these states may want to ensure that the CEIP is implemented in a way that aligns with any existing state incentive programs. Some states may wish to explore how participating in the CEIP would align with existing emissions targets. For example, a state could decide to implement greater stringency later in the program or allow the CEIP allowances to be sold to entities in other states.

In considering the CEIP, RGGI states and California will need to consider how participation in the CEIP could facilitate trading with other states. Even if RGGI or California design programs that, in general, do not "link" with other states to allow trading, these states could allow in-state entities to nevertheless earn allowances through the CEIP and sell these allowances outside of the existing program region. This sort of "partial" trading could help a state capture the Clean Power Plan-related benefits of early action even if the state does not wish to enter into ongoing trading with other states.

Recommended Analysis to Assess Clean Power Plan Options

A crucial tool to analyze and consider the issues above will be energy and economic modeling of possible options. Both RGGI and California have begun scoping and conducting such modeling. As the efforts progress, policymakers should ensure that models are capable of taking inputs on key policy choices and economic assumptions and providing as output dispatch decisions, allowance and energy prices, GHG emissions, and other metrics of resulting operations. Each region should utilize a model that can assess multiple cases and sensitivities in order to gauge the impact of various policy choices.

Each region will determine the ideal model type and structure to address its unique program structure and with recognition that some modeling can require financial resources that may not be available in all states. At a minimum, we recommend that, in order to effectively analyze the above key considerations, this modeling exercise be designed to run cases that incorporate the following input metrics:

1. <u>Base Emissions Budgets</u>

   Total number of allowances that are available for compliance under the mass-based program. This input can also be used to separate total compliance instruments into multiple buckets, where allowances to be utilized by affected EGUs are placed into a distinct compliance pool. This may be necessary to create a backstop under a state measures approach or design an emissions standards approach. Modeled options should include:

   - Existing regional targets
   - Lowered / tightened regional targets
   - Clean Power Plan targets (existing source only)
   - Clean Power Plan targets with the new source complement
   - Bifurcated budgets: regional affected EGU targets only

2. Flexibility Adjustment (for emission standard programs)

   This would be a downward adjustment to the base budget selected in Input 1 to account for offsets, cost containment mechanisms, or other program components that may otherwise raise emissions over acceptable Clean Power Plan targets. Modeled options should include:

   - None
   - Adjustments to budgets, as necessary

3. Compliance Entities

   This input will define the covered sources under the program and result in total in-state demand for allowances. Imposing the Clean Power Plan definition in RGGI would assume adjustments to the current program; in California, this modeling could be done in coordination with an allowance "bifurcation" in which a model would reflect a state program that has separate allowance pools for Clean Power Plan affected EGUs and other units covered under the existing program definition (as selected under Input 1). Modeled options should include:

   - Existing program definition
   - Clean Power Plan definition

4. Trading Partners

   This determines the scope of the market. While the regional only (i.e., California and Canadian trading partners, or RGGI states) captures current markets, other cases would identify opportunities or costs associated with trading with partners across the country. Because trading would require specific program design choices, this selection will be contingent on appropriate assumptions in Inputs 1 through 3. Additionally, states may wish to analyze the effect of limiting trading partners to only those states that adopt certain program types. Modeled options should include:

   - Existing region only
   - Contingent state partners
   - Non-contingent state partners
   - Selection of state partners that meet specific program design criteria

5. Allowance Distribution

   If trading with outside-region partners under Input 4, a state could model how aligning allowance distribution across programs would affect outputs such as electric mix, emissions, and total costs. Modeled options should include:

   - Maintain existing programs
   - Consistent allocation across trading region

Key Barriers to Future Linkage

This paper highlights nine key considerations for states in designing Clean Power Plan compliance programs that facilitate the continuation, expansion, and efficient operation of the existing RGGI and California programs. While RGGI states and California may decide to not trade with other programs in initial program development, these states may nevertheless wish to carefully consider how their actions in these areas can foster broad markets while maintaining existing programs and ensuring meaningful emissions reductions. In considering the wide array of compliance options under the Clean Power Plan, policymakers should avoid erecting barriers to growing collaboration with additional states.

In particular, we identify three major pitfalls on a path toward efficient regional and national carbon markets.

First, states should ensure that compliance entities are not subject to two separate compliance regimes. Beyond the clear regulatory and market inefficiency of such an approach, this double regulation will provide a strong disincentive for linkage due to its complexity and will likely raise costs without reducing emissions. Additionally, to the extent that such regulation crosses state lines, this double regulation of electricity production could exacerbate electric system "seams" issues across neighboring states. Such double regulation could occur through un-amended treatment of imports in California, for example, or through establishing programs for Clean Power Plan compliance that create separate compliance instruments for existing and new programs.

The second primary barrier to linkage is any program component that significantly inflates existing program prices over those of the remaining market. These components may include price floors, as discussed in more detail above, or increases in existing program stringency that limit the availability of Clean Power Plan-compliant allowances. Such programmatic elements are not impossible to maintain, and may in fact benefit the overall system, but they must be carefully modeled with an eye both toward in-program results and possible future expansions of trading. Modeling that shows a significant spread between existing program prices and out-of-state prices should be a cause for reconsideration.

Finally, states should strongly consider aligning reporting and compliance schedules with EPA requirements in order to facilitate future interstate cooperation. As RGGI and California undergo programmatic reviews, the time is ripe for an update. Without similarity on this simple issue, states may find it challenging to join interstate trading regimes due to administrative and logistical concerns. Having common timing for allowance distribution, compliance, and reporting will allow states to easily coordinate the trading infrastructure that underlies efficient markets.

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Appendix A. Comparison of Key Program Components

Program Component	California	RGGI	Clean Power Plan
Jurisdiction	California (*see "Linkages" for more information)*	Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, Vermont	All states except Alaska, Hawaii, and Vermont
Compliance Instruments	• Metric tons • Offsets allowed for up to 8% of total compliance obligation	• Short tons • Offsets allowed for up to 3.3% of total compliance obligation	• Short tons • No offsets allowed
Covered Entities & Emissions	• Seven GHGs: CO_2, methane N_2O, SF_6, hydro- and per-fluorocarbons, and NF_3 • All electricity generators, industrial facilities in identified categories, and providers of natural gas or transportation fuels that emit more than 25,000 metric tons of CO_{2e}	• CO_2 • All electricity generators greater than 25 MW	• CO_2 • Existing NGCC and steam electricity generators (operational before January 1, 2014) Just CO_2 greater than 25 MW
Allowance Distribution	• Industrial facilities: free allocation, primarily based on updating output, to cover a declining portion of emissions • Electric and natural gas service providers: free allocation to LDC (electric IOUs must sell allowances into auction) • All remaining allowances sold in auction	Over 90% of allowances sold into regional auction	• No specific requirements • If new sources are not included, allowance distribution can be used to show that leakage will not occur
Cost Containment Mechanism	Allowance Price Containment Reserve (APCR) populated with allowances pulled from each year's budget (1 percent of budget years 2013-2014, 4 percent from years 2015-2017, and 7 percent from years 2018-2020); offered in escalating price tiers (ranging from \$40 to \$50 at program start) and offered for sale quarterly only to compliance entities	Cost Containment Reserve (CCR) that holds a supply of additional allowances that are made available if allowance prices exceed pre-set price levels (from between \$4 to \$11 in 2014-2020).	None
Price Floor	\$10 in 2012, escalating 5% annually	\$2.10 in 2016, escalating 2.5% annually	None
Compliance Periods	Three year periods ('15 – 17, etc.), with obligation to surrender 30% of annual obligation each intervening year	Three year periods ('14 – 16, etc.), with obligation to surrender 50% of annual obligation each intervening year	Three year periods during interim period, two year periods during final period.
Interstate Linkages	• Full trading with Québec, proposed with Ontario and Manitoba • All imported electricity assigned emissions rate (either of source or at a default level)	Full trading between all nine participant states	Permissible with certain state plan design characteristics