

Emissions Market Design

Jan 11, 2022, Draft

Summary

The emissions market is functioning smoothly and efficiently, achieving 100 percent compliance. This solid platform and the ongoing Scoping Plan process provides an opportunity to consider reforms to strengthen the market in three related ways that could contribute importantly to achieving the state's ambitious economywide 2030 greenhouse gas reduction goal.

One way would address the substantial reservoir of emissions allowances in circulation and in public accounts (see chapter XX), and the influence this pent-up allowance supply may have on the state's ability to achieve its emissions reduction goal. Coincidentally, by reducing the cumulative supply of allowances, this approach also would lead to an increase in allowance prices, providing a signal to drive further innovation and investment in a clean economy.

A second way to strengthen the market would be to support allowance prices directly. Prices have recently risen well above the price floor, but if prices were to fall again to near the price floor indicating emissions reductions are inexpensive, the quantity of emissions would not be affected. The second reform we consider would ensure that price reductions in the future would achieve associated reductions in allowance supply and emissions.

If the state were to implement reforms that reduce allowance supply and increase the allowance price, one can anticipate the allowance market value would increase overall. However, under the current program structure, the flow of value to the Greenhouse Gas Reduction Fund would likely decrease. A third potential reform would improve the stability and potentially grow the magnitude of revenues for the Fund, which is an important channel for investments to decarbonize the state and especially aimed at addressing legacy environmental burdens in historically disadvantaged communities. Two incremental program changes would be required. First, all free allocation would be consigned to the auction before allowances can be used for compliance, analogous to the current requirement for allocation to investor-owned utilities. Second, the priority assigned to sale of consigned allowances at undersubscribed auctions would be revoked, and instead allowances for sale would be drawn proportionately from all sources of supply. These measures would ensure the options for potential reform we discuss would increase Fund revenues as well as improve the contribution of the emissions market to achieving the state's greenhouse gas reduction goals.

Introduction

The conclusion of the third compliance period (2018-2020) and the ongoing Scoping Plan process provides the Air Resources Board with the opportunity to assess the carbon market and consider potential reform. The final accounting of the emissions allowances in circulation after 2020 finds a substantial quantity of allowances have been banked for future use. Banked allowances in private accounts total more than the cumulative reductions under the emissions cap that will be implemented from 2021-2030 (see Chapter XX). Moreover, a substantial number of allowances held in public accounts may enter the market if allowance price triggers are met. These add to new vintage allowances and offsets to constitute the supply of allowances, although the supply of new allowances issued annually is scheduled to reduce substantially and the supply of offsets is more limited beginning in 2021.

An assessment of the market also requires analysis of allowance demand, which is influenced by many factors including the post-pandemic recovery and regulatory programs that may incentivize emissions reductions. In **Chapter YY**, we suggest that assessment of demand and supply scenarios should be a component of the Scoping Plan process, providing the foundation for dialogue at the Air Resources Board about the role of the carbon market in achieving the state's comprehensive emissions reduction goals, and consideration of potential reforms to the market if they are needed.

The allowance price that results from the interaction of supply and demand is tremendously difficult to forecast. We defer to the Air Resources Board and the legislature in determining the appropriate price range, but one can observe that low prices will provide weak incentives for investment and emissions reductions and consequently emissions reductions will require a greater role for regulations. We believe that a higher allowance price would improve cost effectiveness of emissions reductions overall and support companion regulations. Tightening the allowance supply is therefore a lever that the state should pull if prices are low.

In this chapter we outline options that are available to the Air Resources Board for potential reform through adjusting allowance supply and adjusting the way supply enters the market. These options all firmly preserve the role of the market in efficient mobilization of cost-effective mitigation opportunities and support ongoing emissions reductions in line with California's economywide climate goals. They can be distinguished to some degree by their reliance on *administrative interventions* and *automatic (rule-based) adjustments*. Where possible, we encourage the use of automatic adjustments such as tethering changes in allowance supply to allowance prices, analogous to behavior in commodity markets, although administrative interventions are always possible and can be potent.

A reduction in allowance supply and an increase price will increase the allowance market value but depending on program rules that may not map into an increase in value flowing to the Greenhouse Gas Reduction Fund. We anticipate that maintaining or growing the value of the Fund is necessary to build consensus for any of the reforms we consider. We describe two incremental program changes that are necessary for this to occur and to advance the consideration of other reforms generally.

Administrative versus automatic adjustments to allowance supply

We consider administrative adjustments to be adjustments made by the regulatory agency or legislature that immediately change market rules. Rule-based adjustments are those that are contingent on market outcomes, with the conditions under which adjustment occurs announced in advance.

Both types of adjustment have been evident previously in emissions trading programs and generally have strengthened those markets and accelerated emissions reductions. In the northeast state Regional Greenhouse Gas Initiative (RGGI), the issuance of new allowances through the auction has been reduced administratively twice to account for the substantial supply of allowances that had accumulated in private accounts through banking and in public accounts because of allowances unsold at the auction price floor. Coincidentally, a rule-based reduction in supply resulted when prices rested on the price floor, and the rule-based cost containment reserve was once triggered bringing additional allowances into the market (<https://www.rggi.org/program-overview-and-design/design-archive>). In the European Union Emissions Trading System, administrative adjustments have reduced allowance supply in each phase of the program. This has been recently supplemented by the rule-based Market Stability Reserve that

changes allowance supply automatically based on the measure of the quantity of allowances in circulation (the allowance bank) (Perino 2018).

California has also previously enacted administrative and rule-based adjustments in its market, including a regulatory decision to increase the share of allowances set aside in reserve accounts, a legislative restriction on the use of post-2020 offsets, and rule-based adjustments to transfer unsold allowances to reserve accounts and to account for emissions leakage in the electricity sector. These precedents have strengthened the market, but they have not sustained the allowance price at a level that adequately promotes state ambitions, requiring an expanded role for regulatory mandates and standards to achieve the state's climate goals.

We argue generally in favor of rule-based adjustments such as a price floor and additional allowance supply price steps whenever possible because these features are transparent and can be anticipated ex ante by compliance entities. A rule-based adjustment to allowance supply transforms a fixed (inelastic) allowance supply into a price-responsive allowance supply that contracts when the market price is low and expands when it is high, mimicking the dynamic in commodity markets where both demand and supply respond to changes in market outcomes.

It is important to note that an administrative adjustment such as a reduction in the issuance of new allowances always remains an available option for policymakers. One disadvantage of an administrative approach is that it may amplify regulatory uncertainty by instituting changes as a surprise, causing parties to anticipate further possible changes in their compliance planning; and it can be administratively challenging to adjust the market on a case-by-case basis. It is generally easier to identify criteria for adjustments ex ante and embody them as rules in market design. Hence, while recognizing the potential use of both approaches, we argue a rule-based approach is preferable and whenever possible the features of a rule-based approach should be built into the program design.

Administrative options for market reform

IEMAC has identified several options for administrative adjustments to allowance supply:

Changes in auctioned allowance supply

A reduction in the supply of new allowances would increase the allowance price and would be expected to increase the total economic value (quantity times price) of all allowances issued in the program, as occurred in RGGI. However, if the Air Resources Board were only to reduce the new vintage allowances sold through the auction — without also adjusting the extent to which allowances are freely allocated to utilities and industry — then it would cause a shift in the distribution of the economic value of allowances away from the Greenhouse Gas Reduction Fund to entities that receive freely allocated allowances, and likely would reduce the value flowing to the Fund. If the Board or the legislature seeks to maintain or increase value flowing into the Fund while reducing allowance supply, then a change in allowance supply should balance a reduction in auctioned allowances and freely allocated allowances.

Changes in freely allocated allowances to utilities

A portion of allowances are freely allocated to electricity and gas utilities, some of which must consign them to the auction and receive auction revenue on behalf of their customers. The utility-owned consigned allowances are the first to be sold under the auction, taking precedence over state-owned allowances that contribute to the Greenhouse Gas Reduction Fund when auctions are undersubscribed (i.e., when auctions clear at the price floor). Although this prioritization benefits utility customers

through the distribution of climate dividends, it undermines the stability of auction revenue for the Fund. Instead of prioritizing consignment allowances, an alternative approach would proportionately reduce the sale of consigned allowances and all other supplies in an undersubscribed auction. This alternative would not have any effect when auction prices clear above the price floor but could reduce volatility for revenues and achieve proportionally equal effects on free allocation recipients and Fund revenues if market prices fall to the price floor.

The state also should consider improving the visibility of consignment allowances for utility customers to better communicate the compensation provided to ratepayers. Many customers are not aware they receive the climate dividend, but anecdotally the dividend is popular when customers are made aware of it and improving its visibility could improve the popularity of the program. Today, utility revenues are rebated to all residential customers of investor-owned electric utilities on a broad basis, and thus contribute modest rate benefits for all customers. Although broad-based rebating has its own merits, policymakers might also wish to consider how consignment allowance revenues could be targeted at low-income households instead.

Changes in freely allocated allowances to industry

A portion of allowances are provided to energy-intensive and trade-exposed industries to prevent emissions leakage, as well as to protect industrial competitiveness and maintain employment in the state. While changes to this allocation schedule could influence economic activity in these vulnerable industries, the allocation methods were based on industry conditions over a decade ago and expected carbon market prices that are much greater than what has been observed (Economic and Allocation Advisory Committee 2010). We encourage the Air Resources Board to review how free allocation to various industries has aligned with emissions from those industries and whether the current allocation strategy effectively prevents leakage while also not overcompensating firms.

Whatever level of free allocation policymakers determine, we recommend a change in how those allowances are introduced to markets. Specifically, we recommend that policymakers require compliance entities to consign all freely allocated allowances for sale at auction, with revenues flowing back to the allowance owners. If the allowance is fully subscribed and all allowances are sold, this reform would not change the value of free allocation, but it could convey several other benefits including improving price discovery and market liquidity, market transparency, and recognition of opportunity costs in compliance decisions aligning organization interests with the state's emissions goals (Burtraw and McCormack 2017).

Changes in offset availability

Potential adjustments in offset availability are discussed in **Chapter XX**. It is valuable to reiterate here the observation that offsets expand the volume of compliance instruments and lower the allowance price in the short term. Because most offset credits do not lead to reductions that are counted under California's greenhouse gas inventory, while they enable higher in-state emissions in sectors covered by the cap-and-trade program, their use sets the stage for a future reconciliation between the mitigation achieved by sources covered by the emissions cap and the share of statewide greenhouse gas reductions that is expected to come from those sources. That reconciliation may necessitate adjustment to the emissions market that should be anticipated in the Scoping Plan process.

Automatic adjustments to allowance supply

IEMAC has identified several options for automatic adjustments to allowance supplies. These adjustments are based on conditions that may be observed in the market in the future, so they are not guaranteed to affect allowance supply, but they will affect market dynamics.

Raising the price floor

A change in the price floor will affect the distribution of expectations of future allowance prices and supplies. A higher price floor could induce greater emissions abatement that temporarily increases the allowance bank; however, if market prices fall to the new floor price, then there could be a reduction in allowance supplies that would also have long-run market supply effects. The price floor could be adjusted by a one-time price increase. However, a smoother adjustment can be implemented through a series of discrete price increases over time, which would be equivalent to increasing the annual increase in the price floor to a value above the current value of 5 percent per year (plus inflation).

Introducing additional price steps

The allowance price schedule starts from the price floor and has price steps that are 50 percent and 75 percent of the way between the floor and the price ceiling. At these price steps additional allowances from the cost containment reserves are available in the market. An additional price step located 25 percent of the way between the floor and the ceiling could deliver symmetry to the allowance supply schedule. Rather than adding additional allowances as do the cost containment reserves, this price step could reduce supply below the anticipated issuance of new allowances. This limitation of allowance supply would support the price above the level it would obtain otherwise and would be expected to result in greater value for allowances entering the market. Adding an additional price step is an approach that is embodied in the emissions containment reserve in RGGI, where 10 percent of allowances are held for sale only at a price above the reserve price trigger; a similar approach is indicated in Washington state's new cap-and-trade program as well.

Conditioning offset availability on the auction price

Within the carbon market, offsets contain allowance cost by expanding the supply of compliance instruments. One reform could be to tether the use of offsets for compliance to the auction price, such that fewer offsets are available at low prices and are increasingly available at higher prices. The limit on offset use during a compliance period could reflect cumulative auction outcomes. This approach would clarify the role that offsets play in containing cost, while also limiting the supply of offsets when allowances supply is abundant, and prices are low.

Implement a quantity-based adjustment to allowance supply

The EU Market Stability Reserve implements a rule-based adjustment to the auctioned supply of allowances based on the total number of allowances in circulation, i.e., the allowance bank, at the end of every annual compliance period. This approach has been impressively impactful in the EU emissions market, leading to the anticipated cancellation of nearly one gigaton of emissions allowances in 2023, roughly equal to one vintage year of allowances in the program. However, it has been criticized for amplifying regulatory uncertainty compared to an adjustment rule based on the allowance price, and because of potentially perverse outcomes stemming from the timing of when adjustments are implemented in the EU market (Rosendahl 2019; Perino 2019; Flachsland et al. 2019).

Impact on the Greenhouse Gas Reduction Fund

Allowance market value is a product of allowance supply and price. Over the range of the market size expected this decade and the price responsiveness one observes in the market, evidence from simulation modeling using a derived elasticity of demand for emission allowances indicates that restricting supply and increasing the price of allowances would be likely to increase the market value overall. However, the increased value may not flow proportionately within the market and may in fact lead to a reduction in the value flowing to the Greenhouse Gas Reduction Fund, which provides important investments to poor communities and those that have experienced disproportionate environmental burdens.

Reforms to the cap-and-trade program can support emissions reductions in line with California's economywide climate goals. We anticipate that to achieve consensus for program reforms, they must be designed to improve the stability of auction proceeds contributing to the Greenhouse Gas Reduction Fund, and where possible increase the value of those proceeds.

Two changes to program rules are necessary to satisfy this criterion.

1. Require the consignment of all freely allocated allowances including those to industry to the auction before they can be used for compliance. The proceeds from the sale of allowances would be returned proportionately to their owners in a manner analogous with utility-consigned allowances currently.
2. Remove the priority sale assigned to consigned allowances when the auction is undersubscribed due to a clearing price at the price floor or at a newly introduced emissions containment reserve price and scale the sale of allowances from all sources proportionately.

By ensuring proportional changes to freely allocated and auctioned allowance supply, these changes would maintain or grow Fund revenues if the Air Resources Board or legislature decide to implement other program reforms that we describe.

References

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