

Market Design to Strengthen California's Climate Policy Portfolio

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Every five years the Air Resources Board's Scoping Plan process provides a blueprint for California's climate policies. The Plan assesses the emissions pathway under status quo policies, describes the state of technology, and where technological advancements are required. Traditionally, the Plan does not prescribe policy, but it does describe the contribution that regulatory actions are expected to make to the state's climate outcomes.

Although the carbon market is anticipated to play a fundamental role in achieving the state's goals, sector-specific regulatory policies have been and will continue to be critical to environmental outcomes. However, regulatory ambition may be intermittent and the outcomes from regulation are uncertain. Regulatory targets embodied in efficiency performance standards for buildings and vehicles are typically effective in improving the efficiency of energy use, but sector-specific emissions are not constrained. Secular trends in economic activity, fuel prices, and behavior are inherently uncertain and strongly influence outcomes; hence, ***uncertainty about emissions outcomes and timelines in the regulatory domain is inherent.***

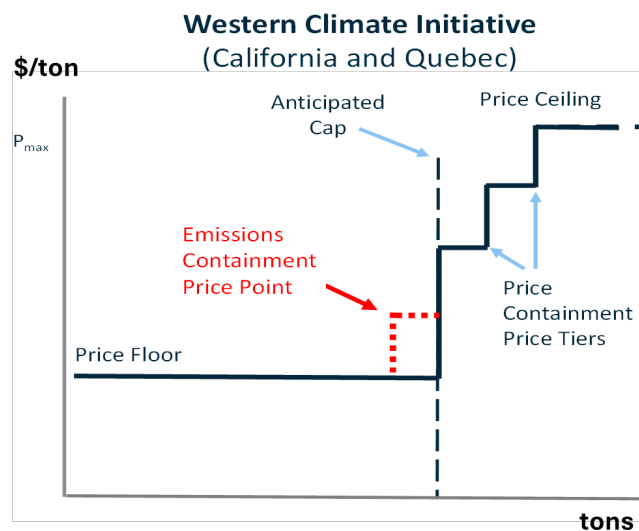
The carbon market interfaces with regulations in several important ways. The declining emissions cap boosts confidence that emissions reductions will be achieved over time at covered sources. The emissions market is generally understood to be more cost effective than prescriptive regulation [see other chapter in this report], providing benefits to the state's economy as a leading instrument to achieve the state's climate goals. The price provides information to investors and consumers and shapes expectations about the future. The market provides revenue for investments to accelerate emissions reductions and to address other social concerns. And importantly, as part of the climate policy portfolio, the price in the carbon market responds to the variable performance of regulations and economic trends.

The dilemma is that the carbon market does not efficiently amplify and may diminish the performance of sector-specific regulations. When state regulations, measures by local government, firms, or individuals are effective in mitigating emissions they reduce the demand for emissions allowances. [reference the cost containment chapter here] Unfortunately, over a broad range of outcomes, successful regulations do not affect the number of emissions allowances available in the market and hence do not affect the emissions that occur. This phenomenon is known as the "waterbed effect" because the emissions cap acts like the volume in a waterbed; that is, when regulatory policies push emissions down in one place, emissions rise at a covered entity somewhere else in the market. The price is affected by regulatory activities outside the market, but the emissions outcome is not affected, thus eroding the contribution from regulations.

The Western Climate Initiative carbon markets (California, Quebec, and Washington) and the Regional Greenhouse Gas Initiative have measures to ameliorate extreme fluctuations in allowance price through the auction price floor (minimum price in the auction) if prices reach very low levels and allowance reserves that make additional allowances available if the price reaches very high levels. In California, however, price movements over the broad range between the price floor price of \$24 and the tier one reserve price threshold of \$56 yield no changes in emissions.

In annual reports since 2018, this committee has described an adjustment to market design that can importantly improve the alignment of the market and regulations within a more strategic policy framework. This market feature is sometimes named an Emissions Containment Reserve. In its simplest and most practical form, ***an Emissions Containment Reserve would add a price step at about \$40, midway between the price floor and reserve price threshold.*** As illustrated in Figure 1, this price step would apply to a fraction (e.g., 10%) of the allowances that would otherwise enter the market, and it would constrict allowance supply by removing these allowances from sale in the auction if the auction clearing price were below the price step. Implementation of this feature would be very simple and precisely mirror the existent price floor mechanism.

Figure 1: An illustration of the allowance supply schedule with an Emissions Containment Reserve



Importantly, ***an Emissions Containment Reserve would be triggered only if and when allowance prices are low***, accelerating emissions reductions when prices are low, and magnifying the cost effectiveness of the carbon market. In this way, the Reserve would support the affordability of California's overall climate policy portfolio.

A related concern is the accumulation of a large privately held allowance bank, now greater than 379 million tons and greater than one year's allowance supply. Although there is little theory to describe the optimal size of the bank and that size depends on expectations about the future of the market, a very large bank conveys a sense that the allowance supply is too generous and that future emissions reductions will be hard to achieve because the bank provides an ample allowance supply that will re-enter the market. The Regional Greenhouse Gas Initiative has responded to a comparable situation with administrative adjustments to reduce the supply of newly auctioned allowances to absorb the private bank into the market. The European Union responded with the adoption of a quantity-triggered approach to automatically adjust allowance supply in response to the bank (the number of allowances in circulation). The EU's quantity-based approach is complicated and may be less efficient according to most economic appraisals than a price-based approach such as an Emissions Containment Reserve because

the quantity-based adjustment is delayed and difficult to predict; nonetheless, the quantity-based approach has enabled a reduction in the size of the bank and a substantial increase in allowance prices in the EU.

In response to the challenge of implementing repeated adjustments to supply, the Regional Greenhouse Gas Initiative in 2021 implemented an automatic price-based adjustment to supply as an Emissions Containment Reserve. Washington also adopted this feature in legislation establishing its carbon market, but the feature was suspended largely in anticipation of eventual linking with California, which has not adopted this feature.

Paradoxically, ***a reduction in allowance supply to support the allowance price will likely yield an increase in auction revenue.*** The value of allowances is determined by their number multiplied by their price. Much like reduced supply in commodity markets can increase the commodity's value, if an Emissions Containment Reserve were triggered leading to reduced allowance supply it would yield an increase in allowance value. Three times in 2023 the auction price fell below the proposed price trigger level, and three times again in 2024. Based on modeling from Roy et al. (2024), ***the absence of the Emissions Containment Reserve has lost the state's Greenhouse Gas Reduction Fund over \$250 million in each of those three auctions in 2023 and again in three auctions in 2024.*** That is, the lost opportunities for revenues to the Fund accumulate to over \$1.5 billion since 2023.

For an Emissions Containment Reserve to benefit the Greenhouse Gas Reduction Fund, ***it is important that adjustments to supply accrue not just by constricting auctioned supply but also across all channels through which allowances enter the market,*** including allowances consigned by utilities and free allocation to industry. Currently, utility-consigned allowances sell before state-owned allowances, and hence sell first if the price falls to the price floor. Utility consigned allowances can be treated symmetrically with auctioned allowances by ending the priority sale of consigned allowances in the auction, which would create a symmetric treatment for these allowances and state-owned allowances. Free allowances to industry can be adjusted as part of the annual true-up that already occurs to adjust free allocation to changes in production at industrial facilities.

A different approach to realize greater emissions reductions when allowance prices are low would be to raise the auction price floor, which would shorten the vertical portion of the allowance supply curve in Figure 1 and also reduce the influence of the waterbed effect. If the auction clearing price were to fall to the price floor, then allowance supply would be reduced. As with an Emissions Containment Reserve, for this reform to preserve the share of allowance value accruing to the Greenhouse Gas Reduction Fund it would be important that adjustment to supply occur for all channels through which allowances enter the market. An advantage of introducing an additional price step as an Emissions Containment Reserve is that it fills out a price-responsive allowance supply schedule which preserves and enhances the role of the market in price discovery over a wider range of outcomes (Roberts and Spence 1976; Burtraw et al. 2022). An increase in the price floor could be coupled with an Emissions Containment Reserve. We understand that a change in the price floor or the introduction of an Emissions Containment Reserve would not require legislative authorization.

A related opportunity for reform exists in the way sales from the Allowance Price Containment Reserve would be implemented if the mechanism were triggered by a high auction clearing price. Although prices have never reached a level that would trigger a sale from the Reserve, regulations imply that sales from the Reserve would occur weeks after the auction if the auction price reached the price trigger threshold. This separation in time is unnecessary and makes

possible the cycling of allowance prices and potential strategic behavior. In contrast, the allowances from the Cost Containment Reserve in the Regional Greenhouse Gas Initiative are available instantaneously in the auction if the price reaches the threshold, like the current price floor mechanism Emissions Containment Reserve in that market.

A price-triggered Emissions Containment Reserve and a parallel rule-based approach to the Allowance Price Containment Reserve would provide mechanisms like the current price floor that could be anticipated by market participants and implemented automatically. The mechanisms would not be dependent on discretionary decisions and procedures that are challenging to implement in the moment, and which can appear to observers as arbitrary. For example, recently Washington made an administrative decision about the number of allowances and price level for implementing its Allowance Price Containment Reserve, which led some market participants to unexpectedly lose substantial value and may have weakened overall market confidence. In contrast, a rule-based approach decided ex ante could be anticipated, would be perceived as fair, and would boost confidence in the performance and durability of the market.

In summary, ***automatic adjustments to allowance supply are necessary to better align incentives in the market with regulatory initiatives.*** Rule-based approaches triggered by the auction price like the current price floor, a new Emissions Containment Reserve, and a reformed Allowance Price Containment Reserve boost confidence in the market and the credibility of the state's long-term goals. It would enable the market to automatically respond to inherent uncertainty in economic conditions and the state's prominent regulatory programs. Reform of California's market design to better align the market with regulation is important to California's goals and can be a model for policy globally.

Recommendations

1. CARB should initiate a workshop to investigate the introduction of an Emissions Containment Reserve to add a price step at about \$40, midway between the price floor and Allowance Price Containment Reserve price threshold.

References

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- Burtraw, D., C. Holt, K. Palmer, and W. Shobe. 2022. "Price-Responsive Allowance Supply in Emissions Markets." *Journal of the Association of Environmental and Resource Economists*, 9: 851-884.