

TO: Transportation and Climate Initiative

FROM: Thomas J. Modzelewski

DATE: March 24, 2021

RE: Draft Model Rule Comments

By Electronic Submission to www.transportationandclimate.org

I am writing as an interested citizen with an educational background in energy physics who is currently studying climate change law at Harvard University. I applaud efforts to reduce greenhouse gas (GHG) emissions within the transportation sector. The cap-and-invest program envisioned by the multi-jurisdictional Transportation and Climate Initiative Program (TCI-P) will likely be a strong catalyst for reducing mobile GHG emissions.

I am grateful for the opportunity to comment on the Draft Model Rule of the TCI-P dated March 1, 2021. I recommend modifying three provisions of the Draft Model Rule to encourage the distribution and sale of alternative drop-in liquid fuels which do not emit net CO₂ when burned. I also recommend that you consider modifying the auction mechanism for CO₂ allowances by substituting a Vickrey-Clarke-Groves auction method in place of a uniform price auction method. This modification would help preserve the incentive for bidders to bid sincerely, thereby minimizing the chance of creating inefficient price equilibriums for CO₂ allowances.

Recommendation #1: Consider modifying the TCI-P Draft Model Rule's provisions to encourage the distribution and sale of alternative drop-in liquid fuels that do not emit net CO₂ when burned.

While the CO₂ market-pricing mechanisms integral to TCI-P will undoubtedly accelerate a shift in the transportation sector to electric vehicles (EVs), it is important to keep in mind that less than 2% of new vehicle sales in the U.S. today are EVs. Even if EV sales increase dramatically over the next decade, liquid fuels will likely power most passenger vehicles on the road for the foreseeable future since the average lifespan of a car is about 12 years. Therefore, it would be prudent to encourage the production and distribution of alternative carbon-neutral "drop-in" liquid fuels such as advanced biofuels and electrofuels to reduce CO₂ emissions from the transportation sector as soon as possible. Biofuels and electrofuels have practical advantages because they can be used immediately by conventional engines and transported via existing petrochemical infrastructure such as tankers and pipelines.

Advanced second-generation biofuels can be produced from switchgrass, farming residues such as cornstalks, paper manufacturing by-products, and yard waste. Electrofuels (i.e., synthetic fuels) are a promising new technology in which hydrocarbon fuels are created from ambient atmospheric CO₂ and hydrogen feedstock. Electrofuels are carbon-neutral, provided the

electricity used during electrolysis to produce hydrogen is obtained from non-carbon emitting sources such as wind, solar, hydropower, or nuclear.

While advanced biofuels and electrofuels emit CO₂ when burned, they are not a net new source of CO₂ in the atmosphere, unlike conventional gasoline or diesel produced from oil pumped from the ground. To encourage the use of alternative liquid fuels, I recommend modifying the TCI-P Draft Model Rule as follows:

Section XX-1.4(f)

The cessation of TCI-P compliance and reporting requirements should be modified to consider *net zero* CO₂ emissions to encourage the production and distribution of carbon-neutral alternative liquid fuels.

This provision's language could be interpreted to require jurisdiction fuel suppliers to satisfy TCI-P compliance and reporting mandates, even if they exclusively distribute carbon-neutral fuels. Clarifying that carbon-neutral fuels do not count toward calculations of metric tons of CO₂ emitted may encourage greater distribution of such fuels because suppliers would avoid additional administrative costs. Moreover, these administrative cost savings can be passed on to the consumer, helping make carbon-neutral fuels more price competitive with conventional gasoline/diesel.

Section XX-1.5(b)(1)

Jurisdiction fuel suppliers should be able to exclude carbon-neutral fuels from their calculations of required CO₂ allowance purchases.

This change would ensure that jurisdiction fuel suppliers are not financially penalized for distributing carbon-neutral fuels. It would also create a price mechanism to favor carbon-neutral fuels compared with conventional gasoline/diesel.

Recommendation #2: Consider replacing the uniform price auction format for CO₂ allowances in the TCI-P Draft Model Rule with an alternative Vickrey-Clarke-Groves (VCG) auction mechanism to avoid the potential sub-optimal market pricing of allowances.

A uniform price auction is an auction for a fixed number of identical units of a homogeneous commodity, in this case CO₂ emission allowances. Units are allocated to the highest bidder, the second highest bidder, the third highest, and so forth until the commodity supply is exhausted. All bidders receiving an allocation of units then pay a per-unit price equal to the lowest winning bid, or in a variation, the highest winning bid. Unless each bidder desires only a single unit, a uniform price auction creates an incentive for bidders to bid insincerely. In the case of scenarios in which multiple-unit demand exists, bidders have an incentive to shade their bids for additional units, resulting in depressed demand and an inefficient price equilibrium.

In contrast, a VCG auction variation maintains the incentive for a bidder to bid truthfully. Under this auction format, each bidder is penalized for the harm it causes other bidders by shading. A

VCG auction creates an incentive for bidders to bid their actual unit valuations, since different bidding strategies are not financially optimal.

To encourage optimal bidding to maximize the value of CO₂ allowances and revenue received, I recommend modifying the TCI-P Draft Model Rule as follows:

Section XX-11.4

Replace the reference to a uniform price auction with a Vickrey-Clarke-Groves auction

In summary, I believe that the Draft Model Rule may be improved by creating carve outs or exceptions for carbon-neutral drop-in fuels with respect to compliance, reporting, and CO₂ allowance purchase requirements. I also believe that a modified auction methodology can help to maximize the value of CO₂ allowances. These changes would allow the Transportation and Climate Initiative Program to better meet its CO₂ reduction goals by pricing CO₂ emissions more efficiently and encouraging the distribution and sale of carbon-neutral fuels over conventional gasoline/diesel fuels.

Thank you for your attention to my comments.