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28 August 2019

Dr. Emily Wimberger  
Chief Economist  
California Air Resources Board  
1001 "I" Street, Sacramento

Dear Dr. Wimberger,

Thank you for organizing the workshop on the Social Cost of Carbon and Affordability in Sacramento on August 16<sup>th</sup>. There can be no question that California faces affordability challenges, and we support attention to protecting lower- and middle-income households. It is also important to emphasize that California's affordability challenges are overwhelmingly determined by factors apart from climate policy.

California policy has caused not just costs but also benefits. Our view is that benefits such as tens of billions of dollars attracted for clean technology research and startup activity, an established and growing collection of clean energy companies and jobs, and lower energy bills due to efficiency investments have neutralized costs—if not completely then nearly so.

While working for the Union of Concerned Scientists in 2006, I added three Nobel Prize-winning economists as signatories to the [economists' letter](#) supporting the 2020 cap (Akerlof, Arrow, and McFadden). The economists' letter message then was: "The most expensive thing we can do is nothing." Today, we can go further. California [has proved](#) that climate policy leadership and strong economic growth can go hand in hand.

This is different from saying that the policies have caused stronger overall growth. While there is some uncertainty about the net effect of costs and benefits, there is no doubt that California's economy has continued to grow robustly even as its climate policy efforts have ratcheted up. Affordability challenges in California exist in no small part due to the combination of strong job creation and suboptimal housing development. Poverty and inequality need to be addressed, but the state's economy is recognized globally as an outstanding creator of innovation and wealth.

### ***Clean Tech Manufacturing, Exports, and Jobs***

There is an important bright spot in the realm of clean technology manufacturing that deserves attention as industry cites leakage concerns. Electric vehicles are already a top foreign export for California, the seventh largest by revenue earned, bringing in [nearly \\$3 billion dollars](#) in 2017 according to federal trade data. Tesla, Inc. is the only major automaker in California, and is certainly driving this growth.

Tesla's production grew quickly in 2018, but the automaker had an incentive to prioritize domestic sales in that year. The structure of federal incentives penalizes Tesla's early success, and 2018 was the last year Tesla buyers received the full value of the federal tax credit. The incentive for domestic sales likely contributed to a plateau in foreign exports of electric vehicles manufactured in California in 2018, with value roughly unchanged at \$3 billion dollars.

Data from China—where the value of Tesla sales [grew by 40 percent](#) in the first half of the year—suggest 2019 will see a significant increase in California’s electric vehicle exports compared to 2017 and 2018. If other categories are held constant, electric vehicle exports would reach the number five sales spot with just a 15 percent increase in sales.

Evidence of the job creation that is accompanying the increasing production and exports comes courtesy of the National Association of Manufacturers. The Association identifies motor vehicle manufacturing as the sixth-most vibrant source for [manufacturing job growth](#) in California. Because Tesla’s currently dominates motor vehicle manufacturing in California, these data show that electric vehicle manufacturing is a top source of job growth.

While bringing attention to a promising example of economic opportunity generated by climate policy leadership, we should hasten to add that any overall assessment must recognize there have been costs. For example, renewable power purchase agreements—multiyear contracts for electricity delivery—that were signed in the early years of efforts to expand renewable electricity paid higher prices than fossil options at the time. It is also true, however, that California’s early efforts helped spawn the learning by doing and economies of scale that led to today’s economically attractive prices for wind and solar power, renewable energy sources. Recent research from Energy Innovation and co-authors has found that “[t]oday, local wind and solar could replace approximately 74 percent of the U.S. coal fleet at an immediate savings to customers. By 2025, this number grows to 86 percent of the coal fleet,” ([Coal Crossover](#)).

As you well know, the complexity and economy-wide nature of the energy transition in a state as large and diverse as California have thus far served as a barrier to sophisticated evaluation of economy-wide impacts. In sum, we would suggest the state of California greatly expand the capacity for policy analysis at CARB, bolstered by additional funding from the state budget.

### ***Comments on Cap-and-Trade Program Design***

We were unable to attend the Cap-and-Trade Program public meeting on the topic of allowance supply that followed the morning session on Affordability and the Social Cost of Carbon. In addition, the website does not allow for submission of written comments for that workshop. Therefore, we offer the comments we had prepared on that topic here. In brief:

1. **We recommend modifying the way the price floor adjusts over time using a “quantity-adjusted price floor” approach.**
2. **The basic metrics needed to describe the balance of supply and demand are straightforward and should be presented as part of public information released starting this year.**
3. **The question of optimal program design is complicated, and calls for expanded analytical efforts.**

These points are expanded upon below.

1. **Introduce a quantity-adjusted price floor.**

We recommend an adjustment of the lower bound price support by introducing what we have referred to as a quantity-adjusted price floor. This would create a self-ratcheting mechanism that adjusts

according to the thing that matters most—whether emissions are falling quickly enough. The idea is that the price floor would increase faster if emission reductions fall short of the pace needed to meet the 2030 target. If emission reductions fall faster than needed, the price floor could hold steady.

This would exemplify the type of “rules-based” approach that Dr. Dallas Burtraw recommended during the panel discussion. If we understood correctly, panelist Professor Severin Borenstein also recommended increasing the price floor to increase emission reductions the program is causing, though his comments did not endorse the particular quantity-adjusted approach Energy Innovation recommends.

At the June meeting of the Independent Emission Market Advisory Committee, Dr. Burtraw delivered a presentation including a slide entitled, “Program design for allowance supply,” which mentioned the option to “increase price floor rate of change,” with the caveat: “A rate of change greater than the opportunity cost of capital could invite speculative acquisition of allowances, pushing up prices at an even greater rate.” We emphasize that the quantity-adjusted price floor approach does not require prices to increase more quickly. In fact, if emission reductions are occurring quickly enough, prices might rise more slowly or might even remain constant.

We would like to express our agreement with Dr. Burtraw, the chair of the Independent Emission Market Advisory Committee, that a “rules-based” approach to managing future adjustments is preferable. A quantity-adjusted price floor is an example of such a rule-based approach.

Dr. Burtraw has urged an emission containment reserve approach, as the Regional Greenhouse Gas Initiative has adopted. The limitation with this approach is that it does not include the self-ratcheting connection between evolution of the price floor over time and the pace of emission reductions that is consistent with a long term trajectory that hits the 2030 target. The Regional Greenhouse Gas Initiative is not aiming to hit any particular emission reduction target, while CARB is required to develop policies to meet the goal mandated under Senate Bill 32, subject to cost and other conditions.

**2. The basic metrics needed to describe the balance of supply and demand are straightforward and should be presented as part of public information released starting this year.**

Well-understood consensus metrics are in common use by carbon market analysts. This is evident in the presentation from an analyst with ClearBlue Markets to the Independent Emission Market Advisory Committee on June 14, 2019. Annual balance and cumulative balance are the basic measures of how short or long a market is. The annual balance is the difference between allowances made available to the market from the amount of emissions that must be covered, i.e., allowances introduced minus the total compliance obligation. The cumulative market balance is calculated as the sum of annual balances.

Public data provided by CARB, after complicated, time-consuming calculations, does provide the information needed to produce estimate annual market balances. In our opinion, it is government’s responsibility to provide these basic market insights so they can be readily accessible to all. Market participants pay for proprietary analysis to understand the status of the market. Some nonprofit work has filled the gap, helping level the playing field as to information, but CARB has a unique position to provide authoritative data.

In addition to calling for the workshop held on August 16th, Board Resolution 18-51 directs staff to quantify and report to the Board, no later than December 31, 2021, the volume of unused allowances from 2013 through 2020, including volumes held in private accounts. These metrics, analogous to the aforementioned market balance metrics, will help level the information playing field for nongovernment

groups, members of the public, and others seeking to engage but unwilling or unable to pay for proprietary market insights. We urge CARB to move expeditiously in publishing data on the annual and cumulative market balance.

**3. The question of optimal program design is complicated. Better analysis is needed.**

Though measuring the balance of supply and demand in the market is straightforward, broader questions of policy design would benefit from expanded analytical efforts. Board Resolution 18-51 direct staff to analyze the potential for unused allowances to hinder the ability of the program to help achieve the SB 32 target. We would hope the aforementioned increase in resources and expansion of modeling capacity will support these policy judgements.

In closing, once again we offer our heartfelt thanks to you and all your colleagues for your work on behalf of the people of California, the stability of the global climate, and future generations.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Busch". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Chris Busch, Ph.D.

Research Director, Energy Innovation