The Climate Reality Project
SILICON VALLEY CHAPTER

May 8, 2024

Cap-and-Trade Workshop
California Air Resources Board
1001 I Street
Sacramento CA 95814

Kevin Hamilton and Dr. Dr. Catherine Garoupa
Environmental Justice Advisory Committee

Re: Comments on the April 23, 2024 Cap-and-Trade Workshop, EJAC presentation

We appreciate the opportunity to offer our perspectives on the April 23, 2024 Cap-and-Trade Workshop: Potential Amendments to the Cap-and-Trade Regulation. Our comments pertain primarily to the presentation by Kevin Hamilton, representing the Environmental Justice Advisory Committee, and they also touch on issues raised by Dr. Catherine Garoupa in recent Senate hearings[1]. The key points of our comments are:

- Free allowance allocation (in the context of either cap-and-trade or a carbon tax) can be used to channel industry resources toward decarbonization, and to give consumers an equity stake in a decarbonized energy economy.

- In evaluating post-2030 GHG policy options, the EJAC should not accept the political status quo without any serious or meaningful consideration of the relative policy merits of cap-and-trade and carbon taxes.

- Carbon offsets amount to a “kick-the-can-down-the-road” policy of procrastination.

- California's climate policies should seek to maximize a "benefit-cost score" that accounts for both climate and health benefits (GHGs and criteria pollutants).

- CARB is oblivious to the “waterbed effect” whereby cap-and-trade undermines and discourages independent climate actions in support of the state’s climate goals by nullifying the environmental benefits of such actions.

[1] February 13, 2024 Joint Hearing Environmental Quality and Budget and Fiscal Review Subcommittee No. 2 on Resources, Environmental Protection and Energy; March 11, 2024 Joint Legislative Committee on Climate Change Policies

“Free” allocation (with strings attached) can be good for consumers.

The EJAC advocates for the elimination of free allowance allocation (or equivalently, allocation of allowance sales revenue to regulated industries), and recommends rebating of allowance sales revenue back to communities. Programs such as the Canada Carbon Rebate (in the context of a carbon tax) and the California Climate Credit for IOU ratepayers (in the context of cap-and-trade) rebate revenue to consumers regardless of economic need. But if rebates are limited to economically disadvantaged consumers who actually need them, then only a minor portion of the pricing revenue would need to be used for rebating and the balance could be used to facilitate decarbonization and serve consumer interests in other ways. Free allocation of allowances (or allowance sales revenue) to industry can potentially serve such purposes.

For example, if the freely allocated revenue is directed primarily to low-emission energy producers (not the high-emission producers who generate the revenue), it can help to make clean technologies more affordable, especially during their start-up phase while they have not yet gained significant market share and economies of scale. Subsidized clean technologies would put competitive price pressure on high-emission entities, deterring them from passing their carbon pricing costs on to consumers and incentivizing them to decarbonize. The carbon price by itself isn’t a strong motivator if industry can just pass its regulatory cost on to consumers, but serious competition could compel high emitters to decarbonize their operations.

Free allocation of allowances or allowance sales revenue to high-emission entities could also benefit consumer interests if it is used to finance decarbonization. Without such allocation, regulated entities would need to obtain commercial financing, and the decarbonization costs plus financing charges would, over time, be passed on to consumers.

A case in point is the electricity sector: At a carbon price of $40/MTCO2e[2] (the current allowance price in California’s cap-and-trade market), electricity rates would increase by $0.0076/kWh without rebating, based on an average GHG intensity of 0.19 MTCO2e/MWh. That amounts to a 2.5% increase relative to an average electricity retail rate of $0.30/kWh. The cap-and-trade revenue could be freely allocated to IOUs with the requirement that it be used to finance decarbonization infrastructure. If the revenue were instead rebated to ratepayers, then the utilities would need to raise capital financing from shareholders and would pass the financing cost on to ratepayers. Typically, for each dollar of infrastructure investment, IOUs will charge ratepayers $2.50

[2] “MT” = “Metric Ton”; “CO2e” = “CO_2-equivalent GHG emissions”

to cover the investment plus shareholder dividends.[3] Thus, while rebating can give ratepayers a short-term gain of $0.0076/kWh, it comes with a long-term loss of $0.019/kWh that could be avoided if the $0.0076/kWh had instead been invested in building sustainable infrastructure (without adding to the utility's rate base).

Carbon pricing revenue could alternatively be used to simply buy equity shares in IOUs on behalf of ratepayers. Ratepayers would probably be able and willing to pay much more than $0.0076/kWh to reduce their carbon footprint if the investment could earn them long-term returns either in the form of equity dividends or rate savings. (The notion of regulators operating as investment fiduciaries or brokers on behalf of consumers has support in the writings of economist Mariana Mazzucato.)

These types of financing strategies, which leverage the investment potential of carbon pricing revenue and engage ratepayers as investors, could help thread the needle between tight state budgets and increasingly more stringent climate regulations. Regulatory policies that forfeit the investment potential of carbon pricing revenue in favor of cash rebates will, over time, lead to increased wealth concentration and inequality as ratepayers become increasingly indebted to investors. Distributional equity should be pursued as a core objective of California's climate policies, and "carbon dividends" will only impede the clean-energy transition by keeping beneficiaries vested in and economically dependent upon continued carbon emissions.

We encourage the EJAC and CARB to consider the impact of regulatory policies on wealth inequality and to advocate for investment policies that foster more equitable wealth distribution.

Free allocation isn't needed to prevent leakage, but can make carbon pricing affordable.

The conventional wisdom is that high carbon prices in California could cause local industries to lose market share relative to unregulated imports, and perhaps force them to pack up and leave the state. CARB mitigates this "leakage" problem by using free allowance allocation to "level the playing field". But leakage can be avoided by regulating the *use* (or consumption) of GHG-intensive commodities rather than their *production*. This approach is employed, for example, by SB 596, California's new law for decarbonizing cement ("... achieve net-zero emissions of greenhouse gases associated with cement *used* within the state as soon as possible …"). A regulation on in-state cement *production* could be converted to a consumption-based regulation by means of a "border carbon adjustment", which would extend regulatory jurisdiction over cement

[3] from Chapter 7, Table 7.1 in The Future of Decentralized Electricity Networks

imports while exempting exports from regulation. All cement sales in California – imports as well as locally-produced – would be subject to the same regulations and exports would not be regulated by California, so in-state producers would not be competitively disadvantaged and would have no incentive to move out of state.

Use-based regulation would enable cement producers to pass their carbon pricing costs on to their California customers, but this could be harmful to the state economy, especially for a commodity like cement that is very sensitive to carbon prices. Cement sells for about $150/MT-cement; profit margins are about 20%; and the GHG emissions intensity is typically 0.8 MTCO2e/MT-cement. A carbon price of $40/MTCO2e would translate to $32/MT-cement, a 21% price increase.

At higher anticipated future carbon prices (over $100/MTCO2e) the regulatory cost would be especially burdensome. California's cap-and-trade system uses output-based allocation of free allowances in the cement sector to mitigate this cost; i.e., the auction revenue or allowance value is returned to regulated entities in proportion to production output.

Using 2019 data for the California cement market, for example, and assuming a $40/MTCO2e carbon price, the eight major producers in California (at the time) would have incurred carbon costs ranging from about $23 to $33 per ton-cement[4] without free allocation. A zero-emission producer would have incurred zero cost. With output-based free allocation, the refund rate would have been about $28/ton-cement, and the net costs to producers would have ranged from -$5/ton-cement (a net gain) to +$5/ton-cement. A zero-carbon cement producer would have received the full $28/ton-cement refund at no cost. The free allocation eliminates the regulatory cost of carbon pricing, converting it into a subsidy for producers with better-than-average emissions performance, but it does not affect the cost *differences* between low- and high-carbon cement. The cost differences will still incentivize regulated entities to spend up to $40 to reduce their emissions by 1 MTCO2e, and they will need to make the investment to stay competitive. Free allocation does not shield producers from the technology cost of decarbonization, but it can help them to finance the technology cost.

We encourage the EJAC and CARB to consider and assess the extent to which output-based, free allocation can potentially lead to greater emissions reductions by making high carbon prices politically and economically viable.

[4] actually, per ton of clinker to be precise, but cement is composed mostly of clinker

Carbon taxes

Output-based, free allocation can also be used with a carbon tax. The best-known example of this type of policy, not for CO2 but for NOx regulation, is the Swedish "Refunded Emissions Payment" (REP) system in the 1990s, which motivated a 34% drop in stationary-source industrial NOx emission between 1990 and 1992 with negligible economic impact (e.g., the regulation's impact on electricity prices was estimated at $0.0004/kWh).

In its 2011 Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document, CARB considered carbon taxes as a potential alternative to cap-and-trade and identified four potential uses of allowance sales revenue, but did not consider the option of output-based, free allocation. Furthermore, the arguments stated in 2011 for favoring cap-and-trade over a tax are no longer valid; e.g., the "firm cap" was forfeited in favor of a firm price ceiling in AB 398. Over the 2014-2020 time frame the program operated effectively as a "carbon tax pretending to be cap-and-trade", with allowances selling at or very near the predetermined price floor. However, a tax would not have employed allowance banking to let regulated firms lock in future (post-2020) emission rights at rock-bottom allowance prices. The argument that a tax would have somehow been less "cost-effective" than cap-and-trade does not make sense. The predictability and stability of predetermined carbon prices could have allowed CARB to set the price at a level significantly higher than the cap-and-trade price floor, and it would have created an economic environment conducive to long-term investment in decarbonization technologies without the financing risk premium associated with volatile prices.

How might California's climate program have evolved with a carbon tax? CARB could answer that question by running a retrospective economic modeling study of how a carbon tax could have performed before 2020, and how it would be expected to perform post-2030. The results might provide useful insights about post-2030 legislative and regulatory policy options, as well as near-term cap-and-trade amendments to strengthen price containment measures.

We encourage the EJAC to engage CARB and the IEMAC in revisiting the economic policy merits of cap-and-trade and carbon taxes, and in reevaluating the economic rationale for favoring cap-and-trade.

GHG offsets

The fundamental economic rationale for cap-and-trade offsets is that California could achieve its GHG reduction targets at lower cost, and with identical climate benefits, by

outsourcing its emissions reductions to other states and countries. By that rationale, there should be no limit on offsets. Regulated entities should be allowed to offset their entire compliance obligation with credits from anywhere in the world, provided that the offsets are real, additional, permanent, verifiable, quantifiable, and enforceable. And cheap.

Suppose that California were to achieve net-zero by replacing its most expensive emissions reductions, at $100/ton, with the cheapest available offsets at $10/ton. Then it would not be possible to achieve global carbon neutrality unless someone else buys offsets from California, at $100/ton, to fully decarbonize its economy. The offsets will not have reduced global decarbonization costs; they will have merely allowed California to shift its costs onto others. But the implicit premise of offsets is that global decarbonization will *not* be achieved. The $10/ton offsets would probably only be available from jurisdictions that do not regulate or only weakly regulate GHG emissions. If those jurisdictions were to subsequently adopt climate policies comparable to California's, then they would undertake the cheapest emissions reductions to meet their own compliance requirements, and the offsets that California is relying on would fail the additionality criterion. Additionality implicitly assumes inaction by other states and countries, and offsets encourage inaction by claiming credit for the cheapest and easiest emission-reduction opportunities, leaving the more expensive and difficult reduction options to others.

California's policy should be to not only reduce global *emissions* by its equitable share, but to also assume its equitable share of the global *costs* of decarbonization. We can most effectively lead international climate action by successfully tackling the most difficult, not the quickest and easiest, decarbonization challenges. Other states and nations should be allowed to credit the quick and easy emission-reduction measures within their jurisdictions toward their own compliance obligations. California can facilitate global decarbonization by fully decarbonizing its own economy "as *soon* as possible" (pursuant to AB 1279) – not merely as *cheaply* as possible – and by facilitating the transfer of clean-energy technologies and effective climate policies to other states and nations in support of efforts to achieve global GHG reductions *in addition to*, not *in lieu of*, in-state reductions. Offsets contravene these purposes.

We encourage the EJAC and CARB to consider the global dimension of environmental justice in the context of GHG emissions and offsets. The United States, with 4% of the world population, has generated one-quarter of accumulated GHG emissions, and has a particular obligation to reduce its own emissions as soon as possible to forestall the most severe impacts of climate change on the world's most vulnerable populations.

California should not use offsets to procrastinate and delay decarbonization of the state's own economy.

GHGs should not be used as a proxy for co-pollutants.

The climate impacts of GHGs are global and long-term, whereas the health impacts of co-pollutants are local and immediate. The economic rationale for carbon trading and offsets is inapplicable to co-pollutants because their impacts are concentrated at the pollution source and are amplified by factors such as population density (e.g., in Los Angeles) or pollution-trapping thermal inversion (as in the San Joaquin Valley). There is also an environmental justice aspect of co-pollutants: The economic benefits of polluting industries are shared statewide whereas the health and environmental costs are borne disproportionately by disadvantaged communities. GHG emissions are usually accompanied by co-pollutants, but "market-based" GHG regulation does not necessarily reduce, and can exacerbate, the impacts of co-pollutants.

California's AB 32 legislation is primarily directed toward reducing greenhouse gas emissions but also contains numerous directives pertaining to co-pollutants. ("Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health.") The legislation is specifically intended to maximize health co-benefits associated with air quality improvements. ("It is the intent of the Legislature that the State Air Resources Board design emissions reduction measures … in a manner that … maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality.") GHG reductions are not an effective proxy for co-benefits of co-pollutant reductions, and carbon pricing would need to be augmented with co-pollutant pricing to maximize the combined climate and health benefits of GHG regulation.

California statutes pertaining to GHG and criteria pollutant regulation are somewhat incoherent. The Clean Transportation Program (CTP) funding allocations are to be prioritized based on a "benefit-cost score" that only considers greenhouse gas regulations, but priority is also given to projects that reduce "criteria air pollutants, and air toxics". (HSC 44270.3(a)(1), 44272(g), 44272(f)(2)) The Air Quality Improvement Program (AQIP) prioritizes projects based on a benefit-cost score that only considers criterial pollutants, but CARB is also authorized to give additional preference to projects that "achieve climate change benefits in addition to criteria pollutant or air toxic emissions reductions." (HSC 44270.3(b)(1), 44274(b), 44274(b)(4)) The legislation provides no guidance on how GHGs and criteria pollutants are to be weighted and prioritized.

A more concise and unambiguous prioritization criterion would be based on a benefit-cost score that combines both GHG and criteria pollutants. GHG-reduction benefits can be monetized based on the social cost of carbon (about $200/MTCO2e), and the benefits of criteria pollution reduction can be monetized based on health impacts (taking into account emissions locale and environmental justice considerations; see CARB's 2022 Scoping Plan, Figure 3-6). The monetized benefit-cost scores for GHG and criteria pollutant reductions can be added to define a combined benefit-cost score, which regulatory policies should seek to maximize.

Benefit-cost scoring should be applied to GGRF programs to ensure realistic and honest cost-effectiveness reporting and efficient program prioritization. The pitfalls of incomplete and inaccurate cost-effectiveness accounting are illustrated by one particular GGRF program, Clean Cars 4 All (CC4A), which is not part of either the CTP or AQIP and is not subject to benefit-cost scoring.

CC4A provides incentives to help lower-income drivers replace their old, higher-polluting cars with cleaner transportation options. The average cost of a vehicle receiving a CC4A incentive was $35,000 at the end of 2021[5], and CC4A currently offers incentives up to $12,000. Based on project data through the 2022 calendar year, on average, a 2001 MY conventional gasoline vehicle was scrapped and replaced with a 2020 model year conventional hybrid, plug-in hybrid, battery-electric vehicle, or fuel-cell electric vehicle.

CARB reports the cost-effectiveness of CC4A at $1097/MTCO2e, based only on GHG reductions. Co-pollutant reductions are estimated, but health benefits are not. For a battery-electric replacement vehicle, CARB estimates the GHG benefit[6] only over 34,000 driving miles (13,600 annual vehicle miles traveled over the vehicle's 2.5-year ownership requirement), not over the vehicle's full remaining life span. The estimate is based on the implicit, untenable assumptions that without the rebate incentive, the scrapped vehicle would have continued to be driven at least 34,000 miles and the replacement vehicle would have been scrapped.

In fact, a used vehicle purchase has no demonstrable GHG impact – either positive or negative – because the vehicle's remaining lifecycle emissions are not significantly affected by a change of ownership. The CC4A clean-vehicle purchase incentive merely enables the rebate recipient to outbid other buyers in the used-EV market. The GHG benefit of CC4A comes only from early retirement of old vehicles, but CARB has no

[5] AB 2401 Bill Analysis, 04/12/24 – Assembly Transportation
[6] from the AQIP FY 2023-24 Funding Plan, Appendix A: Emission Reduction Quantification Methodology

evidence that scrapped vehicles have any significant remaining life, much less 34,000 miles. CARB's cost-benefit estimation methodology does not show any demonstrable GHG benefit of CC4A.

It may be the case that CC4A is providing substantial benefits, especially considering the health benefits of retiring old, highly polluting vehicles. But the benefits cannot be known, and cannot be maximized, without a meaningful and objectively realistic benefit-cost scoring methodology.

We encourage the EJAC to work with CARB, the state's advisory bodies (IEMAC, LAO, and State Auditor) and the legislature to professionalize CARB's cost-benefit accounting and project prioritization methodologies for its climate and pollution programs, based on a more systematic and cohesive statutory foundation for cost-benefit scoring that accounts for the benefits of both GHG and co-pollutant reduction.

CARB disregards the waterbed effect of cap-and-trade.

In CARB's response to Kevin Hamilton's presentation, staff stated the following[7]:

> *... to the extent that you, Kevin, and other members of the EJAC are speaking, whether it's in California or in front of other governments, or with coalitions across the U.S. or internationally, I think we all have a role to play as an ambassador to help push people to do as much as they can everywhere to reduce greenhouse gasses.*

The term "waterbed effect" describes the mechanism whereby cap-and-trade discourages and inhibits people's efforts to "do as much as they can … to reduce greenhouse gasses" by nullifying the environmental benefits of such actions. The term appears to have been introduced in a 2017 RFF paper coauthored by Dallas Burtraw, chair of the IEMAC, in connection with electricity-sector GHG regulation in the Regional Greenhouse Gas Initiative, but it is equally applicable to California's cap-and-trade regulation. The paper explains the effect as follows:

> *Additional actions may be taken by cities, states, companies, or individuals to reduce emissions associated with electricity consumption based not on the price of CO2 emissions but for other environmental reasons. These additional efforts lead to an economic benefit for all RGGI states in the form of lower allowance prices, but they do not yield additional emissions reduction benefits. We refer to this as the "waterbed effect." Reducing emissions in one place simply makes*

[7] Workshop recording @36:33

> *available allowances to emit CO2 in another place. … The waterbed effect undermines the incentive for environmentally motivated cities, states, companies, and individuals to take actions to reduce emissions associated with electricity consumption as any such actions may yield no climate benefit.*

Simply stated, to the extent that emissions in capped sectors are controlled by a predetermined cap, they are not influenced by supplemental climate actions. Cap-and-trade effectively disallows overcompliance. (If allowances are trading at the floor or ceiling price, then the number of issued allowances is not predetermined by the cap. In that case the allowance auction transitions to a fixed-price allowance sale – effectively a carbon tax – and the waterbed effect is inoperable.)

The IEMAC's 2022 Annual Report explained how the waterbed effect nullifies the environmental benefits of the federal Inflation Reduction Act (IRA) in sectors regulated by California's cap-and-trade regulation. A 2016 LAO report similarly explained how cap-and-trade nullifies the environmental benefit of GGRF programs in capped sectors:

> *Spending [GGRF funds] on Capped Sources Likely Has No Net Effect on Overall Emissions. … As long as the cap is limiting emissions, subsidizing an emission reduction from one capped source will simply free up allowances for other emitters to use. The end result is a change in the sources of emissions, but no change in the overall level of emissions.*

A 2016 publication discussed the waterbed effect (which it calls "handcuffing") in the context of cities' Climate Action Plans: "... a state-level cap handcuffs cities: by fixing emissions at the level of the cap, it precludes local governments from further reducing aggregate emissions." The study found that cities are universally oblivious to the effect ("… the limitation of cap-and-trade on the city's ability to reduce aggregate emissions is not addressed in any of the 72 Californian [climate action] plans reviewed").

The core tenet of cap-and-trade, which is firmly ingrained in CARB's institutional culture and mindset, is that regulatory climate policy should not operate to minimize emissions; it should minimize the cost of achieving a predetermined emissions target. The 2022 Scoping Plan makes no claim or representation that CARB's cap-and-trade system has achieved, or that the plan would achieve, the "maximum technologically feasible and cost-effective greenhouse gas emission reductions" required by AB 32. AB 1279 establishes a state policy to "Achieve net zero greenhouse gas emissions as soon as possible …," but contrary to statutory guidance, staff does not plan or intend to incentivize attainment of net zero any sooner than 2045.

A legislative and regulatory strategy for post-2030 climate policy that would be more consistent with the AB 32 and AB 1279 mandates would be to (1) decide what price we are able and willing to pay for a sustainable climate, (2) set a carbon price at the level that we are able and willing to pay, and (3) spend the carbon pricing revenue to finance decarbonization and to make decarbonization affordable.

We encourage the IEMAC to help the legislature and CARB to recognize and understand the fundamental conflict between cap-and-trade and California's statutory climate policy, and to consider post-2030 policy alternatives that would be better aligned with statutory policy and with the imperative of climate change.

Sincerely,

Kenneth Johnson
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The Climate Reality Project: Silicon Valley Chapter