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SENATE BUDGET AND FISCAL REVIEW SUBCOMMITTEE NO. 2 ON RESOURCES, ENVIRONMENTAL PROTECTION, AND ENERGY AND SENATE ENVIRONMENTAL QUALITY COMMITTEE

SENATORS ALLEN AND BLAKESPEAR
CHAIRS

9:30am or upon adjournment of Session Thursday, May 8, 2025
1021 O Street, Room 2200

JOINT OVERSIGHT HEARING

Cap-and-trade

BACKGROUND INFORMATION

Where we stand today

Cap-and-trade is California's flagship greenhouse gas (GHG) emission reduction program. Cap-and-trade establishes a declining limit on roughly 80% of the sources of GHG emissions throughout California (called "covered entities"), and it creates a powerful economic incentive for significant investment in cleaner, more efficient technologies. The California Air Resources Board (CARB) creates allowances equal to the total amount of permissible annual emissions (i.e., the "cap"). One allowance equals one metric ton of carbon dioxide equivalent emissions (using the 100-year global warming potential). Each year, fewer allowances are created and the annual cap declines.

First authorized in 2006 under AB 32's authority to create a "market-based compliance mechanism", and reauthorized with reforms via AB 398 (E. Garcia, Chapter 135, Statutes of 2017), cap-and-trade has operated continuously for over

ten years. The first auction of allowances occurred November of 2014, where roughly 23 million allowances were sold at a price of $12.10 each, the proceeds of which went into the Greenhouse Gas Reduction Fund (GGRF) to be appropriated by the Legislature. In contrast, the latest auction—February 2025—saw over 51 million allowances sold at a price of $29.27 each (down from a high point of $41.76 in the February 2024 auction), bringing over $851 million into GGRF. All in all, the program has funded $31 billion in investments across the state since its inception.

However, the current authorization for CARB to implement the cap-and-trade regulations ends on December 31, 2030.

In advance of the program's expiration, the Legislature and Governor alike have expressed emphatic interest in continuing the program beyond 2030. In an April 2025 joint statement between the Governor, Senate President pro Tempore, and Assembly Speaker[1], the directive was made clear:

> "California must continue to lead on reducing pollution and ensuring our climate dollars benefit all residents. That's why we're doubling down on cap-and-trade: one of our most effective tools to cut emissions and create good-paying jobs.
>
> "In just the last decade, cap-and-trade has invested billions of dollars in projects by holding polluters accountable – helping clean our air, protect public health and propel new careers.
>
> "Cap-and-trade is a huge success and, working together, we'll **demonstrate real climate leadership** that will attract investment and innovation to **deliver the technologies of tomorrow**, right here in California." (Emphasis added)

Beyond climate leadership and developing innovative technology that can be used elsewhere, California has also committed to addressing issues of affordability. In this particular political moment, where tariffs are actively worsening an already-concerning cost of living crisis, recognition of the struggles faced by everyday Californians crosses party lines. In another April 2025 statement from Senate

[1] Governor Newsom, Legislature double down on state's critical cap-and-trade program in face of federal threats https://www.gov.ca.gov/2025/04/15/governor-newsom-legislature-double-down-on-states-critical-cap-and-trade-program-in-face-of-federal-threats/

President pro Tempore Mike McGuire introducing a three-bill affordability package[2], the Senate leader said,

> "For too long, hardworking families have **struggled to afford the basics**—skyrocketing housing costs and utility bills are stretching budgets and folks are struggling to achieve a job that pays a family-sustaining wage. That's why the state Senate is taking bold action to help fix the status quo here in the Golden State." (Emphasis added)

Taken altogether, some of California's biggest current goals are clear, even if the paths to achieve those goals remain murky. The State must:

- Protect Californians from skyrocketing living expenses;
- Reaffirm California's climate leadership; and
- Invest in a climate-prepared future for California

By using these goals as lenses through which to evaluate our options, the Legislature can think effectively about the future of the cap-and-trade program. The program is massive, complex, and consequential.

Perhaps the first major question facing the Legislature as it contemplates program reauthorization is whether it should be extended without any further reforms or changes. For a number of reasons, leaders in both the Senate and Assembly have expressed an interest in reforming the program. The initial language of SB 840 stated that, "It is the intent of the Legislature to enact subsequent legislation to reform, and extend the operation of [cap-and-trade]."[3] And, in a recent panel at The Climate Center's California Climate Policy Summit, Assemblymember Jacqui Irwin stated unequivocally, "We've had a lot of folks with anxiety coming in and saying, 'We just want a clean reauthorization.' But I think it's really up to the Legislature to take a good look at what's working and what could be improved upon."[4]

Although by no means exhaustive, the remainder of this document will assess some different policy options and "What ifs" policymakers might consider as part

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[2] Pro Tem McGuire, Senators Launch Affordability Package: 'Investing in Your California Dream' https://sd02.senate.ca.gov/news/pro-tem-mcguire-senators-launch-affordability-package-investing-your-california-dream

[3] SB 840, Limón and McGuire, Allen, Becker, Blakespear, Caballero, Gonzalez, Laird, and Stern, as introduced February 21, 2025.

[4] Lawmakers are ready to get down and dirty with cap and trade, Begert, Blanca and Kahn, Debra, 04/22/2025 https://www.politico.com/newsletters/california-climate/2025/04/22/lawmakers-are-ready-to-get-down-and-dirty-with-cap-and-trade-00305518

of cap-and-trade reform discussions. Not every policy reform will advance every goal, and that is to be expected.

At its core, a cap-and-trade program that helps California achieve its goals must answer the following questions, none of which have easy answers:

- How should allowances be distributed within cap-and-trade? (Section 1, pages 4-12)
- How should emissions and projects outside of the program be addressed? (Section 2, pages 12-17)
- How can the communities hit the hardest be helped the most? (Section 3, pages 17-21)
- How can GGRF revenues support this transition? (Section 4 pages 21-24)

The ideas contained show a number of possible paths forward to try to achieve all three goals through modifications to all four areas of cap-and-trade reform. The Senators and panelists gathered for the hearing may find discussions of the pros, cons, and alternatives to the ideas presented here illuminating in charting the best path.

There is no one right way to reauthorize cap-and-trade, every decision—even deciding to keep things the same—has consequences, and we can never perfectly predict the future. Nevertheless, the better informed members of the Legislature are, the better their decisions can be.

1. How should allowances be distributed within cap-and-trade?

There are three primary ways that allowances enter the market: freely allocated to industry, allocated to utilities to be consigned to auction, and auctioned to fund the Greenhouse Gas Reduction Fund (GGRF). The three segments sum to the "cap" of cap-and-trade. What are some options the Legislature may wish to consider for reforming those portions, and what impacts would that have on achieving our three goals? What options affect the size of the market altogether?

1.1. Overall allowance quantity and distribution

1.1.1. What if the cap is reduced to increase ambition?

As part of the 2022 Scoping Plan Update, CARB modeled different emission reduction trajectories to achieve 2045 carbon neutrality (as

required by AB 1279, Muratsuchi, Chapter 337, Statutes of 2022). Under current law (i.e. SB 32), California is required to reduce the state's GHG emissions to 40% below the 1990 level by 2030. The challenge and magnitude of reaching that goal is significant. Nevertheless, CARB determined that in order to be on track for carbon neutrality in 2045, California should further strive for a 48% reduction by 2030. This is a monumental undertaking, but doing so appears to be necessary to meet our carbon neutrality goals.

In an October 2024 Market Notice[5], CARB announced that expected forthcoming cap-and-trade amendments would work towards this by including, in part, "Removal of at least a total of 180 million allowances from 2026-2030 annual budgets from the auction and allocation pools of allowances to align with the 2022 Scoping Plan and reflect updates to the AB 32 Greenhouse Gas Inventory and up to 265 million allowances in aggregate removed from 2026-2045 annual budgets." This will address the updated targets envisioned for the program, as well as the oversupply of banked allowances resulting from excess supply in early years.

Notably, the Notice did not describe the specifics of from where those allowances would be removed. *Even if the allowance price remained at a modest $30, the combined 445 million allowances removed from the program would represent some $13.35 billion in assets reallocated between now and 2045, and it is not clear whose share will be affected*. In other words, even though the location of the removal of allowances to increase program stringency seems like an academic distinction, it will decide who does and does not get billions of dollars of allowances.

Although the need for an increase in cap-and-trade stringency seems a near-certainty to achieve our GHG emission reduction goals, the nature of that adjustment is not certain at all. Absent any input from the Legislature, CARB will determine from who gets fewer allowances in order to lower the overall program cap.

[5] CARB, Information Regarding Cap-and-Trade Regulation Updates. Issued October 15, 2024. https://ww2.arb.ca.gov/sites/default/files/cap-and-trade/nc-CT_Notice_Oct_2024.pdf

The following three sections describe the main ways that allowances enter the cap-and-trade program. In short, they are either freely allocated to industry (14% of all allowances), allocated to utilities to be consigned to auction to benefit ratepayers (37% of the total), or sold at auction to fund GGRF (46%). (For completeness, there is also the Allowance Price Containment Reserve, which received only 3% of allowances in 2024 for purposes of protecting against future price spikes).

It bears repeating: *in order to increase cap-and-trade stringency—which CARB has found is necessary to meet our climate goals—one or more of these three categories will necessarily need to receive fewer allowances than planned. Otherwise there is no way to remove enough allowances from the overall program to meet our goals.*

1.2. Freely allocated to industry

1.2.1. What if California ceased all industrial allowance free allocation?

The allowances given to industrial sources (roughly 14% are allocated to prevent leakage (i.e. emission reductions in California being counterbalanced by emission increases out of the state, such as a manufacturer moving to another state with laxer policies). When tasked by AB 32 to develop a market-based compliance mechanism, CARB was directed in statute to minimize leakage, and the free allowance approach was selected in the rulemaking process.

Regardless of intention, freely allocated allowances to industry in 2024 did represent over $1 billion in assets from the state's primary GHG emission reduction program given freely to major sources of pollution in the state. So it is understandable that some believe those assets could be better allocated in line with our goals by defraying utility bills or increasing GGRF revenues.

If the Legislature elected to discontinue any freely allocated allowances to industry, the roughly 400 covered entities (ranging from petroleum refineries to potato chip manufacturers) under cap-and-trade would see their costs of program compliance increase. The indirect impacts of these costs are unknown but could be significant for some industries,

which could be a downside. The upsides—depending on how those allowances are used instead—could felt by utility customers or any beneficiary of a GGRF-funded program.

1.2.2. What if California imposed a Carbon Border Adjustment Mechanism?

Freely-allocated allowances are not necessarily the only way to stop covered entities from simply leaving the state and selling their products back to California with a competitive advantage; another option is a Carbon Border Adjustment Mechanism (CBAM). A CBAM is effectively a tariff on carbon intensity; any good being sold in or into the state could have a fee levied on it proportionate with its carbon intensity. If effective, this would prevent companies from simply leaving California to operate in lower-cost, higher-polluting states and selling their goods at an advantage over California businesses.

The world's largest carbon market, the European Union's (EU's) Emission Trading System (ETS) is currently undergoing a three-year transition from a free allowance allocation regime to a CBAM, with the CBAM expected to be in full force next year.[6] However, the ETS has a significant advantage over California's cap-and-trade program, because the EU has authority over its trade policies, and California does not. Being one of fifty states, California is subject to the so-called "dormant commerce clause" doctrine of the U.S. Constitution, which, "prevents the States from adopting protectionist measures and thus preserves a national market for goods and services."[7]

Despite the dormant commerce clause, a CBAM is not entirely out of the question for California. Other California climate policies, such as the Low-Carbon Fuel Standard (LCFS) impose a carbon intensity cost on goods produced out of state, and that program has weathered legal challenges.[8] In short, it could be argued that by imposing a carbon

[6] Carbon Boarder Adjustment Mechanism https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en

[7] Artl.S8.C3.7.1 Overview of Dormant Commerce Clause. https://constitution.congress.gov/browse/essay/artI-S8-C3-7-1/ALDE_00013307/

[8] Abbott, Kathryn. The Dormant Commerce Clause and California's Low Carbon Fuel Standard. Michigan Journal of Environmental & Administrative Law, 2012, Volume 3, Issue 1

intensity fee on in- and out-of-state goods, a CBAM (even one that generally made out-of-state goods costlier) would not be prima facie in violation of the dormant commerce clause. This is not a settled issue, and any legal basis for a CBAM-like policy would have to be carefully considered and would very likely be challenged in court. However, short of freely-allocated allowances or a CBAM, it is not clear what other options could exist for preventing leakage.

1.2.3. What if freely-allocated allowances more accurately reflected leakage risk?

To tailor leakage prevention at the level necessary for each industry, CARB had previously assessed leakage risk, which was a product of their emissions intensity and their trade exposure. Some industries (like oil extraction) were deemed to have a high leakage risk have indeed would have had their IAF set to 100%. Others, like automobile manufacturing, were deemed to have low leakage risk, and would have only received at most 50% of their historical freely-allocated allowances starting 2018. No two covered entities are exactly the same, and yet as part of the 2017 reauthorization, major industrial sources of GHG emissions were required by law to receive the same "Industry Assistance Factor" (IAF) of 100%, which is part of how their freely-allocated allowance amount is calculated. Ultimately, AB 398 set that number to 100% in perpetuity, and the Legislature could consider once more allowing CARB to set the IAF based on calculated leakage risk.

Care should be taken to understand the impacts of accurately assessing leakage risk and allocated allowances accordingly once more. One particularly notable sector in the present moment is petroleum refineries. According to previous cap-and-trade regulations, petroleum refineries have medium leakage risk, and so they would have begun having a 75% IAF starting in 2018 if not for the AB 398 requirement. While the specific amounts of freely-allocated allowances are not reported in order to protect confidential business information, sector-wide numbers do provide some sense of scale.[9] For one approximated example, the "petroleum refining & hydrogen production" sector was

[9] Cap-and-trade program data. CARB. https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/cap-and-trade-program-data

allocated 17.75 million allowances last year, distributed across 23 facilities. At an allowance price of $31.91, that is a total of over $566 million in free allowances across the sector, an average of approximately $25 million per facility. Under that hypothetical scenario, reducing that by 25% (as would happen if they were correctly treated as a medium-leakage risk facility) could represent something on the order of nearly $7 million less in cap-and-trade compliance instruments going to the facility annually. The impact such a change could have could be significant or not, depending on the business, its profitability, and its ability to recoup costs by passing through costs to consumers.

1.3. Allocated to utilities to be consigned to auction

Today, the 37% of allowances that are allocated to electric and natural gas utilities CARB are required to be sold at auction and the proceeds used to benefit ratepayers. To date, about 79% of the auction proceeds have gone to residential ratepayers, with 7% going to industrial ratepayers, 6% to small business ratepayers, and 2% to clean energy & energy efficiency programs.[10]

The California Climate Credit, administered by the California Public Utilities Commission (CPUC) is by far the largest portion of the utilities' share and a direct way to defray costs to consumers For investor-owned utility (IOU) customers, the Credit is applied automatically (typically in April and October) to all customers' bills, regardless of demographics or energy usage. It has generally been in the $100-160 range per year for most IOU customers.[11] Anecdotally, many IOU customers either do not know about the Climate Credit, let alone its connection to cap-and-trade.

Another option within cap-and-trade for addressing high utility bills is to—rather than defraying high bills with credits or rebates—move some of the fixed costs that are currently borne by ratepayers to being paid by GGRF. This is explored more in section 4.5 of this document.

[10] Summary of 2013-2023 Electrical Distribution Utility Use of Allocated Allowance Value. CARB. https://ww2.arb.ca.gov/sites/default/files/cap-and-trade/allowanceallocation/EDU%202023%20Use%20of%20Allowance%20Value%20Report.pdf

[11] California Climate Credit. CPUC. https://www.cpuc.ca.gov/industries-and-topics/natural-gas/greenhouse-gas-cap-and-trade-program/california-climate-credit

1.3.1. What if the Legislature were more prescriptive in how the utilities' allowances were allocated and how the proceeds must be used?

Today, utility allowances go to electrical distribution utilities and natural gas suppliers. While the investor-owned utilities (IOUs) are regulated by the CPUC, the state plays no other role in directing how the utilities' share of allowances are distributed or used. The Legislature could decide to make changes to this share. Some ideas could include directing an even greater share to the California Climate Credit, shifting allowances between portions, or directing CPUC to make specific changes.

For example, the Legislature could consider only allocating allowances to EDUs by redirecting the share going to NGSs today. This would be expected to have little to no impact on affordability for most Californians who are both electrical and natural gas utility customers. Consider an example where a resident is currently receiving a $100 annual Climate Credit on their electric bill and a $50 annual Climate Credit on their gas bill; changing that to $150 on their electric bill and $0 on their gas bill does not ultimately change the amount they would spending on utilities between the two sources. However, doing so would have the upside of further subsidizing the use of electricity (which is aligned with state goals) and not subsidizing the use of natural gas (which is not). It would theoretically even provide some additional incentive for customers who are able to go all-electric in their homes.

Within the portion to EDUs, the Legislature currently delegates decision making on how to use the auction proceeds to the recipients themselves (or, in the case of IOUs, the CPUC). Even though the California Climate Credit is already where the majority goes (72% of 2013-2023 proceeds), if the Legislature wanted to maximize the Climate Credit it could stipulate that the other uses (industry rate assistance, small business credits, and clean energy & energy efficiency programs) are no longer authorized. There is no one best distribution of utility auction proceeds; the Legislature should weigh what might be most in line with members' values and priorities.

1.3.2. What if the Climate Credit were redesigned with geography and equity in mind?

A group of Stanford researchers recently proposed redesigning the Climate Credit to better ways to distribute it in line with where and when it would be the most needed.[12] The authors devised a method for reallocating the residential California Climate Credit to help low-income customers in the hottest parts of California reduce their electric bills in their highest-bill months.

The study concluded that, "Reallocating the current residential Climate Credit pool has important implications for electricity affordability and public health… By both lowering and stabilizing the monthly electric bills of low-income customers, we find that the highest monthly bills can be reduced by over fifty percent." This could be an approach worth considering to use the Climate Credit resources currently available to take a more targeted approach to mitigating some of the most significant cost impacts affecting some of the most vulnerable Californians. This concept is being explored currently as part of Senator Becker's SB 254, which is awaiting hearing in the Senate Appropriations Committee.

1.4. Purchased at quarterly auctions

1.4.1. What if auction prices were more prescriptively set in statute?

There are four price controls that apply to cap-and-trade allowances, all of which shape the market. As part of the 2017 cap-and-trade reauthorization, AB 398 directed CARB to establish a price ceiling on allowances, based on the need to avoid adverse impacts on resident households, businesses, and the state's economy, among other specified considerations. On the low end, the program has had a gradually-rising price floor since inception. There are also two "speed bumps" between the floor and the ceiling: the allowance price containment reserves (APCRs). These are pools of allowances offered at set prices which can be purchased under special circumstances to help address allowance prices, should they increase significantly.

[12] Smith, Mastrandrea, and Wara, December 13, 2024. Reallocating the Residential California Climate Credit to Low-Income Customers

The current price ceiling in 2025 is $94.92—significantly higher than the $29.27 settlement price at the latest auction. Notably, AB 398 also required that if that ceiling were to be reached (such as through a significant increase in demand or decrease in supply of allowances), then essentially additional allowances would be sold until all covered entities can achieve their compliance obligations. Any proceeds from allowances sold at the ceiling would effectively have to be used to buy offsets. Requiring any proceeds generated at the price ceiling to go to offsets is ostensibly an attempt to maintain the "cap" on emissions, but it is not the only option for what to do with those proceeds either.

The Legislature should determine whether the current system for establishing the price ceiling is suitable, and if not, adjust accordingly. What good is setting a highest possible price if that price is too high for comfort? Using an estimate of 9 cents of gas price impacts per $10 of allowance price, the program currently adds around 27 cents to a gallon of gas. Would 81 cents per gallon (as it would be expected to be at the ceiling) be acceptable?

2. How should emissions and projects outside of the program be addressed?

2.1. What if the Legislature tells CARB to fix the perceived issues with offsets?

In 2017, the California Legislature passed AB 398 to reauthorize the cap-and-trade program along with a number of provisions affecting offsets (such as lowering the limitations on how many offsets covered entities could use to comply). Even then, offsets (particularly those generated through forest management) were a fraught and complex topic, and so AB 398 included the establishment of the Compliance Offsets Protocol Task Force, a group of specified stakeholders intended to provide expert guidance to CARB on new offset protocols.

After a year of work, the 11-member Task Force released its final recommendations in March of 2021, but the report was saddled with controversy. Specifically, two members (the representatives of advocates for environmental and environmental justice issues) resigned in protest less than a

month before the report was finalized. The designated representative of environmental advocates, in tendering his resignation, wrote:

> "As we heard several times at the November Task Force meeting, it is precisely the intention of both the Task Force and the Air Resources Board to describe the recommendations as the product of diverse stakeholder input, including environmental and environmental justice advocates. However, the membership of the Task Force does not adequately represent either environmental or environmental justice interests. Nor does a perfunctory public comment process represent meaningful inclusion of environmental justice interests, or the free, prior, and informed consent that should be expected of such a product.
>
> "I understand that the composition and mandate of the Task Force is set by statute, which is beyond the control of either the Air Resources Board or the Task Force members. However, I do not feel that my participation adds value to a wish list from offset proponents and developers. In fact, I feel that my inclusion on the final product would serve only to obscure the true nature of the Task Force report and add to the misconception that the recommendations represent a broad array of interests."[13]

Ultimately, the final recommendations in the report were never presented to the CARB board. If the Legislature elects to defer to CARB or appointed experts to address issues in offset protocols again—as it did in 2017—great care should be taken to avoid the same unproductive outcomes that resulted from the last process. The Legislature may also wish to consider directing CARB to adopt more specific reforms to how offsets are administered, and could consider approaches taken in other carbon markets among other approaches.

2.2. What if California put offsets "under the cap"?

In their cap-and-invest program, Washington approached the issue of unreliable offset quality by reducing the annual allowance budget by an amount equivalent to offset use.[14] This puts "offsets under the cap," in the sense that capped emissions are necessarily reduced by the use of offsets.

[13] Nowicki, Brian. Compliance Offsets Protocol Task Force Resignation Letter, 2/8/21. https://ww2.arb.ca.gov/sites/default/files/2021-02/nowicki_brian_offsets_task_force_letter_020821.pdf

[14] Washington Department of Ecology, Cap-and-Invest Offsets. https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest/Offsets

This mechanism was also offered in previous IEMAC reports as a possible approach to addressing offset concerns in California. Under a hypothetical worst-case scenario where not a single offset corresponded to a real emission reduction, the program would still achieve its emission reduction goals.

Putting offsets under the cap would be expected to increase the cost of offsets (which are currently a significantly less expense method of compliance than purchasing allowances), which in turn would increase covered entities' cost of compliance. However, it would provide greater confidence in the emission reductions represented in their purchase.

2.3. What if California did away with offsets entirely and invested directly in projects?

Rather than attempting to make the outcomes of non-covered activities fungible with tons of covered emissions, simply investing in beneficial projects is also an option to be considered. An investment-centric alternative to offsets has been proposed for California.[15] The authors of that issue brief state that, "Procurement of nature-based climate solutions to supplement or substitute the existing offset program could additionally yield hundreds of millions of dollars in expanded investments and achieve a fuller range of environmental and community-based benefits."

Similarly, Oregon's Climate Protection Program is another cap-and-trade program currently in the early days of its first compliance period, but it notably does not contain offsets at all.[16] Rather, the program has a different alternative compliance mechanism: the Community Climate Investment (CCI). By providing payment to a third-party administrator (currently $129 per credit), covered entities in Oregon can comply with the cap-and-trade program without reducing their own emissions, like purchasing offsets works in California. Unlike offsets, however, CCI projects are robustly managed and directed to make specific investments in reducing GHG emissions in communities, prioritizing environmental justice.

[15] Burtraw, Dallas and Roy, Nicholas. Offset Reform Could Drive Investments in Nature-Based Climate Solutions, 1/23/2025. https://www.rff.org/publications/issue-briefs/offset-reform-could-drive-investments-in-nature-based-climate-solutions/

[16] Oregon Department of Environmental Quality. Climate Protection Program. https://www.oregon.gov/deq/ghgp/cpp/Pages/default.aspx

To the extent that this minimizes (or eliminates) the use of offsets, doing so may increase cap-and-trade compliance costs (modestly, since currently covered entities can only use offsets to meet 6% of their compliance obligations), raising concerns of affordability impacts. However, it would allow the state to take a much more active role in determining which (and where) projects are funded. By prioritizing projects that provide substantial, tangible benefits to Californians, greater targeted, visible benefits could be realized even if costs are modestly increased.

2.4. What if we required more Direct Environmental Benefits to the State?

Under the 2017 cap-and-trade reauthorization, a requirement was imposed on covered entities using offsets to comply that half of the offsets used for compliance must provide a "direct environmental benefit to the state" (DEBS). While simple in concept, in practice there have been a variety of ways projects can prove their DEBS, including entirely out-of-state projects being deemed DEBS-eligible by CARB[17] (such as carrying out a forest management plan in north-central Oregon that was found to "provide for the reduction or avoidance of emissions of air pollutants associated with wildfire smoke and potential impacts to the State of California").[18] In Washington's cap-and-invest program, all offsets must provide DEBS, which California could consider adopting as well. This could make offsets slightly more expensive (though likely not as much as putting offsets entirely "under the cap"), but would ostensibly provide more in-state benefits from the compliance instruments.

2.5. What if CDR/CCS were brought into the program?

As the regulation exists today, carbon capture and sequestration (CCS) is not counted towards cap-and-trade compliance. Regardless of any carbon dioxide emissions captured, covered entities can still only comply through direct emission reductions or the use of allowances or offsets. This has been a contentious issue among affected industries and interested academics for many years, such as a July 2020 letter to CARB requesting staff to,

[17] DEBS Determinations for Compliance Offset Program. CARB. https://ww2.arb.ca.gov/resources/documents/debs-determinations-compliance-offset-program

[18] Letter from CARB to the operators of the Opal Mountain Ranch project, December 23, 2024. https://ww2.arb.ca.gov/sites/default/files/2025-01/debs5554.pdf

"promptly analyze if and how inclusion of CCS could strengthen the Cap-and-Trade program by examining potential impacts and benefits and, subject to the conclusions of the analysis, enhance the Cap-and-Trade regulation and [mandatory reporting regulation] as needed to include CCS projects that comply with the already established CCS Protocol [of the LCFS]."[19]

During past cap-and-trade workshops, CARB staff noted that they are evaluating opportunities to align the treatment of CCS and carbon dioxide removal (CDR) within cap-and-trade in line with other state targets. This remains an active topic of debate and discussion. Any tying together of cap-and-trade compliance with CCS deployment must be approached carefully.

To the extent that CCS can operate as an effective and reliable way to mitigate emissions from a point source, this could be a meaningful and sensible issue to address. However, it would be essential at the very least for CARB to develop rigorous protocols that ensure any carbon captured from point sources is stored—securely, verifiably, and permanently—before these activities can reduce a compliance obligation. Moreover, it is unlikely CCS/CDR could feasibly help address affordability, since such technologies are generally among the most expensive per-ton options. However, to the extent that future carbon neutrality relies on deploying CCS and CDR technology and that these technologies pan out at scale, California's investments today could play a key leadership role in bringing it to market.

[19] California Decarbonization Partnership letter to CARB on Carbon Capture, July 20, 2020 https://www.c2es.org/press-release/california-decarbonization-partnership-letter-to-carb-on-carbon-capture/

3. How can the communities hit the hardest be helped the most?

Whether or not California's cap-and-trade program has disproportionately benefited disadvantaged communities to date is the subject of significant and ongoing academic debate.[20,21,22,23,24] In short, despite twelve years of experience running cap-and-trade in California, the confounding nature of complex air quality data and imperfect sources of data for comparison makes it impossible to draw ironclad conclusions either way about the environmental justice impacts of cap-and-trade at this time. Regardless of the complex and nuanced debate unfolding in this space, one simple fact remains: by design, California's cap-and-trade program does not direct where emissions reductions occur.

Nevertheless, these very same communities are affected several times over by the issues created by major sources of pollution. They are hit hardest by climate impacts, cost impacts are most regressive, and they live near the polluting sources. The complexity of addressing these issues is further compounded because the jobs and tax base the polluting sources provide are often the economic anchor of the community. How can reforms to cap-and-trade (or other, complementary policies) help these communities receive the types of targeted interventions needed to counteract decades of systematic neglect and disinvestment?

3.1. What if cap-and-trade included facility-level emission caps?

"No-Trade Zones" or "Facility-level emission caps" refer to a set of practices that would limit certain covered entities' ability to comply with cap-and-trade using allowances, based on their location and/or contributions to local air pollution. One example could be requiring covered entities who lag in reducing emissions and are located in disadvantaged communities to comply with cap-and-trade more by reducing emissions (as opposed to retiring allowances or offsets) than they might otherwise. There are several

[20] Hernandez-Cortes and Meng, 2020. "Do Environmental Markets Cause Environmental Injustice? Evidence from California's Carbon Market." NBER Working Paper 27205. UC Santa Barbara: National Bureau of Economic Research.
[21] Pastor, Ash, Cushing, Morello-Frosch, Muna, Sadd, 2022. Up in the Air: Revisiting Equity Dimensions of California's Cap-and-Trade System.
[22] Hernandez-Cortes & Meng, 2022. The Importance of Causality and Pollution Dispersal in Quantifying Pollution Disparity Consequences: Reply to Pastor et al. (2022)
[23] Hernandez-Cortes & Meng, 2023. Do Environmental Markets Cause Environmental Injustice? Evidence from California's Carbon Market. Journal of Public Economics
[24] Ash, Pastor, 2024. What a Difference a Datum Makes: Revisiting the Impacts of Cap-and-Trade on Emissions and Environmental Justice. Environmental Justice

similar policy approaches that could be used to tune this as well: affected facilities could be required to surrender more compliance instruments than they otherwise would, or they could receive fewer free allowances.

Imposing facility-level emission caps would be expected to raise the cost of compliance for affected facilities somewhat, since they may no longer be able to select the most cost-effective compliance strategy. However, some reports have predicted that the overall cost impacts could be minimal. [25] The upside is it would be expected to cause those facilities to directly reduce their emissions more rapidly than they have to date. This gets at the fundamental tension underpinning cap-and-trade, and there is no objectively correct answer. When does improving air quality around major pollution sources take precedence over minimizing compliance costs for those sources?

3.2. What if stationary sources more aggressively moved towards clean technology?

Ultimately, market-based compliance mechanisms may simply not be the right tool for the job when it comes to targeted emissions reductions in specific locations. Rather, it may be necessary to craft more targeted and prescriptive policies to get at such environmental justice issues.

This was addressed indirectly during the last cap-and-trade reauthorization through AB 398's companion bill, AB 617. That bill, in part, directed organizations within communities faced with significant sources of pollution to work with their local air districts to develop community-based monitoring and emission-reduction strategies. Although it created a time- and labor-intensive process which has not produced uniformly positive outcomes, AB 617 has meaningfully helped improve engagement, information, and (in some cases) outcomes in these communities. AB 617 also directed CARB to take a more active role in assessing what the best technologies were that could be used by stationary sources of air pollution to control their emissions.

[25] Burtraw, Dallas and Roy, Nicholas. How Would Facility-Specific Emissions Caps Affect the California Carbon Market? July 2023. https://www.rff.org/publications/reports/how-would-facility-specific-emissions-caps-affect-the-california-carbon-market/

Currently, SB 318 by Senator Becker attempts to build upon some of the provisions created by AB 617 to help improve how local air districts evaluate permit applications for new major sources of pollution. Although the bill is still undergoing the legislative process, it does provide one avenue by which prescriptive, targeted emissions reduction approaches could be taken. Although doing so would inherently be expected to be less cost-effective that market-based mechanisms, there is the potential to advance state leadership in developing and deploying state of the art technologies to reduce emissions. Care must be taken to do so without unduly disrupting existing air district permitting processes as well.

3.3. What if workers at emissions-intensive industries get transition support?

Despite the uncertainty around the path and the timing to get there, California's destination is clear: a decarbonized economy using—at most—minimal fossil fuels as compared to today. That means more than just that the nature of California's energy mix will change drastically; our economy and workforce will change significantly too. It is unclear exactly how many workers are employed in the oil & gas industry (with estimates ranging from as low as 45,900 according to a 2023 report from the Gender Equity Policy Institute (GEPI) based on 2021 data,[26] to as high as 148,150 direct employees according to a 2025 report from the Los Angeles County Economic Development Corporation (commissioned by the Western States Petroleum Association) based on 2022 data).[27]

Regardless of specific numbers, the point remains: decarbonizing California's economy will require a significant shift in livelihoods for many Californians working in the oil & gas industries today. This was seen tangibly in 2020, when the Marathon Martinez oil refinery in Contra Costa County announced they would indefinitely idle their facility, resulting in over 700 jobs losses with only 60 days' notice.[28] In response, a partnership of labor unions, environmental justice organizations, and supporting academics was formed to assess the situation and recommend policies to

[26] Impact analysis: California's Oil and Gas Workers. January 2023. https://thegepi.org/california-oil-gas-workers/
[27] Economic reports: Oil & Gas in California. March 2025. https://laedc.org/research/reports/oil-gas-in-california/
[28] California Contra Costa Refinery Transition Partnership Report and Policy Recommendations. January 14, 2025. https://www.bluegreenalliance.org/resources/report-and-recommendations-of-the-california-contra-costa-refinery-transition-partnership/

balance the many competing priorities that face the communities who are undergoing these transitions. These recommendations included (but were not limited to) providing advanced notification of closures and maintenance oversight, developing workforce transition plans, establishing oversight commissions, establishing financial supports for worker transition, exploring policy mechanisms for refinery industry funding of worker & community safety nets, establishing statewide severance standards & employee protections, securing enforceable financial assurances for environmental remediation, establishing local community recovery & transition funds with state/federal support, and aligning and embedding just transition standards in all state and federal investments.

Although it may not represent a dollar-per-ton GHG reduction, supporting a just transition of workers from carbon-intensive industries to decarbonized ones could be beneficial to workers, communities, and the environment alike. The Legislature may wish to consider if supporting these efforts is a priority to consider for cap-and-trade and GGRF in the coming years.

3.4. What if fossil fuel companies are no longer profitable to operate?

Whether through the intentional phase-down of fossil fuels in California, shifting global market dynamics, the reduction (see 1.2.4) or removal (see 1.2.1) of freely-allocated allowances, or any combination thereof, it is clearly becoming more and more difficult to profitably operate fossil fuel infrastructure in California.

California's economy today relies on an immense volume of fossil fuels (by some accounts as much as 84% of our total energy today)[29]. In turn, extracting, transporting, refining, distributing, and using those fossil fuels relies on an immense network of infrastructure owned by a number of private companies and operated by tens of thousands of skilled workers . Those private companies rely on certainty about the profitability of their investments. What happens when—not if—it is no longer profitable to operate fossil fuel infrastructure in California? What—if not profit—would compel private companies to continue maintaining and operating their infrastructure? How can California keep its economy afloat and its people

[29] California State Profile & Energy Estimates. U.S. Energy Information Administration. https://www.eia.gov/state/?sid=CA

thriving in the crucial period between when fossil fuels stop being profitable, and when they stop being needed?

Pursuant to SBX1-2, the California Energy Commission produced a Transportation Fuels Assessment, which has begun to wrestle with some of these questions. One of several possible solutions under consideration is state ownership of refineries, in which, "The State of California would purchase and own refineries in the State to manage the supply and price of gasoline." However, doing so would be extremely costly and represent a significant departure from how this industry has operated in California. The Legislature may wish to consider how cap-and-trade and the GGRF could play a role in these solutions.

There is no clear best way to transition the world's fourth largest economy off of fossil fuels. California is leading the way and charting a path to navigate this transition. This monumental task will have consequences, both expected and unforeseen. Nevertheless, the Legislature should evaluate the information and options available and take action before GHG emissions continue unabated, fossil fuel infrastructure falls into disrepair (with potentially catastrophic results), and communities surrounding this infrastructure continue to face air pollution and economic uncertainty alike.

4. How can GGRF revenues support this transition?

The GGRF is the depository for revenues generated from the sale of cap-and-trade allowances. In recent years, cap-and-trade auctions have raised between $2 billion and $5 billion per year, totaling $26.4 billion between 2013 and 2023. Multiple factors influence revenues—including interest in purchasing allowances from outside investors, confidence in the longevity of the program, and the balance of supply versus demand for allowances.

As a result of several bills over the years, roughly 65% of annual GGRF revenues is now dedicated to statutorily required continuous appropriations. Since 2014, High-Speed Rail (receiving 25% of GGRF revenues), Affordable Housing and Sustainable Communities (20%), Transit and Intercity Rail (10%), and Low Carbon Transit Operations (5%) have collectively accounted for 60% of all GGRF spending. More recently, Safe and Affordable Drinking Water ($130 million) and Healthy and Resilient Forests ($200 million) were added as

continuous appropriations in 2019 and 2022, respectively. Notably, pursuant to AB 680 (Burke, Chapter 746, Statutes of 2021), the vast majority of all projects supported by continuous GGRF appropriations will, by July 1, 2025, will be required to meet specified labor standards, including fair and responsible employer standards and inclusive procurement policies.

After accounting for these statutory spending commitments, the remainder of annual GGRF revenues are available for the state to spend on other activities, at its discretion (and pursuant to other statutory requirements). The Legislature typically appropriates GGRF funds as a part of the annual budget process, and spending priorities for these "discretionary" revenues can vary each year. Past expenditures have focused on low-carbon transportation programs, community-based air protection, and agriculture programs. The Legislative Analyst's Office has noted in several recent reports on GGRF expenditures that the existing statutory commitments were made under different policy environments than exists today. There is no shortage of meritorious projects and programs the Legislature could elect to invest GGRF revenues in, but the following are provided as some possibilities for consideration.

4.1. What if we don't change anything with GGRF?

As part of the informal workshops that preceded CARB's cap-and-trade rulemaking, modeling was commissioned to estimate future allowance prices under a range of scenarios.[30] That model predicted that under most scenarios allowance prices would climb quickly upon program reauthorization. **In other words, the cost impacts and inflows to GGRF are expected to climb sharply, even without any further policy changes beyond simply reauthorizing the program.** When envisioning a post-2030 cap-and-trade program, the Legislature should consider that there is effectively no status quo; we are entering uncharted territory with or without any specific reforms.

[30] Bushnell, James, Aaron Smith, Wuzheqian Xiao, and Julie Witcover. 2023. Allowance Supply and Demand in California's Cap-and-Trade Market: Initial Results. *Energy Institute at Haas* (blog). https://energyathaas.wordpress.com/2023/11/27/californias-cap-andtrade-market-enters-its-teen-age-years/

With the exception of the appropriations for safe and affordable drinking water (capped at $130 million per year) and to CAL FIRE (a set $200 million per year), the rest of the continuous appropriations will continue to increase in proportion with GGRF. While this would provide more resources to those projects that have secured a continuous appropriation, the Legislature would continue to only have discretion over a minority of the fund, despite compliance costs being expected to rise.

In terms of goals, leaving the GGRF appropriations as they are would likely do little to address affordability or demonstrate leadership in climate policy. To the extent that projects currently funded by continuous GGRF appropriations are investing in a climate-ready future, not changing them would continue those investments in likely-increasing amounts.

4.2. **What if we get rid of all the continuous appropriations altogether?**
The current continuous appropriations are all set in statute (Health and Safety Code 39719), and that section could be amended by legislation. The High Speed Rail Authority, other rail and transit, affordable housing, drinking water, and forest health projects that currently have been receiving consistent funding—some for as many as 12 years—would undoubtedly face major disruption as they seek alternative sources of funding, at best. The upside is that the Legislature would have the ability, given the state's goals and financial situation, to direct the greatest amount of money possible to priorities that are more current.

4.3. **What if we cap the current continuous appropriations?**
As one possible middle option between the previous two, the Legislature could consider replicating the approach currently used to fund safe and affordable drinking water: appropriating a percentage of GGRF revenues up to a fixed numerical cap. For a given value (say $4 billion, for example), GGRF would then function roughly as it does today up to that point, and beyond that could be unconstrained by the existing continuous appropriations. Depending on how high GGRF revenues go in response to reauthorization and other reforms, this could potentially generate a large sum of money to address more current priorities and goals, while still keeping the recipients of current continuous appropriations roughly funded at a level chosen by the Legislature.

4.4. What if we give money back to Californians?

Given the pressing urgency of tackling California's affordability crisis, some have proposed implementing progressive cash rebates.[31] This could allow California to mitigate some of the cost impacts of an increased allowance price. This idea has been implemented in other carbon markets, such as Canada's Canada Carbon Rebate[32] although this program has now concluded with the end of the federal fuel charge.

While the rebate could be structured in any way, it would be simpler to implement if it made use of an existing payment Californians make today, such as utility bills or state taxes. The execution and appropriate distribution of a cap-and-trade rebate would not be trivial, but it could provide significant discretion to the Legislature in who tangibly benefits from cap-and-trade by addressing affordability.

4.5. What if we moved programs funded out of electricity rates into GGRF?

Similarly to direct rebates (see 4.4), some have proposed using GGRF to subsidize electrical utility rates. Specifically by moving embedded costs (like funding wildfire prevention programs or solar subsidies) out of volumetric electric rates and into GGRF, electric rates could be reduced statewide. In contrast to the allowance allocation policies described in section 1.3, this would reduce bills, rather than compensate higher bills with higher rebates. This could address affordability concerns while promoting greater adoption of electric appliance and vehicles by reducing electric rates.

5. Conclusions & considerations for the hearing

Clearly, cap-and-trade is a complex and consequential policy that is deeply embedded in California's economy and transition away from fossil fuels. Pulling any one policy lever alone will not accomplish our goals, but taken together—and with the insight and input of the experts gathered today—the Legislature can chart a course for cap-and-trade that addresses affordability,

[31] Ansar, Jasmin and Vesser, Barry, 2025. Reforming California's Cap and Trade Program: Analysis and Recommendations https://theclimatecenter.org/climate-targets/reforming-californias-cap-and-trade-program-policy-brief/

[32] https://www.canada.ca/en/revenue-agency/services/child-family-benefits/canada-carbon-rebate.html

reaffirms California's climate leadership, and invests in California's climate-ready future. The panelists in today's hearing are experts in their fields and are prepared to answer questions and provide context for the gathered Senators. Some questions that may spark informative discussion include:

- How exactly could the Legislature go about ensuring GGRF revenues are prioritized in a reauthorized cap-and-trade program?

- What would the trade-offs be in imposing facility-level emission caps on some major pollution sources?

- What role do offsets play in affordability today, and how does that compare with possible outcomes under the approaches taken by Oregon and Washington?

- What would the impacts be of removing freely-allocated allowances to industries altogether? What about of allowing CARB to set appropriate industry assistance factors again?

- What role can cap-and-trade play in a just transition for workers and communities?

- How does cap-and-trade compare to the Low-Carbon Fuel Standard in terms of its costs, impacts, and Legislative oversight?