
The Economic Equity of California's Cap-and-Invest Program

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ABSTRACT

Climate change requires urgent, comprehensive, and effective solutions to mitigate impacts to people and the planet. California is a leader in climate policies that address this issue, with its most prominent policy being the Cap-and-Invest Program, aimed to lower greenhouse gas (GHG) emissions. This program has faced opposition from environmental justice advocates for disproportionately impacting disadvantaged communities based on the distributional inequities of GHG and co-pollutant emissions. This policy brief expands upon this topic by exploring the economic equity implications of the California Cap-and-Invest Program throughout the state. While policy initiatives have been adopted to address equity issues of the program, economic inequities remain. The program imposes high energy costs on producers, which are transferred to consumers, acting as a regressive tax that pushes disadvantaged communities into energy poverty. The program does not exacerbate nor alleviate distributional inequities of GHG and co-pollutant emissions. This policy brief identifies and discusses actionable policy recommendations, including producer and consumer-side subsidies and incentives, restructuring the allowance, offset, and quantity constraint requirements, and investing in research and development to promote equity within this program and beyond.

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Introduction

Climate change, its causes, and its solutions have drastic economic impacts, making the issue deeply intertwined in the economy. As a national and global leader in environmental and climate policy, California has worked to mitigate climate change through market-based policies. In 2006, the state passed the Global Warming Solutions Act (AB 32) that directed the California Air Resources Board (CARB) to establish a Cap-and-Invest Program, a statewide market quantity restraint on greenhouse gas (GHG) emissions sources (California Air Resources Board 2018). The program is a market-based policy mechanism that allocates emissions allowances to regulated emitters through “a tradable permit to emit one MTCO_{2e} GHG emission” (California Air Resources Board 2012). Emitting entities—including large industrial facilities, electrical distribution facilities, and natural gas facilities—receive emissions allowances equivalent to around 90% of the annual GHG allowance budget (California Air Resources Board 2015). Entities can buy additional allowances at auction, purchase allowances from other entities, or purchase offset credits to identify and implement the most cost-effective strategies to reduce GHG emissions (California Air Resources Board 2015).

The quantity restraint applies to industrial facilities, power plants, and fuel suppliers that emit 85% of California’s emissions (California Air Resources Board 2015). The aim of the program is to reduce GHG emissions by approximately 427 million metric tons of carbon dioxide equivalent (MMTCO_{2e}), 100% below the 1990 level, by 2050 (California Air Resources Board 2015). The program also aims to “establish a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy” (California Air Resources Board 2015). The revenue generated by the program is deposited into the Greenhouse Gas Reduction Fund (GGRF) to be used for California Climate Investments (CCI) projects (California Air Resources Board n.d.a). CCI projects invest in sustainable communities, sustainable agriculture, improved air quality, and other climate-focused projects to transition to an equitable, low carbon future while delivering major economic, environmental, and public health benefits for Californians (California Air Resources Board 2024).

Between the initial implementation of the policy in 2013 and 2023, the policy reduced GHG emissions of covered sources by 10.6 MMTCO_{2e}, or 3.6% (Environmental Defense Fund 2023). The policy has also generated over \$28 billion in funding for CCI projects (California Air Resources Board 2023). Since 2014, \$11.6 billion has already supported 584,440 implemented CCI projects that are expected to reduce an estimated 112.8 MMTCO_{2e} (California Air

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Resources Board 2024). These outcomes represent the success of California's Cap-and-Invest Program in reducing GHG emissions in the state.

Economists and policymakers often favor market-based policy mechanisms to reduce GHGs, but environmental justice advocates have historically opposed these policies on the grounds that they disproportionately impact disadvantaged communities. California defines disadvantaged communities as “the areas throughout California which most suffer from a combination of economic, health, and environmental burdens” (California Public Utilities Commission n.d.). In designing the Cap-and-Invest Program, CARB was required to promote equity, minimize costs, and maximize overall GHG emissions reduction in California (California Air Resources Board 2019). AB 32 chartered an Environmental Justice Advisory Committee (EJAC) to ensure that these goals are met in the path to achieving GHG reduction targets, but the practical implementation of the legislation has encountered formidable equity challenges (Fowlie et al. 2020). Equity concerns have been raised over the program's cost incidence, inaccessible incentives, impact on energy costs, and distribution of GHG and co-pollutant emissions. As a result, environmental justice advocates fiercely opposed the policy's renewal in 2017 after its initial 2013 implementation phase (Fowlie et al. 2020). Yet, by implementing equity-focused policy provisions, California's Cap-and-Invest Program and CARB can effectively promote environmental justice, benefit state communities, and act as a model leader in climate policy.

Equity Implications of California's Cap-and-Invest Program

California's Cap-and-Invest policy has generated welfare inequities across the state through an uneven burden of prices for necessary goods. This occurs when entities increase the price of GHG intensive energy sources, such as oil or natural gas, to meet the quantity restriction on allowed GHG emissions under the program. They do so through either investing in emission reduction activities or purchasing allowances. When producers increase the price of their goods, consumers are burdened with paying for the cost of the program in the form of higher costs on GHG producing goods. For example, in 2023 alone, the costs of complying with the Cap-and-Invest Program increased retail natural gas prices by an estimated 8% (California Environmental Protection Agency 2025). The program has also contributed to higher residential electricity prices across the market, which have increased by 95.9% since the implementation of the program (California Center for Jobs and the Economy 2025). As emissions reduction goals increase, electricity prices are expected to rise at an even faster rate over the coming years (Lesser and Continental Economics 2015).

Furthermore, in practice, the pass-through costs of the Cap-and-Invest Program act as a regressive energy tax, where the average tax rate increases as income decreases. With the cost initially falling on producers and being transferred to consumers at a flat fee, price increases are proportionately more of a household's income in low-income households. This feature of the program has pushed many low-income households into energy poverty—defined as energy expenditures exceeding 10% of household income (Lesser and Continental Economics 2015). In 2023, over 34% of Californians, or approximately 14 million people, were at or near the income poverty line and vulnerable to these high energy prices (Bohn et al. 2025). In 2024, 1 in 5 households in California struggled to pay their energy bills (The Greenlining Institute 2024). In fact, California residents owe investor-owned utilities more than \$2 billion in past due bills, with low-income households carrying a disproportionate amount of the debt (The Greenlining Institute 2024). For example, in California's inland Central Valley regions, "summer electricity consumption and prices are highest, but household incomes are lowest" (Lesser and Continental Economics 2015).

In addition to high energy costs, there are high costs associated with switching to low-emission technologies, such as energy efficient heat pumps or electric vehicles. The unaffordability of low-emission technology creates a barrier to entry for low-income households, increasing the costs they face from the Cap-and-Invest Program when consuming high emitting goods (Holliman and Collins 2023). Affordability credits, such as the Residential California Climate Credit (RCCC), have been designed to mitigate the pass-through costs of the Cap-and-Invest Program. Yet, the RCCC is a flat fee that does not account for household income (Irwin et al. 2025). While alleviating some of the cost burden of the program, the RCCC has not been sufficient in addressing the program's resulting energy inequities nor increase significant consumption of low-emission technologies for low-income households (Holliman and Collins 2023). Therefore, low-income households continue opting for cheaper, used, and inefficient technologies that they can afford in the short-term, while continuing to face the long-term costs of the Cap-and-Invest Program (Merchant 2024).

These economic inequities stem from discriminatory policies, such as redlining and discriminatory housing practices. These policies "confined many low-income individuals and communities of color into disinvested neighborhoods with older energy grid infrastructure, less energy efficient technology, and less renewable infrastructure investments" (The Greenlining Institute 2024). Additionally, low-income communities of color are much more likely to live near sources of GHG emissions and co-pollutants (Johnston and Cushing 2020). Poor infrastructure and proximity to high-emitting entities increase public health inequities that can impact the economic prosperity of these communities. It is critical to assess the health inequities in evaluating the economic equity

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of this policy because health inequities are costly, reducing productivity and increasing financial burdens (Deloitte Insights 2024).

The Cap-and-Invest Program was expected to yield improvements in environmental equity with respect to GHG and co-pollutant emissions, however the program has yet to realize these improvements (Cushing et al. 2018). While the program aimed to decrease toxic pollutants in minority communities, there has been neither an increase nor decrease. In their research, Glenn Sheriff found that under all policy scenarios, “minorities have a less desirable exposure distribution than whites, however both demographic groups have a better air toxic exposure distribution with the Cap-and-Invest Program than in a counterfactual without” (Sheriff 2023). These findings have been supported by similar studies, showing that, while the Cap-and-Invest Program is not causing disparities, the program highlights disparities that already exist, proving that the program neither exacerbates nor alleviates health inequities directly. However, the distribution of GHG and co-pollutant emissions disproportionately impacts disadvantaged communities, and policy solutions should continue to address this issue and the systemic inequities that have caused it.

Policy Recommendations to Promote Equity

In response to the remaining inequities, the state legislature has adopted policies to advance the equity of the program. In 2017, AB 617 was passed, creating the Community Air Protection Program (CAP). CAP’s goal is to reduce emissions of toxic air contaminants and criteria air pollutants in communities with the highest cumulative exposure to address environmental justice concerns that aren’t solved by the Cap-and-Invest Program (California Air Resources Board n.d.b.). CAP “requires CARB and local air districts to engage community members, community-based organizations, environmental justice organizations, state and local governments, regulated industries, and other key stakeholders” directly in the development of local pollution regulations (California Air Resources Board n.d.b.). This program is critical in addressing the distributional inequities of GHG and co-pollutant emissions, and the community engagement requirements will promote equity in all aspects of the program.

Based on the findings from the relevant literature, the importance of investing in energy projects in underserved communities is clear. GGRF and CCI are effective provisions of the program that fund investment projects. GGRF has invested about 76% of project funds in underserved and low-income communities that face the greatest environmental burdens from pollution. These projects include 420,000 rebates for low-emission vehicles, 22 million new trees in urban and

wildland areas, 12,606 affordable housing projects, and 1,248 new or expanded transit systems (California Air Resources Board 2023). These projects have supported roughly 30,000 jobs, and they expect to reduce 109 MMTCO₂e over their lifetime—the equivalent of removing 25 million cars off California’s roads (California Air Resources Board 2023).

While AB 617 has mitigated some economic inequities of California’s Cap-and-Invest Program, there is a need for further policy intervention. The following recommendations aim to address the economic inequities of the program that remain.

Producer-Side Subsidies & Incentives

Producer subsidy and incentive policies can help reduce the distributional inequities that exist. Incentivizing emissions reduction projects in high-pollution areas can effectively reduce emissions and mitigate existing inequities (Cushing et al. 2018). These incentives would also have the benefit of improving the effectiveness of the program in regulating the highest emitting entities.

Policy recommendations:

- Raise the price of allowances in high-pollution areas. When prices of allowances are increased, firms will be incentivized to reduce additional emissions to make more of a profit when selling allowances. If firms cannot further abate emissions, they will have to pay more for the allowances, increasing the cost of emitting.
- Subsidize offsets that are linked to local projects that reduce GHG emissions where emitting facilities are located. Reducing the price of offsets through subsidies increases the demand for offsets and, therefore, the quantity of GHG emission projects in these areas. This will help reduce emissions in the areas where they are highest due to proximity to emitting facilities.

Consumer-Side Subsidies & Incentives

As discussed in the literature and throughout this paper, the subsidies and incentive structures for low-income individuals are not sufficient in addressing the program’s cost burdens. Subsidy and incentive policies need to be expanded to reduce the barrier to entry to purchasing low-emission technology, decrease

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energy prices, and subsequently decrease energy poverty.

Policy recommendations:

- Increase rebates from GGRF to low-income households and underinvested communities that face disproportionately high energy prices. It is important that these rebates remain fixed and unrelated to the amount of individual energy consumption to maintain the incentive to substitute away from emission-intensive goods.
- Expand subsidies for low-emission technology based on a sliding scale where applicants with lower incomes receive higher subsidies.
- Implement long-term zero interest loan programs with a high quantity of available loans for low-income individuals to purchase low-emission technology. This loan must be coupled with consumer protections, including transparency of loan requirements, to avoid predatory loans.

Allowance, Offset & Quantity Restraint Restructuring

Amending the allowance, offset, and quantity constraint requirements of the program can also effectively address emissions inequities. These recommendations largely address emission distribution and its subsequent health inequities, which, as discussed above, indirectly reduce economic inequity. The EJAC, under CARB, has recommended multiple of these policies but have yet to be implemented.

Policy recommendations:

- Restrict allowance trading in high-pollution areas, requiring emitters in these communities to achieve direct emissions reductions rather than relying on the purchase of allowances to maintain pollution levels.
- Apply facility-level emissions caps on polluters operating in disadvantaged communities.
- Count offset credits beneath the set emissions cap rather than in addition to allowances, as recommended by the EJAC (Environmental Defense Fund

2023). Under this policy, firms could not buy offset credits to reduce its GHG emissions until it is already under the emissions cap.

- Institute an emissions containment reserve—a mechanism that reduces the number of emissions allowances that are sold at low prices—to modestly increase the ambition of the Cap-and-Invest Program when prices are low, as recommended by the EJAC (Environmental Defense Fund 2023).

Research & Development

A critical component of addressing inequities from the Cap-and-trade program is spurring innovation to increase energy efficiency, effectively decreasing energy prices. By investing in research and development, policy can keep energy costs low as emission reduction goals of the Cap-and-Invest Program rise over time. Research on specific emissions reduction projects will also be important to most effectively distribute GGRF dollars.

Policy recommendations:

- Develop grant programs to fund studies on hydrogen, clean fuels, and other low-emission technologies.
- Require cost-benefit analyses on emissions reduction projects funded through GGRF that include economic equity considerations.

Conclusion

This paper demonstrates the economic inequities perpetuated by California's Cap-and-Invest Program. The nature of the pass-through costs of the program from producers to consumers, as a flat fee increasing energy prices, is the main cause of these inequities. These costs disproportionately impact disadvantaged communities, acting as a regressive tax, which can increase energy poverty rates. The incentive structures that currently exist to alleviate these cost burdens have proven ineffective. In addition, systemic environmental injustices have caused disadvantaged and low-income communities to become exposed to high GHG and co-pollutant emissions. This has contributed to health inequities that have subsequently imposed economic burdens on impacted communities. Research shows that the Cap-and-Invest Program does not exacerbate nor alleviate these effects.

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While policy advancements, such as the creation of the CAP and EJAC, have been made to promote the equity of California's Cap-and-Invest Program, further policy intervention is necessary. Policies that target producer and consumer-side subsidies and incentives, restructure the allowance, offset, and quantity constraint requirements, and invest in research and development have the potential to promote equity within the program and beyond.

As a leader in climate policy, California has a responsibility to its people and to those who look toward it for policy guidance to maximize the benefits, effectiveness, and equity of its most prominent climate policy: the Cap-and-Invest Program. By addressing the shortcomings of its policy, California can craft an equitable program, increase the sustainability and equity of its communities, and expand its vision of a sustainable society beyond its borders to positively influence global climate change mitigation.

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