

The State of California's Draft Priority Climate Action Plan

Created under the U.S. Environmental Protection Agency's Climate Pollution
Reduction Grants Program



Submitted to the U.S. Environmental Protection Agency

March 1, 2024

Acknowledgements

The State's Priority Climate Action Plan (PCAP) was generously funded through the United States Environmental Protection Agency's Climate Pollution Reduction Grants (CPRG) Program. It was primarily developed by the California Air and Resources Board (CARB) and the California Environmental Protection Agency (CalEPA), in strong partnership with several state agencies (listed below) that have demonstrable work and commitment to California's climate policies and contributed directly to the development of the State's PCAP. The State's PCAP was also made possible through contributions from dozens of air districts, local governments, and through consultation with Tribal Nations not otherwise covered by a CPRG Planning Grant. This PCAP was also shaped through coordinated conversations with the 10 metropolitan statistical areas (MSAs) offered a CPRG Planning Grant and drafting their own PCAPs. Finally, this PCAP has been shaped by the comments and feedback CARB has received from community-based organizations, various advocates, the public and other stakeholders.

State agencies contributing to this PCAP include:

- California Environmental Protection Agency
- California Natural Resources Agency
- California Labor and Workforce Development Agency
- California State Transportation Agency
- California Business, Consumer Services, and Housing Agency
- California Government Operations Agency
- Governor's Office of Business and Economic Development
- California Volunteers - Office of the Governor
- Governor's Office of Planning and Research
- California Public Utilities Commission
- California Energy Commission
- California Department of Conservation
- California Department of Transportation
- Department of Resources Recycling and Recovery
- California Air Resources Board
- California Department of Food and Agriculture
- California Infrastructure and Economic Development Bank
- California Department of General Services
- California Department of Public Health

Table of Contents

Acknowledgements	1
Table of Contents	Error! Bookmark not defined.
List of GHG Reduction Measures included in Section 3.5.....	3
List of Acronyms	4
List of Figures	5
Executive Summary	6
1. Introduction	9
2. Approach to Developing the PCAP	10
3. PCAP elements	11
3.1 Greenhouse Gas (GHG) Inventory	11
3.2 GHG Reduction Targets	15
3.3 Prioritizing Benefits to Low-Income and Disadvantaged Communities	15
3.4 Workforce Considerations	19
3.5 GHG Reduction Measures	20
Transportation.....	21
Industrial	34
Energy	37
High Global Warming Potential.....	48
Agriculture	50
Natural and Working Lands.....	54
Waste.....	59
4. Conclusion and Next Steps.....	63
Appendix A: Low-Income and Disadvantaged Community Analysis.....	65

List of GHG Reduction Measures included in Section 3.5

Transportation Measures:

1. Create a Holistic, Heavy-Duty Zero-Emissions Vehicle Buydown Program
2. Install Truck Charging to Support Zero-Emissions Goods Movement at California Ports and Warehouse Districts
3. Advance the Deployment of Clean Off-Road Equipment
4. Bolster Investments in the State's Sustainable Port and Freight Infrastructure
5. Support Mobility Projects Uplifted by Communities
6. Allow for Local Deployment of ZEV Infrastructure and Low-Income ZEV Support

Industrial Measure:

1. Accelerate Industrial Decarbonization by expanding the existing Industrial Decarbonization and Improvement to Grid Operations Program

Energy Measures:

1. Expand Decarbonization through the Energy Conservation Assistance Act (ECCA)
2. Create a Funding Program to Upgrade the Capacity of Distribution Systems
3. Expand the Success of California's Self Generation Incentive Program for Behind the Meter Energy Storage
4. Bolster Healthy Landscapes and Resilient Communities through Expanding the Biomass to Carbon Negative Biofuels Program
5. Deploy Equitable Building Decarbonization
6. Implement Bioenergy Projects
7. Enable Renewable Microgrids for Rural Communities and Tribes

High Global Warming Potential Gases Measure:

1. Expand F-gas Reduction Incentive Program (FRIP)

Agriculture Measures:

1. Expand California's Healthy Soils Practices
2. Reduce Methane Emissions by Expanding California's existing Dairy Digester Research and Development Program

Natural and Working Lands Measures:

1. Bolster California's Forest Health Program
2. Expand Urban and Community Forest Projects
3. Expand the State's Wetland Restoration Program

Waste Measures:

1. Food Waste Prevention and Edible Food Recovery Program
2. Bolster Organics Recycling Infrastructure

List of Acronyms

AB	Assembly Bill
ACF	Advanced Clean Fleets Regulation
ACCII	Advanced Clean Cars II Regulation
ACT	Advanced Clean Trucks Regulation
AQIP	Air Quality Improvement Program
CALFIRE	California Department of Forestry and Fire Protection
CARB	California Air Resources Board
CCI	California Climate Investments
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDTFA	California Department of Tax and Fee Administration
CEC	California Energy Commission
CERF	Community Economic Resilience Fund
CMIS	Clean Mobility in Schools
CO ₂	carbon dioxide
CORE	Clean Off-Road Equipment Voucher Incentive
CPRG	Climate Pollution Reduction Grants
CPUC	California Public Utilities Commission
DDRDP	Dairy Digester Research and Development Program
ECAA	Energy Conservation Assistance Act
EVSE	electric vehicle supply equipment
FCEV	fuel cell electric vehicle
FRIP	F-Gas Incentive Program
GGRF	Greenhouse Gas Reduction Fund
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbons
HVIP	Clean Truck and Bus Incentive Program
INDIGO	Industrial Decarbonization and Improvement to Grid Operations Program
IRA	Inflation Reduction Act
MHD	Medium- and heavy-duty vehicle
MMTCO ₂ e	million metric tons of carbon dioxide equivalent
MRR	mandatory reporting of GHG emissions
NO _x	oxides of nitrogen
NWL	natural and working lands
ODS	ozone depleting substances
PCAP	Priority Climate Action Plan
PFAS	polyfluoroalkyl substances

PFIP	Sustainable Port and Freight Infrastructure Program
SB	Senate Bill
SDFR	Socially Disadvantaged Farmers and Ranchers
SF ₆	sulfur hexafluoride
SGIP	Self-Generation Incentive Program
SLCP	short-lived climate pollutant
STEP	Sustainable Transportation Equity Project
SO ₂ F ₂	sulfuryl fluoride
U.S. EPA	United States Environmental Protection Agency
VMT	vehicle-miles traveled
ZE	Zero-emissions
ZEV	zero-emissions vehicle

List of Figures

Figure 1: California’s AB 32 GHG Emissions Inventory	13
Figure 2: California’s Annual Greenhouse Gas Emissions (2000 to 2022)	14
Figure 3: California’s 2021 Greenhouse Gase Emissions by Gas	15
Figure 4: Low-Income and Disadvantaged Communities under CPRG.....	18
Figure 5: Transportation Sector Emissions in 2021	22
Figure 6:Industrial Sector Emissions in 2021	35
Figure 7: Electricity Sector Emissions in 2021	38
Figure 8: High-Global Warming Potential Sector Emissions in 2021	48
Figure 9: Agriculture Sector Emissions in 2021	52

Executive Summary

California's Priority Climate Action Plan (PCAP) presents a strong portfolio of proven climate programs specifically chosen to guide a range of coordinated implementation grant applications throughout the State. With federal funding, the climate measures included in this PCAP would immediately begin to help California meet its long-term goal of achieving carbon neutrality by 2045 and deliver a range of short-term benefits over the next five years.

In particular, this PCAP delivers the benefits of clean energy, technology, and transportation to historically underserved and marginalized communities. These are the communities that have all too often borne the brunt of heavy pollution, especially in California, from fossil fuel combustion, mobile sources, and industries. Californians in these frontline communities live in or near regions of the State that are not attaining federal air quality standards, which are often communities near ports and federally recognized freight corridors, or adjacent to fossil gas power plants and large fossil-fueled industrial facilities. Communities most affected by environmental burdens also includes those in or near forested areas that are increasingly prone to wildfire risk and encompasses remote Tribal lands and rural areas.

The measures included in this PCAP leverage a variety of existing programs from multiple state agencies that directly incorporate Governor Gavin Newsom's whole-of-government approach to tackling climate change. The measures are also consistent with the Governor's Executive Order N-16-22¹ to take additional actions to embed equity considerations in every State climate plan and program.

Since this PCAP directly addresses the major sectors of one of the world's largest economies, the programs and approaches outlined will also advance the national climate goals pursuant to the Paris Agreement.² This PCAP will help further U.S. energy independence by supporting the development and transmission of clean and renewable energy, including scalable hydrogen and bio-methane projects. The PCAP will take strides toward achieving the federal environmental Justice 40 goal, ensuring that 40% of overall benefits of certain Federal investments "flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution."³ It will help develop and propel innovative and practical climate solutions and technologies that can be exported to other states – and even beyond our national borders. This PCAP will help ensure that the U.S. leads by example in tackling this global threat while delivering co-benefits at home.

This PCAP was developed with public participation and input, including a kickoff virtual public workshop, multiple comments and recommendations from a broad group of interested parties and communities, and three virtual public webinars to present the draft

¹ 2022. Executive Order N-16-22. <https://www.gov.ca.gov/wp-content/uploads/2022/09/9.13.22-EO-N-16-22-Equity.pdf>

² UNFCCC. <https://unfccc.int/process-and-meetings/the-paris-agreement>.

³ The White House. Justice40. <https://www.whitehouse.gov/environmentaljustice/justice40/>.

PCAP, where CARB received written comments in an online docket. Staff had several meetings with representatives of Tribal Nations and with the 10 Metropolitan Statistical Areas (MSAs) in California that were offered their own CPRG planning grants. These MSAs are home to more than 90% of the state's 40 million residents, and each engaged in their own outreach on their respective PCAPs. The State organized more than 15 meetings with MSAs in the development of the PCAP. Many of the agencies and programs in this PCAP include statutory and ministerial requirements to consult with representatives of low-income and disadvantaged communities to ensure program implementation provides meaningful engagement opportunities and direct community benefits.

In developing this PCAP, California was fortunate to have a decade and a half of climate planning experience, as well as a many successful climate programs and projects to leverage from across dozens of state agencies and multiple economic sectors. Over that same decade and a half, California has also witnessed first-hand the growing ravages of the effects of climate change. Weather whiplash has become commonplace with years of severe drought followed by seasons of atmospheric rivers bringing flooding, mudslides, and even the reappearance on Central Valley farmland of an inland sea that had not been seen in more than a century.

California's forestlands have also been hit hard. Nearly 200 million trees, stressed by drought, were killed by bark beetle infestation linked to warmer winters, and now stand dead and dry throughout the State's forests. Hotter summers and strong dry winds are resulting in catastrophic megafires. In the 2017 and 2018 fire seasons alone, more than 17,000 wildfires burned over 3 million acres – nearly 3% of California's land mass. These fires killed 139 people, destroyed tens of thousands of homes and businesses, and devastated millions of acres of precious habitat and critical watersheds. In addition to the destruction, these megafires are converting hundreds of thousands of acres of conifer forests to shrub land and emitting black carbon, further compounding the climate change crisis. By the end of this century, California's wildfires are expected to burn 77% more acreage – roughly the size of Delaware – every year.

Rising temperatures also adversely impact those communities already suffering disproportionately from fossil fuel pollution. The impacts to low-income and disadvantaged communities, coupled with emerging studies that indicate increasing temperatures may start to reverse progress already made to improve air quality,⁴ underscore the need to move with all possible haste to slash carbon and air pollution. California's unique weather, topography, and the size of its population and economic activity leave it with some of the worst air quality in the nation: over half of its residents (21 million of roughly 40 million) live

⁴ U. Ifran. 2015. Global Warming Could Undo 50 Years of Health Gains. <https://www.scientificamerican.com/article/global-warming-could-undo-50-years-of-health-gains/>.

in areas that exceed the most stringent federal ozone standard⁵ and the State is home to the only three 'extreme non-attainment' areas for federal ozone standards. As the EPA recently established more health-protective fine particle limits, more regions of the State are falling into non-attainment of federal clean air quality standards, highlighting the need to move more quickly to zero-emissions transportation and other clean-energy solutions.

CARB submits this PCAP not as a definitive compendium of California programs but as a careful selection of climate solutions that, over the next five years, will cut climate pollution and deliver benefits to those communities who most need them.

The funding offered by the U.S. EPA under this program will help California achieve climate and clean air goals, protect the State's forests and rural communities, provide resources to Tribal Nations, and help clean the air for low-income and disadvantaged communities. It will also establish a new and important level of cooperation and partnership with U.S. EPA, further strengthening the meaning and reality of cooperative federalism that has benefited California and the nation for decades.

⁵ 2022. CARB. 2022 State Strategy for the State Implementation Plan. https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf.

1. Introduction

California has a statutory goal of reducing anthropogenic emissions by at least 85% below 1990 levels and achieving carbon neutrality by 2045. CARB is currently building on 15 years of climate action experience with an economy-wide, multi-sector approach to cutting greenhouse gases while providing maximum benefits to communities that have historically borne the public health burdens of exposure to pollution from fossil fuel combustion, mobile sources, and industries. The Climate Pollution Reduction Grants (CPRG) program will definitively support accelerated efforts and help achieve both goals.

California appreciates the unprecedented lift by the Biden Administration to tackle climate change, as evidenced by the passing of the Inflation Reduction Act (IRA) and the creation of the CPRG program, among other accomplishments. Through the CPRG program, U.S. EPA seeks to support the development and expansion of state, territory, Tribal and local climate action plans that aggressively reduce greenhouse gases (GHGs), provide equitable access and solutions to new technologies, and support a resilient equitable economy that benefits all Americans. California values its long-standing relationship with U.S. EPA and has developed this Priority Climate Action Plan (PCAP) not only to showcase the State's current climate priorities but as a foundation to help deliver the steep GHG reductions needed to contribute to the U.S. commitment under the Paris Agreement and ensure that it meets its Justice 40 Initiative policy goals.

This PCAP builds on over a decade of California's climate leadership. Most recently, California passed Assembly Bill (AB) 1279 (Muratsuchi, Chapter 337, Statutes of 2022) which sets goals to achieve carbon neutrality by 2045 and ensures that by 2045, statewide anthropogenic GHG emissions are reduced at least 85% below 1990 levels. California's 2022 Scoping Plan Update⁶ lays out the sector-by-sector roadmap for California to achieve the mandates in AB 1279, outlining a technologically feasible and cost-effective path to achieve the State's climate target. The 2022 Scoping Plan Update also highlights how increased climate ambition can address persistent air pollution and opportunity gaps faced by low-income communities and communities of color.

In this PCAP, California has leveraged the substantial work of the 2022 Scoping Plan Update, and the directives, sector-specific plans, and reports it incorporates.² Further, this PCAP covers the geographic extent of California, nearly every economic sector, and in the inventory below, accounts for all GHG sources across the State.³ This PCAP uplifts a strong set of impactful near-term actions and elevates many existing programs that stand ready to catalyze CPRG funding into action to help California and the U.S. achieve a historic rate of clean

⁶ CARB. 2022. 2022 Scoping Plan for Achieving Carbon Neutrality. December 22. <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

technology production, deployment, and rapid consumer adoption, while ensuring affordability and maximizing myriad co-benefits.

2. Approach to Developing the PCAP

Given the substantial body of climate planning across the State and local governments at the start of CPRG, California's work to develop the PCAP began with an extensive review of existing climate plans, policies, and programs, as well as lessons learned from them to date. These were captured through document review,⁷ in-depth discussions with relevant State agency staff, and the collection of input from across State agencies and other interested parties via surveys and detailed questionnaires.

Consistent with Governor Gavin Newsom's whole-of-government approach to tackling climate change, this PCAP formally brought together multiple agencies across the administration via the California State Agency CPRG Task Force, whose membership is listed in the Acknowledgement section above. This PCAP has also incorporated as many comments as possible from dozens received during three public webinars held on January 31 and February 1, 2024, and attended by a total of over 300 participants.⁸ In all, this PCAP is the direct result of several distinct outreach and coordination pieces:

- A kick-off public webinar in August 2023
- Three regional public webinars on January 31 and February 1
- Monthly meetings of the State Agency CPRG Task Force
- Direct solicitation from State agencies on their top climate priorities for CPRG
- Continued conversations with MSAs leading their own planning grants
- Regular dialogue with air districts across the State
- Outreach and solicitation from local governments without CPRG planning grants
- Sector-specific coordination meetings across State and local agencies on goods movement, ZEV infrastructure, waste, bioenergy, agriculture, and natural and working lands
- Outreach and consultation with Tribal Nations

In addition, this draft PCAP includes layers of analysis and assessment. The statewide GHG inventory included here leverages the State's GHG emissions inventory. Using it and other robust and vetted data sources, this PCAP also includes the GHG abatement potential of

⁷ This includes but is not limited to: The 2022 Scoping Plan Update, The 2022 State Strategy for the State Implementation Plan, The Community Air Protection Blueprint, the SB 100 Joint Agency Report, the Climate Action Plan for Transportation Infrastructure, the Short-Lived Climate Pollution Strategy, the Climate Smart Lands Strategy, California Climate Insurance Report: Protecting Communities, Preserving Nature, and Building Resiliency, the SB1000 Electric Vehicle Infrastructure Deployment Assessment, 2021 Integrated Energy Policy Report: Vol 1: Building Decarbonization, Fourth Cap and Trade Auction Proceeds Investment Plan, Achieving Carbon Neutrality Report, and California Transportation Plan 2050.

⁸ CARB. 2024. Public Comments on California's Draft Priority Climate Action Plan Under the U.S. EPA Climate Pollution Reduction Grants program. https://ww2.arb.ca.gov/approved-comments?entity_id=34706.

each measure included in this PCAP. In addition, mapping analysis was used to identify low-income and disadvantaged communities under U.S. EPA's recommended definition for CPRG, and against the State's existing definition. Both were used to assess the merit of PCAP measures to uplift equity and ensure benefits to low-income and disadvantaged communities. Across each measure, a review of the legal framework and authority to implement each measure was also carried out. Where possible, workforce considerations, job creation potential and interactions with other funding sources were assessed.

3. PCAP elements

Section three includes several PCAP elements: a statewide GHG emissions inventory, the State's overarching GHG targets, an overview of the State's approach to low-income and disadvantaged community benefits analysis, workforce considerations, and the measures that make up the bulk of this plan.

3.1 Greenhouse Gas (GHG) Inventory

This PCAP leverages California's AB 32 GHG Inventory⁹ which was initiated after the passage of the State's landmark climate bill, the Global Warming Solutions Act, (AB 32), (Nunez, Chapter 488, Statutes of 2006).¹⁰ The AB 32 inventory includes emissions from the following types of sources: fossil fuel combustion, including combustion for imported electricity consumed in state, by-products of chemical reactions in industrial processes, use of GHG-containing consumer products and human-made chemicals, agricultural operations, and recycling and waste sector operations. The exchange of ecosystem carbon between the atmosphere and plants and soils (including through wildfires) is separately quantified in the Natural and Working Lands Ecosystem Carbon Inventory.¹¹ The methods used to quantify emissions included in the AB 32 GHG Inventory are consistent with international and national practices¹² and meet the requirements of AB 32.

The 2023 edition of the AB 32 GHG Inventory includes the emissions of the seven GHGs identified in AB 32 for the years 2000 to 2021. There are additional climate pollutants that are not included in AB 32 that are tracked separately. These include black carbon and sulfuryl fluoride (SO₂F₂), which are discussed in the Short-Lived Climate Pollutant (SLCP)

⁹ CARB. 2023. California Greenhouse Gas Emissions from 2000 to 2021: Trends of Emissions and Other Indicators. https://ww2.arb.ca.gov/sites/default/files/2023-12/2000_2021_ghg_inventory_trends.pdf.

¹⁰ CARB. AB 32 Global Warming Solutions Act of 2006. <https://ww2.arb.ca.gov/resources/fact-sheets/ab-32-global-warming-solutions-act-2006>.

¹¹ CARB. 2018. An Inventory of Ecosystem Carbon in California's Natural & Working Lands. https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/pubs/nwl_inventory.pdf

¹² Intergovernmental Panel on Climate Change. IPCC Guidelines for National Greenhouse Gas Inventories, Volume 1 - General Guidance and Reporting. [Online]. Available: <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol1.html>

Strategy,¹³ and ozone depleting substances (ODS), which are being phased out under a 1987 international treaty.^{14,15}

Statewide GHG emissions are calculated using several data sources. The primary data source is from reports submitted to CARB through the Regulation for the Mandatory Reporting of GHG Emissions (MRR).¹⁶ MRR requires facilities and entities with more than 10,000 metric tons CO₂e per year of combustion and process emissions, all facilities belonging to certain industries, and all electricity importers to submit an annual GHG emissions data report directly to CARB. Reports from facilities and entities that emit more than 25,000 metric tons of CO₂e per year are verified by a CARB-accredited third-party verification body.¹⁷

CARB also relies on data from other California State and federal agencies to develop the AB 32 GHG Inventory. These agencies include, but are not limited to, the California Energy Commission, California Department of Tax and Fee Administration, California Department of Conservation, California Department of Food and Agriculture, California Department of Resources Recycling and Recovery, U.S. Energy Information Administration, and U.S. EPA. The timing for when these data sources are available drives the publication date for the AB 32 GHG Inventory each year. All data sources used to develop the AB 32 GHG Inventory are listed in supporting documentation alongside California's AB 32 GHG Emission Inventory Data.¹⁸ Figure 1 below shows the breakdown of the most recent AB 32 inventory, and Figure 2 below shows how the State's overall levels of AB 32 sources have trended downward, in line with the State's climate targets and efforts, over the past 20 years. Lastly, Figure 3 shows the percentage of different gases that make up the State's total GHGs.

¹³ CARB. 2017. Short-Lived Climate Pollutant (SLCP) Strategy. [Online]. Available: <https://ww2.arb.ca.gov/our-work/programs/slcp>

¹⁴ Many ODS substitutes are GHGs whose emissions are included in the AB 32 GHG Inventory, consistent with IPCC Guidelines.

¹⁵ United Nations Environmental Programme, "About Montreal Protocol," 2023. [Online]. Available: <https://www.unep.org/ozonaction/who-we-are/about-montreal-protocol>.

¹⁶ CARB. Mandatory Greenhouse Gas Reporting Regulation. <https://ww2.arb.ca.gov/mrr-regulation>.

¹⁷ For additional information see: emissions data reported to MRR <https://ww2.arb.ca.gov/mrr-data>.

¹⁸ CARB. Current California GHG Emission Inventory Data. <https://ww2.arb.ca.gov/ghg-inventory-data>.

Figure 1: California's AB 32 GHG Emissions Inventory

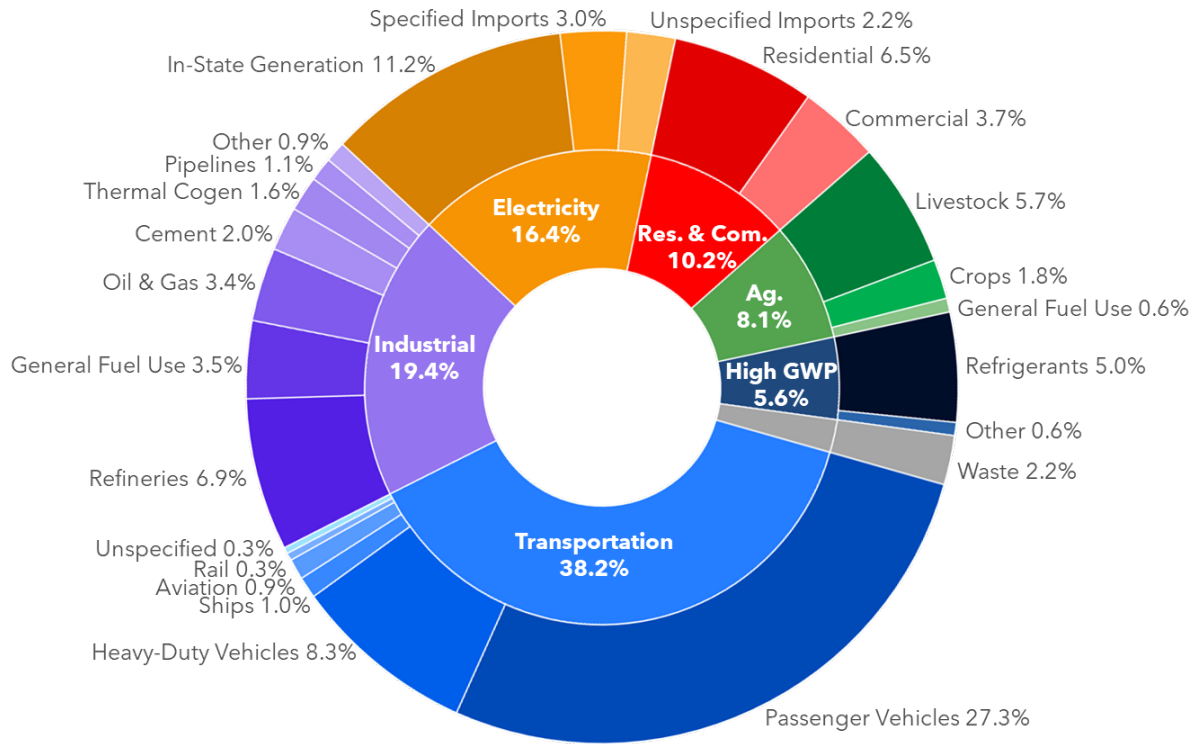


Figure 1 shows 2021 GHG emissions by Scoping Plan category. The inner ring shows the Scoping Plan sectors, while the outer shows the sub-sectors. Values do not reflect some rounding.

Figure 2: California's Annual Greenhouse Gas Emissions (2000 to 2022)

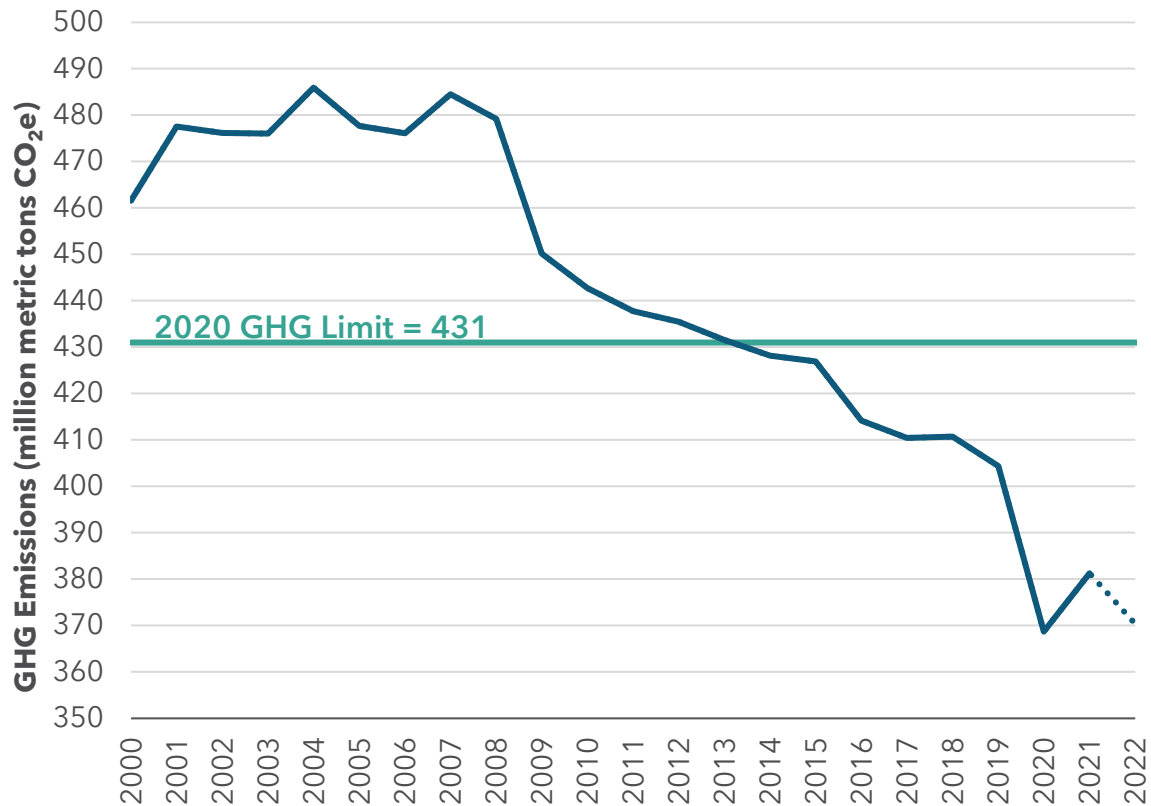


Figure 2 above shows California's annual GHG emissions from 2000 to 2021 in relation to the 2020 GHG Limit established by AB 32 [1]. The dotted blue line shows an estimate of AB 32 GHG Inventory emissions for 2022 based solely on data reported and third-party verified to CARB pursuant to the Regulation for the Mandatory Reporting of GHG Emissions (MRR). The 2022 estimate is provided for informational purposes only and should not be used for any policy making decisions or regulatory compliance. The 2022 estimate of AB 32 GHG Inventory emissions is calculated as 2022 MRR non-biogenic emissions, divided by the ratio of 2019-2021 MRR non-biogenic emissions to 2019-2021 AB 32 GHG Inventory emissions. California's GHG emissions dropped below the 2020 GHG Limit in 2014 (428.2 MMTCO₂e) and have remained below this level since that time.

Figure 3: California's 2021 Greenhouse Gas Emissions by Gas

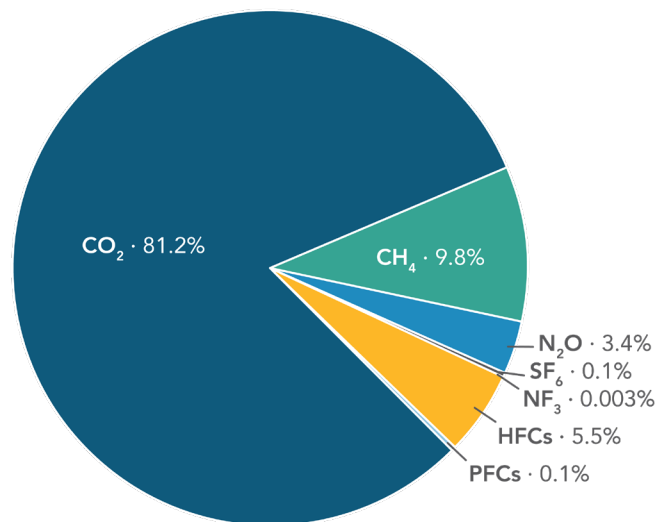


Figure 3 shows the 2021 GHG Emissions by gas. The above does not include biogenic CO₂ and sources "excluded" from the Inventory (e.g., international flights, military, international shipping).

3.2 GHG Reduction Targets

With the passage of AB 32 in 2006, California established its first statewide climate target – to return to 1990 GHG levels (431 MMT CO₂e) by 2020, which the State subsequently met several years ahead of schedule. In 2016, with the passage of SB 32 (Pavley, Chapter 249, Statutes of 2016),¹⁹ California solidified the target to reduce statewide anthropogenic emissions 40% below 1990 levels by 2030. In 2022, the State codified its most ambitious target to date with the passage of AB 1279 (Muratsuchi, Chapter 337, Statutes of 2022),²⁰ which sets California on a path to reduce anthropogenic emissions 85% below 1990 levels by 2045 and to also achieve carbon neutrality by 2045. This PCAP and California's participation in U.S. EPA's CPRG Program are well aligned with the State's climate targets and the all-hands-on-deck approach to meeting them.

3.3 Prioritizing Benefits to Low-Income and Disadvantaged Communities

Addressing climate change and advancing California's equity and economic opportunity goals cannot be decoupled. In line with Governor Newsom's Executive Order N-16-22²¹ to

¹⁹ 2016. California SB 32. http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb_0001-0050/sb_32_bill_20160908_chaptered.htm

²⁰ 2022. California AB 1279. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB1279

²¹ 2022. Executive Order N-16-22. <https://www.gov.ca.gov/wp-content/uploads/2022/09/9.13.22-EO-N-16-22-Equity.pdf>

take additional actions to embed equity analysis and considerations, this plan works to center equity by addressing some of the disparities for historically underserved and marginalized communities. California strives to ensure that its climate and air research regulations, investments, and plans include provisions that specifically address and advance equity. This includes engaging with representatives of these communities, reducing and eliminating air pollution disparities, removing barriers that can prevent frontline communities from accessing benefits, lowering costs for low-income Californians, and promoting high-quality jobs. California can simultaneously confront the climate crisis and build a more resilient, just, and equitable future for all communities. Importantly, it is recognized that due to persisting health and opportunity gaps, not all communities are equally resilient in the face of climate impacts. The 2022 Scoping Plan Update began the work to better understand how to capture incremental additional economic impacts faced by overly burdened communities since a global metric, such as the Social Cost of Carbon, cannot adequately capture that detail.²²

While the State has a long history of public health and environmental protection, California's unique weather, topography, and the size of its population and economic activity leave it with some of the worst air quality in the nation.: More than half of its residents (21 million of roughly 40 million) live in areas that exceed the most stringent federal ozone standard,²³ and the State is home to the only three 'extreme non-attainment' areas for federal ozone standards. As U.S. EPA recently established more health-protective fine particle limits, more regions of the state are falling into non-attainment of federal clean air quality standards. Low income and disadvantaged communities are more likely to live in these areas, often as a result of discriminatory practices such as redlining that have disproportionately exposed these communities to health hazards and pollution burdens that affect lives.²⁴ For example, Black children are four times more likely to be hospitalized for asthma compared with white children, and urban Black and Latino children are two to six times more likely to die from asthma than white children.²⁵ Native American children also experience more impacts from asthma and they, along with Black children, have the highest prevalence of asthma.²⁶ This context also elevates the urgent need to partner with federal leaders on pollution sources that are primarily under federal authority – such as interstate trucks, locomotives, and planes – and to invest federal funding in the kinds of proven emissions-reducing solutions included

²² CARB. 2022. Appendix K: Climate Vulnerability Metric. 2022 Scoping Plan for Carbon Neutrality. https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-k-climate-vulnerability-metric_0.pdf

²³ CARB. 2022. 2022 State Strategy for the State Implementation Plan. https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf.

²⁴ CalEPA. 2021. Pollution and Prejudice: Redlining and Environmental Injustice in California. August 16. <https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5>

²⁵ California Department of Public Health. Asthma Inequities in California Children. 2021. https://www.cdph.ca.gov/Programs/CCDC/DEOD/CEHIB/CPE/CDPH%20Document%20Library/CA_Asthma_Inequities_Children_2021-Infographic.pdf

²⁶ Meng, Y., S. H. Babey, T. A. Hastert, and E. Brown. 2007. California's Racial and Ethnic Minorities More Adversely Affected by Asthma. UCLA: Center for Health Policy Research. Retrieved from <https://escholarship.org/uc/item/4k45v3xt>

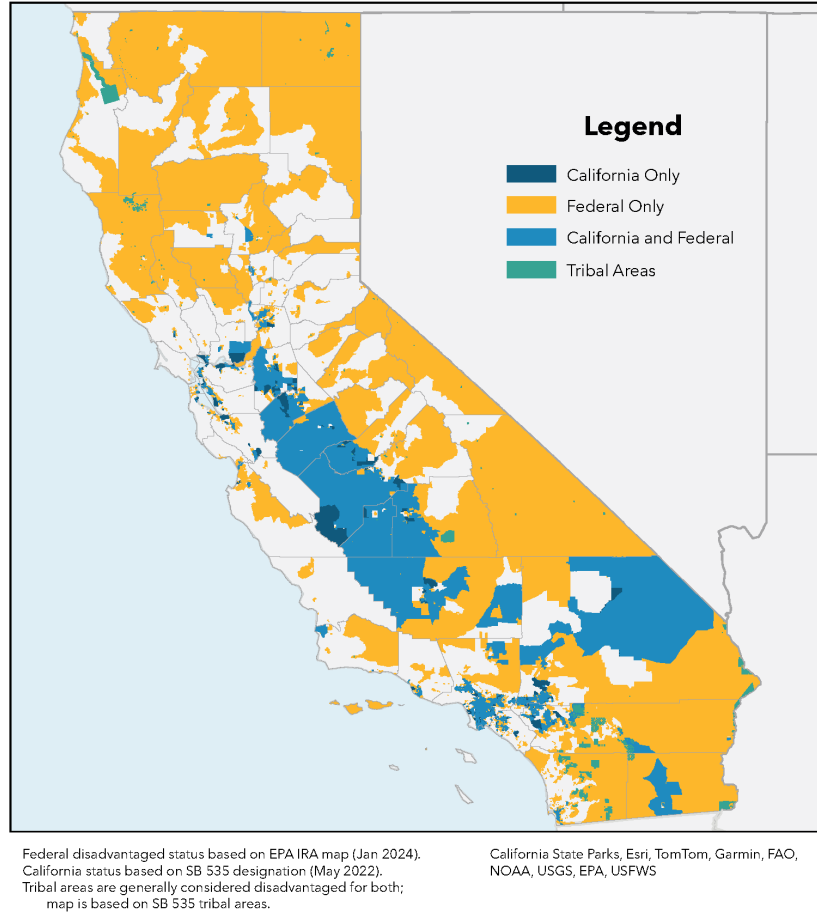
in this PCAP. This PCAP helps deliver on the promise to close these disparities and move expeditiously away from fossil fuels and to clean alternatives. It also prioritizes working with the communities most impacted to ensure that these strategies address their needs.

For the purposes of this PCAP, and per U.S. EPA guidance, California is considering low-income and disadvantaged communities as identified through both the Climate and Economic Justice Screening Tool (CEJST) as well as the supplemental data from U.S. EPA's Environmental Justice Screening and Mapping Tool (EJScreen).²⁷ The footprint of the federal definition is visualized alongside a comparison of the State's definition for disadvantaged communities, as defined by California Senate Bill 535 (De León, Chapter 830, Statutes of 2012), which directs minimum funding levels from the State's Cap-and-Trade auction proceeds to be spent within and to benefit California's disadvantaged communities.²⁸

²⁷ Data and EPA guidance can be found here: <https://www.epa.gov/inflation-reduction-act/cprg-tools-and-technical-assistance-low-income-and-disadvantaged>

²⁸ A summary of California's definitions for disadvantaged communities can be found here: <https://oehha.ca.gov/calenviroscreen/sb535>

Figure 4: Low Income and Disadvantaged Communities under CPRG



CARB also has conducted a spatial analysis to assess how the climate measures included in Section 3.5 below would affect low-income and disadvantaged communities across California (inclusive of the yellow and light blue areas in Figure 4 above).

In summary, CARB's analysis considers how the measures below would affect low-income and disadvantaged communities that live in or near: regions of the State not attaining federal air quality standards; near ports and federally recognized freight corridors; fossil gas power plants; large industrial facilities; forested areas prone to wildfire risk; proposed wetland remediation sites; and often remote and underserved Tribal lands and rural areas with limited infrastructure and job opportunities. This analysis also looks at how U.S. EPA's definition of low income and disadvantaged communities overlaps with areas of California expected to bear the greatest cost from both the effects of climate change and the cost of confronting it. While this is not an exhaustive list of the impacts that could be disproportionately felt by low-income and disadvantaged communities, even this analysis shows that over 90% of low income and disadvantaged communities in California would benefit from the package of measures included in this PCAP. The data sources, methods, and results of this analysis can be found in Appendix A.

3.4 Workforce Considerations

California is working aggressively to transition away from fossil fuels, reach its climate goals, and ensure that its climate policies generate high-quality, local jobs.

The State acknowledges the challenge associated with transitioning to carbon neutrality, especially for workers in fossil fuel industries, and has developed job training and job placement programs to assist in this workforce transition. Programs such as the Community Economic Resilience Fund Program (CERF) and the Regional Investment Initiative within the Governor's California Jobs First portfolio support this transition. These programs specifically aid communities and regional groups in producing regional roadmaps for economic recovery and resilience that prioritize the creation of accessible, high-quality jobs in sustainable industries.²⁹ Additionally, programs like the California Conservation Corps' Training and Workforce Development Program provides funding for job training and workforce development in the building energy efficiency and forestry sectors.³⁰

California Climate Investments (CCI) – the State's fund through which its Cap-and-Trade auction proceeds flow – has funded 569,477 projects and subsidies totaling \$9.8 billion as of May 2023, which are expected to reduce an estimated 98 MMTCO₂e.³¹ Cumulatively, \$7.2 billion in implemented funds are benefiting disadvantaged communities and low-income households and communities, and low-income household in California. CARB estimates through its models that for roughly \$7.5 billion of awarded CCI funds, 85,000 direct, indirect, and induced jobs are being supported.³² Workforce development is a critical part of this existing funding opportunity at the State level.

Furthering efforts to facilitate the workforce transition, in 2021, the California State Legislature passed Assembly Bill 680 (AB 680) (Burke, Chapter 746, Statutes of 2021), requiring that CARB work with the California Labor and Workforce Development Agency to

update the Funding Guidelines for Agencies that administer CCI (Funding Guidelines) to include new workforce standards. Specifically, the Funding Guidelines were updated to require administering agencies to prioritize investments in projects that directly support jobs or job training and placement programs. Although these standards are only required for a subset of CCI programs, all programs are encouraged to incorporate recommended workforce development strategies and workforce standards to support a robust workforce in the new, low-carbon economy and improve access to high-quality jobs. As many of the measures in this plan leverage existing programs funded by CCI, this PCAP similarly supports the growth of high-quality jobs.

In addition, the California High-Speed Rail Project, which receives substantial funding from CCI, along with \$3.1 billion in federal funds, has been a job creator. The project has directly supported 92,000 job-years of employment and generated \$18 billion in total economic activity. In addition, the High-Speed Rail Authority's expenditures through completion of the Phase 1 system from San Francisco to Los Angeles/Anaheim are expected to support 945,000 job-years, nearly \$79 billion in labor income, and \$203.6 billion in total economic output, with a focus on construction employment and training opportunities that also benefit economically disadvantaged areas.

CPRG funding, alongside the State's climate investments, will further accelerate growth in the high-quality jobs that underpin State and federal climate efforts, and that help deliver cleaner air for communities most impacted by air pollution.

3.5 GHG Reduction Measures

The list of measures presented below outline necessary and no-regrets actions that will help ensure the State and the U.S. stay on course to avoid the worse effects of climate change. The measures are grouped by several sectors: transportation, industrial, energy, high global warming potential, agriculture, natural and working lands, and waste. Some measures have been included by contributing State agencies, while others, listed at the end of each subsection, have been nominated by communities or local governments without their own CPRG planning grants.

²⁹ Office of Planning and Research. Community Economic Resilience Fund. <https://opr.ca.gov/economic-development/cerf/>

³⁰ California Climate Investments. 2022 Profiles: California Conservation Corps Supporting San Bernardino Mountains Restoration. <https://www.caclimateinvestments.ca.gov/2022-profiles-1/cccsanbernardino>

³¹ 2023. California High Speed Rail Authority. <https://hsr.ca.gov/wp-content/uploads/2024/01/Agenda-Item-4-FY2022-23-Economic-Impact-Analysis-Fact-Sheet-011824-A11Y.pdf>.

³² 2023. Annual Report: Cap-and-Trade Auction Proceeds. https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/cci_annual_report_2023.pdf

Per U.S. EPA's PCAP guidelines,³³ each measure below contains a description of many elements. Calculations are provided to assess how each measure would reduce GHGs (see disclaimer below). A qualitative analysis of its benefits to low-income and disadvantaged communities along with other benefits is also included. Agencies and programs that could implement the measure and a review of their authority to implement them are enumerated, and where possible, the interaction of the measure with other funding sources is outlined. Lastly, an outline of the expected schedule of milestones and metrics for tracking implementation success are included for each measure.

Disclaimer on GHG emissions estimates

Estimates of GHG reductions for each measure below rely on many unknown factors, including the level of additional funding support each measure would receive. The estimates below draw from past allocations to similar programs as well as data on past program performance, among other sources. It is also difficult to isolate the impact of any one specific measure or project given the portfolio approach California is taking to reduce its greenhouse gas emissions. This approach for developing estimates is also overly conservative because it does not capture economies of scale as technologies become less expensive to deploy. Because methods may vary, estimates presented in this PCAP may not match quantification estimates of similar actions conducted for other State plans, regulations, or incentive programs. For some of the calculations, data were limited, which may also result in differences in what is estimated in this document versus actual reductions achieved in practice. Finally, the estimates provided in this document should not be used for any other purpose outside of this document.

Transportation

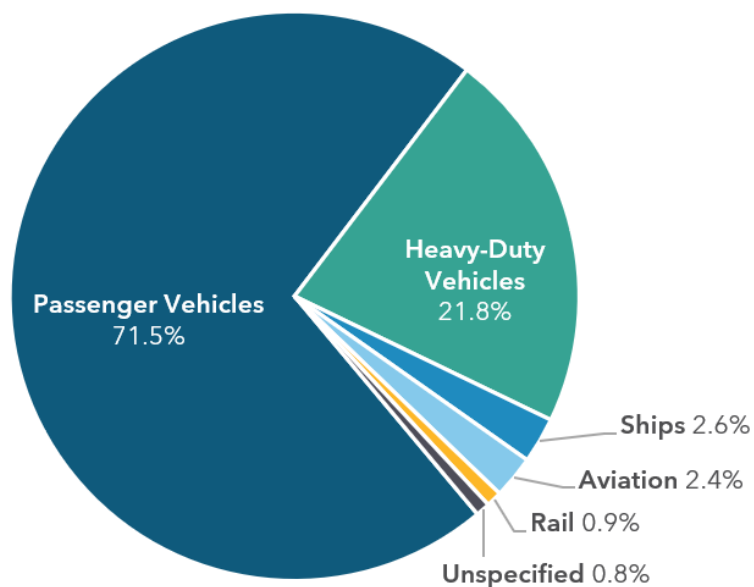
The transportation sector has long relied on liquid petroleum fuels as the primary energy source for internal combustion engine vehicles, including cars, trucks, locomotives, aircraft, marine, construction, agriculture, and other off-road equipment. Combustion of fossil fuels in vehicles emits significant amounts of GHGs, criteria pollutants, and toxic air contaminants. In 2021, the transportation sector, when including fossil fuels processing, accounted for approximately 50% of statewide GHG emissions.³⁴ As seen in Figure 5 below, the largest source of GHGs from this sector is passenger vehicles.

³³ Guidance for State development of PCAPs can be found on U.S. EPA's website: <https://www.epa.gov/inflation-reduction-act/about-cprg-planning-grant-information>

³⁴ CARB. Current California GHG Emission Inventory Data. <https://ww2.arb.ca.gov/ghg-inventory-data>.

Figure 5: Transportation Sector Emissions in 2021

Total Emissions = 145.6 MMTCO₂e



In addition, the transportation sector accounted for over 80% of statewide NO_x emissions and 30% of fine particulate matter emissions, including toxic diesel particulate matter.³⁵ In California, communities adjacent to congested roadways, including ports and distribution centers, are often low-income or communities of color. These communities are exposed to the highest concentration of criteria and toxic air pollution from vehicles and equipment consuming fossil fuels, leading to a number of demonstrated health impacts such as respiratory illnesses, higher likelihood of cancer development, and premature death.³⁶ While CARB's programs, along with local action, have made substantial progress in reducing harmful local air pollution over the past few decades,³⁷ it is clear that California must transition away from fossil fuels to zero-emissions technologies in order to meet its GHG and air quality targets.

California is a leader in designing and implementing transportation decarbonization policies. Delivering on Governor Newsom's Executive Order N-79-20³⁸ to transition away

³⁵ CARB. California Greenhouse Gas Emission Inventory Program. <https://ww2.arb.ca.gov/our-work/programs/ghg-inventory-program>

³⁶ CARB. Overview: Diesel Exhaust & Health. <https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health>

³⁷ CARB. 2022. 2022 State Strategy for the State Implementation Plan. https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf.

³⁸ CARB. Governor Newsom's Zero-Emission by 2035 Executive Order (N-79-20). <https://ww2.arb.ca.gov/resources/fact-sheets/governor-newsoms-zero-emission-2035-executive-order-n-79-20>.

from internal combustion vehicles, CARB's Advanced Clean Cars II Regulation (ACCI³⁹) requires manufacturers to sell an increasing number of zero-emissions cars, SUVs, and light-duty trucks, reaching 100% by 2035. California hit its goal of 1.5 million light-duty ZEVs on the road in April 2023, two years ahead of schedule. CARB's Advanced Clean Trucks Regulation (ACT)⁴⁰ similarly requires truck manufacturers to sell zero-emissions trucks (100% by 2045 where possible). The Advanced Clean Fleets Rule (ACF),⁴¹ adopted in 2023, requires specific truck fleets to buy zero-emissions trucks as soon as 2024.

The State's Low Carbon Fuel Standard⁴² is the primary mechanism to transform the transportation fuel pool with low-carbon energy alternatives and is in the process of being updated to further support growth in renewable and clean transportation fuels.⁴³ The State also has supported several policies and programs, many developed by and with local representatives of California's low-income and disadvantaged communities, that provide alternatives to driving, such as transit, walking and biking, to reduce overall vehicle miles travelled.

Funds from CPRG would leverage California's pioneering and proven transportation policies and help deliver GHG and cobenefits faster, especially for low-income and disadvantaged communities. California's proposed measures under transportation also further support U.S. EPA's Clean Ports Initiative⁴⁴ and proposed vehicle standards,⁴⁵ as well as President Biden's 2030 GHG targets.⁴⁶ The measures below outline critical transportation measures across goods movement, community-focused transportation options, and light-duty zero-emissions vehicles and infrastructure.

Transportation Measure 1: Create a Holistic, Heavy-Duty Zero-Emissions Vehicle Buydown Program

The newly created Heavy-Duty Zero-Emissions Vehicle Buydown Program would expand and leverage three existing programs to accelerate the deployment of zero-emissions (ZE) medium- and heavy-duty (MHD) vehicles, particularly for small fleets that face the greatest barriers to their adoption. While CARB has regulations in place to require the cleanest

³⁹ CARB. Advanced Clean Cars II. <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii>.

⁴⁰ CARB. Advanced Clean Trucks. <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks>.

⁴¹ CARB. Advanced Clean Fleets. <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>.

⁴² CARB. Low Carbon Fuel Standard. <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>.

⁴³ CARB. Proposed Low Carbon Fuel Standard Amendments. <https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>.
<https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>

⁴⁴ U.S. EPA. Ports Initiative. <https://www.epa.gov/ports-initiative>.

⁴⁵ U.S. EPA. Biden-Harris Administration Proposes Strongest-Ever Pollution Standards for Cars and Trucks to Accelerate Transition to a Clean-Transportation Future. <https://www.epa.gov/newsreleases/biden-harris-administration-proposes-strongest-ever-pollution-standards-cars-and>

⁴⁶ U.S. White House. 2021. Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

technology for specific fleets, many smaller fleets are not subject to such regulations. This measure would accelerate and provide stronger support for the transition to ZE technology for small fleets by building off the Clean Truck and Bus Incentive Program (HVIP)⁴⁷ that provides vouchers for medium- and heavy-duty vehicle purchases; the Innovative Small E-fleet⁴⁸ program that helps small fleets access ZE trucks; and a new ZEV loan pilot program under development.⁴⁹ CARB could lead this measure with key roles for the State Treasurer's Office and the California Energy Commission. Alternatively, this measure could be leveraged by local governments eligible to apply for CPRG implementation grants looking to purchase, finance, or subsidize ZE trucks directly. This measure builds off CARB's successful incentive and loan programs that have been in place for over 10 years, have appropriated \$3.7 billion in funding, leveraged millions of dollars in private funding, and have helped deploy thousands of cleaner trucks. CARB's existing loan programs have a low default rate of 4%.

The combined, new program under this measure would simultaneously help overcome two barriers faced by small fleets: 1) the high upfront cost of ZE trucks, and 2) the difficulty encountered by small fleets in qualifying for affordable loans, which are very difficult for small fleets to obtain without the significant buy-down this program would offer. The program could also potentially create a used-vehicle voucher incentive, which CARB's current incentive programs do not cover, to prove the residual value of ZE MHD trucks and further develop the ZE MHD market. This innovative program could be replicated by other states and influence national initiatives for cleaner transportation.

California's MHD vehicles contribute disproportionately to mobile source emissions. They comprise roughly 3% of California's 30 million vehicles but are responsible for one-third of mobile source NO_x emissions and one-fourth of mobile source GHG emissions. Diesel exhaust emissions are classified as carcinogenic toxic air contaminants and account for 70% of the known cancer risk from toxic air contaminants in California.⁵⁰ Due to historical inequities, low-income and disadvantaged communities are often located close to goods movement operations and have higher incidents of such diseases. To achieve equitable public health outcomes across the State, California must continue to pursue all available avenues to invest in ZE MHD vehicles, and this measure can play a pivotal role in achieving those goals. In addition, consistent with Justice40 targets, this measure would leverage CARB's existing outreach and engagement practices to ensure that ZE MHD investments benefit the most disadvantaged communities.

If implemented statewide and depending on total funding support, this measure could lead to annual emissions reductions of approximately 109,000 MTCO₂e, as well as 436,000

⁴⁷ CARB. Clean Truck and Bus Vouchers (HVIP). <https://ww2.arb.ca.gov/resources/fact-sheets/clean-truck-and-bus-vouchers-hvip>.

⁴⁸ CARB. Innovative Small e-Fleet Pilot Program. <https://ww2.arb.ca.gov/resources/fact-sheets/innovative-small-e-fleet-pilot-program>.

⁴⁹ CARB. Truck Loan Assistance. <https://ww2.arb.ca.gov/resources/fact-sheets/truck-loan-assistance>.

⁵⁰ *Ibid.*

MTCO₂e cumulatively between 2025 and 2030, and 2,615,000 MTCO₂e cumulatively between 2025 and 2050.⁵¹

In terms of implementation, this measure could be defined by the following key phases and milestones: conduct outreach to small fleet operators to identify and prioritize needs (first three to six months); conduct outreach to low-income and disadvantaged communities near freight sites and corridors to maximize direct community benefits of CPRG investments (first three to six months); conduct public workshop on proposed investment (within first year); enroll private lenders and establish agreements to access loan-loss reserve (first year); launch program (first/second year); deploy loans and track ZE MHD vehicle purchases (continuously as needed); and amend program as needed.

To track progress under this measure, CARB would rely on and expand existing systems that require detailed reports for loan and incentive programs and regulatory compliance. For example, these systems track vehicle purchases under CARB programs, active finance and insurance companies in the ZE MHD vehicle market and underpin publicly available data dashboards. These data, alongside vehicle registration and other sources, would allow CARB to create regular reports on this measure.

Many laws authorize and govern existing programs and would similarly apply to the new Heavy-Duty Zero-Emissions Vehicle Buydown Program. SB 372 (Leyva, Chapter 639, Statutes of 2021)⁵² requires that CARB provide financial and non-financial assistance to applicants for ZEVs. AB 1496 (Chapter 1164, Statutes of 1993) established the California Capital Access Program, approving CARB as an “Independent Contributor,” which is an entity that contributes funds to a loan support program, in this case, one that assists fleets procure loans at lower interest rates. In addition, CARB has offered cleaner vehicle incentives since 1998 when the Carl Moyer Program – supporting the transition away from the State’s dirtiest diesel trucks to the latest, cleaner technologies -- was first enacted by state law. In 2012, three bills were approved – AB 1532 (Pérez, Chapter 807), SB (SB) 535 (de León, Chapter 830), and SB 1018 (Budget and Fiscal Review Committee, Chapter 39) – that established the Greenhouse Gas Reduction Fund (GGRF) to receive Cap-and-Trade auction proceeds and provide a framework for investing the proceeds to further the purposes of California’s groundbreaking climate law, AB 32 (Nunez, Chapter 488, Statutes of 2006). This framework also underpins CCI, the main program to distribute GGRF funds and mentioned in section 3.4 above. Many local governments could also demonstrate their authority to implement this measure.

⁵¹ See disclaimer about GHG emissions reductions estimates on page 21.

⁵² 2021. California SB 372. <https://legiscan.com/CA/text/SB372/id/2436302>.

Transportation Measure 2: Install Truck Charging to Support Zero-Emissions Goods Movement at California Ports and Warehouse Districts

This measure would accelerate the development of charging infrastructure and hydrogen refueling stations. This measure could be administered by local governments or across the State by leveraging and adding federal funds to an existing block grant program run by the California Energy Commission (CEC) and administered by CALSTART.⁵³ That program, known as Energy Infrastructure Incentives for Zero-Emissions Commercial Vehicles, or EnergIIIZE,⁵⁴ is the nation's first large-scale commercial fleet ZE infrastructure incentive project, and is run in coordination with the programs that underpin Transportation Measure 1 above to provide fleets with a suite of ZE upgrades. Under statewide implementation, CEC would manage the federal funds, conduct oversight, and provide general direction while CALSTART would administer the program in conjunction with Tetra Tech.⁵⁵ CPRG awards via EnergIIIZE would prioritize urgently needed, shovel-ready projects, with strong operations plans and community-level benefits.

Past rounds of EnergIIIZE funding were oversubscribed *within minutes*, definitive proof that the need for ZE medium- and heavy-duty charging infrastructure in California is pressing. That need will only grow as a result of the State's existing climate goals and regulations that are compelling the transition to ZE MHD vehicles and equipment. Accordingly, the scale of statewide truck charging needed is immense; there are about 1 million MHD trucks in California currently, and the most recent CEC Report⁵⁶ estimates that 109,000 depot and 5,500 public electric vehicle chargers will be needed to support 155,000 MHD EVs in 2030. By 2035, California will need about 256,000 depot and 8,500 public electric vehicle chargers to support 377,000 MHD EVs. Electrification infrastructure for the trucking industry will require continued and significant funding and will likely prove more complex than light-duty vehicle charging due to the need for higher-powered chargers, higher site-level power levels, and larger site footprints. Recent data show that MHD vehicles and infrastructure technology have matured, and this measure could utilize additional funding quickly.

Ultimately, the resulting GHG reductions from this measure will be influenced by several factors, including the size of an overall award under CPRG, portion of each project covered by federal funding, amount of match required (CEC traditionally uses a 50% match requirement for charger incentive funding), and whether it was a public station or private depot station. Given these considerations, and if implemented statewide, this measure could lead to annual emissions reductions of approximately 18,000 MTCO₂e, as well as

⁵³ CALSTART is a nonprofit organization working nationally and internationally with businesses and governments to develop clean, efficient transportation solutions. <https://calstart.org/>.

⁵⁴ EnergIIIZE website: <https://energiize.org/resources..>

⁵⁵ Tetra Tech website: <https://www.tetrattech.com/>.

⁵⁶ CEC. Electric Vehicle Charging Infrastructure Assessment - AB 2127. <https://www.energy.ca.gov/data-reports/reports/electric-vehicle-charging-infrastructure-assessment-ab-2127>.

roughly 74,000 MTCO₂e cumulatively between 2025 and 2030, and 441,000 MTCO₂e cumulatively between 2025 and 2050.⁵⁷

In addition, as described in Transportation Measure 1 above, investments in ZE goods movement will greatly improve public health, particularly for low-income and disadvantaged communities often traversed and intersected by MHD vehicles. This is especially true of the concentrations of distribution centers and the many related delivery trucks that, in California, are most often found in or adjacent to low-income and disadvantaged communities. Addressing this disparity equitably will be aided by leveraging CEC's Disadvantaged Communities Advisory Group,⁵⁸ a legislative-created body that advises the CEC on energy issues in California. Federal funding could be folded under CEC's annual process to draft and solicit feedback on investment plans through a robust public process and in consultation with an advisory group that includes members of disadvantaged communities. Similar to Justice40, CEC's funding programs have long required that 50% of benefits accrue to low-income and disadvantaged communities.

To implement this measure, CEC or local governments could: conduct outreach to port operators and logistics companies to prioritize investments (first six months); conduct outreach to low-income and disadvantaged communities proximate to potential project sites to maximize direct community benefits of such investments (first six months); finalize ports, warehouses, and connecting corridors to be targeted with CPRG funding (within first year); finalize analysis of chargers, energy levels, number of ports, and all associated costs (within first year); conduct public workshops (within first year); launch the measure (at start of second year); and monitor the construction and other metrics of the measure (continuously as needed).

To ensure progress of this measure, government agencies could require site owners and operators to document: site control, permits or permit applications, outreach to local communities, consultation with utility providers, statements of intent from fleet operators, clear descriptions of construction and operation plans, and a maintenance and operation plan to meet uptime requirements. Following any awards, CEC or local governments could track construction progress and charger uptime and operation.

The authority for CEC to implement this measure is well established by the Warren Alquist Act, which created the CEC and its purview;⁵⁹ AB 118 (Núñez, Chapter 750, Statutes of 2007) that created CEC's Clean Transportation Program, and AB 8 (Perea, Chapter 401, Statutes of 2013) and AB 126 (Reyes/Gonzalez), which extended the program. AB 2127 (Ting, Chapter 365, Statutes of 2018) further requires CEC to publish a biennial report on

⁵⁷ See disclaimer about GHG emissions reductions estimates on page 21.

⁵⁸ This group was established by Senate Bill 350 (de León, Chapter 547, Statutes of 2015), the Clean Energy and Pollution Reduction Act of 2015. (California Leg Info. 2015: SB 350. October 7. [SB 350 Senate Bill - CHAPTERED \(ca.gov\)](#))

⁵⁹ CEC. About. <https://www.energy.ca.gov/about>.

the charging infrastructure needed to meet California's zero-emission vehicle targets and SB 1000 (Lara, Chapter 368, Statutes of 2018) requires CEC, in consultation with CARB, to assess equity in funded transportation projects. Many local governments could also demonstrate authority to implement this measure.

Transportation Measure 3: Advance the Deployment of Clean Off-Road Equipment

This measure would expand programs and efforts that help lower the upfront cost and deploy ZE heavy-duty off-road equipment, including ZE agricultural equipment, airport ground support equipment, cargo handling equipment, commercial harbor craft, construction equipment, heavier lift forklifts, mobile power units, railcar movers and freight locomotives, terminal tractors (yard trucks), transport refrigeration units, and Electric Vehicle Supply Equipment (EVSE) and other supporting infrastructure. This measure is largely informed from CARB's experience implementing the Clean Off-Road Equipment Voucher Incentive Project (CORE).⁶⁰ This streamlined voucher incentive project helps offset the higher cost of ZE technology with a point-of-sale discount. CARB could similarly lead this measure, with CALSTART already competitively selected to provide implementation support. Alternatively, air districts, local governments, and port authorities, each with eligibility to receive CPRG implementation funds, could also implement this measure. CARB's experience with CORE illustrates the need for this measure as well as its potential outcomes and benefits.

The outstanding need for this measure can be illustrated in part by CORE's success to date. Demand for CORE funding has been high, and the project has been oversubscribed each funding cycle since its inception in 2020. For example, in 2022, \$125 million in CORE funding was oversubscribed by more than \$100 million, and three of the 10 eligible equipment categories sold out within 90 minutes. In 2023, \$185 million was available, and within 60 minutes, three of the 11 categories were oversubscribed. In the last round, a \$10 million small business set aside was exhausted within 22 minutes. Given how many pieces of fossil fueled off-road equipment exist in California, CARB staff expect demand for programs like CORE to remain high. Meanwhile, funding to meet such demand is uncertain.

If implemented statewide, and depending on total additional funding, this measure could lead to annual emissions reductions of approximately 10,000 MTCO₂e, as well as 41,000 MTCO₂e cumulatively between 2025 and 2030, and 244,000 MTCO₂e cumulatively between 2025 and 2050.⁶¹

⁶⁰ CARB. Clean Off-Road Equipment Vouchers. <https://ww2.arb.ca.gov/our-work/programs/clean-off-road-equipment-voucher-incentive-project>.

⁶¹ See disclaimer about GHG emissions reductions estimates on page 21.

As with the above goods movement measures, a transition to ZE off-road equipment carries measurable air quality and other cobenefits that would lessen pollution and public health burdens most often shouldered by low-income and disadvantaged communities. CORE also currently aims for at least 50% of funding to support equipment domiciled in disadvantaged communities, and to date, has achieved a rate higher than 75%. The CORE team would continue these practices under this measure, as well as continue to conduct outreach and partnership with community-based organizations, along with efforts to convene community members and equipment manufacturers to foster communication and ZE equipment awareness.

This measure would help encourage additional manufacturers to bring ZE products to market, support technology transfer to new equipment types and market segments and grow the overall ZE off-road market. The benefits of this measure, and related lessons learned and technologies developed, would apply not only to California, but across the U.S.

In the first three to six months of this measure, the key implementation features could include outreach to potential applicants as well as low-income and disadvantaged communities to maximize their direct benefits from CPRG investment. Public workshops could follow in the first year, and the program could process applications and make awards in the beginning of the second year.

To track progress under this measure, CARB would rely on and expand existing systems that require detailed reports for incentive programs, including tracking the number and cost of equipment purchased and operated under this measure. Tracked progress could be made available through regular reports and public dashboards.

CARB's authority to implement this measure is well established. In addition to the bills that established the State's GGRF to further statewide climate investments as mentioned under Transportation Measure 1 above, AB 118 (Nunez, Chapter 750, Statutes of 2007) created the Air Quality Improvement Program (AQIP), a voluntary incentive program implemented by CARB to fund clean vehicle and equipment projects, air quality research, and workforce training. Several bills have appropriated funding from the GGRF or through AQIP to fund ZE technology, including ZE equipment through CORE. Governor Newsom's Executive Order N-79-20 also calls for 100% of off-road vehicles and equipment operations to be ZE by 2035 where feasible. Many local governments could also demonstrate authority to implement this measure.

Transportation Measure 4: Bolster Investments in the State's Sustainable Port and Freight Infrastructure

This measure would augment the Sustainable Port and Freight Infrastructure Program (PFIP),⁶² which advances clean, efficient, sustainable, and resilient port and freight infrastructure. At its core, PFIP and this measure would champion projects that deploy electric equipment and vehicles, renewable energy, and other emissions-reducing technologies. While PFIP projects vary according to context-specific needs, they include strategically integrating electrical infrastructure into port projects to reduce emissions during vessel berthing; optimizing truck access to vital freight hubs; installation of all-electric heavy lift cargo cranes; and much more. Increased funding under CPRG in the future would empower PFIP to unlock GHG emissions reductions, improve air quality, and bolster logistics and economic efficiency of goods movement across the State and beyond.

The State's ambitious \$1.2 billion initial allocation provided an effective kickstart to PFIP and showed that additional funding would be needed to fully meet the critical needs it identified. In its pipeline of emissions reducing projects, PFIP has showed that there are at least \$430 million worth of shovel-ready projects that fit within PFIP's objectives of reducing environmental impacts.

If implemented statewide and depending on total additional funding, this measure could lead to annual emissions reductions of approximately 18,000 MTCO_{2e}, as well as roughly 72,000 MTCO_{2e} cumulatively between 2025 and 2030, and 434,000 MTCO_{2e} cumulatively between 2025 and 2050.⁶³

The California State Transportation Agency and the California Department of Transportation could lead this measure in partnership with local governments, ports, air quality management districts, and rail operators. Alternately, local governments whose projects have been submitted and vetted by the PFIP program, but have been waitlisted, could also implement this measure by pursuing CPRG funding for eligible projects that were not funded in the original PFIP award.

As described in the above goods movement transportation measures, PFIP projects would cut air pollution across the State's most burdened populations, many of which are adjacent to some of the nation's largest port operations. PFIP projects would also help reduce NO_x and PM_{2.5} emissions from freight – a large contributor for non-attainment of the National Ambient Air Quality Standards for ozone and PM_{2.5}. Quarterly reports would also include public-facing activities to help ensure meaningful engagement with communities effected by each project, and the California Department of Transportation Office of State Planning, Equity, & Engagement framework would be followed.

⁶² CalSTA. Freight, Rail and Border. <https://calsta.ca.gov/subject-areas/freight-rail-border>.

⁶³ See disclaimer about GHG emissions reductions estimates on page 21.

Different projects under PFIP also have the potential to generate local, high-quality jobs. Standards to ensure the inclusion of job quality that are embedded in PFIP include community workforce agreements, diversity and inclusion initiatives, career advancement opportunities, local hiring preferences, regular workforce feedback mechanisms, collaboration with workforce development agencies, and inclusive hiring practices for underserved groups. This measure would also help modernize goods movement systems to improve economic efficiency and help strengthen State and U.S. goods movement operations.

As this measure focuses on shovel-ready sustainable port and freight projects, milestones of this measure in the first year would include outreach to potential project leads and impacted communities, prioritization of projects to fund, any public events to advertise this measure, project selection, and the award of funding. Continuously thereafter, progress on awarded projects would be tracked.

To ensure success, quarterly progress reports could be required under this measure. In addition, implementing authorities could be required to submit a final delivery report that compares proposed and delivered project elements, including project scope and timeline, performance outcomes, and final costs by component and fund type.

In addition to a proven track record to implement such projects, several laws and directives ensure the State's authority to implement this measure. For example, SB 198 (Chapter 71, Statutes of 2022) established the PFIP Program.⁶⁴ Other bills and directives also further underpin the State's authority to implement this measure.⁶⁵ Many local governments could substantiate their own authority to implement this measure as well.

Transportation Measure 5: Support Mobility Projects Uplifted by Communities

This measure would expand existing grant programs to fund projects identified by communities, including any that local governments would like to pursue under CPRG. This measure would also cover clean mobility projects identified through CARB's Clean Mobility in Schools (CMIS), the Sustainable Transportation Equity Project (STEP), or the Clean Mobility Options Program, which each aim to directly improve transportation equity in disadvantaged and low-income communities by addressing community-identified transportation needs, increasing access to key destinations and services, reducing vehicle

⁶⁴ SB 198 also established the Transportation Infrastructure Climate Adaptation Strategy Grant Program and the Local Transportation Infrastructure Climate Adaptation Project Program, both designed to tackle climate-related challenges in transportation systems. California Legislative Info. 2022: SB 198. June 30. https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB198

⁶⁵ These include, but are not limited to, SB 375 which aims to reduce greenhouse gas emissions by integrating land use, transportation, and housing planning, Executive Order B-16-12 which outlines directives to improve the efficiency of freight transportation in California,

miles travelled (VMT), and reducing GHGs. This measure aims to elevate unique transportation concerns and to address different barriers faced by various communities.

This measure would cover a diverse collection of projects, including active transportation infrastructure; new and expanded zero-emission public transit and school bus services; and shared mobility services such as ZE micro transit and e-bike lending libraries. The projects could also include a variety of necessary supporting elements such as workforce training in the clean transportation sector; diverse community engagement, outreach, and education activities; displacement avoidance considerations; and clean transportation subsidies.

Under implementation by CARB, qualified but unfunded projects from the CMIS, STEP, or CMO programs would be prioritized. The combined total need of such unfunded projects is substantial, and funding from CPRG for these community-driven transportation solutions could be matched with local sources and any available State funding.

Many of the projects identified through CARB's programs have been chosen because they benefit low-income and disadvantaged communities. In addition, projects were chosen because they were informed and developed through a concerted process of community engagement that was inclusive and representative of the diversity of the community being served. All proposed projects also identified ways in which, through the proposed project, community-led decision-making would continue, including through direct community decision making, focus groups, and surveys.

If implemented statewide and depending on total additional funding, this measure could lead to annual emissions reductions of approximately 1,000 MTCO₂e, as well as 4,000 MTCO₂e cumulatively between 2025 and 2030, and 25,000 MTCO₂e cumulatively between 2025 and 2050.⁶⁶

This measure could be implemented by or alongside various local authorities and community-based organizations. CARB would also leverage a network of local implementers working on community-based clean mobility projects through an effort known as the Clean Mobility Equity Alliance. The partnerships developed through CMEA and between local governments and community-based organizations would help build the social infrastructure needed to pursue future funding opportunities, helping to spur transformational change at the community scale.

In terms of implementation schedule and milestones, within the first few months of this measure, CARB or local governments would prioritize a list of already-vetted mobility projects alongside community outreach and engagement. Once funded, projects could begin implementation, some of which may take up to three years to complete.

⁶⁶ See disclaimer about GHG emissions reductions estimates on page 21.

To track progress under this measure, CARB or local governments could prepare quarterly progress reports tracking technology or services provided, as well as their costs, and any explanation for differences in completed versus anticipated implementation.

The State has the authority to implement this measure as established by several State bills and directives, including, but not limited to, SB 1275 (de León, Chapter 530, Statutes of 2014),⁶⁷ which established a broad suite of statewide transportation equity programs under the Charge Ahead Initiative, including CMIS and STEP. Further, SB 350 (de León, Chapter 547, Statutes of 2015),⁶⁸ directed CARB to undertake a study to identify the barriers to accessing clean transportation and mobility investments for low-income Californians, work that underpins this measure.⁶⁹ In addition, local governments may have their own authority to implement this measure.

Transportation Measure 6: Allow for Local Deployment of ZEV Infrastructure and Low-Income ZEV Support

California's light-duty ZEV market is one of the largest and most dynamic in the world. Over 1.7 million light duty ZEVs have been sold through the third quarter of 2023 (including Fuel Cell Electric Vehicles (FCEVs) and Plug-In Hybrid Electric Vehicles. ZEVs now account for over 25% of new vehicle sales.⁷⁰ However, many communities lack reliable ZEV infrastructure or the access to affordable ZEV options.

This measure elevates the fact that many local governments serving low-income and disadvantaged communities, and Tribal Nations without their own CPRG planning grants, are seeking every available opportunity to fund light-duty ZEV infrastructure projects in their regions and communities, and in some cases, to fund ZEV incentive programs similar to CARB's Clean Cars 4 All,⁷¹ which targets incentives to low-income residents. Not only have such needs been prioritized at the local level under CPRG, the urgency for such action is also outlined in the State's 2022 Scoping Plan Update and CEC's Electric Vehicle Charging Infrastructure Assessment, mandated biennially under AB 2127 (Ting, Chapter 365, Statutes of 2018), among other reports.⁷²

Additional benefits from the further deployment of ZEVs for low-income residents and installation of light-duty ZEV infrastructure are reduced vehicle operating costs, reduced air

⁶⁷ California Legislative Info. 2014: California SB 1275. September 21. http://leginfo.ca.gov/pub/13-14/bill/sen/sb_1251-1300/sb_1275_bill_20140921_chaptered.pdf.

⁶⁸ California Legislative Info. 2015: SB 350. September 15. http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb_0301-0350/sb_350_bill_20151007_chaptered.htm.

⁶⁹ In addition, the bills that establish the State's Greenhouse Gas Reduction Fund and the Air Quality Improvement Program also apply here, as do SB 375, SB 150, AB 118 (Chapter 750, Statutes of 2007), and AB 398 (Eduardo Garcia, Chapter 135, Statutes of 2017).

⁷⁰ CEC. Zero Emission Vehicle and Infrastructure Statistics. <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics>.

⁷¹ CARB. Clean Cars 4 All. <https://ww2.arb.ca.gov/sites/default/files/movingca/vehiclescrap.html>.

⁷² CEC. 2024: Electric Vehicle Charging Infrastructure Assessment - AB 2127. January. <https://www.energy.ca.gov/data-reports/reports/electric-vehicle-charging-infrastructure-assessment-ab-2127>.

pollution, and in many cases, the first opportunity for community members to access ZEV technology or to charge a ZEV reliably. Exact costs and GHG emissions reductions would vary based on local projects.

While implementation schedules and milestones may differ across sites, potential steps for ZEV infrastructure could include outreach, site identification and selection, consultation with utilities, estimating the number of chargers and associated costs, and securing contractors for implementation. For ZEV incentive programs for low-income residents, steps could include outreach to target residents, incentive program design, public workshops, launch of incentive programs, and tracking progress.

Metrics for local governments in tracking ZEV infrastructure deployment could include measurements of charger uptime, number of drivers served, and others as appropriate. For low-income ZEV incentives, metrics for success could include number of residents served, number of ZEVs deployed, and estimated avoided emissions.

Local governments and Tribal Nations typically have the necessary authority to plan, permit, site, and build ZEV infrastructure in their jurisdictions, as well as to run vehicle incentive programs.

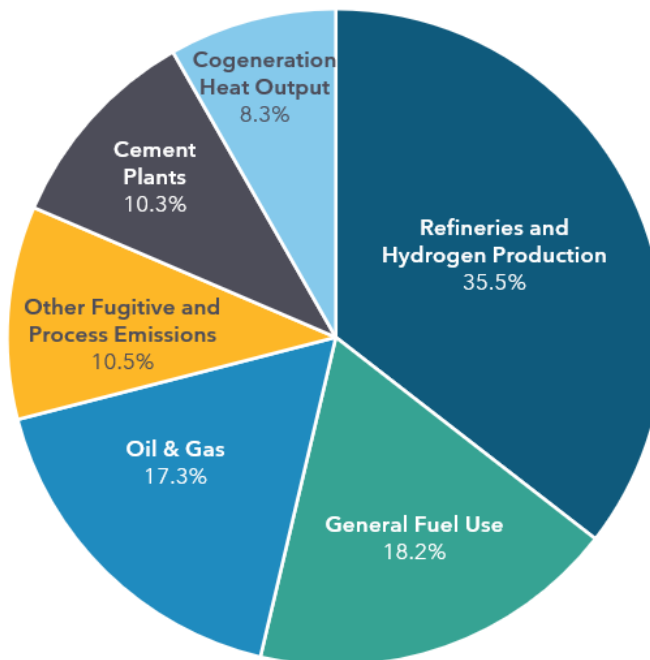
Industrial

California's industrial sector, which includes upstream oil and gas extraction and refining operations for transportation fuels, contributes roughly 19% of California's total emissions,⁷³ and can be further broken down as shown in Figure 6 below.

⁷³ CARB. 2023. Current California GHG Emission Inventory Data. <https://ww2.arb.ca.gov/ghg-inventory-data>.

Figure 6: Industrial Sector Emissions in 2021

Total Emissions = 73.9 MMTCO₂e



California's industrial sector contributes significantly to the state's economy, with a total output from manufacturing in 2019 of \$324 billion (10.4% of the state total)⁷⁴ and employment of 1,222,000 manufacturing jobs (7.6% of the total state workforce).⁷⁵ The industrial sector includes a diverse range of sources, including cement plants, refineries, glass manufacturers, oil and gas producers, paper manufacturers, mining operations, metal processors, and food processors. Combustion of fossil gas, other gaseous fossil fuels, and solid fossil fuels provide energy to meet three broad industry needs: electricity, steam, and process heat. There are also fugitive emissions from processing (such as clinker production in cement plants) and other chemical transformations inherent to some manufacturing processes.

Decarbonizing industrial facilities will benefit low-income and disadvantaged communities where, as described in Section 3.3 above, many of the industrial facilities are located and contribute to inequitable health disparities. Achieving this goal will primarily depend upon replacing or reducing existing fossil fuel use with a mix of electrification, solar thermal heat, biomethane, low- or zero-carbon hydrogen, and other low-carbon energy to provide energy

⁷⁴ National Association of Manufacturers (NAM). 2021 California Manufacturing Facts. <https://www.nam.org/state-manufacturing-data/2021-california-manufacturing-facts/>

⁷⁵ National Association of Manufacturers. 2021: California Manufacturing Facts. <https://nam.org/state-manufacturing-data/2021-california-manufacturing-facts/>

for heat and reduce combustion emissions. Emissions also can be reduced by implementing energy efficiency measures and using substitute raw materials that can reduce energy demand and some process emissions. Some remaining combustion emissions and some noncombustion CO₂ emissions can be captured and sequestered.

Transforming this sector will require the demonstration and deployment of advanced decarbonization technologies targeted to the unique needs and requirements of the many industrial sub-sectors. That is to say, there is no 'one-size fits all' solution for industry to contribute and support the State's transition to a net-zero economy by 2045 and to meet air quality goals. The measure included in this PCAP directly addresses the complexity of this sector, and supports solutions that can provide examples of innovative, cost-effective and practical solutions that decarbonize specific industrial and sub-sector needs. Those solutions, focused on the State's hardest hit communities, can be transferred to other states as their effectiveness is demonstrated here. The end result of this effort will be the consistent decline overall in the use of fossil energy usage and lower process emissions in the industrial sector, resulting in improved air quality, especially in low income and disadvantaged neighborhoods where many of these facilities are located.

In addition, the measure below is consistent with federal efforts to reduce industrial emissions, including the U.S. Department of Energy's Industrial Decarbonization Roadmap⁷⁶ and similar programs.⁷⁷

Industrial Measure 1: Accelerate Industrial Decarbonization

This measure would leverage CEC's existing Industrial Decarbonization and Improvement to Grid Operations Program (INDIGO) to quickly and seamlessly fund industrial decarbonization projects across California's manufacturing sector, including chemicals, metals, food and beverages, and nonmetallic minerals, such as cement, glass, electronics, pharmaceuticals, and related support facilities. CEC would lead this measure with input from CARB and the California Department of Food and Agriculture (CDFA). Industrial stakeholders and utilities would implement the projects.

With bolstered CPRG funding, new INDIGO projects would accelerate the decarbonization of California's industry; ensure substantial and lasting GHG reductions; provide reliability benefits to local electricity grid operations; reduce air pollution, particularly for low-income and disadvantaged communities; provide replicable examples that could stretch beyond the State; and provide workforce opportunities.

⁷⁶ U.S. Department of Energy (U.S. DOE). 2022: DOE Industrial Decarbonization Roadmap. September 7. <https://www.energy.gov/industrial-technologies/doe-industrial-decarbonization-roadmap>.

⁷⁷ This includes the Advanced Energy manufacturing and Recycling Grant Program (BIL 40209), and the Industrial Demonstrations Program. (for more information see U.S. EPA. 2023: Investing in America. Climate Action Funding Fair. August 11. https://www.epa.gov/system/files/documents/2023-08/6.Industrial_Waste_508-combined.pdf)

While the decarbonization technologies and practices supported by this measure would vary, they could include process heat electrification (such as industrial heat pumps), alternative processes (such as thermal energy storage, use of evaporators replaced with membranes, and use of feedstocks that reduce use of fossil fuels), renewable energy generation, energy efficiency, and load flexibility.

Depending on the level of additional funding, this measure could yield annual emissions reductions of approximately 2,800 MTCO₂e, as well as roughly 11,000 MTCO₂e cumulatively between 2025 and 2030, and 68,000 MTCO₂e cumulatively between 2025 and 2050.⁷⁸

This measure would also decrease air pollution, and consistent with CEC's current practices, 60% of installations would be located in or directly benefit low-income and disadvantaged communities. Project developers would also develop community benefits plans. It is expected that this measure will require a skilled workforce to manufacture, design, install, and operate the GHG reduction technologies, leading to job creation in the communities served. These projects also have the potential to generate real-world technical and economic data on installed decarbonization equipment in use, initiate service and maintenance infrastructure in California, and ultimately, spur similar private-sector investment in decarbonization technologies across different industries.

As this measure leverages CEC's existing administrative structure under INDIGO, the key expected milestones include a release of a competitive solicitation to industry three to four months following a CPRG award, an award of funds to industry by CEC approximately six to nine months after solicitation release, and ongoing tracking to ensure success thereafter. Such tracking would involve third-party verification of anticipated GHG and local air emission reductions based on actual installations and operations. Tracking would also ensure the development of community benefits plans by industry grant recipients, with input from local community groups, along with, workshops and site visits for community members and fellow industrial operators to facilitate transparency and clean technology transfer.

Recognizing the need for decarbonization of the industrial sector, AB 209 (Committee on Budget, Chapter 251, Statutes of 2022) created the CEC's INDIGO program, and among other bills and directives, demonstrates the State's authority to implement this measure.

Energy

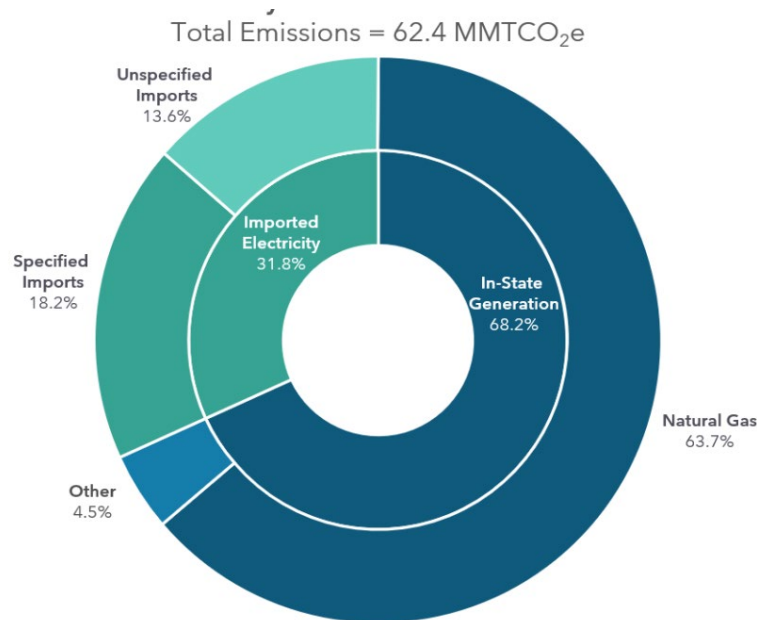
Electricity currently comprises 16% of the State's GHGs, according to the latest inventory,⁷⁹ constituting the third largest sector in terms of carbon pollution. Further, the majority of

⁷⁸ See disclaimer about GHG emissions reductions estimates on page 21.

⁷⁹ CARB. 2023: Current California GHG Emission Inventory Data. <https://ww2.arb.ca.gov/ghg-inventory-data>.

emissions from generation serving California comes from natural gas as shown in Figure 7 below.

Figure 7: Electricity Sector Emissions in 2021



Emissions from electricity – both imported and local generation – have dropped dramatically over time. Much of the State’s success in reducing GHGs is due to focused decarbonization requirements, programs, and investments in the electricity sector. This includes pioneering efforts such as the Renewable Portfolio Standard, SB 350 Clean Energy and Pollution Reduction Act, SB 100 implementation (requirement to achieve 100% electric retail sales to end-use customers by 2045), and the Cap-and-Trade Program (in effect since 2012). These initiatives have delivered significant reductions from this sector, notably related to electricity imports. (This has also resulted in incentivizing lower-carbon electric generation in adjoining states that deliver electricity to California.) It is also worth noting that California's policies have provided strong investment signals for renewable electricity that have benefited other jurisdictions that can now deploy these technologies at lower costs and at scale.

As the State begins to implement broad-scale additional efforts to reach carbon neutrality by 2045, as set forth in the 2022 Scoping Plan Update, a clean, affordable, and reliable electricity grid will serve as the backbone to support deep decarbonization across California’s economy and air quality improvements across the State. In fact, the State will not be able to transition away from the burning of fossil fuels in transportation, freight, industry, and buildings that disproportionately burden and harm low-income and disadvantaged communities without substantial, continued investment in clean energy and electricity. The transportation and industrial measures preceding this subsection rely on it.

Such critical emissions reductions across several of the State's sectors depend on an unprecedented energy transition and include the measures listed below. These measures build on California's past success and continue to develop and deploy affordable renewable and zero-carbon electricity, upgrades to grid capacity, increased energy storage, the deployment of ZE appliances, efficiency upgrades for homes and commercial buildings, bolstering long-term energy planning, and more. It is a pivotal time where the actions taken today have significant impacts on the State's goals years into the future. For example, the 2022 Scoping Plan Update estimates that a five-year delay in renewable capacity would increase emissions by 8% in 2030 (25 MMTCO₂e), compared to an approach at current levels.

The measures below also align with the federal goal to achieve 100% clean electricity by 2035,⁸⁰ and can also help provide jobs and economic opportunity, energy security and resiliency, and air quality and health benefits particularly for low-income and disadvantaged communities. The measures below were chosen in line with these critical actions and the important benefits they offer.

Energy Measure 1: Expand Decarbonization through the Energy Conservation Assistance Act

The proposed expansion of the Energy Conservation Assistance Act (ECAA) would scale zero- and one-percent interest loans to educational agencies, municipalities, and Tribal Nations for clean energy generation, energy storage, ZEV infrastructure, and energy efficiency upgrades. The measure aims to ensure that loan repayments do not exceed the utility bill savings generated by these energy-efficient measures, thereby maintaining budget neutrality for the applicants. CEC would have primary responsibility for this measure.

This measure could unlock funding for 20 eligible projects without otherwise identified funding, which includes \$44 million in wait list applications from low-income and disadvantaged communities. In fact, with the recent expansion of ECCA program to include Tribal applicants and additional opportunities to fund energy storage and ZEV infrastructure, this program has greater capacity than ever to expand clean energy measure opportunities for low-income and disadvantaged communities. In addition, projects under ECCA would deliver improved air quality, clean energy generation, grid resilience, and decarbonization of buildings, contributing to healthier living environments.

Depending on the amount of additional funding received, this measure could yield annual emissions reductions of approximately 63,000 MTCO₂e, as well as roughly 188,000 MTCO₂e

⁸⁰ U.S. DOE. 2023: On The Path to 100% Clean Electricity. May. <https://www.energy.gov/sites/default/files/2023-05/DOE%20-%20100%25%20Clean%20Electricity%20-%20Final.pdf>.

cumulatively between 2025 and 2030, and 1.4 million MTCO₂e cumulatively between 2025 and 2050.⁸¹

To implement this measure, within six months of receiving a CPRG award, CEC could first consider its waitlisted ECAA projects for low-income residents and Tribal Nations, and from there, conduct any necessary outreach and hold public workshops as needed to arrive at the final selection of projects and help ensure direct community benefits. Within six months of receiving a CPRG award for this measure, CEC anticipates awarding loans, and tracking progress thereafter. Such tracking could include location and type of loans, and the associated energy bill savings, GHG reductions, and benefits to end users.

The ECAA program operates under the authority granted by the Energy Conservation Assistance Act of 1979 (Public Resources Code §§ 25410-25422), most recently amended in 2021. The CEC's established track record in managing a vast portfolio of energy projects, along with its low default rate, underscores its capability and authority to successfully implement this expanded initiative. Recent legislation (AB 33, Ting, Chapter 226, Statutes of 2021) expanded the ECAA program to California Native American Tribes and expanded allowable measures to include energy storage and ZEV infrastructure.

Energy Measure 2: Create a Funding Program to Upgrade the Capacity of Distribution Systems

This measure would create a new Distribution System Capacity Upgrades Funding Program to enhance the electric distribution system in California. Its primary goal would be to increase capacity to support climate initiatives, particularly transportation and building electrification, which are crucial for reducing the State's reliance on fossil fuels and for meeting several sector-specific climate goals, the State's overarching 2045 carbon neutrality target, the State's air quality goals, and to closing pollution disparities for low income and disadvantaged communities. The program aims to address the challenges posed by the increased electrical demand from electric vehicles (EVs), heat pumps, and other electrification technologies, which the current distribution system is not fully equipped to handle. It also aims to help mitigate rising electricity costs that disproportionately affect low-income customers and currently acts as a disincentive for consumers to switch from fossil fuels in vehicles and buildings. The California Public Utilities Commission (CPUC), in consultation with CEC and CARB, would implement the program.

The cost of overall distribution system upgrades is immense and would traditionally be funded by ratepayers. CPRG funding would kick-start this program, help alleviate the financial burden on consumers, and accelerate grid upgrades that will otherwise become a bottleneck to ZE technologies across the State.

⁸¹ See disclaimer about GHG emissions reductions estimates on page 21.

Depending on level of additional funding support, this measure could yield annual emissions reductions of approximately 1.8 million MTCO₂e, as well as roughly 3.6 million MTCO₂e cumulatively between 2025 and 2030, and 39 million MTCO₂e cumulatively between 2025 and 2050.⁸²

The program is also expected to deliver considerable benefits to disadvantaged communities, especially those affected by high levels of trucking emissions, such as near ports and along major transportation corridors. To facilitate the transition to electric vehicles and reduce these emissions in such communities, urgent upgrades to the distribution systems in these highway corridors and port areas are essential. In addition, the CPUC has an open proceeding on distribution system planning and in which numerous representatives from low-income and disadvantaged communities participate. The CPUC could leverage this proceeding for further meaningful engagement with community groups.

In setting up this measure, the CPUC expects to reach the following key milestones in the first year following a CPRG award: outreach with low-income and disadvantage communities through open proceedings as program design features are solidified, analysis of and prioritization for grid capacity upgrades, coordination with utilities, and selecting specific sites for upgrades. Sub-awarding CPRG funds to selected sites could follow in the second year, and tracking progress could follow continuously from there. This measure could ensure success through tracking metrics such as miles of distribution circuit capacity installed, timelines for customers to have capacity for full-electric homes, and more.

The CPUC, vested with broad authority over investor-owned utilities, will spearhead this program. CPUC's jurisdiction covers approximately 75% of California's customers, providing CPUC with substantial leverage and capacity to implement such a large-scale program effectively.

Energy Measure 3: Expand the Success of California's Self-Generation Incentive Program for Behind-the-Meter Energy Storage

The proposed expansion of the Self-Generation Incentive Program (SGIP) would enhance behind-the-meter energy storage and resilience during power outages, particularly for low-income residential customers. Energy storage systems would be charged when electricity rates are low and renewable generation is high, and discharge energy during peak hours when electricity rates and GHGs from fossil generation are highest. These practices enhance resilience, reduce emissions, and support affordability. This initiative would be led by the CPUC using existing proceedings and program implementers to expand SGIP and scale its transformative impact.

⁸² See disclaimer about GHG emissions reductions estimates on page 21.

Depending on additional funding received, this measure could yield annual emissions reductions of approximately 175 MTCO₂e, as well as roughly 520 MTCO₂e cumulatively between 2025 and 2030, and 4,000 MTCO₂e cumulatively between 2025 and 2050.⁸³

The majority of the avoided emissions from this measure would likely come from natural gas Peaker plants, and reducing their use across the State would deliver air quality benefits, especially where those Peaker plants are located in or adjacent to low-income and disadvantaged neighborhoods. In addition, increasing the number of energy storage systems and integrating them into demand response programs can further bolster grid reliability, potentially transforming them into virtual power plants.

Within the first six months following a CPRG award, this measure would be incorporated into an existing CPUC proceeding in which diverse stakeholders representing low-income communities already participate. Once the CPUC adopts a decision on how to expand SGIP with CPRG support, funds would be disbursed through existing program implementors with a proven track record of efficient and effective fund distribution. From there, the success of this measure would be ensured through continual tracking of metrics such as expenditures made, number of batteries installed, and number of customers served by location and income level.

The SGIP, established in 2001, has been supported by legislative actions including AB 209, which amends Public Utilities Code Section 379.6 and adds Section 379.10, gives CPUC authority to use SGIP to offer California residents solar and storage incentives. This authority, and a track record in financing over 1.23 GW of capacity through SGIP across numerous projects, demonstrate CPUC's capability to successfully implement this measure.

Energy Measure 4: Bolster Healthy Landscapes and Resilient Communities through Expanding the Biomass to Carbon Negative Biofuels Program

This measure seeks to expand the existing Biomass to Carbon Negative Biofuels Program at the California Department of Conservation,⁸⁴ and ultimately play a unique role in addressing climate change by producing low-carbon and carbon-negative fuels from forest and agricultural biomass while addressing critical issues such as forest health, wildfire risk, and air quality concerns. In particular, using agricultural waste that has historically been burned in the San Joaquin Valley will help reduce fine particulates across some of the State's most overburdened low-income and disadvantaged communities. The Department of Conservation would lead this measure, in partnership with various State and federal agencies, local governments, and Tribes. These entities – alongside community input to

⁸³ See disclaimer about GHG emissions reductions estimates on page 21.

⁸⁴ California Department of Conservation. 2023: Forest Biomass to Carbon-Negative Biofuels Pilot Program. November 15. <https://www.conservation.ca.gov/cgs/fbp>.

maximize local co-benefits - could collectively contribute to the measure's development, solicitation crafting, and application review processes.

Depending on total additional funding added to this measure, it could yield annual emissions reductions of approximately 10,000 MTCO₂e, as well as roughly 38,000 MTCO₂e cumulatively between 2025 and 2030, and 230,000 MTCO₂e cumulatively between 2025 and 2050.⁸⁵

The financial scope of the program is significant, with implementation costs ranging from \$60 million to \$500 million per facility, where grants are designed to cover at least 10% of the total costs. CPRG funding would be leveraged and matched with private and public funding, including local funding from jurisdictions - many of which are rural - that would benefit from these facilities with enhanced forest resilience, improved air quality, and jobs.

Additionally, by avoiding wildfire risks and by providing an alternative to the open burning of agricultural waste, this measure promises substantial public health and safety benefits, for rural low-income and disadvantaged communities as well as Tribal Nations, many of which live in California's San Joaquin Valley, and face persistent air quality challenges.⁸⁶ The program also aims to create hundreds of construction jobs and numerous long-term operational roles, with a focus on local hiring to boost employment for priority populations. This measure can yield biochar and other soil amendments that have the potential to both store carbon and improve soil quality.

The transformative potential of this program is significant. It is expected to lead to notable advancements in sustainable forestry and biofuel technology, thereby setting a national model for combining rural economic opportunities with environmental stewardship and improvements in air quality. The program also can contribute substantially to renewable energy, potentially supplying renewable electricity to the grid and replacing fossil fuel combustion.

This measure would include several major milestones. One month after CPRG funding was awarded, a solicitation would be finalized and made available for biofuels implementation. Within two months, five existing pilot regions could be awarded funds to help with biomass aggregation, and a workshop for all other interested parties would be held, in part to help ensure direct benefits to local communities. Within five months, biofuels implementation awards could be made. Within 18 months, the final legal entities in aggregation pilot regions would be established, and within two years, the first long-term feedstock contracts would be available through aggregation pilot regions. Between two and five years after the CPRG award, facilities would be built and generating carbon-negative fuels. Tracking these milestones will help ensure measure success, as could the number of sites and facilities

⁸⁵ See disclaimer about GHG emissions reductions estimates on page 21.

⁸⁶ CARB. 2022: 2022 State Strategy for the State Implementation Plan. September 22. https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf.

funded by the measure, biofuel produced or energy sold, aggregation site purchases, bone-dry tons of biomass acquired, acres of improved forests, plans indicating agricultural areas targeted, lifecycle carbon assessments, awardee facility job counts, and others as appropriate.

The Department of Conservation derives its authority from Chapter 2 of Division 1 of the California Public Resources Code (Pub. Resources Code, §§ 600 et seq.), which provides the Department with powers and responsibilities over several natural resource areas, including forestry, agriculture, and energy, which are directly relevant to the existing Biofuels Program and this measure. Furthermore, the Department's general statutory authorization to award grants and accept federal grants for relevant purposes is outlined in Public Resources Code, section 604, and section 608, respectively. Section 608 is particularly crucial as it allows the Department to expend federal funds under conditions set by the federal government, which aligns with the objectives of the Biofuels Program. Additional specific authorizations for various grant programs related to natural resource management are found in separate statutes, such as Public Resources Code, §§ 10200 et seq. (California Farmland Conservancy Program) and §§ 4208 et seq. (Regional Forest and Fire Capacity Program).

The Department's mission to balance contemporary needs with future challenges, particularly in the realms of carbon management, sustainable economic development, watershed management, and hazards management, further reinforces its capacity to implement such a comprehensive program. SB 155, passed in 2021, is a critical legislative piece that directly supports the Biofuels Program. It includes an appropriation in the 2022-23 Fiscal Year for pilot projects in the Sierra Nevada to create carbon-negative fuels from materials resulting from forest vegetation management, explicitly stating that eligible projects should focus on California-based hydrogen or liquid fuel use (Section 50).

Energy Measure 5: Deploy Equitable Building Decarbonization

This measure would help accelerate the energy transition and further energy equity by directly upgrading low-income homes, providing them greater energy efficiency, and replacing fossil burning equipment with high-efficiency electric appliances such as heat pump water heaters, heat pump space heating and cooling, heat pump dryers, and induction cooktops. These direct installations would be done at no or low cost to residents of single family, multifamily, or mobile homes. This measure would be implemented by CEC through its existing Equitable Building Decarbonization (EBD) Direct Install Program, in consultation with CARB, and carried out by regional administrators. This measure could span the entire State or be limited to one or more of the three distinct regions it serves – Northern California, Southern California, or Central California.⁸⁷ The targeted population for

⁸⁷ CEC. 2023: Equitable Building Decarbonization Direct Install Program Guidelines. October 23. <https://www.energy.ca.gov/publications/2023/equitable-building-decarbonization-direct-install-program-guidelines> (The counties that fall into each region can be found on page 5.)

this measure could be homes within the LIDAC geographies established under the Inflation Reduction Act and discussed in Section 3.3 above.

The need for this measure is substantial. Over 75% of the homes and commercial structures in California were constructed prior to the establishment of the Building Energy Efficiency Standards in 1978. Approximately 14 million single-family homes and multifamily units exist in California, with under-resourced communities accounting for 59% of the State's population. With an initial allocation of \$922 million to the EBD program, CEC is expected to reach only a fraction of low-income homes that need upgrades and electrification. Other funding sources, including CCI and the HOMES Program created under the Inflation Reduction Act, are simply not enough to cover the need identified in this measure.

Homes retrofitted through this measure could reduce energy consumption and begin to yield GHG reductions starting in 2025. Improved energy efficiency also could mean monthly savings for low-income households and improved indoor air quality from eliminating the burning of fossil gas indoors, which has been linked with heart and respiratory disease and premature death.⁸⁸ This measure will help reduce these risks, particularly for overburdened low-income and disadvantaged communities. In addition, this measure would leverage the direct input received through CEC's EBD program design process, which was attended by hundreds of public participants in multiple stages.

Depending on the level of additional funding, this measure could yield annual emissions reductions of approximately 14,000 MTCO₂e, as well as roughly 42,000 MTCO₂e cumulatively between 2025 and 2030, and 319,000 MTCO₂e cumulatively between 2025 and 2050.⁸⁹

This measure could also be transformative. It could help advance the deployment and scale of heat pumps, create sizeable energy savings through demand response across the State, transform the market for non-combustion equipment, and help create high-quality jobs in the communities served.

The major implementation milestones of this measure could include the competitive selection of regional administrators, regional administrators' submission of proposals for how they would implement the measure, and identification and outreach to initial community focus areas to maximize benefits to communities. The dispersion of funds and the tracking of progress could follow. To ensure success, bi-annual reports could be required on all project-related activities and outcomes for completed projects, including GHG emission reductions, criteria air pollution reduction, energy savings, job creation, and other benefits created by the program. Additionally, regional program administrators could

⁸⁸ American Lung Association. 2022. Literature Review on the Impacts of Residential Combustion. July. https://www.lung.org/getmedia/2786f983-d971-43ad-962b-8370c950cbd6/ICF_Impacts-of-Residential-Combustion_FINAL_071022.pdf.

⁸⁹ See disclaimer about GHG emissions reductions estimates on page 21.

be required to collect and report specified data from program activities, analyze data on a regular basis, and present results to CEC managers on a monthly basis to provide early identification of challenges, poor performance, and necessary adjustments to the program.

Through AB 209 (Committee on Budget, Chapter 251, Statutes of 2022), CEC was directed to develop the EBD Program. This and other statutes establish the State's authority to implement this measure.

Energy Measure 6: Implement Bioenergy Projects

This measure includes emerging opportunities elevated by local jurisdictions to create renewable energy, including renewable hydrogen from various organic waste sources such as landfill methane;⁹⁰ woody biomass, yard and agricultural waste; and biosolids. This measure could apply to projects that capitalize on any one of these practices, or that are able to combine them to more cost effectively reduce emissions and achieve greater co-benefits. These actions could have a significant impact on reducing methane emissions, a powerful short-lived climate pollutant. Sustainable management of forests and prohibitions on agricultural waste burning will reduce smoke exposure from fires in rural communities and in the central valley which continue to be in nonattainment region of federal air quality standards. Many of these projects would also provide an alternative to fossil combustion energy for the transportation sector and stationary sources.

In particular, this measure could include, but would not be limited to, the following:

- Anaerobic digestors to process organic waste and collect renewable gas
- Systems to process organic waste and create renewable energy (including onsite use of the energy created)
- Equipment that processes organic waste to feedstock for the above technologies (e.g., dewatering presses)
- Equipment and processes to upgrade landfill gases for energy uses
- Upgrades to help meet SB 1383 goals for landfill operators, such as waste sorting technologies
- On-site renewables energy and storage for increased energy processing needs
- Other onsite construction as needed to combine the above operations

This measure would prioritize technologies or practices that do not expand fossil gas or hydrogen combustion.

Emissions estimates for this measure will vary for each local project. An investment that leverages CPRG funds could thus lead to substantial greenhouse gas emissions reductions.

⁹⁰This measure is meant to address methane emissions from organic decomposition in landfills, consistent with SB 1383 (Lara, Chapter 395, Statutes of 2016). California Legislative Info. 2016: SB 1383. September 19. *Bill Text - SB-1383 Short-lived climate pollutants: methane emissions: dairy and livestock: organic waste: landfills. (ca.gov)*

This measure could also help lead to a variety of benefits. Any projects that support destruction of polyfluoroalkyl substances (PFAS), a known carcinogen associated with water, wastewater, and landfills, could help lower public health risks.⁹¹ These projects could also help create jobs, and help test and scale emerging renewable energy technologies, practices, and markets. All projects could bring these benefits to low-income and disadvantaged communities, depending on their location and operational contexts. Outcomes, benefits, and public engagement efforts from each project could be tracked and documented to help ensure these benefits, share lessons learned, and scale success.

While they will vary for different local governments, major implementation milestones of this measure may include outreach to communities to ensure local benefits, site selection, permitting, contracting and coordination with relevant local agencies, selecting contractors and making subawards, and site construction and equipment installation. Similarly, metrics for tracking success will vary but may include expenditures made, number of equipment installations, jobs created, tons of organic waste utilized, amount of renewable energy generated, and more.

This measure would be led directly through local governments with authority to implement it and eligibility to pursue CPRG implementation grants.

Energy Measure 7: Enable Renewable Microgrids for Rural Communities and Tribes

This measure elevates interest from local State governments and Tribal Nation in rural parts of California to pursue renewable microgrid projects that can contribute to lower emissions and manage local energy resiliency. This measure would be led directly through local governments or Tribes with authority to implement it and eligibility to pursue CPRG implementation grants. Microgrids would need to be created in accordance with any relevant CPUC and utility directives concerning microgrids.

Emissions estimates for this measure will vary by local project but could include cost-effectiveness of roughly \$1,500 per MTCO₂e across all funding sources.⁹²

All such projects could bring jobs and other benefits – such as energy reliability and resilience, energy sovereignty, economic development, improved air quality and health, and GHG reductions – to low-income and disadvantaged communities, depending on their location and operational contexts. Implementation milestones and schedules will necessarily vary by context. Outcomes, benefits, and public engagement efforts from each project could be tracked and documented to help ensure these benefits, share lessons learned, and scale success.

⁹¹ U.S. EPA. 2021: Potential PFAS Destruction Technology: Pyrolysis and Gasification. January.

https://www.epa.gov/sites/default/files/2021-01/documents/pitt_research_brief_pyrolysis_final_jan_25_2021_508.pdf

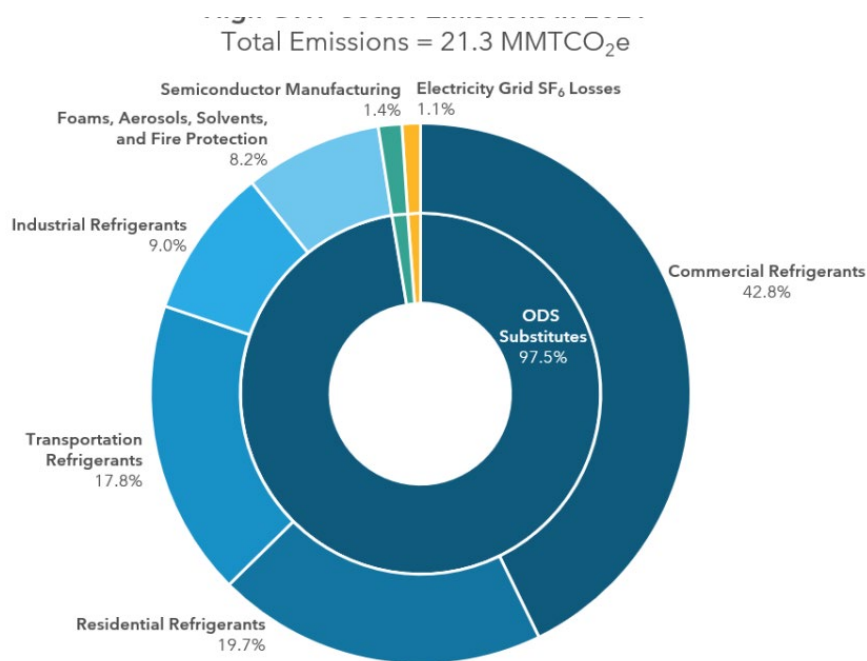
⁹² See disclaimer about GHG emissions reductions estimates on page 21.

High Global Warming Potential

The High Global Warming Potential sector includes emissions from releases of ozone depleting substance (ODS) substitutes, sulfur hexafluoride (SF₆) emissions from the electricity transmission and distribution system, and gases that are emitted in the semiconductor and other manufacturing process. ODS substitutes, which are primarily hydrofluorocarbons (HFC), are used in refrigeration and air conditioning equipment, solvent cleaning, foam production, fire retardants, and aerosols.

As of the latest California GHG Inventory, gases with high global warming potential (GWP) comprise 5.6% of California's emissions. Emissions of ODS substitutes account for 97.5% of emissions from this sector and consist primarily of HFC. In 2021, refrigeration and air conditioning equipment contributed 91.6% of ODS substitutes emissions (see Figure 8 below).

Figure 8: High-Global Warming Potential Sector Emissions in 2021



California began regulating high-GWP emissions at the start of its action on climate in the 2010s and established a program to manage and reduce emissions from refrigeration systems, a major source of high-GWP emissions in the State. This effort began with the largest systems, including all facilities with refrigeration systems containing more than 50 pounds of high-GWP refrigerant. Early actions required such facilities to conduct and report periodic leak inspections, promptly repair leaks, and keep service records on site. This brought thousands of grocery and convenience stores under regulation, many of which are in low-income and disadvantaged neighborhoods.

To support the refrigeration sector and other sectors reliant on high-GWP refrigerants, SB 1013 (Lara, Chapter 375, Statutes of 2018)⁹³ established the F-Gas Incentive Program (FRIP) to promote the voluntary adoption of climate-friendly low-GWP refrigerant technologies and alleviate barriers that prevent the adoption of these technologies. The current proposed action in this sector will, in part, help to address those barriers – especially in low-income and disadvantaged neighborhoods – with funding to assist facilities to transition to less climate polluting refrigeration alternatives while also generating local jobs. This proposed measure also complements the federal High GWP Gases Voluntary Programs (or Fluorinated Gas Partnership Programs).⁹⁴

High Global Warming Potential Measure 1: Expand F-gas Reduction Incentive Program

This measure would expand CARB’s existing FRIP and propel its success in reducing HFC and hydrochlorofluorocarbons (HCFCs), or F-gases, which have outsized near-term climate impacts and global warming potential thousands of times that of CO₂. HFC are also the fastest growing source of GHG emissions in California, the U.S., and the world.⁹⁵ This measure focuses on reducing such emissions from industrial and commercial refrigeration and would continue to be led by CARB with industry partners as appropriate.

Despite the urgency to reduce F-gases from industrial and commercial refrigeration and the effectiveness of this climate action, funding for upgrades from high-GWP refrigerants (GWP 2000 – 4000) to low-GWP (GWP less than 10) is limited. While California regulations prohibit HFC in new technology, without additional funding, thousands of existing units are likely to undergo needed upgrades to mid-range GWP systems (GWP~1400) due to the higher cost of low or ultra-low GWP alternatives and the refrigeration system conversions they require, which could include upgrades to display cases, piping, compressors, and/or condensers.⁹⁶ Upgrades to mid-GWP refrigerants lock in higher emissions for 20 to 30 years. This measure would prioritize stores in disadvantaged communities and food deserts, and additional consideration would be given to small businesses.

CARB expects this measure to yield substantial GHG reductions. As an example, the FRIP 2019 allocation of \$1 million reduced emissions by ~38,000 MTCO₂e with a cost-effectiveness of roughly \$27/MTCO₂e across 15 supermarket projects.⁹⁷

⁹³ California Legislative Info. 2018: SB1013 Fluorinated refrigerants. September 13.

https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1013

⁹⁴ U.S. EPA. 2017: Voluntary Energy and Climate Programs. January 17. https://19january2017snapshot.epa.gov/climatechange/voluntary-energy-and-climate-programs_.html and https://19january2017snapshot.epa.gov/f-gas-partnership-programs_.html

⁹⁵ CARB. 2017: Short-Lived Climate Pollutant Reduction Strategy. March. https://www2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf

⁹⁶ Viable high-GWP alternatives exist and include carbon dioxide (GWP = 1), Ammonia (GWP = 0), and hydrocarbons (GWP < 5).

⁹⁷ See disclaimer about GHG emissions reductions estimates on page 21.

Funding to spur greater adoption of low-GWP refrigerants and associated equipment will help scale these markets and bring down costs over time, which could be transformative for this sector beyond California. Installation of newer systems will lower such businesses operating costs under a national HFC phasedown and could lower electricity-related criteria pollution from increased energy efficiency. This measure would follow FRIP's requirement to conduct outreach to small and independent businesses in low-income and disadvantaged communities.⁹⁸ This measure also would leverage FRIP's mandate to help build a workforce skilled in low-GWP technologies by continuing to require applicants to provide hands-on and virtual trainings by industry, engineering design firms, and public utilities, among others, to contractors and technicians.

Within the first six months following a CPRG award, the implementation milestones of this measure could include completing outreach to identify participating facilities and to engage local communities to help ensure direct community benefits from CPRG investments. Within the first year, a timetable of GHG reduction goals could be made, implementation partners selected, and awards determined through existing FRIP administration. Throughout this measure, success would be ensured through requiring that implementation partners and awardees submit to CARB periodic project progress reports. Funds would be awarded upon the installation of the low-GWP refrigeration system, except in unique circumstances, and a portion retained until CARB is able to measure and verify installation success. CARB could also track funds encumbered and liquidated on a regular basis.

California's authority to implement this measure is created by, among other bills and directives, SB 1383 (Chapter 395, Statutes of 2016), which mandated the reduction of HFC or fluorinated gases by 40% below 2013 levels by 2030, and by SB 1013 (Chapter 375, Statutes of 2018), which created FRIP.

Agriculture

California is responsible for more than half of all U.S. domestic fruit and vegetable production and nearly three-quarters of U.S. fruits and nuts. The State's croplands are some of the most productive in the world, with a farmgate value of over \$55 billion, making California a global leader in agriculture. These lands are becoming increasingly vulnerable to the impacts of climate change. Between 2020-2022, an estimated 750,000 acres of farmland were fallowed due to drought causing more than \$1.2 billion in direct impacts. Impacts to food processing and related industries amounted to an additional \$845 million in losses and over 19,420 jobs were lost.⁹⁹ California is taking aggressive measures to ensure the agriculture sector is more resilient to the effects of climate change. Climate smart

⁹⁸ California Air Resources Board. 2023: F-Gas reduction incentive program (FRIP): third-party administrator solicitation. June 26. https://ww2.arb.ca.gov/sites/default/files/2023-06/FRIP_2023_3PA_Solicitation.pdf.

⁹⁹ UC Merced. 2022: Continued drought conditions add billions in California agriculture losses, UC Merced Report Finds. November 22. <https://news.ucmerced.edu/news/2022/continued-drought-conditions-add-billions-california-agriculture-losses%C2%A0uc-merced-report>

agricultural practices have the potential to transform this sector to increase soil carbon storage, reduce GHG emissions, and reduce pesticide exposure and health impacts. They also support California's pathway to carbon neutrality while simultaneously improving the lives of those who live and work in the agricultural community.

The State has established several ambitious targets to help guide its efforts. Some key targets include accelerating the adoption of healthy soils practices to 80,000 acres annually by 2025, conserving at least 8,000 acres of crops annually through conservation easements or fee acquisitions, and increasing organic agriculture to 20% of all cultivated acres by 2045. The State has also established a target to electrify 25% of agricultural energy demand by 2030 and 75% by 2045. Not only will these goals help address climate change, but they will also bring air quality improvements to polluted areas including the San Joaquin Valley – home to many low income and disadvantaged communities.

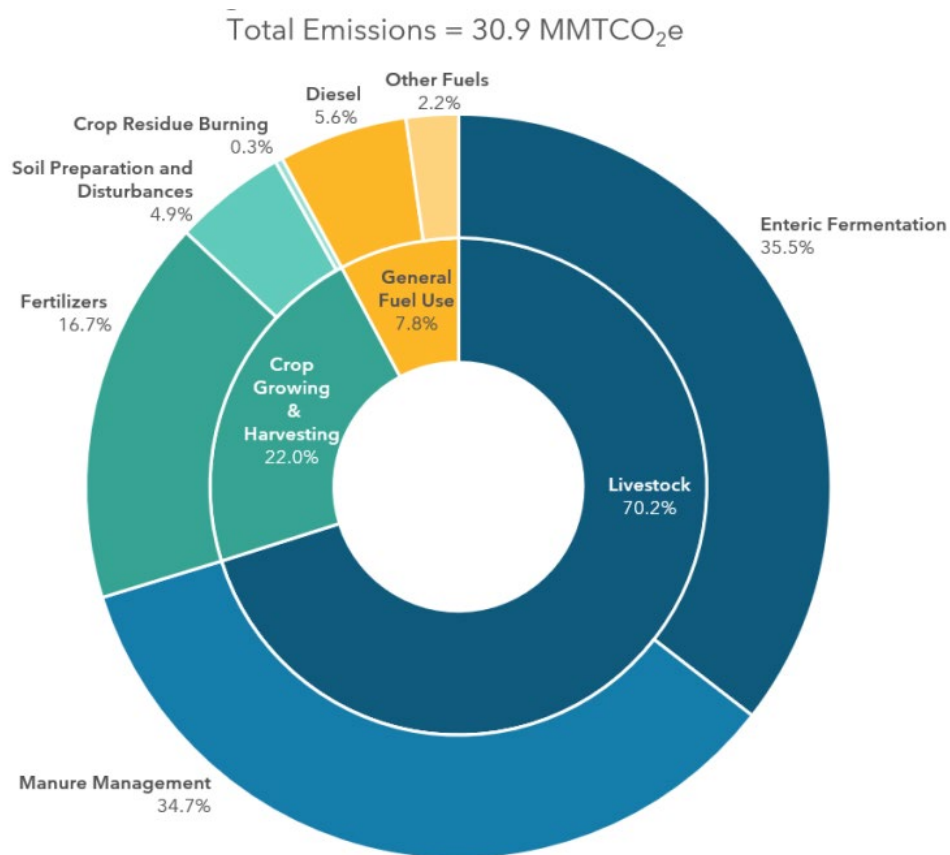
To support these targets, California has made significant investments in climate smart agriculture. The 2022-23 budget includes \$160 million to support agricultural water conservation practices, provide on-farm technical assistance, and provide direct drought relief to small farm operators.¹⁰⁰ These investments also support other strategies identified in the 2022 Scoping Plan Update, including accelerating deployment of healthy soils practices, organic farming, sustainable pest management practices, and more.

Although the State has made large investments in this space, there is still significant work to be done to increase practice adoption across California's 43 million acres of agricultural land and to reduce agriculture GHGs, as broken out in Figure 9 below. Since its establishment in 2014, CDFA's Healthy Soils Program has been able to incentivize 130,000 acres of healthy soils practices.¹⁰¹ CPRG funding would play a vital role in supporting the sustained funding of the proposed programs, specifically the Healthy Soils Program and the Dairy Digester Research and Development program. The State chose to include these programs in its PCAP because they have already proven successful, and they would result in near-term GHG emissions reductions and benefit from additional funding. Furthermore, they prioritize rural, low-income, and disadvantaged communities. Details on these programs are discussed below.

¹⁰⁰ California 2022-2023 State Budget. Climate Change Section. <https://ebudget.ca.gov/2022-23/pdf/Enacted/BudgetSummary/ClimateChange.pdf>

¹⁰¹ California Department of Food and Agriculture. 2023: CDFA Healthy Soils Program. September. https://www.cdfa.ca.gov/oefi/healthysoils/docs/HSP_Flyer-English.pdf

Figure 9: Agriculture Sector Emissions in 2021



Agricultural Measure 1: Expand California's Healthy Soils Practices

This measure would expand support for various conservation practices such as compost application, nutrient management, conservation tillage, and cover cropping across California's diverse agricultural landscape, including through outreach and technical assistance to the farmers who need it most. These practices are designed not only to enhance the carbon storage capability of the soil but also to improve agricultural productivity, soil water holding capacity, and environmental health factors such as air quality. CDFA, in close coordination with farmers, ranchers, and agricultural entities across California with a focus on Socially Disadvantaged Farmers and Ranchers (SDFRs), could lead this measure under its Healthy Soils Program. Alternatively, local governments with the appropriate authority and eligibility to pursue CPRG funding could implement this measure.

Following the example of CDFA's Healthy Soils Program, this measure could be designed to be inclusive with a strong emphasis on aiding SDFRs and low-income communities. For example, as of May 31, 2023, 40% of the funds implemented through CDFA's program have benefited priority populations. By enhancing soil health, this measure would also indirectly

contribute to food security, local job creation, and overall rural economic resilience, benefiting these communities significantly. In addition, improved soil health leads to better crop yields, reduced need for synthetic fertilizers and pesticides, and enhanced biodiversity. In the 2022 Healthy Soils Program funding round, projects resulted in 1.2 million pounds of NO_x reduction.

Depending on total additional funding provided, this measure could deliver approximately 54,000 MTCO₂e, as well as roughly 216,000 MTCO₂e cumulatively between 2025 and 2040, and 1.3 million MTCO₂e between 2025 and 2050.¹⁰²

The implementation schedule and milestones for this measure will depend on whether it is acted upon by the State or local governments. Early milestones could include the completion of outreach to farmers and communities, public workshops, and prioritization of funded activities. Additional milestones may include solicitations, awards, and the identification and deployment of technical assistance providers. Ensuring success of this measure could include tracking metrics such as the types of healthy soils practices deployed by location and acreage, as well as funding encumbered and spent for each action, jobs created, hours of technical assistance provided, and others as appropriate.

Legislative support for the Healthy Soils Program is anchored in SB 859 (Chapter 368, Statutes of 2016),¹⁰³ which established the program under CDFA's jurisdiction. The Environmental Farming Act Science Advisory Panel, as designated by this legislation, provides guidance. This legal framework empowers CDFA to effectively manage and expand the program, integrating soil health into the broader context of California's climate action and agricultural policy. Many local governments have their own authority to implement this measure as well.

Agriculture Measure 2: Reduce Methane Emissions through Dairy Digesters

This measure aims to increase small farm dairy digesters and fund research and demonstration projects for hydrogen production from dairy digesters. It could be implemented by local governments or by the State through the expansion of its existing Dairy Digester Research and Development Program (DDRDP) carried out by CDFA. It would leverage DDRDP's demonstrated success in helping small farms afford and install livestock manure anaerobic digesters and would further help implement linear generators and fuel cell technology for converting dairy biogas into renewable electricity and hydrogen. Such investments are critical to meeting State and federal clean energy and climate goals.

This measure could multiply DDRDP's significant methane emissions reductions and draw down emissions cost-effectively. Depending on the level of additional investment, this

¹⁰² See disclaimer about GHG emissions reductions estimates on page 21.

¹⁰³ SB 859. Public resources: greenhouse gas emissions and biomass.

https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB859

measure could yield annual emissions reductions of approximately 452,000 MTCO₂e, as well as roughly 1.8 million MTCO₂e in cumulative reductions between 2025 and 2030, and 10.8 million MTCO₂e of cumulative reductions between 2024 and 2050.¹⁰⁴

Most DDRDP projects are in California's San Joaquin Valley, home to many low-income and disadvantaged communities. In these areas, this measure would promote rural economic growth, create local jobs, improve local environmental conditions, and support California's interagency efforts to grow its emerging hydrogen market.

The schedule and milestones for this measure will depend on whether it is implemented by the State or local agencies. Early milestones could include the completion of outreach to small dairy farmers, communities, and technology providers, as well as public workshops to ensure direct community benefits. Additional milestones may include award selection and distribution, followed by digester installation. Ensuring the success of this measure could include tracking the number of digesters installed by timeframe and farm size, expenditures made, and estimated GHG reductions, among others.

Operated under SB 1383's authority, DDRDP sets targets for methane emission reduction. The CDFA's Office of Environmental Farming and Innovation, experienced in administering similar programs, could manage the DDRDP expansion. Many local authorities could demonstrate their own authority to implement this measure as well.

Natural and Working Lands

As climate change increases the likelihood of extreme wildfires, drought, heat, and other impacts, carbon stocks in California's Natural and Working Lands (NWL) will face increased risks and impacts. NWL cover approximately 90% of the State's 105 million acres and include California Native American Tribes' ancestral and cultural lands, parks and green spaces in cities and communities, and the waters and iconic landscapes the nation knows and loves. The diverse landscapes and biodiversity found throughout the State's NWL provide a multitude of benefits to the people of California, including clean water, clean air, biodiversity, food, economic prosperity, recreational opportunities, continuation of traditional Tribal ways of life, mental health benefits, and many others.

California's approach to climate action in the NWL sector is not solely focused on maximizing carbon stocks. The State prefers to support carbon management that holistically fosters ecosystem health, resilience, provision of overall climate function, public health, and reduction of short-lived climate pollutants, providing an array of related benefits. CPRG would uniquely support the State's climate strategy in the NWL sector by allowing it to accelerate and expand successful, existing programs that would benefit from additional funding and can be quickly implemented. By helping to scale nature-based climate

¹⁰⁴ See disclaimer about GHG emissions reductions estimates on page 21.

solutions across the State, California can further prioritize equity by helping residents and communities hit worst by climate change impacts.

Governor Newsom's Executive Order N-82-20 established a target to conserve 30% of California's lands and coastal water by 2030, also known as 30x30. This target directly supports President Biden's Executive Order committing the United States to 30x30 through its America the Beautiful initiative.¹⁰⁵ There are a number of other key targets,¹⁰⁶ legislation,¹⁰⁷ and plans¹⁰⁸ that guide and uplift California's NWL strategies.

The 2022 Scoping Plan models that the emissions from the NWL sector will decrease by 2 million MTCO₂e annually compared to the business-as-usual scenario. By continuing to invest in the health of the land, NWL will, in due course, be able to function as a carbon sink instead of a carbon source.

The programs included in the PCAP were selected because they are all shovel-ready projects that can be implemented in a five-year time frame and will significantly reduce emissions by 2030. They also prioritize equity, community voice, job benefits, and complement other federal funding. Taking these criteria into consideration, the State are proposing the measures below.

Natural and Working Lands Measure 1: Bolster California's Forest Health Program

This measure would bolster the Forest Health Program, an initiative of the California Department of Forestry and Fire Protection (CALFIRE). The measure would expand funding for a critical range of activities, including fuel reduction, controlled burns, pest management, reforestation projects, and biomass utilization. Its primary aim would be to continue to enhance forest resilience against wildfires, pests, and diseases, while promoting

¹⁰⁵ The White House. 2021: Executive order on tackling the climate crisis at home and abroad. January 17.

<https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>

¹⁰⁶ Target: Treat 2.3 million acres statewide annually in forests, shrublands/chaparral, and grasslands through strategies like prescribed fire, thinning, and harvesting.

Target: Implement climate smart practices for annual and perennial crops on ~80,000 acres annually.

For full list of NWL targets see California Air Resources Board. 2022: The 2022 Scoping Plan for Achieving Carbon Neutrality.

December. <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>.

¹⁰⁷ Senate Bill 27 requires CNRA to create a Carbon Sequestration and Climate Resiliency Project Registry to facilitate funding of nature-based and direct air capture projects. California Legislative Information. 2021: SB 27. September 23.

https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=20210220SB27

Assembly Bill 1757 requires CARB and CNRA to establish targets for carbon sequestration and nature-based climate solutions.

California Legislative Info. 2016: AB 1757. September 16.

https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=20210220AB1757.

Senate Bill 1386 declares NWL are an important strategy in meeting GHG reduction goals. California Legislative Info. 2016: SB 1386.

September 23. https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1386

¹⁰⁸ Resources Agency. 2022: Natural and working lands climate smart strategy. April. https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Expanding-Nature-Based-Solutions/CNRA-Report-2022---Final_Accessible.pdf.

Ca.gov. 2022: The California Climate Adaptation Strategy. <https://climatesilience.ca.gov/>

California Air Resources Board. 2022: The 2022 Scoping Plan for Achieving Carbon Neutrality. December. <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

carbon sequestration in forest ecosystems. CALFIRE, being the lead State agency for the Forest Health Program, would continue to administer this measure alongside the involvement of local, State, and federal agencies, universities, special districts, Native American Tribes, private landowners, and non-profits like fire safe councils and land trusts.

This measure would leverage the Forest Health Program's past success. For example, from 2017 to 2023, the program funded 108 projects expected to result in a reduction of 16.2 million MTCO₂e over their 60-year lifetimes. The program's efficiency is further highlighted by its cost-effectiveness, with an average cost of \$24 per MTCO₂e reduced. Despite the success of this program, funding is still desperately needed to shore up forest health, prevent further wildfire and emissions from forests, and help these ecosystems and communities store carbon into the future. CPRG funding could have a similar GHG impact and help achieve these critical outcomes.¹⁰⁹

This measure would deliver substantial benefits to low-income and disadvantaged communities, aligning with Justice40 and ensuring that at least 40% of CPRG funding would benefit such populations. This strategic focus addresses the heightened risks these communities face due to climate change and their limited resources to adapt or recover from such impacts. The measure would help protect public health by reducing wildfire smoke, a significant source of air pollution. The program also supports rural economies through the development of sustainable wood product markets and improves biodiversity and water quality. Its multifaceted approach provides a model for comprehensive nature-based climate solutions.

The schedule and milestones for this measure could include early needs assessment for additional forest health investment, outreach and public workshops to help ensure local communities receive direct benefits from CPRG investment, and the prioritization of viable projects. Subsequent milestones may include site and activity selection, award distribution, and project implementation. Ensuring the success of this measure could include tracking the number of forested acres treated, waste biomass removed, trees treated for pests, funds distributed, and estimated GHG reductions, among others as appropriate.

The authority for the Forest Health Program is firmly established under California Public Resources Code §4799.05. The program aligns with California's broader climate and environmental strategies, including the Wildfire and Forest Resilience Action Plan and the Natural and Working Lands Climate Smart Strategy. The continued commitment to this program is also supported by legislative actions, such as SB 901 passed in 2018, ensuring its alignment with state-wide climate goals and policy directives.

¹⁰⁹ See disclaimer about GHG emissions reductions estimates on page 21.

Natural and Working Lands Measure 2: Expand Urban and Community Forest Projects

This measure would expand urban canopy while delivering energy conservation and storm-water runoff reduction; improving air, soil, and water quality; and enhancing public health and property values. This measure would expand and improve management of urban and community forests through planting and maintaining trees, developing green spaces, and implementing sustainable urban forestry practices. Utilizing its track record under its Urban and Community Forest Program, CALFIRE could be the lead agency for this measure, continuing to collaborate with cities, counties, air districts, and non-profit organizations to execute projects. Alternatively, local governments with the appropriate authority, and with eligibility to pursue CPRG funding, could implement this measure.

This measure could contribute substantial GHG reductions and other benefits, as evidenced by CALFIRE's Urban and Community Forest Program. As of May 31, 2023, the program, through its 115 projects, resulted in an estimated 0.48 million MTCO₂e of GHG reductions. Depending on the amount, additional funding could yield similar results, or annual emissions reductions of approximately 17,000 million MTCO₂e, and cumulative reductions of 69,000 million MTCO₂e between 2025 and 2030, and 412,000 million MTCO₂e cumulatively between 2025 and 2050.¹¹⁰

This measure would be structured to prioritize disadvantaged communities. Along with climate and air quality considerations, planting and supporting trees and tree shade in these communities also provides definitive improvements in quality of life. For example, in its 2021/2022 solicitation, 96% of the funds implemented under CALFIRE's Urban and Community Forest Program benefited low-income and disadvantaged communities, well aligned with Justice40 goals, and meaningfully addressing the disproportionate impact of climate change and urban heat islands on these communities.

This measure would continue to help mitigate urban heat, enhance groundwater infiltration, and improve overall urban air and water quality. It would also provide health benefits by reducing stress levels and encouraging physical activity, as well as boost local economies by creating urban forestry jobs, reducing energy costs through strategic shading, and protecting properties from flood damage.

The schedule and milestones for this measure could include early needs assessment for community and urban forest investment, outreach and public workshops to foster direct community benefits, and the prioritization of projects. Subsequent milestones may include site selection, award distribution, and project implementation. Ensuring the success of this

¹¹⁰ See disclaimer about GHG emissions reductions estimates on page 21.

measure could include tracking the number of trees planted, location of communities served and their LIDAC status, funds distributed, and estimated GHG reductions.

The Urban and Community Forest Program operates under the authority of the California Urban Forestry Act of 1978 (Public Resources Code 4799.06-4799.12). This legal framework, alongside State directives, aligns this measure with California's broader goals for urban environmental improvement and community resilience. Many local governments could similarly demonstrate their autonomy to implement this measure.

Natural and Working Lands Measure 3: Expand the State's Wetland Restoration Program

This measure would further the achievement of the existing Wetland Restoration Program, a joint initiative of the Sacramento-San Joaquin Delta Conservancy (Delta Conservancy) and the California Department of Fish and Wildlife (CDFW). This measure could support a variety of wetland restoration projects, including re-wetting peat soils to reduce carbon emissions, restoring mountain meadows for carbon sequestration, and enhancing wetland biodiversity. This measure would focus on the Delta region, which includes over 150,000 acres of highly organic peat soils that are significantly subsided to depths of 20 to 30 feet below sea level, resulting in over 1.5 million tons of carbon dioxide emissions annually. Re-wetting the peat soil stops subsidence and resulting GHGs. The Delta Conservancy and CDFW would oversee the measure, with implementation by non-profits, public agencies, and Tribal Nations, with an emphasis on projects that benefit disadvantaged communities and further environmental justice.

This measure could leverage proven program success. For example, operating since 2010, the Delta Conservancy has made over \$130 million available for more than 145 locally supported ecosystem restoration, climate resilience, drought response and economic development projects, all while reducing GHGs. The re-wetting of peat soils in the Delta region alone could deliver substantial greenhouse gas benefits, at a cost of roughly \$86 per MTCO₂e. Despite this strong track record, and support from State funding sources, the benefits of this measure are limited without additional funding from flexible sources such as CPRG. Depending on the level of additional investment, this measure could deliver additional annual emissions reductions of approximately 58,000 MTCO₂e as well as roughly 232,000 MTCO₂e cumulatively between 2025 and 2030, and 1.4 million MTCO₂e cumulatively between 2025 and 2050.¹¹¹

Consistent with existing practices, this measure would set aside funding for projects that benefit low-income and disadvantaged communities, particularly those facing floods and other disproportionate climate change-related risks. This measure would also meaningfully

¹¹¹ See disclaimer about GHG emissions reductions estimates on page 21.

engage those who have been historically underrepresented, as well as those that have a cultural interest in the project site, such as Tribes with ties to ancestral lands.

Restored wetlands also provide crucial habitats for wildlife, support local economies through sustainable recreation and tourism, and act as natural buffers against sea-level rise and flooding from extreme weather events. These ecosystems also play a key role in water purification and supply, contributing to the overall health and resilience of California's natural landscapes.

The schedule and milestones for this measure could include needs assessment for specific investments, outreach and public workshops to catalyze direct community benefits, the creation of a detailed project schedule, the designation of the implementation team, and ultimately implementation. Ensuring the success of this measure could include tracking the number of acres treated, funds distributed, and estimated GHG reductions.

The Wetland Restoration Program is underpinned by the Delta Reform Act of 2009 and subsequent legislation, which mandates the restoration and conservation of wetland ecosystems. The collaborative efforts of the Delta Conservancy and CDFW, guided by these legal frameworks, ensure the effective implementation of the program and this measure, and align with the State's broader environmental and climate resilience strategies.

Waste

Municipal solid waste landfills are the second largest source of methane emissions in California. Because about a third of California's waste stream is made up of organic waste, it is critical that the State focuses on both diverting organic waste and improving landfill operations to tackle waste sector emissions from multiple angles. Due to the multidecadal time frame required to break down landfilled organic material, the emissions reductions from diverting organic material in one year are realized over the course of several decades. Combined with the fact that methane is a powerful GHG and short-lived climate pollutant, near-term action is crucial to avoid locking in future landfill methane emissions. CPRG would allow California to expand and accelerate near-term efforts that will significantly reduce emissions for decades to come while also providing immediate benefits to climate change and public health.

Although approximately 95% of all waste disposed in the State has been deposited in a landfill that is equipped with a gas collection and control system, as required by California's Landfill Methane Regulation,¹¹² a portion of the methane still escapes into the atmosphere. Technologies to utilize landfill gas efficiently can contribute further emission reductions in the energy sector.

¹¹² CARB. Landfill Methane Regulation. <https://ww2.arb.ca.gov/our-work/programs/landfill-methane-regulation>.

To address organic waste diversion, the SLCP Reduction Strategy¹¹³ outlines how California will achieve its SB 1383 goals to reduce organic waste disposal 75% from 2014 levels by 2025 and recover at least 20% of edible food for human consumption.¹¹⁴ Strategies such as expanding markets for products made from organic waste, recovering edible food to combat food insecurity, investing in organics recycling infrastructure, and more, will be used. Additional legislation and targets¹¹⁵ passed over the last few years have reinforced California's commitment to protecting the climate by making critical advances in the waste sector.

CPRG funding would have a substantial positive impact by allowing California to scale up successful programs such as the State's Organics Recycling Infrastructure Grants program and Food Waste Prevention and Edible Food Recovery program. These programs were included in this PCAP because they have immediate GHG reduction potential, provide jobs, protect the environment, help address food insecurity issues, and put organic waste back to work growing food and building healthy soil. Furthermore, these programs directly align with the federal strategies discussed in EPA's Strategies for Methane Mitigation,¹¹⁶ as well as EPA's Draft National Strategy for Reducing Food Loss and Waste and Recycling Organics.¹¹⁷ Additional detail on these programs is discussed below.

¹¹³ California Air Resources Board. 2017: Final short lived climate pollutant reduction strategy. March. <https://ww2.arb.ca.gov/resources/documents/slcp-strategy-final>.

¹¹⁴ California Legislative Information. 2016: SB 1383. September 19. https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1383.

¹¹⁵ California Legislative Information. 2018: SB 1440. Implement biomethane procurement targets for investor-owned utilities to reduce GHG emissions in remaining pipeline gas and reduce methane emissions from organic waste. September 24: https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB1440.

2014: AB 1826. Requires businesses to recycle their organic waste, depending on the amount of waste they generate per week. September 28. http://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1826&search_keywords=.

2014: AB 1594. Eliminates incentives to use green materials as alternative daily cover by ensuring it counts as disposal. September 28. http://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1594&search_keywords=.

(The CPUC approved a decision in February 2022 implementing the biomethane procurement program, which will require investor-owned utilities by 2025 to procure 17.6 billion cubic feet (BCF) of biomethane produced from organic wastes to support the landfill disposal reduction and SLCP target and reduce fossil gas reliance for residential and commercial customers. Additionally, the organic waste stream includes more than one million tons of edible food that could be recovered before it enters the waste stream through food rescue programs that combat hunger in communities throughout California.)

California Public Utilities Commission. 2022: CPUC sets biomethane targets for utilities. February 24. <https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-sets-biomethane-targets-for-utilities#:~:text=The%20short%2Dterm%202025%20biomethane,waste%20diverted%20annually%20from%20landfills>.

¹¹⁶ United States Environmental Protection Agency. 2022. Downstream management of organic waste in the United States: strategies for methane mitigation. January: https://www.epa.gov/system/files/documents/2022-01/organic_waste_management_january2022.pdf

¹¹⁷ United States Environmental Protection Agency. 2023. Draft national strategy for reducing food loss and waste and recycling organics. December 2: <https://www.epa.gov/circulareconomy/draft-national-strategy-reducing-food-loss-and-waste-and-recycling-organics#feedback>

Waste Measure 1: Food Waste Prevention and Edible Food Recovery Program

This measure would leverage CalRecycle's existing grant programs,¹¹⁸ and build a new program to holistically prevent food waste, reduce food waste in landfills, and recover edible food for human consumption. CalRecycle could administer this measure statewide, in collaboration with local governments and in partnership with hunger relief organizations. This measure could also be implemented directly by local governments with the appropriate authority and with eligibility to apply for CPRG funds.

The measure would operate in two primary areas. First, funds would support activities including food waste tracking software, preservation equipment, and training, to reduce food loss throughout supply chains.¹¹⁹ Second, this measure would aim to recover at least 20% of currently disposed edible food by 2025, using additional staffing for volunteer coordination and donor recruitment, transportation, refrigeration and food storage, and distribution systems to recover excess edible food. This measure aligns with California's Short Lived Climate Pollutant law (SB1383) and emphasizes reducing the environmental impact of food waste while addressing food insecurity, and alleviating burdens to organics processing facilities to manage additional food waste.

According to CalRecycle's 2021 Waste Characterization Study,¹²⁰ 4.3 million tons of food is landfilled annually in California, including 1.5 million tons of potentially donatable food. The more than 290 million pounds of edible food that has been recovered for human consumption as a result of CalRecycle funding is equivalent to a reduction of 0.27 million MTCO₂e. Additional funding sources, including those from CPRG, could similarly lead to cost-effective emissions reductions of approximately \$40 per MTCO₂e. If implemented statewide and depending on additional funding received, this measure could yield annual emissions reductions of approximately 25,000 MTCO₂e, as well as roughly 101,000 MTCO₂e cumulatively between 2025 and 2030, and 604,000 MTCO₂e cumulatively between 2025 and 2050.¹²¹

This measure would directly benefit low-income and disadvantaged communities by providing nutritious food at little to no cost to food insecure populations. More extensive food recovery networks would help ensure that food recovery resources are available to communities in need while also keeping excess edible food where it is generated, rather

¹¹⁸ CalRecycle. 2020. The Food Waste Prevention and Rescue Grant Program. <https://calrecycle.ca.gov/climate/grantsloans/foodwaste/fy201920/>. And the Edible Food Recovery Grant Program. <https://calrecycle.ca.gov/climate/grantsloans/foodwaste/fy202123/>.

¹¹⁹ Notable initiatives like the Pacific Coast Food Waste Commitment, which features some of the nation's largest food businesses working collaboratively with local, state, and provincial governments to implement industry-wide actions that prevent wasted food along the West Coast, highlight powerful public-private partnerships targeting food waste reduction.

¹²⁰ Calrecycle. 2021: Disposal Facility-Based Waste Characterization Study. <https://calrecycle.ca.gov/wcs/dbstudy/>.

¹²¹ See disclaimer about GHG emissions reductions estimates on page 21.

than being removed from local communities due to lack of food recovery or distribution infrastructure.

Milestones for the implementation of this measure would vary by location but could include notices of upcoming awards and public workshops, solicitation for applications, application review, finalizing projects and implementation partners, and sub-awarding CPRG funds. The success of this measure could be ensured through the tracking of pounds, tons, and meal equivalents of food waste prevented, or food recovered for human consumption, funding levels invested, and estimated GHGs reduced.

The authority to implement this program is established under California's SB1383 and other related statutes, which mandate the reduction of organic waste and support the recovery of edible food. CalRecycle, with its history of managing similar programs and expertise, is well-equipped to implement these actions, and local governments are also experienced deploying funds for these purposes.

Waste Measure 2: Bolster Organics Recycling Infrastructure

This measure would enhance organics recycling infrastructure to divert more green materials, food materials, or alternative daily cover from landfills, thereby reducing methane emissions and improving air and water quality. This measure would support composting, co-digestion, and anaerobic digestion projects, along with emerging, non-combustion biomass conversion technologies. This measure could be administered by CalRecycle or by local governments also eligible to apply for CPRG funds.

According to the SB 1383 Infrastructure and Market Analysis study, full implementation of SB 1383 and the Short-Lived Climate Pollutant Reduction Strategy requires diverting an additional 12 to 14 million tons of organic waste from landfills to avoid methane emissions. CalRecycle's analysis in 2020 anticipates an organic recycling capacity shortfall of about eight million tons by 2025, highlighting the urgency of investing in organics recycling infrastructure. Despite significant contributions from the State, this funding has been insufficient to meet the rising demand. For example, in the 2023 grant cycle, although CalRecycle awarded over \$130 million to 23 projects, 10 eligible projects were waitlisted due to lack of funds. CPRG funding could bring these projects to fruition and attract substantial matching private investments in the process.

The GHG impacts of this measure depend on total funding received. For example, the 2023 cycle of CalRecycle's Organics Grant Program is expected to divert 7.7 million tons of green and food material from landfills, which has the capacity to cut 2 million MTCO₂e in emissions over the next decade. New funding sources, including those from CPRG, could similarly lead to emissions reductions with a cost-effectiveness of approximately \$250 per MTCO₂e. If implemented statewide and depending on total funding received, this measure could yield annual emissions reductions of approximately 20,000 MTCO₂e, as well as roughly 80,000

MTCO₂e cumulatively between 2025 and 2030, and 479,000 MTCO₂e cumulatively between 2025 and 2050.¹²²

This measure could benefit low-income and disadvantaged communities by creating local jobs and targeting hiring in these communities. Projects will also offer organic material diversion for communities, compost availability, and reductions in odor and air pollutants. In addition, this measure could provide renewable energy and fuel from organic waste, reducing dependence on fossil fuels. The use of produced compost could also support carbon sequestration across the State.

While the implementation of this measure may vary by location, early milestones could include outreach and public workshops, finalization of project details and implementation partners, and ultimate installation of equipment and infrastructure. The success of this measure could be tracked through metrics such as the tons of organic waste diverted from landfills, counts of infrastructure equipment installed by location, funding levels invested, and estimated GHGs reduced or avoided.

The authority for this measure stems from SB 1383 and AB 1826, which provides for organic waste collection services in California and sets a goal of 75% organic waste diversion from landfills. CalRecycle's expertise and track record in managing similar programs since 2001 demonstrate its capability to successfully implement these actions. Public Resource Code 42999 authorizes CalRecycle to administer a grant program to provide financial assistance to promote in-state development of infrastructure to reduce organic waste or process organic and other recyclable materials into new, value-added products.

4. Conclusion and Next Steps

The State's Priority Climate Action Plan outlines urgently needed climate investments across the economy to benefit our most vulnerable communities. By pinpointing near term climate implementation priorities and giving them the option to compete for federal implementation funding, this plan puts the State on stronger footing to achieve its science-based carbon neutrality target and will help the U.S. meet its commitments under the Paris Agreement. It will also help meet the nation's Justice40 initiative goals by providing a broad range of benefits to California's low-income and disadvantaged communities that have historically had to shoulder the negative impacts of fossil fuel powered transportation and industry. Importantly, California's statutory, regulatory, and policy framework supports a broad authority to take decisive and quick action to utilize any federal funding received by the State.

California's next deliverable under the CPRG Program, the Comprehensive Climate Action Plan, will build off the processes and ideas that underpin the PCAP, expanding on its

¹²² See disclaimer about GHG emissions reductions estimates on page 21.

stakeholder engagement and the scope of climate actions included. This holistic approach will be the State's next step under CPRG to help address the global climate crisis.

Appendix A: Low-Income and Disadvantaged Community Analysis

Overview

As mentioned previously, low income and disadvantaged communities are more likely to live in and be exposed to toxics and air pollution, often as a result of discriminatory practices such as redlining that have disproportionately exposed these communities to health hazards and pollution burdens that affect lives.¹²³ Low income and disadvantaged communities are often more vulnerable to the effects of climate change and the least prepared to adapt to it. To assess how the 22 measures outlined in this PCAP would affect low income and disadvantaged communities, CARB identified several spatial variables to overlay with U.S. EPA's defined low income and disadvantaged communities. As seen in the list below, these fall into three broad categories. First, some spatial variables represent emissions sources or areas of poor ambient air quality where the measures in this PCAP could lead to cleaner air for low income and disadvantaged communities. Second, CARB included land type variables to show where this PCAP would improve landscapes or decrease natural hazard risks. Finally, CARB used the Climate Vulnerability Metric¹²⁴ to show where strong climate action could lessen expected economic losses associated with climate change. Developed under the 2022 Scoping Plan Update, the CVM includes the projected impacts of climate change on human welfare across four impact categories through midcentury (2050) under a moderate emissions scenario, including human mortality, hours worked in high-risk sectors (e.g., with high heat exposure), household energy costs, and flood-related property damage.

Spatial variables to show areas of air quality improvement

1. Non-attainment areas for U.S. EPA's 2015 ozone standard¹²⁵
2. Non-attainment areas for U.S. EPA's 2015 PM_{2.5} standard¹²⁶
3. California ports and a half-mile buffer around each¹²⁷
4. The Federal Highway Administration's National Highway Freight Network¹²⁸

¹²³ CalEPA. 2021. Pollution and Prejudice: Redlining and Environmental Injustice in California. August 16. <https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5>

¹²⁴ CARB. 2022. 2022 Scoping Plan Update Appendix K: Climate Vulnerability Metric. November. https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-k-climate-vulnerability-metric_0.pdf. Note that these data were created under the 2010 U.S. Census boundaries. A crosswalk from the Census Bureau relating 2010 Census Boundaries to 2020 Census boundaries was used to relate the CVM to U.S. EPA's low income and disadvantaged communities definition. Available: <https://www.census.gov/geographies/reference-files/2020/geo/relationship-files.html#tract>

¹²⁵ U.S. EPA. <https://www.epa.gov/green-book/green-book-gis-download>

¹²⁶ *ibid*

¹²⁷ California Open Data. Ports. <https://lab.data.ca.gov/dataset/ports>.

¹²⁸ Federal Highway Administration. National Highway Freight Network. <https://usdot.maps.arcgis.com/apps/webappviewer/index.html?id=c4c0fdef029a4093b169e493e1883988>.

5. Large industrial point sources subject to California's Cap-and-Trade Regulation and a half-mile buffer around each¹²⁹
6. Fossil gas fired power plants, and a half-mile buffer around each¹³⁰
7. Forested areas
8. Croplands
9. Sacramento delta
10. Negative impacts under the Climate Vulnerability Metric

Methodology and Results

The methodology underpinning this assessment was a spatial overlay and intersection of the above 10 spatial layers with U.S. EPA's spatial definition of low income and disadvantaged communities. Across the 10 variables, over 90% of low income and disadvantaged community block groups are expected to benefit from the climate measures in this PCAP. Measures that reduce fine particulates and ground level ozone are expected to have the greatest reach in terms of benefiting low income and disadvantaged communities, including all transportation measures and those that reduce wildfire risk. In the end, measures that help curb the climate crisis will create widespread positive effects on low income and disadvantaged communities as seen in the Climate Vulnerability Metric map below.

The maps below illustrate these findings further. Additionally, the block group IDs for all low income and disadvantaged communities expected to benefit from the measures in this PCAP would be too lengthy to list here. Instead, they can be found at this website:

<https://ww2.arb.ca.gov/sites/default/files/2024-03/California%20LIDACs%20in%20CPRG%20Priority%20Climate%20Action%20Plan.xlsx>

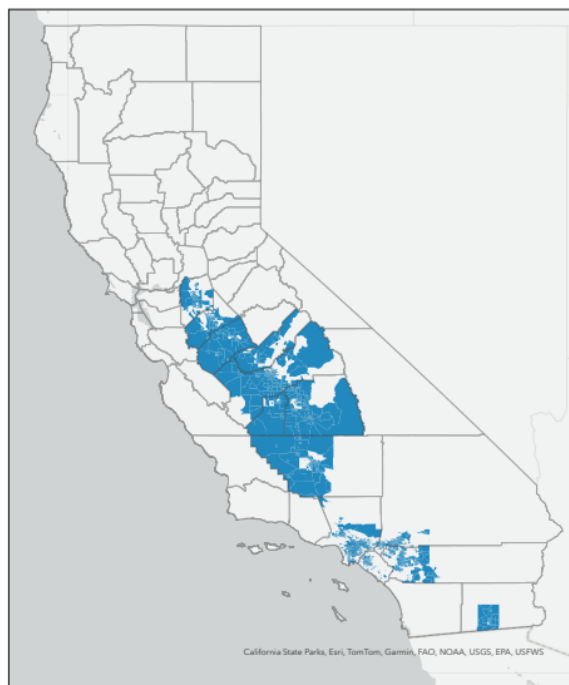
¹²⁹ CARB. Pollution Mapping Tool. <https://www.arb.ca.gov/carbapps/pollution-map/>

¹³⁰ Energy Information Agency. <https://eia.maps.arcgis.com/home/item.html?id=bf5c5110b1b944d299bb683cdbc02d2a>. Note that the entire fossil fuel generation category was used, but this can largely be assumed to be natural gas, as there is very little generation from coal or oil in California. See more here: <https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2022-total-system-electric-generation>

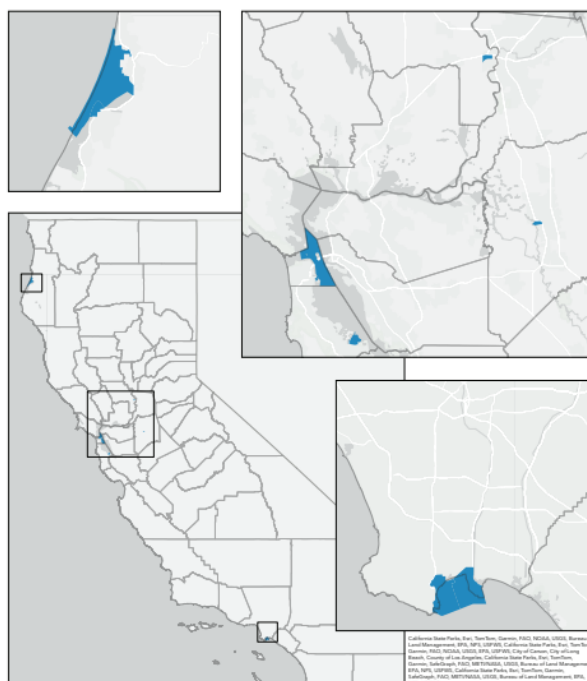
LIDACs in nonattainment of U.S. EPA's 2015 standard for ozone



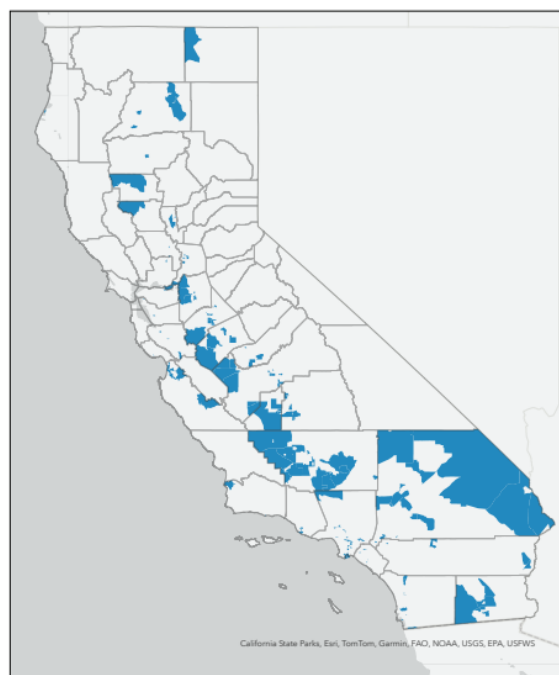
LIDACs in nonattainment of U.S. EPA's 2015 standard for PM_{2.5}



LIDACs within a half-mile of a port



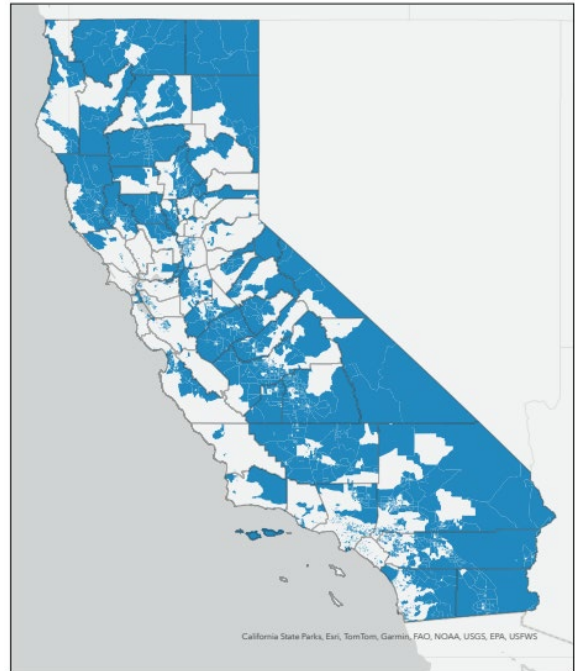
LIDACs within a half-mile of a large industrial facility



**LIDACs within a half-mile of a fossil
gas fired power plant**



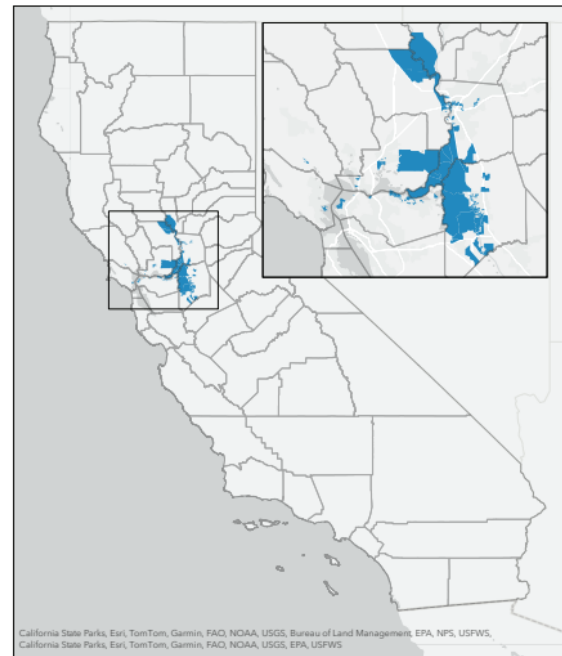
LIDACs with forested areas



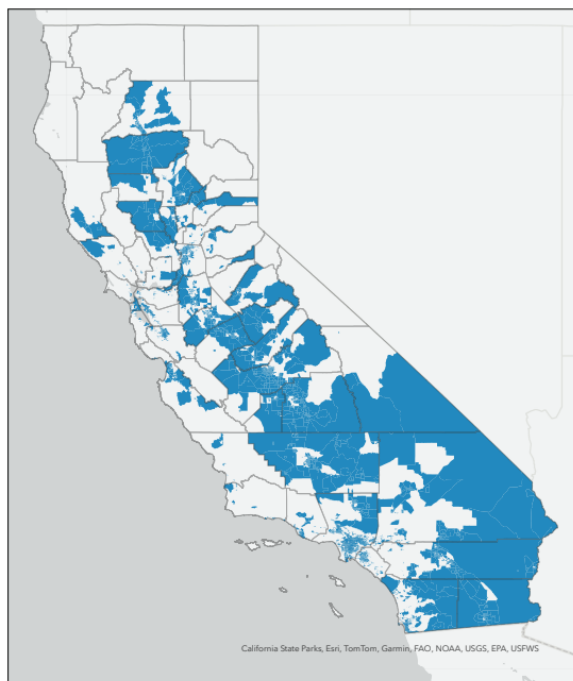
LIDACs with croplands



**LIDACs in the Sacramento
Delta Area**



**LIDACs with vulnerable to the costs
of climate change under CVM**



**LIDACs with one or more
intersection across variables**

