Bay Area Regional Climate Action Plan Measures for Public Review

What is the Bay Area Regional Climate Action Plan?

The Bay Area Regional Climate Action Plan (BARCAP) is a regional-level plan to move the Bay Area towards carbon neutrality, developed with support from the US Environmental Protection Agency (EPA) Climate Protection Reduction Grant (CPRG) program.

The BARCAP focuses on what can be done through regional-scale action and collaboration to reduce greenhouse gas emissions (GHGs) and address issues that can be very difficult for individual cities and counties to address on their own. It is designed to complement, rather than duplicate, climate planning efforts at the state, county, and city levels by filling gaps, addressing common challenges, and by building upon, expanding and accelerating climate solutions that are already happening in the region.

The Air District is coordinating the development of the BARCAP, along with a broad array of Bay Area regional agencies, local governments, community organizations, community energy providers, and technical experts. The BARCAP will be implemented by this rich mix of agencies and organizations that each have unique expertise and authority to implement different actions. The Air District will therefore be one of many implementers of the BARCAP.

The BARCAP covers Alameda County, Contra Costa County, Marin County, Napa County, City and County of San Francisco, San Mateo County, and the southern portions of Sonoma County and Solano County that are included in the Air District's jurisdiction. Santa Clara County is considered by the EPA as part of a neighboring but separate planning area for the CPRG program and has received its own planning grant. Air District staff is coordinating closely with staff from Santa Clara County during this process.

The BARCAP measures focus on reducing GHG emissions in areas within which local and regional governments have implementing authority, including the following sectors: Buildings, Power, Transportation, Waste, and Natural and Working Lands. Current state law prohibits local air districts from regulating carbon dioxide emissions from sources covered by the state's Cap and Trade regulation. This includes many industrial facilities, including refineries, in the region. Roughly 85% of Bay Area's industrial sector GHG emissions are covered by Cap-and-Trade. The Air District can, and does, regulate other GHG emissions from industry, such as methane. For this reason, the BARCAP is focused on non-industrial sectors for climate action.

How to read the Measures Document

The Measures Document includes sector-specific sections. Each section includes introductory text that defines the sector and provides some helpful context-setting information, such as major sources of emissions and the focus of the BARCAP for that sector, followed by a table describing the measures.

Each measure in the table includes:

- measure title and description
- GHG reductions– qualitative description of reductions (low, medium, high), or if reductions are not quantified for that measure because that measure is considered *supportive* of achieving reductions for another measure[1]

Category	Emissions Range (representative annual GHG reductions[2]) MMTCO2e
Supporting	Not quantified
Low	< 0.5 MMTCO2e
Medium	0.5 – 5 MMTCO2e
High	> 5 MMTCO2e

- potential co-benefits – in addition to GHG reductions
- potential metrics – potential ways to track progress in implementing the measures and actions
- implementing actions – one or more actions that implement different parts of the measure
- implementers – implementers for actions are divided into "lead implementers" that would coordinate or manage the overall implementation of an action, and "supporting implementers" that would participate in the implementation of an action but would not take a leading role (for some actions, lead or supporting implementers are known, for other actions where discussions on implementation are still ongoing, *proposed* implementers are listed). While all implementers are indicated as "proposed" in this document, several have confirmed their participation in implementation and the Air District is working to confirm other implementers.
- timeframes –each action can start in the short-, medium-, or long-term (even though full implementation of the action may occur over a longer time period)
    - short-term = all or part of the action can begin implementation within two years from plan finalization
    - medium-term = all or part of the action can begin implementation within 2-5 years
    - long-term = all or part of the action can begin implementation after five years

[1] ICF developed these qualitative GHG reduction estimates for the draft measures. More detailed quantification for each measure and a full methodology description will be provided in the final BARCAP document.

[2] The representative annual GHG reductions are the average annual (per year) change in emissions for the analysis period (2025-2050) for measures.

How the measures were developed

The draft measures were developed over the past year and a half, informed by a variety of outreach and engagement activities, including:

- working with community-serving organizations to create design principles to guide measure development (see below)
- four workshops in frontline communities, developed and co-led with community-based organizations
- two public workshops (a third public workshop is scheduled for July 22, 2025)
- a region-wide public survey
- meetings with local governments
- meetings with technical experts and potential implementers in each sector

A set of nine Design Principles guided measure development. They were first developed in 2023 in partnership with community-serving organizations and informed by input from local governments and regional agencies based on what they have heard directly from their communities. The Air District further refined the Design Principles based on feedback from workshops in frontline communities.

Nine Measure Development Design Principles	
Climate equity: Provide direct, meaningful, desired, and assured benefits to frontline communities, with a particular focus on Black, Indigenous, and People of Color (BIPOC) communities.	**Health & safety**: Improves living and/or working conditions (e.g. indoor and outdoor air quality, safety in green spaces, traffic safety, and pedestrian safety), especially in frontline communities.
Cooperative: Build upon and integrate existing efforts to expand impact, rather than introduce duplication.	**Housing and community stability**: Supports people, especially renters and low-income homeowners, to be housed and remain in their homes by increasing healthy, resilient housing with affordable electricity and accessible transportation options. Considers how communities use and connect to spaces.
Coordinated: Build cooperation and peer working relationships among local government and community-based organizations that builds community capacity and empowers community leadership within and across counties, in consultation with community members through culturally relevant, multi-lingual, trusted-messenger-delivered outreach to reach frontline communities and other vulnerable groups including recent immigrants, Indigenous communities, and youth.	**High-Quality Jobs & Local Entrepreneurship**: Creates lasting, high-quality, family-sustaining high-road jobs and other pathways to economic sovereignty in frontline communities.

Funding: Increases access to critical financing and funding mechanisms for frontline communities and other key stakeholders (including operations and maintenance) and identifies alternative financing mechanisms that provide sustained benefits for frontline communities.	**Resilience**: Builds resilience, especially for frontline communities, through changing climate conditions in the near and long term, increasing preparedness to respond to climate-related emergencies.
Genuine affordability and access: Increases access to housing and transportation, and other community benefits like green spaces, reduces or does not increase costs (e.g. housing, transportation, energy) and considers options to expand and improve access and affordability.	

How your feedback will be used

The draft measures will be open for public review and feedback until July 28, 2025. All feedback provided through this process will be reviewed by Air District staff and shared with the BARCAP's Advisory Work Group.[3] Draft measures may be modified to reflect public feedback, including implementing actions, potential implementers, tracking metrics, etc. at the discretion of the Air District.

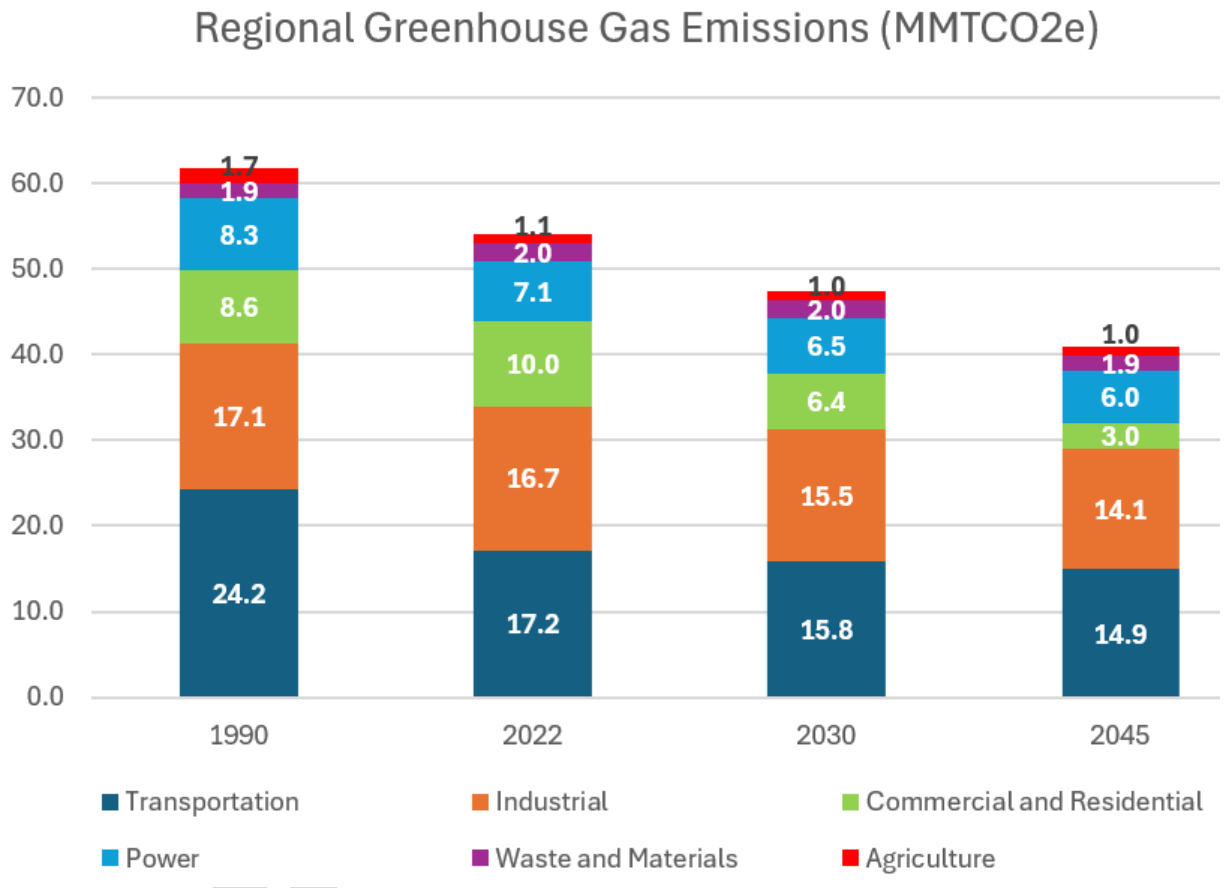
The BARCAP document will be submitted to the EPA by December 1, 2025.

[3] The Advisory Work Group consists of staff from regional agencies (the Bay Area Regional Collaborative, the Association of Bay Area Governments' Bay Area Renewable Energy Network [BayREN], and Metropolitan Transportation Commission), the counties included in the planning area, the City of Oakland, and several community-serving and community-based organizations.

Buildings Sector Draft Measures

Overview of the Buildings Sector

The commercial and residential sector of the Bay Area Air District's 2025 greenhouse gas (GHG) inventory[4] includes direct emissions from homes, commercial businesses, office spaces, places of business, worship, and congregation, entertainment venues, etc., excluding those classified as agricultural and industrial activities. GHG emissions from the sector include fossil fuel combustion for heating, cooling and cooking, leaks of refrigerants from equipment, lawn and garden equipment, etc.



The commercial and residential sector accounted for 18% GHG emissions in 2022 in the BARCAP region (10 million metric tons of carbon dioxide equivalents ($MMTCO_2e$)), with residential and commercial combustion of natural gas as the largest contributors, accounting for approximately 42% and 23% of total emissions from the sector, respectively. GHG emissions from this sector within the BARCAP region increased between 1990 and 2022 but are projected to decrease significantly over the next twenty years – largely driven

[4] To be published summer 2025

by state and regional policies that facilitate transitioning buildings off natural gas – accounting for approximately just 7% of the region's total [5] in 2045 (3 million $MMTCO_2e$).

California buildings constructed over the past century – including most Bay Area homes – mainly rely on natural gas for space and water heating, which together comprise the vast majority of the sector's GHG emissions. For the BARCAP, the building sector focuses on the GHG emissions generated by the combustion of fuels[6] to provide key services such as space heating, water heating, cooking, and clothes washing, primarily in the residential building stock. As the state's supply of renewable electricity continues to increase toward a goal of 100% by 2045, a larger share of building emissions will be attributable to natural gas. Switching gas appliances to clean, efficient, electric alternatives like heat pumps is commonly referred to as building decarbonization or building electrification.

Sector Goal: *Accelerate the transition to healthy, zero emission homes for all by supporting equitable implementation of existing regulations, integrating and leveraging programs to reduce emissions while improving housing conditions for those most in need, and supporting the growth of a successful, well-trained and diverse workforce.*

The California Air Resources Board's 2022 Scoping Plan for Achieving Carbon Neutrality (Scoping Plan) scenario for the building sector reflects the following policy goals established by Governor Newsom:

- Deploy 6 million heat pumps by 2030 (water and space heating)
- Deliver 3 million homes with heat pumps by 2030 (7 million by 2035)
- Direct 50% of investments to low-income and disadvantaged communities

State and local government policies and investments support these goals through activities such as "reach" building codes, financial incentive programs, and public education efforts, which have all expanded greatly over recent years, driving innovation and market transformation. In 2023, the Bay Area Air District adopted Rules 9-4 and 9-6 ("appliance rules") which phase-in requirements that aim to eliminate nitrogen oxides[7] (or "NOx," which worsens air quality and harms public health when released to the atmosphere) from space and water heating appliances. While these rules establish limits on air pollutants to protect public health, they can also dramatically reduce GHG emissions by displacing natural gas with emissions-free electricity. The rules do not require the use of electric equipment, but it is expected that many property owners will choose efficient electric heat pump technology to meet the regulatory requirements. If everyone chooses electric appliances, at full implementation (i.e. when all NOx-emitting appliances covered by the rules have been replaced with zero NOx), the appliance rules could reduce building sector natural gas emissions by 69% below 2022 levels.

[5] This includes GHG emission reduction co-benefits

[7] When released to the atmosphere, NOx reacts with other chemicals in the air to form both fine particulate matter (PM2.5) and ozone (O3), both which contribute significantly to poor air quality and can cause and exacerbate respiratory illnesses such as asthma.

It is important to note that energy efficiency (EE), which has been a staple of state and local efforts to reduce building sector emissions over the past several decades, is already being addressed by programs administered by the Bay Area Regional Energy Network (BayREN). So, while it is not explicitly stated as its own measure in the BARCAP, energy efficiency is acknowledged as a critical tool to support achieving sector goals, and the BARCAP aims to take a highly strategic and targeted approach to driving its benefits to traditionally underserved Bay Area populations (see measure B-2 and supporting actions, below).

BARCAP public survey results showed relatively strong regional support for transitioning buildings from gas to all-electric (ranked fifth out of thirteen potential focus areas for climate action).

Members of the region's frontline communities who participated in the BARCAP engagement process expressed concerns about how renters would be impacted by the costs associated with implementation of the appliance rules and perceived challenges with finding skilled contractors for zero NOx appliances, They also expressed support for simplifying the permit process for zero NOx appliances, increasing the availability of multilingual contractor training, and expanding efforts to combine building health and safety retrofits with electrification upgrades.

The BARCAP therefore focuses on three main areas:

1) Address key challenges with implementing regional zero NOx appliance rules
2) Support low-income households by integrating home repair, energy efficiency and weatherization services with building decarbonization incentives
3) Grow the building decarbonization workforce by connecting employers with diverse and well-trained personnel

Measure B-1: Support Implementation of the Air District's Zero NOx Building Appliances Rules by Addressing Key Opportunities and Challenges

Support an equitable and affordable transition to healthy, zero NOx water and space heating for buildings in the region by addressing key implementation challenges of the Air District's appliance rules, which go into effect for small gas residential water heaters in 2027 and gas furnaces in 2029. Actions are informed by the Air District's Implementation Working Group in addition to BARCAP stakeholder engagement.

GHG reductions in 2045: Low

Potential co-benefits: Reduced exposure to air pollution, climate resilience, job creation, reduced energy costs, improved housing quality, enhanced community engagement

Potential metrics:

# of new outreach activities and/or information resources provided that advance any of the actions, particularly in or for overburdened communities. Examples include: tabling at events,

sending online communications, or presenting at industry gatherings about appliance rules and/or sharing resources regarding supportive strategies e.g. low-power appliance options, SB 282/permit streamlining approaches. # of jurisdictions adopting the model code or streamlined permitting for zero NOx appliances.		
Actions	Implementers	Timeframe to start implementation
B-1.1: Leverage partnerships and coordinate with key supply chain entities to develop together a suite of activities to increase zero NOx appliance awareness and adoption to support high-levels of compliance and equipment performance Example activities could include: • coordinate and deliver consistent outreach and marketing campaigns through distribution networks regarding zero NOx appliance benefits, products, and services; • promote aligned/consistent contractor training and sales tools (aligns with and supports Measure B-3); • support the provision of non-equipment retrofit materials at distribution centers such as duct kits/terminations, insulated flex duct, grilles, louvered doors, enclosures, etc.; and • collect and share data regarding contractor installations (models, UEF ratings, voltage, etc.) to help distributors fine-tune inventory stocking to best match local housing stock and to inform incentive program design.	**Proposed Lead Implementer:** Regional agency **Proposed Supporting Implementers:** CA Heat Pump Partnership (CAHPP), Energy Solutions' Trade Ally Management Program)	**Short-term**
B-1.2: Support policy development efforts and disseminate best practices that streamline permitting for heat pump installations and promote electrification readiness in Bay Area jurisdictions Coordinate local development and implementation of supportive policies with regional partners such as BayREN and community choice aggregators. Collect	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** BayREN, community choice aggregators,	**Short-term**

and disseminate model code language to support local code updates that focus on preparing buildings for future electric appliances.	SPUR, Sonoma County Transportation and Climate Authorities and other local governments	
B-1.3: Promote and increase awareness of low-power appliance options and other panel optimization strategies with multi-language communications that will help people avoid unnecessary electrical service upgrades Reduce upfront costs for zero NOx appliance replacements by helping avoid expensive panel upgrades by propagating the knowledge and use of low power appliance options like 120 Volt heat pump water heaters (HPWH) and panel optimization strategies (e.g. circuit splitters and/or smart electric panels which can balance home electric loads in real-time to make the most of existing service capacity). Collaborate with key partners to spread knowledge and best practices to a range of key audiences.	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** CAHPP, SPUR, Build It Green POWER group, community choice aggregators, community organizations	**Short-term**
B-1.4: Explore new funding and financing opportunities to augment existing sources to further reduce financial burdens, especially for low income building owners and tenants Seek out new capital sources and mechanisms, including easy-to-use financing options with strong consumer protections, that solve upfront cost barriers.	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** Community choice aggregators, BayREN, State of California, specialty lenders	**Short-term**
B-1.5: Develop and deliver culturally competent and multilingual information, outreach and marketing campaign about the zero NOx building appliance rules, focusing on low-income and overburdened homeowners and renters, and multifamily building owners	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:**	**Short-term**

Develop an awareness-building communications campaign to ensure stakeholders in the Bay Area know about the upcoming compliance dates for the zero NOx appliance rules. Partner with key organizations and community partners to leverage their networks and ensure a wide reach.	BayREN, local governments, Building Decarbonization Coalition, CAHPP, community organizations	
B-1.6 Expand engagement with affordable multifamily housing owners (deed-restricted and naturally-occurring) to address technical, financial, and community challenges related to zero NOx appliance rules, and co-develop solutions to ensure owners get the resources and support they need so residents and owners benefit from the transition to clean appliances Work with key agencies and other partners to engage closely with affordable housing owners to increase shared understanding of opportunities and constraints regarding the transition to healthy zero NOx appliances.	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** BayREN, local governments, affordable housing providers, community organizations	**Short-term**
B-1.7 Provide education regarding best practices for those that choose to self-install heat pump water heaters (i.e. Do-It-Yourself'ers, or DIY'ers) Provide helpful guidance that promotes safe and correctly done installations by homeowners who have the technical ability and motivation to install their own zero Nox appliance, to increase the likelihood that units perform as intended.	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** Sonoma County Transportation and Climate Authorities and other local governments	**Short-term**
B-1.8 Collaborate with Northwestern Energy Efficiency Alliance (NEEA) and others to support the development and piloting of split-system heat pump water heaters that can address constrained space installation challenges for Rule 9-6 Work with key partners in the region to support market adoption of new small form-factor HPWH designs through pilot projects, performance	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** Community choice aggregators, TECH	**Short-term**

reporting, and outreach and education activities to share lessons learned.	Clean CA, building owners, others	

Measure B-2: Advance Decarbonization and Public Health Goals by Integrating Electrification Incentives with Home Repair and Weatherization Services and Other Non-Energy Programs Targeted Toward Low-Income and Frontline Communities

Perform holistic building retrofits that include energy efficiency, electrification, and home repair and remediation by braiding together and augmenting funding, services, and other assistance from existing programs. Focus retrofits in the region's low-income and frontline communities. This measure builds upon the Air District's Bay Area Healthy Homes Initiative, and the initial buildings-focused program concept first articulated in the CPRG Priority Climate Action Plan (called the "Bay Area Clean Homes Initiative," or "BACHI"). Implementation of this measure is highly dependent on seeking and obtaining other funding sources (per B-2.1). BayREN and the Air District are committed to leading this exploration in partnership with other key organizations as noted below.)

GHG reductions in 2045: Low

Potential co-benefits: Reduced exposure to pollution, climate resilience, reduced energy costs, improved housing quality, enhanced community engagement

Potential metrics: # of homes receiving remediation and EE upgrades, # of homes electrified and receiving solar

Actions	Implementers	Timeframe to start implementation
B-2.1: Explore new funding and financing opportunities for home repair, public health, energy efficiency, and decarbonization programs to augment existing sources. Identify new, additive financial resources to support the planning, integration, and execution of pulling together existing programs that will lead to positive health and climate outcomes and improved housing conditions for frontline communities.	**Proposed Lead Implementer:** BayREN **Proposed Supporting Implementers:** Air District, community choice aggregators, PG&E	**Short-term/ ongoing**

B-2.2: Make home decarbonization retrofits more affordable and accessible through coordinated efforts to use all capital and programmatic options Braid together existing resources (funding, technical assistance, outreach) to ensure the benefits of building decarbonization are made available to those with the fewest means to participate and who can benefit the most.	**Proposed Lead Implementer:** BayREN **Proposed Supporting Implementers:** Community choice aggregators and municipal electric utilities	**Short-term/ ongoing**
B-2.3: Partner with PG&E to map ideal locations for decommissioning[8], work with counties to coordinate and conduct outreach Advance early-stage planning efforts to pilot targeted neighborhood-scale natural gas distribution system decommissioning that can scale-up building electrification and offset future investments in GHG-and-capital intensive gas infrastructure.	**Proposed Lead Implementer:** BayREN, PG&E **Proposed Supporting Implementers:** Sonoma County Transportation and Climate Authorities and other local governments	**Short-term**
B-2.4: Pilot a mini-BACHI retrofit program that combines home repair, EE and decarbonization services and incentives. Work with Rebuilding Together and Habitat for Humanity to leverage programmatic resources (funding, technical assistance, outreach) to implement holistic home retrofits for low-income and frontline communities within 2-3 counties.	**Proposed Lead Implementer:** BayREN, Rebuilding Together **Proposed Supporting Implementers:** Habitat for Humanity Bay Area, Association for Energy Affordability (AEA), Sonoma County Transportation and Climate Authorities and other local	**Medium-term**

[8] In this context, decommissioning refers to the process of taking a section of the natural gas distribution system completely out of service for a specific subset of end users and customers. This would eliminate the need for future costly investments into system maintenance and upgrades and hazards associated with gas infrastructure, which could then be allocated towards building decarbonization.

	governments, community choice aggregators, PG&E	
B-2.5: Based on lessons learned from pilot (B-2.4), secure funding to expand the mini-BACHI pilot retrofit program to all Bay Area counties with a focus on partnering with affordable housing programs and owners to identify sites and project opportunities. Use lessons learned from initial pilot experiences (from B-2.4) to adjust and expand efforts to additional Bay Area counties with an added emphasis to work with and support different types of affordable housing sites (deed-restricted and naturally-occurring).	**Proposed Lead Implementer:** BayREN, Rebuilding Together **Proposed Supporting Implementers:** Habitat for Humanity Bay Area, and Association for Energy Affordability (AEA), Sonoma County Transportation and Climate Authorities and other local governments, community choice aggregators, PG&E	**Long-term**

Measure B-3: Support Collaborations and Partnerships to Ensure the Building Decarbonization Workforce is Successful, Skilled, and Diverse Enough to Serve the Entire Region Effectively and in a Culturally Competent Manner

Support the transition to healthy, emissions-free buildings by ensuring there is a trained and sufficient contractor workforce equipped with the new skills and knowledge required to install efficient, electric heat pumps. While public funding for incentives has set a foundation for early adopters in the field, the building decarbonization contractor base needs to scale up significantly to effectively implement the zero NOx appliance rules and achieve state, regional, and local building decarbonization goals, especially considering the transition from gas to electric appliances and as incumbent workers age-out of the workforce. These actions aim to support this outcome by creating an attractive and sustainable business environment that highlights today's heat pump contractors, increasing their overall numbers, and focusing on building the next generation of workers that reflects the diverse and multilingual communities of the Bay Area.

GHG reductions in 2045: Supporting

Potential co-benefits: Employment opportunities, job training Potential metrics: # of activities (such as specialized heat pump trainings, peer-to-peer mentorship sessions)		
Actions	Implementers	Timeframe to start implementation
B-3.1: Highlight and promote contractors who hold established certifications and credentials (e.g. U.S. DOE Energy Skilled recognition) that indicate they are skilled and knowledgeable about heat pumps, and partner with incentive program administrators and other organizations to communicate their value proposition for customers Provide easy-to-access training that "meets contractors where they are" and focuses on enabling quality installations are key to a successful transition to zero NOx appliances. Work with key partners to highlight contractor designations obtained through training programs that promote quality installation practices to consumers.	**Proposed Lead Implementers:** State and regional organizations **Proposed Supportive Implementers:** Community choice aggregators, Sonoma County Transportation and Climate Authorities and other local governments, community organizations	**Short-term**
B-3.2: Explore funding opportunities and partnerships to expand education, training, business growth and other targeted support of Minority/Women/ Disadvantaged Business Enterprises (MWDBE) contracting companies to become active in building decarbonization program and project opportunities Facilitate collaborations with Bay Area entities to develop resources that empower minority, women-owned and other disadvantaged companies to increase their opportunities and participation in the growing building decarbonization sector.	**Proposed Lead Implementer:** Regional organizations **Proposed Supporting Implementers:** Community choice aggregators, local nonprofit workforce training organizations	**Short-term**
B-3.3: Explore the creation of a contractor mentorship program that leverages the experiences and knowledge of high-performing heat pump installers ("volume installers") to share information and tips that explain the business	**Proposed Lead Implementer:** Regional organization	**Short-term**

opportunity to gas-centric contractors so they get interested in electric heat pump upskilling and training opportunities Work to develop and implement a "mentorship-style" program that leverages peer-to-peer learning and information sharing that inspires contractors who have been hesitant to shift to heat pumps to engage in training and business opportunities. Contractors trust other contractors for good industry advice.	**Proposed Supporting Implementers:** TECH Clean CA, CAHPP, community choice aggregators, Sonoma County Transportation and Climate Authorities and other local governments	
B-3.4: Assemble a regional information-sharing network/directory to increase awareness and opportunities for contracting businesses to connect with training providers and new workers who have demonstrated a commitment to pursuing a career in the field. Integrate information about project and funding opportunities, requests for proposals, and incentive program updates as appropriate Work with key partners in the region to build out an accessible directory that lays out the regional building decarbonization workforce ecosystem in a way that increases transparency and the ability to access information to aid in hiring, employment, training, and project opportunities.	**Proposed Lead Implementer:** Regional organization **Proposed Supporting Implementers:** Training and education providers, industry associations/contractor networks, manufacturers, community organizations	**Medium-term**

Natural and Working Lands Sector Draft Measures

Overview of the Natural and Working Lands Sector

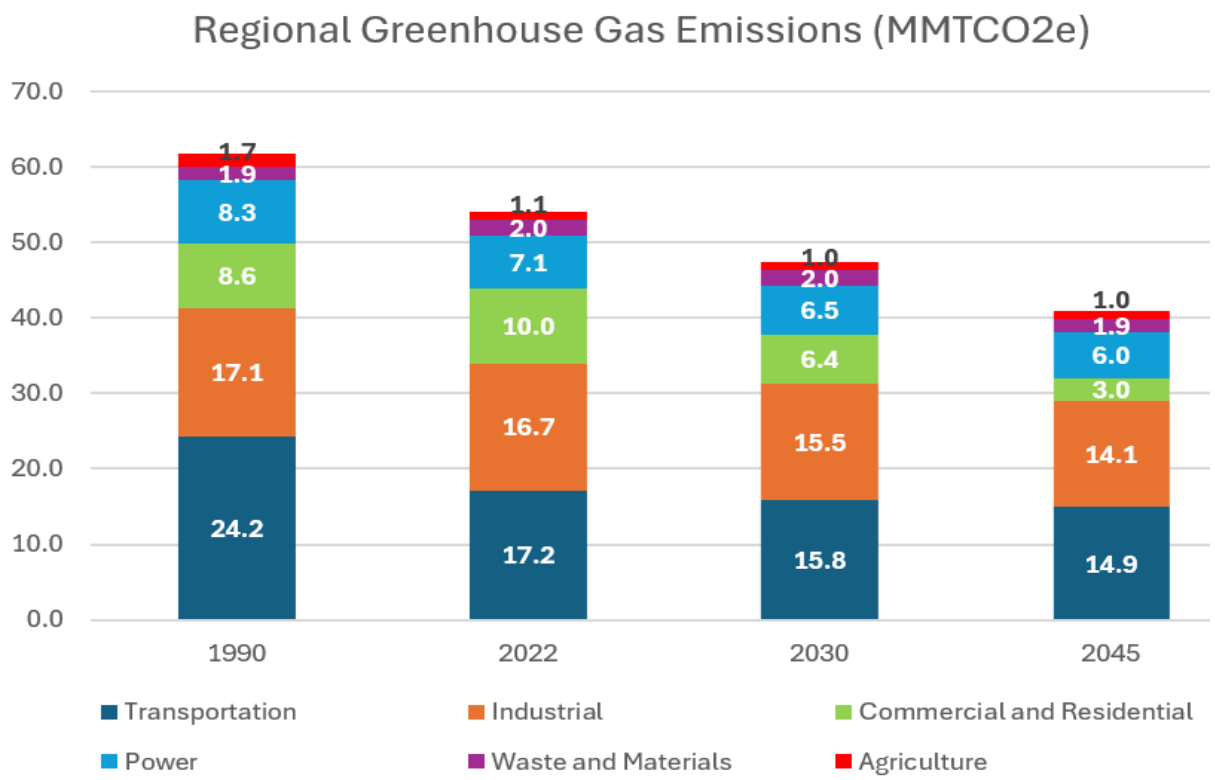
The natural and working lands (NWL) sector includes carbon stocks held in plants and soils in agricultural and forestry lands (working lands) and natural ecosystems like wetlands, forests, and grasslands (natural lands), as well as greenhouse gas (GHG) emissions from agricultural equipment and livestock.[9] The NWL sector is unique as it is the only sector with the potential to be a carbon sink in addition to a GHG emissions source.[10] NWL also provide critical benefits to Bay Area communities beyond carbon sequestration, such as clean drinking water, food and fiber crops, urban green spaces that cool cities and protect communities from flooding, and iconic natural landscapes including delta wetlands and redwood forests.

In 2022, the region's plants and soils held over 92 million metric tons of carbon (MMT C), which is over 6 times larger than total annual GHG emissions across the region.[11] The three largest contributors to carbon stocks are forests (50%), developed lands (12%), and grassland/herbaceous lands (11%). The massive amounts of carbon held in the region's plants and soils emphasize the importance of preserving and enhancing these carbon stocks to achieve the region's climate goals.

[9] While carbon stocks and carbon sinks are oftentimes used interchangeably, carbon stocks in the context of the BARCAP carbon stock inventory specifically refer to the amount of carbon held in a carbon pool, or stock, such as soil organic carbon or forest biomass. Carbon sinks, as described further in footnote two, refer more specifically to the process of carbon drawdown, or movement of carbon from the atmosphere into natural carbon pools. Michigan State University Department of Forestry

[10] Carbon sinks describe the role of plants and soils to sequester carbon by capturing carbon dioxide from the atmosphere and transform it into biomass and soil organic matter, where it is stored for long periods of time. When more carbon is drawn down than these natural carbon cycles emit, these reservoirs of carbon in plants, oceans, and soils are called carbon sinks because they are net sinks, not net emitters. MIT Climate Portal and United Nations

[11] The U.S. Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator was used to convert carbon held in NWL to carbon dioxide equivalent (CO_2-e) units in order to make this comparison.



Fossil-fuel powered agricultural equipment and livestock methane were the main sources of GHG emissions from the agricultural sector, accounting for 2% (1.1 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) of 2022 regional GHG emissions.

GHG emissions in this sector for the BARCAP region have decreased since 1990, mainly due to shrinking livestock operations, and are projected to be 3% (1.0 MMT CO_2e) of regional GHG emissions by 2045.

If current statewide trends continue, NWL are projected to be a net source of GHG emissions through 2045, mainly because of loss of plants and soil carbon stocks from land conversion and climate impacts like drought and wildfire.[12] These trends can be observed at the regional level: significant spikes in historic regional emissions from the sector were caused by wildfires in 2017 and 2020, two of the most severe wildfire years in California's history.

Goal for this sector: *Preserve and enhance the 92 MMT C held in the region's natural and working lands, contributing to the state goal of no more than 4% loss of carbon stocks by 2045. Catalyze regional scale transformations in land management and implementation of nature-based*

[12] California Air Resources Board (CARB) 2022 Scoping Plan for Achieving Carbon Neutrality, Appendix I: Natural and Working Lands Technical Support Document

solutions including conservation, wildfire management, ecosystem restoration, climate beneficial agriculture, and environmental justice-focused urban greening.[13]

California's climate plans are increasingly recognizing the role of NWL in climate action. The California Air Resources Board 2022 Scoping Plan for Achieving Carbon Neutrality (Scoping Plan) included accounting and forecasting of NWL carbon stocks for the first time and included ambitious statewide targets for nature-based solutions, including:

- Conservation of 30% of California lands and waters by 2030
- Reducing wildfire risk through annual fuel treatments on 2.3 million acres of forest, shrubland, and grassland
- Increasing organic agriculture to 20% of all croplands
- Restoring 60,000 acres of delta wetlands
- Increasing urban forestry investment by 200%

Even if these targets are achieved, the outcome will slow, but not reverse losses of carbon stocks across the state. Wildfire in particular is projected to drive large losses of carbon stocks, especially carbon rich forests through 2045. Meanwhile, the region is home to many long-term implementers of nature-based solutions who until recently, may not have considered themselves part of the climate action landscape.

BARCAP survey results showed very strong regional support for expanding and protecting green spaces and natural ecosystems (ranked second among thirteen potential focus areas for climate action).

Members of the region's frontline communities who participated in BARCAP engagement process expressed support for the creation of food-growing spaces, expansion of urban green spaces that beautify communities and reduce urban heat and flooding, restoring indigenous land ownership, access to nature, and desire for community-led land stewardship. At the same time, these members were concerned that new green spaces might unintentionally cause gentrification and displacement, increase wildfire impacts, and reduce water availability.

The BARCAP therefore focuses on accelerating implementation of nature-based solutions that both protect existing carbon stocks and increase carbon sequestration through new funding and technical assistance to the region's rich network of implementers. Key areas for action include policy and data innovation, conservation, wildfire risk reduction, ecosystem restoration, climate beneficial agriculture, and environmental justice-centric urban greening.

[13] Nature-based solutions are defined by the United Nations Environment Programme as "actions aimed at protecting, conserving, restoring, and sustainably managing natural or modified terrestrial, freshwater, coastal, and marine ecosystems, which address societal, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience, and biodiversity benefits".

Measure NWL-1: Accelerate Implementation of Nature-Based Solutions through Regional Funding and Data Analysis

Accelerate implementation of nature-based solutions by providing land stewards and other implementers with regional-scale technical assistance for carbon data analysis and long-term funding and financing. This will allow for more focus on on-the-ground transformation of land management practices by reducing competition among implementers for funding or the need to conduct duplicative data analysis.

GHG reductions in 2045: Supportive

Potential co-benefits: Reduced duplication of work and administrative burden, increased implementer capacity, integration of best available science and data

Potential Metrics: Number of data projects supported, usage of datasets by implementers, funding allocated to new nature-based solution implementation projects across the region

Actions	Implementers	Timeframe to start implementation
NWL 1.1: Provide technical assistance for NWL data analysis to support project implementation, results tracking, and incorporation of emerging science Increase capacity for implementers of nature-based solutions to meet data tracking and inventory needs and reduce duplicative work across the region by enhancing existing tools and resources, and/or providing technical assistance and standardization of regional approaches for analysis. Implementation actions may include: • obtain funding and/or provide professional expertise to provide long-term maintenance of public data and technical assistance; • create a public library for spatial and carbon sequestration datasets and tracking metrics consistent with state analyses and latest science, include spatial data on equity, public health, and climate impacts; • provide technical assistance to conduct standardized NWL carbon inventories and landcover changes over time, including analysis of equity concerns to support	**Proposed Lead Implementers:** Regional agency or organization **Proposed Supporting Implementer(s):** Bay Area Greenprint, TOGETHER Bay Area, regional agency, San Francisco Estuary Institute (EcoAtlas), San Francisco Bay Joint Venture	**Short-term**

implementation of nature-based solutions by local governments, resource conservation districts, community organizations, and other implementers.		
NWL 1.2: Increase long-term funding for nature-based solutions through dedicated support for regional-scale grant writing and exploration of emergent sources of long-term funding Support long-term implementation of nature-based solutions by obtaining regional-scale, transformative levels of funding. Implementation actions may include: • offer grant writing assistance to support nature-based solution implementation by multi-agency or organization coalitions including parks departments, local governments, open space districts, community-based organizations, nonprofits, resource conservation districts, and tribes; • explore new long-term funding sources for nature-based solutions including Proposition 4 and other state bonds, green banks, and market mechanisms; • provide outreach to key environmental justice groups to increase their knowledge and uptake of new regional supports.	**Proposed Lead Implementer:** Regional agency or organization **Proposed Supporting Implementers:** Regional agency or organization, TOGETHER Bay Area	**Short-term**

Measure NWL-2: Prevent Losses of Carbon Held in NWL through Land Conservation, Wildfire Management, and Ecosystem Restoration

Prevent losses of carbon held in NWL from development and wildfire, while managing and restoring key carbon-rich lands to maximize carbon sequestration. Geographic areas that may garner particular focus based on the BARCAP 2022 landcover analysis include wetlands in Solano, Sonoma, Napa and Contra Costa counties, as well as high-fire risk forest, shrub, scrub, and grassland areas in Marin, San Mateo, Alameda, Napa, and Sonoma counties.

GHG reductions in 2045: likely High

Potential co-benefits: Biodiversity, climate resilience, outdoor access, stewardship opportunities for frontline communities, community health, climate resilience, green jobs, access to services and amenities

Potential Metrics: Number of new projects launched, acreage covered, funding provided, # of programs supporting implementation		
Actions	**Implementers**	**Timeframe to start implementation**
NWL 2.1: Support conservation of lands at the regional scale through the Priority Conservation Area (PCA) Program Support regional implementation of California's 30 x 30 goals through conservation of NWL in the Bay Area region through the Priority Conservation Area (PCA) Program. Conservation priorities for protection and/or enhancement may be informed by emerging regional analysis on carbon stocks and sequestration, such as the 2022 carbon stock BARCAP inventory, and potential deliverables from NWL 1.1.	**Proposed Lead Implementers:** MTC - PCA Grants Program, San Francisco Estuary Partnership	**Short-term**
NWL 2.2: Increase fuel management and reduce wildfire risk on natural and working lands and at the wildland-urban-interface (WUI) through new funding and financing mechanisms, workforce development, and innovation Contribute to State targets for increased fuel management through treatments on NWL with high-fire risk. Treatments may include wood chipping, cultural and prescribed fire, and targeted grazing.[14] Implementation actions to increase fuel management uptake may include: • exploration of new funding and financing strategies to increase incentives for landowners to manage fuels, including development of markets for fire-at-risk wood, and climate co-benefit products like biochar; • identify and scale innovative and successful pilot projects in fuel management;	**Proposed Lead Implementers:** Resource conservation districts (RCDs), fire safe councils, county governments (long-range planners), CALFire, local fire protection districts **Proposed Supporting Implementers:** Community organizations, tribes, conservation corps, water agencies, local governments	**Short-Medium term**

[14] Implementation of these strategies, including biochar created via pyrolysis, may require an Air District permit, or be subject to Air District regulations (e.g. Regulation 5, Open Burning).

• reduce risk of ignition at the WUI by providing new incentives and exploring new policies to increase the uptake of home hardening practices by homeowners, including "zone zero" practices that create an ember resistant zone within five feet of structures by managing flammable material; and • fill the workforce gap for fuel managers through job training, emphasizing potential trainings for indigenous land stewards and agricultural workers.		
NWL 2.3 Incentivize private landowners managing large land areas to manage fuel at scale through innovations in cost sharing and financing Overcome challenges for incentivizing private landowners to manage fuels on large land parcels through innovative financing mechanisms that allow for re-consideration of risks, pooling of costs, and benefits at the multi-parcel scale. This may include cost-sharing grants provided by local governments, and emergent insurance-based mechanisms.	**Proposed Lead Implementers:** RCDs, fire safe councils, county governments (long-range planners), CALFire, local fire protection districts **Proposed Supporting Implementers:** Community organizations, tribes, conservation corps, water agencies, local governments	**Medium-term**
NWL 2.4: Protect carbon held in the Bay Area's wetlands through protection, restoration, and enhancement of tidal marsh habitat Contribute to the achievement of targets from the 2022 San Francisco Estuary Blueprint Task 10, and Baylands Ecosystem Habitat Goals Science Update (2015): • 23,000 acres of tidal marsh restored in the Bay, and 5,500 acres of tidal marsh restored in the Delta, which is achieved through collaboration with diverse partners, and consideration of climate adaptation in project design	**Proposed Lead Implementers:** Nonprofits, government agencies, private entities, San Francisco Bay Joint Venture **Proposed Supporting Implementers:** San Francisco Estuary	**Short-term**

• 3,000 acres of tidal marsh enhanced in San Francisco Bay • 20,000 acres of Baylands protected through various mechanisms including acquisition, transfer of fee title, or easement Implementation may depend upon funding availability.	Partnership, regional restoration funders	
NWL 2.5: Contribute to emergent science on blue carbon through research on blue carbon fluxes and beneficial sediment reuse[15] Monitor and research blue carbon fluxes – both sequestration and emissions- to inform wetland restoration and management, supporting San Francisco Estuary Partnership 2022 Blueprint Tasks 7-2 and 7-5. Study and share knowledge on beneficial reuse of sediment for wetland restoration and adaptation- and how this can affect carbon sequestration.	**Proposed Lead Implementers (Fluxes):** State agencies, Federal agencies, and Universities **Supporting Implementers (Fluxes):** Delta Stewardship Council **Proposed Lead Implementers (Reuse):** SF Estuary Institute/ Regional Monitoring Program, United States Army Corps of Engineers, **Proposed Supporting Implementors (Reuse):** Long Term Management Strategy Implementors (Federal agencies, regional commissions, State water agencies)	**Short-Medium-term**

[15] The National Oceanic and Atmospheric Administration defines blue carbon as "carbon dioxide that is absorbed from the atmosphere and stored in the ocean…underwater sediments, coastal vegetation and soils; carbon-containing molecules such as DNA and proteins; and ocean life from whales to phytoplankton."

Measure NWL-3: Enhance Carbon Sequestration and Reduce Greenhouse Gas Emissions through Management and Restoration of Agricultural and Working Lands

Increase carbon draw-down into agricultural lands by scaling up climate beneficial agriculture and reducing implementation challenges, helping to achieve state and local governments' agricultural targets and goals.[16] Explore areas to increase cross-sector benefits and GHG emission reductions through energy-efficient sustainable water management and integration of renewable energy on agricultural lands. Geographic areas that may garner particular focus based on the BARCAP 2022 landcover analysis include orchards in Contra Costa, vineyards in Napa and Sonoma, pasture and hay in Marin, Sonoma, and Solano, and field crops in San Mateo, Contra Cost, and Solano.

GHG reductions in 2045: Low

Potential Co-benefits: Reduced water consumption, community health, land access, climate resilience, green jobs, resilient food and fiber production, renewable energy generation

Potential Metrics: Number of growers assisted, acreage applied, funding provided, # of programs supporting implementation, MW new renewable energy on agricultural lands, # water projects implemented on farm, water savings ($, acre feet, %)

Actions	Implementers	Timeframe to start implementation
NWL 3.1: Scale climate-beneficial agriculture and catalyze widespread adoption of practices that increase or maintain above- and below-ground carbon stocks, and achieve climate resilience on working lands Implement scaled adoption of climate-beneficial agriculture practices including silvopasture, hedgerows, cover crops, conservation cover, windbreaks, compost application, riparian forest buffer, and critical area planting, contributing to State target. Support scaled adoption through actions including:	**Proposed Lead Implementers:** Growers and land stewards, public and private landowners **Proposed Supporting Implementers:** RCDs, Carbon Cycle Institute, Farm Bureau, University of California	**Short-term**

[16] Climate beneficial agriculture is the term preferred by implementing partners at Carbon Cycle Institute and Bay Area resource conservation districts (RCDs), and can also be described interchangeably as 'carbon farming', 'climate-smart agriculture' and 'regenerative agriculture'. Climate beneficial agriculture, as articulated by the California Department of Food and Agriculture's 2025 definition of regenerative agriculture describes an integrated approach to farming and ranching rooted in principles of soil health, biodiversity and ecosystem resiliency leading to improved targeted outcomes.

• increasing technical assistance to support land managers plan, design, implement, and monitor multi-benefit climate-beneficial agriculture practices, with a particular focus on ensuring technical assistance access for small-scale and disadvantaged producers; • strengthening education and partnerships at the local and regional level to understand and overcome barriers to adoption; • supporting development of key infrastructure to reduce cost on the individual grower/ organization and expand adoption of climate-beneficial practices, explore opportunities for local equipment and infrastructure sharing and improve access to plant materials and other supplies which may be supported through implementation of NWL 3.2; • enhancing applied research by supporting trials, research, and monitoring on working lands to refine local data and effectiveness of climate- beneficial practices; and • developing new equity-centric land access strategies to increase access to agricultural lands, advancing environmental justice outcomes for disadvantaged producers, and new farmers and ranchers.	Cooperative Extension	
NWL 3.2: Increase local implementer capacity by conducting a regional needs assessment and 'shovel-worthy' project portfolio Secure funding for and conduct a regional needs assessment. Implementation actions may include: • identify gaps in existing locations of staff and infrastructure (compost spreading equipment, nurseries) to support necessary investments, leveraging existing needs assessment work done by resource conservation district regional hubs; • identify a portfolio of projects that could be implemented within 5 years, including those that could be aggregated to achieve	**Proposed Lead Implementers:** RCDs, including Bay Area and North Coast Hub **Proposed Supporting Implementers:** Carbon Cycle Institute, University of California Cooperative Extension (UCCE), Farm Bureau	**Short-term**

economies of scale and leverage funding, especially for multi-benefit projects; and • include specific analysis of needs and opportunities for tribal, disadvantaged, and small-scale producers, which should be co-created with these implementers.		
NWL 3.3: Support integration of climate-beneficial agriculture into climate-related plans and policies through a planning toolkit and training Support local, county, and regional governments in adopting strong agricultural climate solutions as part of future climate plans and policies by producing a toolkit on climate mitigation, co-benefits, resilience and adaptation impacts of climate beneficial agriculture. Implementation actions may include: • update and finalize existing toolkit developed by the Carbon Cycle Institute and partners; • provide technical assistance to government staff using toolkit to inform County climate action plan updates; • work with Sonoma and Solano counties to identify updates to agriculture and working lands climate action plan chapters and targets; and • advocate for strengthening the integration of climate beneficial ("regenerative") agriculture in the Priority Conservation Area Program lead by the Metropolitan Transportation Commission and funding priorities.	**Proposed Lead Implementers:** Carbon Cycle Institute, county governments (climate, sustainability, planning staff) **Proposed Supporting Implementers:** RCDs, Air District, UCCE	**Short-term**
NWL 3.4: Explore establishment of more renewable energy on agricultural lands Explore areas where working lands can house and generate clean energy, including agrivoltaics, wind power, storage, and geothermal power resulting in a regional roadmap for renewable energy on agricultural lands to contribute to Measure P-1 in the Power Sector. Implementation actions may include:	**Proposed Lead Implementers:** Farmers, ranchers and growers, power providers **Proposed Supporting Implementers:** RCDs, research organizations	**Medium-term**

• mapping suitable sites, establishing criteria for site suitability (e.g. presence of animal agriculture and existence of renewables like wind); • identifying financing models; and • pilot project identification and opportunities for replication and expansion.	(Berkeley Food Institute), community organizations, local governments	
NWL 3.5: Reduce energy-related emissions and increase groundwater recharge through adoption of sustainable water management practices Support higher rates of adoption for sustainable water management practices through promotion of best practices and technical assistance, contributing to energy efficiency targets for the region. Implementation actions may include: • promote climate-friendly irrigation and stock watering practices that increase water use efficiency and, where possible, recharge groundwater, including: solar-powered irrigation equipment, conversion to drip irrigation, winter stormwater capture, groundwater recharge basins, increasing soil organic matter and cropping system flexibility to maximize resilience to a changing climate; and • support farmers and ranchers in successful water management through irrigation evaluations, permitting assistance, incentive program application assistance and whole-operation planning for improved water use efficiency, soil carbon enhancement and climate benefits.	**Proposed Lead Implementers:** Regional water agencies, farmers, ranchers, and growers, RCDs **Proposed Supporting Implementers:** Groundwater sustainability agencies, local governments with groundwater resources, Farm Bureau	**Short-term**

Measure NWL-4: Expand and Maintain Urban Green Spaces While Advancing Environmental Justice Outcomes

Increase carbon stored in urban plants and soils through expansion and maintenance of green spaces that reduce the effects of flooding and extreme heat, build food sovereignty,

and beautify and connect communities. Achieve these outcomes through new regional funding, staffing, and technical assistance resources. Ensure that frontline communities benefit from urban green spaces and avoid unintended consequences by supporting a policy shift towards community-led planning to embed environmental justice and anti-gentrification approaches in urban greening. Geographic areas that may garner particular focus based on the BARCAP 2022 landcover analysis and LIDAC communities map include Assembly Bill 617 (AB 617) neighborhoods and developed regions lacking urban canopy.

GHG reductions in 2045: [Forthcoming] likely Medium

Potential Co-benefits: Local food production, community health, climate resilience, green jobs, access to nature, enhanced community engagement, improve housing quality, comfort, and safety, biodiversity

Potential Metrics: % urban canopy increase, funding invested in urban greening, # new urban green spaces, # new programs and supports for operations and maintenance

Actions	Implementers	Timeframe to start implementation
NWL 4.1: Expand urban green spaces and prevent loss through new regional funding and technical support, prioritizing green spaces that benefit frontline communities Contribute to state and local goals for regional investment in urban greening and drought resistant watering. Green spaces that may garner particular focus because of air quality, environmental justice, or climate resilience benefits include parks and trees in formerly redlined or under-greened communities, community farms and gardens, freight corridor buffers, and green stormwater infrastructure. Implementation actions may include: • increase funding through new regional-scale funding sources such as Proposition 4/state bonds, and leveraging the 2025 CARB Community Air Protection Community Greening Incentives, which can be provided to coalitions of local governments/implementers for urban greening implementation; • increase technical assistance, funding, and long-term maintenance support for urban	**Proposed Lead Implementer(s):** Regional agencies, local governments, community organizations, parks departments, public works, urban farms and gardens **Proposed Supporting Implementer(s):** CALFire, Bay Area Regional Collaborative (BARC), water agencies, San Francisco Estuary Institute [Urban Nature Program]	**Short-term**

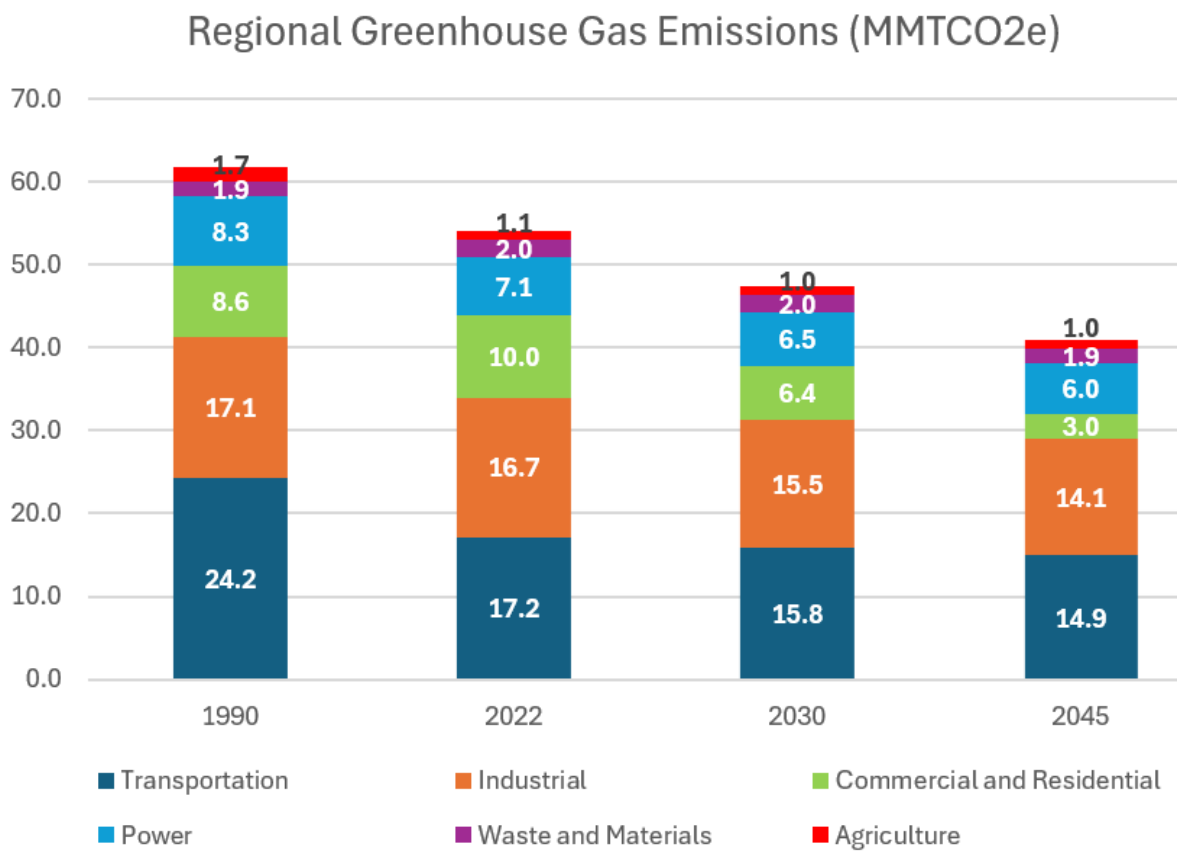
green spaces by providing tree inventories, and hands-on arborist support to local governments and other implementers at the regional scale; • identify, support, and scale pilot projects for emergent or difficult to implement urban green spaces like green buffer zones along freight corridors and urban agriculture; • regularly convene local governments and other implementers to understand and overcome barriers to implementing 'right tree right place' urban greening, allowing for iterative and targeted future technical assistance; and • dedicate regional staff time and expertise to help local governments integrate best practices into urban greening by providing policy resources, research, and case study support that will aid implementers in achieving urban greening goals.		
NWL 4.2: Advance environmental justice-centered approaches for urban greening through policy innovation, community-led planning, and support for frontline community land stewardship Implementation might consist of regional support to local governments and other implementers for policy and plan updates and to frontline community-lead stewardship for capacity building, including: • provide local governments and community organizations with a best practices policy toolkit, including emergent projects across the region, for environmental justice approaches including case studies, and local examples that embody community-led planning and outcomes for equitable urban greening that avoid unintended gentrification consequences;	**Proposed Lead Implementer(s):** Regional agency, local governments (planning), community organizations **Proposed Supporting Implementer(s):** Community members, conservation corps, nonprofits, Air District	**Short-term**

• develop and share best practices on air quality and urban greening intersection- facilitate establishment of low volatile organic compound (VOC)-emitting native new trees through exploration of resources and best available research on community health and air quality benefits of urban greening, amplifying similar work being done at Sacramento Metropolitan Air Quality Management District; • advocate for a regional shift towards community-led planning in urban greening by encouraging new urban greening projects to include frontline community members and community-based organizations early, and often in planning stages to guard against gentrification, space conflict, and other unintended harms of urban greening, explore collaboration points with AB 617 community emission reduction plans; • provide financial and technical assistance for local planners to identify and collaborate with trusted messengers and community organizations to deliver multilingual, culturally relevant urban greening outreach; and • seek additional technical and financial support opportunities to build long-term land stewardship capacity among frontline communities through education programming, and job training to implement urban greening.		

Power Sector Draft Measures

Overview of the Power Sector

The Power sector includes generation of electricity in the BARCAP region and its associated greenhouse gas (GHG) emissions.



It accounted for 13% of regional GHG emissions in 2022 (7.1 million metric tons of carbon dioxide equivalents ($MMTCO_2e$)), emitted predominantly from natural gas-fired power plants and cogeneration facilities. GHG emissions in this sector for the BARCAP region have decreased since 1990 and are projected to be 15% of regional GHG emissions in 2045 (6.0 $MMTCO_2e$), with more than two-thirds from cogeneration (compared to more than half in 2022).[17]

Goal for this sector: *Accelerate the transition to 100% clean electricity (including both power produced in the region and electricity consumed in the region), while maintaining affordability*

[17] Bay Area Air District draft GHG Emissions Inventory and Projections, to be published summer 2025 with methodology document. Projections are based on CEC's 2023 IEPR Business as Usual forecast for PG&E's natural gas power plants and California Air Resources Board's 2022 Scoping Plan for Achieving Carbon Neutrality's scenario for energy, industry and waste heat for cogeneration facilities.

and minimizing rate impacts, increasing resilience and reliability, and benefiting frontline communities.

Nearly all GHG emissions from this sector are covered by the State of California's Cap-and-Trade Program, which prevents local air districts from regulating carbon dioxide (CO_2) emissions from these sources.[18] The state also requires that electricity sold in California be 100% clean energy by 2045, with interim milestones. Community choice aggregators (CCAs or community choice energy organizations) and utilities in the region have even more ambitious clean energy goals than the state. California also has a statewide goal to shift 7,000 MW of electricity consumption to 'off-peak hours' by 2030.

BARCAP survey results showed extremely strong regional support for the production of more clean energy (ranked as the top strategy among thirteen focus areas for climate action).

Members of the region's frontline communities who participated in the BARCAP engagement process expressed concern about rising electricity rates and the reliability of the grid. They also expressed interest in more education and outreach to increase their understanding of their electricity bills and opportunities to reduce them.

The BARCAP therefore focuses on regional efforts that support small- to medium-scale clean energy and storage projects in the region that can strengthen the resilience of the grid, support local jobs, help lower energy bills for subscribers of on-site or community-solar projects, and speed up delivery of clean energy and storage to reduce GHGs from electricity consumed in the region. It also focuses on efforts to equitably expand consumer programs that help customers adjust the timing and amount of their electricity consumption and deploy clean backup power and grid technologies more widely. These strategies can help support integration of new clean energy power and storage resources onto the regional grid to meet growing electricity demand for electrification in the region and may help apply downward pressure on rates and GHGs.

For the BARCAP, clean energy is defined as zero-emissions technologies that produce electricity without emitting GHGs or harmful air pollution. Renewable natural gas and biodiesel are not considered clean energy sources due to air pollution impacts of combustion. Hydrogen, depending on how it is generated and used, may or may not be considered a clean energy source.

Measure P-1: Increase Development of Local Clean Energy and Storage Projects (with a Focus on Projects up to 20MW), Including Behind-the-Meter and Distributed Energy Resources

[18] Per state law, the Air District cannot mandate reductions in CO_2 emissions from facilities covered by the State's cap-and-trade program. Nearly all GHG emissions from this sector are CO_2 emission (99.5%), and 96% of CO_2 emissions from the power sector are covered by the program.

Develop small- to medium-scale local clean energy and storage projects to help meet a regional goal of 8.4 GW in 2030 and 31.2 GW in 2045 for clean energy generation and storage[19] and support an equitable and affordable transition to clean energy in the region and help community choice aggregators (or energy organizations) and utilities meet state goals early. Focus projects where it is the best possible use of land given local and regional considerations (e.g., brownfields, rooftops, parking lots, capped landfills, under-utilized plots, etc). Clean energy and storage projects might include but are not limited to behind-the-meter, community solar, microgrids, agrivoltaics, and feed-in tariffs. These projects might include storage or storage might be deployed as a standalone project.

GHG reductions in 2045: Low

Potential co-benefits: Lower energy bills (for subscribers of on-site or community solar projects), strengthened regional grid resilience, job creation potential, increased/faster access to clean energy and storage, reduced reliance on centralized generation and long-distance transmission

Potential metrics: MW of clean power installed in the region with fraction on locally-identified sites (from P-1) noted, MW of community solar and/or brownfield-to-brightfield (especially serving frontline communities in region), percentage of low-income households with access to clean energy and storage

Actions	Implementers	Timeframe to begin implementation
P-1.1: Support local governments to deploy state-of-the-art tools and engagement processes to identify preferred sites in the region that are well-suited for small- to medium-scale clean energy development and have community and business support; identify monetary and non-monetary incentives for project development on these sites Implementation might include: • facilitating a cohort of local governments to identify sites in their jurisdictions; • providing technical support and assistance to local governments (e.g., specific data and	**Proposed Lead Implementer:** Regional agency or organization, or local government **Proposed Supporting Implementers:** Technical consultant to support analysis, local governments, community	**Short-medium term**

[19] The targets are informed by existing planning processes and forecasts to ensure alignment with already completed analysis and state law. They consider utility scale clean energy and storage resources and smaller resources, such as customer-owned clean energy and storage resources, in the region. Forecasts were informed by California Independent System Operator (CAISO) busbar mapping and the California Energy Commission IEPR distribution generation forecasts (high). Draft interim regional targets are 13.8GW in 2035 and 18.7GW in 2040.

tools, and assistance to use tools, to determine appropriate sites based on resource potential, estimated interconnection capacity and cost or economic feasibility); • identifying incentives for project development (e.g., expedited permitting, overlays, including projects in feed-in tariffs, novel financing approaches); • developing a toolkit for local governments with case studies, policy options, and model; and • supporting community engagement (in partnership with community organizations). Assess local government facilities and properties along with commercial and industrial sites (brownfields, landfills, large commercial rooftops, parking lots, under-utilized lots, etc.). Prioritize sites that serve frontline communities, including low-income and moderate-low-income communities and multi-family buildings, as well as critical community-serving facilities. Consider potential climate impacts, like sea level rise or wild-urban interface, during site selection.	organizations, community choice aggregators, utilities	
P-1.2: Develop a roadmap for community solar and brownfield-to-brightfield projects, particularly projects serving multi-family renters and frontline communities, and identify options to fund and pilot projects at key sites Establish a workgroup composed of community organizations representing community interests, developers, property owners (especially brownfield or industrial sites), renewable energy financing companies, local governments and community choice aggregators, focused on identifying solutions to advance and accelerate community solar and/or brownfield-to-brightfield projects in the region. Special emphasis would be placed on projects that benefit frontline communities and multi-family renters. Review existing funding and financing	**Proposed Lead Implementer:** GRID Alternatives **Proposed Supporting Implementers:** Community organizations, community choice aggregators, utilities, local governments	**Short-term**

options for these projects. Identify options to pilot project(s) from the roadmap.		
P-1.3: Identify and disseminate best practices for local governments to simplify permitting of clean energy and storage projects Develop best practices for behind-the-meter and small- to medium-sized clean energy and/or storage projects. Development will be informed by a workgroup of local governments and developers and technical and policy analysis. Initial focus might be on sharing best practices for battery storage to encourage more consistency for permitting across the region. (The state has streamlined permitting for rooftop solar.) Identify mechanisms to support local governments as they update permitting.	**Proposed Lead Implementer:** Regional agency **Proposed Supporting Implementers:** Local governments, project developers	**Short-term**
P-1.4: Monitor - and explore how to address - key funding and financing gaps for behind-the-meter and in front-of-the-meter small clean energy and storage projects that benefit frontline communities, low-income and moderate-low-income households, small businesses, and community organizations Conduct a gap analysis or convene a work group to assess the sufficiency of current funding and financing for local clean energy and storage projects. Monitor a subset of the identified gaps. Deploy existing funding and financing in innovative ways to help close the gaps, including through increased awareness and accessibility of these programs (through coordination with community choice aggregators, utilities, community organizations, and others) and potentially helping address building readiness. Explore new funding or financing mechanisms, including public private partnerships or novel financing approaches, and consider ratepayer impacts.	**Proposed Lead Implementer:** Regional agency or organization **Proposed Supporting Implementers:** Community choice aggregators, utilities, community organizations, regional agency	**Short-term**

Measure P-2: Equitably Expand Customer Programs and Deploy Power System and Grid Technologies More Widely

Expand consumer programs and deploy grid technologies and clean backup power resources to enhance flexibility, efficiency, reliability and affordability of electricity delivery, while aligning with state goals and plans and reducing carbon emissions. (Consumer programs include demand flexibility solutions,[20] such as demand-side management, virtual power plants,[21] and vehicle-to-everything,[22] and examples of technologies and resources include solar+battery projects that can disconnect from the grid, district geothermal heating and cooling, and grid enhancing technologies.[23]) Ensure access to and direct benefits from these programs, technologies, and resources for frontline communities, including low-income and moderate-low-income households and multi-family renters. (Note: use of residential batteries (encouraged in P-1) can provide valuable resilience benefits and support this measure.)

GHG reductions in 2045: Supporting

Potential co-benefits: New clean energy power and storage resources able to integrate onto grid to meet growing electricity demand for electrification, potential downward pressure on electricity rates and reduced customer costs, increased resilience and reliability of grid, increased access to consumer programs and reliable and resilient clean backup power

Potential metrics: # of critical public facilities and/or key community facilities with clean back up power, participation in demand flexibility programs and virtual power plants (especially by low-income households and frontline communities), # of local governments provided with information about resilient energy resources and demand flexibility options,

Actions	Implementers	Timeframe to start implementation
P-2.1: Increase the number of critical public facilities with reliable clean backup power and key	**Proposed Lead Implementers:**	**Short-term**

[20] Demand/load flexibility solutions help electricity customers adjust the timing and amount of their electricity consumption to match the supply of electricity. They can help "shift their (customers) energy usage to when electricity is cheaper and clean, and use less energy when the grid is under stress or running polluting power plants" (California Energy Commission).

[21] Virtual power plants are a software-based management of distributed energy resources - such as rooftop solar, batteries, electric vehicle chargers, and appliances *(including smart thermostats, smart water heaters, smart plugs)* – that serve to automatically generate, store, and use energy to support the grid and reduce costs to consumers.

[22] Vehicle-to-everything, also known as bi-directional electric vehicle charging, allows vehicle owners to use the energy stored in the electric vehicle's battery to power homes, grids, and other devices.

[23] Grid-enhancing technologies maximize the electricity transmission across the existing system through sensors, power flow control devices, and analytical tools (Department of Energy definition). They can reduce the need for new transmission infrastructure and enable the addition of clean, renewable power to the grid.

community facilities with clean resilient energy resources (e.g., solar+storage, microgrids) in coordination with local government emergency response plans. (In some cases, solar+storage hybrid[24] may be necessary depending on the end use.) Support local governments and community organizations to identify and access funding and financing for the upfront costs and/or operation and maintenance of projects at key facilities. Coordinate this support with local government emergency response plans and networks. Collect and share case studies of successful procurement, development, and financing. In the near-term, some facilities may need hybrid systems to fully meet their reliability or resilience needs. Explore the important opportunity presented by resilient energy resources at schools to educate youth about clean power resources and clean energy jobs.	Community choice aggregators, utilities, BayREN **Proposed Supporting Implementers:** County emergency operations staff, public facility staff, community organizations	
P-2.2: Accelerate scaling up of different load flexibility solutions across the region in an equitable manner to improve grid reliability, help control costs, and align with state load shift goals to shift electricity usage In the near-term (0-2 years): Electricity providers scale up demand flexibility solutions by: • sharing best practices, data, and lessons learned from pilots and existing programs; • exploring new incentives and tariffs; • improving and coordinating customer outreach and education efforts to increase customer enrollment (including multilingual and culturally relevant outreach and education in partnership with community organizations); and	**Proposed Lead Implementers:** Community choice aggregators, utilities **Proposed Supporting Implementers:** BayREN, community organizations	**Short – medium-term**

[24] The goal is to produce as much day-to-day and resilient energy from renewable sources as possible, and have some on-demand generation for critical missions for only when sun, wind or other intermittent sources or battery storage are inadequate at that time. Hybrid systems refer to including non-solar or storage-based resources along with solar power plus battery storage (and potentially other renewable generating sources like micro hydro, micro wind, etc). These systems may be necessary if the amount or duration of power necessary to meet a facility's resilience needs cannot be met with solar+storage alone.

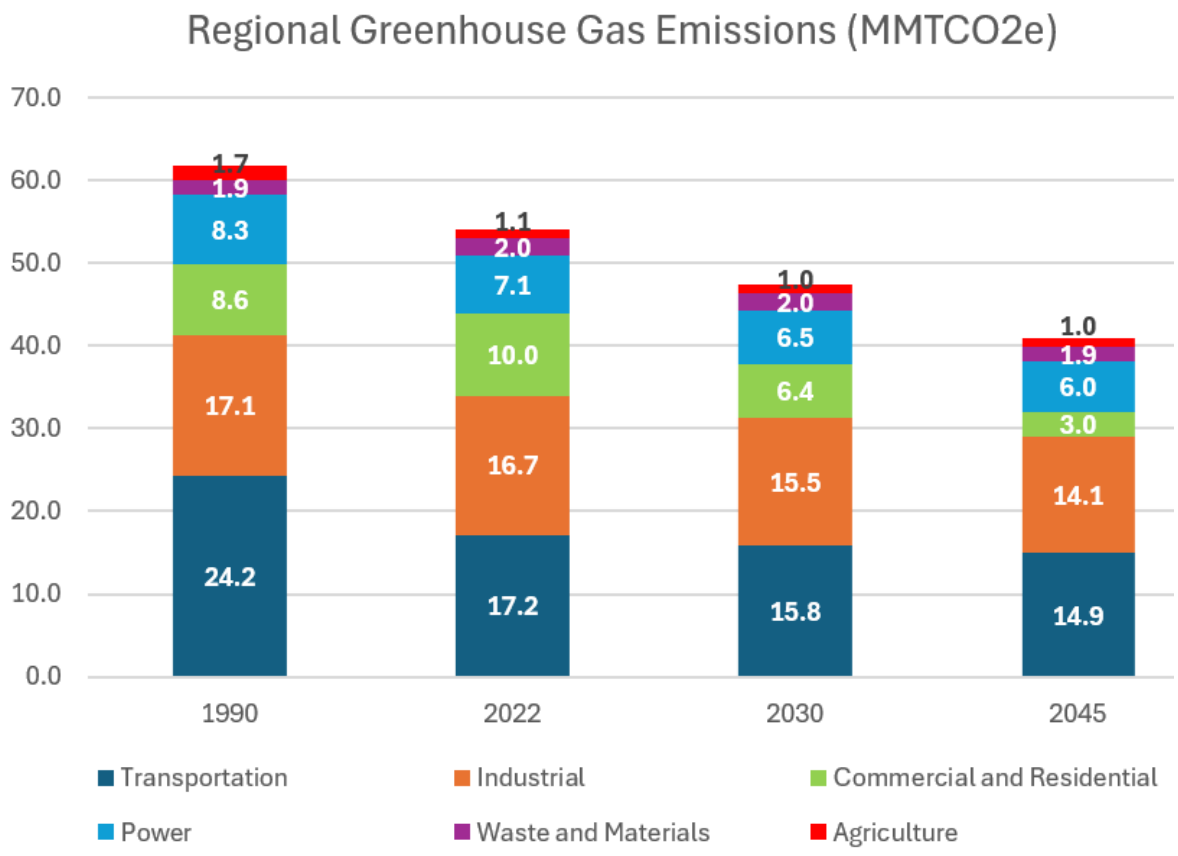
• expanding pilots in additional service areas. In the medium term (2-5 years): • securing funding and financing and conduct outreach in partnership with community organizations and a regional agency, to support the equitable scaling of virtual power plants and other critical load flexibility solutions, particularly low-income and moderate-low-income households in frontline communities and key public facilities serving these communities; and • scaling load flexibility solutions for commercial and industrial customers.		
P-2.3: Modernize transmission and distribution lines to increase efficiency and improve reliability (e.g., grid-enhancing technologies, reconductoring[25]) Update transmission and distribution lines with technologies that increase their efficiency (and therefore their ability to bring more clean energy into the region) and their reliability. Leverage existing grants and loans to support this action.	**Proposed Lead Implementer:** PG&E	**TBD**

[25] Reconductoring is replacing old, existing power line conductors with newer, more efficient conductors, which can increase how much electricity they can carry.

Transportation Sector Draft Measures

Overview of the Transportation Sector

The transportation sector includes on-road vehicles (such as light-duty automobiles and heavy-duty trucks) and off-highway mobile sources (such as locomotives, ships, and aircraft). Greenhouse gas (GHG) emissions from off-road equipment (such as lawn and garden equipment, construction equipment, and agricultural tractors) are included in the inventories for other sectors.



The transportation sector accounted for 32% of GHG emissions in 2022 in the BARCAP region (17.2 million metric tons of carbon dioxide equivalents ($MMTCO_2e$)), predominantly emitted from fuel combustion in vehicles, with passenger cars, light-duty trucks, heavy-duty vehicles, and medium- duty vehicles as the largest contributors accounting for approximately 31%, 22%, 18%, and 13% of total emissions from the sector, respectively. GHG emissions in this sector for the BARCAP region have decreased since 1990 and are projected to be approximately 36% of regional GHG emissions in 2045 (14.9 $MMTCO_2e$), with

passenger cars, light-duty trucks, heavy-duty vehicles, and medium- duty vehicles still being the largest contributors, respectively.[26]

Goal for this sector*: Accelerate decarbonization of the transportation sector through increasing funding, implementing policies, and providing technical support for zero-emission vehicles (ZEVs) and the charging and fueling infrastructure that support them, as well as creating policies that require expanded use of ZEVs in goods movement.*

Transportation solutions to reduce GHG emissions can be grouped into one of three categories, per the California Air Resources Board's 2022 Scoping Plan for Achieving Carbon Neutrality (Scoping Plan): vehicle miles traveled, fuels, and technology.

- *Vehicle Miles Traveled (VMT)* refers to the measure of distance a vehicle travels
- *Fuels* refer to the source of energy used to power the vehicles and equipment
- *Technology* refers to the vehicles as well as the associated charging or fueling infrastructure

Managing total demand for transportation energy by reducing the miles people need to drive daily from their homes to work, school, or key services is critical for a more sustainable, zero-carbon, and multi-modal transportation future. Land use, transit, bicycle, and pedestrian policies can reduce VMT and emissions of GHGs and other criteria pollutants and toxic air contaminants. Additionally, sustainable land use policies may also help avoid land disturbances that could result in the loss of carbon sequestration in the natural environment.

The Metropolitan Transportation Commission's (MTC) Sustainable Communities Strategy, Plan Bay Area, focuses on reducing VMT in the region by aligning transportation, housing, and land use decisions in the Bay Area to achieve GHG emission reduction targets and to meet the requirements of SB 375 (Steinburg, 2008). Since MTC's Plan Bay Area focuses on VMT reduction strategies, including active transportation (biking and walking infrastructure), these strategies are not included in the BARCAP.

The state is focusing on ensuring that an adequate supply of zero-carbon alternative fuels and distribution infrastructure is available to meet the needs of ZEVs into the future. Electricity and hydrogen are currently the primary fuels for ZEVs and both must be produced using low-carbon technology and feedstocks to minimize upstream emissions. The transition to ZEVs will not happen overnight and the state expects conventional vehicles from legacy fleets to remain on the road for some time. As such, in addition to building the production and distribution infrastructure for zero-carbon fuels, the state plans to continue to support low-carbon liquid fuels during this period of transition and for harder sectors for ZEV technology such as aviation, locomotives, and marine applications. The

[26] Bay Area Air District draft GHG Emissions Inventory and Projections, to be published summer 2025 with methodology document.

state is working to do this through investments in the production and distribution of low- and zero-carbon fuels and through the Low Carbon Fuel Standard.

The state's Executive Order N-79-20 calls for 100 percent ZEV sales of new light-duty vehicles by 2035; sets targets for transitioning the medium- and heavy-duty fleet to zero emissions: by 2035 for drayage trucks and by 2045 for buses and heavy-duty long-haul trucks, where feasible; and 100 percent sales of new off-road vehicle and equipment by 2035, where feasible. The Scoping Plan reflects these targets, and CARB has a number of regulations to fulfill the goals of the executive order that serve as the primary mechanism to help deploy ZEVS. Specifically for light-duty EVs, the state has set a goal of 5 million EVs sold by 2030 and the Air District has set a target of 90% of vehicles in the Bay Area being zero-emission by 2050[27].

Critical in meeting these targets is deploying sufficient charging and fueling infrastructure to support these ZEVs and focusing on equity to ensure that the transition to ZEVs is affordable for low-income households and frontline communities and that those communities benefit most from air quality co-benefits of the transition.

Although off-road mobile sources, such as locomotives, ships, and aircraft, are included in the inventory for the sector, they fall under the regulatory authority of the state or federal government and have not been explicitly included in the measures for the BARCAP.

BARCAP survey results showed strong regional support for active transportation (ranked third out of thirteen potential focus areas for climate action). The transition to electric vehicles was comparatively less popular among survey respondents.

Members of the region's frontline communities who participated in the BARCAP engagement process expressed concerns around EV charging reliability and accessibility, costs of EVs, range anxiety, and theft of parts. Additionally, while interested in expanded access to transit, biking, and walking, they had concerns about bike safety. Projects to expand roadways and increased e-commerce leading to increased VMT from goods movement were also concerns.

The BARCAP therefore focuses on accelerating the decarbonization of vehicles and equipment through policies and programs that incentivize zero-emission vehicles and deploy the charging and fueling infrastructure to support those vehicles, including vehicles and equipment used for goods movement.

Measure T-1: Accelerate Light-Duty Electric Vehicle Adoption

Support the acceleration of light-duty electric vehicle (EV) adoption through expanded incentives for EVs, coordinated planning for EV charging locations and installation of EV

[27] 2017 Bay Area Clean Air Plan, Bay Area Air District, 2017

chargers to meet expected demand across the region, and expanded support for low-income residents, frontline communities, and local governments in adopting EVs.

GHG reductions in 2045: Low

Potential co-benefits: Reduced exposure to air pollution, health benefits, reduced cost burden, increased access to services, job creation

Potential metrics: Percentage of registered light-duty EVs in the region, number of level 2 and DC fast chargers installed (total and in frontline communities)

Actions	Implementers	Timeframe to start implementation
T-1.1: Expand incentives for the purchase or lease of EVs Include e-micromobility (e-bikes, e-scooters, etc.) and pre-owned EVs, especially in frontline communities and for low-income residents to lower upfront costs of EV purchase.	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** Air District, community choice aggregators, MTC	**Medium-term**
T-1.2: Provide monetary and non-monetary incentives to deploy EV charging stations at strategic locations to help fill gaps in the existing charging network Include a focus on deploying DC fast and multi-family charging in charging deserts and key commute routes to accelerate the adoption and use of EVs and to help reduce range anxiety and provide greater accessibility, especially in frontline communities. Actions may include: • exploring the feasibility of municipalities or CCAs providing non-monetary incentives, such as subsidized or lower lease rates, providing make-ready infrastructure subsidies, and guaranteeing power availability in areas served by publicly owned utilities; • securing funding for planning/technical assistance or direct-install programs for	**Proposed Lead Implementer:** Regional agency **Proposed Supporting Implementers:** Air District, community choice aggregators, CARB, CEC, county transportation agencies, local governments, utilities	**Medium-term**

multifamily properties and smaller businesses/nonprofits interested in hosting public or workplace charging sites; • securing funding for ongoing maintenance to keep chargers available and operational; • securing funding for low-cost, Level-1 charging at multi-family properties; • exploring including charger uptime requirements when funding public charging stations to improve availability, performance, and accessibility; and • working with communities to identify trusted institutions for locating low-cost, community-facing EV charging.		
T-1.3: Partner with community organizations to provide community outreach, awareness, and technical support for low-income households and small business/nonprofits in navigating incentives Actions may include: • expanding programs to directly assist low-income households, affordable housing developers, and CBOs with funding applications and grant writing; • supporting light-duty fleet electrification for small merchants, Transportation Network Company drivers (e.g., Uber, Lyft), etc.; support charger installation site hosts such as community centers, churches, etc.; • ensuring community outreach and support is culturally relevant and multi-lingual; include information about comparative costs for operations and maintenance of EVs, EV safety issues, theft issues, and range-anxiety; and • working to better understand immigrant community needs for incentives support including how submitting required paperwork could negatively impact their lives.	**Proposed Lead Implementer:** Regional organization **Proposed Supporting Implementers:** Air District, MTC, community choice aggregators, community organizations	**Short-/ medium-term**

T-1.4: Expand support for local governments in developing and implementing policies that help accelerate the transition to EVs, such as zoning and building code updates, permit streamlining, and parking and curbside policies Include local government approaches that may involve strengthening local requirements for new developments or parking facilities to include EV charging infrastructure; simplifying and expediting the permitting process for charger installations to reduce delays and costs; designating EV charging zones, prioritizing public right-of-way access for chargers, or implementing preferential parking policies.	**Proposed Lead Implementer**: Regional Agency **Proposed Supporting Implementers:** MTC, local governments, community organizations	**Short-/ medium-term**

Measure T-2: Accelerate Medium- and Heavy-Duty Vehicle and Equipment Decarbonization

Accelerate medium- and heavy-duty vehicles and equipment adoption through expanded incentives, coordinated deployment of EV chargers and fueling infrastructure to meet expected demand across the region, while incorporating the needs of low-income and frontline communities.

GHG reductions in 2045: Low

Potential co-benefits: Reduced exposure to air pollution, health benefits, job creation

Potential metrics: Number of zero-emission medium- and heavy-duty vehicles replaced and/or purchased, number of charging and fueling hubs deployed

Actions	Implementers	Timeframe to start implementation
T-2.1: Expand incentives and loan assistance for the purchase of medium- and heavy-duty zero-emission (ZE) vehicles and equipment Actions may include: • targeting incentives to electrify equipment at marine and air ports;	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** community choice aggregators	**Medium-term**

• creating a streamlined voucher incentive program to electrify small fleets of heavy-duty trucks; and • increasing participation from operators of older and dirty heavy-duty diesel vehicles and equipment that operate in frontline communities.		
T-2.2: Encourage large fleets (e.g., municipal, transit, or corporate fleets) to serve as anchor tenants for charging and clean-fuel fueling hubs Increase economic feasibility of charging/fueling hubs by sharing charging among multiple fleets domiciled or operating in the same neighborhood/logistics hub. Work regionally to identify and engage with fleets that operate regionally but may frequently stop/fuel in specific neighborhoods to inform this effort.	**Proposed Lead Implementer:** Regional Agency **Proposed Supporting Implementers:** MTC, community choice aggregators, counties, local governments, ports, private fleets	**Medium-term**

Measure T-3: Accelerate Decarbonization of Goods Movement

Pilot and implement policies that accelerate decarbonization of goods movement and deliveries of goods and reduce emissions that result from increased e-commerce.

GHG reductions in 2045: Medium

Potential co-benefits: Reduced exposure to air pollution, health benefits

Potential metrics: Number of pilots deployed, development and dissemination of policy for warehouses

Actions	Implementers	Timeframe to start implementation
T-3.1: Pilot policies that expedite the transition to ZE last-mile delivery for goods to identify feasibility and best practices Actions may include: • piloting ZE delivery zones and/or ZE loading zones, in frontline communities and urban centers to facilitate and promote the use of	**Proposed Lead Implementer:** Regional agency, local governments **Proposed Supporting Implementers:**	**Medium-term**

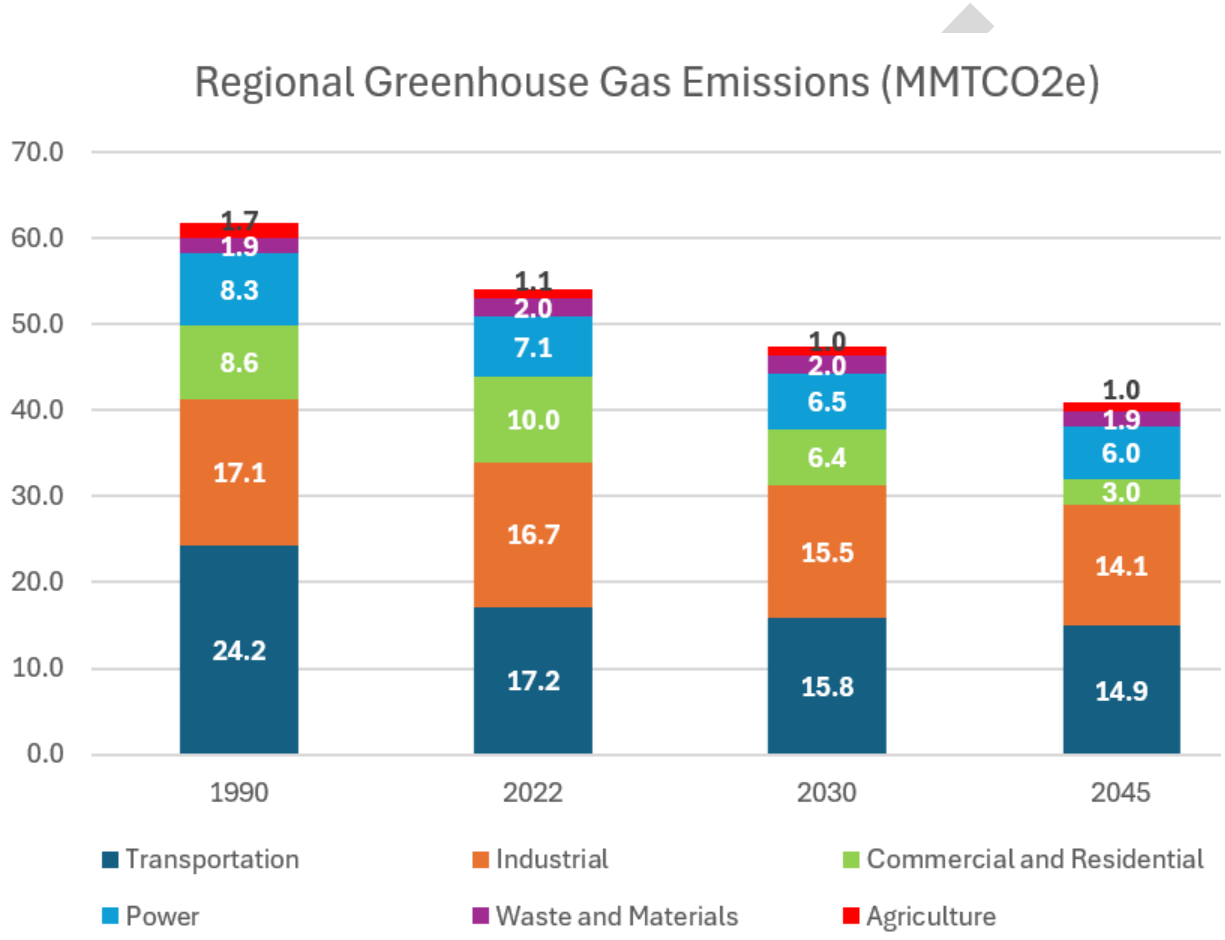
ZE delivery trucks or e-cargo bikes for last-mile delivery of goods; • piloting urban micro-hubs to encourage last-mile ZE deliveries with ZE vehicles or e-cargo bikes (a micro-hub is a small-scale, strategically located facility equipped with basic storage facilities and loading docks that act as an intermediary point for the consolidation and distribution of goods); and • developing and disseminate best practices and technical assistance that is informed by pilots to increase deployment of urban distribution centers and ZE delivery zones more broadly.	Air District, MTC, counties	
T-3.2: Explore regulatory and non-regulatory approaches to incentivize or mandate ZE trucks and off-road mobile operations at truck-attracting businesses Actions may include: • developing and disseminate model policies for local governments that require the use of ZE trucks and ZE off-road mobile operations at new or expanded warehouses; and • exploring the development of a magnet source rule similar to the South Coast Air Quality Management District's Warehouse Actions and Investment to Reduce Emission (WAIRE) Rule Program[28] to address NO_x and diesel particulate matter from warehouses. Operations could include ZE transport refrigeration units, forklifts, etc. For any regulatory approaches, consider phased transitions to compliance to allow operators that comply early to maintain eligibility for all incentive sources.	**Proposed Lead Implementer:** Air District **Proposed Supporting Implementers:** Local governments, ports, private fleets	**Medium-term**

[28] The WAIRE Program is an indirect source rule that regulates warehouse facilities to reduce emissions from the goods movement industry. For more information: https://www.aqmd.gov/home/rules-compliance/compliance/waire-program

Waste and Materials Sector Draft Measures

Overview of the Waste and Materials Sector

The Waste and Materials sector consists of the food, goods, and building materials consumed and discarded in the BARCAP region.



The greenhouse gas (GHG) emissions from materials decomposing in the region's waste management facilities accounted for 4% of regional GHG emissions in 2022 (2.0 million metric tons of carbon dioxide equivalents ($MMTCO_2e$)), with landfills contributing most of these emissions. GHG emissions from this sector have remained relatively stable since 1990 and are projected to be approximately 5% of regional emissions in 2045 (1.9 $MMTCO_2e$ for Waste, out of 40.95 $MMTCO_2e$ total)[29], with landfills continuing to contribute most to

[29] Bay Area Air District draft GHG Emissions Inventory and Projections, to be published summer 2025 with methodology document. Projections are based on California Air Resources Board's 2022 Scoping Plan for Achieving Carbon Neutrality's scenario for organic waste profile.

emissions. GHG emissions from the production of materials that are consumed in the region are not included in BARCAP's GHG inventory because they occur predominantly outside the region, but they can be ten times greater than landfill emissions.[30] Therefore, the measures in this sector aim to reduce the GHG emissions related to the whole lifecycle (from production to waste) of materials consumed in the region through better material use.

Goal for this sector*: Reduce organic discards going to landfill by 75% in a manner that also reduces GHG emissions over the lifecycle of materials and improves communities' health.*

California's main strategy to reduce waste-related emissions is the Short-Lived Climate Pollutants Act (Senate Bill 1383), which aims to reduce organic discards going to landfills by 75% and recover 20% of currently wasted edible food to feed people. Implementation of SB 1383 is primarily at the local level. Assembly Bill 2446 sets a goal of reducing embodied carbon (emissions related to manufacturing, transportation and installation) of building materials by 40% by 2035. Together, food, other organics, and building materials make up a majority of what the region consumes and wastes. Improving how we use these materials has the potential for the biggest emissions reductions among material types, as well as the potential to improve people's lives through food security, healthy homes, and job opportunities.

BARCAP survey results showed regional support for waste reduction, recycling, and composting (ranked among the top five of thirteen potential focus areas for climate action by nearly 30% of respondents). Similarly, almost 30% of respondents ranked strengthening local food production and consumption through reduced food waste and stronger food security as a top-five strategy for potential focus areas.

Members of the region's frontline communities who participated in the BARCAP engagement process expressed the importance of having access to healthy, affordable food and buildings. They emphasized the important role of community organizations in filling gaps in the food system and strengthening their ability to grow, distribute, and compost food in their communities. Health impacts were an important concern, particularly related to plastics, toxins in building materials, and an inequitable air pollution burden from waste management facilities.

The BARCAP therefore focuses on regional efforts that support community-based initiatives for food recovery, production, distribution, and composting to address food insecurity and reduce the amount of organics decomposing in landfills. It also focuses on efforts to increase the use of low-carbon and nontoxic building materials. Finally, it addresses proper waste sorting and treatment to decrease the amount of organics going to

[30] U.S. EPA. 2020b. Documentation for greenhouse gas emission and energy factors used in the waste reduction model (WARM): Management practices chapters. WARM Version 15. Washington, DC, USA: United States Environmental Protection Agency, Office of Resource Conservation and Recovery. https://www.epa.gov/warm/documentationchapters-greenhouse-gas-emission-energy-and-economic-factors-used-waste-reduction.

landfill and to manage landfills, composting facilities, and wastewater treatment facilities to minimize their GHG emissions.

Measure W-1: Enable Food Access and Clean Compost

Support local governments and food recovery organizations to more effectively meet their food recovery and composting goals and overcome implementation hurdles to implement Senate Bill 1383 goals to reduce landfilled organic discards by 75% and recover 20% of edible food.

GHG reductions in 2045: Low

Potential co-benefits: Improved community health, reduced cost burden through increased access to food, reduced exposure to emissions near waste treatment facilities, creation of food recovery jobs, new green spaces and community gardens

Potential metrics: Pounds of food recovered to feed people

Actions	Implementers	Timeframe to start implementation
W-1.1: Develop funding and asset-sharing mechanisms to support edible food recovery operations Expand edible food recovery capacity and training for businesses and institutions that generate surplus edible food to enable at least the minimum edible food recovery requirement in SB 1383 and deliver food to people experiencing food insecurity. Steps to implement this action include: • assessing the funding needs for food recovery, grounded in data of actual cost of service; • pursuing a sustained and dedicated funding source, potentially paid for by the region's largest food waste generators; • designing the funding to be accessible to food recovery organizations with effective and equitable food distribution models; • strengthening regional and local networks of food recovery organizations to enable them to pursue funding collectively; and	**Proposed Lead Implementers:** Counties **Proposed Supporting Implementers:** Food recovery organizations	**Medium-term**

• supporting these networks to develop mutual benefit arrangements for shared assets (e.g. clean air vehicles, food processing and storage facilities and equipment, and software).		
W-1.2: Coordinate regional efforts to improve sorting of organics discards, including reducing common contaminants of the organics stream Coordinate joint efforts across counties to minimize duplication of effort and share best practices with local governments and waste haulers, including strategies to: • translate informational materials and target outreach to multi-family, small mom and pop, minority-owned businesses and restaurants, and multi-tenant commercial properties; • reduce single-use foodware and plastics through regionally aligned messaging, incentives, and policies that advance reusable foodware and other alternatives; • include in waste hauler agreements the use of new technologies that enable real-time monitoring and feedback on proper sorting (e.g. cameras in trucks and bins, artificial intelligence analysis of discard streams); and • receive feedback from compost users in natural and working lands to improve strategies to reduce contamination.	**Proposed Lead Implementers:** Counties **Proposed Supporting Implementers:** Waste haulers	**Medium-term**
W-1.3: Increase the region's understanding of lifecycle and health impacts of food and goods consumption and the opportunity for community-scale solutions Include information about lifecycle, health, and community impacts of materials in waste-related and other messages distributed to communities by regional and local governments. Partner with schools to educate youth about health, climate	**Proposed Lead Implementer:** Regional agency or local governments **Proposed Supporting Implementers:** Schools, food producers, food recovery organizations,	**Medium-term**

literacy, and community-scale entrepreneurship. Impacts and benefits to highlight include: • lifecycle environmental impacts including climate pollution from the production of food and other goods consumed in the region; • health concerns including toxic chemicals, microplastics, and date labeling; and • community resilience, food security, and economic benefits from community-scale food production, distribution, recovery, gleaning, and composting.	community composters, health agencies	

Measure W-2: Advance Low-Carbon Building Materials and Reuse

Reduce waste and GHG emissions associated with building materials in alignment with Assembly Bill 2446 goals to reduce embodied carbon by 40% by 2035 through expansion of the California Green Building Code and economic development initiatives that advance deconstruction[31] and reuse, material efficiency, and the prevalence of carbon storing, low-carbon, and healthy building materials. Actions are informed by a series of convenings of the Bay Area Deconstruction Working Group.[32]

GHG reductions in 2045: Supporting

Potential co-benefits: Reduced exposure to health-damaging demolition dust containing asbestos, lead, etc. through manually deconstructing buildings, reduced exposure to health-damaging toxins off-gassing from building materials, improved housing quality, job creation (supply chain and deconstruction) anti-displacement if existing buildings retrofitted to provide more housing units

Potential metrics: Tons of used building material salvaged by resellers, metric tons of carbon dioxide equivalent decrease in embodied carbon from a baseline measured by the California Air Resources Board

[31] Deconstruction is the systematic dismantling of a structure, or portion thereof, to maximize the salvage of materials for reuse, in preference over salvaging materials for recycling, energy recovery, or sending the materials to the landfill.

[32] The Bay Area Deconstruction Working Group is composed of representatives of government, construction industry, and nonprofits, in fall 2024 to discuss strategies to increase the use of salvaged materials. It was convened by San Francisco Environment Department, EPA Region 9, and supported by StopWaste. Information can be found on StopWaste's website: https://www.stopwaste.org/at-work/built-environment/construction-demolition-debris/bay-area-deconstruction-workgroup

Actions	Implementers	Timeframe to start implementation
W-2.1: Support the state and local governments to implement and expand the California Green Building (CALGreen) embodied carbon code requirements Engage with the state's code setting commissions and local governments to amend building codes (e.g. adopting CALGreen Tiers, material-specific requirements, or expanding to more project types) to encourage material efficient building design and lower carbon material choices, deconstruction surveys, and use salvaged materials. Increase the code's effectiveness by supporting its implementation. This action includes providing: • comments and information during code development processes; • templates and justification for local reach code adoption; • training resources (e.g. those developed by state agencies or architectural associations) to local building officials and design teams; and • coordination across jurisdictions for regional consistency to ease compliance by construction teams that work across the region.	**Proposed Lead Implementer:** Regional agency or counties **Proposed Supporting Implementers:** Local government building departments, building sector associations	**Medium-term**
W-2.2: Work with construction teams and suppliers to increase availability and adoption of low-carbon building materials and practices Increase adoption of reuse and low carbon practices by project teams and increase the availability of low carbon materials in the region through: • information sharing and education through existing networks and industry associations; • public recognition, faster permitting for deconstruction or projects pursuing certifications like TRUE or Zero Carbon;	**Proposed Lead Implementer:** Regional agency, counties, or industry networks **Proposed Supporting Implementers:** Local governments, industry associations,	**Medium-term**

• identification of priority materials and products to focus on for the Bay Area; • economic development including workforce training, entrepreneurship support, and physical infrastructure such as space for manufacturing, research and prototyping, and storing salvaged materials; and • collaboration with rural economic development agencies and initiatives in natural and working lands for regeneratively sourced wood and agricultural building materials.	economic development agencies, higher education institutions	
W-2.3: Identify opportunities for the region's existing buildings Assess how much vacant space and reusable materials are in the region's existing buildings. Compile economic, land use, assessments of salvageable materials, and building type and age information to establish a regional understanding that will enable the region to: • identify opportunities to retrofit underused commercial and oversized residences to accommodate more housing units or community-based economic development (e.g. pop-ups in vacant retail spaces) • identify commercial sites for storing and processing salvaged building materials • target materials to deconstruct and salvage when buildings are taken down or remodeled.	**Proposed Lead Implementer:** Regional agency or counties **Proposed Supporting Implementers:** Regional governments, local governments, deconstruction assessors and contractors, academic institutions	**Medium-term**

Measure W-3: Reduce Methane Emissions from Waste Management Facilities

Reduce methane emissions through expansion or amendment of existing Air District rules or engage in new rulemaking to address sources including landfills, compost facilities and wastewater treatment facilities.

GHG reductions in 2045: Low

Potential co-benefits: TBD

Potential metrics: TBD

Actions	Implementers	Timeframe to start implementation
W-3.1: Explore revisions to Air District's regulation to reduce emissions from landfills Determine if Air District's Rule 8-34 to reduce methane and non-methane volatile organic compounds from landfills needs to be updated depending on the direction of the state's rulemaking. The state currently has a Landfill Methane Regulation in place and is continuing to explore updates to further reduce emissions as part of the Climate Change Scoping Plan process.	**Proposed Lead Implementer:** Air District	
W-3.2: Explore policy options to reduce emissions from wastewater treatment facilities Review current understanding of GHG emissions from wastewater treatment facilities and explore options to reduce methane and other emissions from wastewater treatment facilities and anaerobic digestion systems. Based on findings, determine whether rule development is needed and initiate that process.	**Proposed Lead Implementer:** Air District	
W-3.3: Explore rulemaking to minimize emissions of methane, volatile and toxic organic compounds, and odorous substances from organic waste handling facilities, including large composting facilities Review regulatory mechanisms to reduce emissions. Conduct outreach to facility operators and impacted communities. Develop specific requirements for facilities. Based on findings, determine whether rule development is needed and initiate that process.	**Proposed Lead Implementer:** Air District	