



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

BOARD OF DIRECTORS  
STATIONARY SOURCE COMMITTEE

November 13, 2024

COMMITTEE MEMBERS

VACANT – CHAIR  
KEN CARLSON  
LYNDA HOPKINS  
GABE QUINTO  
STEVE YOUNG

MARK ROSS – VICE CHAIR  
JOHN GIOIA  
OTTO LEE  
VICKI VEENKER

**MEETING LOCATION(S) FOR IN-PERSON ATTENDANCE BY  
COMMITTEE MEMBERS AND MEMBERS OF THE PUBLIC**

**Bay Area Metro Center  
Yerba Buena Room  
375 Beale Street  
San Francisco, CA 94105**

**City of Palo Alto City Hall  
250 Hamilton Ave.  
Palo Alto, CA 94301**

**Office of Contra Costa County  
Supervisor John Gioia  
Conference Room  
11780 San Pablo Ave., Suite D  
El Cerrito, CA 94530**

**Pleasant Hill  
2255 Contra Costa Blvd., Suite 202  
Pleasant Hill, CA 94523**

**THE FOLLOWING STREAMING OPTIONS WILL ALSO BE PROVIDED**

**These streaming options are provided for convenience only. In the event that streaming connections malfunction for any reason, the Stationary Source Committee reserves the right to conduct the meeting without remote webcast and/or Zoom access.**

**The public may observe this meeting through the webcast by clicking the link available on the air district's agenda webpage at [www.baaqmd.gov/bodagendas](http://www.baaqmd.gov/bodagendas).**

**Members of the public may participate remotely via Zoom at <https://bayareametro.zoom.us/j/88946811724>, or may join Zoom by phone by dialing (669) 900-6833 or (408) 638-0968. The Webinar ID for this meeting is: 889 4681 1724**

**Public Comment on Agenda Items: The public may comment on each item on the agenda as the item is taken up. Members of the public who wish to speak on a matter on the agenda will have two minutes each to address the Committee on that agenda item, unless a different time limit is established by the Chair. No speaker who has already spoken on an item will be entitled to speak to that item again.**

**The Committee welcomes comments, including criticism, about the policies, procedures, programs, or services of the District, or of the acts or omissions of the Committee.**

**Speakers shall not use threatening, profane, or abusive language which disrupts, disturbs, or otherwise impedes the orderly conduct of a Committee meeting. The District is committed to maintaining a workplace free of unlawful harassment and is mindful that District staff regularly attend Committee meetings. Discriminatory statements or conduct that would potentially violate the Fair Employment and Housing Act – i.e., statements or conduct that is hostile, intimidating, oppressive, or abusive – is *per se* disruptive to a meeting and will not be tolerated.**

# STATIONARY SOURCE COMMITTEE MEETING AGENDA

**WEDNESDAY, NOVEMBER 13, 2024**

**10:00 AM**

**1. Call to Order - Roll Call**

*The Committee Chair shall call the meeting to order and the Clerk of the Boards shall take roll of the Committee members.*

**2. Pledge of Allegiance**

**CONSENT CALENDAR (Item 3)**

**3. Approval of the Draft Minutes of the Stationary Source Committee Meeting of October 9, 2024**

*The Committee will consider approving the Draft Minutes of the Stationary Source Committee Meeting of October 9, 2024.*

**INFORMATIONAL ITEM(S)**

**4. Update on Refinery Corridor Community Air Monitoring**

*The Committee will consider and discuss an update on refinery corridor community air monitoring, including the particulate monitoring program that was approved by the Board of Directors in April 2024 based on the recommendations of the Incident Response Monitoring Ad Hoc Committee and this Committee. This item will be presented by Dr. Kate Hoag, Assistant Manager, Meteorology and Measurement Division.*

**5. Update on Indirect Sources and Questions on Marine Source Impacts**

*As a follow-up to the September 2024 Committee Meeting discussion, the Committee will receive an update on regulating indirect sources and responses to questions regarding marine source impacts. The presentation will include a brief overview of the regulatory landscape for marine sources and an illustration of the marine source impacts on Assembly Bill (AB) 617 communities. This item will be presented by Virginia Lau, Manager in the Assessment, Inventory, and Modeling Division.*

6. Implementation of Programs related to Zero NOx Building Appliances

*The committee will hear from a group of speakers who are administering a range of programs that support implementation of zero nitrogen oxides (NOx) appliance replacement projects like those called for under amended Rules 9-6 and 9-4 (“building appliance rules”). The speakers are: Blake Herrschaft, PE, LEED AP, Building Electrification Programs Manager with Peninsula Clean Energy, and a team representing the statewide heat pump incentive program called “TECH Clean California Program (TECH)”: Nate Dewart, Business Strategy Fellow with Energy Solutions; Bruce Mast, Principal with Ardenna Energy; and Amy Dryden, Senior Director of Strategic Innovation with Association for Energy Affordability, who will each present updates regarding different TECH sub-programs designed to facilitate the installation of zero NOx building appliances.*

**OTHER BUSINESS**

7. Public Comment on Non-Agenda Matters

*Pursuant to Government Code Section 54954.3, members of the public who wish to speak on matters not on the agenda will be given an opportunity to address the Committee. Members of the public will have two minutes each to address the Committee, unless a different time limit is established by the Chair. The Committee welcomes comments, including criticism, about the policies, procedures, programs, or services of the District, or of the acts or omissions of the Committee. Speakers shall not use threatening, profane, or abusive language which disrupts, disturbs, or otherwise impedes the orderly conduct of a Committee meeting. The District is committed to maintaining a workplace free of unlawful harassment and is mindful that District staff regularly attend Committee meetings. Discriminatory statements or conduct that would potentially violate the Fair Employment and Housing Act – i.e., statements or conduct that is hostile, intimidating, oppressive, or abusive – is per se disruptive to a meeting and will not be tolerated.*

8. Committee Member Comments

*Any member of the Committee, or its staff, on his or her own initiative or in response to questions posed by the public, may: ask a question for clarification, make a brief announcement or report on his or her own activities, provide a reference to staff regarding factual information, request staff to report back at a subsequent meeting concerning any matter or take action to direct staff to place a matter of business on a future agenda. (Gov’t Code § 54954.2)*

9. Time and Place of Next Meeting

*Wednesday, December 11, 2024, at 10:00 a.m. at 375 Beale Street, San Francisco, CA 94105. The meeting will be in-person for the Stationary Source Committee members and members of the public will be able to either join in-person or via webcast.*

10. Adjournment

*The Committee meeting shall be adjourned by the Chair.*

**CONTACT:**

**MANAGER, EXECUTIVE OPERATIONS**  
**375 BEALE STREET, SAN FRANCISCO, CA 94105**  
[vjohnson@baaqmd.gov](mailto:vjohnson@baaqmd.gov)

**(415) 749-4941**  
**FAX: (415) 928-8560**  
**BAAQMD homepage:**  
[www.baaqmd.gov](http://www.baaqmd.gov)

- Any writing relating to an open session item on this Agenda that is distributed to all, or a majority of all, members of the body to which this Agenda relates shall be made available at the Air District's offices at 375 Beale Street, Suite 600, San Francisco, CA 94105, at the time such writing is made available to all, or a majority of all, members of that body.

**Accessibility and Non-Discrimination Policy**

The Bay Area Air Quality Management District (Air District) does not discriminate on the basis of race, national origin, ethnic group identification, ancestry, religion, age, sex, sexual orientation, gender identity, gender expression, color, genetic information, medical condition, or mental or physical disability, or any other attribute or belief protected by law.

It is the Air District's policy to provide fair and equal access to the benefits of a program or activity administered by Air District. The Air District will not tolerate discrimination against any person(s) seeking to participate in, or receive the benefits of, any program or activity offered or conducted by the Air District. Members of the public who believe they or others were unlawfully denied full and equal access to an Air District program or activity may file a discrimination complaint under this policy. This non-discrimination policy also applies to other people or entities affiliated with Air District, including contractors or grantees that the Air District utilizes to provide benefits and services to members of the public.

Auxiliary aids and services including, for example, qualified interpreters and/or listening devices, to individuals who are deaf or hard of hearing, and to other individuals as necessary to ensure effective communication or an equal opportunity to participate fully in the benefits, activities, programs and services will be provided by the Air District in a timely manner and in such a way as to protect the privacy and independence of the individual. Please contact the Non-Discrimination Coordinator identified below at least three days in advance of a meeting so that arrangements can be made accordingly.

If you believe discrimination has occurred with respect to an Air District program or activity, you may contact the Non-Discrimination Coordinator identified below or visit our website at [www.baaqmd.gov/accessibility](http://www.baaqmd.gov/accessibility) to learn how and where to file a complaint of discrimination.

Questions regarding this Policy should be directed to the Air District's Non-Discrimination Coordinator, Suma Peesapati, at (415) 749-4967 or by email at [spesapati@baaqmd.gov](mailto:spesapati@baaqmd.gov).

# BAY AREA AIR QUALITY MANAGEMENT DISTRICT

375 BEALE STREET, SAN FRANCISCO, CA 94105

FOR QUESTIONS PLEASE CALL (415) 749-4941

## EXECUTIVE OFFICE:

### MONTHLY CALENDAR OF AIR DISTRICT MEETINGS

#### NOVEMBER 2024

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Stationary Source Committee	Wednesday	13	10:00 a.m.	1 <sup>st</sup> Floor, Yerba Buena Room
Board of Directors Community Equity, Health, and Justice Committee	Wednesday	13	1:00 p.m.	1 <sup>st</sup> Floor, Yerba Buena Room
Board of Directors Finance and Administration Committee – CANCELLED AND RESCHEDULED to Wednesday, November 6, 2024, at 11:30 a.m.	Wednesday	20	10:00 a.m.	1 <sup>st</sup> Floor Board Room
Board of Directors Policy, Grants and Technology Committee -- CANCELLED	Wednesday	20	1:00 p.m.	1 <sup>st</sup> Floor Board Room
Board of Directors Community Advisory Council Meeting	Thursday	21	6:00 p.m.	1 <sup>st</sup> Floor, Yerba Buena Room

#### DECEMBER 2024

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Meeting	Wednesday	4	10:00 a.m.	1 <sup>st</sup> Floor Board Room
Board of Directors Stationary Source Committee	Wednesday	11	10:00 a.m.	1 <sup>st</sup> Floor, Yerba Buena Room
Board of Directors Community Equity, Health and Justice Committee	Wednesday	11	1:00 p.m.	1 <sup>st</sup> Floor, Yerba Buena Room
Board of Directors Finance and Administration Committee	Wednesday	18	10:00 a.m.	1 <sup>st</sup> Floor Board Room
Board of Directors Policy, Grants and Technology Committee	Wednesday	18	1:00 p.m.	1 <sup>st</sup> Floor Board Room

HL 11/6/2024 – 2:30 p.m.

G/Board/Executive Office/Moncal

**BAY AREA AIR QUALITY MANAGEMENT DISTRICT**

Memorandum

To: Vice Chairperson Ross and Members  
of the Stationary Source Committee

From: Philip M. Fine  
Executive Officer/APCO

Date: November 13, 2024

Re: Approval of the Draft Minutes of the Stationary Source Committee Meeting of  
October 9, 2024

RECOMMENDED ACTION

Approve the Draft Minutes of the Stationary Source Committee Meeting of October 9, 2024.

BACKGROUND

None.

DISCUSSION

Attached for your review and approval are the Draft Minutes of the Stationary Source Committee Meeting of October 9, 2024.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Philip M. Fine  
Executive Officer/APCO

Prepared by: Marcy Hiratzka  
Reviewed by: Vanessa Johnson

ATTACHMENTS:

1. Draft Minutes of the Stationary Source Committee Meeting of October 9, 2024



Bay Area Air Quality Management District  
375 Beale Street, Suite 600  
San Francisco, CA 94105  
(415) 749-5073

Stationary Source Committee Meeting  
Wednesday, October 9, 2024

## **DRAFT MINUTES**

*This meeting was webcast, and a video recording is available on the website of the Bay Area Air Quality Management District at [www.baaqmd.gov/bodagendas](http://www.baaqmd.gov/bodagendas)*

### **CALL TO ORDER**

1. **Opening Comments:** Stationary Source Committee (Committee) Vice Chairperson, Mark Ross, called the meeting to order at 10:00 a.m.

#### **Roll Call:**

Present, In-Person (Bay Area Metro Center, 375 Beale Street, Yerba Buena Room, San Francisco, California, 94105): Vice Chairperson Ross; and Director Ken Carlson.

Present, In-Person (Office of Contra Costa County Supervisor John Gioia, 11780 San Pablo Ave., Suite D Conference Room, El Cerrito, CA 94530): Directors Gabe Quinto and Steve Young.

Present, In-Person (City of Palo Alto City Hall, 250 Hamilton Ave., Palo Alto, CA 94301): Director Vicki Veenker.

Present, In-Person (Office of Santa Clara County Supervisor Otto Lee, 70 W Hedding St, East Wing, 10th Floor, San Jose, CA 95110): Director Otto Lee.

Absent: Director John Gioia and Lynda Hopkins.

2. **PLEDGE OF ALLEGIANCE**

### **CONSENT CALENDAR**

3. **APPROVAL OF THE DRAFT MINUTES OF THE STATIONARY SOURCE COMMITTEE MEETING OF SEPTEMBER 11, 2024**

#### **Public Comments**

No requests received.

Committee Comments

None.

Committee Action

Director Carlson made a motion, seconded by Director Lee, to **approve** the Draft Minutes of the Stationary Source Committee meeting of September 11, 2024; and the motion **carried** by the following vote of the Committee:

AYES: Carlson, Lee, Quinto, Ross, Veenker, Young.  
NOES: None.  
ABSTAIN: None.  
ABSENT: Gioia, Hopkins.

**INFORMATIONAL ITEMS**

**4. UPDATE ON FUGITIVE DUST RULEMAKING EFFORTS**

Eric Lara, Senior Air Quality Specialist, gave the staff presentation *Update on Fugitive Dust Rule Amendment Effort*, including: requested action; outcome; outline; fugitive dust background; sources of fugitive dust; recap of white paper; fugitive dust rules background; recap of white paper findings; project status overview; scope and focus of rule amendment concepts; scale and types of sites in the Bay Area; operations and activities of concern; and next steps and milestones.

Public Comments

Public comments were given by Heidi Taylor; Jan Warren, Interfaith Climate Action Network of Contra Costa County; and Sarah Chen Small, Communities for a Better Environment.

Committee Comments

The Committee and staff discussed the criteria used to identify potential fugitive dust sources from agricultural operations in the Bay Area, and whether agricultural activities should be regulated by the Air District; concern that “wetting” air pollution control technologies will impact water conservation; the need to protect the public from construction projects (large and small); the extent to which fugitive dust rulemakings will affect smaller sites and housing projects; and updated test methods to better assess compliance.

Committee Action

No action taken.

**5. BRIEFING ON RULEMAKING OPPORTUNITIES FOR PUBLICLY-OWNED TREATMENT WORKS (POTW)**

Christopher Easter, Senior Air Quality Specialist, gave the staff presentation *Update on Publicly-Owned Treatment Works White Paper Analysis*, including: outline; source description; example POTW;

dry anaerobic digester facility; drivers for white paper efforts; white paper development; Air District rules applicable to POTWs; regulatory landscape – other jurisdictions; methane emissions variance (bottom-up versus top-down); Senate Bill (SB) 1383 – Greenhouse gas (GHG) emissions reduction challenges; data gaps; and POTW white paper process.

### Public Comments

Public comments were given by Jan Warren, Interfaith Climate Action Network of Contra Costa County; and Lorien Fono, Bay Area Clean Water Agencies.

### Committee Comments

The Committee and staff discussed technologies to reduce the formation of methane and odors biologically; whether any POTWs located within the Bay Area are the source of numerous complaints and whether methane emissions outweigh those of other sources (hydrogen sulfide, odors, or volatile organic compounds).

### Committee Action

No action taken.

## **OTHER BUSINESS**

### **6. PUBLIC COMMENT ON NON-AGENDA MATTERS**

No requests received.

### **7. COMMITTEE MEMBER COMMENTS**

None.

### **8. TIME AND PLACE OF NEXT MEETING**

Wednesday, November 13, 2024, at 10:00 a.m. at 375 Beale Street, San Francisco, CA 94105. The meeting will be in-person for the Stationary Source Committee members and members of the public will be able to either join in-person or via webcast.

### **9. ADJOURNMENT**

The meeting was adjourned at 10:58 a.m.

Marcy Hiratzka  
Clerk of the Board

**BAY AREA AIR QUALITY MANAGEMENT DISTRICT**

## Memorandum

To: Vice Chairperson Mark Ross and Members  
of the Stationary Source Committee

From: Philip M. Fine  
Executive Officer/APCO

Date: November 13, 2024

Re: Update on Refinery Corridor Community Air Monitoring

RECOMMENDED ACTION

None; the Committee will discuss this item, but no action is requested at this time.

BACKGROUND

The Air District has multiple air monitoring programs to measure the levels of different pollutants in refinery communities to characterize emissions and their impacts on air quality in different ways. Existing refinery air monitoring programs include Ground Level Monitoring of sulfur dioxide and hydrogen sulfide required by Air District Regulations 9-1 and 9-2, refinery fence-line air monitoring required by Air District Regulation 12-15, and the Air District commitment for one multipollutant air monitoring station in a community near each of the refineries. This community air monitoring is designed to provide real-time data for a variety of air pollutants at and near the refineries. Implementation for these programs is ongoing.

In April 2024, based on the recommendation from the Stationary Source Committee, the Board approved a proposed new refinery corridor air monitoring program for characterizing coarse particles emitted during unplanned incidents as part of broader improvements to the incident response program. This community-partnered program includes a network of sites collecting particles in the refinery corridor throughout the year. If there is an incident, these samples will be analyzed for chemical and physical characteristics. The project also includes developing and implementing protocols for community-conducted sampling, including training and compensation. These air monitoring projects will be supported by a new refinery corridor community air monitoring workgroup and coordinated with other agencies and partners with incident response roles. A task order was set up within an existing contract with the Bay Air Center utilizing reserves that were set aside for incidents as part of the fiscal year ending (FYE) 2024 approved budget. This new program is also aligned with Air District commitments in the 2024-2029 Strategic Plan, and strategies in the Community Advisory Council's Environmental Justice Plan and the Assembly Bill (AB) 617 Path To Clean Air Community Emissions Reduction Plan.

## DISCUSSION

The Air District is exploring opportunities to improve and expand the existing community air monitoring program, including refinery fenceline monitoring and stationary community air monitoring sites, and how those opportunities align with Air District commitments in the *2024-2029 Strategic Plan*, and community priorities reflected in the Richmond-North Richmond-San Pablo AB 617 Path to Clean Air Community Emissions Reduction Plan, and the Community Advisory Council's Environmental Justice Priorities.

The Air District is also preparing to partner with community members to launch the new community-partnered particle sampling program, including holding an informational webinar, and outlining the tasks related to the core network, the community-conducted sampling, and the community workgroup.

## BUDGET CONSIDERATION/FINANCIAL IMPACT

The refinery corridor particulate monitoring has been funded through the \$1 million that were set aside in General Reserves and through the approved FYE 2024 budget. Future costs for the incident response program will be included annually in the proposed budgets.

Respectfully submitted,

Philip M. Fine  
Executive Officer/APCO

Prepared by: Kate Hoag  
Reviewed by: Ranyee Chiang

## ATTACHMENTS:

1. Update on Refinery Corridor Community Air Monitoring Presentation



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

**AGENDA: 4**

# **Update on Refinery Corridor Community Air Monitoring**

**Stationary Source Committee  
November 13, 2024**

**Kate Hoag  
Meteorology and Measurement, Assistant Manager  
[khoag@baaqmd.gov](mailto:khoag@baaqmd.gov)**

# Outline

- Review refinery corridor air monitoring programs
- Refinery fenceline air monitoring
- Refinery community air monitoring
- Upcoming refinery incident particle sampling

# Current Refinery Corridor Air Monitoring

Existing programs include fenceline and near-source air monitoring systems

- Facility-operated **fenceline** monitoring systems
- Facility-operated **ground level monitoring stations** (GLMs) at or near the facility boundary
- Air District operated **community air monitoring stations**

Upcoming:

**Community-partnered particulate sampling**





# Other Air and Emissions Monitoring

Other measurements provide context for refinery-oriented air monitoring or detailed snapshots of emissions and air quality

- Regulatory air monitoring stations
- Short-term air monitoring projects
- Air sensor networks
- Continuous emissions monitors, source tests, and other emissions-related measurements



# Refinery Fenceline Air Monitoring

- Requirements for refineries to operate real-time fenceline monitoring systems are in Regulation 12, Rule 15 (Rule 12-15), and the associated Air District monitoring guidelines
- Refineries required to obtain and maintain Air Pollution Control Officer (APCO) approval of a plan for establishing and operating a fenceline monitoring system
- Fenceline air monitoring plans for all refineries were conditionally approved in 2018
- Revised fenceline air monitoring plans for hydrogen sulfide (H<sub>2</sub>S) were submitted in 2022
- Plans were inadequate and were disapproved, Air District issued Notices of Violation in October 2023

# Refinery Community Air Monitoring

- During Rule 12-15 development, Air District committed to expand multi-pollutant air monitoring in refinery communities
- Objectives:
  - Provide refinery frontline communities with real time local-scale air pollution data reflecting day-to-day cumulative air pollution levels
  - Track air pollution levels near refineries over time to assess trends and support long- and short-term air quality assessments
- Established a new community air monitoring fee to recover some of the costs associated with the program
- Air District Benicia site operational as of July 1, 2024

# Phases of Air Monitoring Station Development

## Siting



- Community input
- Assessment of preferred locations
- **Site identification**
- Leasing
- Site design & permitting

## Construction



- Site construction & station setup
- **Equipment procurement**
- Equipment installation
- Equipment testing

## Monitoring



- Ongoing instrument maintenance and operations
- Data quality assurance
- **Data reporting**
- Data analysis

# Opportunities to Strengthen Existing Programs

- Revise rule and guidelines to expand fenceline monitoring systems to increase confidence in, consistency of, and accessibility to data, based on recent legislative activity and other Air District actions
- Continue to deploy or expand multipollutant air monitoring stations near Petroplus, Blackstone Group, and First Reserve Martinez Refinery Company (PBF MRC), Phillips 66, Tesoro, and Chevron
- Deploy tested real time data instruments for key toxic compounds
- Improve oversight, review, reporting, and analysis of community and fenceline air monitoring data to share contextualized insights with the public

# Opportunities to Strengthen Existing Programs (continued)

These improvements are aligned with existing Air District commitments

- *2024-2029 Strategic Plan* Strategies:
  - **2.3** Make Data Accessible
  - **2.7** Understand Local Air Pollution
  - **4.4** Improve Air Monitoring
- Richmond-North Richmond-San Pablo Assembly Bill (AB) 617 Path to Clean Air Community Emission Reduction Plan - Fuel Refining Strategies:
  - **3.13** Improve refinery fenceline and community air monitoring programs
  - **3.15** Refinery-related measurement data accessibility improvements
- Community Advisory Council Environmental Justice Priority to **Collect and Use Data**

# Upcoming: Particulate Sampling for Incidents

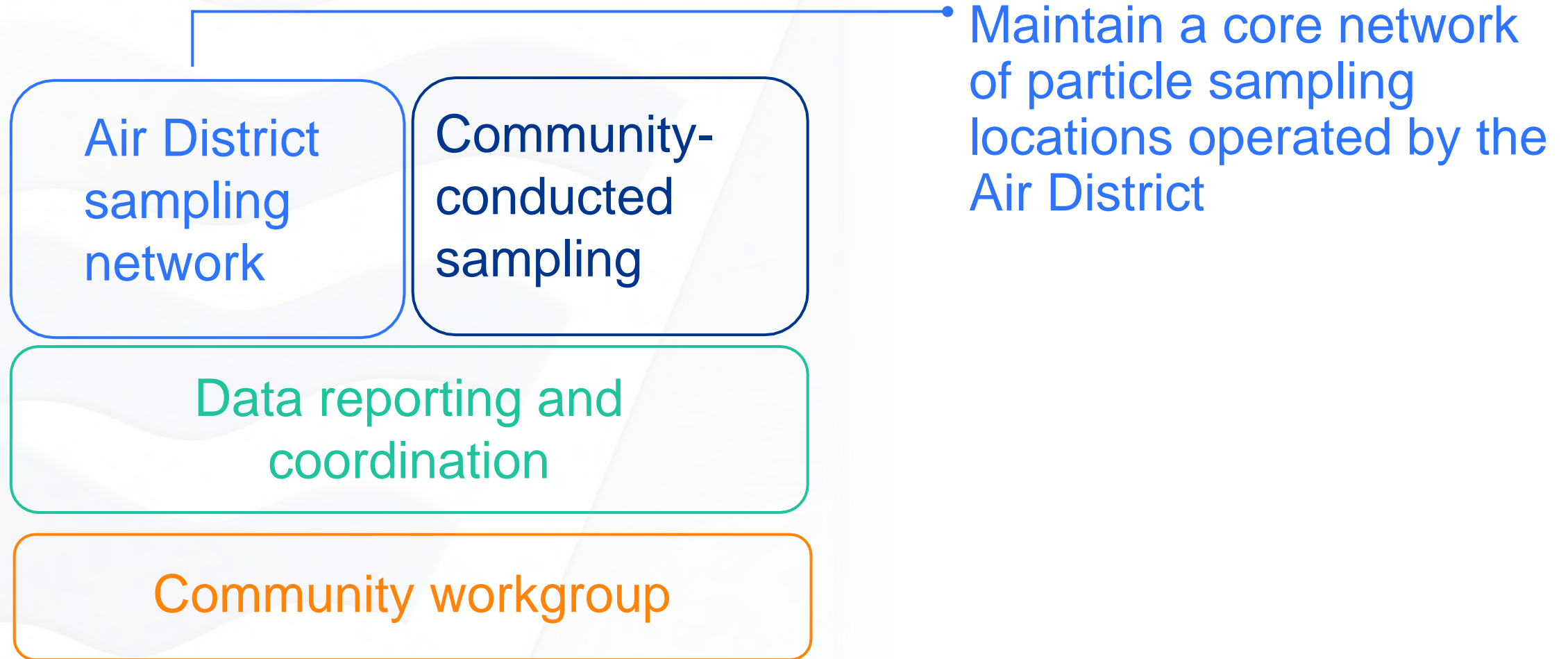
- After past events at the refineries, the Air District heard concerns from community members about particulate matter emissions and fallout from the facilities
- Low-cost PM sensors help track plumes from fires at ground-level, but **current monitoring efforts do not capture larger particles** released during certain types of incidents
- Additionally, **community members have expressed an interest in partnering with the Air District to collect actionable information during facility incidents**
- Air District is partnering with community members to implement a new particulate monitoring program to improve air monitoring during unplanned incidents at industrial facilities

# Program Purpose

- This program aims to **further characterize impacts of emissions from unplanned incidents** in communities near refineries and **improve the reporting** of the results
- Aligned with Air District commitments:
  - 2024-2029 Strategic Plan Strategies
    - **2.2** Collect Community Data
    - **2.5** Make Data Accessible
    - **2.7** Understand Local Air Pollution
    - **4.8** Air Quality Incidents
  - Path to Clean Air Community Emission Reduction Plan **Fuel Refining Strategies 2.2 and 2.4** about incident response improvements
  - Community Advisory Council Environmental Justice Plan Strategy to **Collect and Use Data**



# Program Components



# Program Components (continued)

Air District  
sampling  
network

Community-  
conducted  
sampling

Data reporting and  
coordination

Community workgroup

- Funding and support for community-conducted particle sampling including training on procedures and documentation for sampling

# Program Components (continued)

Air District  
sampling  
network

Community-  
conducted  
sampling

Data reporting and  
coordination

Community workgroup

- Work with community members to present the data with context and make it available in a timely manner

# Program Components (continued)

Air District  
sampling  
network

Community-  
conducted  
sampling

Data reporting and  
coordination

Community workgroup

- Convene a community workgroup to guide the program development and implementation

# Community Workgroup

- Guides the program including
  - Identification and selection of preferred sampling locations
  - Recruitment of community members to collect particle samples during incidents
  - Development of methods and procedures for making the data accessible
- Up to fifteen people who live or work near the refineries
- Workgroup members will be compensated \$250 per meeting for preparing for and participating in the meetings

## Community-conducted Sampling

- Community members not participating in the workgroup may still be able to help collect samples in neighborhoods near the facilities

# Timeline

- September 2024
  - Informational webinar
- November - December 2024
  - Convene workgroup and finalize charter and workplans
- January 2024 – March 2025
  - Workgroup meetings to review monitoring technology and methods, identify monitoring locations, and discuss plans for data dissemination

# Timeline (continued)

- April 2025 – May 2025
  - Air District monitoring sites operational (may be phased in depending on ability to secure monitoring locations)
  - Workgroup meetings to review community monitoring plan, siting, and logistics
  - Recruitment and training of community partners
- June 2025
  - Community sampling operational
- Ongoing recruitment and training as needed

# General Information and Updates

- The enhanced particulate matter (PM) monitoring project community workgroup will
  - Coordinate with the Refinery Bimonthly Workgroup and the Community Advisory Council
  - Explore other ways to engage the refinery corridor communities more broadly to connect and provide ongoing updates
- A web page with information about the program is coming soon
- Subscribe to our Refinery Stakeholders email distribution list at <https://www.baaqmd.gov/en/contact-us/sign-up-for-information>
- Email: bayaircenter@baaqmd.gov



**Questions?**

**BAY AREA AIR QUALITY MANAGEMENT DISTRICT**

Memorandum

To: Vice Chairperson Mark Ross and Members  
of the Stationary Source Committee

From: Philip M. Fine  
Executive Officer/APCO

Date: November 13, 2024

Re: Update on Indirect Sources and Questions on Marine Source Impacts

RECOMMENDED ACTION

None; the Committee will discuss this item, but no action is requested at this time.

BACKGROUND

During the September 11, 2024, Stationary Source Committee Meeting, staff presented an overview of rule development opportunities on indirect sources. Indirect sources are defined in the Clean Air Act as "... a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution." Staff previously presented existing regulations, policies, and ordinances that address impacts from different indirect sources such as warehouses, freight yards, and commercial marine ports. These sources are serviced by trucks, ships, and locomotives, and the California Air Resources Board has made a concerted effort to reduce their emissions by adopting comprehensive regulations of activities, fuel use, and control technology. While these regulations are effective, ships have not experienced the same magnitude of reductions as compared to trucks and locomotives. Committee members asked for additional information concerning impacts from ships that berth and maneuver in areas near Assembly Bill (AB) 617 and other overburdened communities in the Bay Area.

DISCUSSION

Air District staff will address specific questions raised at the September Stationary Source Committee Meeting concerning exposure impacts from marine ships at AB 617 communities. Staff will provide estimates of marine source impacts using examples taken from the recently adopted Path to Clean Air Emissions Reduction Plan for Richmond-North Richmond-San Pablo and the West Oakland Community Action Plan. Both communities have active ports that residents have raised air quality concerns about. Staff will use the modeled air concentrations based on base year emissions inventories from these community assessments to illustrate the exposure impacts from marine ships. Staff will also discuss how the exposure impact from marine sources compares to that of other significant sources (e.g., trucks, locomotives, and stationary sources) identified in the communities.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Philip M. Fine  
Executive Officer/APCO

Prepared by: Virginia Lau

Reviewed by: Song Bai

ATTACHMENTS:

1. Indirect Sources and Marine Source Impacts Presentation



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

## Indirect Sources - Update

Stationary Source Committee Meeting  
November 13, 2024

Virginia Lau  
Assessment, Inventory & Modeling, Manager  
[vlau@baaqmd.gov](mailto:vlau@baaqmd.gov)

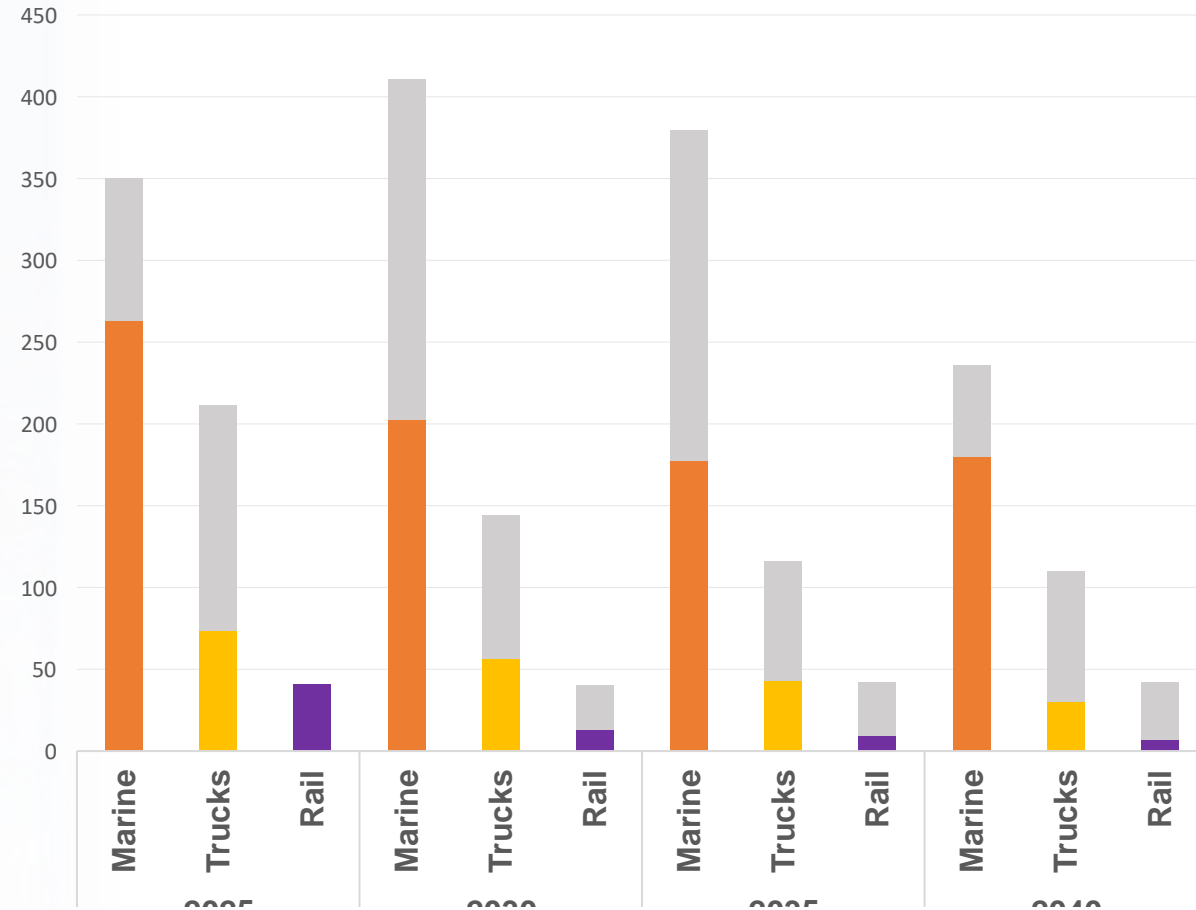
# Outline

- Recap of September Stationary Source Meeting
- Responses to questions concerning marine sources
  - Brief overview of California Air Resource Board (CARB) regulations on marine sources
  - Marine source emissions impact on Assembly Bill (AB) 617 communities

# Recap of September Stationary Source Meeting

- How many truck-related businesses/warehouses are in the Bay Area?
- What is the projected growth of these businesses?
- What are the marine source impacts to AB 617 communities?
- Are the health impacts different when ships are berthing versus maneuvering?

Bay Area Marine, Medium/Heavy Duty Trucks, and Rail  
PM10 Emissions Over Time (Tons per Year)



Gray= without emissions reductions from regulations; Color = emissions with regulations in place)

# California Air Resources Board Regulations on Marine Sources

## OGV Fuel Regulation

Phased requirement using progressive lower sulfur distillate grade marine fuels starting in 2009



OGV At-Berth applies to roll-on-roll vessels



OGV At-Berth applies to tankers



## Commercial Harbor Craft Regulation

Multiple requirements starting in 2023 for use of renewable diesel, annual activity data reporting, upgrading engines, idling limits, and use of shore power

## Ocean-going Vessel (OGV) At-Berth Regulation

Requires containers, reefers, cruise vessels (for visits to all regulated terminals) to use shore power by 2023

# Key Takeaways

## Regional Level

- Marine sources are significant contributors to the regional emissions inventory; nitrogen oxide (Nox) emissions from ships are twice as much of those from all stationary sources in the Bay Area
- Marine sources are major contributor to secondary particulate matter (PM), which has important health impacts

## Local Level

- Exposure analysis for communities indicate that marine sources have lower impacts per ton of emissions than trucks or locomotives (mainly due to proximity differences)

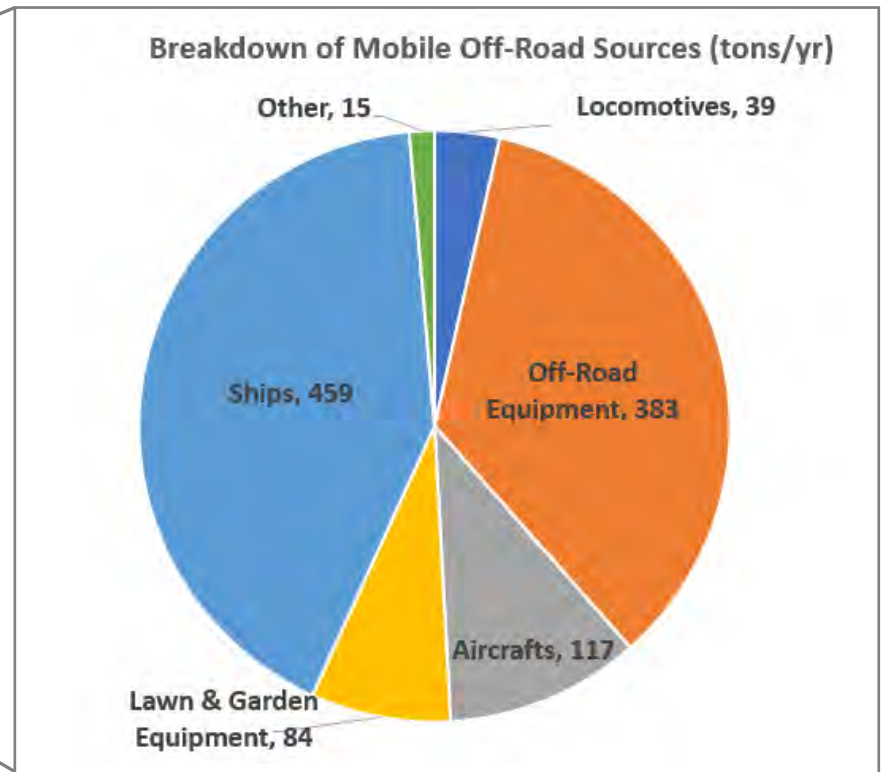
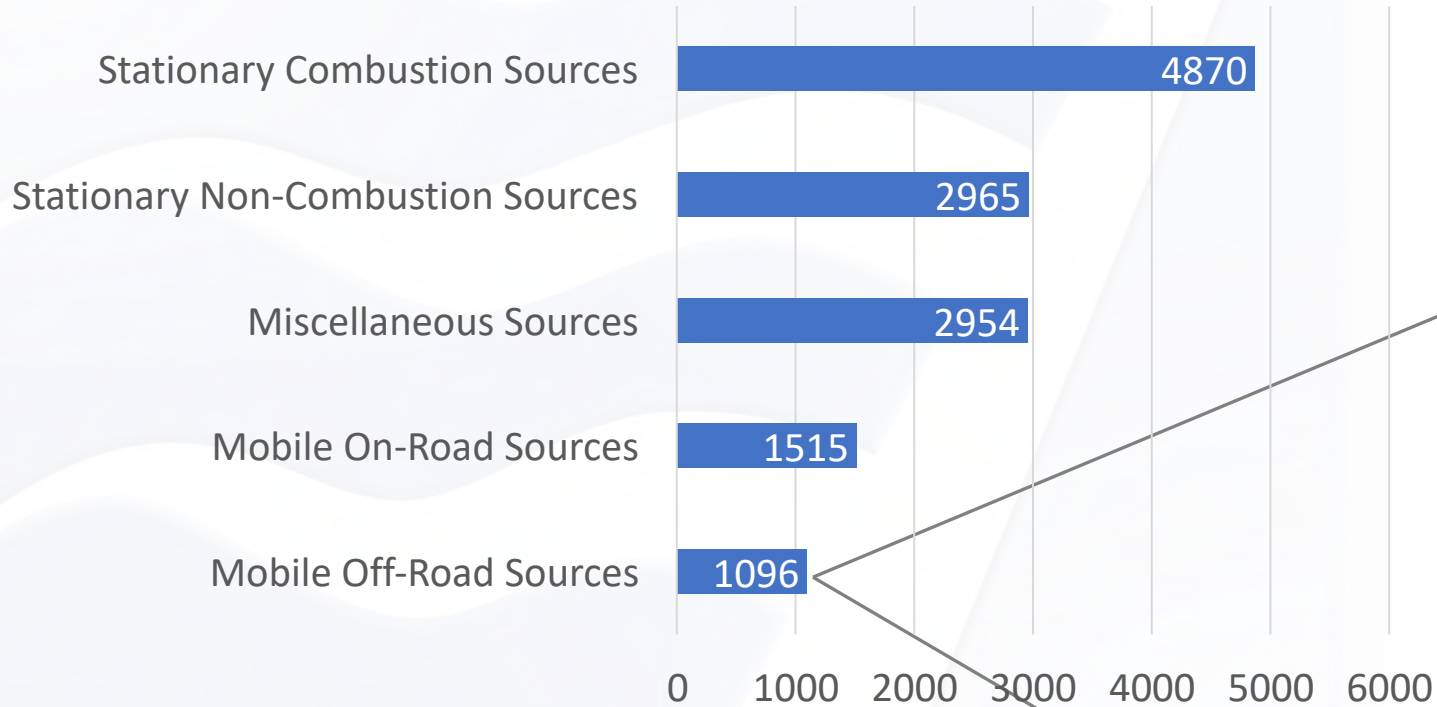
## Emissions/Impact Reduction

- CARB At-Berth regulations and new Environmental Protection Agency (EPA) grant will further reduce ship emissions when fully implemented



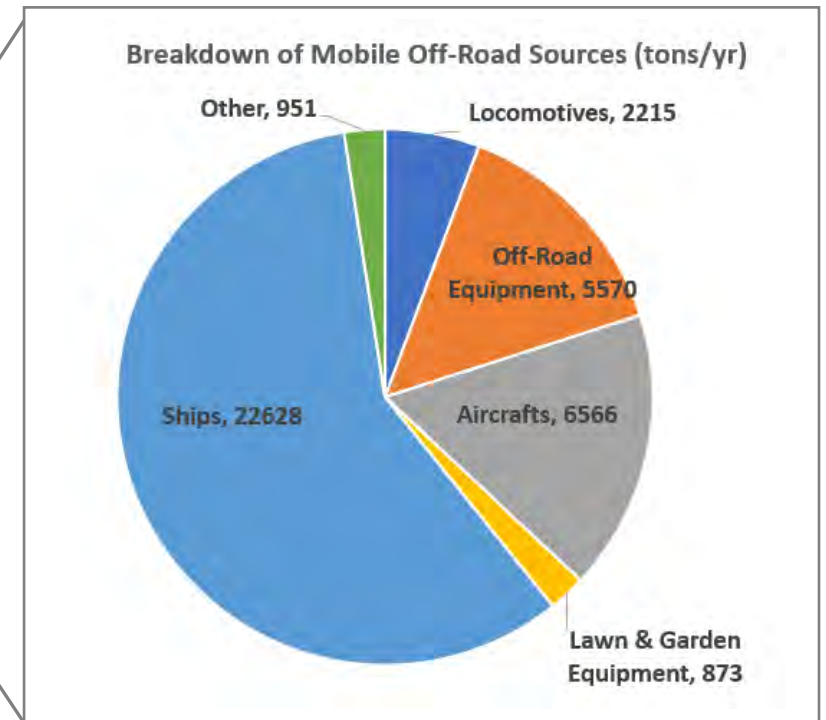
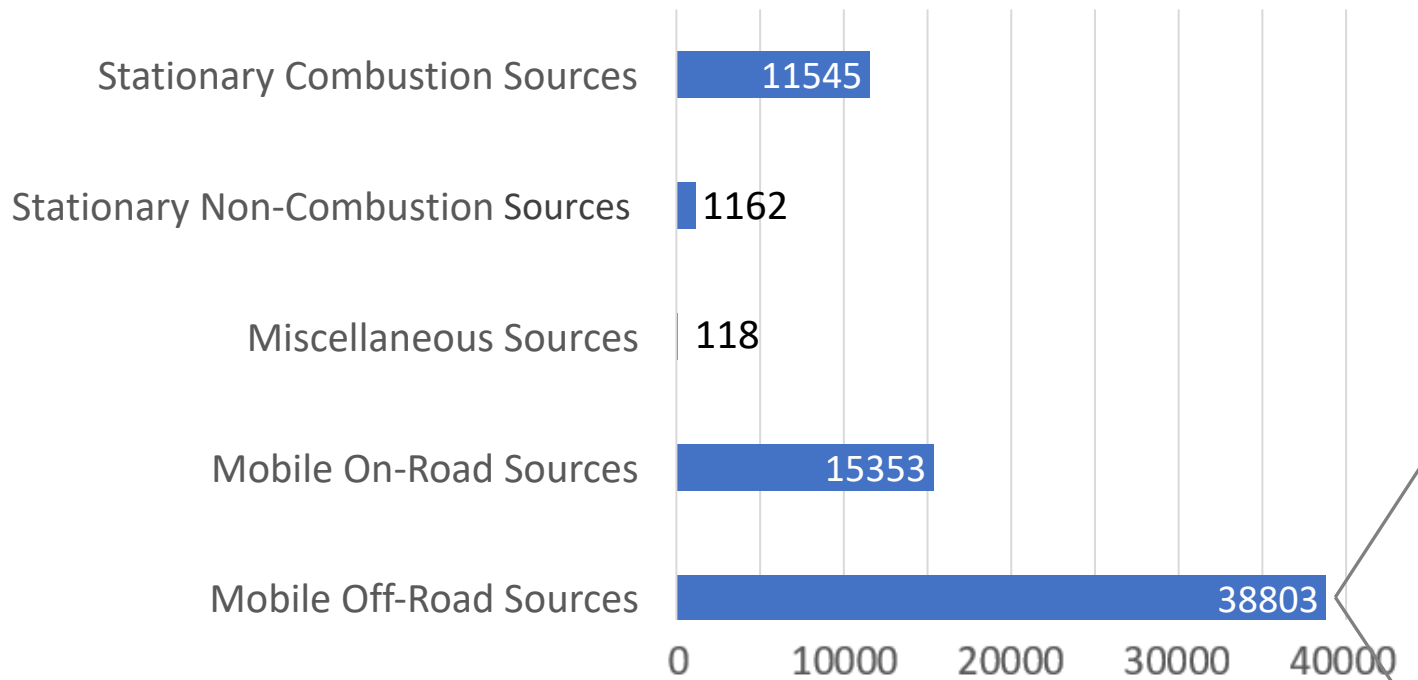
# Regional Emissions Inventory for the Bay Area (PM<sub>2.5</sub>)

2023 Regional Inventory by Sector for PM<sub>2.5</sub> (tons/yr)



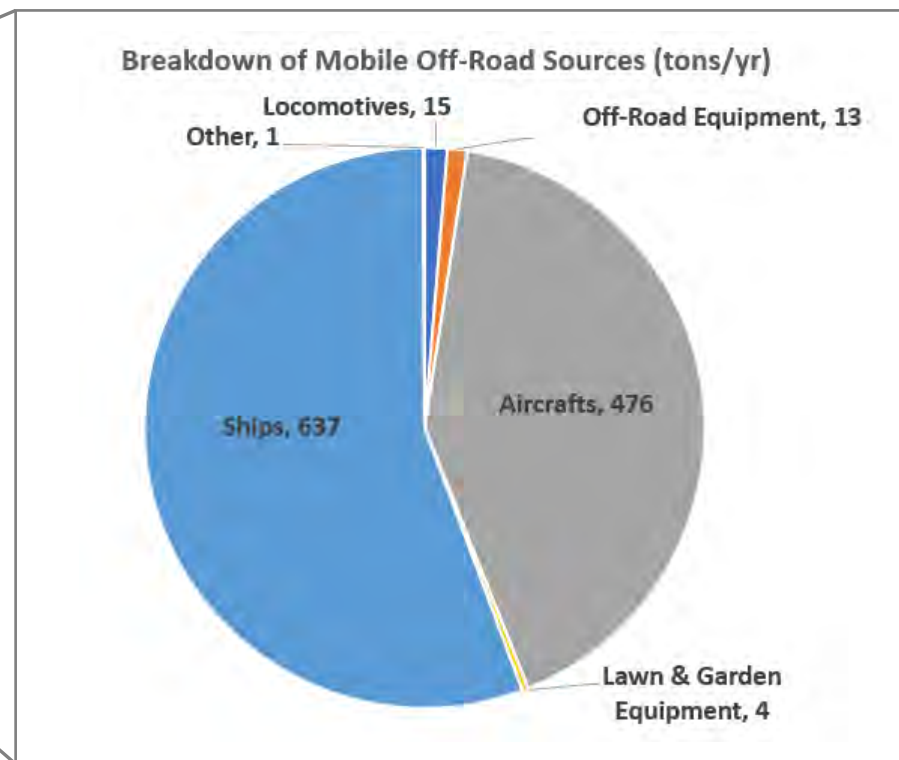
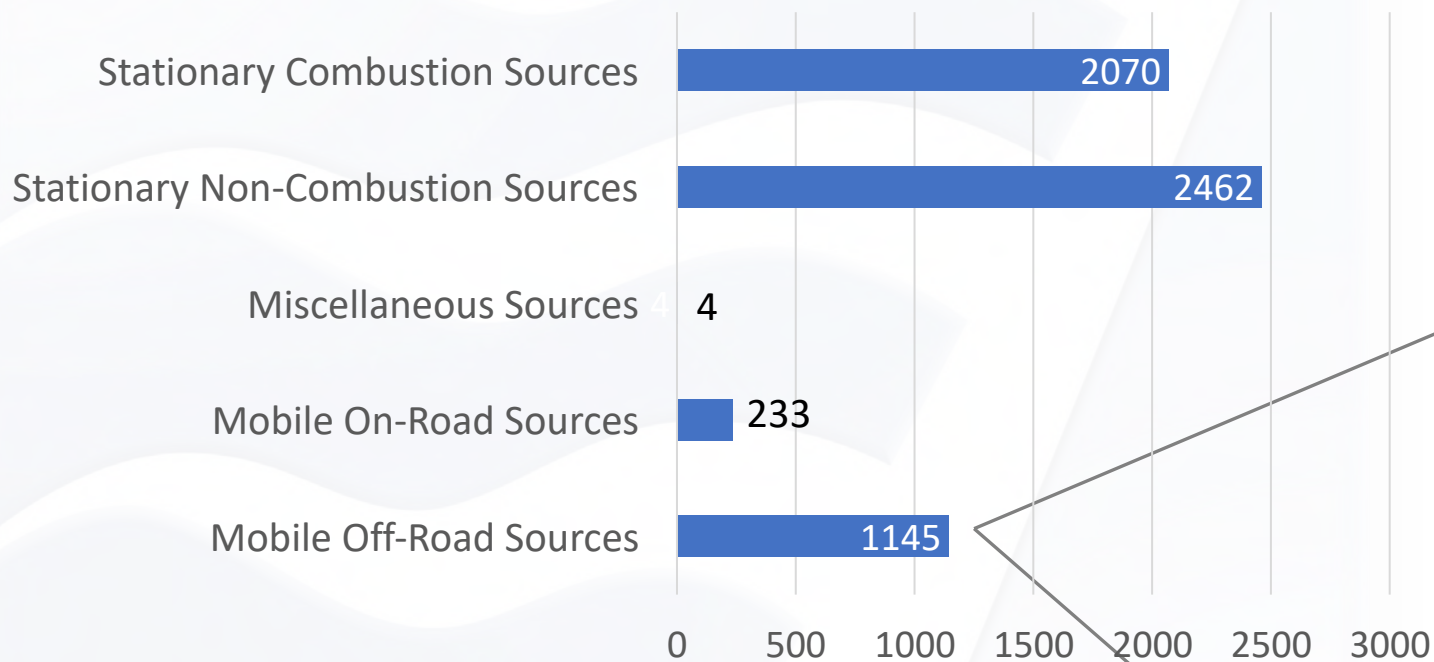
# Regional Emissions Inventory for the Bay Area (NOx)

2023 Regional Inventory by Sector for NOx (tons/yr)



# Regional Emissions Inventory for the Bay Area [(Sulfur Dioxide (SO<sub>2</sub>)]

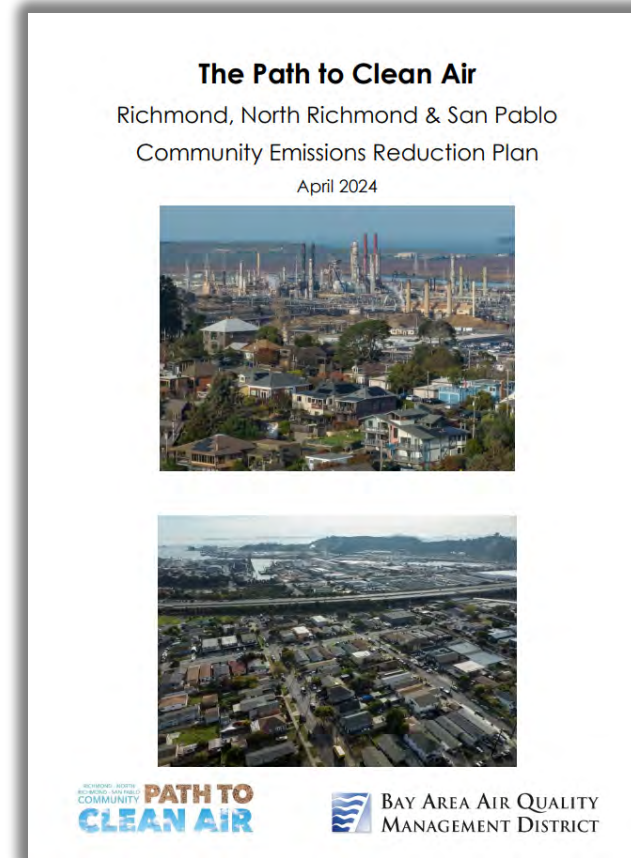
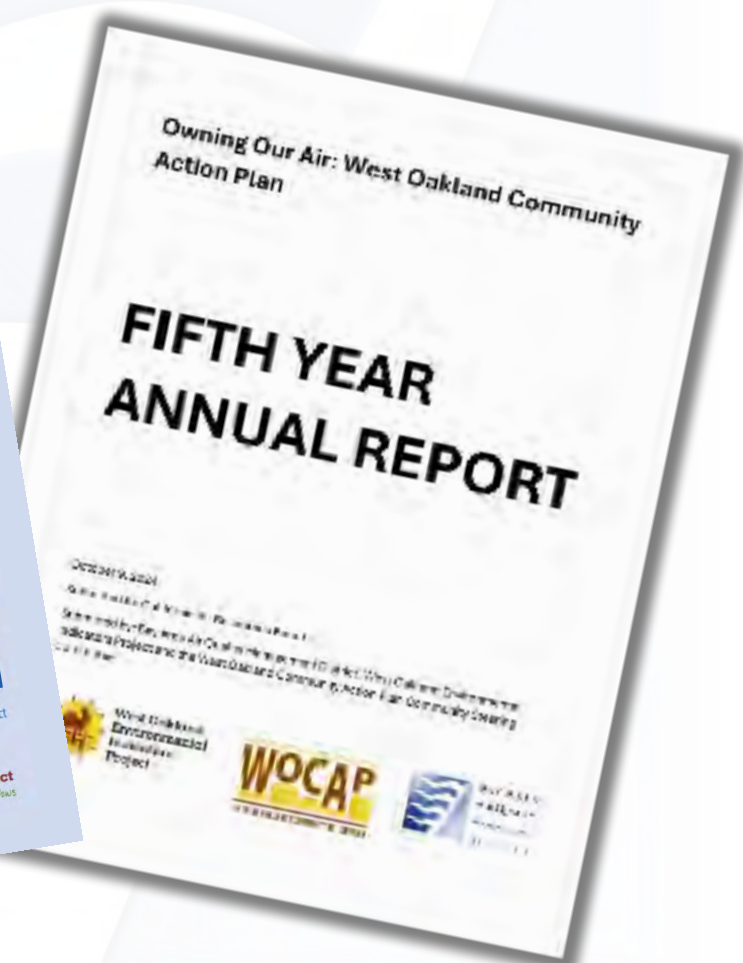
2023 Regional Inventory by Sector for SO<sub>2</sub> (tons/yr)



# Assembly Bill (AB) 617 Community Assessments

West Oakland Community Action Plan (2019) and Fifth Year Annual Report (2024)

Richmond, North Richmond, and San Pablo Community Emissions Reduction Plan (2024)



# General AB 617 Assessment Methodology



Emissions



Ambient Concentrations



Exposure



Health Effects



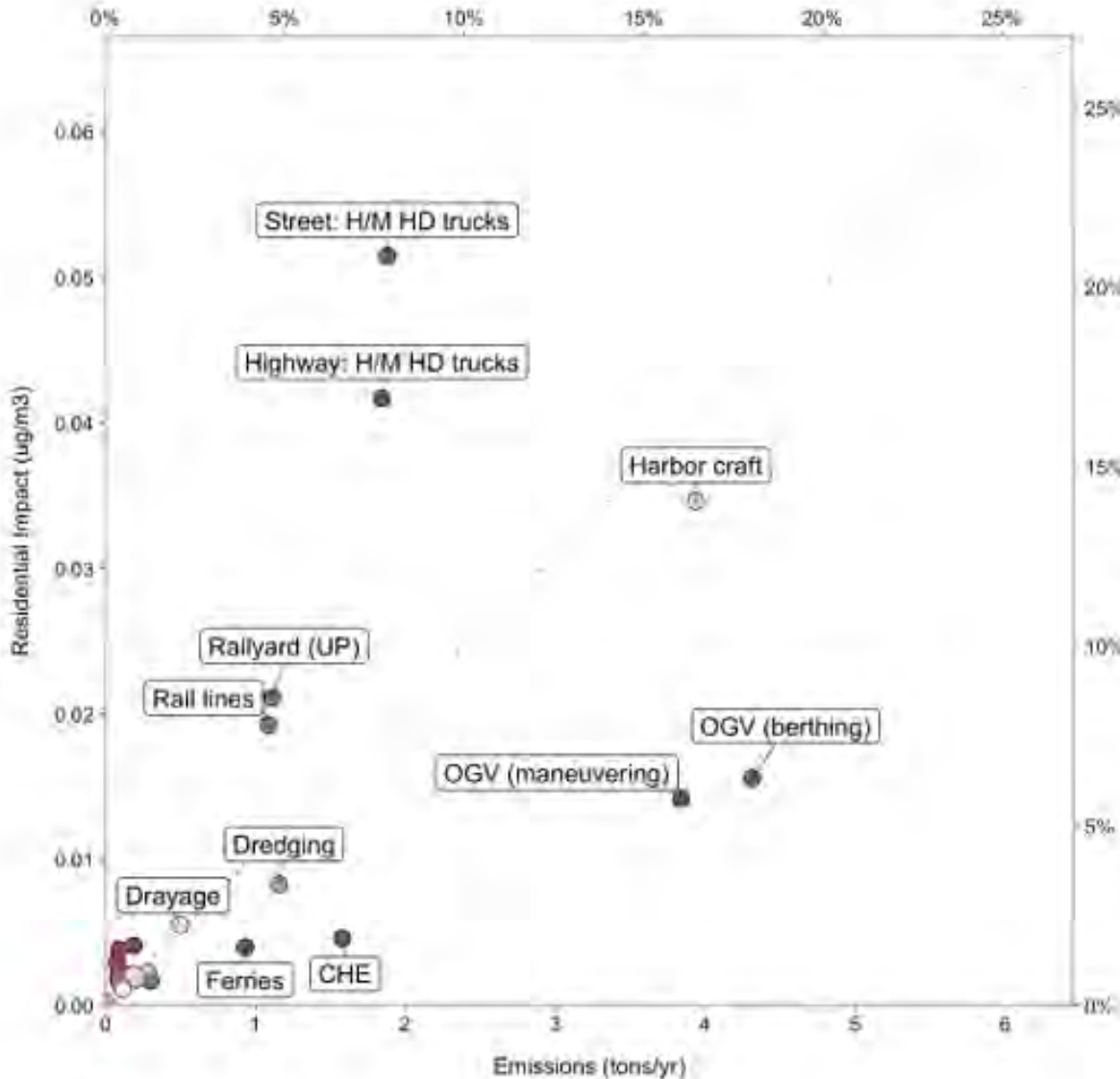
Modeled Annual Average PM<sub>2.5</sub> Concentrations (ug/m<sup>3</sup>)

### Impact Per Ton: Diesel PM in West Oakland

Circles are modeled local sources:

Red circles create more impact per ton of emissions; blue circles, less.

Percentages are shares of the total modeled impact from these local sources.



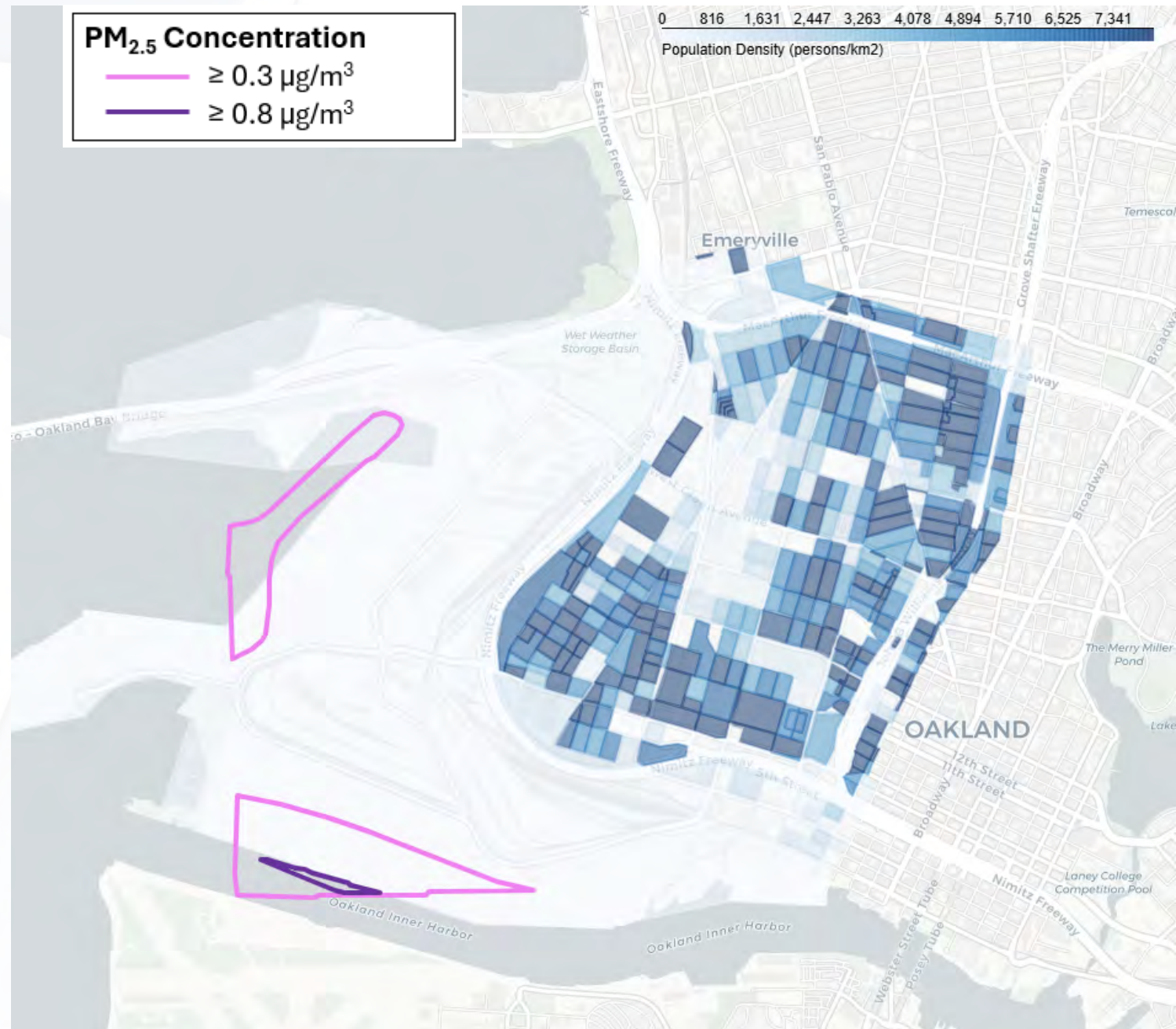
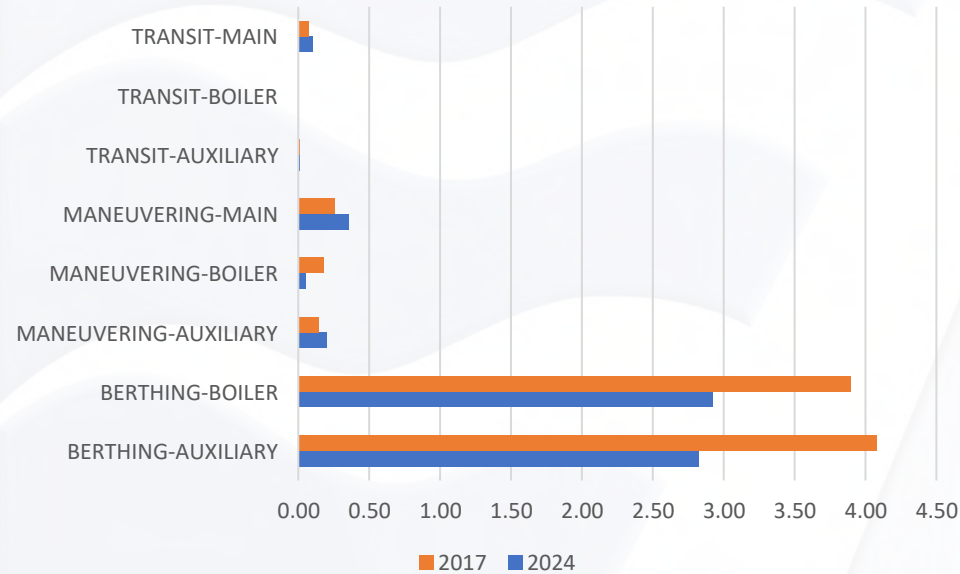
## West Oakland Highlights (base year 2017)

- The magnitude of diesel particulate matter (DPM) emissions from trucks, OGV berthing, and OGV maneuvering are similar
- The relative exposure impact of OGV berthing and maneuvering is much lower than trucks, which are 5 x higher than OGV

# West Oakland OGV Particulate Matter (PM<sub>2.5</sub>) Impacts

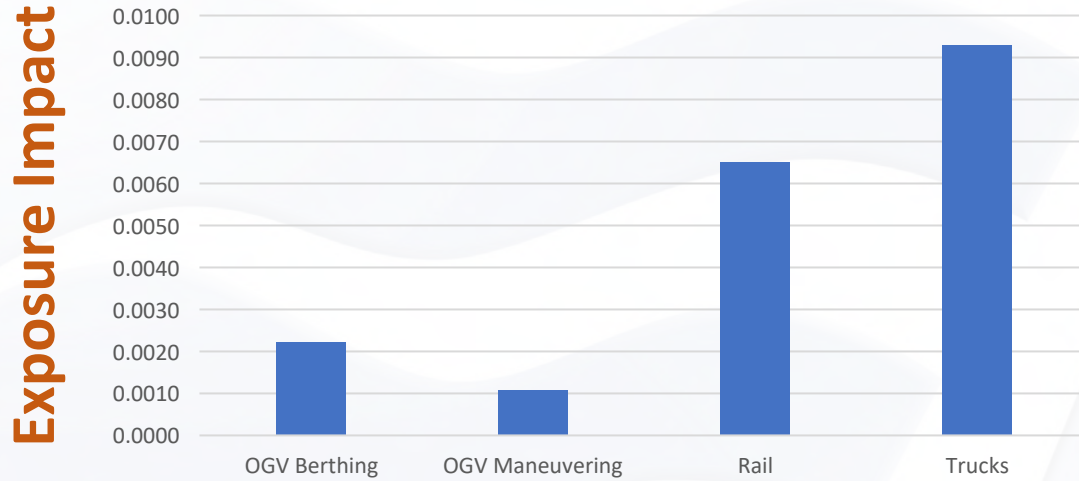
Modeled annual average PM<sub>2.5</sub> concentrations using 2017 emissions against 2020 block level census track data

West Oakland OGV PM<sub>2.5</sub> Emissions (tpy) for 2017 and 2024

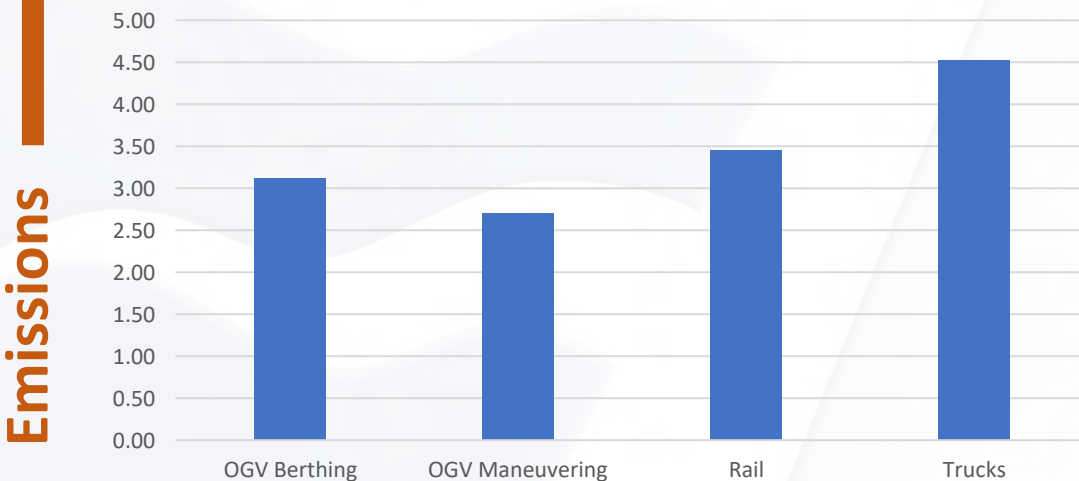


# Richmond-North Richmond-San Pablo (Path To Clean Air - PTCA) Recap (base year 2024)

Exposure Impact ( $\mu\text{g}/\text{m}^3$ ) per Ton of DPM Emissions



Diesel Particulate Matter Emissions (tons/yr)



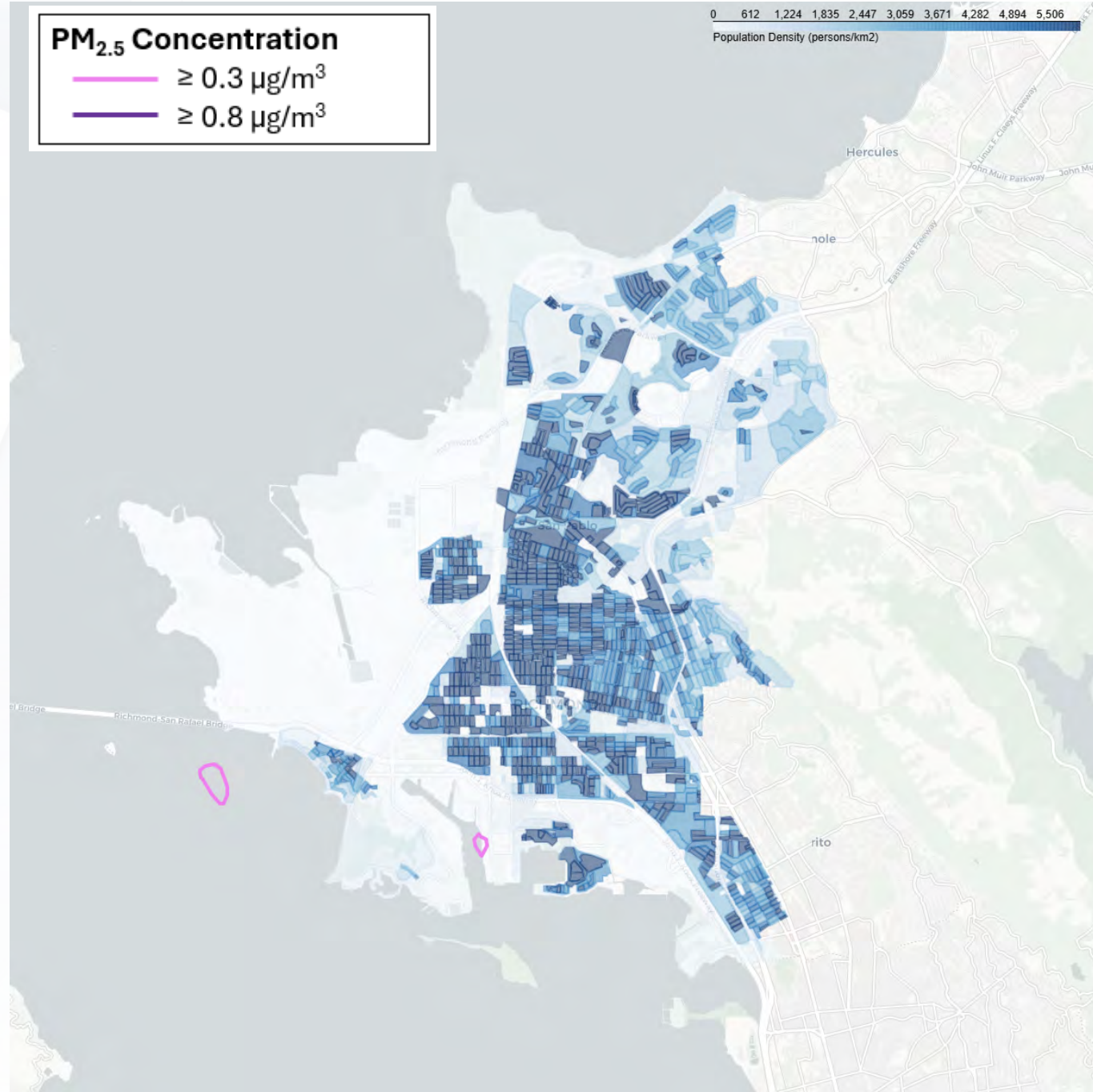
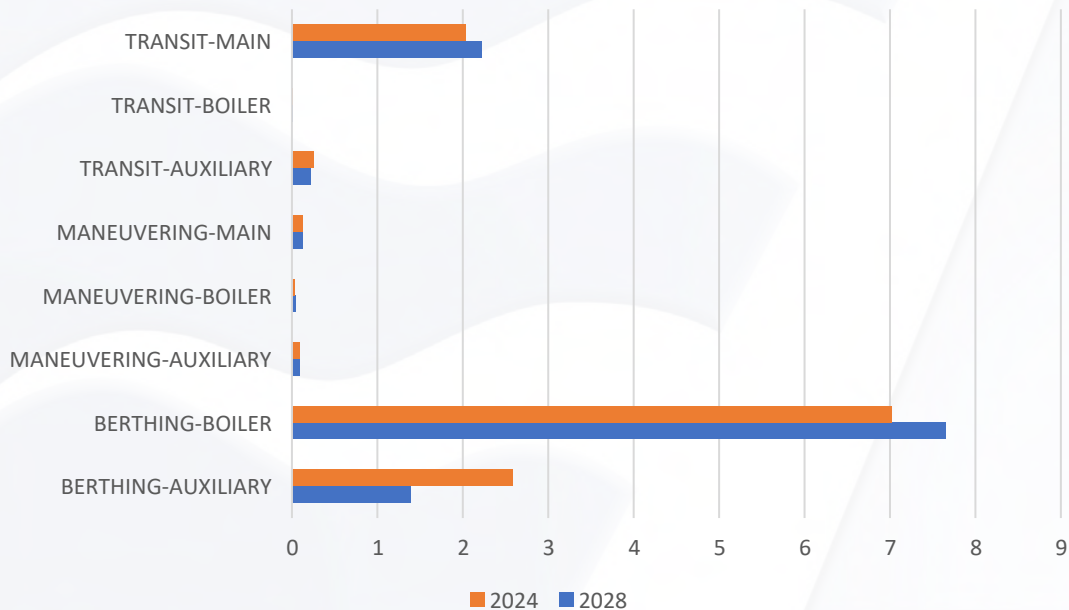
- Most of the  $\text{PM}_{2.5}$  emissions are associated with Chevron Refinery in the PTCA community
- OGV berthing exposure impacts per ton of DPM emissions are double of those for OGV maneuvering
- Truck exposure impacts per ton of DPM emissions are 4 times higher than OGV berthing exposure impacts and 8 times higher than OGV maneuvering exposure impacts



# PTCA OGV PM<sub>2.5</sub> Impacts

Modeled annual average PM<sub>2.5</sub> concentrations using 2024 emissions against 2020 block level census track data

PTCA OGV PM<sub>2.5</sub> Emissions (tpy) for 2024 and 2028



# Recent Headlines for EPA's Clean Port Program

- The awarded \$322 million grant will be used to finance zero-emission trucks and cargo handling equipment (CHE) and improve infrastructure:
  - 475 drayage trucks
  - 180 yard tractors
  - 250+ charging stations/infrastructure
- The Port of Oakland project is scheduled to start in Dec 2024 and complete by Nov 2028.
- The Air District has committed to:
  - Continue participation in the West Oakland Sustainable Port Collaborative and Community Electrification Committee
  - Deploy air monitoring to measure the effectiveness of the project and understand the emissions reductions impacts

## Port of Oakland awarded historic \$322 million EPA grant

October 29, 2024

*Grant to fund hundreds of zero-emissions trucks and cargo-handling equipment*



Source: <https://www.portofoakland.com/port-of-oakland-awarded-historic-322-million-epa-grant/>

# Follow-up Meeting

- Staff to present findings on the number of truck-related businesses/warehouses and their growth projections by early next year
- Staff plan to further assess secondary PM formation and its impact from various sources (including marine sources) as part of our ongoing PM control strategies development

**BAY AREA AIR QUALITY MANAGEMENT DISTRICT**

## Memorandum

To: Vice Chairperson Ross and Members  
of the Stationary Source Committee

From: Philip M. Fine  
Executive Officer/APCO

Date: November 13, 2024

Re: Implementation of Programs related to Zero NO<sub>x</sub> Building Appliances

RECOMMENDED ACTION

None; the Committee will discuss this item, but no action is requested at this time.

BACKGROUND

In March 2023, the Air District Board of Directors adopted amendments to Regulation 9, Rule 4 and Regulation 9, Rule 6 which included zero nitrogen oxides (NO<sub>x</sub>) emissions standards starting in 2027, 2029, and 2031 depending upon the appliance type and size:

- January 1, 2027 for small water heaters (<75,000 BTU/hr.)
- January 1, 2029 for furnaces
- January 1, 2031 for large water heaters (> 75,000 BTU/hr.) and natural gas tankless on-demand water heaters.

Given that the only zero NO<sub>x</sub> space and water heating appliances currently available are electric, rule implementation presents specific challenges regarding switching from natural gas to electric appliances. Thus, the Board required that two years prior to each compliance date, staff must provide updates regarding implementation challenges, especially focused on challenges raised by stakeholders during rulemaking—such as costs, workforce, market development, and equity issues. With this direction, Air District staff coordinated and led a multi-stakeholder Implementation Working Group (IWG) from May 2023 through August 2024 to guide further research and facilitate public conversations regarding stakeholders' concerns and other topics, all of which will inform the update and accompanying written report which will be delivered to the Board of Directors on December 4, 2024.

In advance of the December 4, 2024, meeting, the Air District invited a group of speakers to share updates on key successes, opportunities, and challenges based on their direct experience administering programs that support zero NO<sub>x</sub> appliance replacements. The speakers include:

1. Blake Herrschaft, PE, LEED AP, Building Electrification Programs Manager with Peninsula Clean Energy (PCE). Mr. Herrschaft will present findings and lessons learned from several relevant PCE building electrification programs, including PCE's heat pump rebate program, and Home Upgrade program, focusing on low-income, whole-home electrification.
2. Nate Dewart, Policy & Strategy Fellow with Energy Solutions. Energy Solutions, under contract with the California Public Utilities Commission, serves as the lead program administrator of the statewide TECH Clean California Program (TECH) heat pump market transformation program. Mr. Dewart will present the insights from TECH program implementation, and will also reference CalNEXT, another state-funded program with a focus on electrification.
3. Amy Dryden, Senior Director of Strategic Innovation with Association for Energy Affordability (AEA). Ms. Dryden will present on the multifamily subprogram of TECH, which focuses on working with affordable and market rate multifamily building owners and residents to implement space and water heating electrification replacement projects.
4. Bruce Mast, Principal with Ardenna Energy. Mr. Mast will be in attendance and available to answer questions regarding financing as it relates to heat pump deployment, including TECH's Inclusive Utility Investment Pilot.

## DISCUSSION

Topics covered in this informational item, along with many others, will be further discussed during the informational update to the Board of Directors scheduled for December 4, 2024. The presentations from the speakers will allow the Committee to learn about these programs directly from their implementers.

## BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Philip M. Fine  
Executive Officer/APCO

Prepared by: Richard Chien  
Reviewed by: Idania Zamora and Wendy Goodfriend

## ATTACHMENTS:

1. PCE Presentation
2. TECH Clean CA Presentation

# The Future of Building Electrification Programs is Now

November 13, 2024

# Agenda

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Peninsula Clean Energy Overview



PCE Building Electrification Programs



Lessons Learned From The Field

# Story From Last Month

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1. Customer's water heater broke
2. Went to the PCE website to look at approved loan contractor list for ideas of contractors
3. Had multiple contractors come out the next day
4. Reviewed quotes ranging from \$2.5k to \$13k
5. Within 72hrs, had a 65g Rheem HPWH installed for \$2.5k - rebate and new electrical circuit included
6. Will still be eligible for \$750 in tax credits, making the **net cost to her family \$1,250**





# Peninsula Clean Energy Overview



# Peninsula Clean Energy Overview

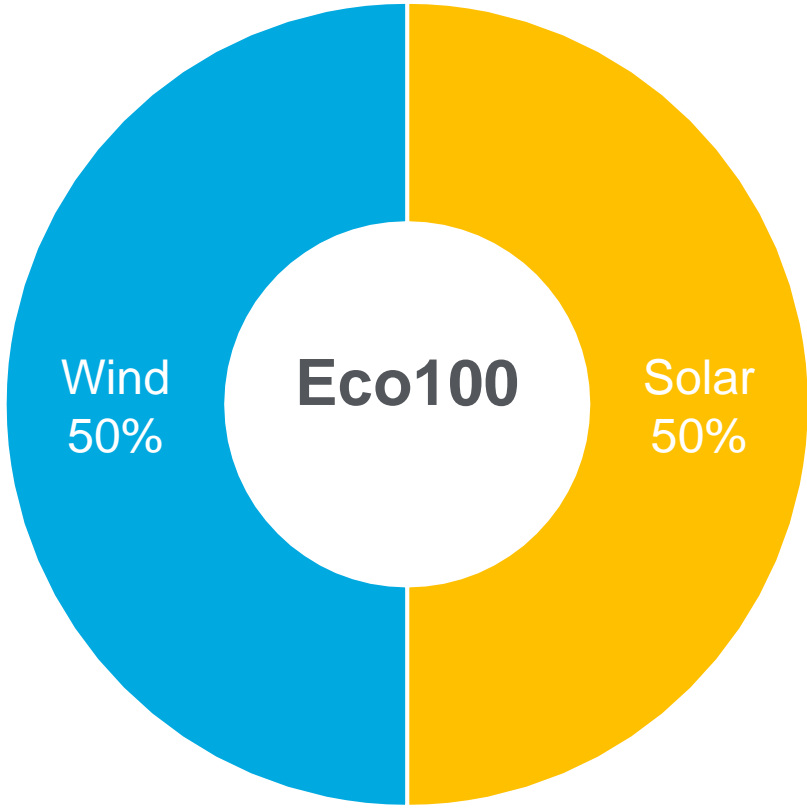
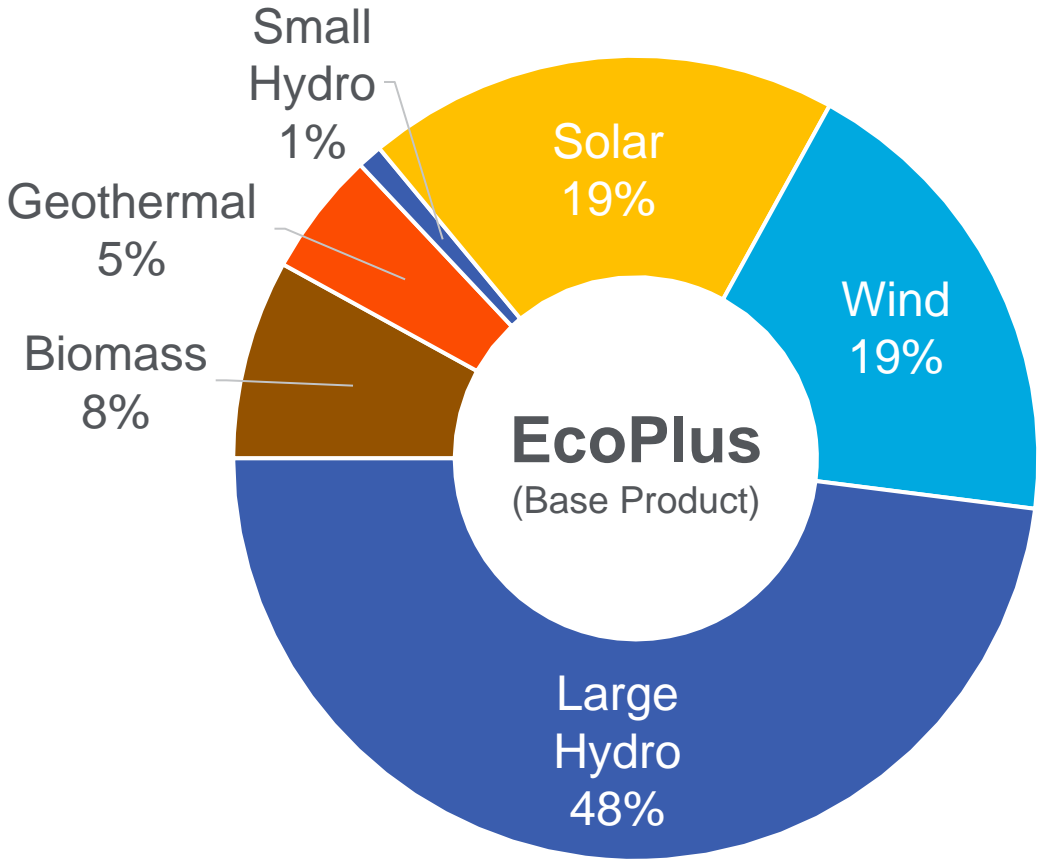


## Serving San Mateo County and Los Banos

- Population - 800,000
- \$400m/yr budget
- 3,700 GWh/yr
- 5% lower costs than PG&E
- Clean electricity

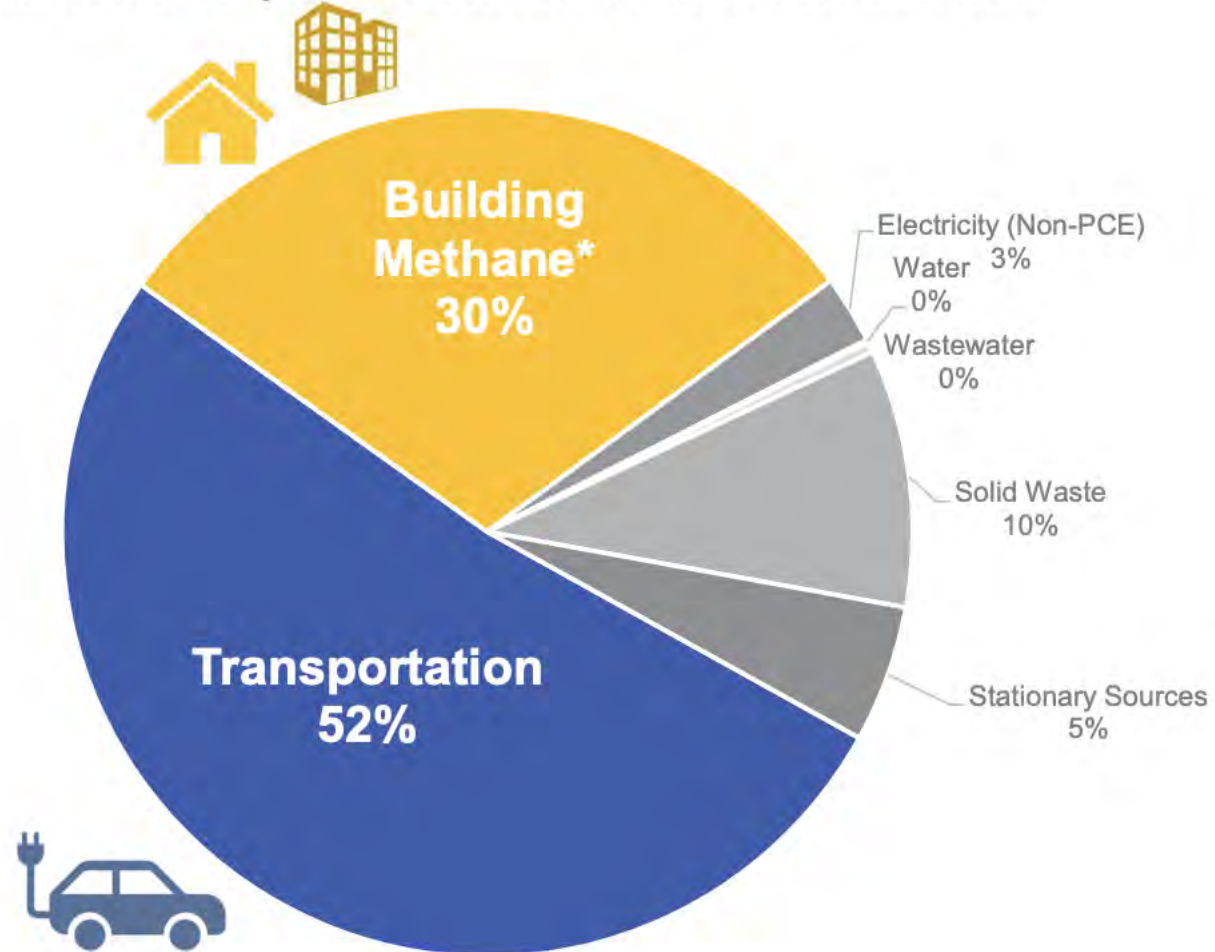


# Peninsula Clean Power Mix



# Remaining Emissions

San Mateo Countywide Greenhouse Gas Emissions, 2021



# PCE Building Electrification Programs



# Program Investment

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**\$31 million**

Invested to date  
across programs

**\$100 million**

Planned building  
electrification spend  
2025-2029

# Existing Building Electrification Programs



**Rebates** for heat pump water heaters (\$3k) & heat pump HVAC (\$1.5k)



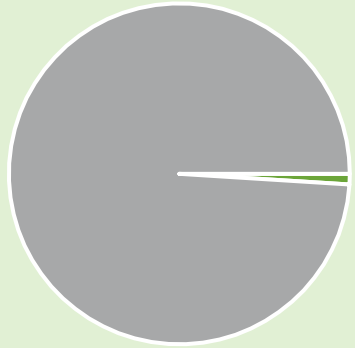
**0% loans** up to \$10k for heat pump water heaters & heat pump HVAC



**Home Upgrade program:** no-cost electrification & minor home repairs for Low Income homeowners

Participants	Count
Rebates	3,513
Loans	663
Low Income Direct Install	305
Appliances installed (all programs)	Count
Heat pump water heater	1,358
Heat pump HVAC	1,896
Induction cooktop/range	75
Electric dryer	73

# PCE Building Electrification



Only 1% of homes in PCE service territory are estimated to take any home electrification step

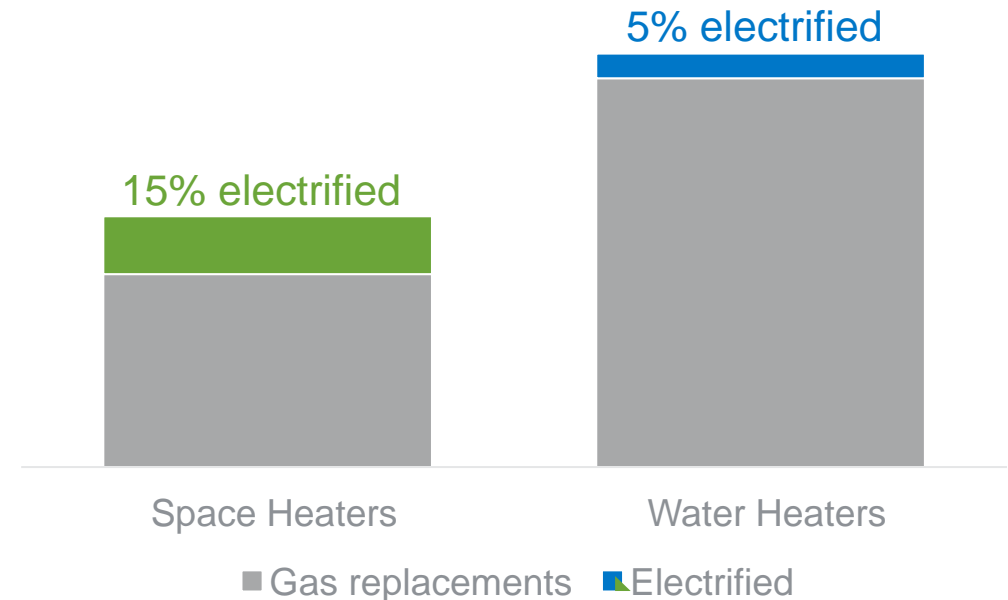
Annual small residential gas replacements

**12,000** water heaters

**7,000** space heaters

Peninsula Clean Energy

Electrification rebates as a percentage of replacements in 2023





# Home Upgrades Program (New)

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\$45 million program in partnership with SVCE  
Launching November 2024

## Income-Qualified No-Cost Electrification

No-cost whole-home  
electrification for low-  
income residents

200+ homes per year

## Market-Rate Low-Cost Electrification

Low-cost whole-home  
electrification for market-  
rate residents

## Emergency Water Heater Replacements

Rapid replacement of  
failing water heaters  
with heat pump water  
heaters

# Residential Programs – Building Electrification



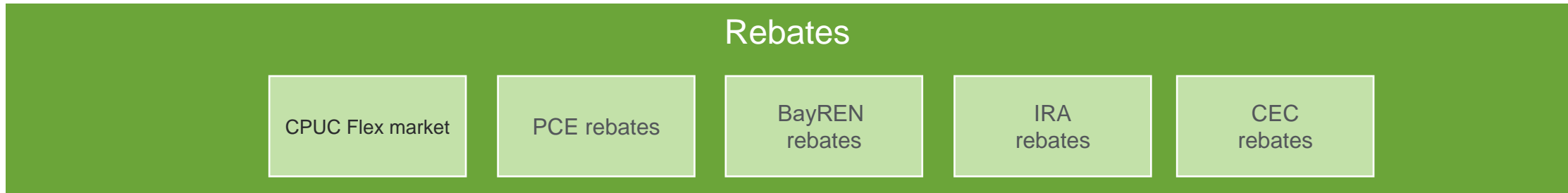
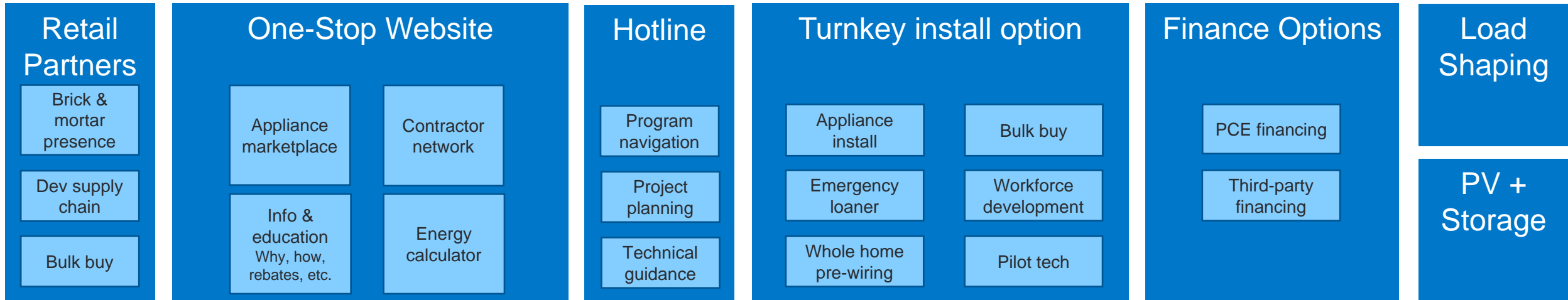
“I want to choose”  
(DIY or self-managed)



“Just get it done” &  
“It’s an emergency”



“I cannot afford this”  
(low income)



# Lessons Learned

100A Electrification is Easy  
Costs

# Do We Really Need to Upgrade Electrical Panels?

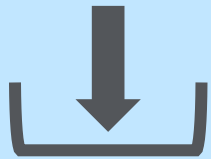


ANALYSIS RESULTS

# Three Reasons Panels are Replaced

## Capacity Constrained

Capacity, measured in Amps, is too low to add equipment



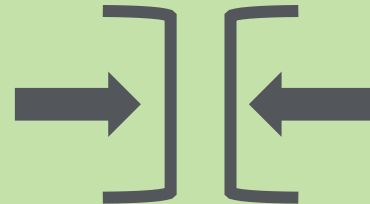
Max. 100A

### Solutions to avoid upgrade:

- Circuit splitters
- Circuit pausers
- Smart panel
- Low-amp equipment

## Space Constrained

There are no longer spare breaker spaces in the panel



### Solutions to avoid upgrade:

- Subpanels
- Circuit splitters
- Smaller breakers
- Breaker re-use

## Unsafe to Use

The panel is unsafe to work on, sometimes found on panels from the 1970s or earlier

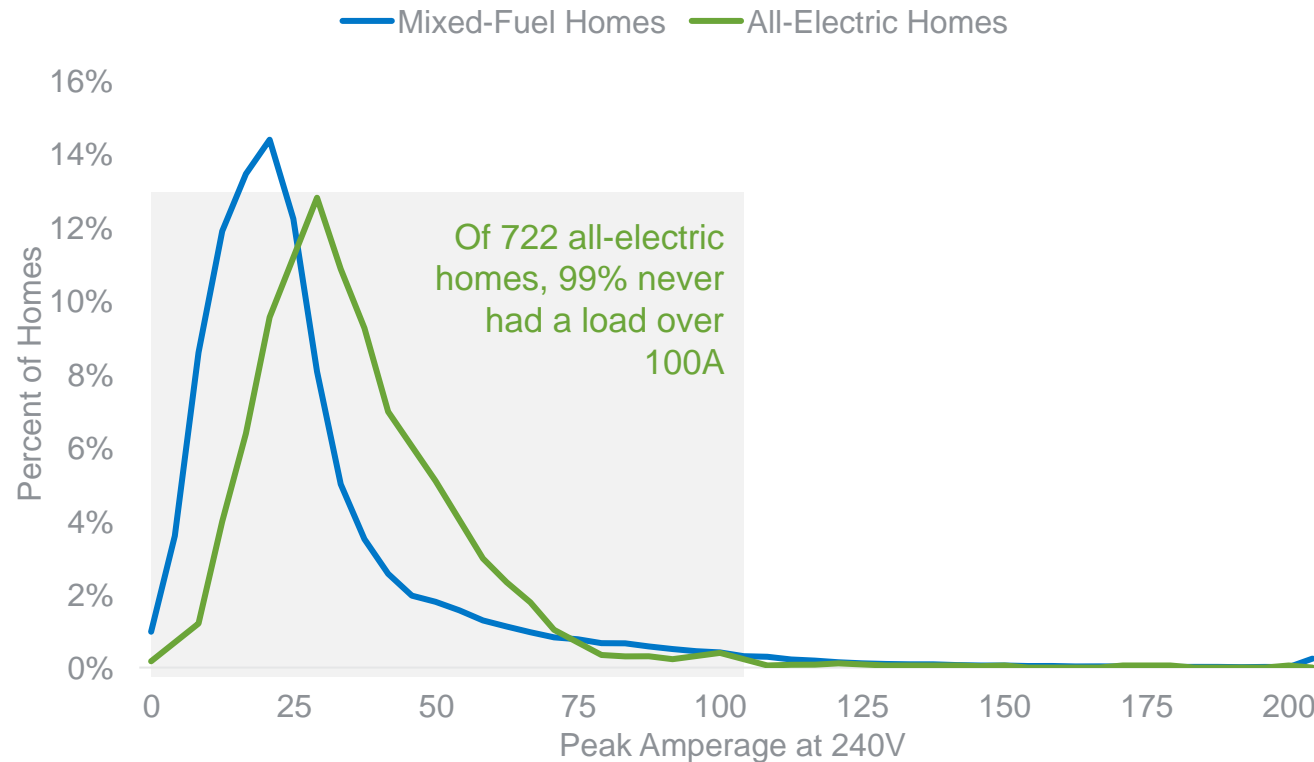


### Solutions to avoid update:

The panel must be replaced for your safety. However, it may be worth avoiding a service upgrade using solutions for capacity-constrained panels, and planning ahead by providing breaker space for an all-electric life.

# Data shows 100A is enough capacity for most homes

Maximum Annual Peak Demand at Single Family Homes in Peninsula Clean Energy Territory



Peninsula Clean Energy analyzed hourly utility data at hundreds of thousands of customer accounts. The peak demand at customer accounts tended to be well-below the 100A threshold.

99% of all-electric single-family homes use less than 100A of power at all hours of the year.

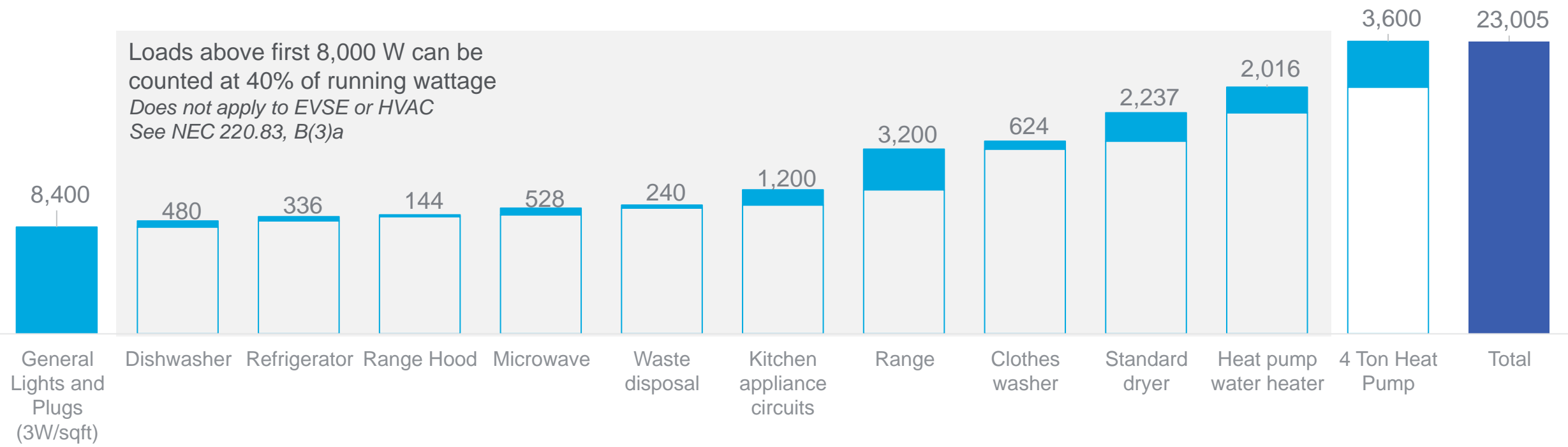
The most common peak demand is 29 Amps, indicating over 70% of capacity goes unused throughout the year.

Over 99% of mixed-fuel, single-family homes use less than 100A of power at all hours of the year.

The most common peak demand is 21 Amps, indicating nearly 80% of capacity goes unused throughout the year. 80% are 38 Amps or less.

# Calculation Summary

Panel Size Calculations for Sample 2,800 sqft Single Family Home  
(Watts at panel)



# Whole Home Pilot

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# Whole Home Pilot

House	Price	Panel Amps	Service Upgrade
San Mateo 1	\$34,312	100A	No service upgrades required in pilot
Foster City	\$36,179	100A	
Millbrae	\$33,556	100A	
Menlo Park	\$45,187	100A	
Woodside	\$48,595	100A	
San Bruno	\$36,788	125A	
San Carlos	\$12,111	200A	
San Mateo 2	\$35,871	200A	
San Mateo 3	\$31,907	200A	
<b>Average</b>	<b>\$34,945</b>		



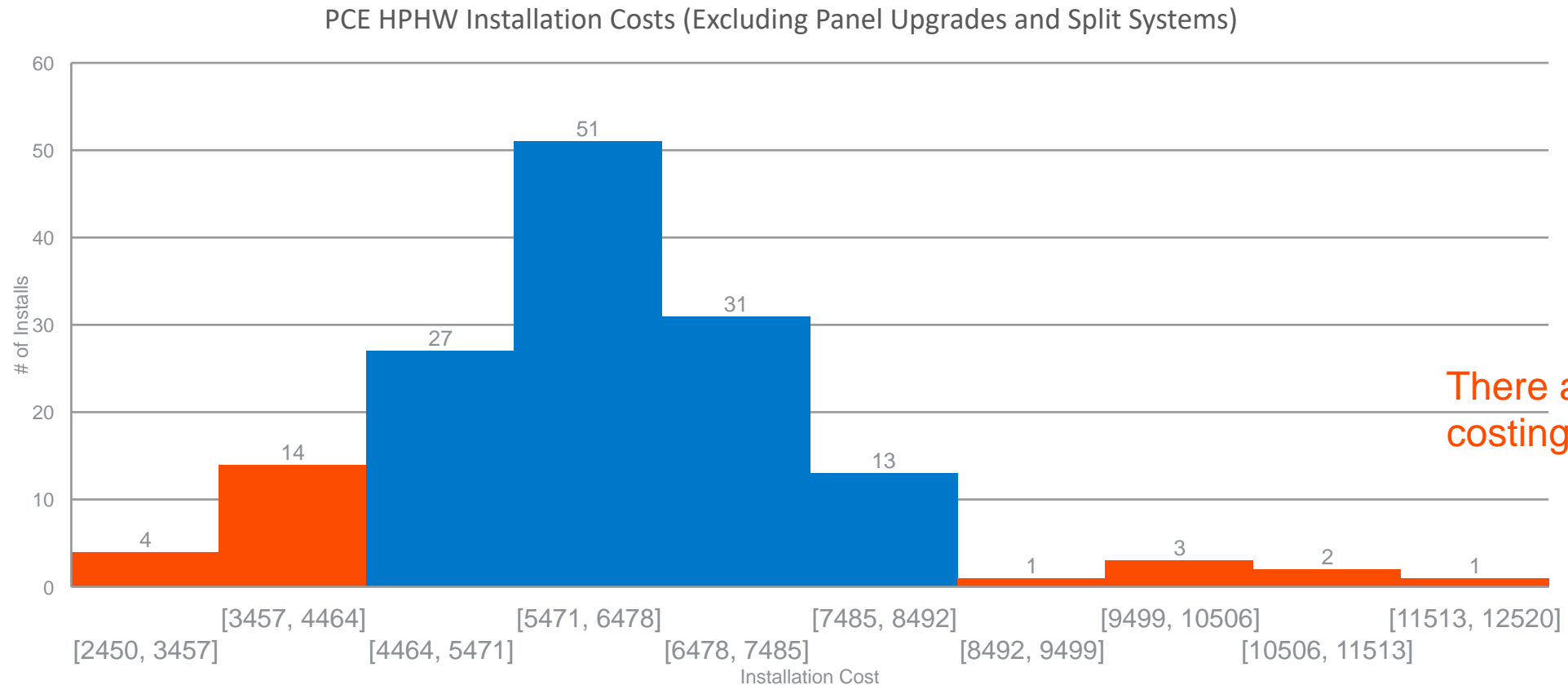
# What Is The Cost to Electrify?

ANALYSIS RESULTS



# Heat Pump Water Heater Costs

Average cost was \$6,100 in 2020  
**\$6,800 in 2024**



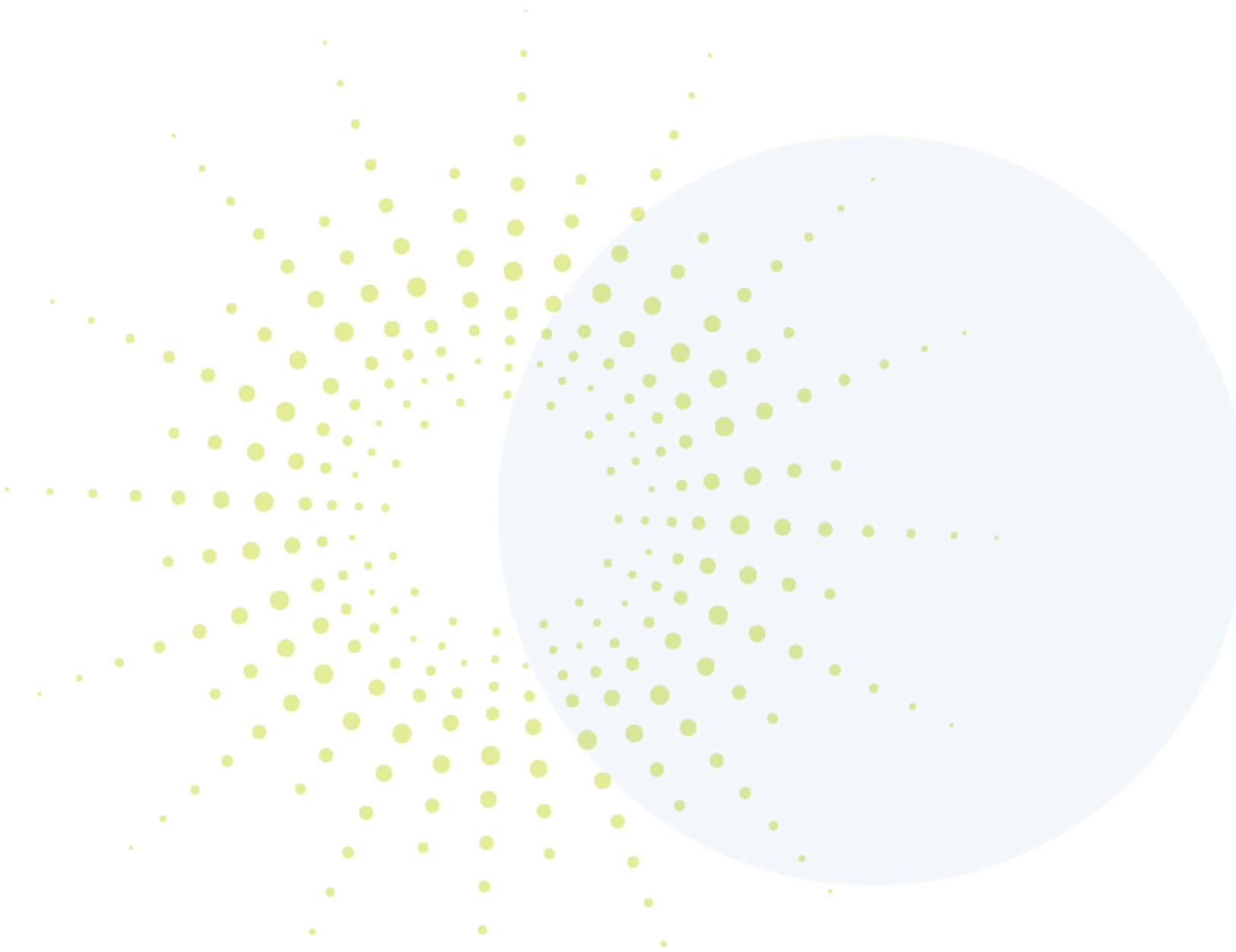
There are outliers,  
costing up to \$12,000



# Heat Pump Water Heater Rebate Impacts



Questions?



# AGENDA: 6

## TECH (+ CalNEXT) Program Insights

November 13, 2024



# Agenda (15 min)

- 1 Overview – TECH + CalNEXt

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- 2 Addressing Challenges - Overview

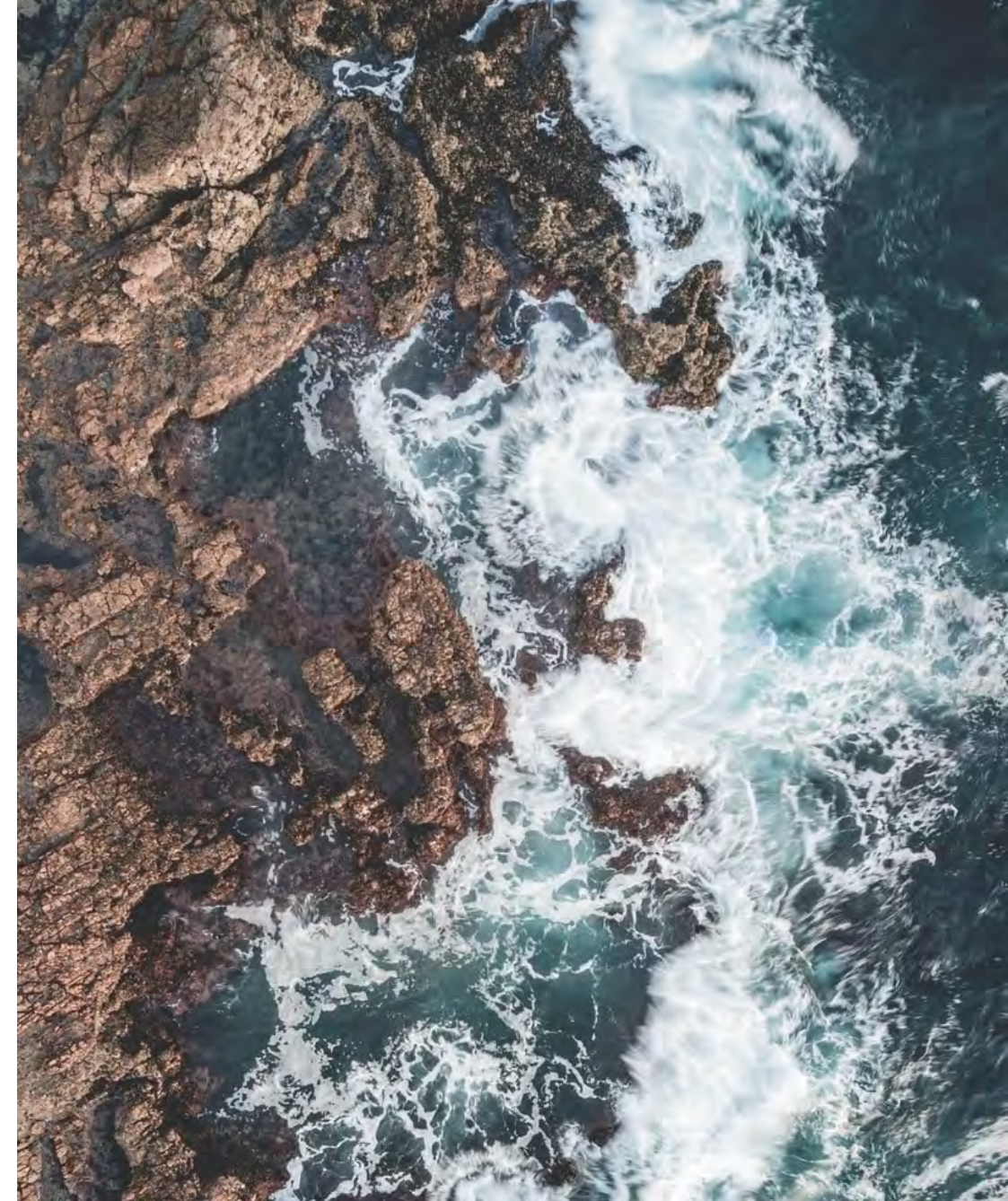
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- 3 Addressing Installation Time & Costs

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- 4 What's On the Horizon

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1

# Overview – TECH (+ CaINEXT)

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# TECH Clean California Overview

## What is TECH Clean California?

- California’s flagship heat pump market transformation initiative for space/water heating
- Guiding principles of scale, equity, regulatory simplicity, and market transformation
- Statewide eligibility
- Launched in 2021 (4-year program) with additional funding since

### California Heat Pump Goals



Heat Pump  
Water Heating



Heat Pump  
HVAC

**6 million heat pumps installed by 2030**

**Climate ready / friendly homes:**

- 3 million by 2030
- 7 million by 2035

**50% of funding**  
delivered to low-income households or disadvantaged communities

Source: California Office of Governor website. July 2022.  
“Governor Newsom Calls for Bold Actions to Move Faster Towards Climate Goals”

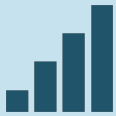
For a more complete overview of TECH Clean California, check out the slides and recordings from our previous quarterly Stakeholder Meetings at [techcleanca.com](https://techcleanca.com).

**TECH Team:**



The TECH Clean California initiative is funded by California ratepayers and taxpayers under the auspices of the California Public Utilities Commission.

# TECH Clean California's Strategic Approach



## Spur the clean heating market through statewide strategies

*Incentives, supply chain engagement, workforce development, consumer education*



## Pilots and Quick Start Grants to address market barriers

*6 Pilots, 19 Quick Start Grants*



## Inform long-term building electrification planning

*Public data reporting: project cost, carbon, grid, bill impacts and best practices*

### Deployment To Date:

- > 1,000 contractors participating
- > 35,000 heat pumps deployed
- > 40% of incentives deployed in equity communities
- Over 100 units provided to 30+ training centers throughout CA
- Over 1,500 downloads of TECH Clean California's anonymized project datasets

**Market Demand + Workforce Capacity**



**Technology Maturity + Project Impacts**



**Incremental Cost + Hassle Factor**





- A statewide initiative to identify, test, and grow electric emerging technologies and delivery methods to support California's decarbonized future.
- Ratepayer-funded California Investor-Owned Utility (IOU) program to help with implementation support.
- 170 projects (completed and forthcoming), include but are not limited to:
  - verifying a technology's technical claims,
  - understanding the market barriers, or
  - assessing a technology's ability to provide savings for the IOU portfolios at scale, and evaluating new program approaches.
- [CalNEXT.com](https://CalNEXT.com) has information about all current and completed projects.



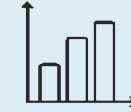
# 2

## Addressing Challenges - Overview

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# Market Engagement – Bay Area Results to-date



**Spur the clean heating market through statewide strategies and infrastructure**

Market engagement	HPWH	HP-HVAC
Contractors engaged	136	230
Brands represented	19	49
Distributor locations <sup>(1)</sup>	121	90

(1) As of Aug. '23

## **Create Statewide Infrastructure**

- Streamlined incentive clearinghouse
- Standardized data collection and reporting
- Website with consumer and contractor facing resources

## **Drive consumer demand**

- Statewide marketing campaign, strategic customer engagement

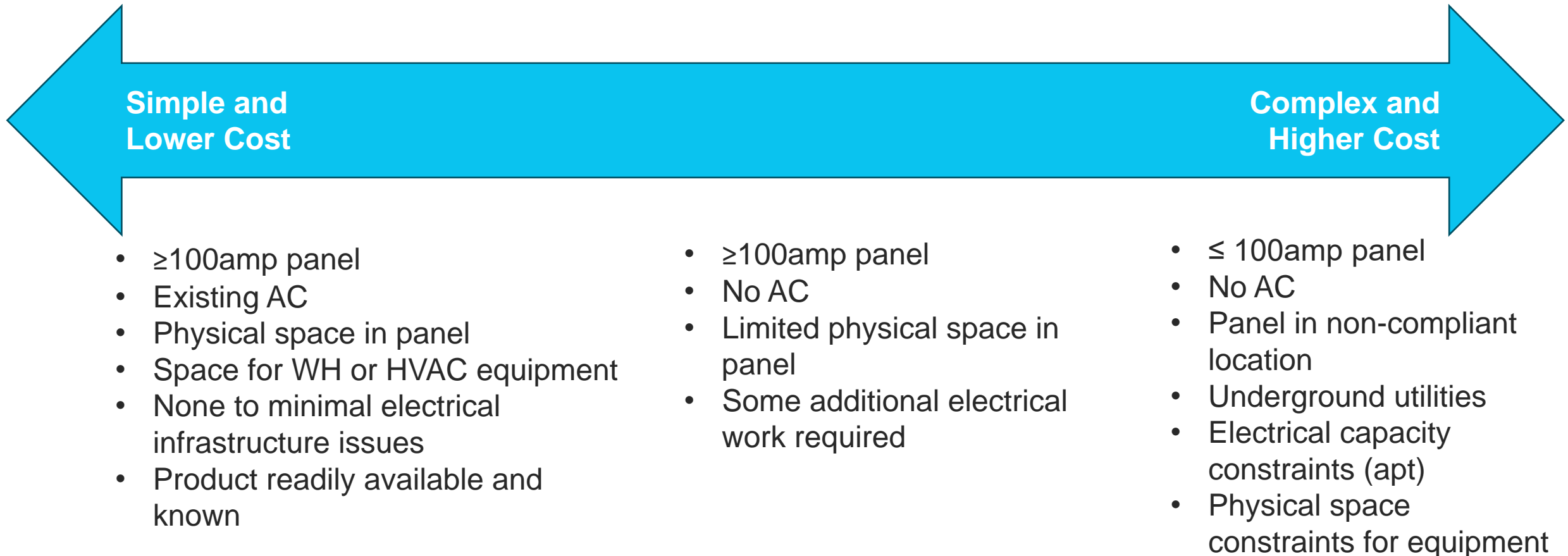
## **Activate the supply chain**

- Contractor incentives
- Technical and sales training
- Trade ally engagement

# Spectrum of Electrification

## Key Variables:

- Electrical Capacity/ Infrastructure
- Physical Space for Equipment
- Products Availability
- Consumer and Contractor Knowledge (• Funding • Rates)



# Addressing Challenges - Highlights

- **Replacement Timing:**

- Temporary Equipment – pilot and integration into programs

- **Installation Costs:**

- Avoiding Panel Upsizing – pilots and tools
- Comprehensive Support – pilot
- Multifamily – pilots and tools
- Expanding workforce – pilots and trainings\*
- Financing – pilots and research\*

## **Operational Costs:** Forthcoming in ~Q1 '25

- Analysis of the real-world bill implications
  - Meter and bill impacts, including peak demand and load shifting impacts
  - Including analysis of Fixed Charges and electrification rates

\*slides in appendix

# 3

## Addressing Installation Time + Costs

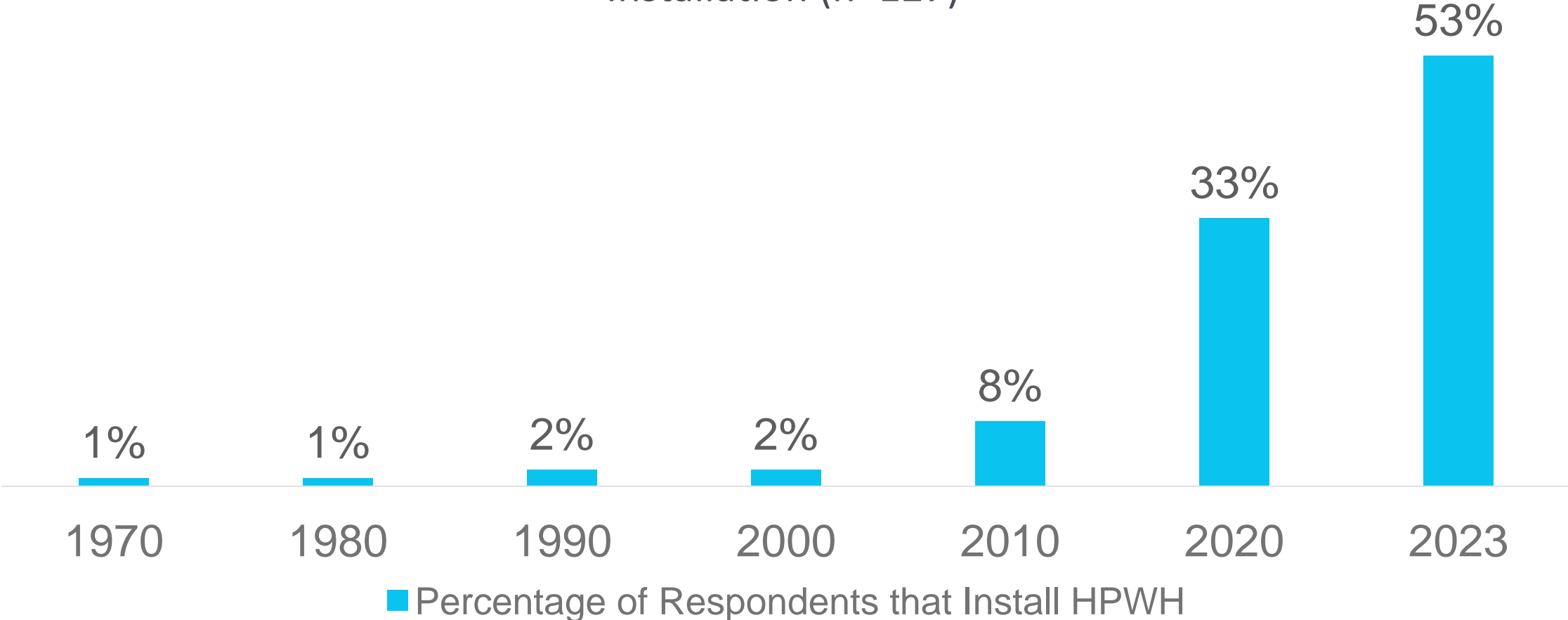
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# Heat Pump Water Heater Adoption is a Relatively Recent and Growing Phenomenon in California, Contractor Survey

Percentage of Respondents that Install HPWH by Decade of First HPWH Installation (n=127)



# Temporary Equipment

## Barnett Plumbing & Water Heaters Gas Loaner Program

QUICK START GRANTS

Installed

- 149 heat pump water heaters
- 127 gas loaners

### PROBLEM STATEMENT:

HPWH retrofits often take too long when emergency replacements are required.

### GOAL:

Test feasibility of loaning customer temporary gas water heater until HPWH retrofit can be completed.

### SCOPE:

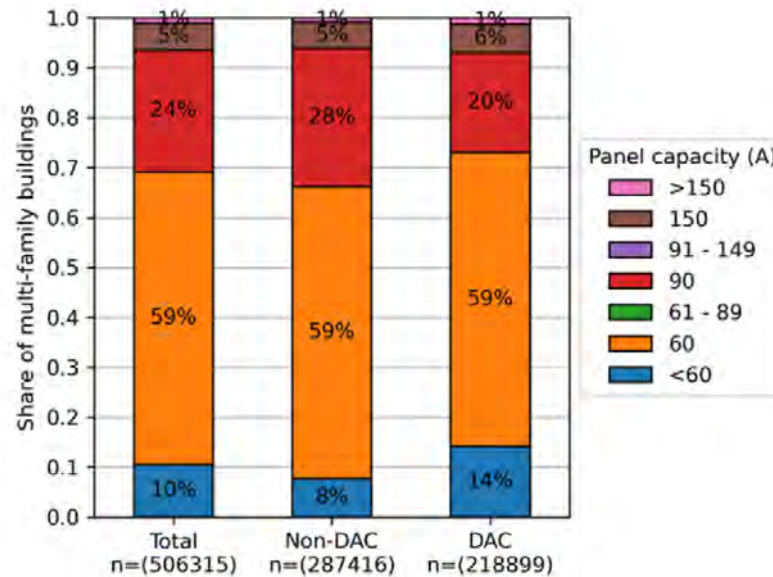
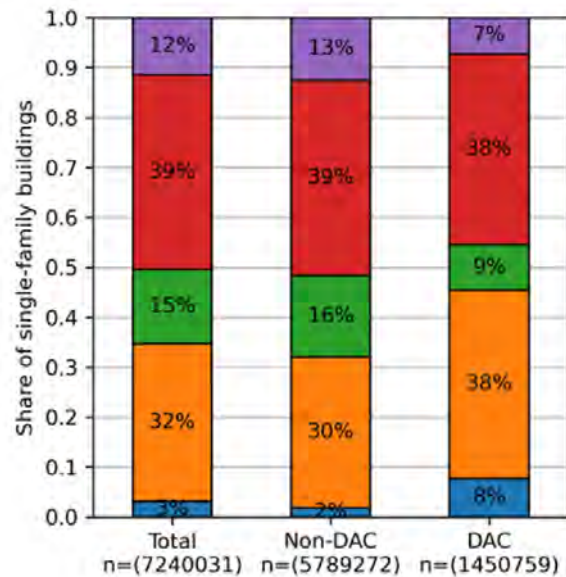
- TECH provided \$975 per project to cover loaner costs.
- New 120V plug-in HPWHs added as an alternative to gas loaners.

### RESULTS:

- Barnett's electrification at time of emergency replacement increased from 1% to 17%.
- City of Palo Alto Utilities, SVCE, MCE, & PCE now incorporating into their programs.
- Some contractors incorporating into business model, as option for customers.

# Avoiding Panel Upsizing

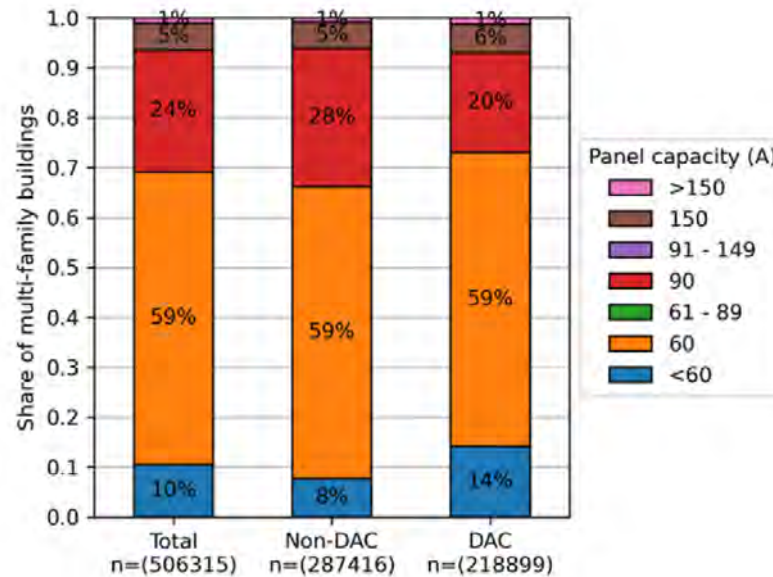
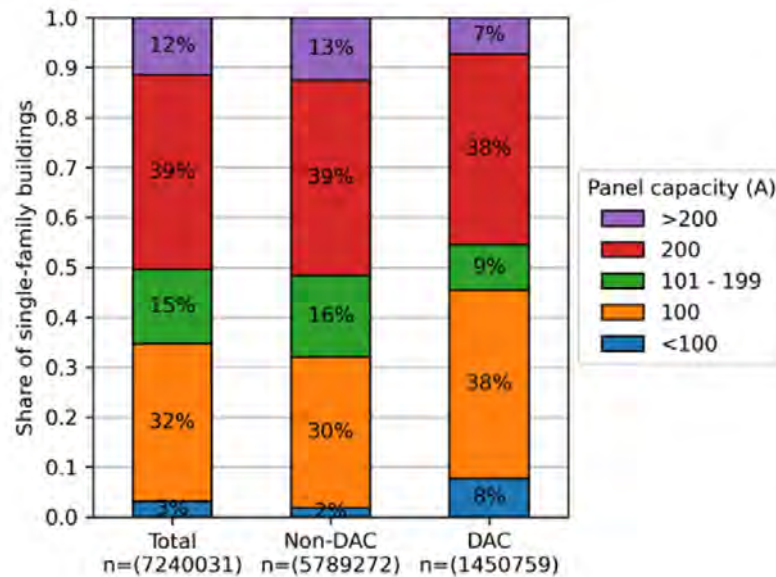
- Per TECH analysis, electrical work, including upsizing adds ~\$1,200 to ~1,500 to project costs, on average.
- Fournier et al., (2024) analysis using TECH data estimates:
  - ~3% of **Single Family (SF)** and ~10% of **Multifamily (MF)** in CA should require panel upsizing
  - ~32% SF of ~59% of MF can electrify without upsizing by applying Watt Diet strategies



Fournier et al. (2024) "Quantifying the electric service panel capacities of California's residential buildings"

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**Result:** Plans for easy-to-use decision tool for electrical panel optimization to avoid unnecessary panel upsizing.

Project now being funded by Energy Commission for development and demonstration.

Fournier et al. (2024) "Quantifying the electric service panel capacities of California's residential buildings"

# Comprehensive Barrier Removal



► HPWH Conversion Readiness  
Program Focused Pilot

Active

2024/12

## PROBLEM STATEMENTS:

1. Higher first costs due to additional expenses for electrical upgrades
2. Customer uncertainties around electrification impacts
3. Lack of trained installers.

## GOAL:

Test customer adoption impact of removing three barriers.

## SCOPE:

- Offer customers a free “heat pump readiness assessment” with forecast utility bill impacts, available incentives, proposed work scope.
- Free electrical upgrades to prepare them for electrification.
- Train installers to create a scalable model for delivery state-wide.

# California Multifamily Landscape

- ~Half of low-income households in California live in multifamily properties and majority are rentals
- Common system configuration:
  - Majority have in-unit HVAC
  - About 50/50 split between in-unit and central domestic hot water
- Heat pump retrofits not yet business as usual, but have strong policy and program support



# Common retrofit scenarios



- **Stand-alone** energy retrofits largely driven by programs
- **Comprehensive** incorporated in larger rehabilitations at **capital events** (refinancing, tax credit investment)
- **Over time** at failure or unit turn
  - Common practice is like-for-like
  - Harder with dissimilar systems, new form factors

# Multifamily Issues and Strategies

## Funding and Timeline Impacts

- **Electrification readiness** – allows for planning and investment today
- Phased approaches in retrofits

## Increased Electrical Loads – time and costs

- Leverage energy efficiency to reduce loads
- **Sharpen pencil on load calculations**
- Select low Amp equipment Elec load

## Uncertainty in New Systems

- **Central HPWH design; sizing; performance and monitoring**
- Share out data and methodology and provide training

## Utility Costs

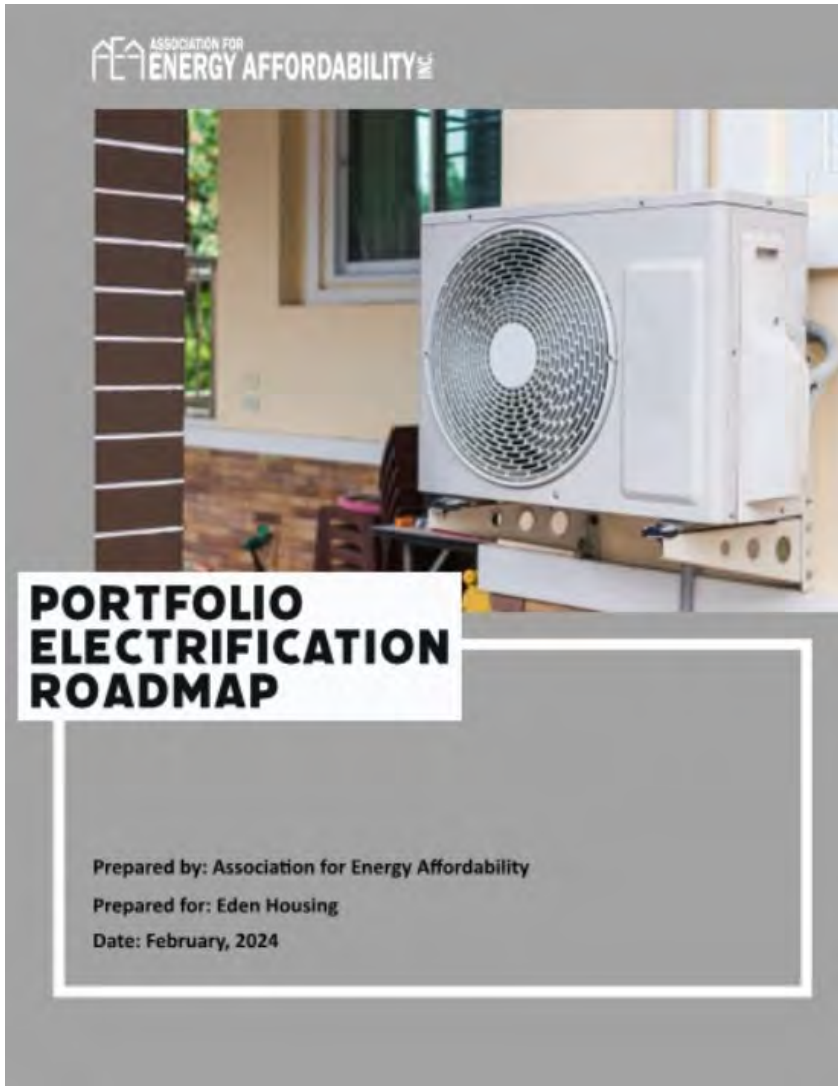
- Comprehensive – Cost effective, EE, PV
- Ensure residents can realize additional benefits for health and comfort

## Prioritization of Capital Events for Funding

- Planned modernization can support electrification



# Multifamily: How TECH Pilots Are Uncovering Opportunities and Advancing Market



- **Electrification Readiness to Enable Future Electrification**
  - Serving 393 units - 10 projects
- **Closing the Funding Gaps for All-Electric Retrofits**
  - Serving 178 units – 7 projects
- **Holistic Planning to Electrify Owner's Portfolio**
  - Serving over 27,000 units
- **Building Capacity to Support Central HPWH Retrofits**
  - Serving 661 units

# Multifamily

## Data collection to inform future planning and design



► Multifamily Central Heat Pump  
Water Heater Field Study

Active

2026/02

**PROBLEM STATEMENT:** Lack of data on costs and system performance for Central HPWHs in multifamily buildings

**GOAL:** Identify design, installation and operational features that are critical for a success application.

**SCOPE:** Field performance evaluation of installed central HPWH systems at five sites to allow for preliminary identification of high, medium, and low performing hot water system designs.

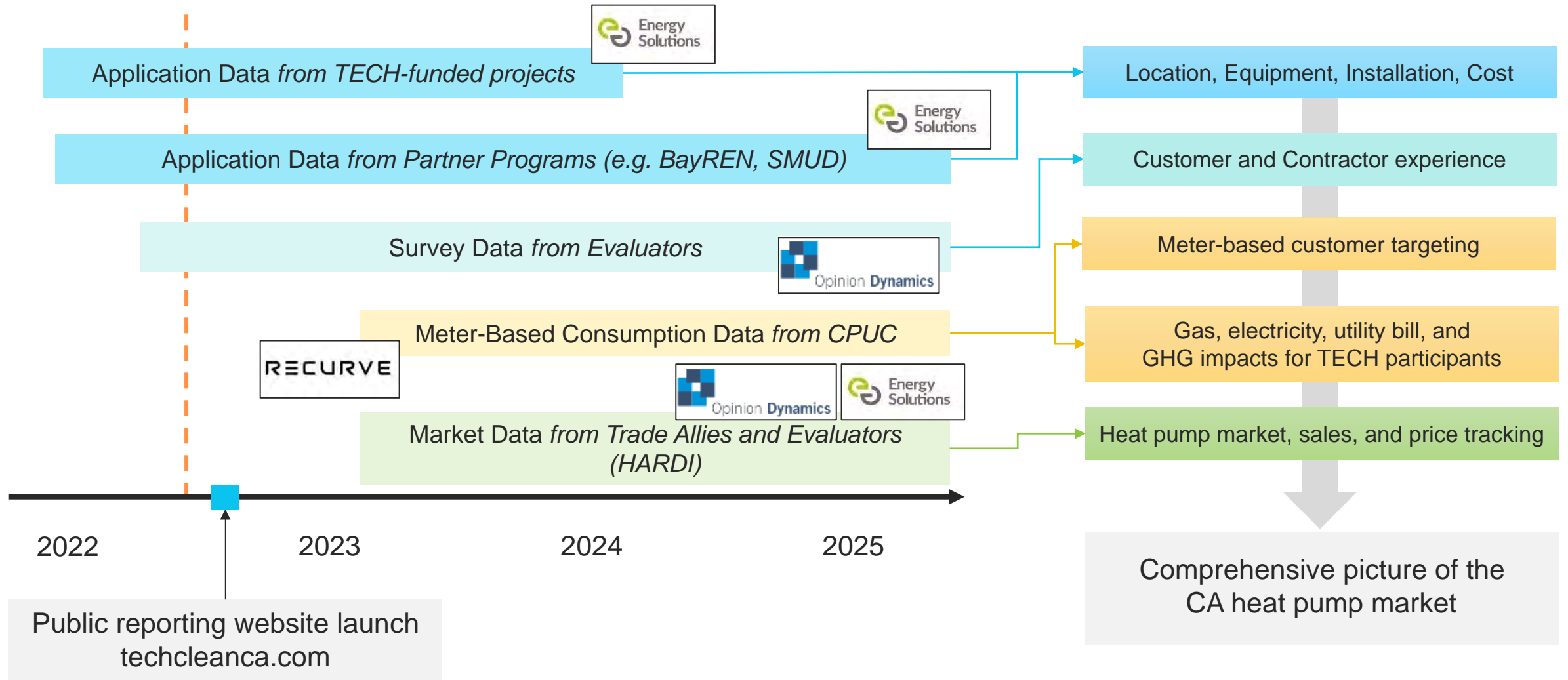
# 4

## What's on the Horizon

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# Major Data Flows and Timeline





# Snapshot of Federal and State Funded Building Decarbonization Programs

Launch Date	Program	Funding	Who Benefits	Measures
Oct. 2024	IRA HEEHRA Phase I / TECH Clean CA	\$80 Million	Low-to-moderate Income Households	Rebates existing single-family and multifamily air and water heat pumps, electrification, and appliance rebates
Nov. 2024	GoGreen Financing	\$30 Million*	All income households	Loan loss reserve and interest rate buydown to support home energy retrofit loans
Mid 2025	IRA TREC	\$9 Million	Trainees and Contractors	Pre-apprenticeship and apprenticeship programs and workforce development
Mid 2025	Equitable Building Decarbonization / HOMES Direct Install	\$413 Million* \$154 Million	Low-Income in Under-resourced Communities	No-cost decarbonization retrofits. All projects must replace gas heating/HVAC or water heating with heat pumps
Late 2025/ Early 2026	IRA HOMES Pay-For-Performance	\$102 Million	All income households	Existing residential. 15% overall energy savings
Late 2025/ Early 2026	IRA HEEHRA Phase II	\$152 Million	Low-to-moderate Income Households	ENERGY STAR® certified electric appliance rebates for existing residential
2026	Equitable Building Decarbonization Tribal Direct Install	\$30 Million*	CA Native American Tribes	Under development. Existing residential.

\*state funded

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**NEW:**  
2025: ~\$40 M TECH Clean CA from Alison Canyon

# Thank You

*For more information:* [techcleanca.com](http://techcleanca.com)

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# Appendix

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# Results To-Date 9-County Bay Area

## Heat Pump Water Heaters

Single Family: 2,964 projects

Multifamily:

Projects completed and reserved: 248

Total units: 4,912

## Heat Pump HVAC

Single Family: 7,641 projects

Multifamily:

Projects completed and reserved: 54

Total units: 434

### HPWH Key metrics include:

- Electric panel work
- Installation times
- Emergency Replacements
- Avg. # of Bedrooms
- Avg Set Point:
- Thermostatic Mixing Valve

### HVAC Key metrics include:

- Electric panel work
- Installation time
- Previous furnaces were fully decommissioned (rest set up to run emergency only)
- Replaced a previous Central AC



# Market / Workforce

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## More Than Half of Water Heater Installs Are Done By DIYers or Friends/Family

- Based on the incidence survey of homeowners (n=149) who replaced their water heaters in the past two years, water heaters are installed by various individuals.

Installer	Percentage
Licensed contractor	32% (n=48)
Unlicensed handyperson	15% (n=23)
Family or friend	3% (n=4)
Respondent installed themselves (Do It Yourself)	50% (n=74)

- About a third of the 149 surveyed customers utilized a contractor who was registered with the CSLB to install water heating equipment.

# Installation Cost Reductions



## ► DIY HPWH Installation & Maintenance Study

Active

2025/06

### **PROBLEM STATEMENT:**

More than half of water heater installs are DIY but permitting and code requirements constrain DIY HPWH installations.

### **GOAL:**

Simplify and expand feasibility of code-compliant DIY HPWH installations, building on new plug-in 120V HPWHs

### **SCOPE:**

Develop resources to simplify code-compliant DIY HPWH installations.

# Workforce Education + Training

## Statewide Training

As of Aug. 2023: 1,873 people attended TECH Clean California training events

63% work in high unemployment zip codes



HVAC Training:  
**National Comfort  
Institute**



HPWH Training (2023):  
**ESMAC\* + HPWH  
Giveaway**



Electrification  
Training:  
**Electrify My Home**



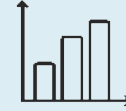
Multifamily Training:  
**Association for Energy  
Affordability**



► **Increasing Heat Pump Water Heater  
Deployment**

**Active**

Install 150-160 120V HPWH  
into the homes of plumbing  
contractors.



**Spur the clean heating market  
through statewide strategies and  
infrastructure**

### Create Statewide Infrastructure

- Streamlined incentive clearinghouse
- Standardized data collection and reporting
- Website with consumer and contractor facing resources

### Drive consumer demand

- Statewide marketing campaign, strategic customer engagement

### Activate the supply chain

- Contractor incentives
- Technical and sales training
- Trade ally engagement

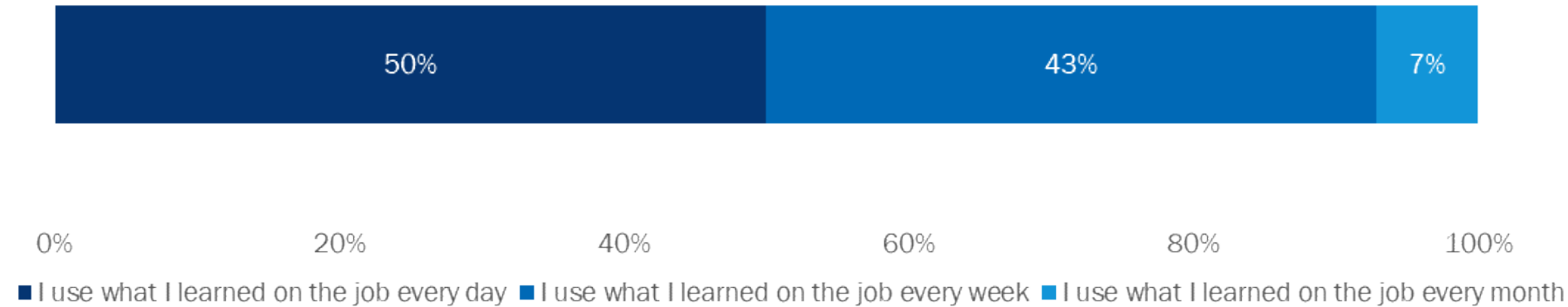
# Topics of Interest and Areas for Expansion

Topic	Percent of Trainings that Reference Topic
Electrical components (currents, amps, voltage)	24%
Water Heating Codes	18%
Circuit Breakers	12%
HPWH Tank Corrosion	9%

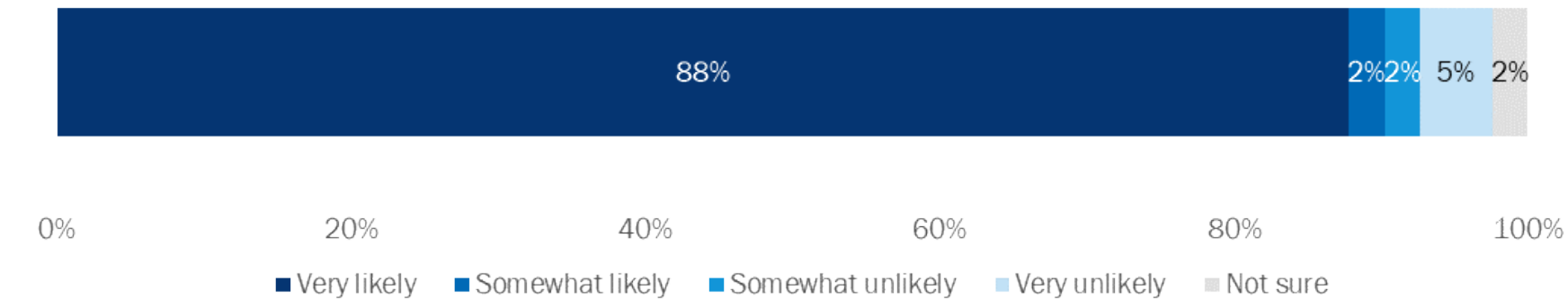
- Installers reported needing additional training on electrical components of heat pump water heater installations, service topics, and plumbing codes and regulations.
  - The training landscape analysis found few trainings that reference these topics.

# Training Application in Work

Nearly all used what they learned frequently on the job



Most (36 of 41; 88%) are very likely to continue using knowledge in their current work



# Quick Start Grant Profile:

## Heat Pump Water Heater Retrofit Best Practices Guide - RHA

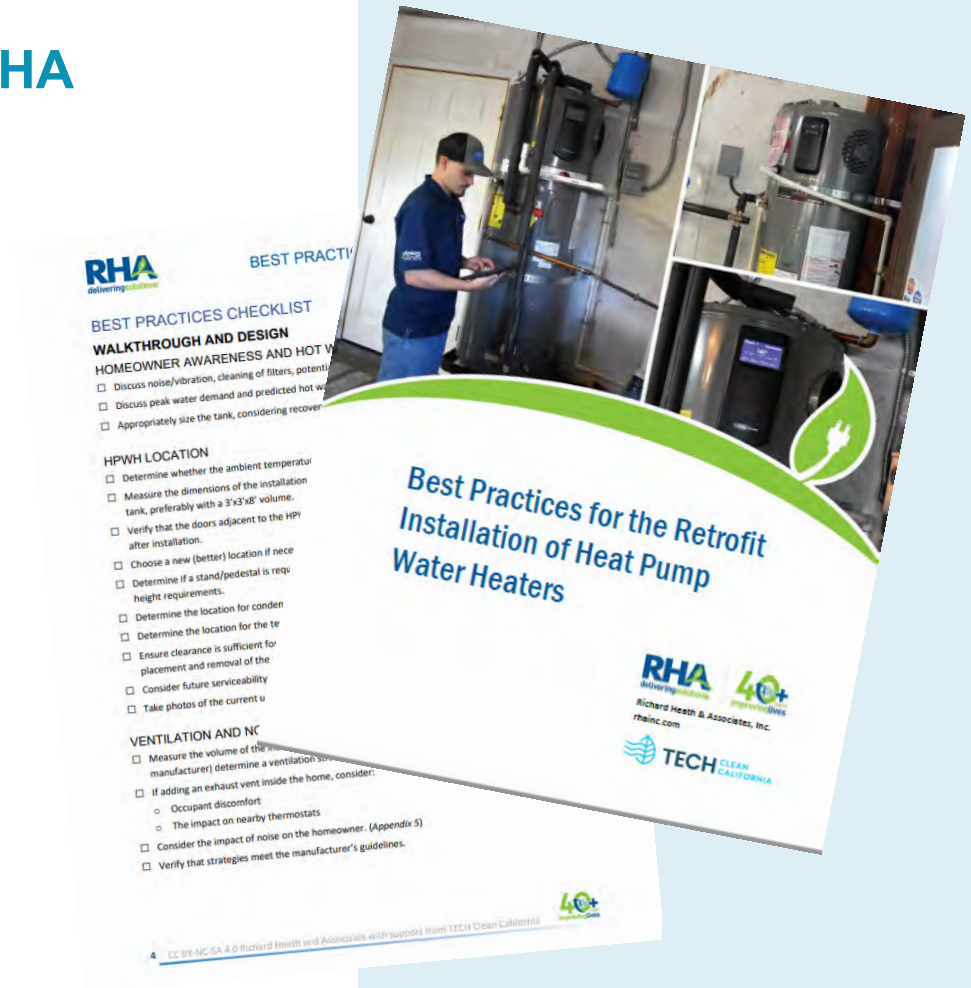
**Project Objective:** Ensure quality, replicable heat pump water heater retrofits across California by creating an open-source retrofit installation best practices and field guide, piloted with a small group of contractors.

### August 2023 update:

- Best Practices document created using input from advisory group
- Available on TECH Clean California Contractor Hub

### What's ahead:

- Interest by national research organizations in adapting this guide for a national audience
- Adapt best practices into a photo-based job aids



# Contractors

**25c Tax credits:** Most contractors don't approach the tax credit conversation too much

- Eligibility can be confusing and contractors do not have visibility into customer tax liability, so can't guarantee tax credit
- Tax credits recognized more than eight months down the line.

**Home Energy Rebate programs.** More predictability with rebates; upfront payment, but still waiting on program design.

**TECH Clean California / SGIP incentives.** Excited to participate. Incentives “open up the door” to customer conversations.

**Simplicity is key.** Prefer “flattened” incentives, centralized application system, broad eligibility.

## Our Takeaways:

- Prefer centralized system/platform
- Clear rules that don't change and are consistent across programs
- Spiffs less important than predictability
- Short payment turnaround is key. Low financial tolerance for long repayment periods.



# Distributors

## Combination of market drivers are increasing their AC:HP stocking ratio

### Distributors are a key partner in heat pump programs.

- They are intimately familiar with the product, the market, and program requirements and are main avenues for education for contractor base.

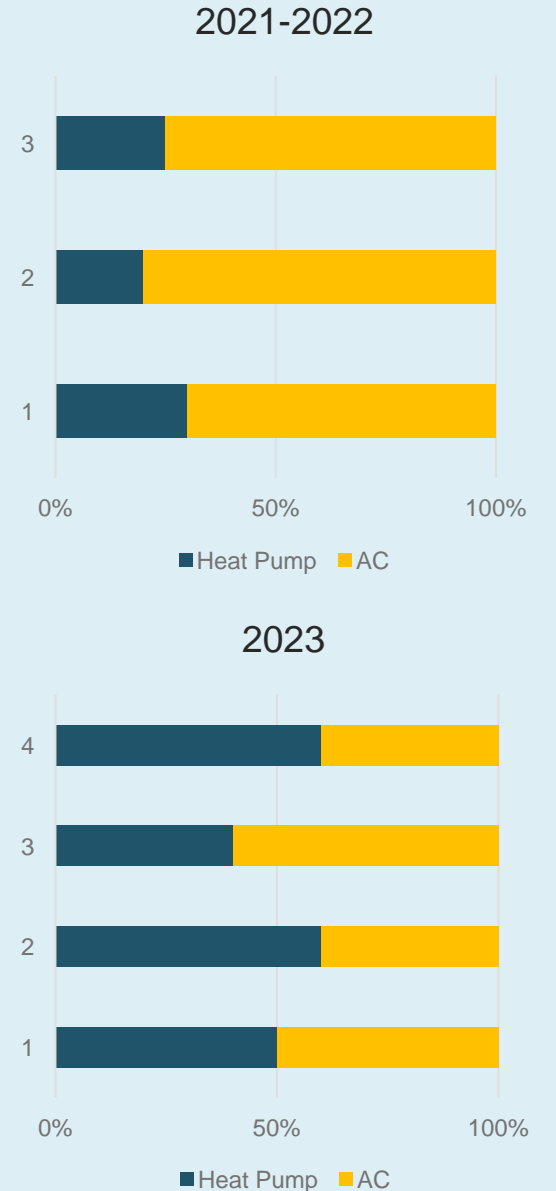
### Substantial increase customer demand for heat pumps, specifically highly-efficient heat pump

- Uptick attributed to recent heat pump media and IRA incentives (\$2000 25C tax credit). May take some time for the 25C tax credit to make larger impacts.
- Some wariness that customers perceive heat pumps as a “panacea.”
- More nuanced customer education necessary (what measures to prioritize first, etc.)

### Codes and Standards also driving stocking decisions

- Ultra-low NOx (ULN) standards also contributing to heat pump adoption.
- New 2023 DOE product standards motivated distributors to get rid of AC stock in 2022 and switch purchase orders to heat pumps.

**IRA Rebate Programs** - hearing lots of buzz / excitement, but not yet a driver.



# Manufacturers

## Insights on ability of manufacturers to convert existing natural gas manufacturing lines to electric

- Some manufacturers are retooling plants to be 100% heat pump focused
- Manufacturers do not see an issue with production capacity and are confident they can meet demand
- Price inflation is similarly affecting heat pumps, furnaces, and gas water heaters
- Some manufacturers are dropping less efficient model lines due to IRA eligibility requirements (25C and home energy rebate programs)
- Main focus of manufacturer marketing dispel old assumptions about heat pumps – i.e., heat pumps are appropriate and effective in cold climates.

## Our Takeaways:

- Provide manufacturers with forecasted units the programs will support to ensure capacity
- Capacity / product quality has been hugely increased but is not instantaneous - manufacturers need to know what to plan for
- Three to six-month headwinds on eligibility changes to retool production
- Consider program goals when determining eligibility requirements

# Financing

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# Affordability - Financing

**PROBLEM STATEMENT:** Conventional finance options are unaffordable or inaccessible to low-income and credit-challenged customers.

**GOAL:** Investigate options for expanding customer access to affordable financing for electrification upgrades.



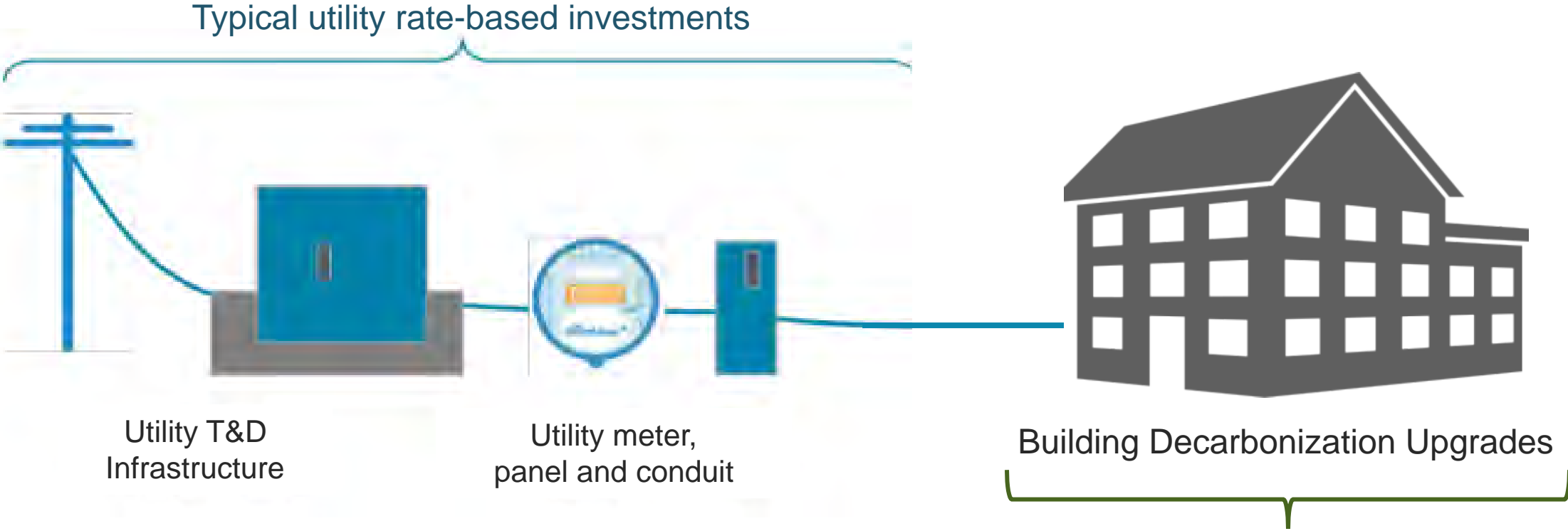
## SCOPE:

- **Inclusive Utility Investment (IUI).** TECH and Silicon Valley Clean Energy have partnered to launch financing pilot to **test key IUI design elements.** Results expected in 2026.
- **CalNext market study** investigating opportunities and gaps for expanding public heat pump financing programs. Promising options include:
  - **contractor point-of-sale lending**
  - **equipment leasing**
  - **combined solar and electrification financing**
- Results will be published in December 2024



# Q. What are Tariffed On-Bill Investments?

## A. Site specific investments on tariffed terms with on-bill cost recovery



Site-specific investments with site-specific cost recovery create an inclusive option for overcoming upfront cost barriers for all

# Tariffed On-Bill vs. On-Bill Financing

		OBF	IUI
Program Attributes	• Cost recovery is through a fixed charge on the utility bill	✓	✓
	• Participant accepts an opt-in utility tariff <u>tied to the location</u>		✓
	• Charge applies automatically to successor customers until cost recovery is complete		✓
	• Estimated savings <u>must exceed</u> cost recovery charges		✓
Customer Benefits	• No upfront participant cost for cost effective upgrades	✓	?
	• No credit or income qualification required		✓
	• Renters are eligible		✓
	• Estimated savings <u>exceed</u> cost recovery charges		✓
	• Payments end if upgrade fails and is not repaired		✓

# Other Topics

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# Time and Cost Savings Opportunity: Same-Day Permitting

TECH analysis of permit issuance times for 1,143 TECH HPWH incentive claims in 100 Authorities Having Jurisdiction (AHJs, mostly Sacto & SF Bay), 12/21 to 4/23

- AHJs commonly issue same-day permits for “like-for-like” replacements of methane DHW
- Ave. application to permit issuance was 5.91 days
- 25 AHJs (49%) process  $\geq 75\%$  of HPWH permits in <1 day

Ave. time to permit issuance	Claims (n=774)	AHJs (n=51)
Same day	527 (68%)	16 (31%)
>1 day	247 (32%)	35 (69%)



Long permit times are common and complicate emergency replacements. **Same-day permitting is possible.**

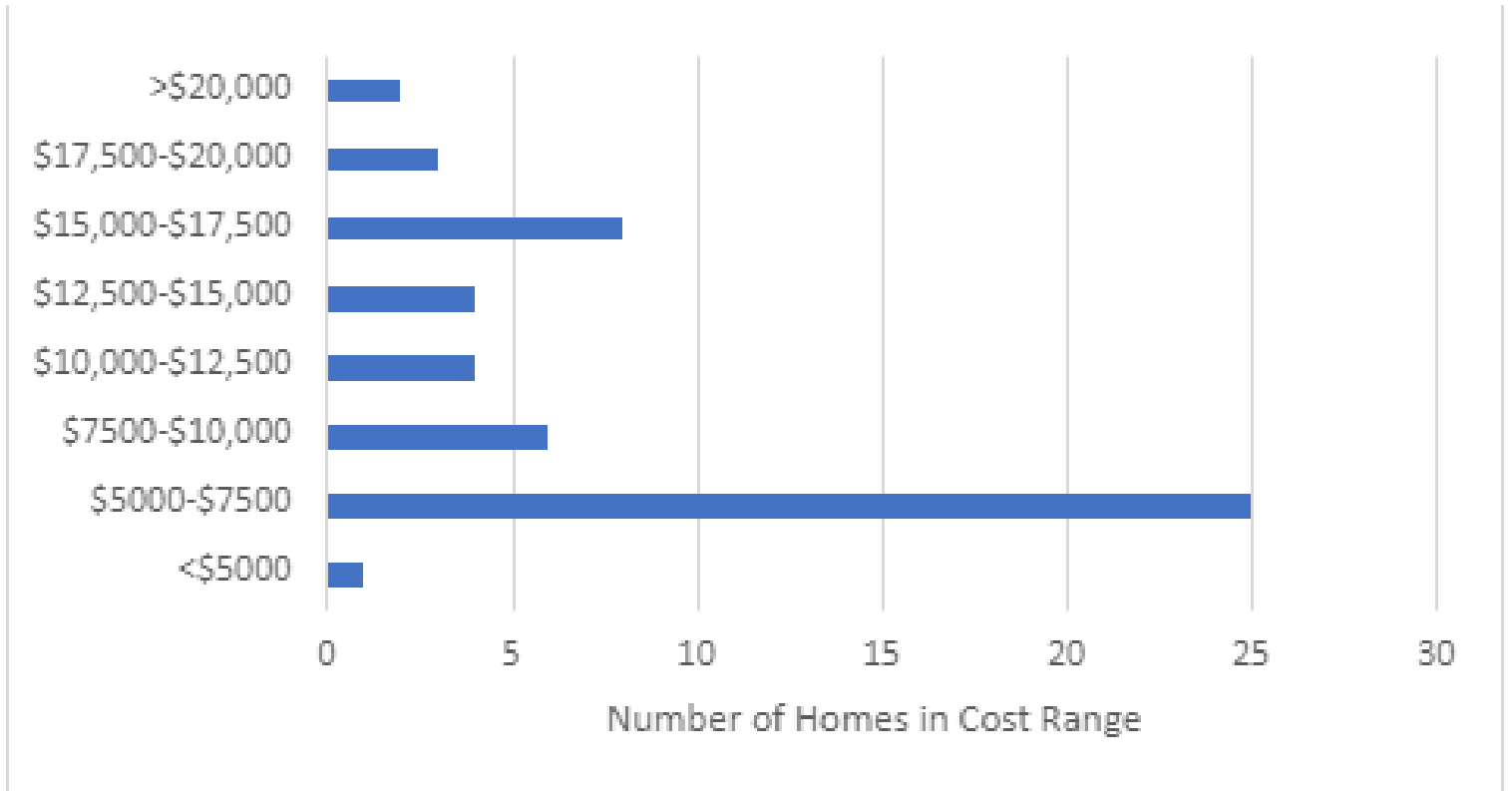
See <https://techcleanca.com/pilots/permitting-pilot/>



# Pilot Profile: Low Income Pilot

## San Joaquin Valley Home Remediation Data Analysis

- Collaboration with SJV DAC Pilot Project offers up additional home remediation funding
- 54 homes funded: 26 single-family + 28 mobile homes
- New report on the type, frequency, and cost of remediation measures published:  
<https://techcleanca.com/pilots/low-income-fuel-switching/>



# Permitting Pilot – Recommendations

- Increase distribution of permitting educational materials through formal and recognized and trusted channels
- Equip building department staff at all levels with online, on-demand, and in-person training and resources
- Direct experiential learning opportunities tailored to address the specific knowledge gaps of building and permitting departments
- Conduct targeted outreach to jurisdiction with the highest volume of TECH Clean California heat pump water heater claim submissions to identify additional best practices
- Conduct targeted interviews with contractors installing heat pump water heaters to increase understanding of permitting barriers.



## Downloadable Permitting Resources

The Permitting Pilot has developed a suite of resources to help guide you through standard permitting and energy code requirements for your HPWH project:

- **HPWH Permit Supplement Template**
- **Electrical Load Estimator**
  - This Estimator includes two calculators, the first being a comprehensive load calculator that assists in calculating the Service Load of a dwelling. This load calculator is compliant with 220.82 of the Electrical Code. The second assists in calculating the Maximum Existing Load per Code Reference 220.87. It is recommended only building professionals familiar with the energy code use the Service Load Calculation sheet.
- **2022 HPWH Building Code Assistance Sheet**
  - BayREN and TECH Clean California offer this summary of California state level building code requirements for the installation of heat pump water heaters. This is intended to assist permit applicants and building department staff to submit, review, approve, install, and inspect heat pump water heater alterations in single family homes.

# Install Costs, Space Constraints, Timing, and Operational Costs (HVAC)



▶ Multifamily In-Unit Heat Pump

▶ Emerging “Micro” Heat Pumps: Testing and Heating Performance Metrics

Complete

Final Report 2023/11

Active

2024/12

- Advantages: potential lower costs, speed and ease of installation, improved aesthetics, occupant controlled space conditioning, and allows incremental displacement or replacement of central or in unit heating and cooling systems.
- New plug-in 120V window heat pumps and other in-unit packaged heat pumps may serve as important technical solutions for multifamily units with limitations of existing electrical panel and service capacity
- Modeling results demonstrate that in-unit heat pumps can reduce energy usage (20 – 40%) and potentially reduced utility costs in some instances. Additional modeling of proposed equity-based rate structures, time-of-use rates, and local natural gas and electricity pricing is needed.
- Split incentive between renter and tenant needs to be addressed

# Tariffed On-Bill could offset some installation costs for some customers (example)

Climate Zone 3, Customers with AC	Impacts from Heat Pump Space Heater + Heat Pump Water Heater + Energy Efficiency	
	Market Rate	Low Income
<b>Total Project Cost: Heat Pump Space Heater + Heat Pump Water Heater + Energy Efficiency</b>	<b>\$26,586</b>	<b>\$26,586</b>
Incentives	\$12,420	\$22,035
<b>Net Project Cost</b>	<b>\$17,366</b>	<b>\$4,551</b>
Annual bill savings	\$462	\$431
<b>Tariffed On-Bill contribution to principal</b>	<b>\$3,154</b>	<b>\$2,944</b>
Tariffed On-Bill monthly service charge	\$30.81	\$28.76
Net annual bill savings	\$92	\$86
Funding Gap / Copay requirement	\$14,212	\$1,607
Annual Gas Savings (Therms)	500	500
Annual Electricity Savings (kWh)	-1,606	-1,606
Lifecycle GHG reductions	25.24	25.24

- Tariffed On-Bill investments could defray installation costs for customers with high bill savings opportunities (generally, customers with high air conditioning loads, ~ 10-20% of Bay Area customers)
- For those customers Tariffed On-Bill could contribute ~\$2-6k towards total installation costs
- CPUC seeks joint utility proposal for Tariffed On-Bill programs by May 2024. Deploy pilots in 2025?