



# **TECH Clean California: Paving the Way to Heat Pump Market Transformation**

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# California...



- **Buildings account for 14% of California's greenhouse gas emissions**<sup>1</sup>
- **85% of building emissions come from space and water heating**<sup>2</sup>
- **State goal of carbon neutrality by 2045 and 6 million heat pumps installed by 2030**<sup>3</sup>
- **HP HVAC and HPWHs have <5% market share**<sup>4</sup>



- **In 2018, Senate Bill 1477 authorizes \$120 million from gas utility cap and trade funding for TECH Clean California**
- **TECH Clean California launched in 2021**

<sup>1</sup> [California Air and Resources Board](#)

<sup>2</sup> [California Public Utilities Commission](#)

<sup>3</sup> [California Office of Governor](#)

<sup>4</sup> [NBI Building Electrification Technology Roadmap](#)





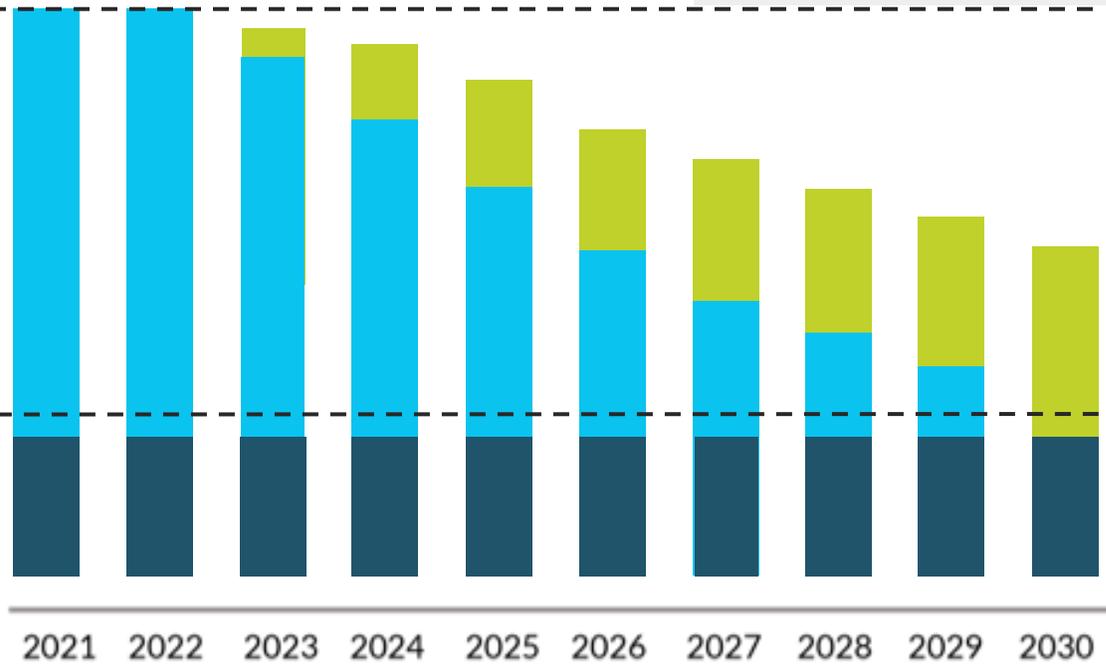
# TECH Vision – Bending the Cost Curve



- 1. TECH and other incentives make heat pumps competitive, drive market demand
- 2. TECH data informs long-term decarbonization framework, public/private investment
- 3. Policy roadmaps and long-term investment structure provide market certainty, driving economies of scale. Performance measurement transitions electrification into an investable clean energy resource

Installed cost of heat pump

Installed cost of incumbent technology



### Product & Installation Cost Declines

- Infrastructural improvements
  - Panel upgrades/smart load centers
  - Retrofit-ready 120V HPWHs
- Trained Contractor Workforce
  - 1-day installation
  - Streamlined permitting
  - Lower perceived business risk
- Competition in the market
  - Increased sales volume
  - Diversity of product offerings

### Clean Energy Resources

- Utilities: Load impacts, GHGs, other
- AQMD: NOx
- Adopting customers: Bill savings, health and comfort, safety

Customer Out-of-Pocket Costs    Incentives    Decarbonization Value Stream



# TECH Overview



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

## Motivate the supply chain

- Activate the supply chain
- Contractor incentives

## Support the workforce

- Technical and sales training
- "Learn & Earn" - free HPWHs

## Drive consumer demand

- Statewide marketing campaign
- Website with fact sheets, contractor directory, and incentive finder



**Create scalable models through regional pilots**

## Improve targeting and project finance

- Target customers using metered-based analysis
- Deploy a tariffed-on-bill financing pilot

## Expand benefits to equity customers

- Integrate heat pumps into low-income programs
- Multifamily pilots targeting property owners

## Streamline installation

- Streamline permitting and installation costs
- Enable load-shifting

**Encourage deployment innovation through Quick Start Grants**



**Inform long-term building decarbonization framework**

## Develop public reporting site

- Inform policymakers and market actors on progress and impacts

## Quantify decarbonization impacts

- Avoided costs, grid benefits, and customer bill impacts

## Inform policy development

- State, regional, and local regulatory policy



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## Demonstrated Market Demand

- Over 1,400 contractors enrolled
- >20,000 single family (SF) and multifamily (MF) units installed/reserved in six months
- 837 people attended TECH trainings, 63% of those in high unemployment zip codes

## Strong Consumer Engagement

- 326,000 unique visitors to [www.switchison.org](http://www.switchison.org), ~4,500 contractor quotes facilitated
- >90% consumer satisfaction for project installs based on third-party evaluation
- ~24% of SF/MF market-rate incentives directed to low-income households, affordable housing, and/or disadvantaged communities



# Supporting Contractors



Three HPWHs installed at DeHart Technical School in Fresno, CA

*“ [TECH] is a smart program that is changing minds and attitudes toward heat pump water heaters among our plumbers. Our family business started nearly 75 years ago, and we might be among the most conservative and traditional plumbers around! Your program has created quite a buzz here, and we are steadily coming on board with hybrid water heater replacements for our customers. ”*

**Troy Guy, Guy Plumbing & Heating,  
Menlo Park, CA**



# Pilots & Quick Start Grants



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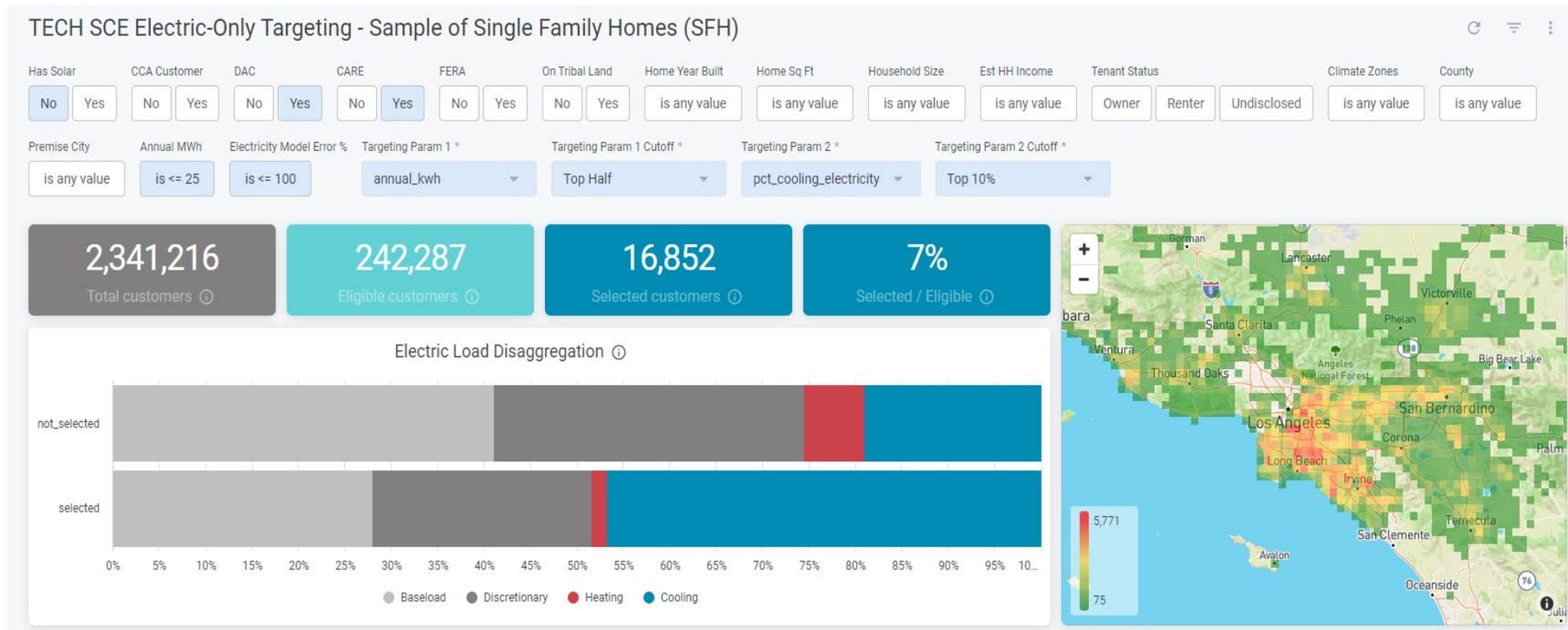


# Customer Targeting Pilot



**Pilot Objective:** Select a list of customers who are the ideal candidates for electrification based on desired outcomes

Selected customers have **2.5x** the cooling burden than others, higher peak demand



Recurve's TECH Customer Targeting Dashboard



# Quick Start Grant Highlight: 120V HPWH Field Validation – New Buildings Institute



**Grant Objective:** Independent field verification of energy performance, installation requirements and user satisfaction of 120V HPWHs

## Overview

- (3) Manufacturer partners including split and integrated 120V HPWH models
- 32 installation sites throughout CA (SF/MF, CZ 1-6, 8-13, 16)
- Primary barriers – space limitations, permitting and CA plumbing code

## Key Takeaways

- Metered 120V Plug-in HPWHs delivered significantly lower equivalent energy use to modeled gas water heaters
- 60% of respondents rated 120V HPWHs the same or better than their gas water heater
- Significant installation cost savings by eliminating potential dedicated 240V circuit run, electrical panel replacement or service amperage upgrade



# Quick Start Grant Highlight: Gas Water Heater Loaner



**Grant Objective:** Offer loaner gas water heaters to minimize the time customers spend without hot water during heat pump water heater installations

## Key Takeaways

- Approximately 90% of water heater replacements performed by Barnett Plumbing are emergency replacements.
- A HPWH conversion typically imposes a two-week delay, due to the supplemental electrical permit and services of an electrical contractor
- If a customer wanted to fuel switch to a HPWH, the Quick Start Grant recipient, Barnett Plumbing, loaned them a temporary gas water heater, at no cost to the customer
- **Gas water heater to HPWH conversion rate increased from less than 1% to 17.1%** (149 installations over one year)

*By assessing strategies that can help address a wide range of customer needs, we can inform the pathway toward market transformation.*





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# Public Reporting Website



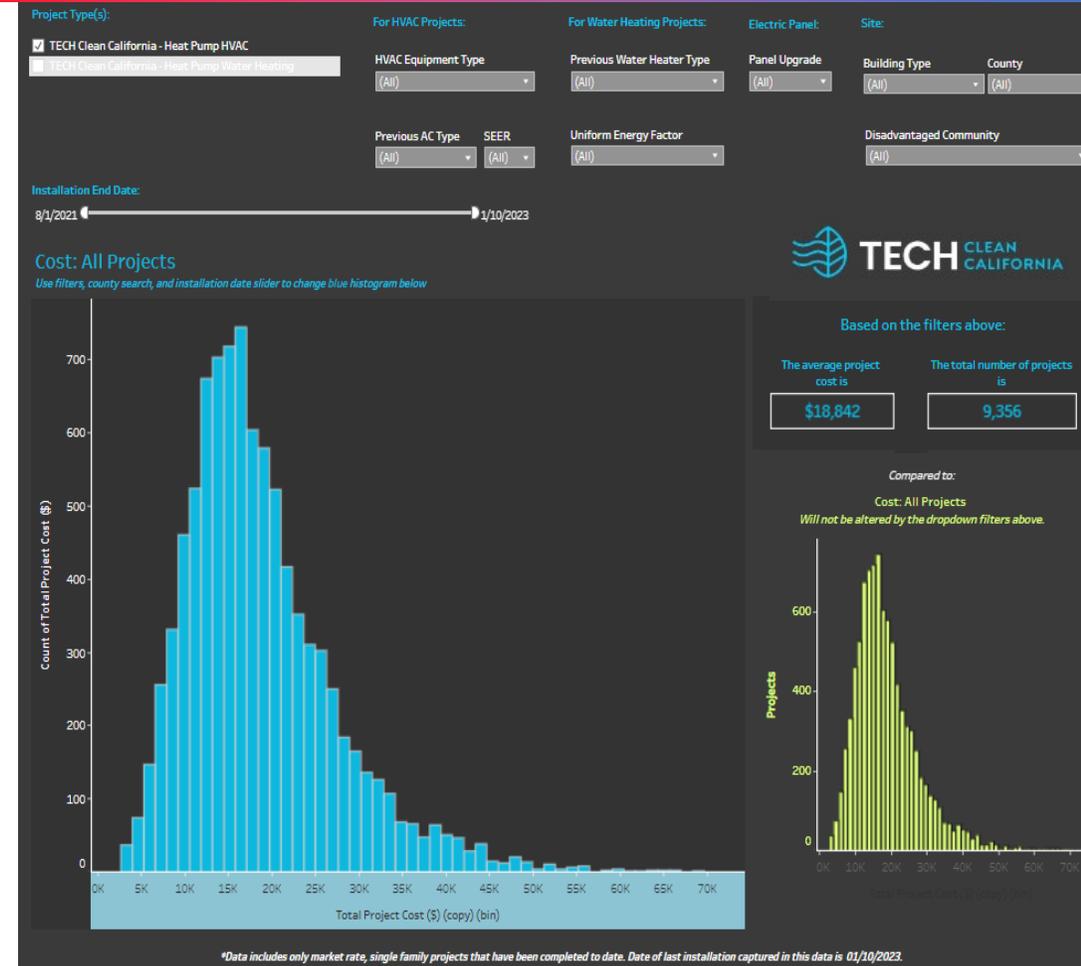
## Interactive Visualizations:

- Filter by location, project details (e.g., panel upgrade, efficiency level, disadvantaged community)
- Those wanting a deeper dive can download anonymized data for over 10,000 projects
- Over 750 downloads of TECH data since July

## Looking Ahead:

- Analyze meter-based impacts from the installations incentivized through TECH
- Publicize quantitative *and* qualitative lessons learned from installations, pilots, and Quick Start Grants.

[www.TECHCleanCA.com](http://www.TECHCleanCA.com)





# Thank You

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