8th Quarterly Stakeholder Meeting

August 30, 2023

TECH CLEAN CALIFORNIA

Welcome!

Goal: Review the goals and structure of TECH Clean California, provide key progress updates, and identify how you can get involved.

Today's Theme: Moving ahead after two years

Presentation Guidelines:

- This is a webinar format, so please direct your questions to the Q&A feature. We will do our best to answer your questions.
- Today's slides and a recording of the presentation will be accessible on our website.

Get Involved:

Submit your questions on **incentive layering, data sharing, and coordination** to TECH.info@energy-solution.com

Agenda

1	TECH Clean California Overview
2	Equity Reporting
3	Incentives, Marketing Engagement, and Workforce Training
4	Project Financing: GoGreen Home
5	Marketing
6	Evaluation: Six-Month Post-Install Survey
7	Pilots and Quick Start Grants
8	Q&A

Presenters

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Energy Solutions

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CPUC

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Frontier Energy

Laura Wilson
BDC

Jen Loomis
Opinion Dynamics

Alison Seel
VEIC

1 TECH Clean California Overview

TECH Clean California Overview

What is TECH Clean California?

- California's flagship heat pump market transformation initiative for space/water heating, designed to help put California on a path towards carbon free homes by 2045
- Guiding principles of scale, equity, regulatory simplicity, and market transformation
- Previously, funds were proportionally allocated by gas IOU service area. New funding from state budget enables statewide eligibility

For a more complete overview of TECH Clean California, check out the slides and recordings from our previous quarterly Stakeholder Meetings at techcleanca.com.

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"

TECH Team: Energy Solutions; Association for Energy Affordability; Building Decarbonization Coalition; Recurve; The Ortiz Group; veic; Ardenna Energy; Frontier Energy; Electrify My Home; NCI National Comfort Institute, Inc.; Tre'Laine

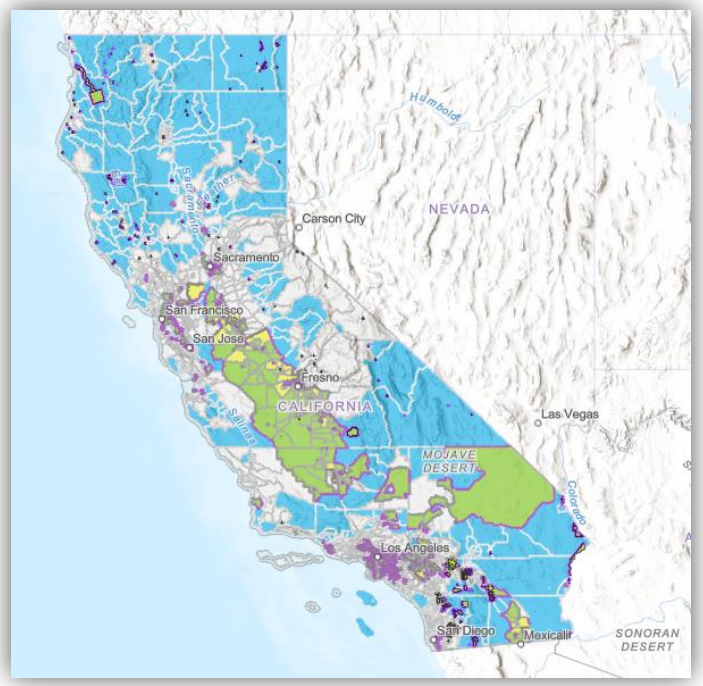
The TECH Clean California initiative is funded by California ratepayers and taxpayers under the auspices of the California Public Utilities Commission.

TECH Clean California & The Greenhouse Gas Reduction Fund

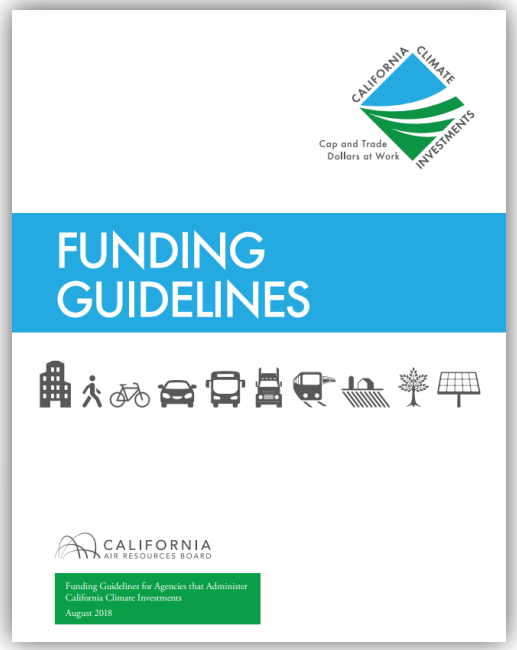
Assembly Bill 209 (2022) & Assembly Bill 102 (2023):

- Assembly Bill 209 set the stage for TECH Clean California to receive $95 million in funding.
- Assembly Bill 102 specified that the $95 million will come from cap-and-trade funds administered by California Air Resources Board.

- **California Air Resources Board Climate Investments:**
- Funding Guidelines
  - GHG emissions reductions
  - Economic, Environmental, and Public Health Benefits
- Priority Populations
  - Disadvantaged and Low-Income Communities & Assembly Bill 1550
  - Investment Minimums



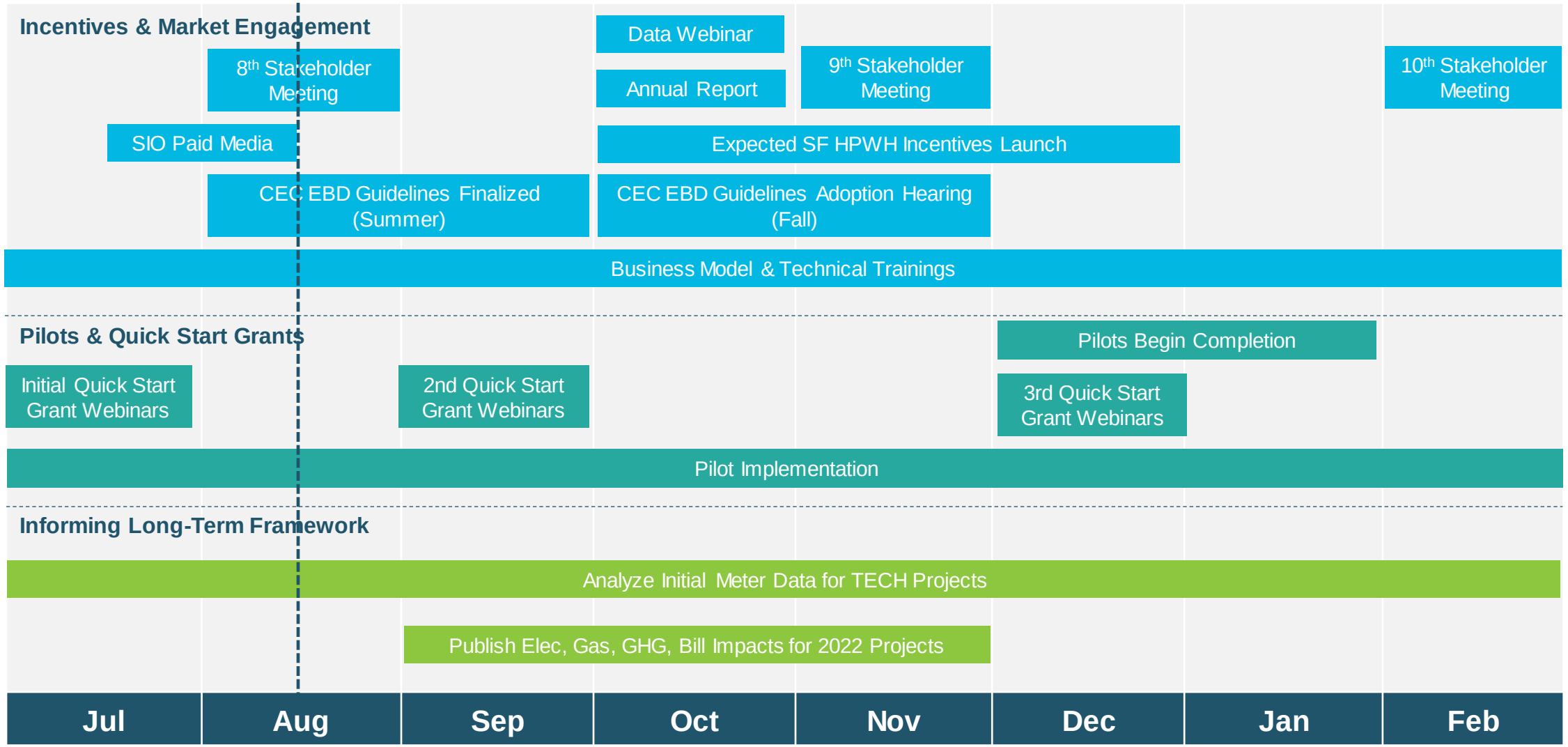
Priority Populations Map



TECH Clean California: 2023 Goals and Path Forward

Today **Relaunched Incentives**	*Ongoing* **Analyze Initial Impacts**	*Next Step* **Consider Program Updates**
Leverage $50M in state funding to relaunch incentive offerings: - Single family, market-rate incentives - Multifamily, market-rate incentives - Heat pump water heater market development activities - Equity-focused activities Align TECH Clean California with SGIP heat pump water heater incentive program launch. Continue TECH Clean California market development activities.	Post-installation energy consumption data from initial TECH Clean California customers becomes available, enabling TECH Clean California to analyze energy consumption, greenhouse gas, and bill impacts. We will be holding a webinar in October to present latest updates.	$95M in state funding received through 2023/2024 budget. Based on impacts analysis and funding, TECH Clean California may consider potential adjustments to help establish a longer-term path towards California's 2030 heat pump goals.

TECH Clean California: 2023-2024 Timeline



2 Equity Reporting

Equity Community Engagement

In Q2 2023, TECH Clean California adopted an equity community definition incorporating elements of the CPUC Environmental and Social Justice Action Plan's Disadvantaged Community and Hard-to-Reach definitions.

A project must capture one of the following:

Attribute	Building Type		
	Single Family	Multifamily	Other
In a CalEnviroScreen 4.0 Disadvantaged Community	X	X	X
Household using a CARE or FERA gas or electricity rate and/or participant in an Energy Savings Assistance program	X		X
Not in SF Bay Area, Greater LA area, Greater Sacramento area, or San Diego County **and** not homeowner (e.g., renter)		X	
Affordable housing: At least 66% of living units are <80% AMI or deed-restricted housing; or subsidized deed-restricted housing		X	

TECH Clean California incentive spending in Equity Communities is now reported on https://techcleanca.com/public-data/equity-budget-and-spending/.

Incentives Paid in Equity Communities

$41.7 million of TECH incentives will be paid via initiatives serving primarily equity communities:

Initiative	Incentive Budget ($ millions)	Portion of Total TECH Incentive budget	Portion of Incentives for Equity Communities	Partner Organizations Offering Layered Incentives	Region Prioritized
Statewide Multifamily Incentives	19.1	17%	84%	SMUD, BAMBE, CLEANair, BayREN, LIWP	Statewide
Low-Income Single-Family Direct Install Incentives	8.5	8%	100%	Energy Savings Assistance Program	Statewide
Multifamily Pilot	4.0	4%	75%		SCG, Southwest Gas service territories
Low-Income Integration Pilot	4.9	4%	100%	San Joaquin Valley DAC Pilot, ESA Program	PG&E, SCG service territories
2021 Quick Start Grants	3.3	3%	75%	--	Statewide
2022 Quick Start Grants	2.0	2%	100%	--	Statewide
Total	**41.7**	**38%**			

**Some incentives delivered via initiatives other than those listed above also go to Equity Communities.*

Workforce Education and Training in Equity Communities

The TECH Clean California team ensures WE&T initiatives serve equity communities by:

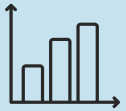
- Preferentially choosing training locations in High Unemployment Areas (HUAs).
- Tracking participation in trainings by contractors residing in HUAs.
- Providing no-cost equipment and curriculum development to organizations focused on training incoming workforce in marginalized communities.

50% of trainings led by TECH team member National Comfort Institute occurred in HUAs, and 60% of attendees reside in HUAs.

TECH Clean California incentive spending in Equity Communities is now reported on https://techcleanca.com/public-data/equity-budget-and-spending/.

3 Incentives, Market Engagement and Workforce Training

TECH Clean California Activities



Spur the clean heating market through statewide strategies

Activate the supply chain

- Contractor incentives
- Streamlined Incentive Clearinghouse
- Technical and sales training

Drive consumer demand

- Statewide marketing campaign and website

Create scalable models through regional pilots

Improve targeting and project finance

- Target customers using meter-based analysis
- Deploy a Tariffed-On Bill Financing Pilot

Expand benefits to HTR customers

- Support low-income programs
- Multifamily pilots targeting property owners

Streamline installation

- Streamline permitting and installation costs
- Enable load-shifting

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

Incentive Relaunch

Relaunch to be guided by our core principles of **simplicity**, **consistency**, and **scalability**

- **Relaunch Update**
  - Relaunched single family heat pump HVAC on April 25
  - Relaunched multifamily on June 13 (first phase of funding spent)
    - Second launch upcoming September 6
  - Launching statewide single family and multifamily heat pump water heater in late October

Current Incentive Budgets

- **Single Family Heat Pump HVAC:** $22 million ($17M remaining)
- **Single Family Heat Pump Water Heater- SCG Only:** $4.5 million ($3.7M remaining)
- **Multifamily Heat Water Heater and HVAC**: $7 million ($2.8M remaining)
- **Equity Program**: $8.5 million (all remaining)

Upcoming

- **Statewide Heat Pump Water Heater**: $80+ million via SGIP HPWH
  - Additional carveout from TECH Clean California to support statewide implementation
  - 50% of the residential budget allocated for equity customers
  - Projected to launch late October 2023

For up-to-date budget spend, please go to **https://techcleanca.com/incentives/**

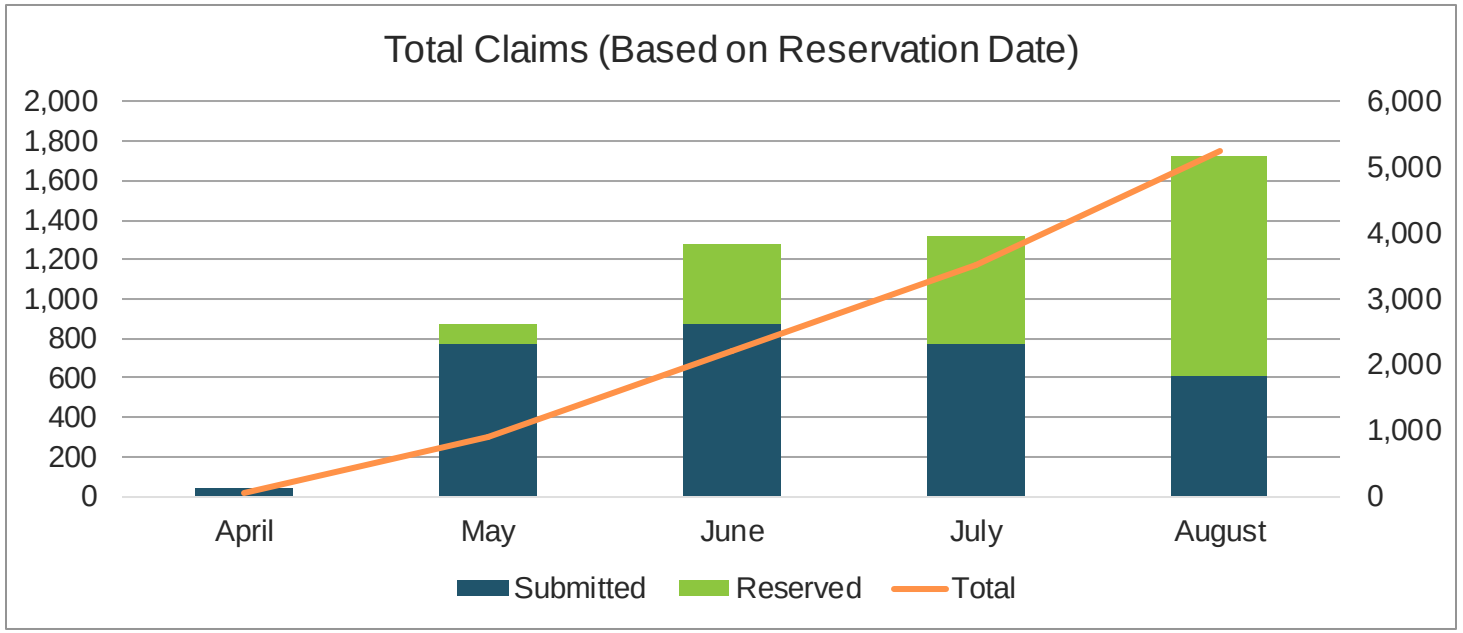
TECH Clean California Single Family HVAC

Incentive Category	Detail
Total budget	$22 million / No allocations per territory
Incentive structure	Flat / One rate available statewide
Incentive rate	$1,000/unit (unit = condenser)
Max incentive/address	$2,000 (2 units)
Eligible equipment	Title 24 Code minimum
SEER vs SEER2?	Both qualify
Dual fuel*	Eligible if part of a three-component AHRI tested system with the heat pump programmed to provide primary heating
Eligible previous furnace types	Natural gas, propane, wood, electric resistance
Not eligible previous heating types?	No previous heating, heat pump, space heater

*rule change under consideration to expand eligibility and improve data collection

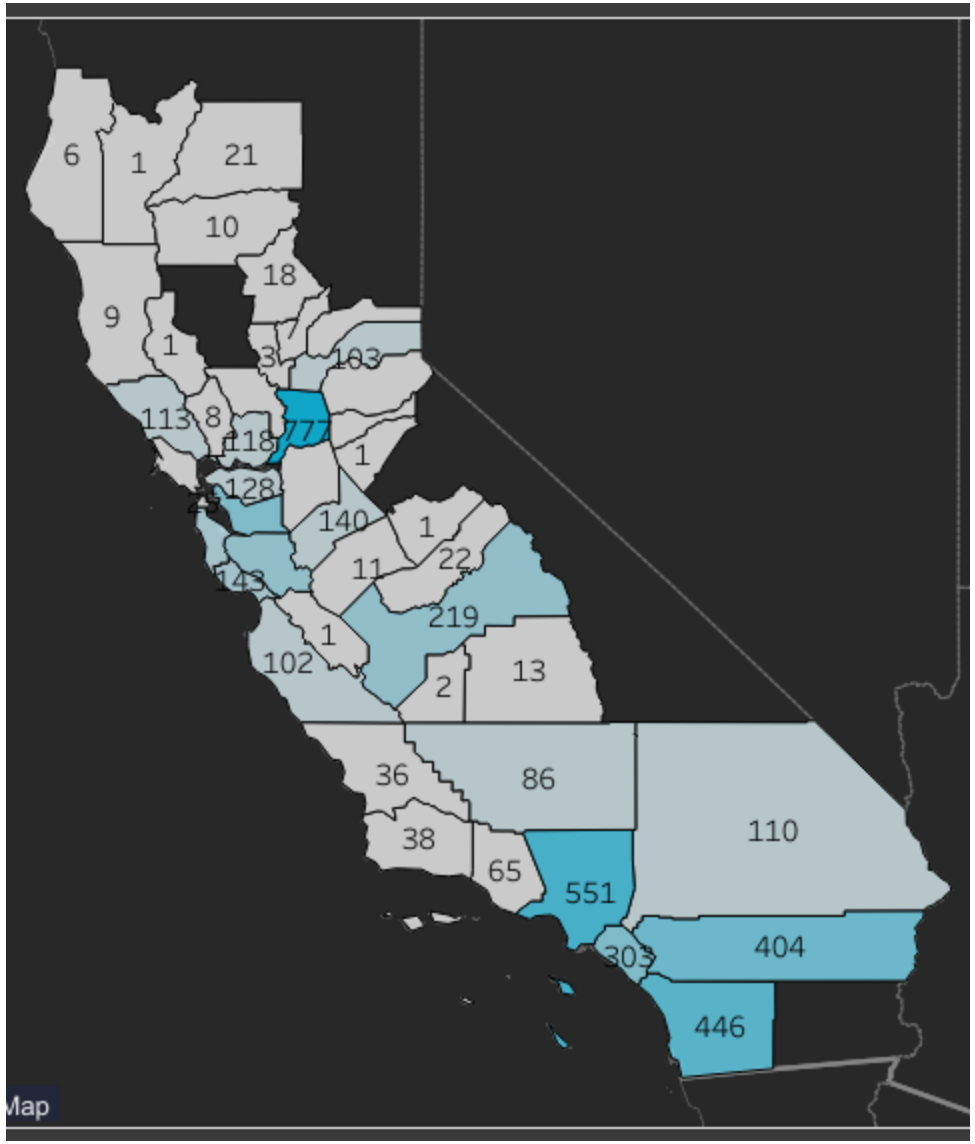
Single Family HVAC: Stats to Date

5,240 Reservations and Submissions from ~300 Separate Participants!



Furnace Left in As Backup?	Total Claims
Yes	426 (14%)
No	2,610 (86%)

Emergency Replacement?	Total Claims
Yes	75 (3%)
No	2,866 (97%)



Single Family HVAC: Stats to Date

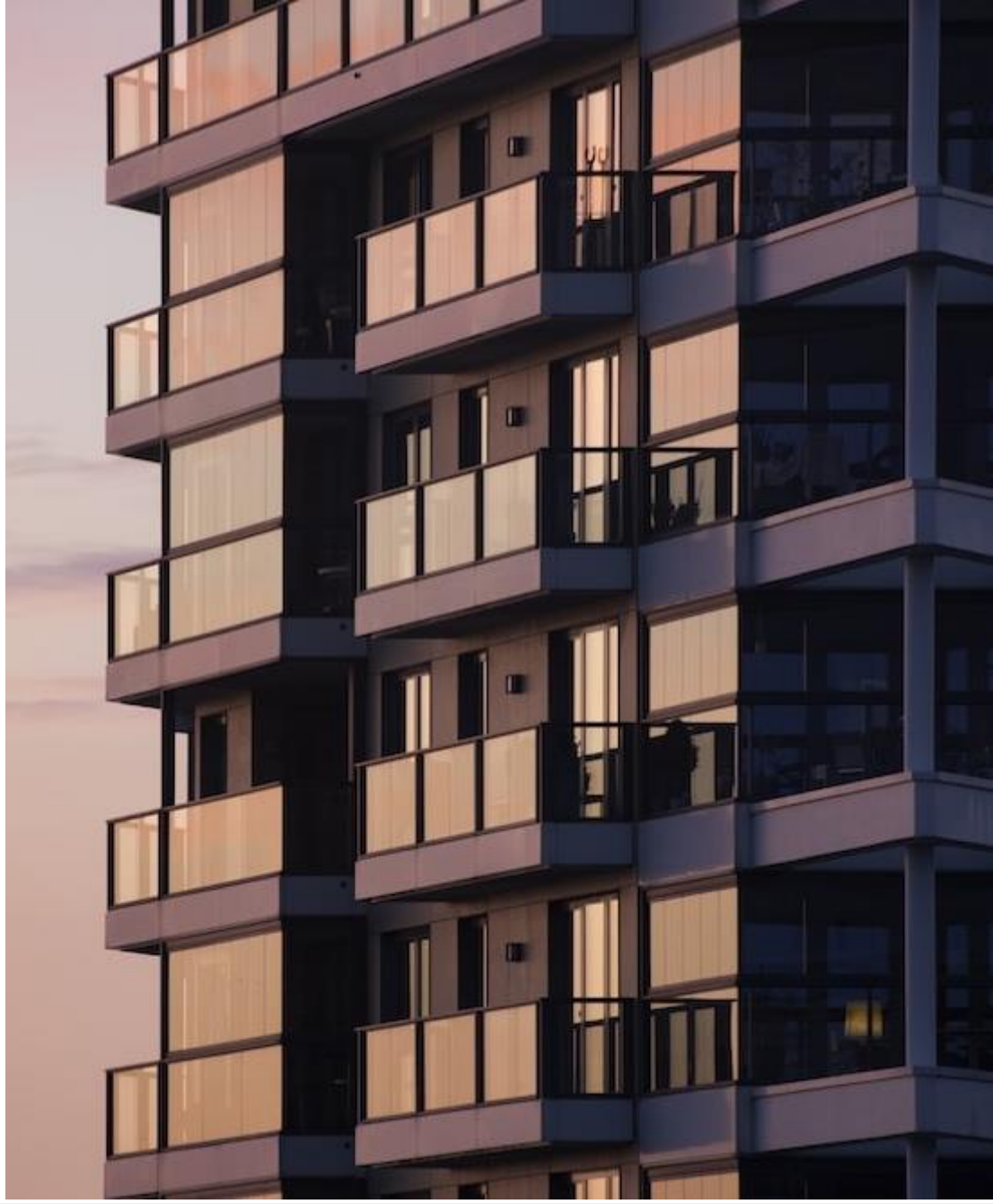
5,240 Reservations and Submissions from ~300 Separate Participants!

Submission Range	Total Participants (Percentage of total)	Round 1 Total Participants (Percentage of Total)
>100	7 (2%)	21 (4%)
50 – 100	13 (5%)	27 (5%)
25-50	23 (8%)	54 (10%)
10-25	55 (19%)	109 (21%)
1-10	197 (67%)	327 (60%)

- **Claim review time:** 5.5 days from submission to first review
- **Average time from submission to payment:** 11 days
- **Average time from reservation to submission:** 14 days

Multifamily Relaunch

- **Launched:** Mid-June, with next round opening on September 6, 2023
- **Budget:** $7 million
  - $4.2 million spent in phase 1
  - $2.8 million to be released in phase 2
  - 75% carveout for equity
  - Participant/Property Owner Caps
    - Phase 1: $500,000
    - Phase 2: $350,000



Multifamily Heat Pump HVAC Details

Incentives for Heat Pump HVAC Systems Serving Common Areas

Previous Space Heat Source	System Type	Total Incentive Per System
Non-heat pump systems	Split or rooftop heat pump (ducted or ductless)	$1,800
	PTHP, SPVHP, or unitary through the wall/ceiling heat pump	$300 (Single or two-stage compressor) $800 (Variable capacity/inverter-driven)

Eligible measures and incentives are unchanged in relaunch

Multifamily Heat Pump HVAC Details

Incentives for Heat Pump HVAC Systems Serving Individual Apartments

Previous Space Heat Source	System Type		Total Incentive Per System
	Description	AHRI Test Standard	
Non-heat pump systems	Split or rooftop heat pump (ducted or ductless)	210/240	$2,000
All except PTHPs	PTHP, SPVHP, or unitary through the wall/ceiling heat pump	310/380, 390	$500 (Single or two-stage compressor) $1,000 (Variable capacity/inverter-driven)

Incentives for Heat Pump HVAC Systems Serving Multiple Apartments

Previous Space Heat Source	System Type	Total Incentive Per Apartment Served
Non-heat pump systems	Heat pump HVAC equipment serving multiple apartments	$1,000

Eligible measures and incentives are unchanged in relaunch

Multifamily Heat Pump Water Heaters

Incentives for Unitary Heat Pump Water Heaters

Previous Space Heat Source	HPWH Tank Size	Total Incentive Per System
Gas or Propane	< 55 Gallons	$1,400
	≥ 55 Gallons	$2,100
Electric Resistance	All	$700

Incentives for Unitary Heat Pump Water Heaters

Previous Space Heat Source	HPWH Tank Size	Total Incentive Per System
Non-heat pump systems	< 17 gallons per bedroom	$1,200
	≥ 17 gallons per bedroom	$1,800

Incentives for Heat Pump Pool or Spa Heating

Previous Space Heat Source	System Type	Total Incentive Per System
Non-heat pump systems	Heat Pump pool heating	$2,500

Eligible measures and incentives are unchanged in relaunch

Multifamily Electrical Panel Upgrades

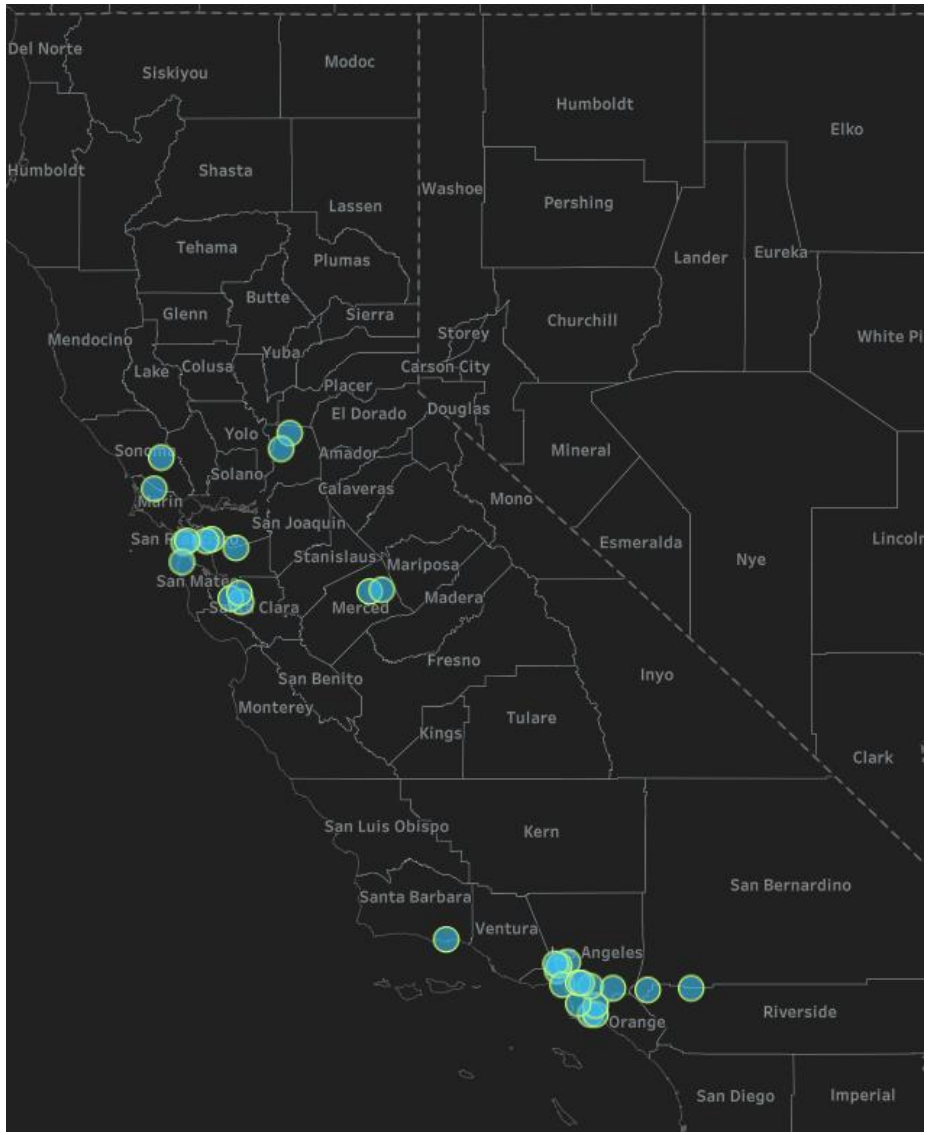
Previous Equipment	System Type	Total Incentive Per Apartment Receiving Electrical Upgrade
Undersized apartment electrical infrastructure that is upgraded as part of an apartment's HPWH or HP HVAC installation	Apartment panel or subpanel upgrades	$1,400 Apartment unit must have received a TECH-funded heat pump HVAC system or HPWH, and must be all-electric after the electrical upgrade

Eligible measures and incentives are unchanged in relaunch

Multifamily Relaunch: Reservation Summary

Product Type	Subcategory	Unit Total
HVAC	Individual Apartment HVAC	951
	Central HVAC (2+ Apartments)	275
	Communal Area (Non-Apartment)	12
	Total	**1,238**
Heap Pump Water Heater	Individual Heat Pump Water Heater (Apartment and Communal)	86
	Central Heat Pump Water Heater	1,170
	Total	**1,256**
Electrical	Individual Apartment	516

Customer Segment	Total Incentive	Total Properties
Equity	$3,560,600 (81%)	32
Non-Equity	$814,200 (19%)	5



Partner Program Incentives

Providing a one-stop shop for heat pump incentives

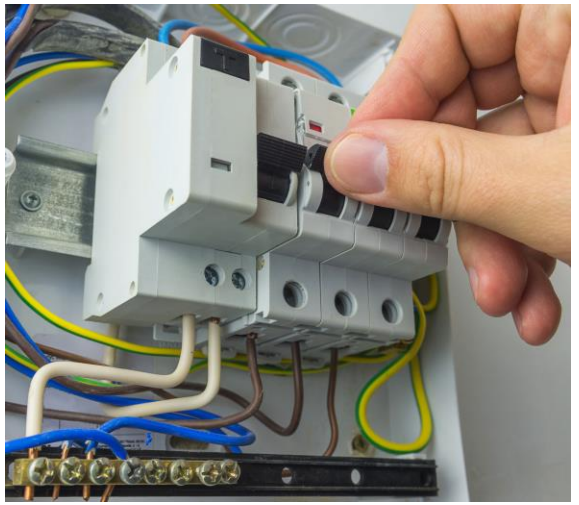
- $1,000 per heat pump water heater installed to replace a natural gas or propane water heater
- Available for customers of EBCE, MCE, SVP or CPSF

- Incentives available for heat pump HVAC and water heater installations in single family and multifamily residences
- Available for customers of 3CE only
- Kickers available for income qualified customers and panel upgrades

Complete list of heat pump incentives available at incentives.switchison.org

Statewide Heat Pump Water Heater Incentives

- $80.2 million in additional incentives funding for heat pump water heaters through the SGIP HPWH program
  - TECH Clean California will add additional funding for non-SGIP heat pump water heater eligible territories
- Eligible projects include residential single family (unitary), residential multifamily (unitary and central), and commercial (unitary)
- New requirements regarding load shifting
- Projected to launch late October 2023



Collaboration with TECH Clean California

Strategy: Fully leverage TECH Clean California's market relationships and name recognition

- Additional $80.2 million incentive budget communicated as TECH Clean California incentives with new requirements
- Fully branding as TECH Clean California
  - Prevent confusion and perceived need to learn a new program
  - Include "funded by SGIP heat pump water heater" in some contexts (esp. during initial roll-out)
- Allows TECH Clean California to fund small portion of projects not eligible for SGIP funding

What stays the same:

- Incentive application portal
- Eligible contractor listing and enrollment process
- Contractor outreach and engagement
- TECH Clean California remains responsible for market transformation (public reporting, pilots, and workforce education and training)

What's new:

- Load shifting requirements and related education
- Higher incentives
- Increased focus on panel upgrade needs

Statewide Heat Pump Water Heater Incentive Details

Category	Customer Class	HPWH Incentive	*Low-GWP Kicker Incentive	≥ 55 Gallon Capacity Incentive	Electrical Upgrade Incentive	Max Incentive
Residential Unitary	General Market	$3,100	$1,500	$700	$2,000	**$7,300**
Residential Central	General Market Multifamily Central	$900/kWh	$200/kWh	N/A	N/A	**$300,000** per project
Commercial Unitary	Large Commercial	$700/kWh	$200/kWh	N/A	N/A	**$50,000**
Commercial Unitary	Small Business	$3,100	$1,500	N/A	N/A	**N/A**

*Low-GWP refers to systems with GWP of 150 or less
+Higher incentive rates for “equity customers”

Changes to Partner Programs

- **BayREN Heat Pump Water Heater Contractor Incentive Program:** No changes planned
- **3CE:** Updated single family heat pump water heater offer to create multiple pathways for customers

TECH HPWH Eligible?	HPWH Capacity	3CE Incentive	TECH Incentive	Total
Yes	<55 Gallons	$1,500	$3,100	$4,600
	>=55 Gallons	$1,500	$3,800	$5,300
No	<55 Gallons	$3,300	$0	$3,300
	>=55 Gallons	$3,800	$0	$3,800

Stacking Cohesive Programs: Barriers and Considerations

- **Consideration 1: New name for someone to recognize**
  - Resolution: Brand all as one program (i.e. SGIP heat pump water heater incentives branded as TECH Clean California heat pump water heater incentives)
- **Consideration 2: Need to enroll participants into each program individually**
  - Resolution: Developing universal enrollment form
- **Consideration 3: Different programs have different requirements**
  - Resolution: Developing dependent claim extensions to only display info that participants need to see

Incentives: What is Next?

Early September 2023 **Relaunch Multifamily Incentives**	*October 2023* **Launch Heat Pump Water Heater Incentives**	*November 2023 – January 2024* **Design Next Incentive Round**
• Release next phase of multifamily incentives • Focused effort to spend through remaining SCG heat pump water heater budget	• Launch statewide heat pump water heater incentives	• Refine strategies and designs for next round of Single Family HVAC and Multifamily Incentives, with planned release in 2024

Contractor Engagement

594 contractors re-enrolled- representing ~75% of total participation in round 1

Heat Pump HVAC

Tier	Total Re-Enrolled/Total 2022 Participants
Tier 1	156/183 (85%)
Tier 2	131/198 (66%)
Tier 3	271/602 (45%)

Heat Pump Water Heaters

Tier	Total Re-Enrolled/Total 2022 Participants
Tier 1	37/37 (100%)
Tier 2	131/142 (92%)
Tier 3	271/678 (40%)

Tier 1: Contractors in Top 20% based on claim volume
Tier 2: Contractors in Middle 60% based on claim volume
Tier 3: Contractors in the Lowest 20% based on claim volume

Contractor Engagement Goals

1. 100% of Tier 1 Contractors Re-Enrolled by end of year
2. Ensure each region in state has at least 1 tier 1 contractor

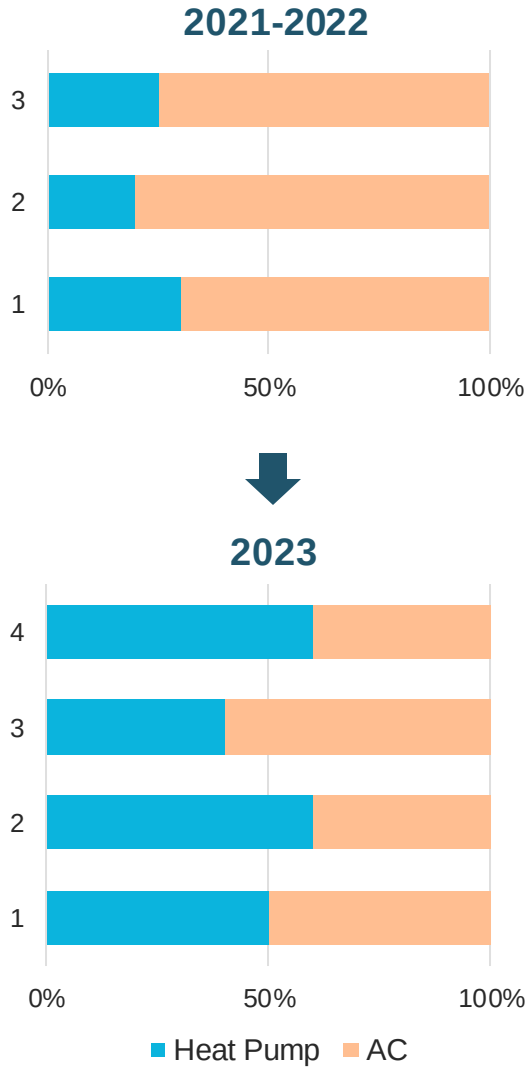
Distributor Engagement

Engagement Events

- In-person events (counter days)
- Manufacturer-rep led contractor events
- Training distributors on heat pump water heater relaunch—expected to get info to 200-300 branch locations over the coming months

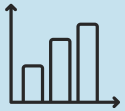
Program Impacts

- TECH Clean California helped increase distributor sales during very slow summer start
- Overall year-over-year heat pump sales increases



Distributor looking to get trained?
Reach out to TECH.Info@energy-solution.com

TECH Clean California Activities



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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

TECH WE&T 2023

Goal: To increase workforce knowledge, skills, and abilities of heat pump technologies, build greater capacity and capability of the workforce to be aptly prepared to transact with the equipment, and to improve employment opportunities.

HVAC System Performance Training
National Comfort Institute

Heat Pump Water Heater Training:
ESMAC + "Learn and Earn" HPWH program

Electrification Sales and Building Performance Training
Electrify My Home

Multifamily Training:
Association for Energy Affordability

2023 Class Schedule

Schedule and signup portals found here:
https://switchison.org/contractors/training-hub/

HVAC Training: **National Comfort Institute**

Airflow Testing and Diagnostics
- September 19 (Fresno and Sacramento)
- October 3 (Anaheim)

Refrigerant Side Performance
- September 20 (Sacramento and Fresno)
- October 4 (Anaheim)

Residential HVAC System Performance
(2.5 days, in-person training)
- October 10 (Fresno)
- October 24 (Sacramento)
- December 19 (Anaheim)

High Performance HVAC Design and Redesign for Electrification
- November 28 (Anaheim)
- December 19 (Sacramento)
- January 9 (Fresno)

Electrification Training: **Electrify My Home**

Residential Space Conditioning and Water Heating Electrification
(Three days, in-person training)

- October 4 (Brea)
- October 25 (San Diego)
- November (Central Coast, TBD)
- December 6 (Concord)
- January 24 (Elk Grove)
- February 28 (Modesto)

Multifamily Training: **AEA**

Multifamily Electrification 101 (Webinar)
- September 27th, 10AM-11:30AM

Multifamily Electrification Retrofits for Property Owners (Webinar)
- TBD Fall

Retrofit Applications and Electrical Assessments (Webinar)
- October 18th, 9AM – 12PM

Installing HPWHs (Webinar)
- TBD Fall

Central HPWH – Advanced Design Considerations (Webinar)
- TBD Fall

TECH WE&T- ESMAC Partnership

- **ENERGY STAR Manufacturer Action Council (ESMAC)** is a water heater manufacturers group, facilitated by ENERGY STAR®
- Trainings offered **100% free** and open to all interested stakeholders—no need to be enrolled in TECH Clean California.
- Training will be **required to participate in upcoming statewide heat pump water heater relaunch**
- Webinars to include:
  - **Presentation from each manufacturer**, focused on technology features and benefits, appropriate applications, energy efficiency comparison to other water heater types, installation techniques and best practices, service support and warranty, proper maintenance, troubleshooting, and selling strategies
  - **Presentation from TECH Clean California and ENERGY STAR**, including overview of TECH Clean California and other program incentives

- **Upcoming Trainings** (all 7:00 – 9:00 a.m. PT):
  - Sept 11th, 2023
  - Oct 9th, 2023
  - Oct 25th, 2023
  - Nov 13th, 2023
  - Nov 29th, 2023
  - Dec 11th, 2023

Registration:

Workforce Education and Training: Gaps and Considerations

Creating scaffolds that recognize an individual's journey and role

Incoming

K-12

- Career Awareness
  - The trades are a viable and lucrative career pathway

College, trade schools, pre-apprenticeships, apprenticeships

- Industry participation in advisory committees
  - Understanding where people are in the pathway and which technologies and training are applicable
- Variations in program requirements and curriculum
- Support needed for
  - Equipment access
  - Faculty training
  - Curriculum development
  - Student → employer connection

Existing

Incumbent

- Supports needed at various levels
  - Contractors (business model)
  - Installers (technical)
  - Services technicians (technical)
  - Sales staff (value prop)
- Industry credential support
- Hands on experience with the technology
- Understanding of project scope/license scope
- Making sure career paths are attainable, accessible and provide long term growth opportunities

Exiting

- Knowledge transfer

Workforce Education and Training Activities

Built on a foundation of industry input and coordination

Incoming

K-12

- Partner with industries to participate at job fairs and engage high school counselors

Colleges, trade schools, pre-apprenticeships, apprenticeships programs

- Outfitting labs with heat pump technologies
- Creating connections with manufacturers and the faculty
- Participating and creating connections for advisory committees
- Developing/publicizing scholarship opportunities

Existing

Incumbent/Existing

- Delivering trainings
  - Electrify My Home
  - NCI
  - AEA
  - ESMAC
- Improving accessibility of various training offers in the market
- Working with distributors to participate in events
- Live and hands-on-training through learn and earn
- Developing trainings to support electrification project approaches

Exiting Workforce

- Quick Start Grant with IHACI
- Turning exiting workforce into expert trainers

These cover both existing and activities on a roadmap.

Please reach out to TECH.Info@energy-solution.com if you would like to get involved!

Hands on Training Support

Leveraging a single pool of units to support both incoming and incumbent workforce

Incoming

46 Units (23 organizations)

Incumbent

195 Units (46 Contractors)

Heat Pump Water Heaters:
241 Units Total
(191 240V Units)
(50 120V Units)

Recipients

- Public and Private Colleges
- Utility Training Centers
- 501C3s
- Apprenticeships Programs

Supporting Activities

- Equipment Purchases
- Manufacturer Training
- Manufacturer Curriculum Support

Recipients

- Contractor sales staff
- Contractor technicians
- Contractor license holders

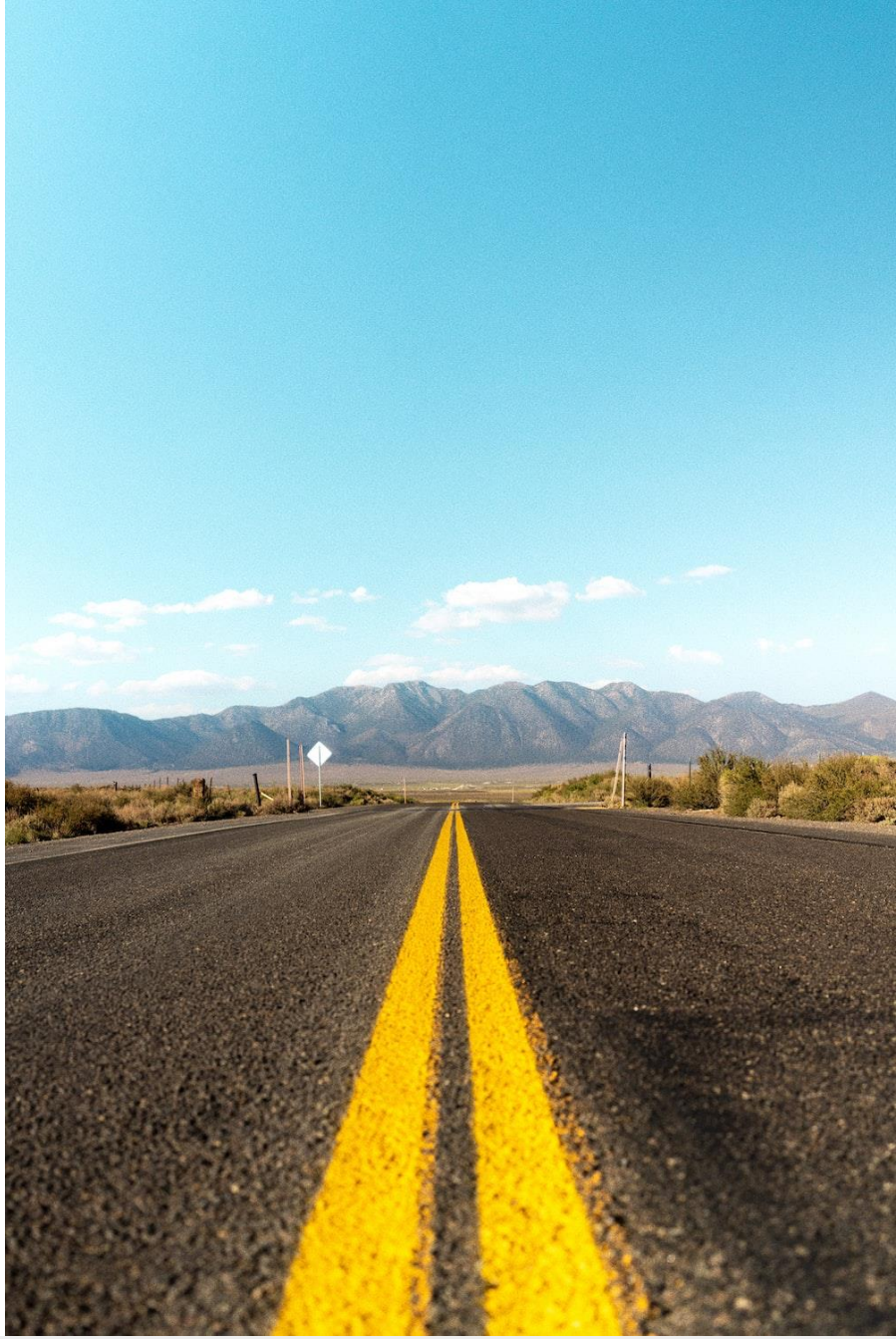
Supporting Activity

Experiential, hands on training through heat pump water heater Learn and Earn Program

Are you involved with contractor training and could use some equipment or curriculum support?
Reach out to us at TECH.Info@energy-solution.com

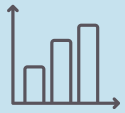
Next Steps

- Conduct Fall/Winter Classes
- Publish SGIP heat pump water heater-approved manufacturer training
- Expand hands on learning via heat pump water heater learn and earn + equipment/curriculum support



4 Project Financing: GoGreen Home

TECH Clean California Activities



Spur the market for electrification through statewide strategies:

Prime the market for electrification

- Layered contractor incentives with other programs that make heat pumps profitable
- Training that improve technical, **sales skills** and enable 1-day installations
- **Free products for contractors / sales staff to install in their own homes; spiffs after X installs.**

Drive consumer demand

- Statewide low-interest financing offering to ensure all Californians have access to financing
- **Statewide marketing campaign** to increase consumer awareness and proactive replacement

Create scalable statewide infrastructure

- Consumer-facing website with contractor, incentive lookups
- **Incentive-processing clearinghouse for contractors to make participation simple and straightforward**

Create scalable models through regional pilots:

Improve targeting and project finance

- Improve targeting and encourage 3rd party business models
- **Tariffed-on bill pilot with partner utility**

Expand benefits to HTR customers

- **Support low-income programs transition to electrification**
- **Multi-family pilots targeting property owners**

Streamline installation

- Streamline permitting and installation costs
- Enable load-shifting

Encourage deployment innovation through quick start grants

Inform development of policies that enable full market transformation:

Develop public reporting site to inform policymakers and market actors on price, deployment progress, meter-based impacts

Quantify the value of electrification

- Avoided costs (GHGs, load-shifting, etc.)
- Load building revenue for electric utilities
- Customer bill impacts

Inform development of supportive policies

- **Electrification in low-income programs**
- Rate proceedings to address consumer risk, value stacking to develop sustained funding mechanisms
- State, regional, and local regulatory policy

Acronyms and Definitions

GoGreen Home ("GGH")

- Provides access to private financing with low-interest rates.
- Paid for by investor-owned utility ratepayer program funds

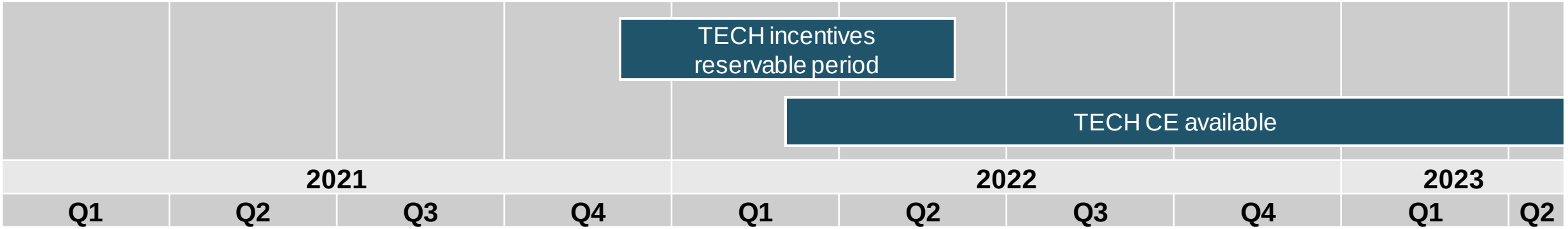
TECH Credit Enhancement ("TECH CE")

- TECH funded credit enhancements
- A type of insurance that helps lenders mitigate the risk if loans are not repaid in full

TECH Incentives

- Heat Pump Heating Ventilation and Air Conditioning ("HP HVAC")
- Heat Pump Water Heater ("HPWH")

Key Dates



December 15, 2021
TECH incentives reservable period starts

March 1, 2022
GGH begins to finance HP in municipal territories

May 13, 2022
TECH incentives fully committed in all territories *with exception of HPWH in SoCalGas territories*

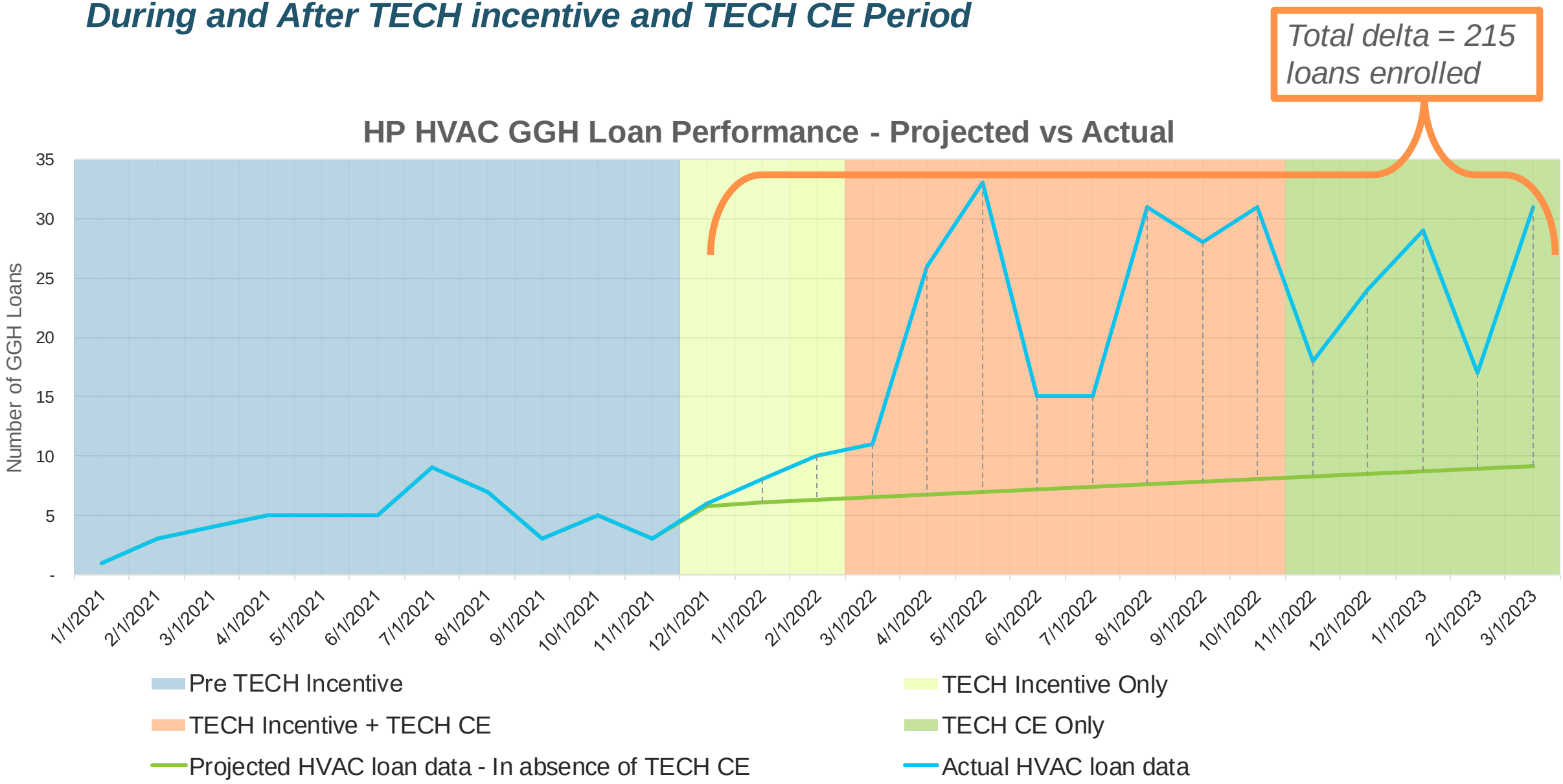
October 31, 2022
TECH incentives projects completed

November 1, 2022
Period of TECH CE only starts

GGH CE for electric measures in electric public utility territories is replenished

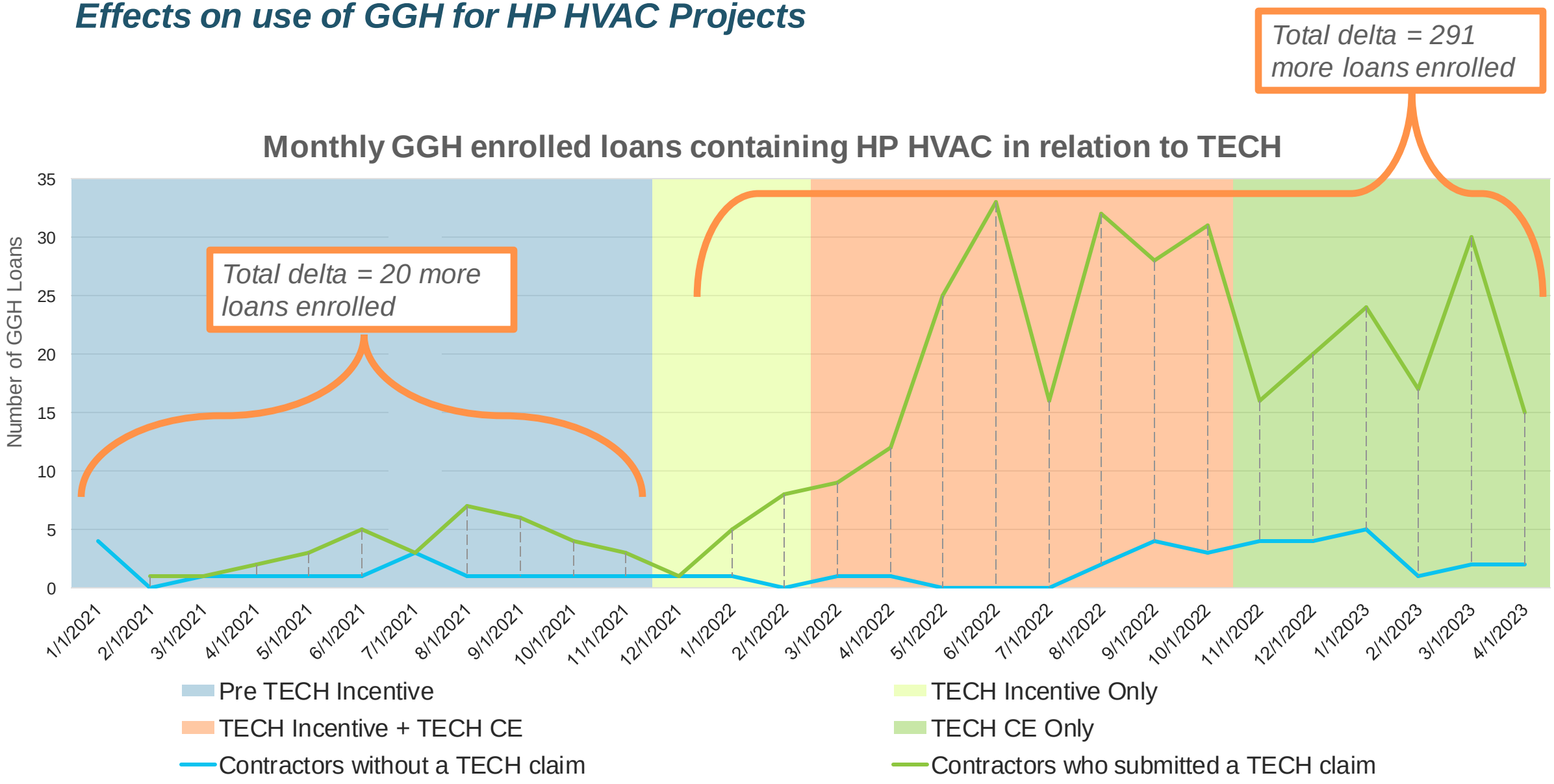
HP HVAC GGH Enrolled Loans

During and After TECH incentive and TECH CE Period



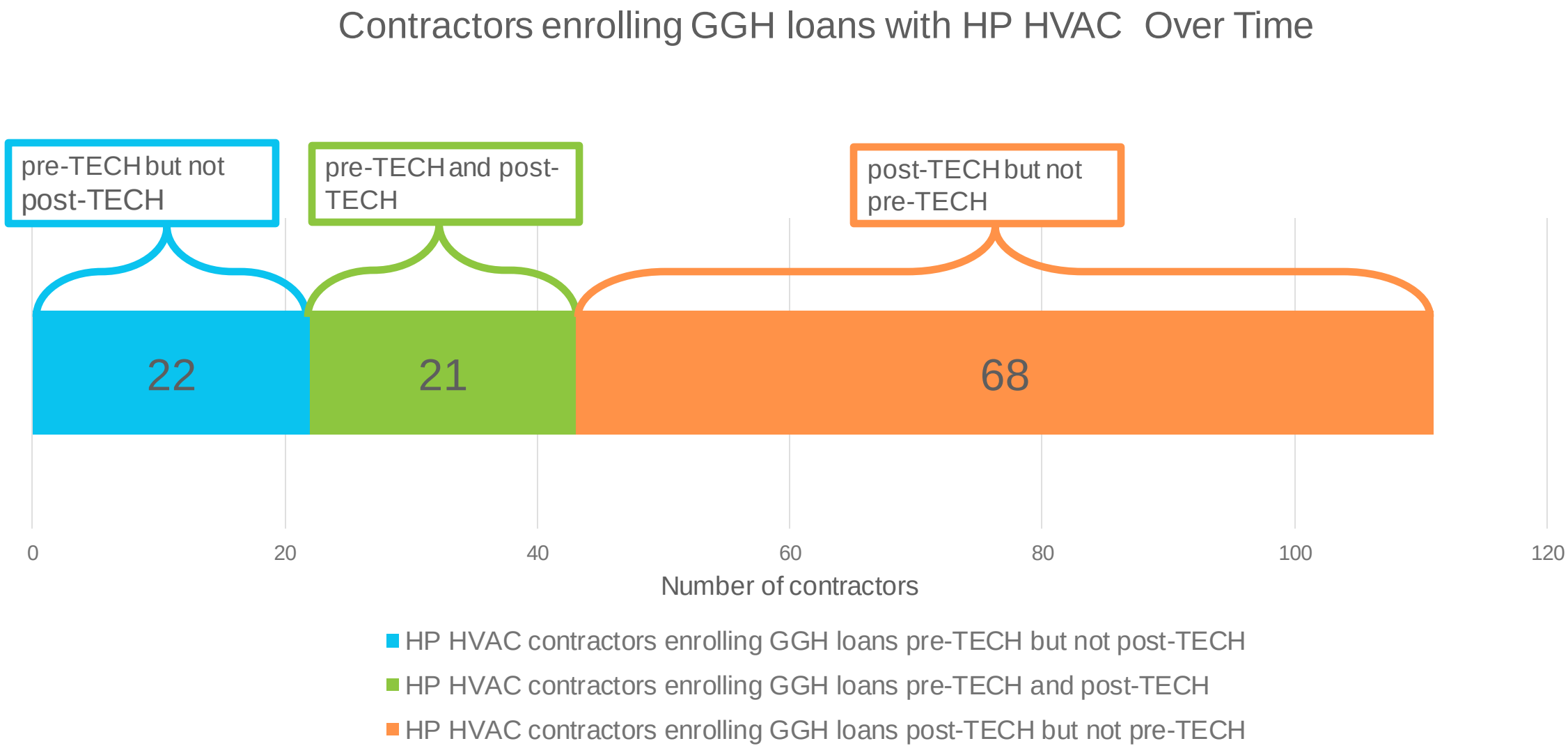
TECH Contractor Education and Engagement

Effects on use of GGH for HP HVAC Projects



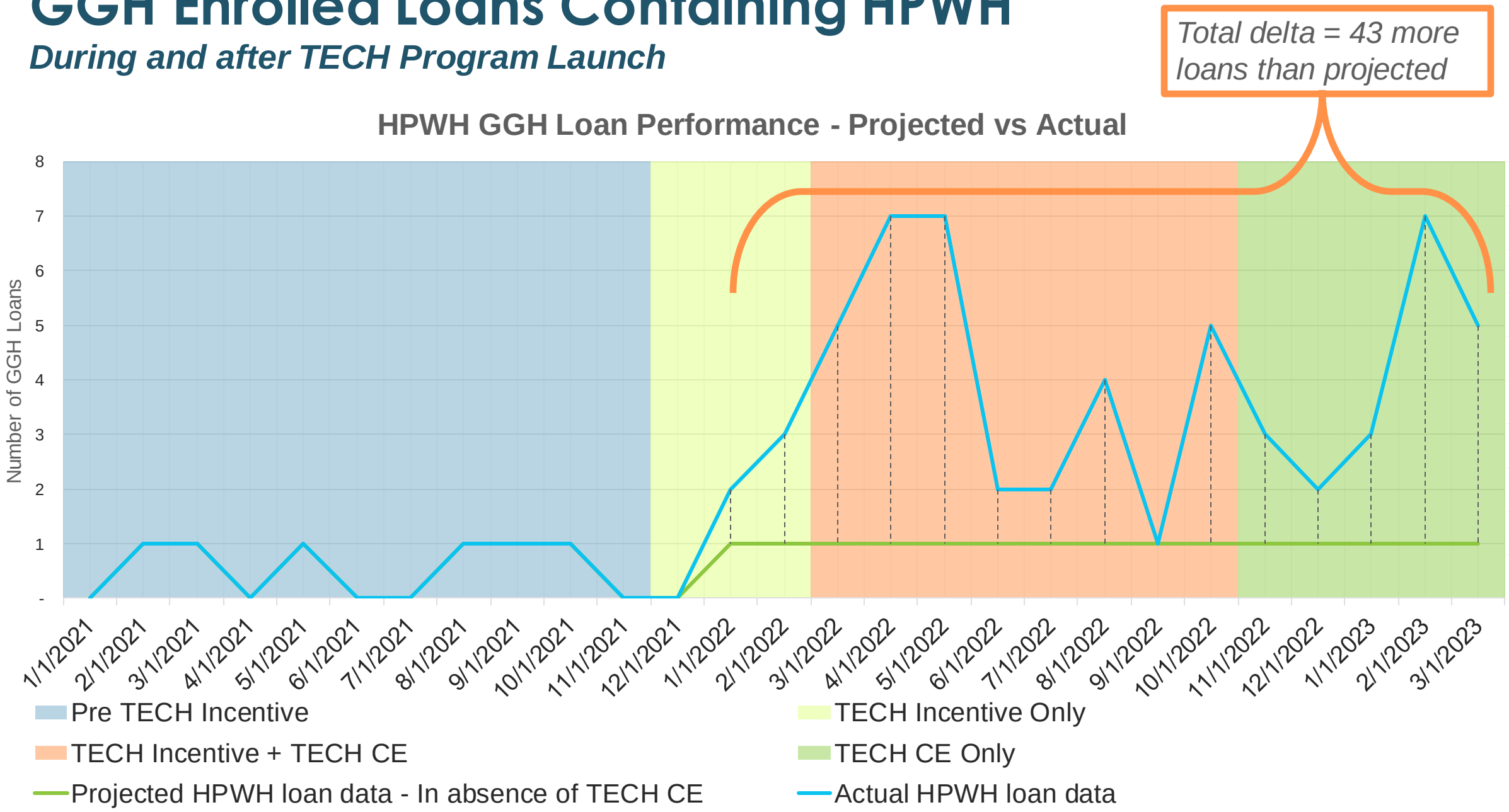
Contractors Enrolling GGH Loans Containing HP HVAC

By Point In Time In Relation To The TECH Program



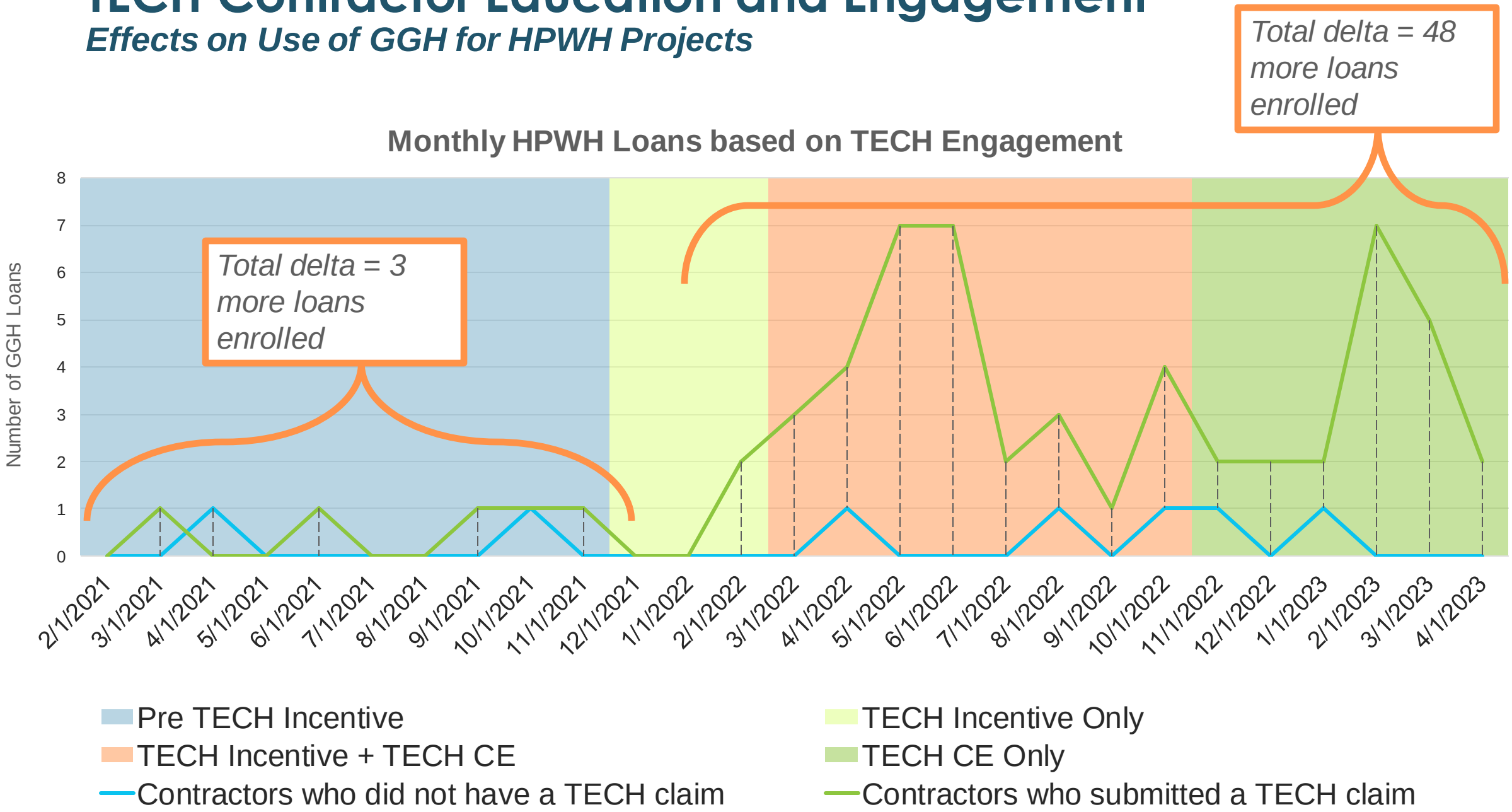
GGH Enrolled Loans Containing HPWH

During and after TECH Program Launch

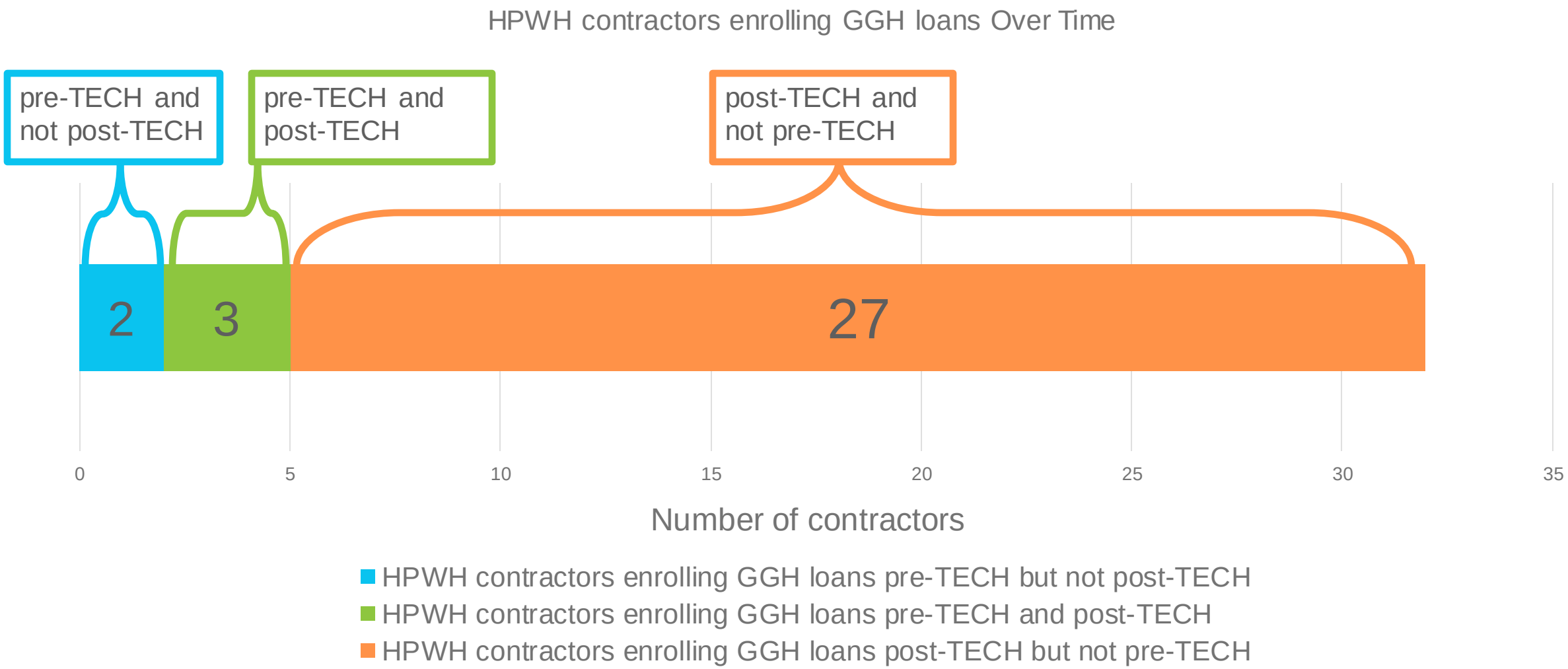


TECH Contractor Education and Engagement

Effects on Use of GGH for HPWH Projects



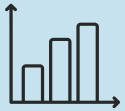
Contractors Enrolling GGH Loans Containing HPWH *In Relation To The TECH Program*



Intermission

5 Marketing

TECH Clean California Activities



Spur the clean heating market through statewide strategies

Activate the supply chain
- Contractor incentives
- Streamlined Incentive Clearinghouse
- Technical and sales training

Drive consumer demand
- Statewide marketing campaign and website

Create scalable models through regional pilots

Improve targeting and project finance
- Target customers using meter-based analysis
- Deploy a Tariffed-On Bill Financing Pilot

Expand benefits to HTR customers
- Support low-income programs
- Multi-family pilots targeting property owners

Streamline installation
- Streamline permitting and installation costs
- Enable load-shifting

Innovation through Quick Start Grants

Inform long-term building decarbonization framework

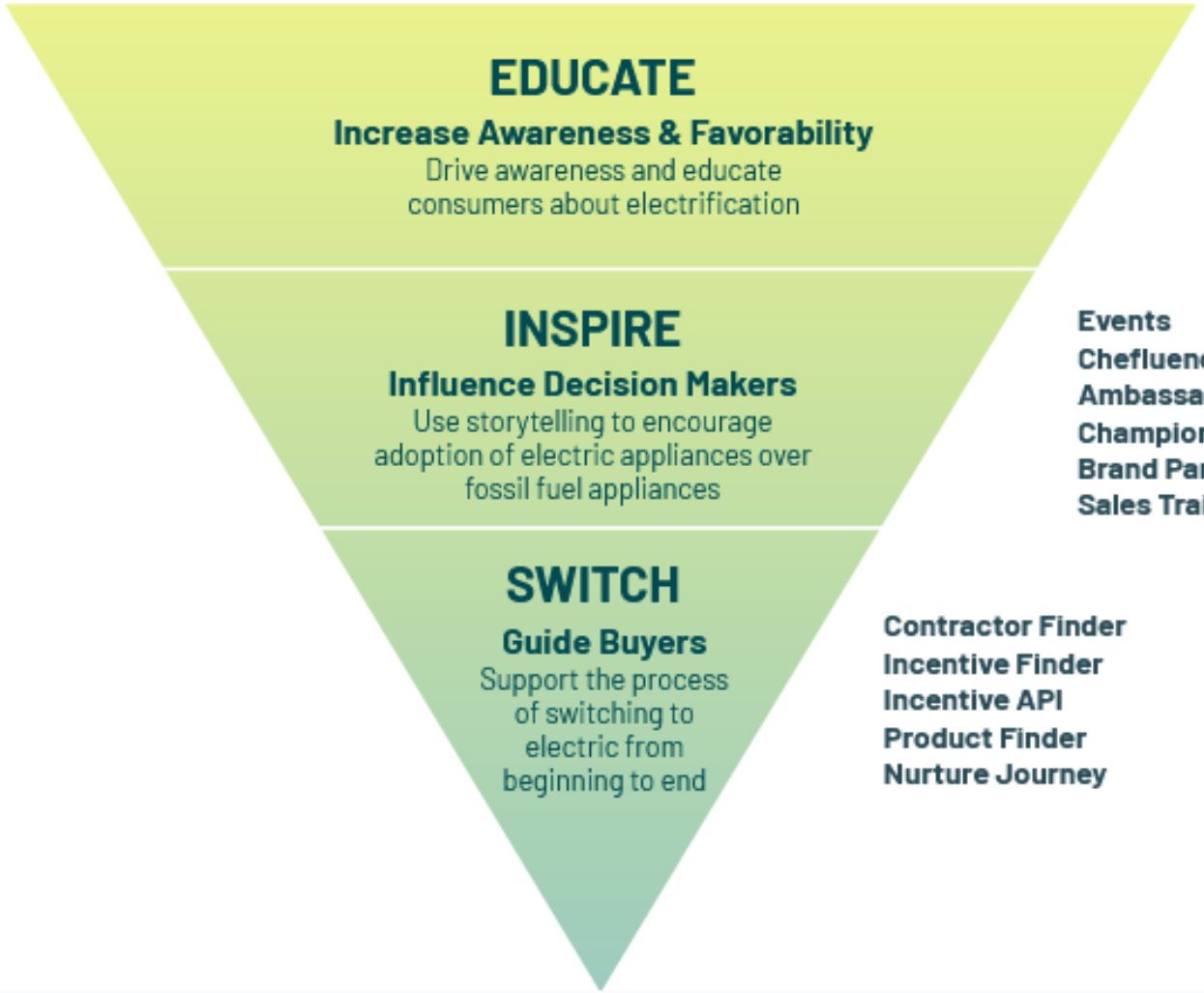
Develop public reporting site
- Inform policymakers and market actors on progress and impacts

Quantify decarbonization impacts
- Avoided costs, grid benefits, and customer bill impacts

Inform policy development
- State, regional, and local regulatory policy

The Switch is On

To encourage consumers to swap out their fossil fuel-powered appliances for electric appliances.



Earned Media
Social Media
Paid Media
Collateral
Website Resources
Partner Co-Creation

Events
Chefluencers
Ambassadors
Champions
Brand Partnerships
Sales Training

Contractor Finder
Incentive Finder
Incentive API
Product Finder
Nurture Journey

Spring Paid Media Recap

Messaging: Switch to Electric because it's Better

Versions: Heat Pump, HPWH, HP Dryer, Induction Cooking

Flight Duration: April 17 to June 30 (11 weeks)

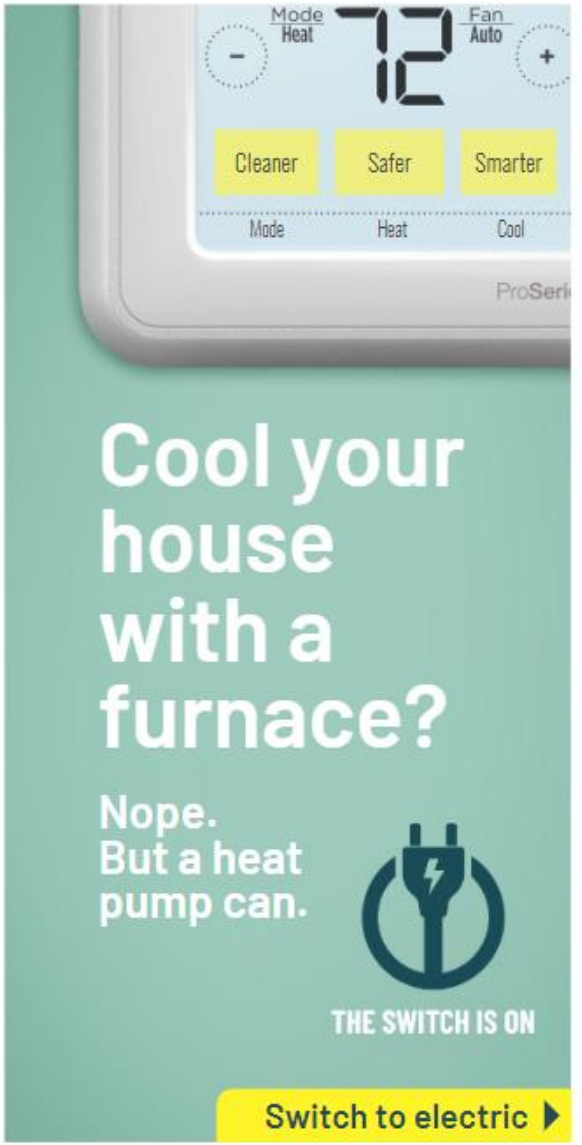
Paid Media Budget: $170k

Geographies: Select cities in Bay Area, Central Valley & Southern California

Target Audience: Homeowners, eco-conscious consumers/shoppers, those in-market for green/energy-efficient appliances, and persons who are interested in clean energy.

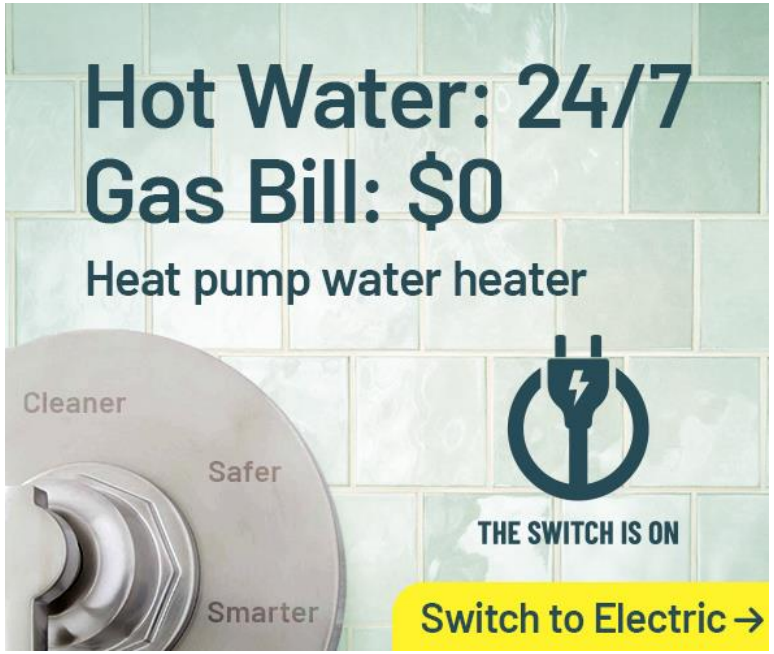
Channels: Online display, online video, connected TV (ex: DirectTV, Hulu), Facebook **Bonus:** Google AdWords (BDC secured $10k monthly from Google Grants)

New Campaign Creative: 90 new assets created



Paid Media – Measurement Summary

- **Goal:** Measure Awareness and Favourability towards home electrification based on campaign assets
- **Survey based Measurement:** How *Switch Is On* advertising shifts attitudes and online behaviors
- **Attitudinal Survey Questions:**
  - How likely are you to switch to a Heat Pump HVAC System?
  - How likely are you to switch to a Heat Pump Water Heater?
  - On a scale from 0-10, how likely are you to recommend the information from the "Switch is On" campaign to friends/family?
  - Home Electrification Perceptions
    - *Is affordable with incentive programs*
    - *Can reduce my energy bill*
    - *Improve air quality and home safety*



Paid Media First Flight Results

- Favorability and switching intent increased dramatically with those **responsible for home-improvement related decision making**.
  - +9% Awareness of the campaign
  - +15% intent to switch to a heat pump water heater and to an electric range
  - +7% intent to share the campaign with others

- People planning to **own a home within the next two years** were especially affected by the campaign (awareness +21%, recall +10%, promoter +13%)

- Short-form, fact based videos increased electric home favorability by 20% and switching intent by 14%
  - Exceptional Video Completion Rate (VCR) of 83.69%
  - CTV secured premium placement; Warriors Playoffs

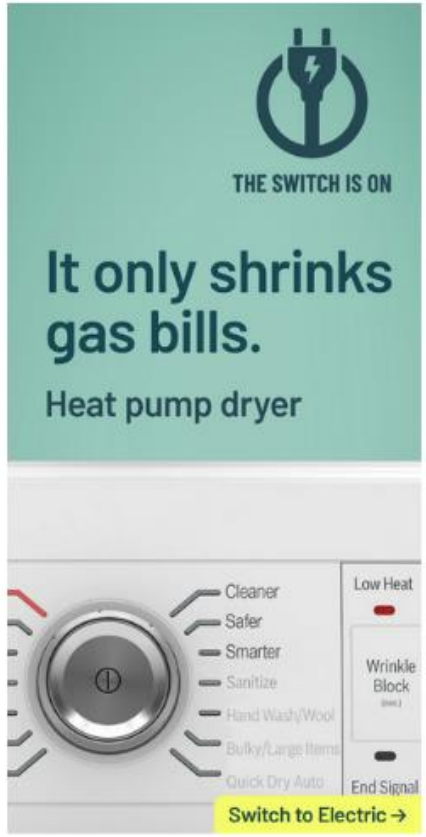
- Electric home switching intent especially high in Central Valley (+17%)

Paid Media Next Steps

Continuation with Optimization

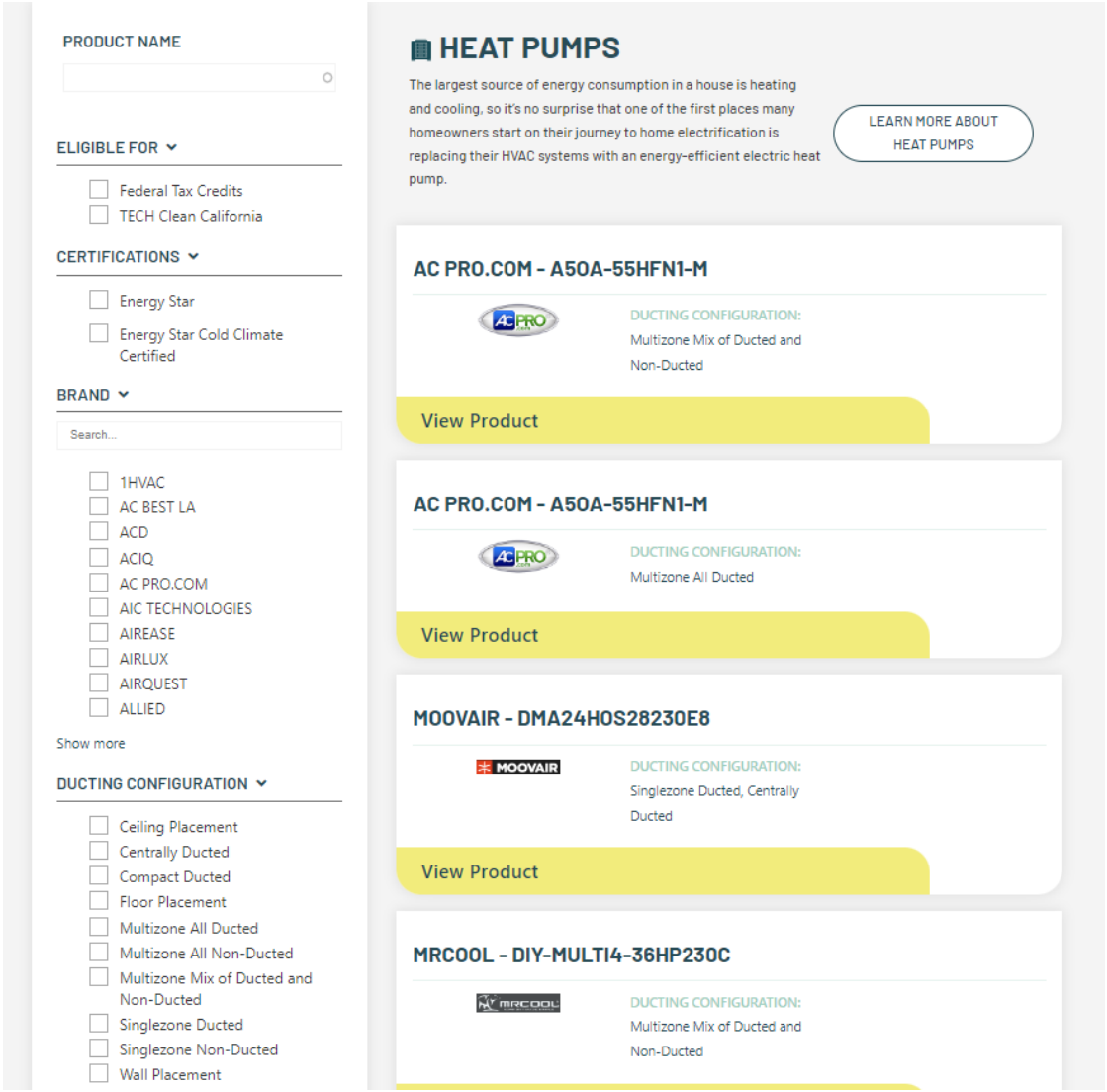
Flight 2: 7/24 - 9/30
Paid media budget: $170k
Creative: no change
Targeting:

- Continuation in the Bay Area, Inland Empire & Central Valley.
  - optimizing toward high performing channels
- In Southern California, utilize anonymized SCE email data for customers with high cooling loads based on Recurve's dashboard analysis.
  - Ideally, this approach will allow us to compare awareness & favorability between "over the counter" targeting technology versus highly contextualized email targets.



Digital Product Updates

- Incentive Finder
  - More incentive categories, including solar & batteries
  - API launching in Q4 of 2023 to enable broader access to incentive directory
- **New** - Product Finder - Launching in September 2023
  - Rebate-eligible electric products, **with TECH Clean California Qualified Products List (QPL)**
  - Help contractors find rebate eligible products
    - Includes Energy Star Cold Climate Certified Heat Pumps
    - Searchable by Brand
  - Help consumers find the right electrification products including HPWH, cooking appliances



2023 TECH Activities

Mar - Apr

- ✓ Re-launch Paid Media
- ✓ Web Enhancements – For Consumers
- ✓ Incentives refresh – TECH
- ✓ Launch SIO Newsletter
- ✓ Refresh creative assets

May - Oct

- ⧗ Paid Media with Targeted data – Flight 2
- ⧗ Product Finder with TECH Qualified Products List (QPL)
- ⧗ Resource Hub for Contractors
- ⧗ Equity Community Outreach Plan
- ⧗ Contractor Workforce Video Content

6 Evaluation

Opinion Dynamics

TECH Customer Acceptance Research: Six-Month Post-Install Survey Findings

August 30, 2023

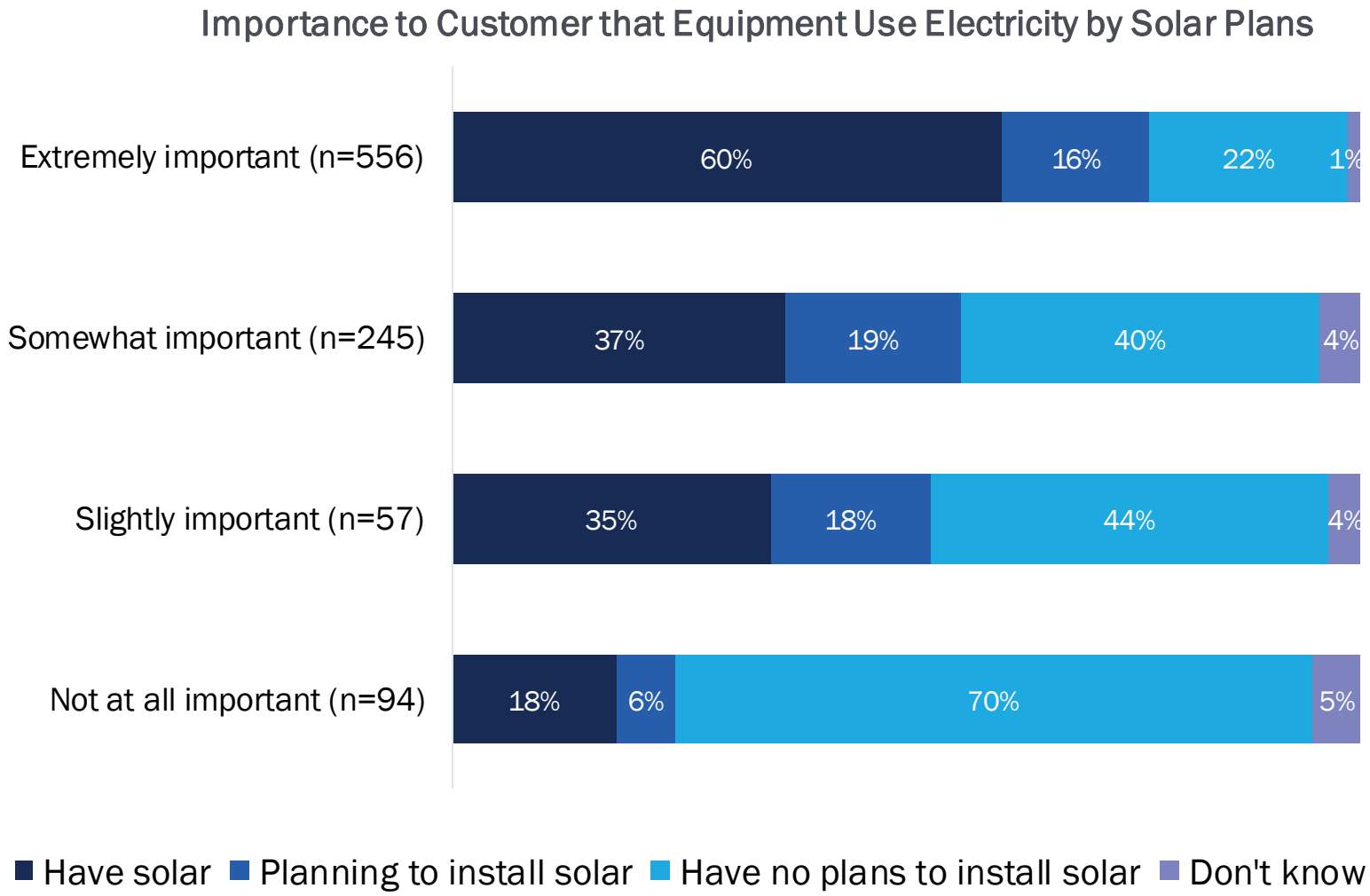
Methods

- Survey with single-family customers who received a TECH-incented heat pump at least six months prior, fielded between November and December 2022
- Purpose was to capture homeowners' experience with their new heat pump, understand any issues they may have encountered, and see if they noticed any changes to their utility costs
- Findings reflect installs that occurred between August 2021 and July 6th, 2022
  - 494 Ducted HVAC HP customers (2,140 invited, RR of 23%)
  - 158 Ductless HVAC HP customers (1,112 invited, RR of 14%)
  - 300 HPWH customers (896 invited, RR of 33%)

Solar in Customer Homes

More than half of customers who found it extremely important that their equipment use electricity already have solar installed

- **HPWH**: three-quarters of customers have solar or plan to install
- **HVAC**: three-fifths of customers have solar or plan to install



Customer Descriptions of Equipment

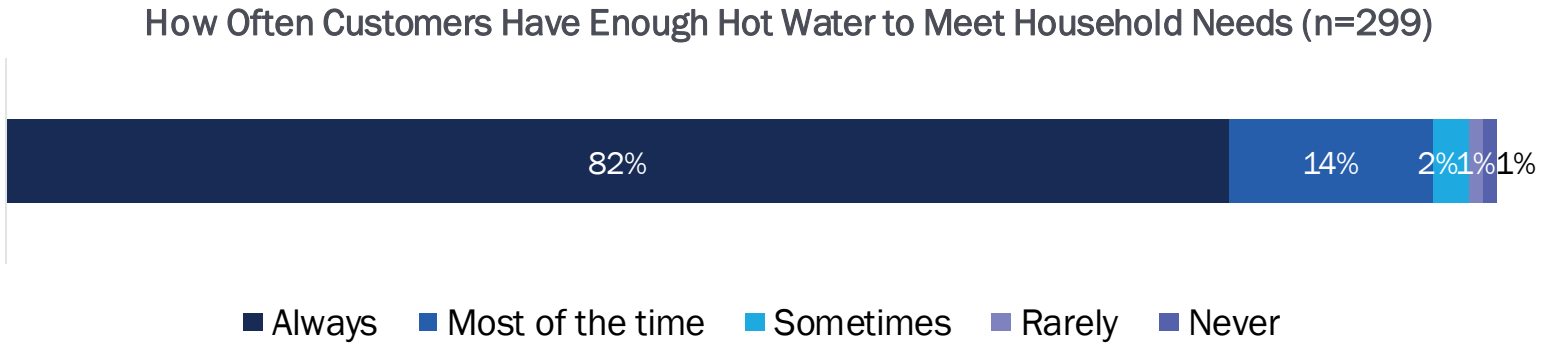
HPWH Customers

HVAC Customers

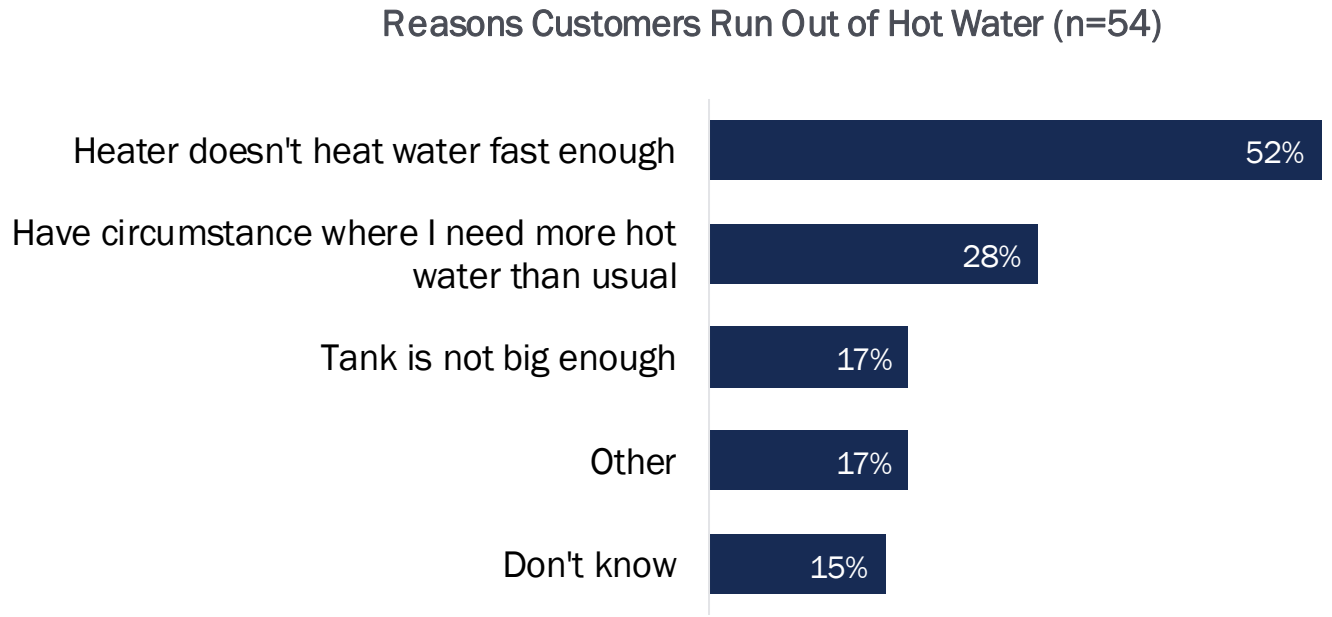
Heat Pump Water Heaters

HPWH - Hot Water Availability

- Most customers always have enough water to meet their household needs

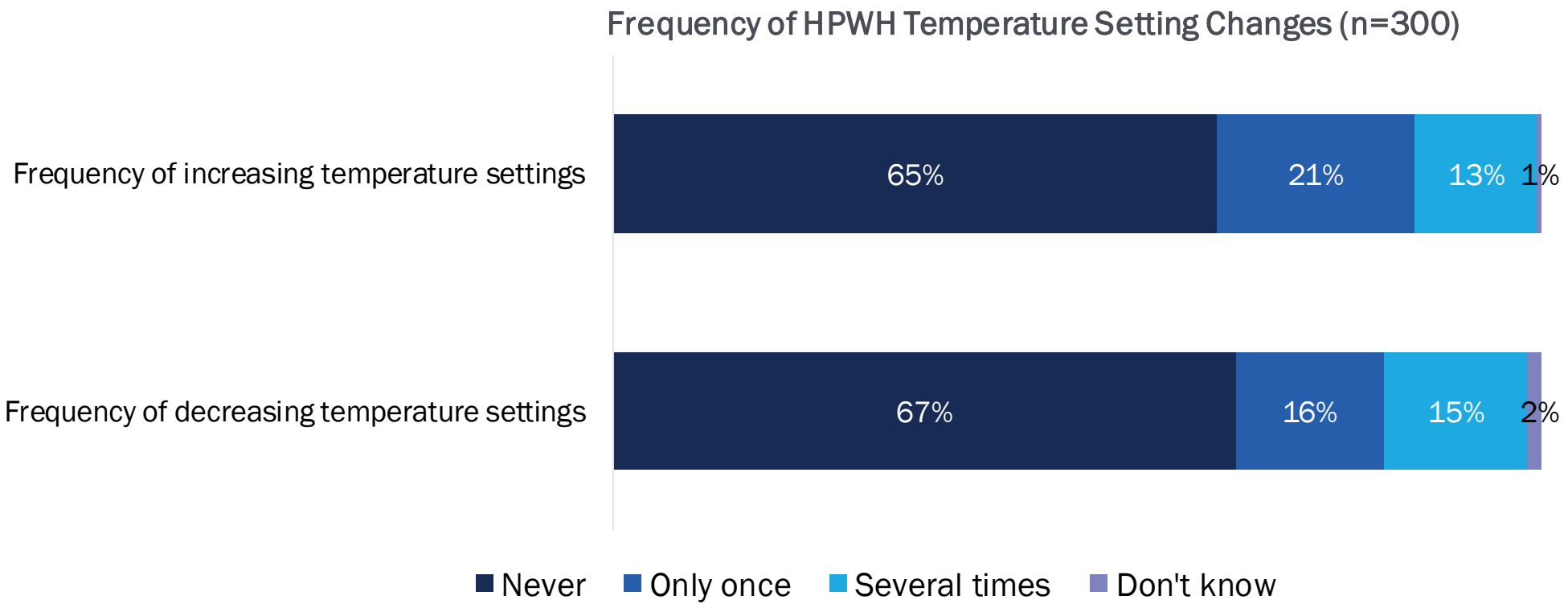


- Customers think they run out of hot water due to slow water heating and circumstances where more hot water is needed than usual



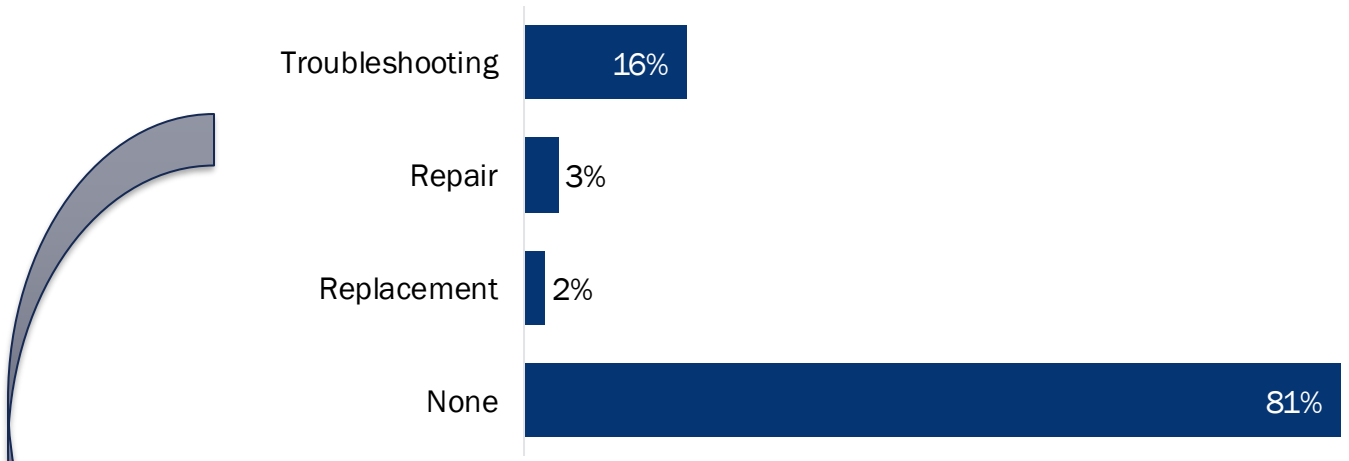
HPWH – Temperature Settings

- About two-thirds of customers have never adjusted their HPWH temperature settings



HPWH - Equipment Issues

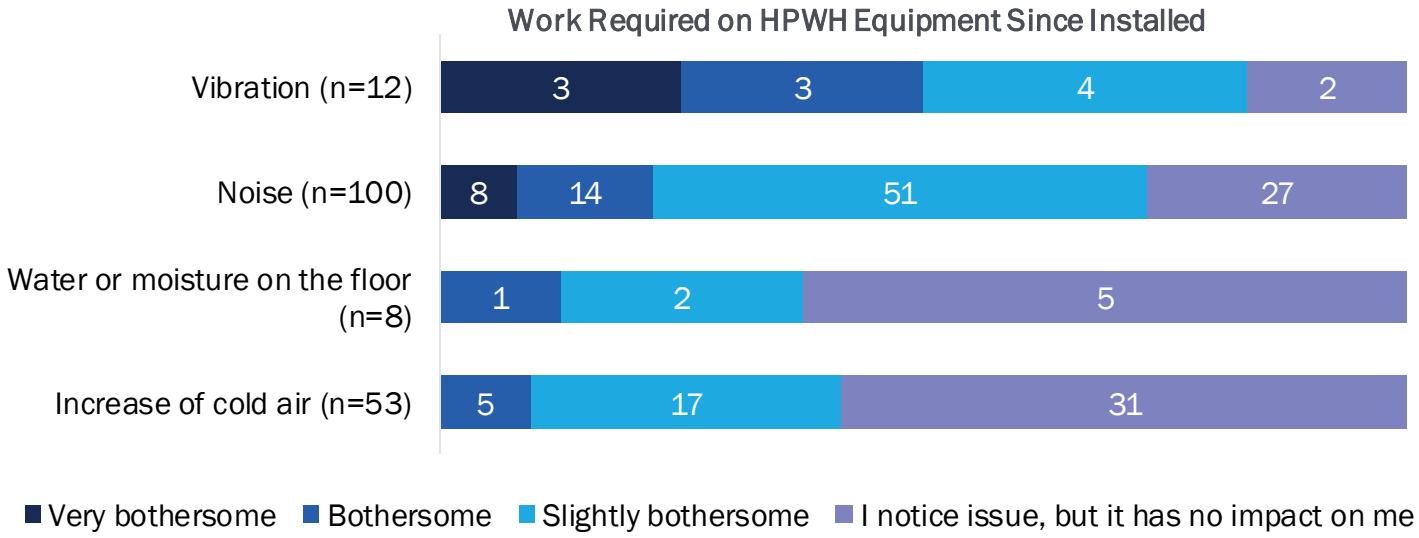
- Large majority had not needed to repair, replace, or troubleshoot issues
- Most common issues that required work were difficulties with user app or equipment Wi-Fi connection, equipment noise or vibration, or an installation error



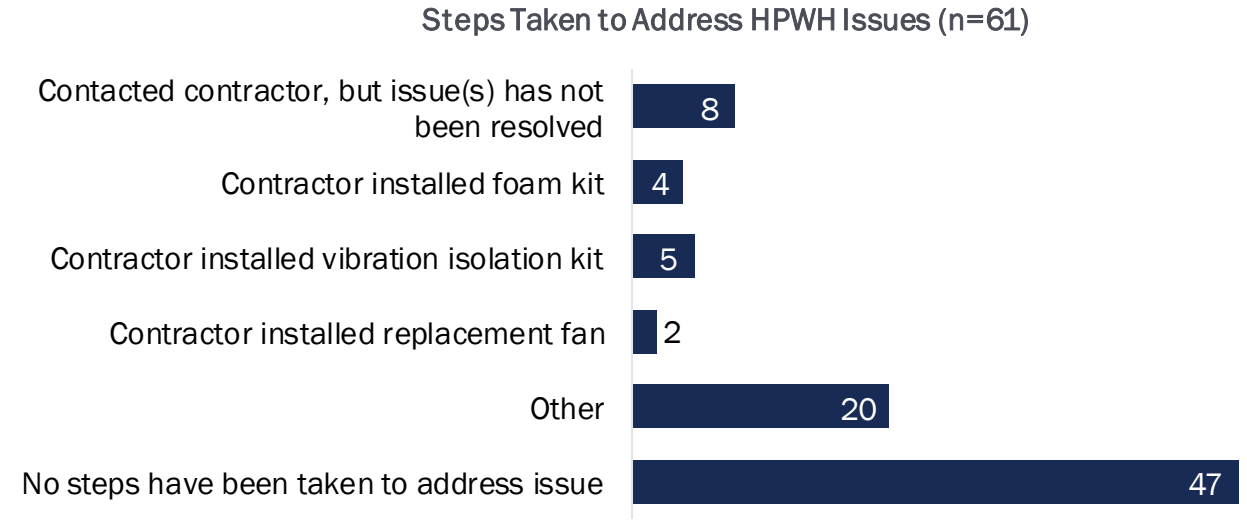
Issue	Number of Respondents (n=58)	Percent of Respondents
Difficulties with user app or Wi-Fi connection	18	31%
Noise or vibration	17	29%
Installation issue	10	17%
Limited hot water availability	8	14%
Temperature control issue	8	14%
Equipment part repaired or replaced	6	10%
Whole unit replaced	6	10%

HPWH – DISRUPTION FROM Equipment Issues

- Overall, customers are minimally or not bothered by most equipment issues
- Vibration issues most bothersome, cold air near the HPWH least bothersome

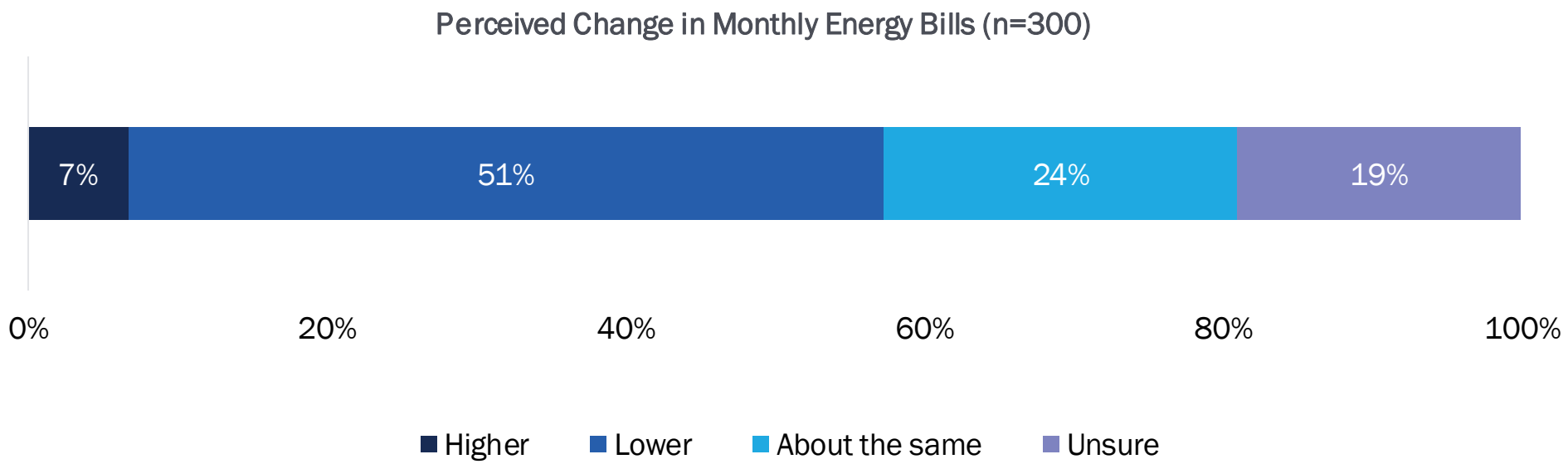


- More than half of customers who reported an issue have not taken any steps to address the problem



HPWH - ENERGY COSTS

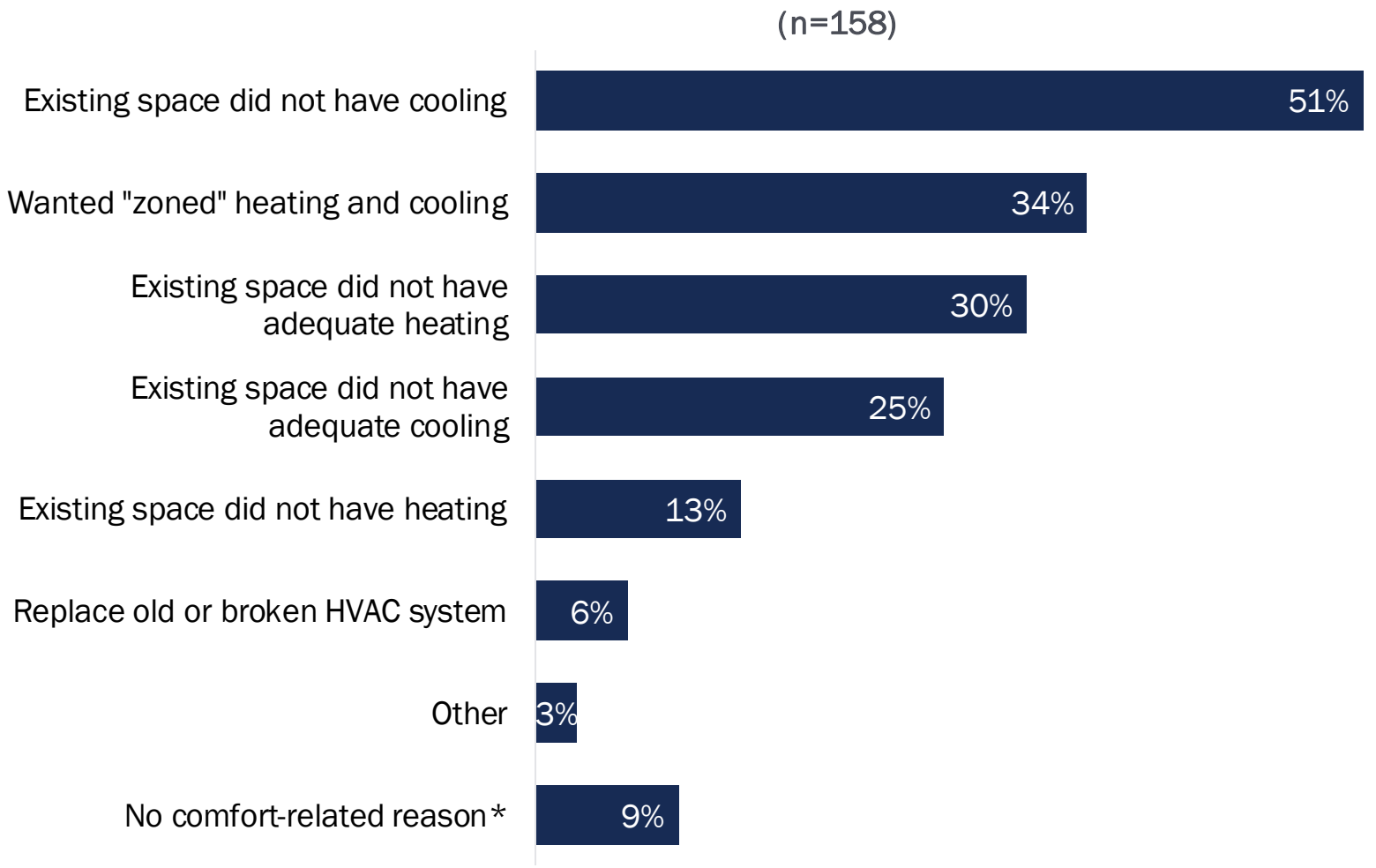
- Nearly three-quarters of customers who reported a decrease in energy bills have solar
- An involuntary change in electric rates had greatest association with increased energy bills



HVAC Heat Pumps

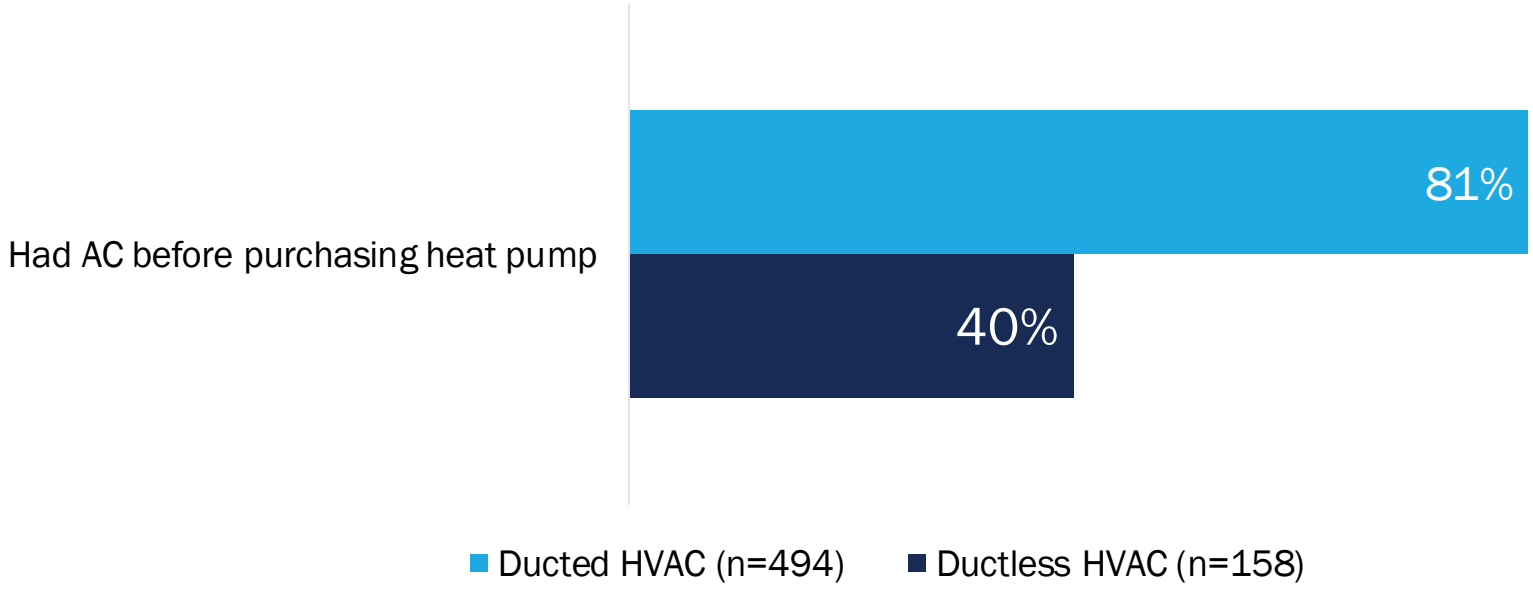
HVAC – Motivations for Selecting Ductless Heat Pump

- Customers most commonly selected a ductless HP to add cooling where they previously did not have it and for the zoned temperature control capabilities



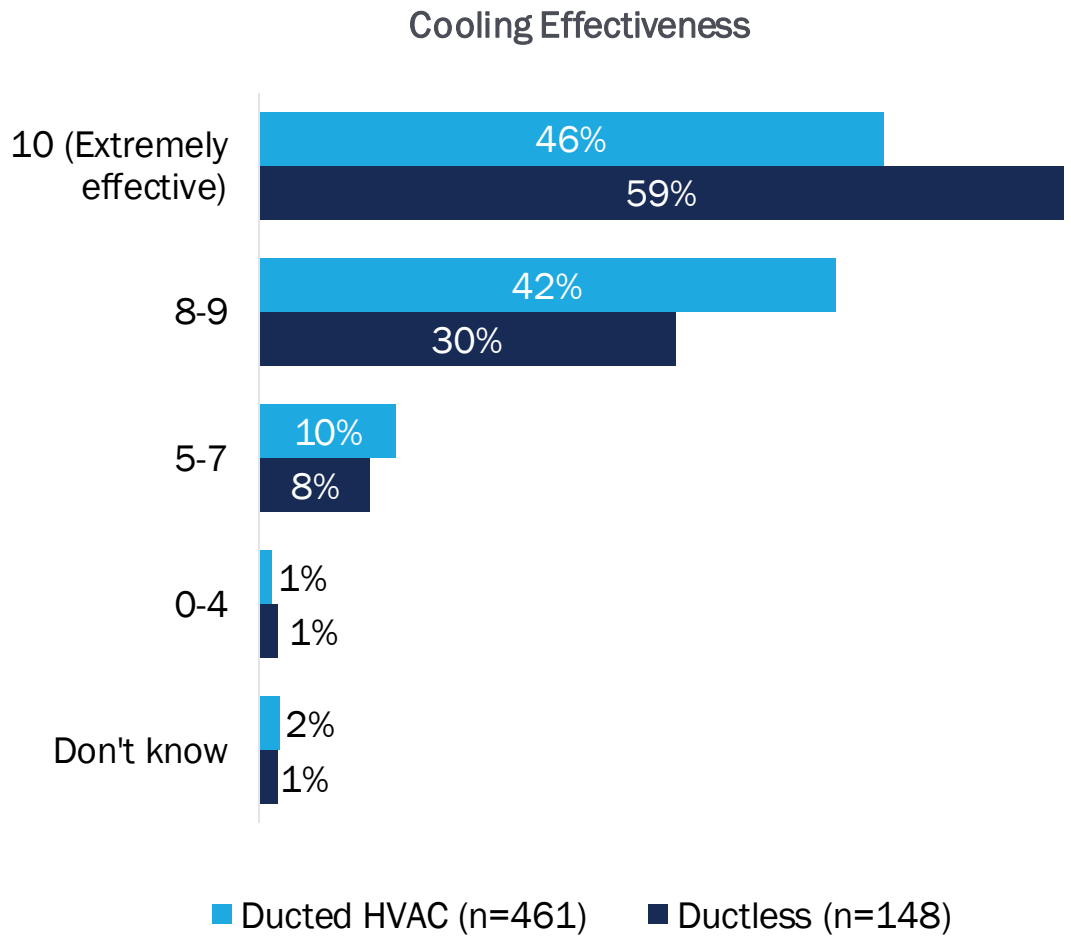
HVAC – Whether Customer Had AC Before Installing HP

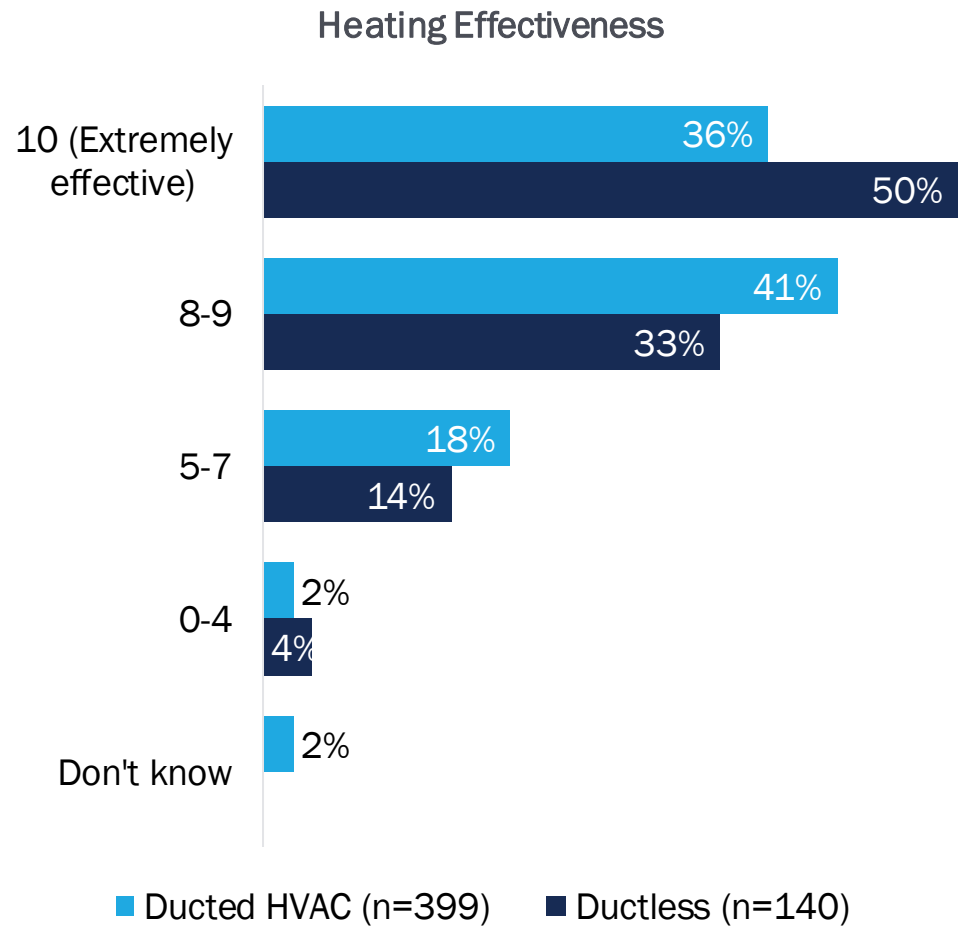
- Ducted HVAC customers were twice as likely than ductless customers to have had AC before their heat pump was installed



HVAC – Heating/Cooling Effectiveness

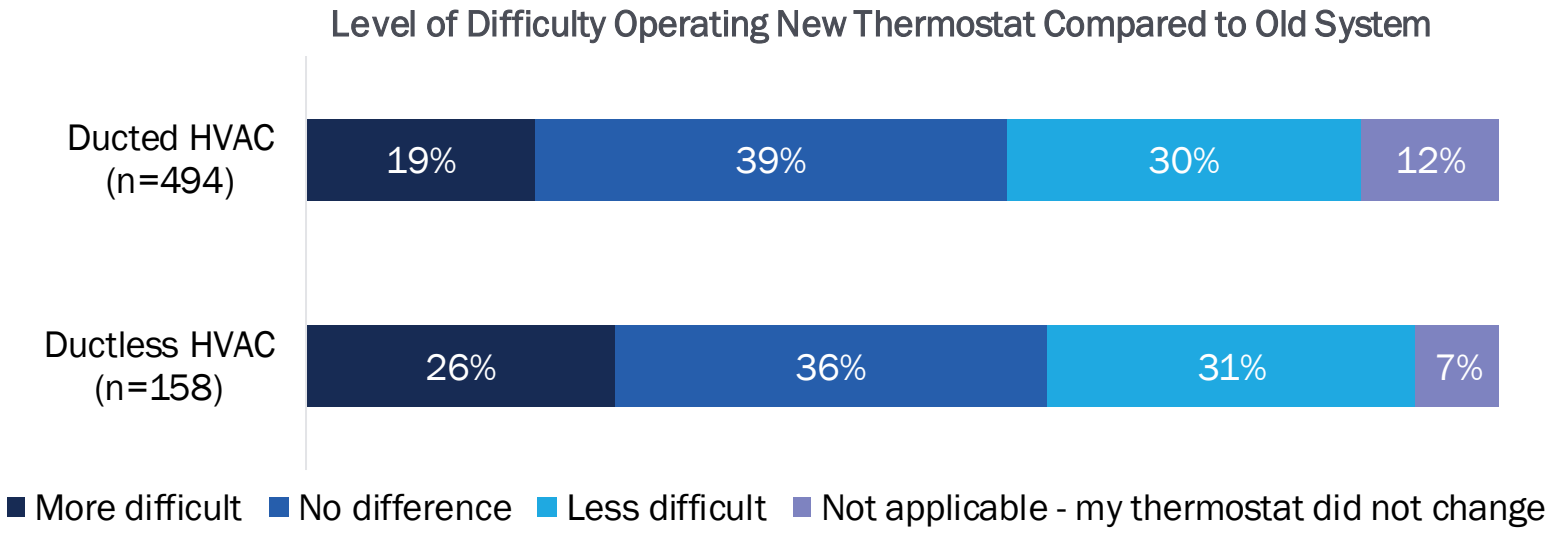
- Ductless HPs rated more effective than ducted in terms of both heating and cooling

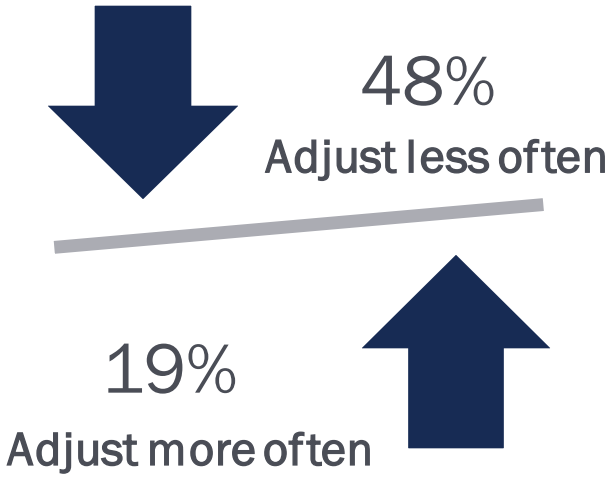




HVAC – OPERATING Thermostat

- 90% of customers had to update their thermostat when their HP was installed
- In most cases, the new thermostat was either similar or easier to operate than their previous system





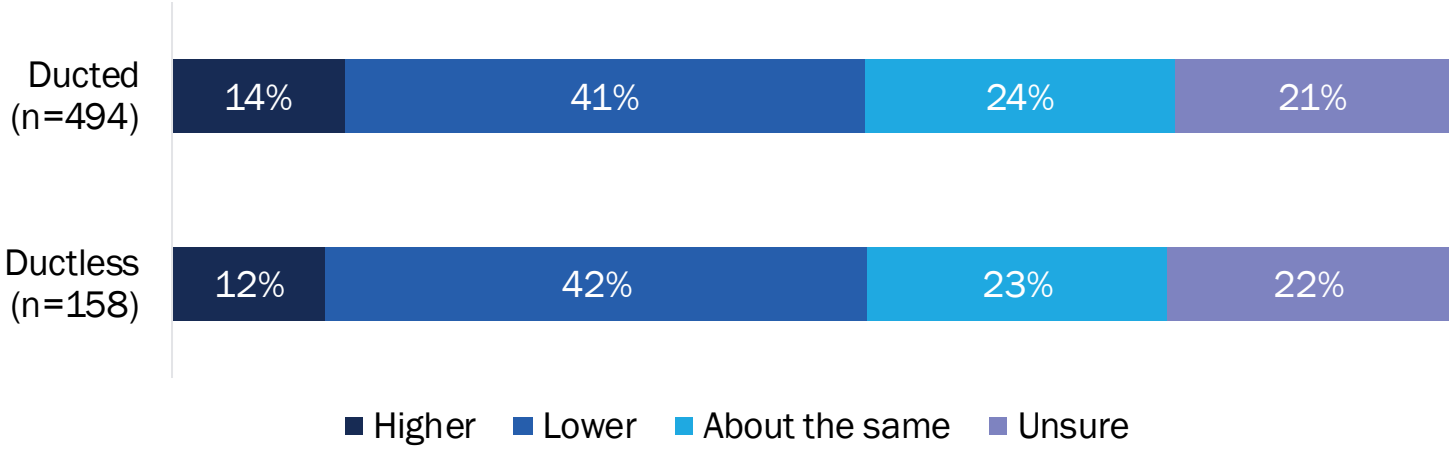
About half of customers find themselves adjusting their new thermostat less than their previous system

HVAC - ENERGY COSTS

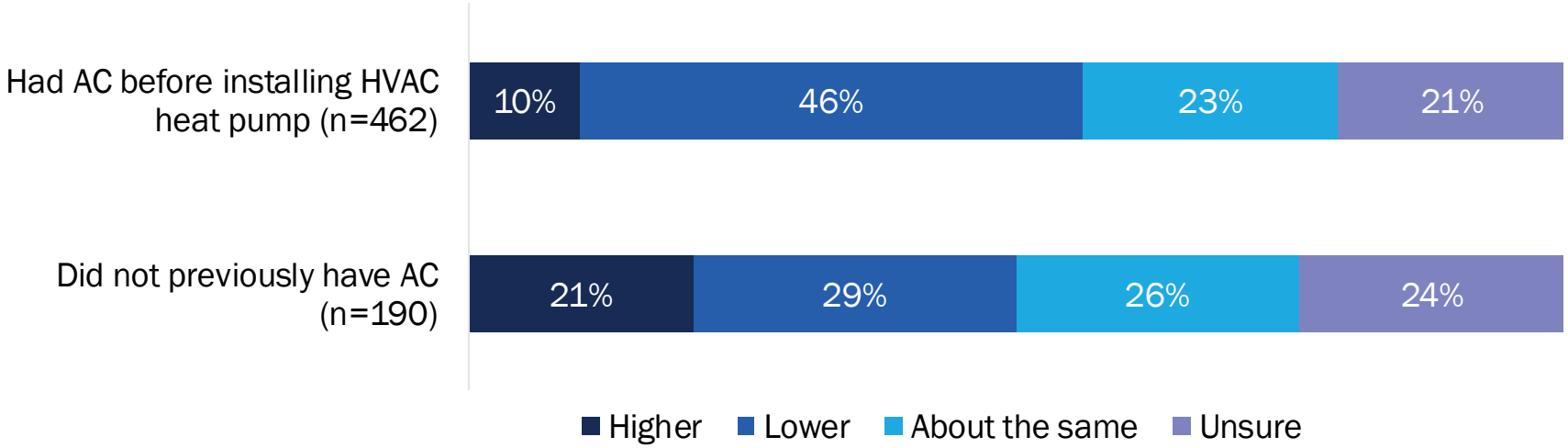
- Changes in energy costs were nearly the same across ducted and ductless equipment

- Whether a customer did or did not have AC before their heat pump was installed was a strong predictor of changes in energy costs

Perceived Change in Monthly Energy Bills by HVAC Type



Perceived Change in Monthly Energy Bills by Whether Customer Had AC Before



Customer Satisfaction & Perceived Investment Value

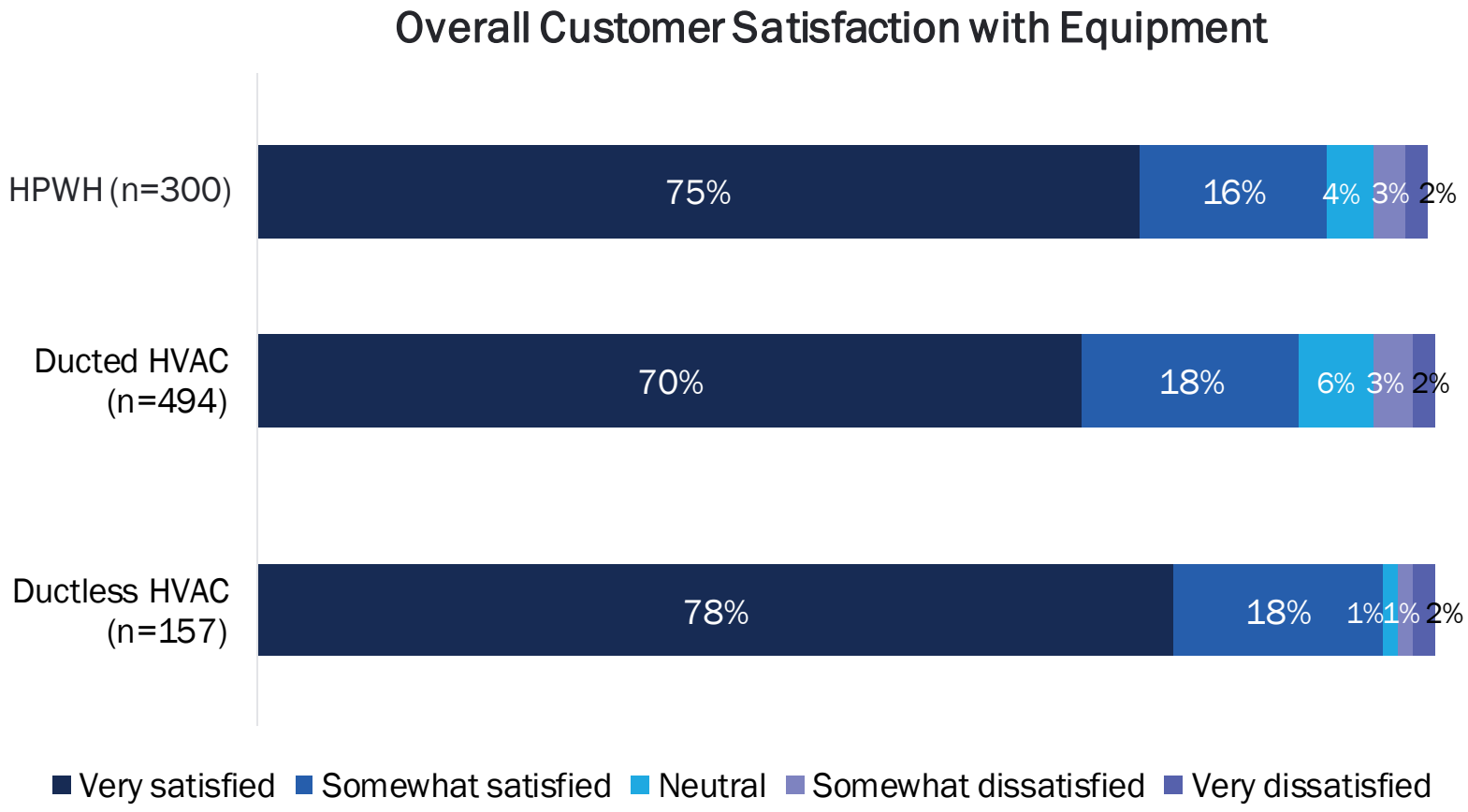
Customer Satisfaction

For all equipment types, 5% or fewer respondents were very or somewhat dissatisfied

85%+ HPWH and HVAC customers likely to recommend heat pump

HPWH: cost-effective, high-quality, beneficial to the environment

HVAC: cost-effective, effectively heats/cools home, beneficial to the environment



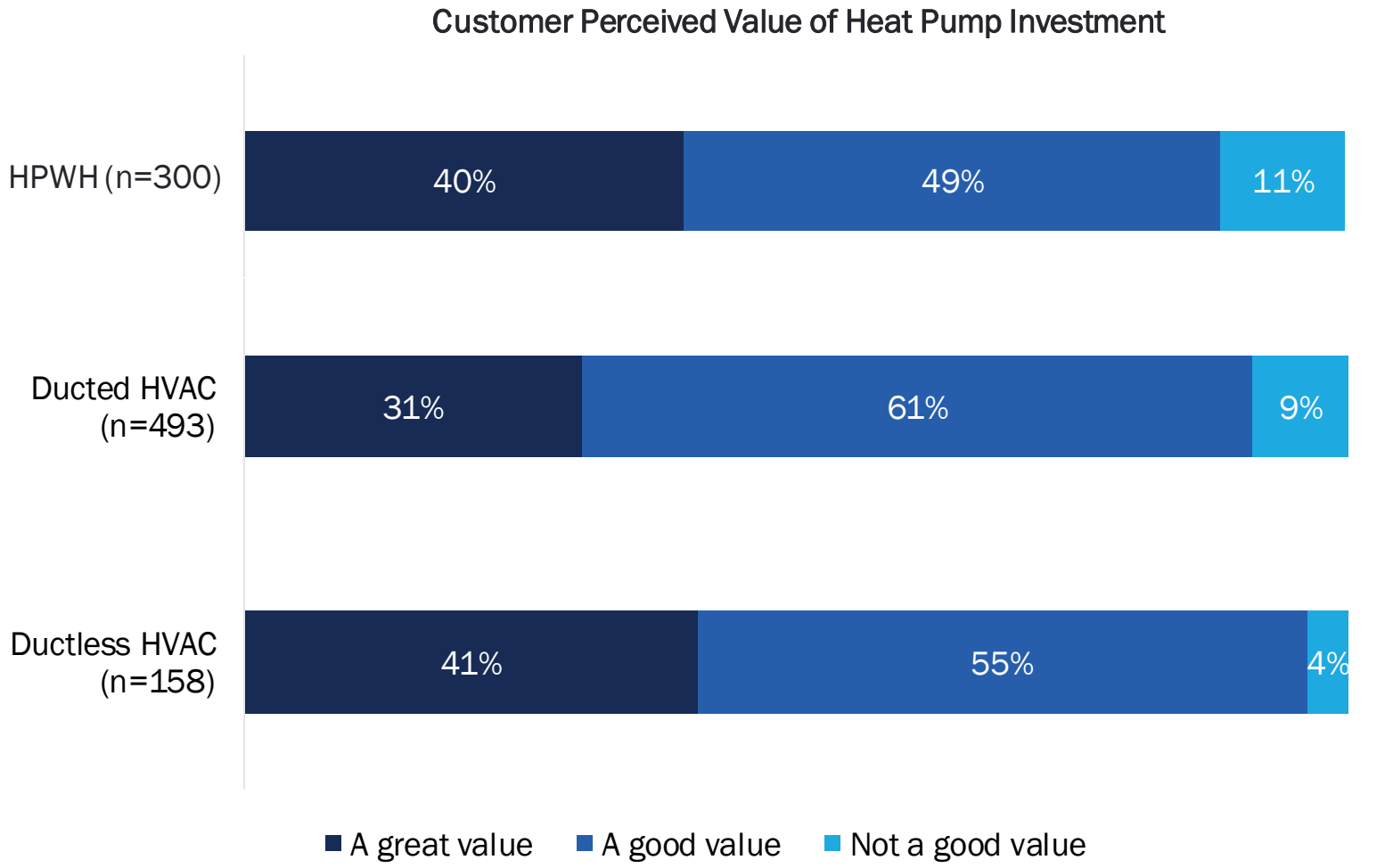
Perceived Value of Heat Pump Investment

- Most customers saw value in their heat pump investment
- Customers more commonly rate investment as “good value” rather than “great value”

Top reasons investment rated as “not a good value”

HPWH: high upfront cost, high energy costs, hot water limitations

HVAC: noise, insufficient heating or cooling



Conclusions and Recommendations

Conclusion

High upfront cost and high electricity bills were factors that caused the greatest customer dissatisfaction with HPWHs (5% of surveyed HPWH customers were dissatisfied)

- Most HPWH customers whose energy bills decreased had solar PV (72%), suggesting those without solar may be paying more to heat their water than before due to the relatively lower cost of natural gas

Recommendations

- Contractors should inform customers about Time-of-Use rates if they are not already on them
- Explore ways to encourage customers to install solar PV at the same time they are purchasing a HPWH
- Pairing incentives for HPWHs with solar PV or developing synergies between HPWH contractors and solar contractors may be fruitful for expanding home electrification

Conclusion

The most common HPWH issues surveyed TECH customers reported derived from something that occurred during installation

- Customers primarily reported issues related to noise, vibration, leaks from pipes, and condensate issues
- Customers were most bothered by noise and vibration issues although most had not taken any steps to address them
- The contractor returned to the home in 11 cases and installed a foam kit, vibration isolation kit, or a replacement fan to address the issue

Recommendations

- Ensure training organizations partnered with TECH include instruction on how to avoid noise and vibration issues as well as leaks.
- Focus future trainings on installation practices that reduce noise and vibration issues such as not installing the HPWH near a bedroom wall or installing a vibration isolation kit.

Conclusion

Some surveyed customers reported difficulty controlling their HPWH via the user app or its Wi-Fi connection (n=18)

- Customers were frustrated they could not access the functionality to adjust the water temperature, generate the intended reports, or consistently use the app

Recommendations

- TECH should take advantage of relationships made with HPWH manufacturers to provide feedback on the usability of the user app and smart equipment features
- Consider requesting manufacturers provide online user manuals about how to best control the equipment and effectively use the equipment's app

Conclusion

HVAC heat pump performance is sufficiently different from furnaces that customers should be advised about what to expect in terms of run times and the air temperature coming out of the vents

- HVAC customers noticed air coming out of the vents was not as hot as it previously had been with a furnace and their heat pumps run longer to heat up the home
- About two-thirds of customers who noticed the change in air temperature from the vents were bothered by it

Recommendation

- Contractors should educate their customers about these differences during the sales process to adjust their expectations in advance
- By providing customers with realistic expectations, the number of callbacks will likely decrease and lead to a more satisfied customer

Opinion Dynamics

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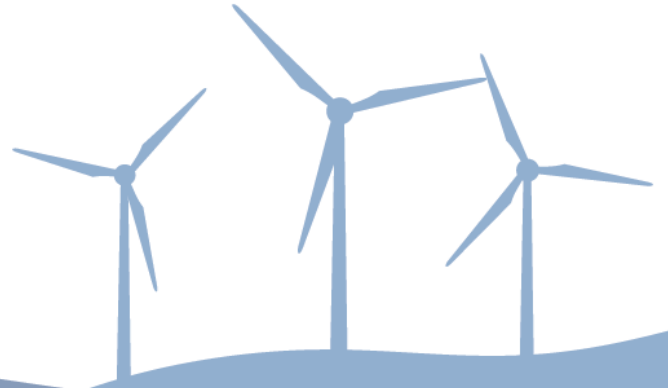
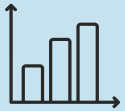


7 Highlights from Pilots and Quick Start Grants

TECH Clean California Activities



Spur the clean heating market through statewide strategies

Activate the supply chain

- Contractor incentives
- Streamlined Incentive Clearinghouse
- Technical and sales training

Drive consumer demand

- Statewide marketing campaign and website

Create scalable models through regional pilots

Improve targeting and project finance

- Target customers using meter-based analysis
- Deploy a Tariffed-On Bill Financing Pilot

Expand benefits to hard to reach customers

- Support low-income programs
- Multi-family pilots targeting property owners

Streamline installation

- Streamline permitting and installation costs
- Enable load-shifting

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

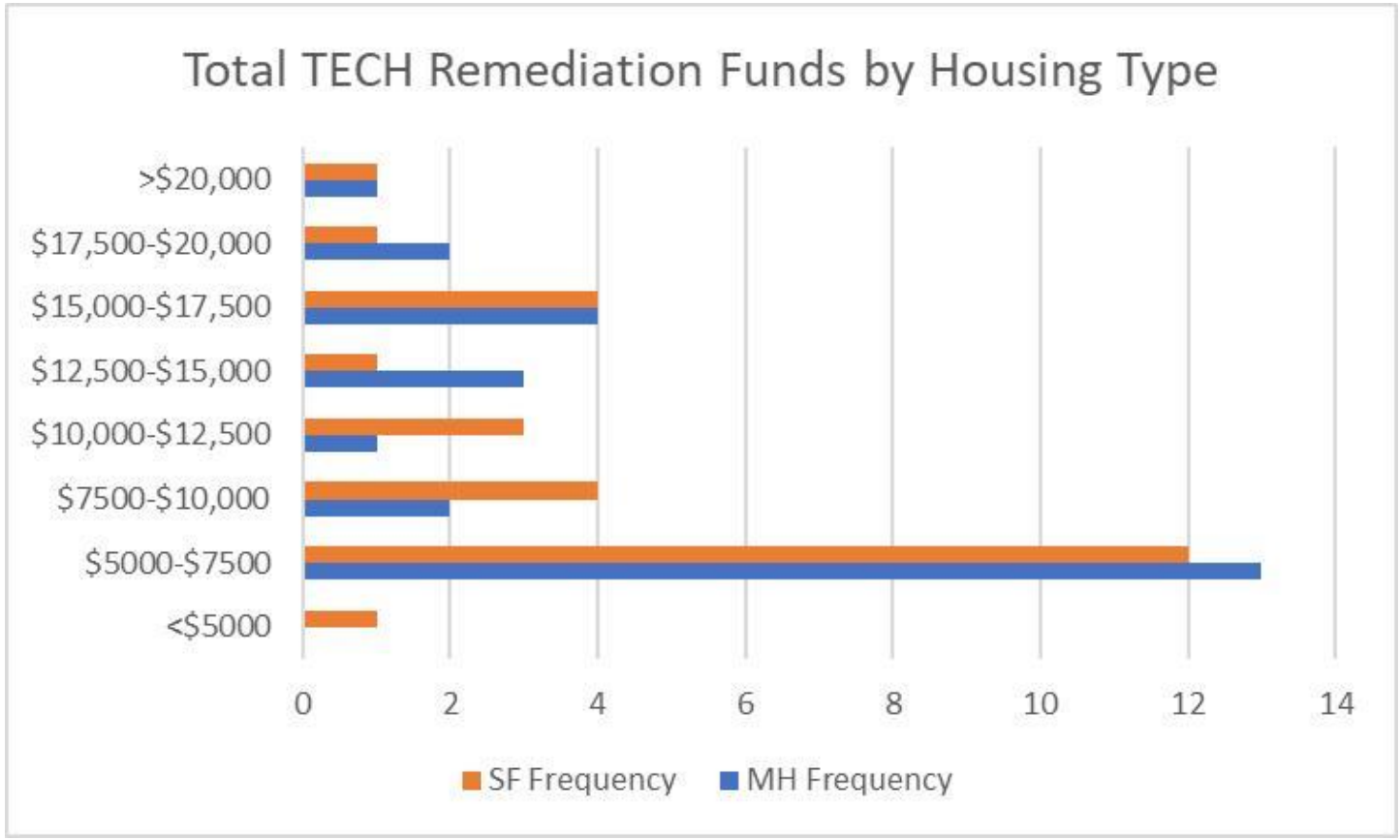
- Avoided costs, grid benefits, and customer bill impacts

Inform policy development

- State, regional, and local regulatory policy

Pilot Profile: Low Income Pilot
San Joaquin Valley Home Remediation Data Analysis

- TECH provided additional home remediation funding to San Joaquin Valley Disadvantaged Communities Pilot
- 67 homes funded
- Report on the type, frequency, and cost of remediation measures shows moderate funding enabled significant increase in participation: https://techcleanca.com/pilots/low-income-fuel-switching/



Quick Start Grants 2023 Projects

Reaching Renters

Bright Power – Aligning utility allowances in regulated affordable housing to promote electrification

350 Bay Area – Fast-path approach to heat pump deployment for renters with portable heat pumps and air purifiers

Expanding the Skilled Workforce

Goodwill – Workforce placement and preparation in the HVAC trades, with a focus on heat pump technologies

RHA – Heat pump water heater best practices and field guide

Community-Centered Approaches

City of Sacramento – Layering multiple programs to enable whole-home electrification and prevent displacement

Viridis Consulting – Decarbonizing a multi-owner equity community with HOA governance

Diversity Coalition – Targeted and inclusive marketing, educational materials for equitable electrification

Novel Financing and GHG Accounting Approaches

Climate Resolve – GHG accounting as a tool to scale heat pump retrofits in housing with cost barriers

Quick Start Grant Profile:
Heat Pump Water Heater Retrofit Best Practices and Field 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:

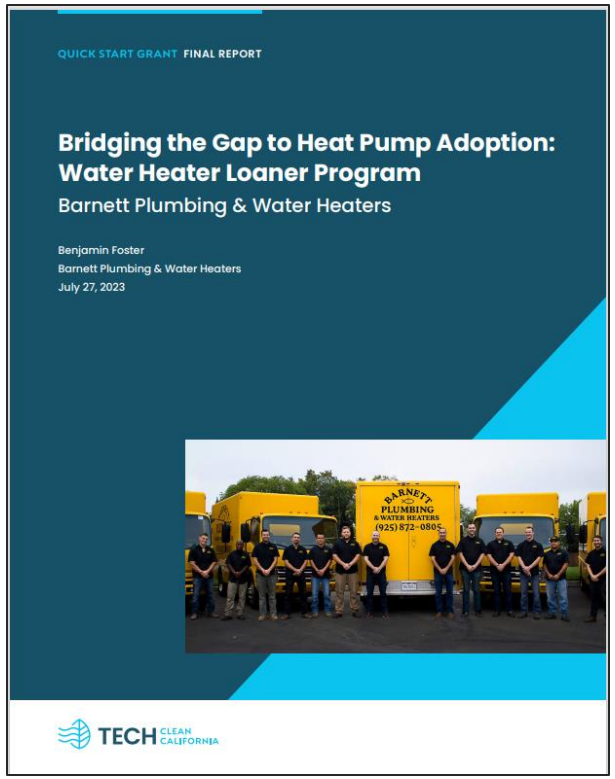
- Best Practices document was created in collaboration with a wide range of industry stakeholders
- Final Version: https://techcleanca.com/quick-start-grants/2022-qsg-recipients/rha-heat-pump-water-heater-best-practices-and-field-guide/

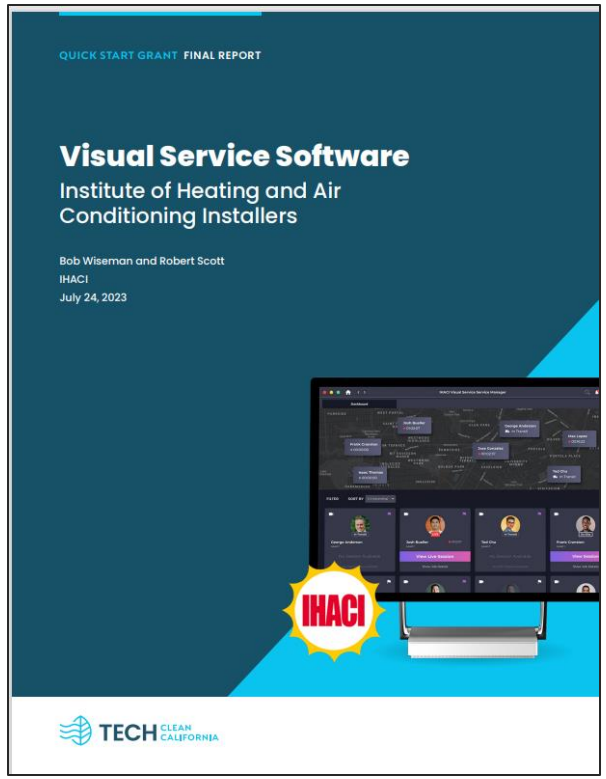
What's ahead:

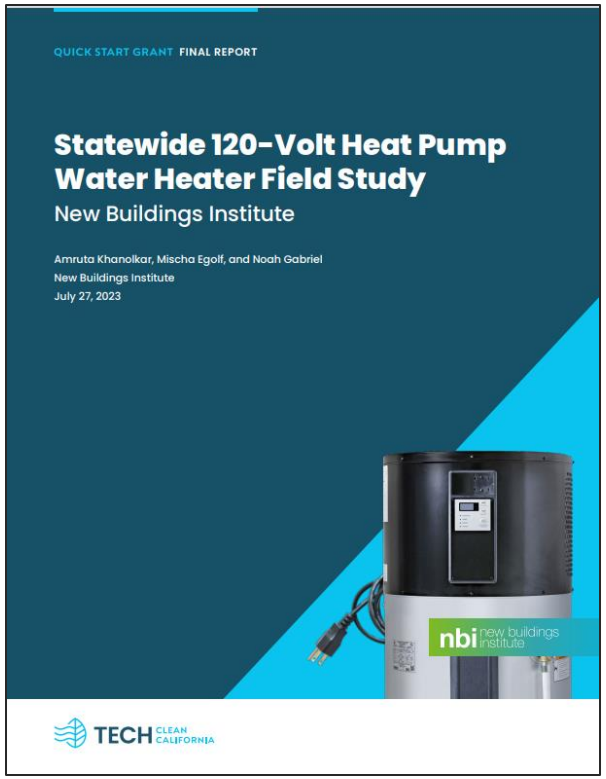
- Interest by national research organizations in adapting this guide for a national audience
- Adapt Best Practices into a photo-based job aids

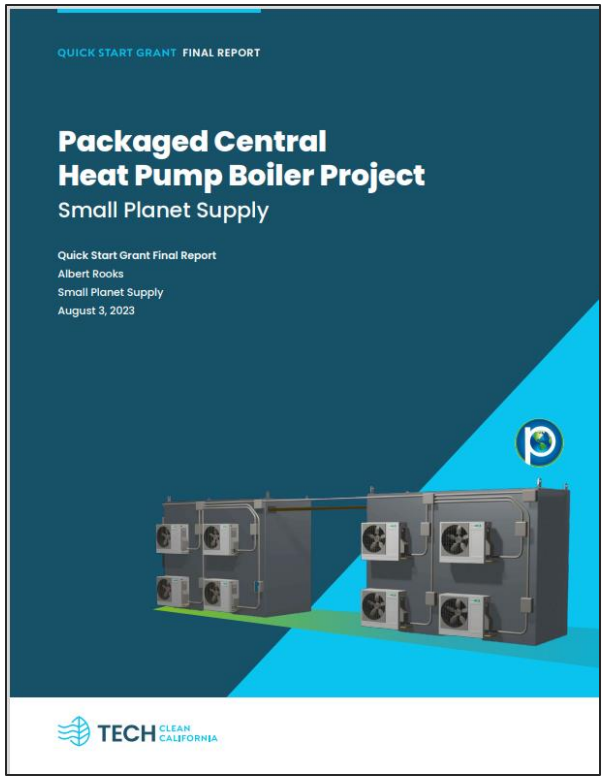
Quick Start Grants Webinar Series, Part 1

- Webinars on Quick Start Grants related to faster heat pump water heater installation were held June 24-26, 2023
- View final reports, recorded webinars, and slides at www.techcleanca.com/quick-start-grants









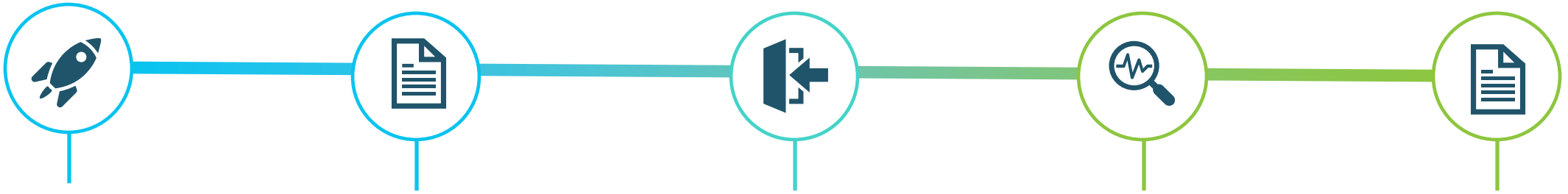
Quick Start Grants Webinar Series, Part 2

Expansion of outreach and electrification support to rural and Native American communities in Humboldt County

Career training and remediation of home health hazards or code violations in low-income West Oakland households through electrification

To be held in October 2023. Watch your inbox for an announcement!

Pilots and Quick Start Grants: Looking ahead



October 2023
Webinar and final reports on second group of completed Quick Start Grants

Winter 2023
Wrap up for Low Income (SJV), Streamlining Permitting;
Publication of initial Pilot Learnings report

January 2024
Webinar and final reports on third group of completed Quick Start Grants

Spring 2024
Second cohort of Quick Start Grant projects begin to wrap up and present results;
HPWH Load Shifting pilots

Summer 2024
Wrap up for Multifamily and Customer Targeting pilots;
Scaling Quick Start Grant and pilot lessons learned within TECH Clean California and beyond

8

Q&A

Summary and Next Steps

TECH Clean California Overview

- Publication of Annual Report focusing on Year 2 of TECH Clean California
- **Next stakeholder meeting: November 2023**

Program Design and Incentives

- Relaunched Multifamily incentives on June 13
- Launch statewide SF and MF HPWH incentives in late October
- Publish SGIP Heat Pump Water Heater-approved manufacturer training

Marketing

- Product Finder with TECH Qualified Products List (QPL)
- Resource Hub for Contractors
- Equity Community Outreach Plan
- Contractor Workforce Video Content

Evaluation

- Impact evaluation results from desk review and deemed savings review
- Updated Market Study Report with contractor and homeowner findings
- Analysis of TECH projects through July 2023

Pilots and Quick Start Grants

- **Webinar and final reports for the second group of completed Quick Start Grants**
- Publication of initial Pilot Learnings Report

Data Analysis

- **TECH Data Webinar on October 12** *(invitation to come)*

Thank You

For more information or to get involved, contact:

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Energy Solutions

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Association for Energy Affordability, Inc.

Building Decarbonization Coalition

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Appendix