

Quarterly Stakeholder Meeting

June 29, 2022



Welcome!

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

Presentation Guidelines:

- This is a webinar format, so please direct your questions to the Q&A feature. We will do our best to answer questions there during the presentation.
- 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 Incentives & Market Engagement

- 3 Marketing

- 4 Pilots & Quick Start Grants

- 5 Data Reporting

- 6 Q & A



Presenters



Evan Kamei
Energy Solutions



Rory Cox
CPUC



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Rebecca Rothman
BDC



Alison Seel
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Jess Kursman
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Jen Loomis
Opinion Dynamics

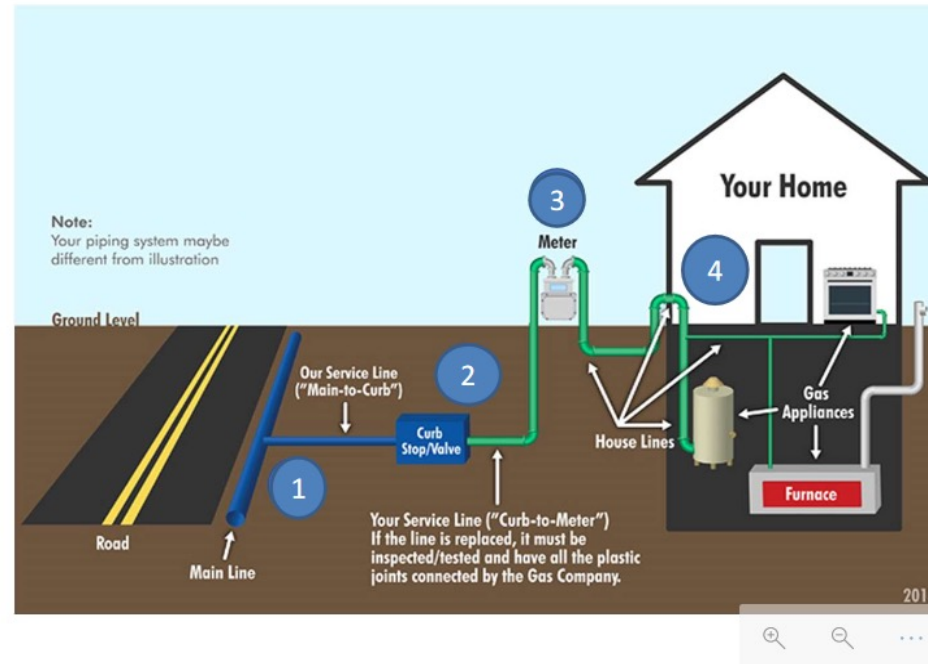


Mia Oppelstrup
Recurve

1 TECH Clean California Overview

Socialized Costs of Gas Line Extensions

- 1 Gas main extension
- 2 Service Lateral
- 3 Meter
- 4 In-house Gas Infrastructure
- 5 Other costs



- Total reported payments for Residential and non-Residential line extensions in 2020 = \$144,349,622 (mostly added to rate base rather than realized immediately)
- Staff proposal under consideration proposes elimination of these subsidies for residential and non-residential customers

Other Issues Under Review

- **Refrigerants**
 - Per CPUC decision, BUILD and TECH required to have only refrigerants that are <750 Global Warming Potential beginning 2023.
 - Due to industry concern, this policy is now being reviewed
- **Bill Impacts of HPWH's**
 - Data submitted by IOUs show increased bills for many customers
 - Data also indicate that this can be mitigated by units with higher (3.5 or above) UEF.

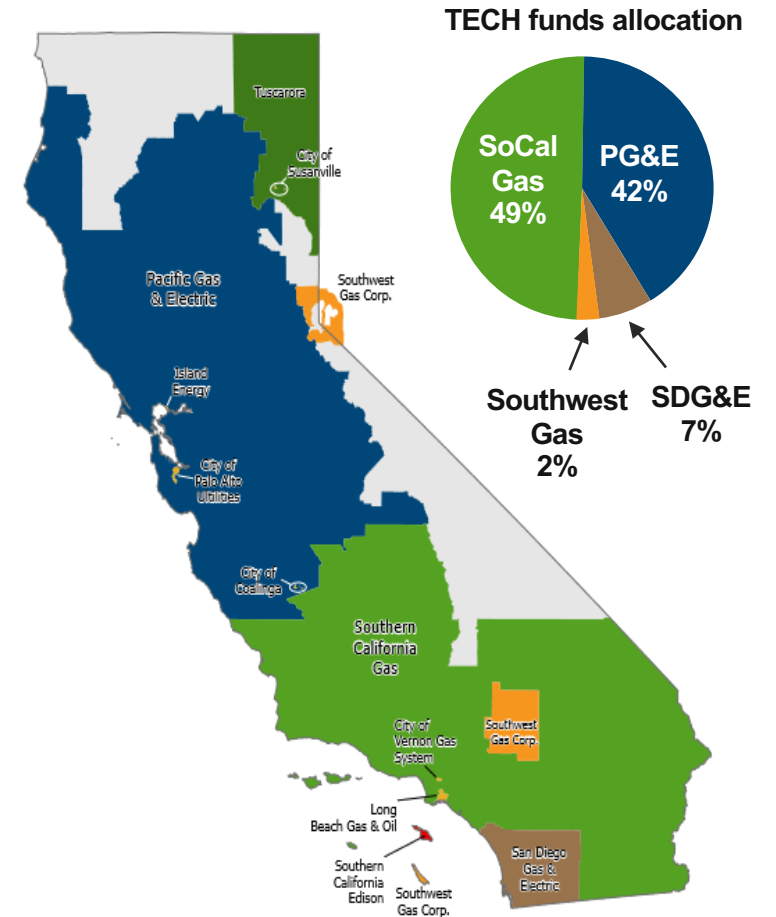
TECH Clean California Overview

What is TECH Clean California?

- CA's flagship heat pump market transformation initiative for space/water heating, designed to integrate and complement other existing offerings
- Purpose is to leverage a comparatively small initial investment to inform California's broader building decarbonization framework and future decarbonization investments
- Guiding principles of scale, equity, regulatory simplicity, and market transformation
- Funds are proportionally allocated by gas IOU territory

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

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



Map source: <https://cecgis-caenergy.opendata.arcgis.com/pages/pdf-maps>

TECH Team:



RECURVE

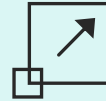


Tre'Laine

The 3 Pillars of TECH



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

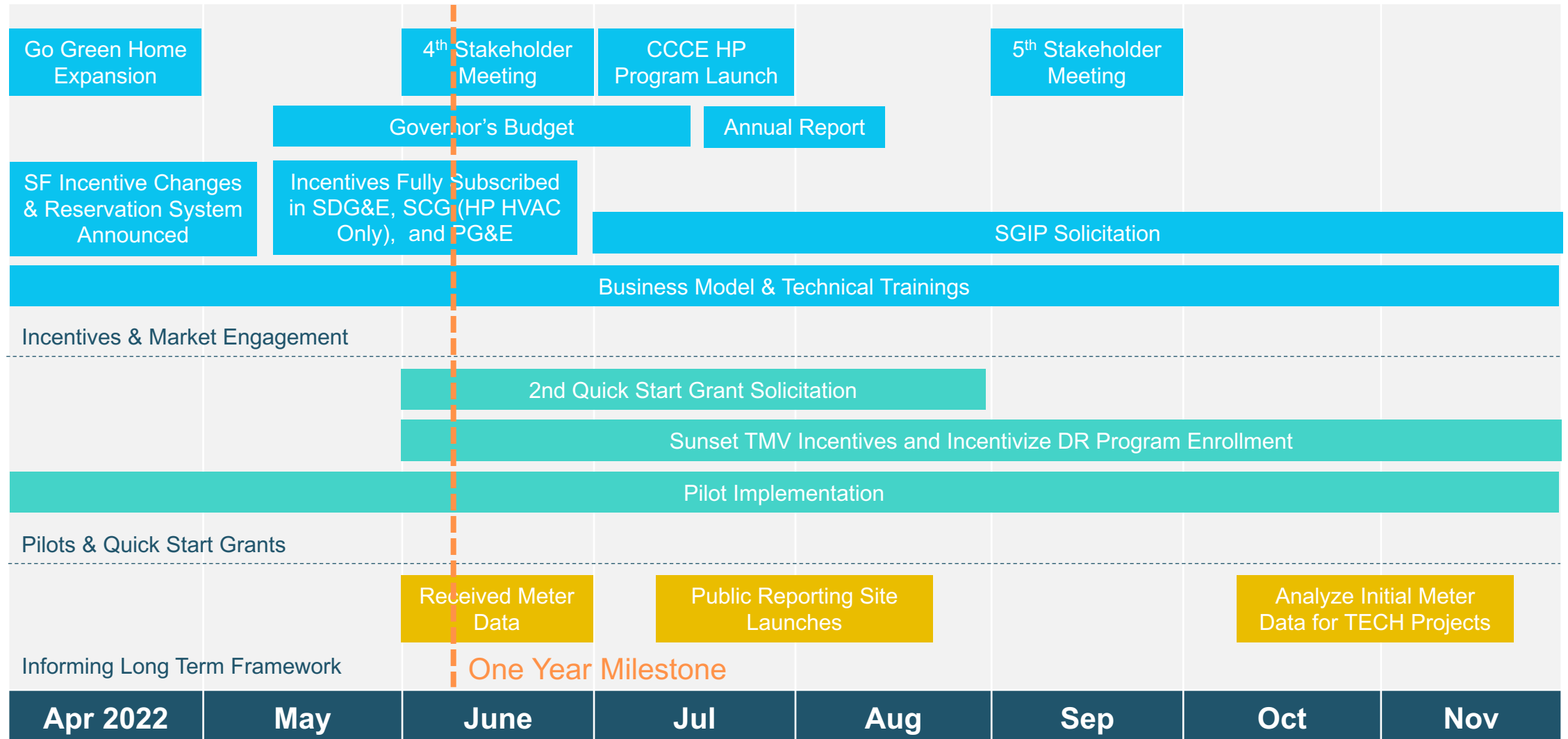


**Create scalable models
through regional pilots**



**Inform long-term building
decarbonization framework**

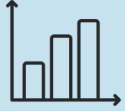
TECH Clean California Timeline



2 Incentives and Market Engagement

Market incentives and workforce education and training to make it easier and cost-competitive for contractors to sell and install heat pump technology.

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

Incentives

Goal: Generate statewide market engagement

Where We Are Now:

- Received an influx of participation and interest that can drive market transformation toward California's goals
 - Single family incentives are still available in **SW Gas (HVAC and WH)** and **SoCal Gas (WH only)**
 - Single family incentives suspended in PG&E and SDG&E territory
- Layer incentives, streamline participation process by integrating with existing heat pump programs and launching new programs
 - Launched new **CCCE Electrify Your Home** incentives using TECH Clearinghouse
 - **BayREN HPWH** Incentives still available through TECH Clearinghouse
 - **SMUD and CHR** incentives continue offering incentives



What's Next

- Focus on application processing and data accuracy
- Document lessons learned, refine incentive approach for existing/future incentives
- Continue refining TECH Clearinghouse to support additional future incentive opportunities

Market Engagement



What we've done:

- Enrolled **923** contractors, with **651** active participants
- Reduced active outreach to focus on supporting existing participants
 - A drop in enrollment coincided with SDG&E incentive suspension announcement
- Continued to engage HPWH manufacturer on enrollment in regions with remaining HPWH incentives

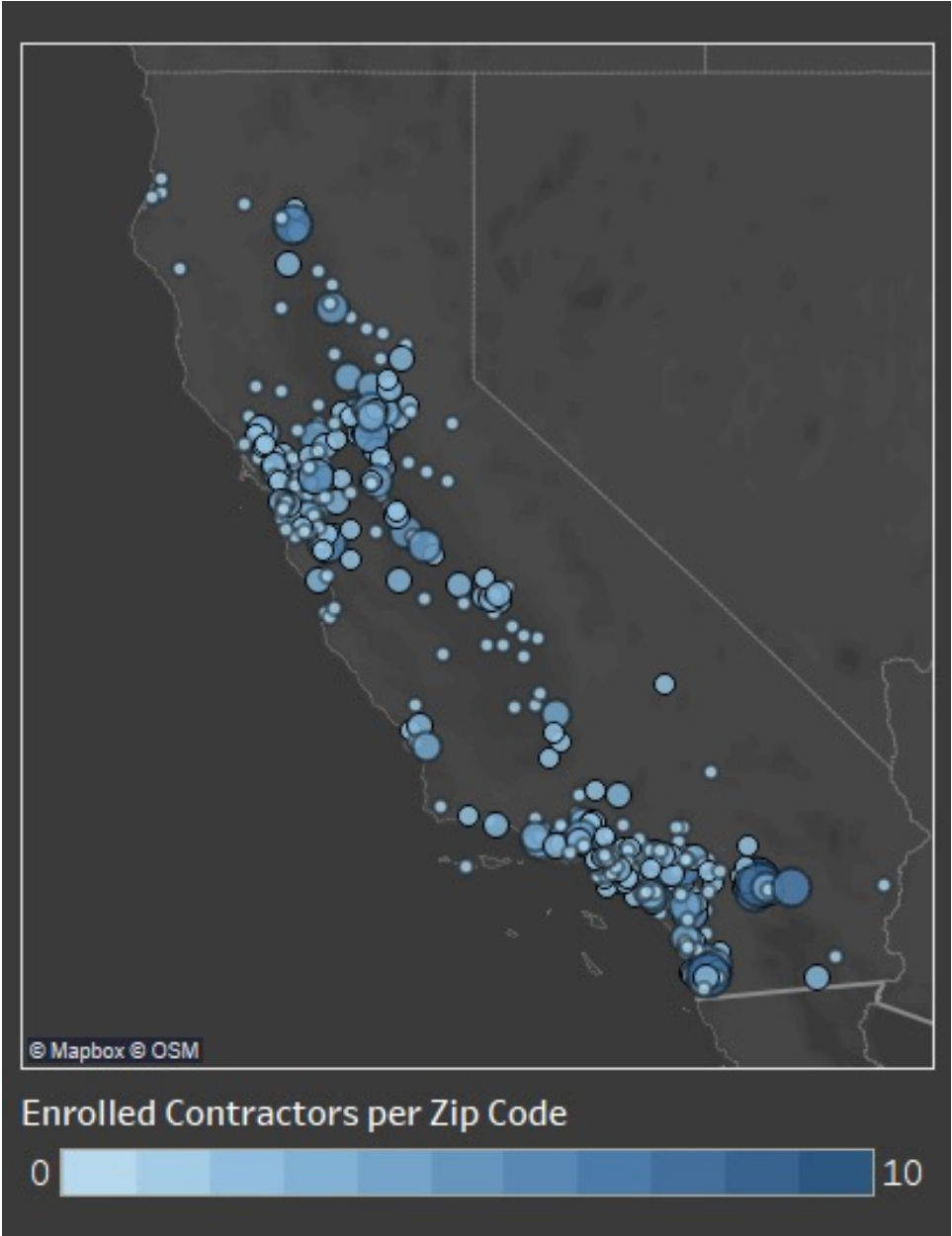
What's next:

- Support contractors through their remaining incentive applications
- Continue to provide value through non-incentive based activities
- Roll-out free HPWH to contractors offering

Contractor Enrollment

Major Region	Total Enrolled
Bay Area	123
Central Valley	60
Sacramento	92
Los Angeles	278
San Diego	81
Inland Empire	91
Statewide	3

Results as of 6/27/2022



Contractor Enrollment Breakdown

License(s) Held	TECH Capabilities	Count
B Only	HP HVAC, HPWH + Panel Upgrade	35
B + C20/C36		151
C20 Only	HP HVAC, HPWH	527
C20+C36		76
C36 Only	HPWH	29
C10 (+C20/36)	HPWH + Panel Upgrade	62

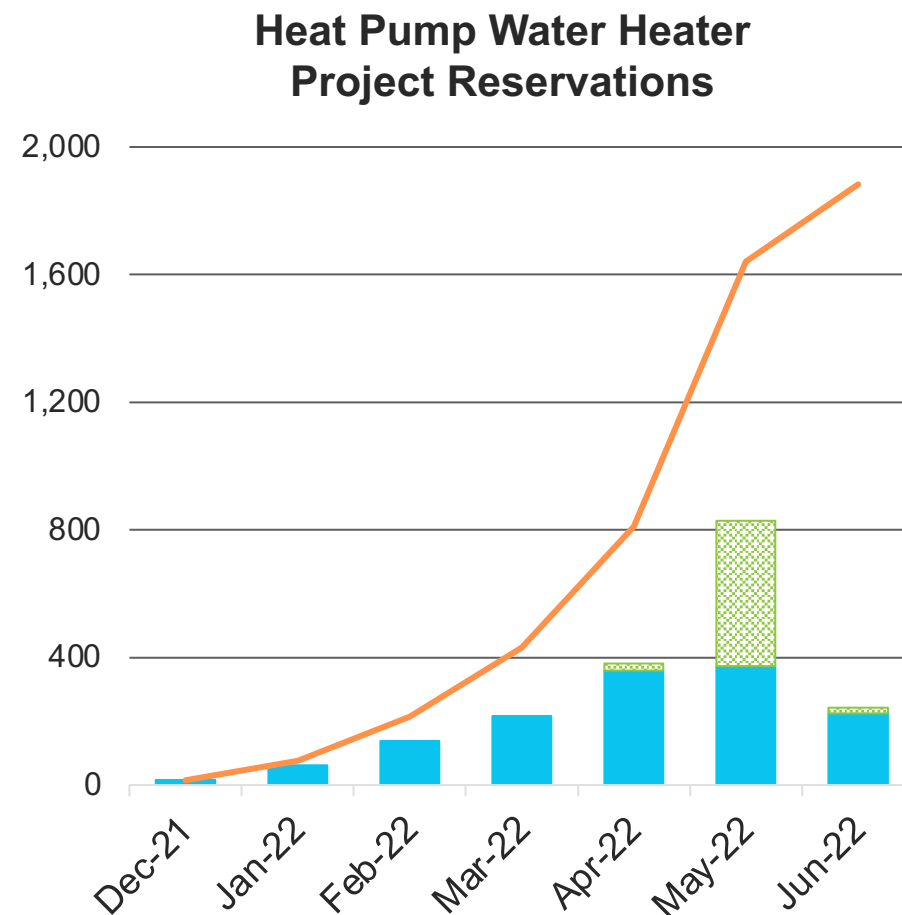
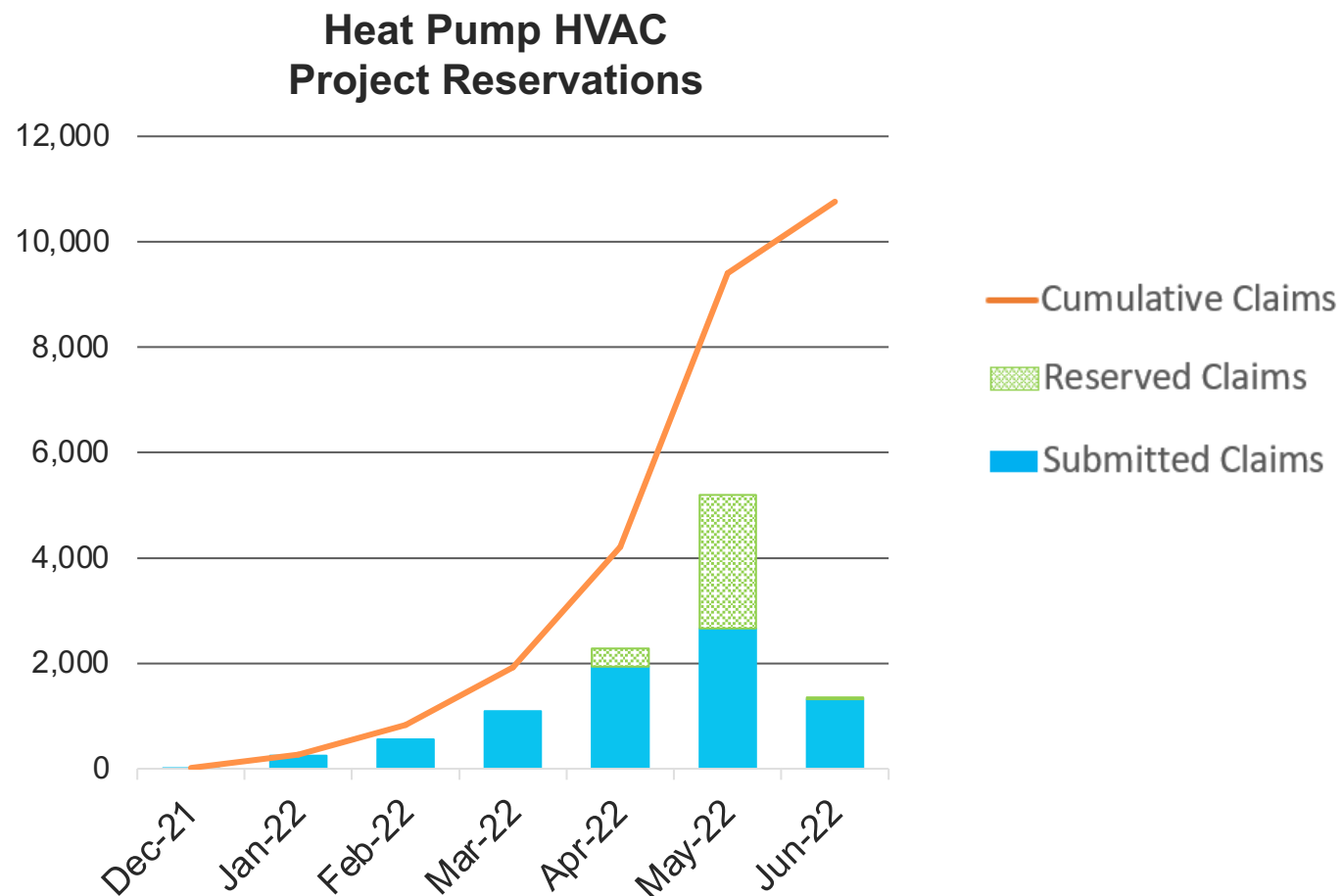
Program	# of Participants
HVAC	592
WH	57
Both	119

Total Submissions	Contractor Count
1-5	322
6-20	167
21-50	98
51-100	32
>101	30

Results as of 6/27/2022

Single Family Heat Pump Incentives

Even with May install rate, need ~6x increase participation to hit California's 2030 target of 6 million heat pumps!



Single Family Incentives

Why the switch to incentive reservation?

- Contractors were concerned they wouldn't be able to fully install/test projects prior to incentive reduction
- Reservation system ensures that assumed incentive amount would be available by the time the job was installed, preventing contractors from having to backout of existing contracts
- System remains in place for remaining funding (SW Gas and SoCal Gas HPWH), and will likely remain if future funding is secured (SB 1261)

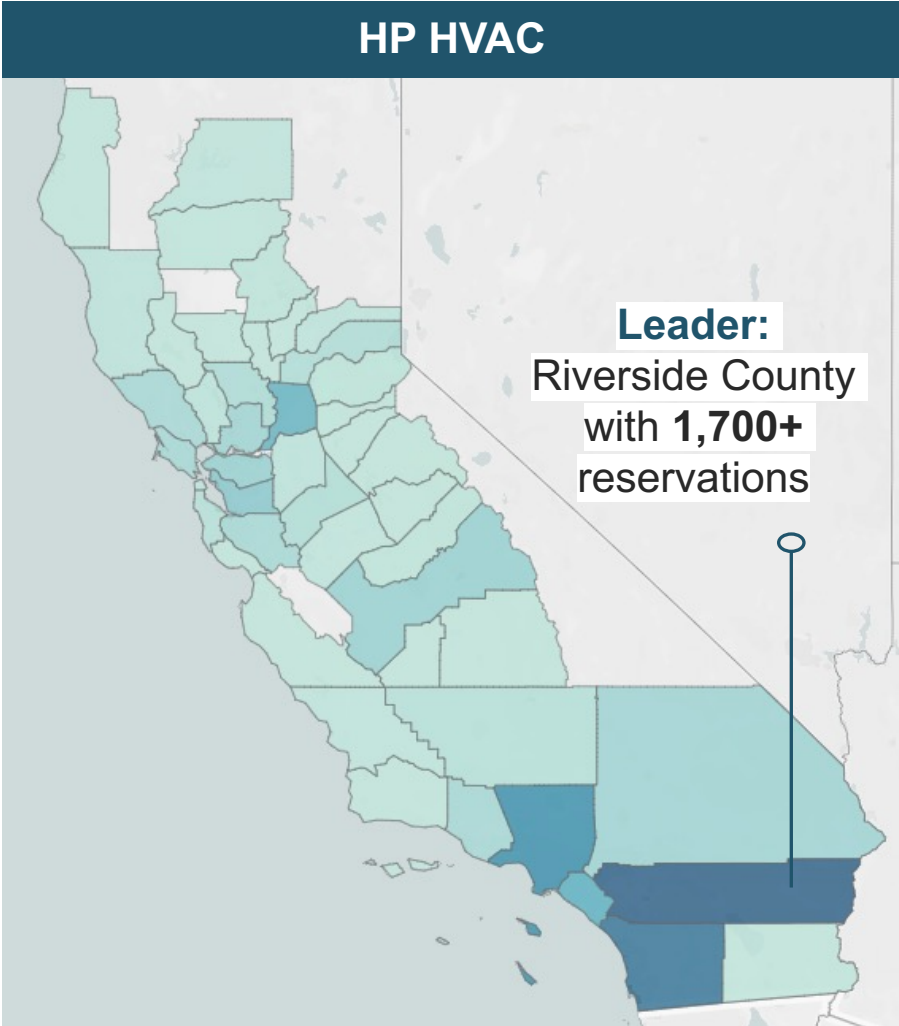
○ **April 13:**
SDG&E switches to reservation system

○ **April 26:**
Incentive reduction announced; SDG&E becomes fully subscribed

○ **May 6:**
Remaining territories switch to reservation system




○ **May 13:**
PG&E and SoCal Gas (HVAC) become fully subscribed

Participation by County (Single Family)

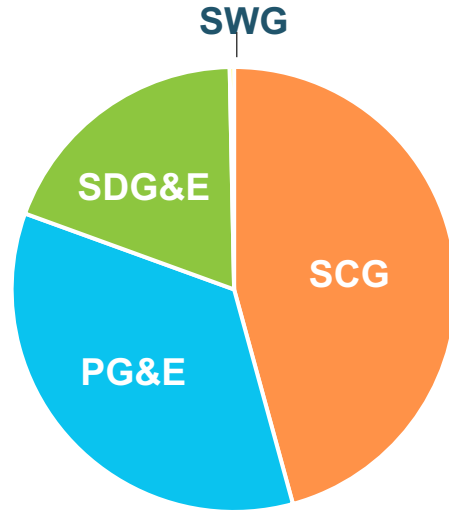


Results as of 6/1/2022

Single Family HVAC Incentives

-  **8,512*** units submitted
-  **\$23.9M** in incentives
-  **(+\$2.7M layered from other programs)**

*Additional ~3,100 units submitted for pre-install reservations



Efficiency	% of Total
< 16 SEER	28%
16 – 18 SEER	35%
> 18 SEER	37%

Furnace Setting After Install	% of Total
Decommissioned	87%
Setup as blower only	<1%
Emergency backup only	12%

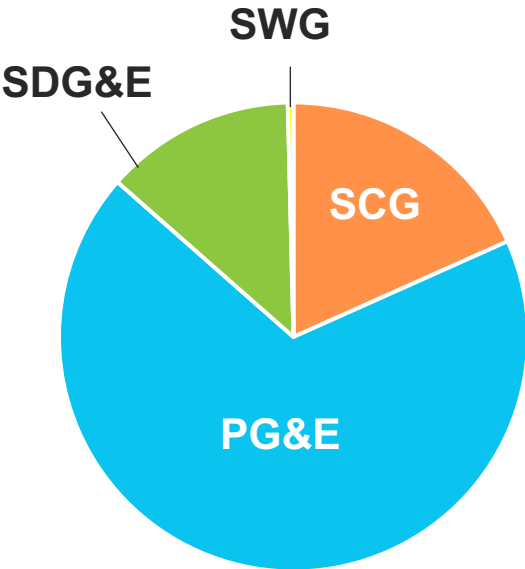
Installation Component	% of Total
Ducts sealed/replaced	15%
Manual-J completed	9%
Full system performance test	3%
Smart thermostat included	42%

Results as of 6/21/2022

Single Family HPWH Incentives

-  **1,176*** units submitted
-  **\$2.0M** in incentives
-  (+ **1.9M** layered from other programs)

*Additional ~350 units submitted for pre-install reservations



HPWH Capacity	% of Total
40	4%
50	65%
65	19%
80	12%

Previous Water Heater Fuel Type	% of Total
Natural Gas	95%
Electric Resistance	3%
Propane	2%

UEF	% of Total
3.00–3.19	1%
3.20–3.39	30%
3.40–3.59	27%

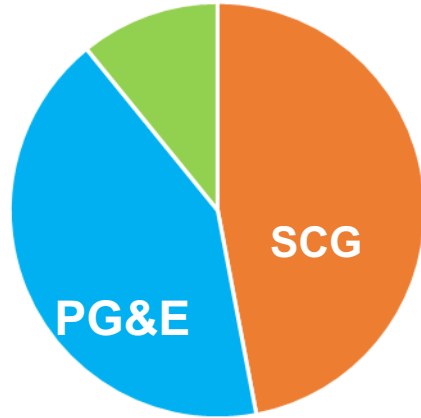
UEF	% of Total
3.60–3.79	20%
3.80–3.99	13%
4.00+	8%

Installation Component	% of Total
Thermostatic Mixing Valve	61%
Water Heater Upsized	63%
Panel Upgrade Required	8%

Results as of 6/21/2022

Multifamily Incentive Reservations

SDG&E



\$12,008,020 reserved
(\$4.8m on Waitlist)

Building Type	Percentage of Total Reservations
DAC	55%
Affordable Housing	56%

HPWH

Measure	Total Units Served	Properties	% of Total
In-apartment HPWH	2,389	25	20%
Central HPWH	3,709	42	31%

HVAC

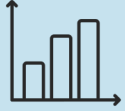
Measure	Total Units Served	Properties	% of Total
Individual apartment HVAC	4,672	44	39%
Central HVAC	204	3	2%

Electrical Upgrades

Measure	Total Units Served	Properties	% of Total
Individual Apartment Electrical Upgrades	974	20	8%

Results as of 6/24/2022

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

Holistic Approach to Workforce Education & Training

Goal: Drive meaningful and relevant activities that align with TECH objectives, leverage existing training infrastructure where possible, and support the needs of the industry, workforce, and consumer.

Our Focus:

1. Gap Filling

- Free technical and sales training, business model support, and field coaching for contractor firms
- Free multi-family & low-income training and business model support to contractor firms

2. Market Transformation Opportunities

- Collaborations and partnerships

“Contractors believe that training is essential to growing the heat pump space heating and cooling market.”

“Among the ten interview respondents who we asked about training opportunities, nine (90%) reported that they find value in training.”

– Opinion Dynamics Heat Pump Market Characterization Study

TECH Training – Year 2

TECH is focused on empowering contractors to communicate the features and benefits to customers while ensuring successful installation:

Electrify My Home (EMH)

(through December 2022)

- 2 additional in-person **Residential Space Conditioning & Water Heating Electrification** courses; 1 additional **Electrification Master Class** cohort session
- Electrification sales training continued to be key gap in training; extending helps fill the gap while we refine training for January 2023
- Cohort trainings are critical to informing how classroom training can be refocused/refined

“More than half of HVAC customers (52%) reported little to no knowledge about heat pumps compared to 39% of HPWH customers.”

– **Opinion Dynamics**
Customer Survey

National Comfort Institute (NCI)

(through December 2022)

- Replacing **Refrigerant-side Performance** with 2 courses focused on **equipment sizing practices**
 - *Advanced Load Calculations, System Sizing*
(TECH data showed only 9% of HVAC installs included sizing)
 - *Duct Redesign for Existing Homes*
- Added expense budget for ASHRAE 221 and Manual-J software purchases for class attendees, so they can continue to practice what they learn

Central HPWH Hands-On Training

Goal: Provide opportunity for all involved with multifamily project to get firsthand, in-depth look into central HPWH installation

- In process of selecting Central HPWH install site to be used in field demonstration training
 - Current eligible sites include 2 in Southern California, 1 in Central Coast and 1 in Central Valley
 - Geographic spread allows for stakeholders throughout the State to have a potential site to travel to
- Trainings potentially held in early 2023 (awaiting final installation date)



Photo credit: AEA

Market Transformation – Year 2

Goal: Focus on collaborations and partnerships to maximize the impact of WE&T activities across the industry.

- **CSLB** letter identifying appropriate HPWH installation classifications
- Presented at the annual **HVAC Excellence Conference**
- **SEI & 8 Community College HVAC programs** partnership — Outfit labs with HP technologies, provide curriculum support, assist students with employer connections
- **Energy Star Manufacturer Council (ESMAC)** partnership to develop and deploy manufacturer-delivered HPWH webinar trainings (Installation, service, maintenance, troubleshooting, and sales)
- **Regional training centers** partnership to outfit labs and mobile units with HPWH equipment to expand outreach and accessibility



3 Marketing



Purpose

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

Campaign Goals

EDUCATION

Drive awareness and educate consumers about electrification.

INSPIRATION

Encourage adoption of electric appliances over gas appliances.

SWITCHING

Support the process of switching to electric from beginning to end.

EQUITY

Building Awareness



THE SWITCH IS ON

- **Educating**
 - Website Traffic
 - Emails
 - Ambassadors
- **Inspiring**
 - Articles
 - Social Media
 - Ambassadors
- **Switching Support**
 - Incentive Finder
 - Find a Contractor
 - Financing Options



INCENTIVE LOOKUP FOR CUSTOMERS

BUILDING TYPE ▼

☐ SINGLE-FAMILY

EQUIPMENT TYPE ▼

- ☒ HEAT PUMP WATER HEATER
- ☐ INDUCTION RANGE
- ☐ MINI-SPLIT HEAT PUMPS
- ☐ CENTRAL HEAT PUMPS
- ☐ HEAT PUMP DRYER
- ☐ INSULATION AND DUCTWORK
- ☐ AIR SEALING
- ☐ SMART THERMOSTAT
- ☐ WHOLE HOUSE FAN

INCOME QUALIFYING? ▼

☐ NO

WHO CAN APPLY? ▼

- ☐ CONTRACTORS
- ☐ HOMEOWNERS
- ☐ RENTERS

94607

Home Function ▼

SEARCH

CLEAR ALL

SEARCH

for local California incentives by location, specialty and more.

CONNECT

directly with trusted contractors, no middle-man.

ENJOY

the benefits of your eligible rebates and incentives.

(-) HEAT PUMP WATER HEATER

3 Incentives Available For 94607



Local Governments Empowering Our Communities

Save \$1,000 Per Unit - Rebate On Heat Pump Water Heater

REQUIREMENTS

Must use participating contractor and \geq 3.1 UEF

GET REBATE

LEARN MORE

WHO CAN APPLY



Contractors



Save \$450 Per Water Heater - Rebate On Heat Pump Water Heater

REQUIREMENTS

Removal of gas powered water heater

GET REBATE

Enhanced Incentive Finder

- Customer and Contractor user experiences
- Search filters
- New incentive profile pages
- Better administrator functionality

Current Reach



THE SWITCH IS ON

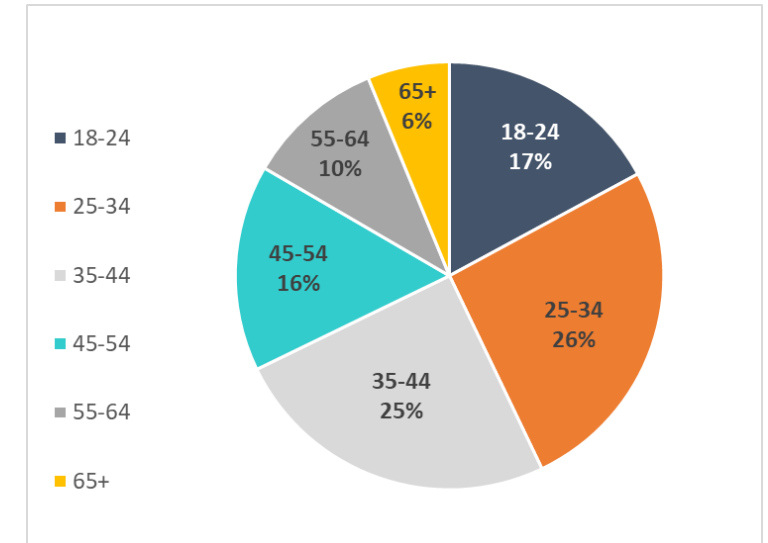
Location

1	Los Angeles (26,627)	6	Fresno (3,120)
2	San Francisco (10,729)	7	Bakersfield (2,081)
3	San Jose (5,898)	8	Long Beach (1,983)
4	Irvine (5,654)	9	San Diego (1,837)
5	Sacramento (3,120)	10	Oakland (1,461)

Reflections

- Translate other resources
- Consider strategies for expanding reaching to 55+
- Cities with largest population have the largest traffic (except Irvine), consider paid media and ambassadors where this trend does not hold true
- Paid media is effective at generating traffic

By Age Group



Top Languages

1	English
2	Spanish
3	Chinese
4	Korean
5	Vietnamese

Paid Media

Top Driver of April & May traffic increases

Google Display & YouTube Ads Performance:

- Impressions: 15M
- Clicks: 106k

Running through early September in

- 9 Bay Area Counties
- SCE Territory
- LADWP Territory
- San Joaquin Valley
- Central Coast (starting soon)





My Experience Going Electric

By Diane Bailey

[→ READ MORE](#)



What's a Good Ancestor, and How Can I Be One?

Geoff and Bev Ainscow

[→ READ MORE](#)

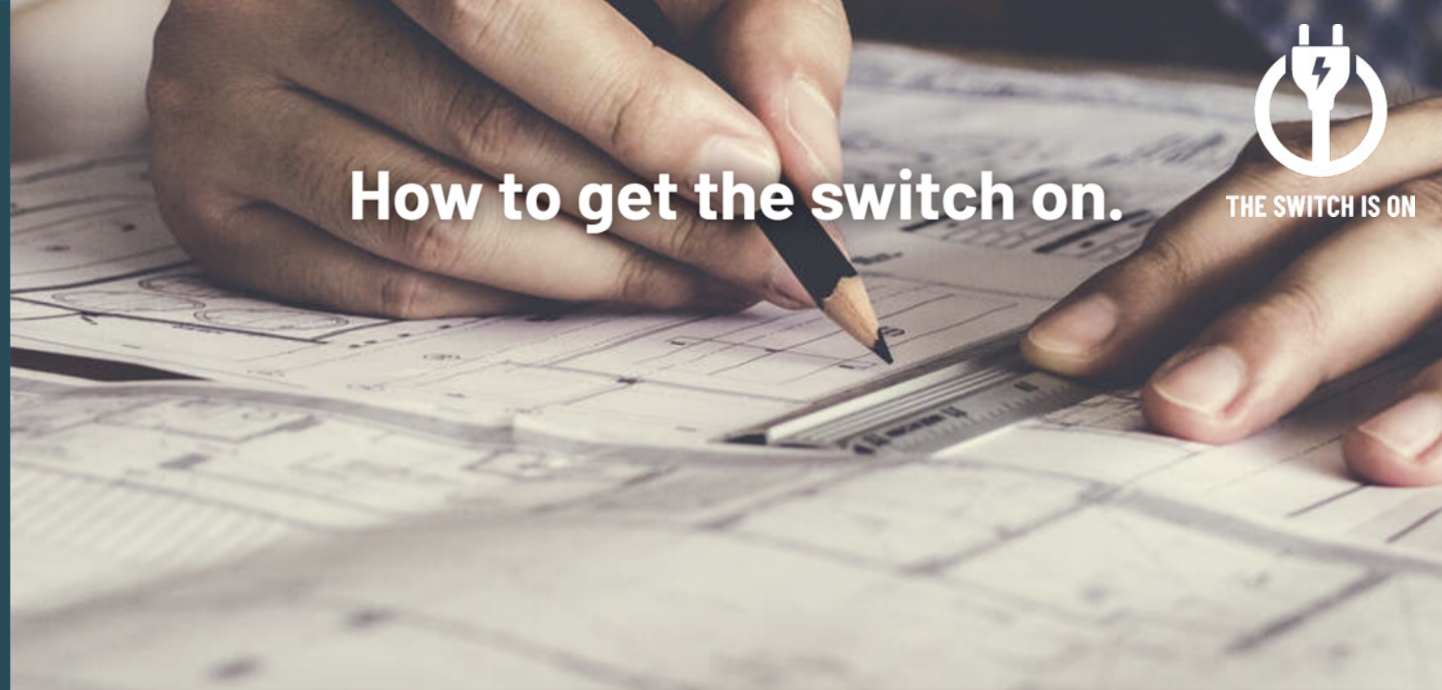


Ambassadors in Action

(140 individuals + a few organizations)

Continuous Improvement

- Incentive Finder Enhancement ✓
- Financing Options page ✓
- Contractor Survey ⌚
- Translating Flyers ⌚
- Tabling Resource Package ⌚
- Switchison.org UX Review ⌚
- Be an Ambassador page ✓
- Retail Pilot 💡



How to get the switch on.



THE SWITCH IS ON

Did we mention there are rebates to help drive down the cost of installing your new electric appliances? Simply input your zip code below and search for incentive programs available in your city. You can also find a list of prescreened contractors.

Moving to all-electric living means that solar may make even more sense with your home. You can also contact a local solar contractor to learn more about how you can make the most of electric.

If you own your home, there may also be tax credits available. Contact your tax specialist or [find out more](#) about tax credits that may apply to you.



FIND REBATES

FIND CONTRACTORS

[Liability Limitations](#)

9 Rebates Found for 94501

Intermission

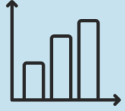


4

Pilots & Quick Start Grants

Regional pilots testing scalable solutions to market barriers, and Quick Start Grants for strategically important installations that will help scale adoption.

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Quick Start Grants: 2022 Projects



Enabling Faster Installations

Barnett Plumbing, Loaner Water Heaters for Emergency Fuel-Switching
Small Planet Supply, Parkside Apartments HPWH
New Buildings Institute, 120V HPWH Field Test
IHACI, Virtual Technician Software Platform

Making Programs More Inclusive

Redwood Coast Energy Authority, Air Source Heat Pump Incentives for Unregulated Fuel Customers
Franklin Energy and MCE, Augmentation of Income-Qualified Electrification Program

Reducing Energy Costs

The Energy Coalition, Basset Avocado Heights Advanced Energy Community HPWH
AESC, Interactive Impacts of HPWH in Manufactured and Mobile Homes

Innovation for Hard-to-Reach Housing

BlocPower and City of San Luis Obispo, Better Buildings SLO Pilot
Revalue, Green and Healthy Homes
USGBC-LA, Electrification in Green and Affordable Homes Program

Quick Start Grants: 2023 Solicitation Now Open

Successful applications will clearly demonstrate that the project:

- Tests a solution to a barrier to residential building decarbonization, *especially barriers for market segments that face formidable barriers or that have been historically underserved*
- Has the potential to expand into a statewide approach
- Can be implemented within 12-16 months, starting in January 2023

Award amount:
Up to \$350,000
per award

Number of grants:
6 – 12

Application period:
May 31 – July 31, 2022

Learn more and register for upcoming trainings at energy-solution.com/tech-qsg

Send any questions to tech.pilots@energy-solution.com by June 30, 2022



Regional Pilot Updates: Inclusive Utility Investment Program

Pilot Objective: Launch program with partner utility to expand customers' access to up-front capital

June 2022 Update:

- Partner CCA Silicon Valley Clean Energy
- Program would install 500 HPWH and 500 HP HVAC systems in high energy use households
- Awaiting approval in CPUC Clean Energy Finance Proceeding in November 2022
 - Next comment round in this proceeding due June 29
- Implementation could begin in Q1 2023

Regional Pilot Updates:

Low Income Integration Pilot

Pilot Objective: Collaborate with low-income retrofit programs to incorporate heat pumps into existing offerings

June 2022 Update:

- 13 home remediations enabling heat pump installations have been completed in the San Joaquin Valley (and growing)
- Pilot team discussing collaboration opportunity with PG&E Energy Savings Assistance (ESA) program. TECH would provide:
 - Outreach materials and training to ESA contractors
 - Funding for home repairs necessary to convert electric resistance water heaters to HPWH





Photo credit: AEA

Regional Pilot Updates: Multifamily Pilot

Pilot Objective: Provide deep technical support in building system design to reduce perceived risk of heat pump systems

June 2022 Update:

- Continuing to sign up properties for all three pilot tracks (Portfolio Roadmaps, Electrification Readiness plans, and Central Heat Pump Water Heater technical support)
 - Learn more here: <https://energy-solution.com/tech-incentives/multifamily/>
- Beginning monitoring for first installed CHPWH project
- Expanding outreach for pilot participation to include unrepresented geographies, ownership structures, building types, etc.

Regional Pilot Updates:

HPWH Load Shifting Pilot

Pilot Objective: Influence contractors as key actors to maximize HPWH load shifting

June 2022 Update:

- Over 150 contractors watched load shifting training video
- Thermostatic mixing valve incentives ended June 20th
- Currently: \$50 bonus incentive available to contractors who enroll contractors in demand response programs:
 - PowerMinder
 - WatterSaver
 - Ohm Connect
- Other DR programs can reach out if interested in participating to tech.pilots@energy-solution.com





Regional Pilot Updates: Streamlining Permitting

Pilot Objective: Design and test process for code-compliant, One Day HPWH permit, and support broad use and regional permitting consistency

June 2022 Update:

- Began working with City of Pleasant Hill as implementation partner for the permit guidance package
- Seeking second partner jurisdiction in Silicon Valley Clean Energy territory
- Developing load calculation form to be hosted by Pleasant Hill permitting website
- Tracking where existing resources are being used

Regional Pilot Updates:

Customer Targeting

Pilot Objective: Identify and engage customers who can benefit most from heat pumps

June 2022 Update:

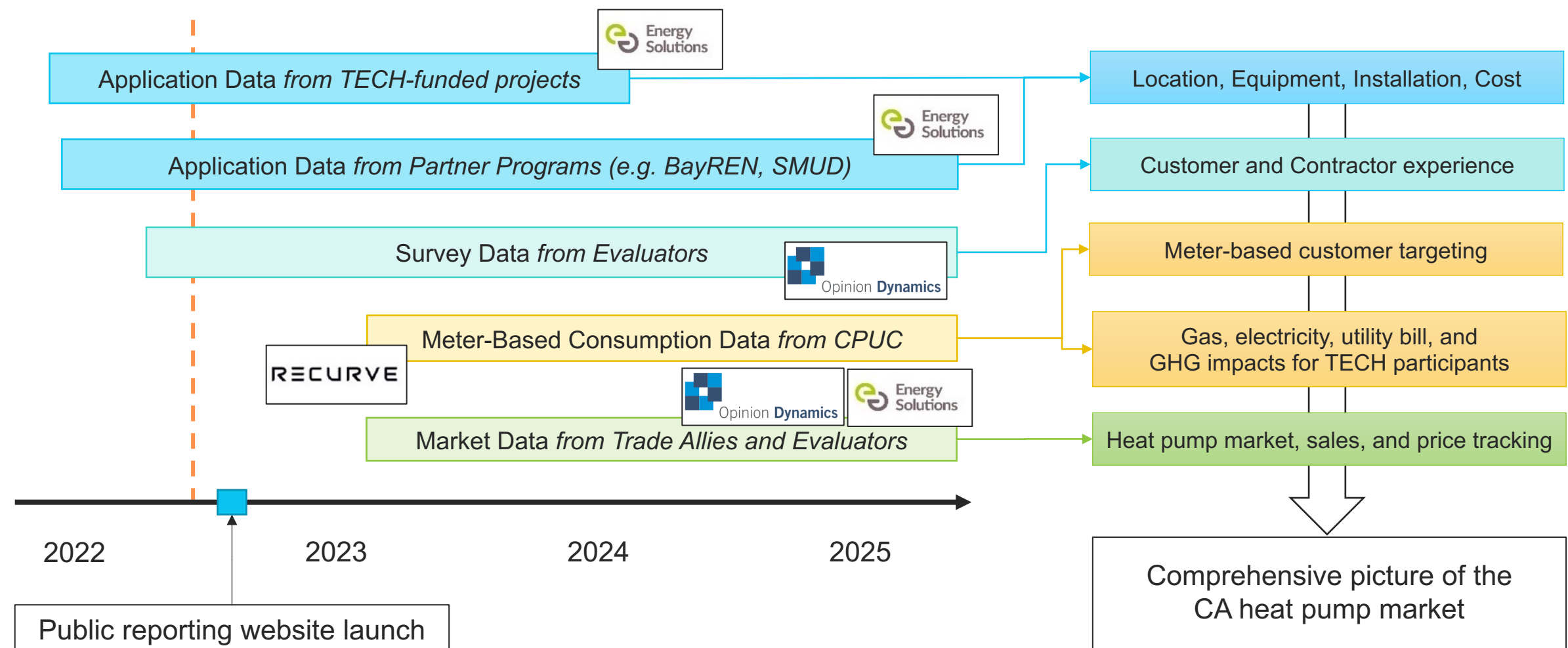
- Recurve analyzing SCE customer data to identify good HP HVAC candidates based on evidence of high A/C use
- Email campaign to test targeted vs. general outreach approaches to begin mid-summer 2022



5 Data Reporting

Gather, combine, and publish critical data to inform future programs and policies

TECH Data Timeline



TECH Public Reporting Website – Preview

Expected launch: July 2022



TECH WORKING DATA SET

The TECH Working Data Set provides anonymous data gathered from TECH incentive applications and qualified product lists. This data is provided on a per-installation basis, so each row in this dataset represents a unique installation of either a heat pump water heater or a heat pump space heater. Data fields provided for each installation include: gas utility service territory, California Climate Zone, disadvantaged community status of the install site, information on the installed and replaced equipment, installation cost, incentives and financing utilized, and quality installation measures performed by the installer.

[Download Dataset](#)
[Data Key](#)
[Read Me](#)

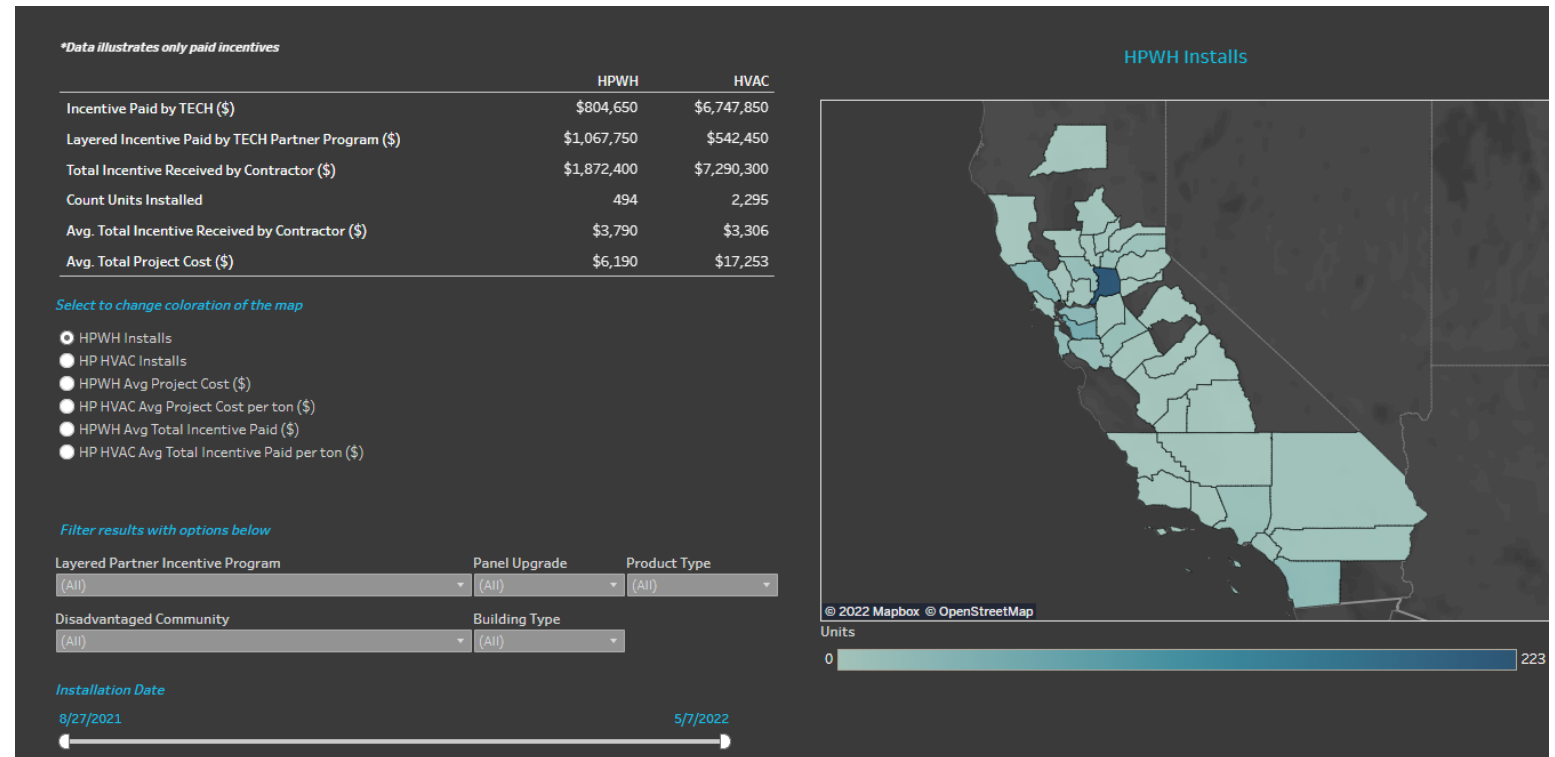
GHG IMPACTS DATA SET – Coming Soon

The GHG Impacts Data Set provides anonymous meter-based gas and electricity consumption data for California residents who installed a piece of technology that received a TECH incentive.

BUDGET REPORT

The Budget Report summarizes where and how TECH incentive budget has been utilized throughout the state of California to-date. The Budget Report breaks down TECH incentive spending by building type (single family or multifamily), technology type (heat pump water heater or heat pump space heater), disadvantaged community status (DAC or non-DAC), and gas investor-owned utility (IOU) service territory (Southern California Gas, Pacific Gas & Electricity, San Diego Gas & Electricity, and Southwest Gas).

[Download Report](#)



Major Data Sources as of June 2022



Incentive Application Data

Current dataset

- By July: 5,000 fully paid single-family HPWH and HVAC projects
- This year: 10,000 SF units and 3,000 MF units

Final unit counts

- TECH single family: ~15,000
- TECH multifamily: ~7,000
- Additional datasets from ESA, BUILD, SGIP*: +25,000 units



Customer Surveys

Current dataset

- Over 450 HP HVAC customers
- Over 130 HPWH customers
- Surveys continue biweekly as TECH customer count increases

Future iterations

- Follow-up surveys of customers after several months using HP
- Contractor surveys to gauge experience with heat pumps and TECH



Electricity & Gas Meter Data

Current dataset

- Where: all residential meters in 5 major IOUs + SMUD + LADWP
- What: gas + hourly electricity consumption Q1 2018 - Q1 2022

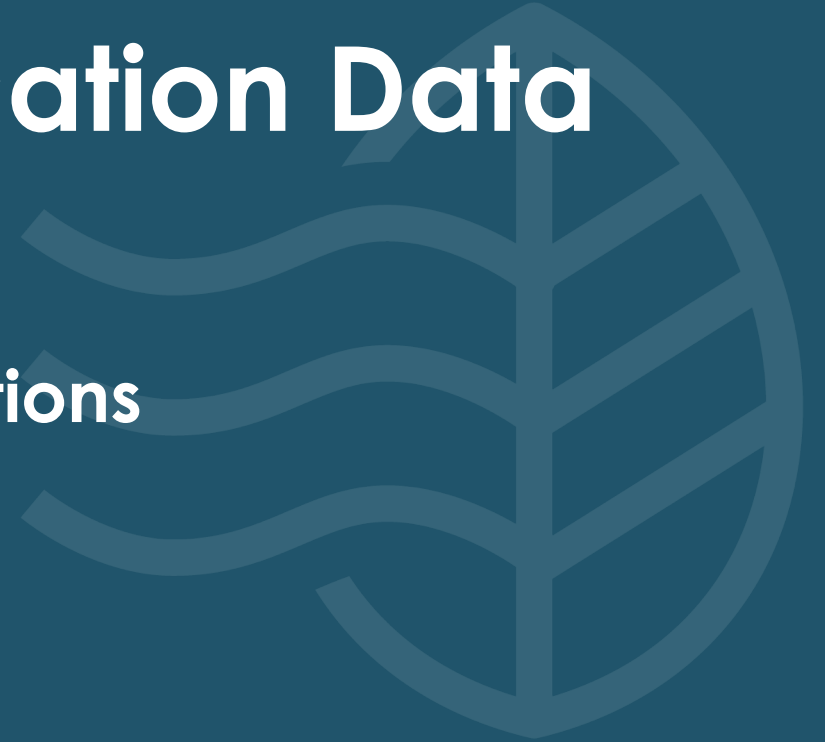
Timeline

- Shared with TECH implementer through June 2027
→ Quantify multi-year impacts for all TECH participants

* Energy Savings Assistance program, Building Initiative for Low-emissions Development, and Self-Generation Incentive Program

Incentive Application Data

Presented by:
Jess Kursman, Energy Solutions



Customer Survey Data

Presented by: Jen Loomis, Opinion Dynamics

Evaluator of the TECH Clean California initiative





Opinion **Dynamics**

TECH: SINGLE FAMILY POST- INSTALL SURVEY FINDINGS



June 29, 2022



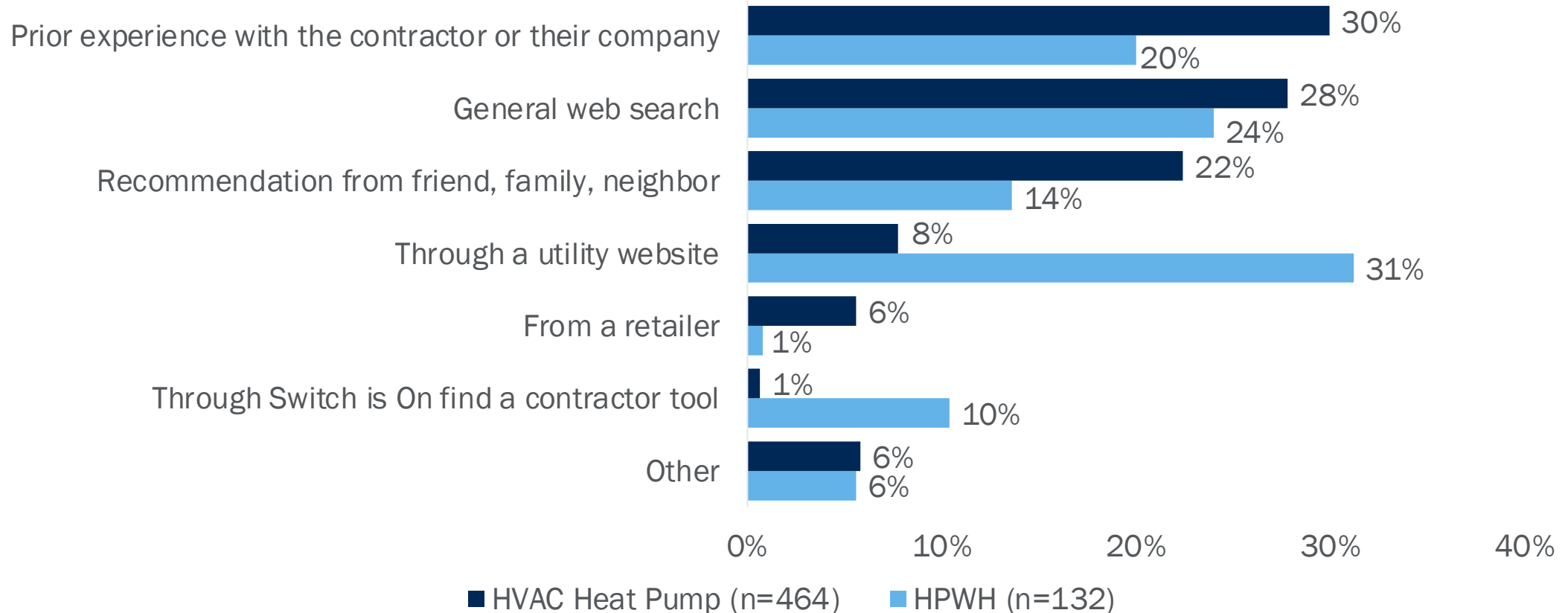
Methodology

- Surveys with single-family homeowners who received a TECH-incented heat pump
- Purpose was to understand decision-making, and gauge satisfaction with contractor and installation
- Findings reflect installs between December 2021 and April 9th, 2022
 - 464 HVAC customers (1,766 emails sent, RR of 26%)
 - 132 HPWH customers (410 emails sent, RR of 32%)



Finding a Contractor: Differences between HVAC & HPWH

- **HVAC:** more through existing relationships
- **HPWH:** more searching online



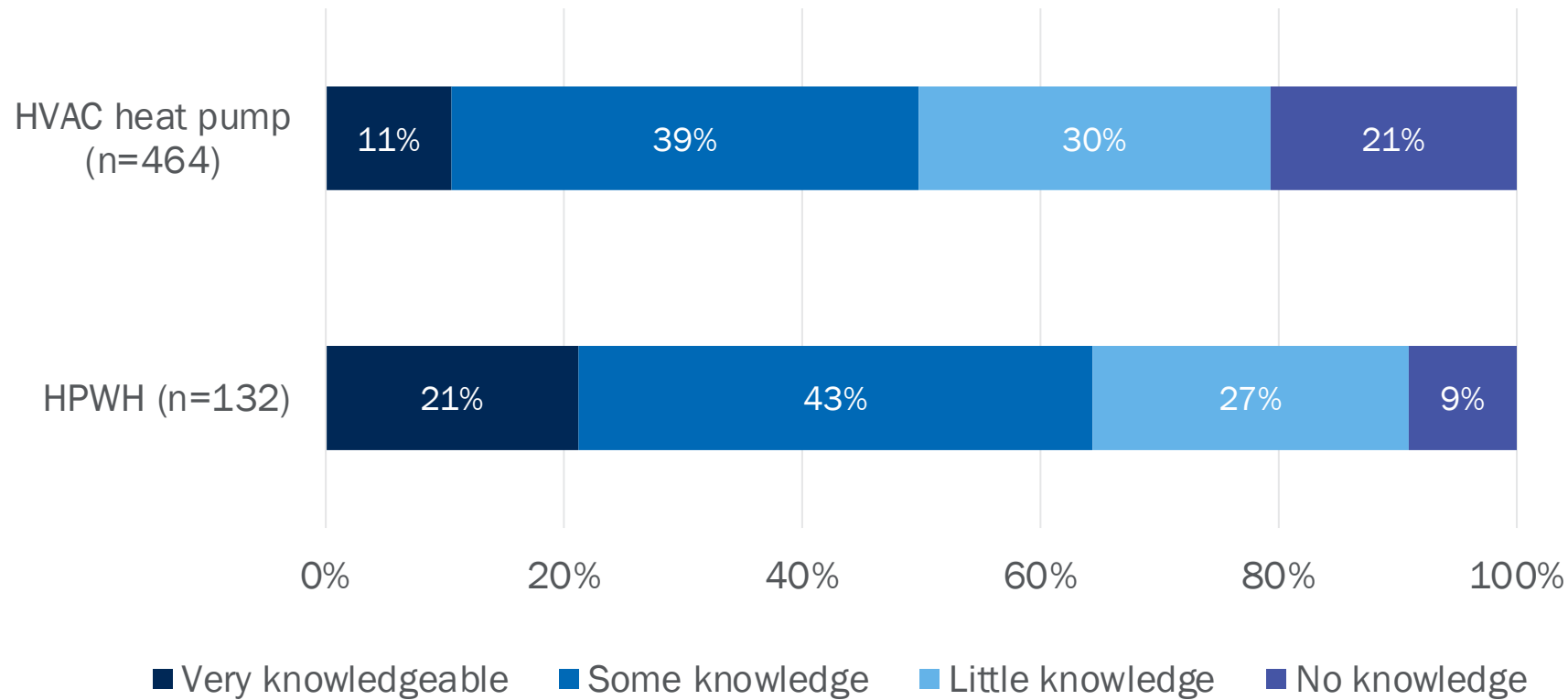
Motivations for Installation

- HVAC more likely looking to **replace old equipment** that was functioning poorly or not at all
- HPWH more likely to be **exploring new options** while their existing equipment was still functioning well
- HPWH more likely to contact contractors to electrify or **reduce the carbon footprint** of their homes

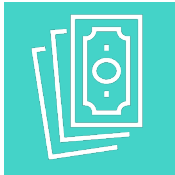
Reasons for Reaching out to Contractor	HVAC Heat Pump Customers (n=464)	Heat Pump Water Heater Customers (n=132)
My existing equipment was old or not functioning well	50%	24%
My existing equipment was broken, and I needed to replace it	20%	20%
My existing equipment was functioning, but I wanted to explore options for new equipment	18%	36%
I was doing an addition and needed to add new equipment	4%	1%
Wanted to remove fossil fuels/reduce carbon footprint/ electrify home	1%	12%
Other	7%	7%

Customer Knowledge of Measures Varied

Half of HVAC heat pump homeowners had at least **some knowledge** of their equipment, compared to two-thirds of HPWH heat pump respondents.



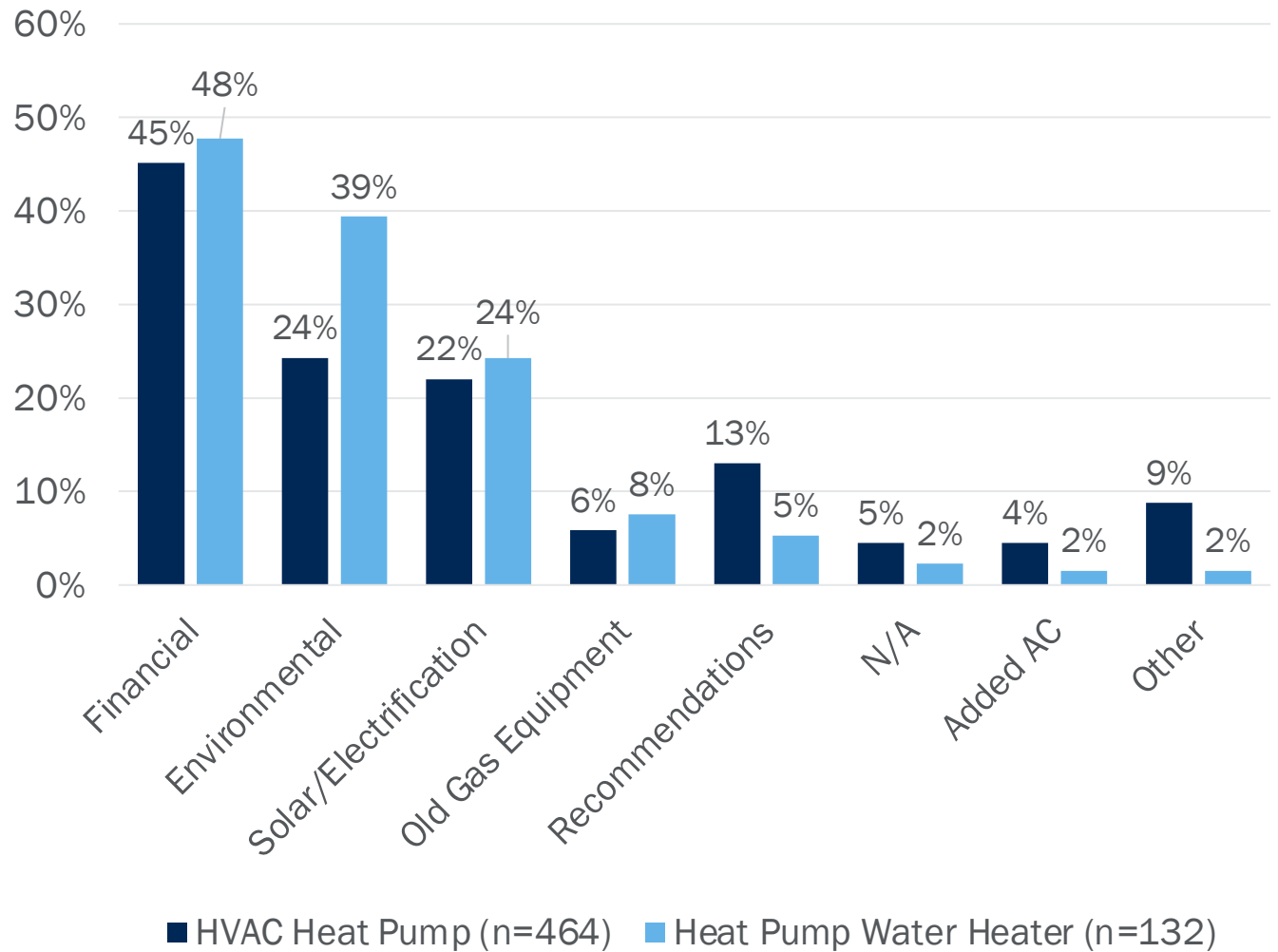
Customer Decision-Making – Open-Ended



Financial benefits were the main reason they went with a heat pump (TECH incentive, energy savings, energy efficiency)

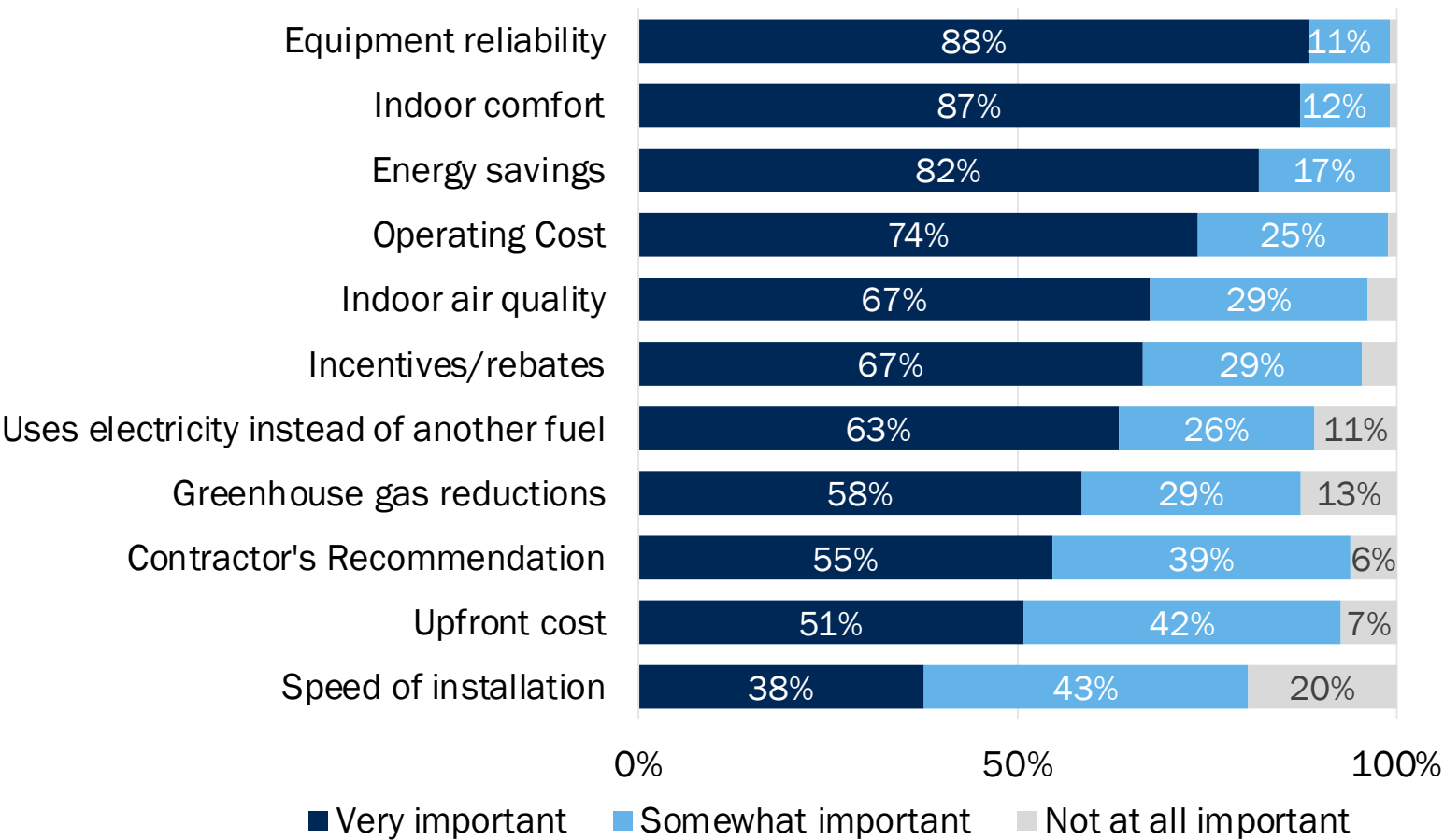


Environmental reasons and the desire to complement existing/future **solar installations** rounded out the top three reasons



Customer Decision-Making – Specific Factors for HVAC HP

Importance of Factors - HVAC Heat Pumps (n=464)



HVAC respondents still rated **financial benefits** such as energy savings, operating costs, and incentives highly



Other factors like **equipment reliability, indoor comfort, and indoor air quality** were also important

Customer Decision-Making – Specific Factors for HPWH

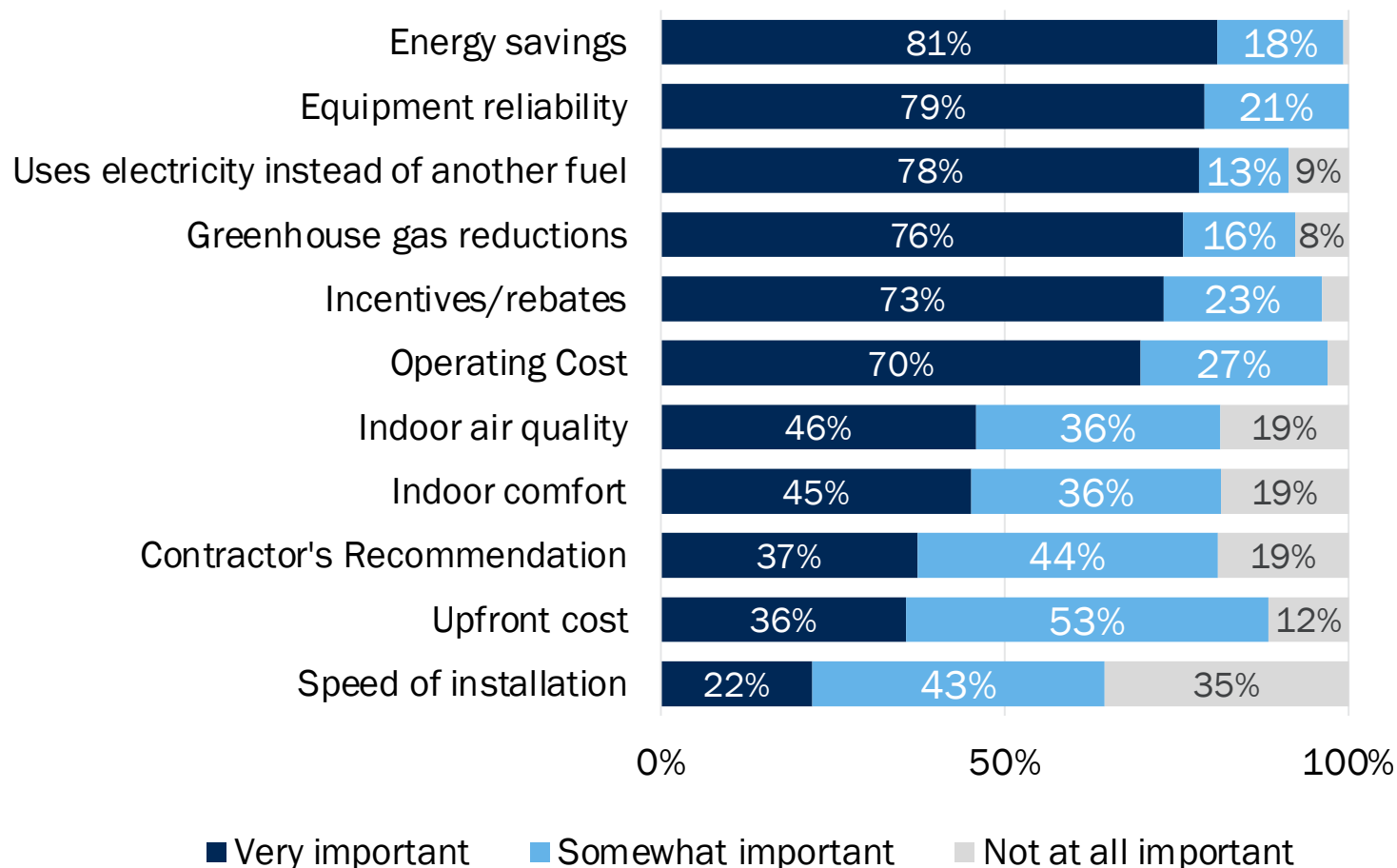


Other than financial and environmental factors, HPWH customers also emphasized that the **HPWH uses electricity**



Consistent with HVAC, **speed of install and upfront cost** least important factors

Importance of Factors - Heat Pump Water Heaters (n=132)



The TECH incentive was influential

Financing

A minority financed their project

- One-quarter of HVAC customers used financing
- Fewer (9%) HPWH customers financed their project



Incentive

For 93% (555 of 596), the incentive was at least somewhat important in their decision to get the heat pump

- 39% of HVAC customers (167 of 430) were either unlikely or would not have purchased a heat pump without the incentive
- 59% of HPWH customers (77 of 125) felt the same way



Customer Generally Very Satisfied with Contractors

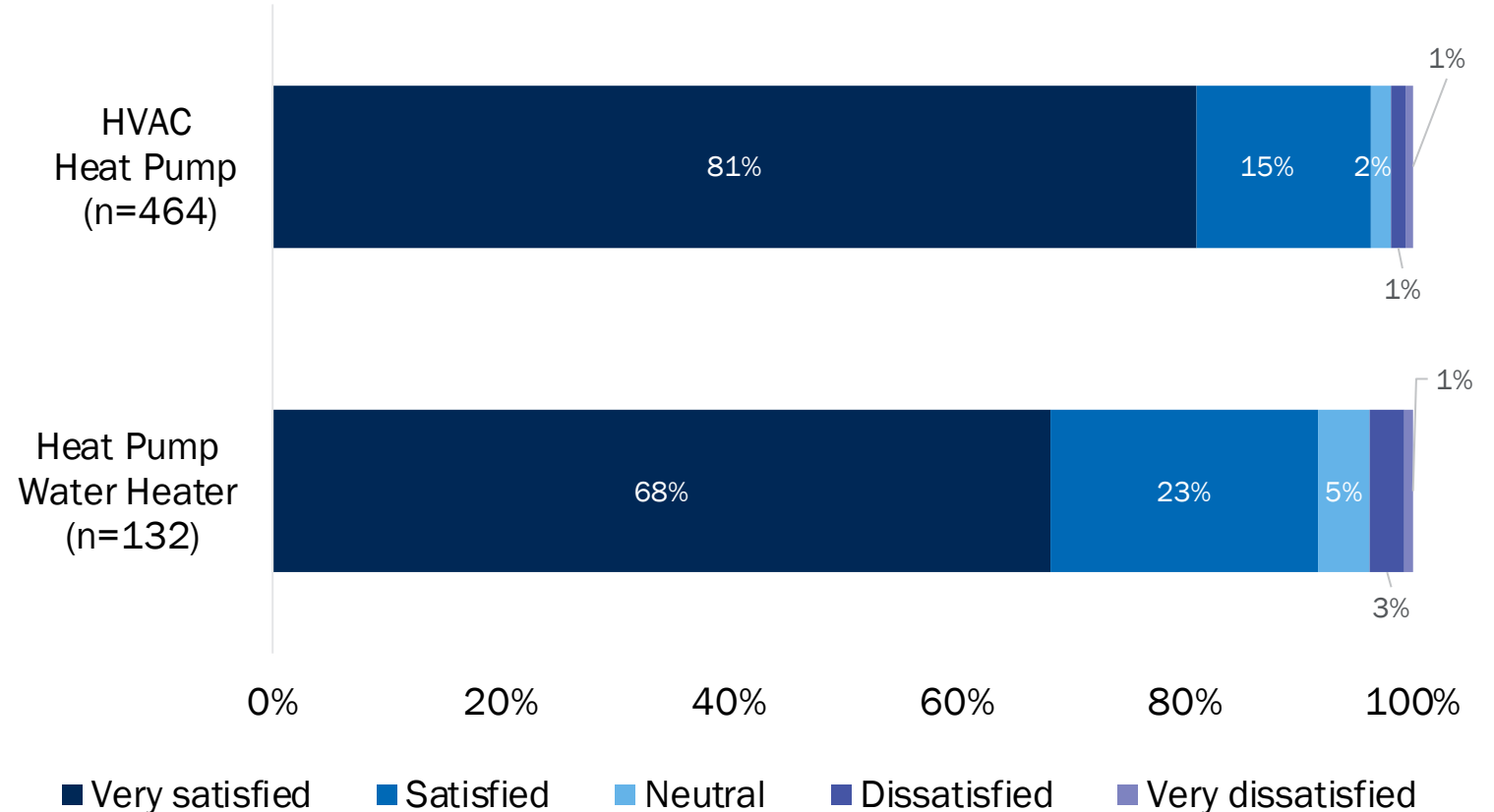


Fewer than 5% of respondents were dissatisfied or very dissatisfied

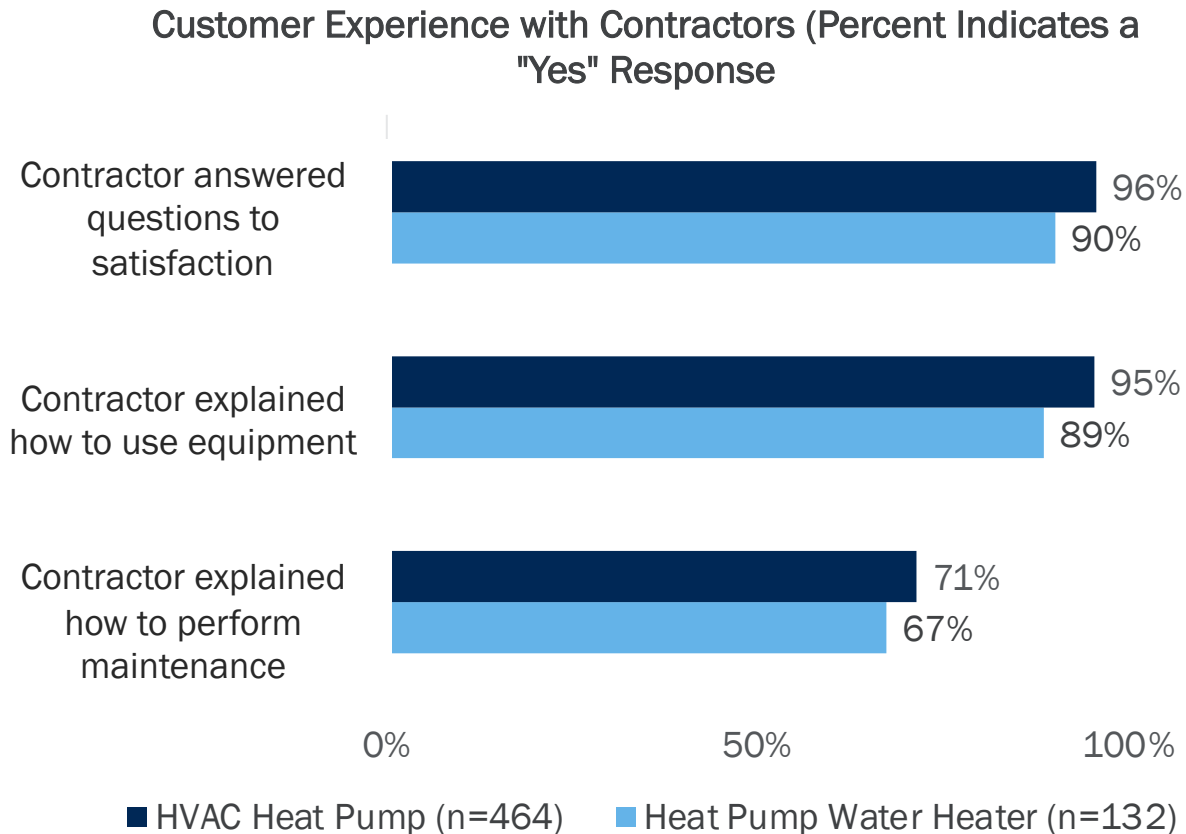


Greater satisfaction with **HVAC contractor (96%)** than HPWH contractor (91%)

Overall Customer Satisfaction with Contractor



Customer Experience



Contractors answered customer questions satisfactorily



Contractors could do better explaining how to perform maintenance on customers' new equipment



HVAC contractors slightly more likely to have done each of these



Opinion **Dynamics**

Contact Information:

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jloomis@opiniondynamics.com

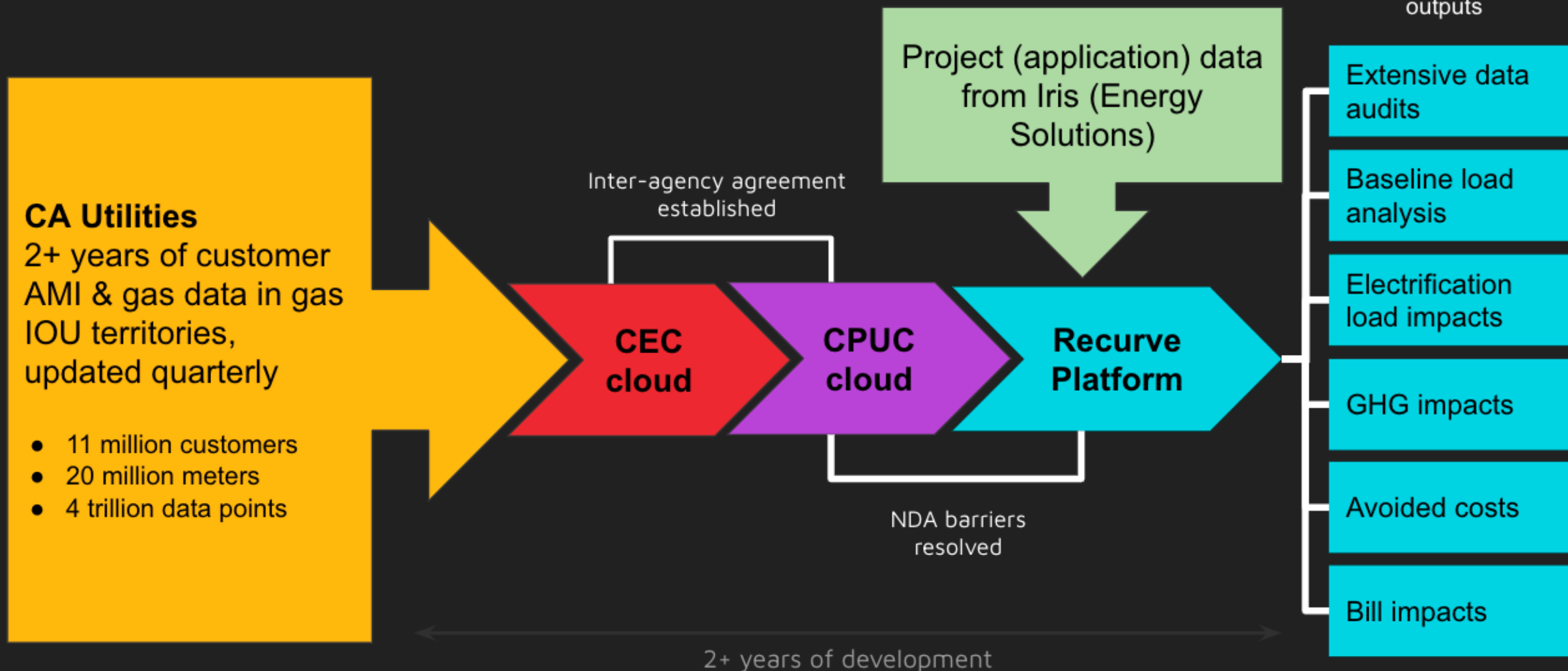


Customer Meter Data

Presented by: Mia Oppelstrup, Recurve Analytics



TECH Meter Data Transfer & Processing Flow



What can we learn about electrification potential?

Population-level analysis:

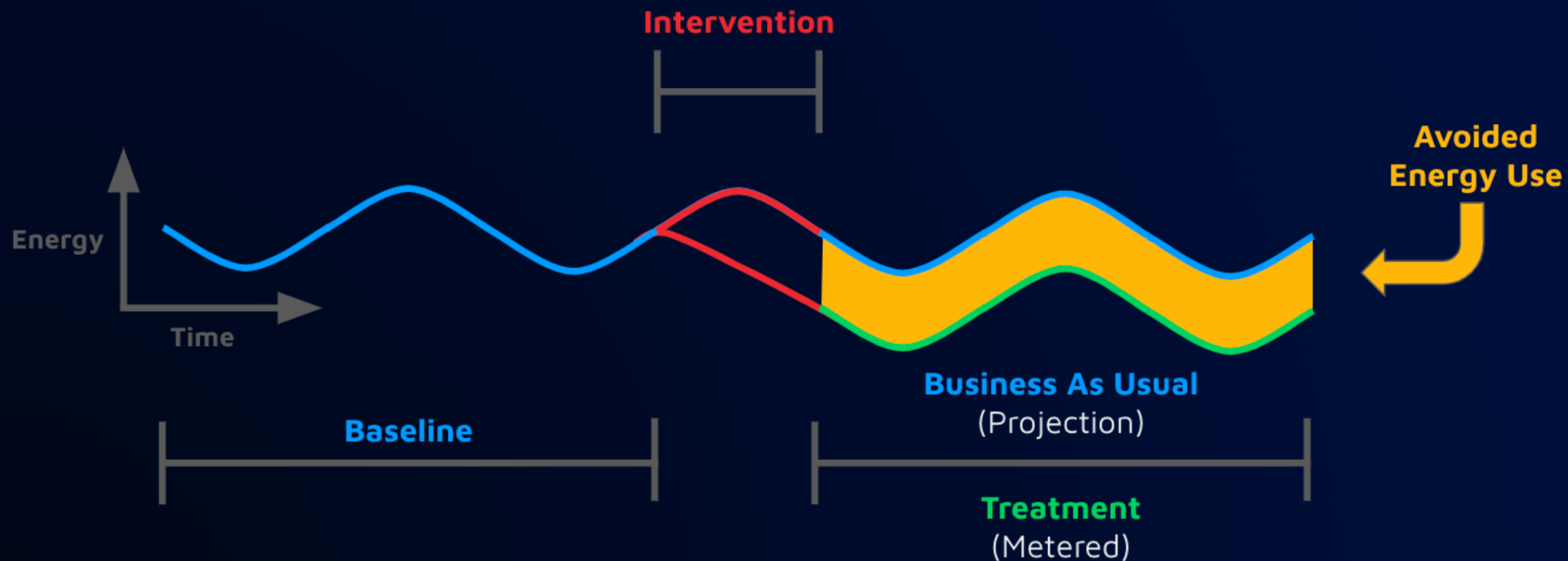
- Unprecedented scale
 - 11 million customers
 - 20 million meters
 - 2-4 trillion data points

Insights:

- Real-world usage disaggregation
 - By estimated end use:
 - Cooling
 - Space heating
 - Water heating
 - Baseload
 - By climate zone
 - Low income vs. market rate

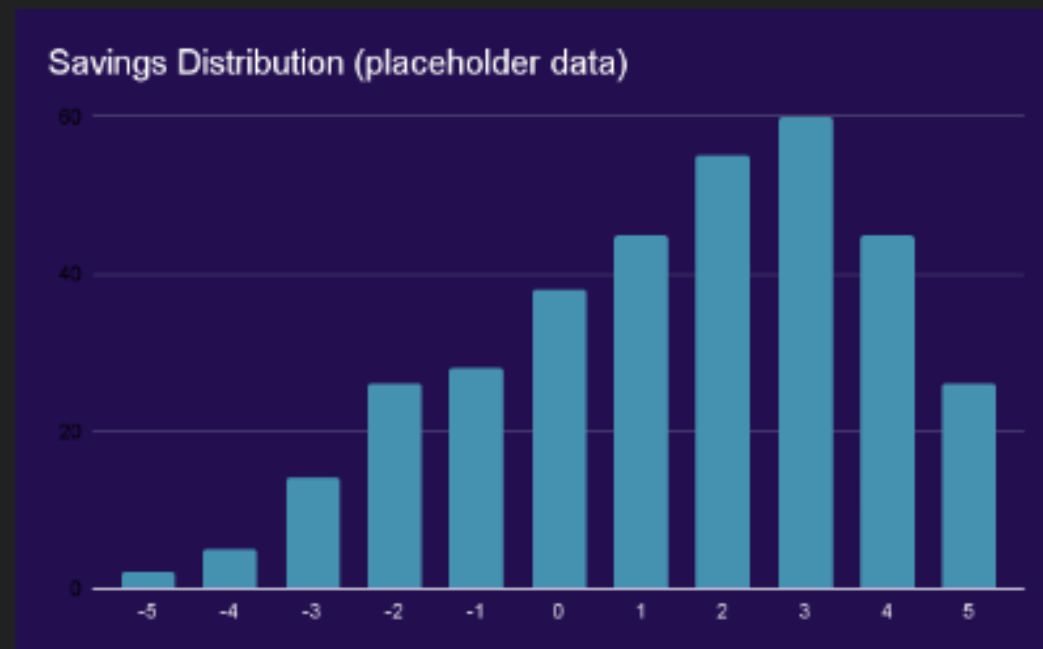
**The
“average”
customer
is a myth**

CalTRACK Avoided Energy Use Calculation



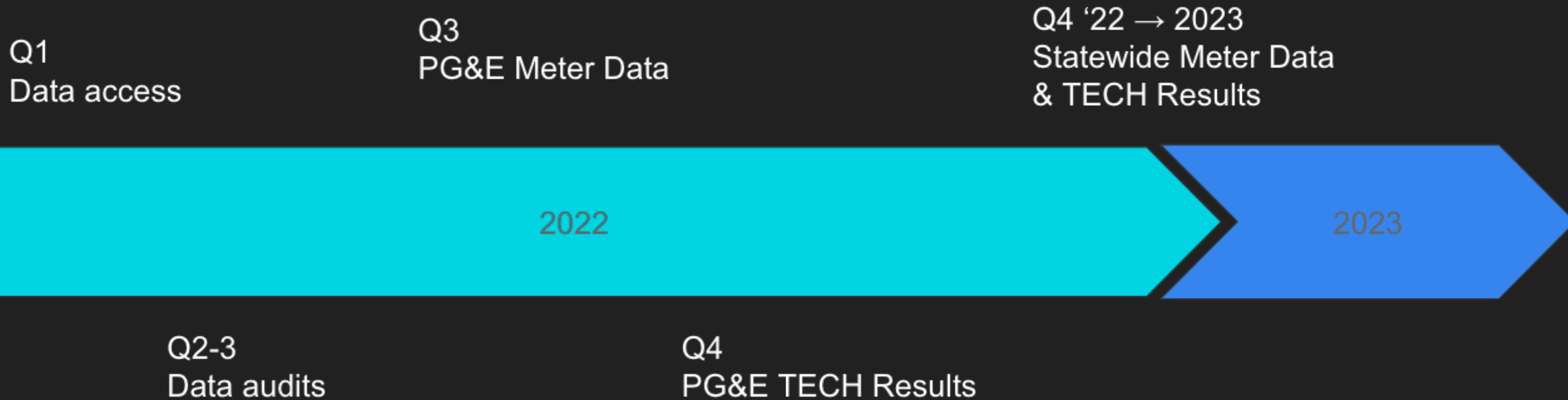
What can we learn about heat pump impacts?

- What were the impacts of heat pumps overall?
 - Electricity use changes overall
 - Hourly impacts
 - Electricity use changes during summer peaks (4-9pm)
 - Overall grid impacts
 - Net greenhouse gas impacts
 - Net customer bill impacts
- Were there sub-groups with particularly good or bad outcomes?
 - What drove those outcomes?
 - How did climate zone affect outcomes?
 - How did equipment type affect outcomes?
 - How did pre-electrification usage patterns affect outcomes?
 - E.g., non-AC vs. high AC users
 - High space & water heating users who electrified



Why?

Meter-Based Analysis Timeline



6

Q&A



Thank You

For more information or to get involved, contact:

TECH.info@energy-solution.com



Tre'Laine

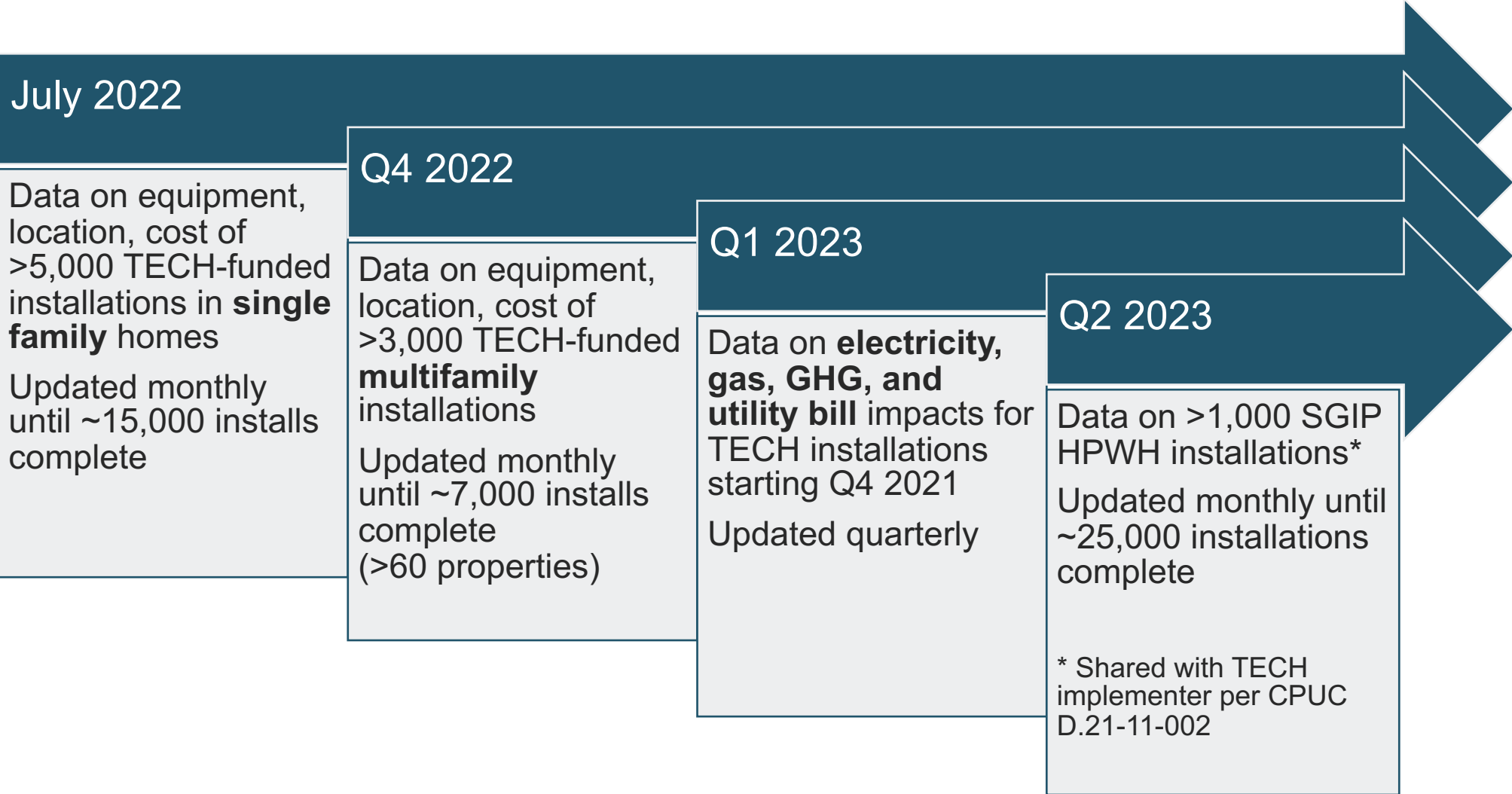


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Appendix

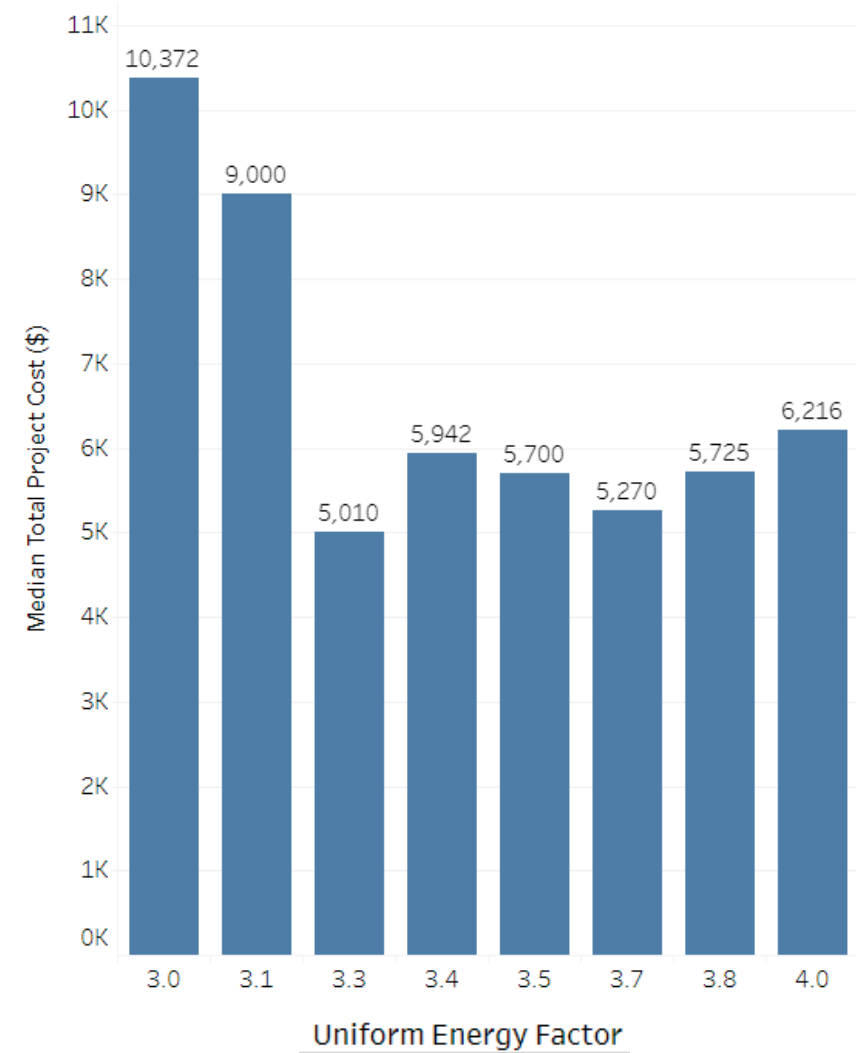
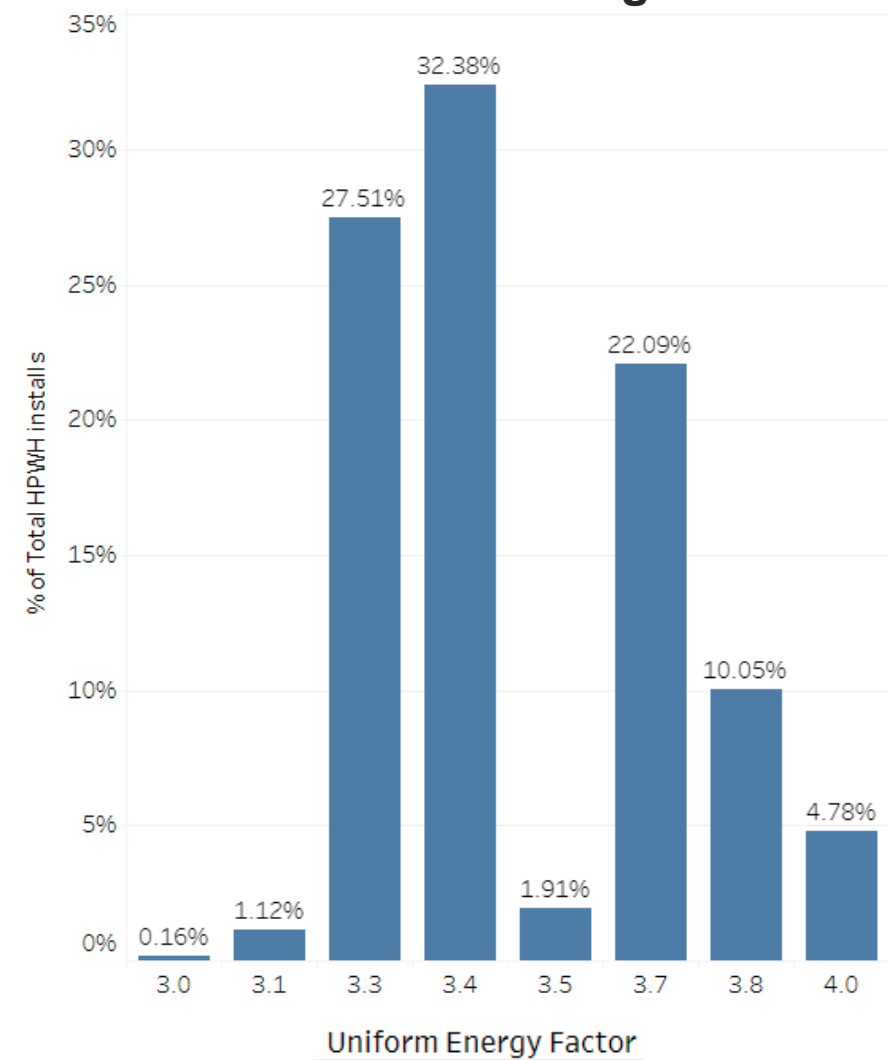


Public Reporting Website timeline

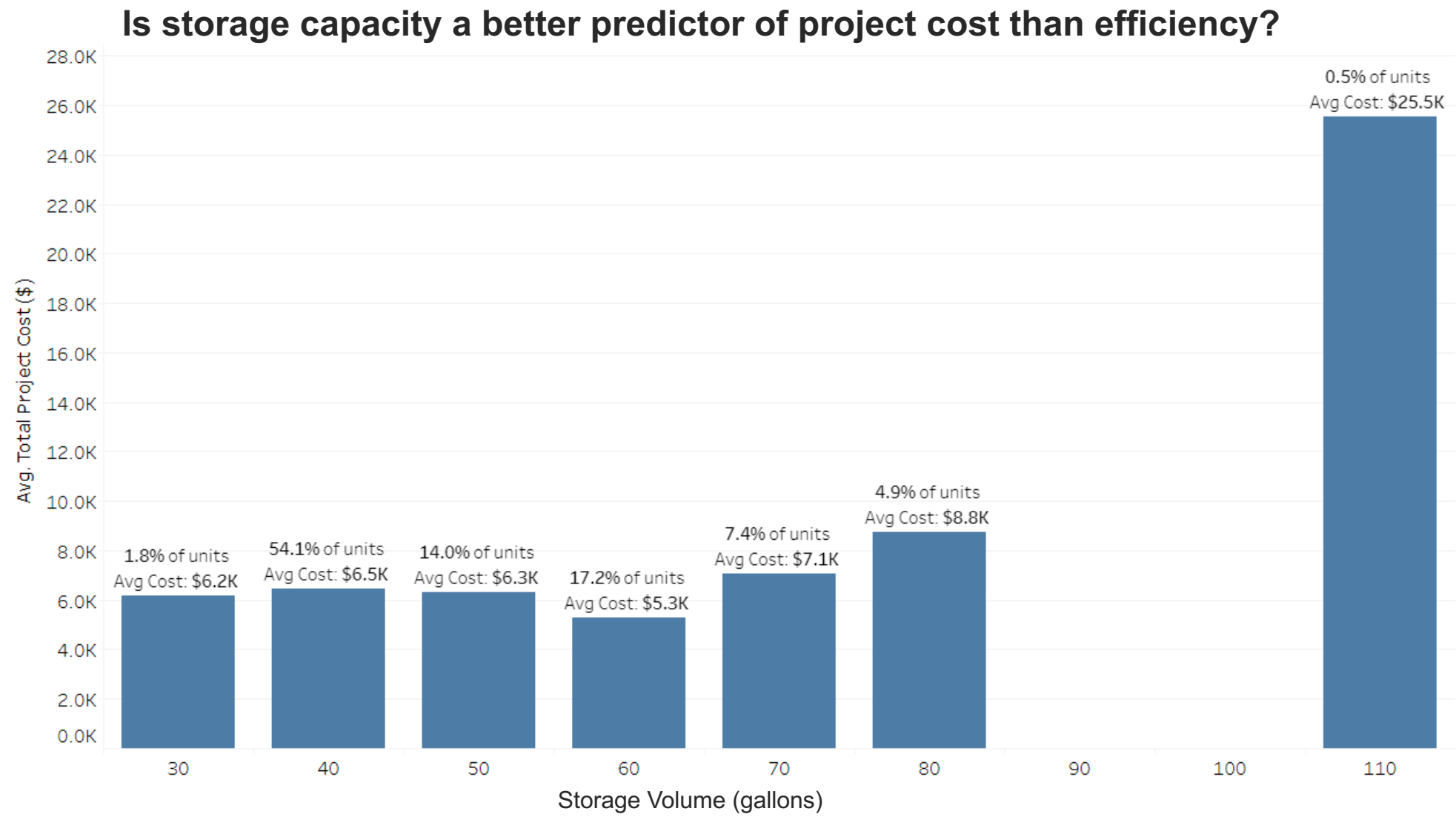


Popularity and Price of HPWH efficiency

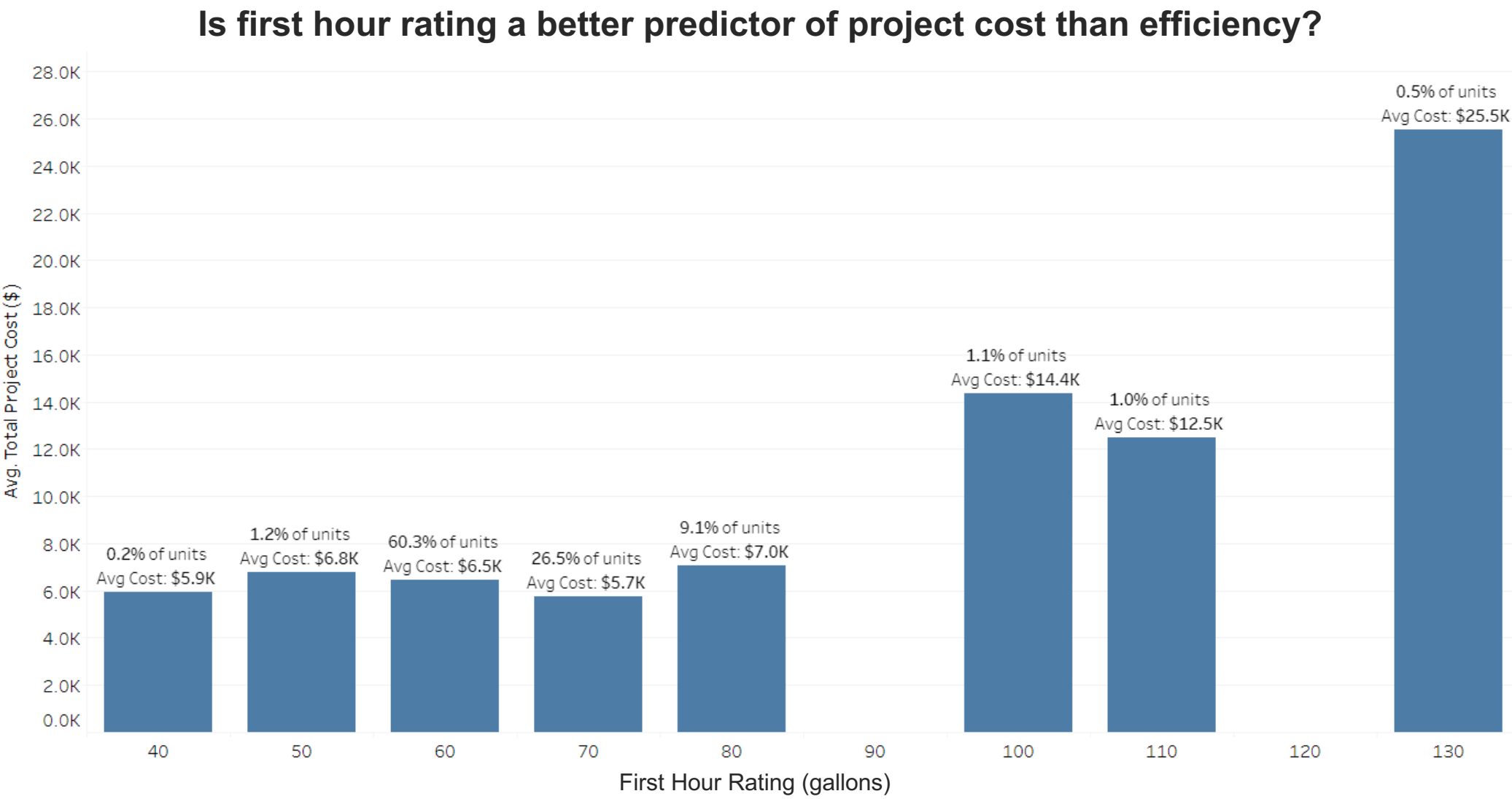
How strong is consumer demand for higher-efficiency products?



What Factors Contribute Most to HPWH Cost?

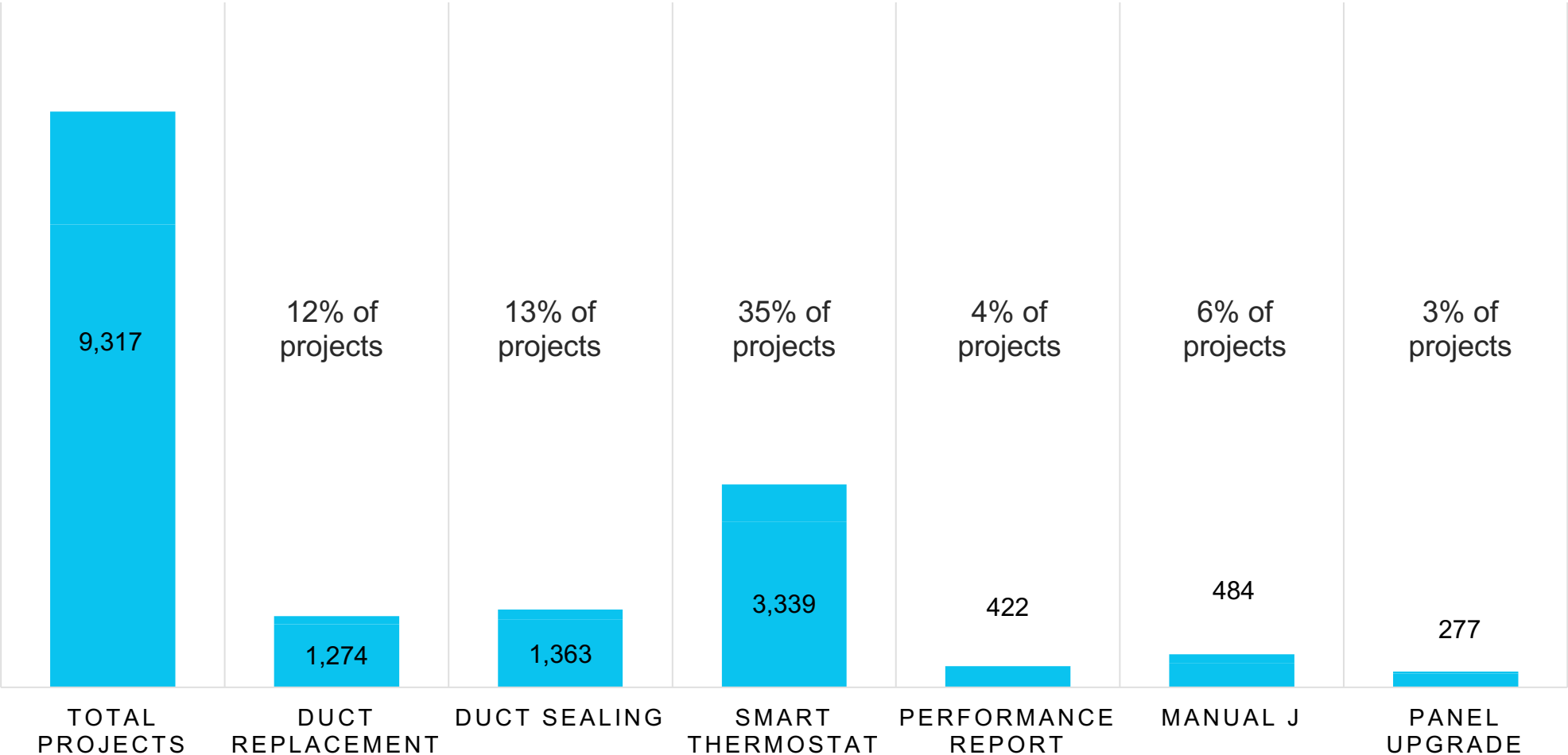


What Factors Contribute Most to HPWH Cost?



What is the Popularity of HVAC Quality Installation Measures?

TECH HVAC contractors prefer some optional installation practices over others:



What is the Popularity of HVAC Quality Installation Measures?

The top 10 most active HVAC installers submitted 2,277 (20%) of 11,594 applications

