CalMTA

March 25, 2026

# Market Transformation Advisory Board (MTAB) Meeting

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Agenda

| Time | Agenda Item | Presenter |
|---|---|---|
| 9:00 a.m. | **1. Welcome, Introductions & Agenda** | Stacey Hobart |
| 9:10 a.m. | **2. COI Declarations & Review of Draft Notes from March 5 MTAB Meeting** | Stacey Hobart |
| 9:20 a.m. | **3. Residential Heat Pump Water Heating (HPWH): Draft MTI Plan Overview** | Alexis Allan |
| 10:10 a.m. | **4. Residential HPWH: Appendix F – Evaluation Plan** | Ellen Rubinstein |
| 10:55 a.m. | *Break (10 min.)* | |
| 11:05 a.m. | **5. Residential HPWH: Market Adoption** | Isaac Schultz |
| 11:50 a.m. | *Break (10 min.)* | |
| 12:00 p.m. | **6. Residential HPWH: Total System Benefit (TSB) and Cost-effectiveness** | Isaac Schultz |
| 12:45 p.m. | **7. Public Comment** | |
| 12:55 p.m. | **8. Next Meeting & Next Steps** | Stacey Hobart |
| 1:00 p.m. | *Adjourn* | |

# 2. COI Declarations & Review of Draft MTAB Meeting Notes

Stacey Hobart | Principal of Engagement & Communications

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# MTAB declaration of COI

## MTAB eligibility

- Can't receive funding from CalMTA or be in pursuit of funding

## Recusal requirements

- Can't bid on RFP/RFQ if giving input after Phase I
  - Nearly all ideas under development are now in Phase II or III
- Those with competitive interest can recuse themselves from discussion, but must leave MTAB if responding to RFP
- Agree to not influence remaining MTAB members
- Interpretation, if needed, done by CPUC staff

MTAB Charter with Conflict of Interest

## Transparency

- Public meetings and process where COI concerns can be raised by the public

# CalMTA COI policies

- The CalMTA program has robust COI policies to ensure decision-making is transparent, impartial, and unbiased.
- The Resource Innovations team that administers CalMTA has deep experience implementing market transformation and other energy efficiency programs in California and throughout North America.
- Resource Innovations employees and subcontractors who function in decision-making roles for CalMTA are firewalled from any ongoing work with California utilities or other covered entities and sign COI certifications.
- CalMTA seeks CPUC approval when there is a need to draw on specialized expertise from subject matter experts who also support work with covered entities.

# MTAB meeting notes

## Draft MTAB meeting notes

## March 5, 2026

# *Idea to Initiative:*
# Residential HPWH Part 3

**Part 1**

- Market Characterization
- Logic Model
- Market Transformation Theory

**November 12 & 13, 2025**

**Part 2**

- Market Progress Indicators & Milestones
- Product Assessment

**January 29, 2026**

**Part 3**

- Draft Market Transformation Initiative Plan & Appendices
- Evaluation Plan
- Total System Benefit & Cost Effectiveness

**March 25, 2026**

# MTI Plan aspects to be discussed today

A: Logic Model Packet

**B: Market Forecasting & CE Modeling Approach**

C: Product Assessment Report

D: Market Characterization Report

E: External Program Alignment & Coordination

**F: Evaluation Plan**

G: Risk Mitigation Plan

H: MTI Lifecycle Cost Estimate

I: MTAB Feedback

**Market Transformation Initiative Plan**

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# 3. Residential Heat Pump Water Heating (HPWH): Draft MTI Plan Overview

Alexis Allan,
Strategy Manager

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Guiding principles that influenced MTI Plan

- Identified opportunities:
  - Where CalMTA can be additive and not create additional market confusion
  - To create consistency and alignment amongst programs
  - That are well-suited for a market transformation organization to address.

## Vision for the future

# HPWHs contribute to California goals

- HPWHs play a central role in California achieving its heat pump and electrification goals.
- HPWHs are able to serve the majority of California housing stock.
- The majority of water heaters sold are heat pump water heaters.
- HPWHs installed in California utilize lower GWP refrigerants and include load-flexibility capabilities.

# MTI targets residential market




# Product definition

- Focus is on residential HPWH products with the following attributes:
  - Integrated units or split-systems
  - Shared- or dedicated-circuit 120V and/or 240V configurations
  - Certified effective storage volume ≤120 gallons
  - Meets Version 5.0 ENERGY STAR specifications
- Other key product features (load shifting and lower-GWP refrigerants) will be included later.
- MTI scope does NOT include HPWHs used in nonresidential applications, commercial water heaters, central water heaters, point-of-use water heaters, or other water heating systems composed of multiple heating units.

# Market Intelligence & Research

# Key findings on HPWHs

| | |
|---|---|
| **Low saturation and market share** | HPWHs represent <2% of 11+ million residential CA water heaters and an estimated 5-6% of CA annual sales. |
| **Upfront cost is a top barrier to HPWH purchase** | HPWHs are ~ $1,000+ more expensive or, with professional installation, ~$4,000 more expensive than alternatives. |
| **Incentives to support are complex** | 30+ active programs exist. Incentives motivate some, but incentive/program complexities also create barriers. |

# Key findings on HPWHs (continued)

| | |
|---|---|
| **HPWH fit is uncertain in some existing buildings** | Physical footprint, ventilation and condensate needs, and electrical capacity can complicate install and may require additional work for HPWH installation. |
| **Bill savings are uncertain to most converting from gas to HPWHs** | Bill savings are a leading benefit and driver of HWPH adoption nationally, but gas customers worry about bill increases in many California service territories. |
| **Regional variations leave a disconnect from HPWHs and limit broad adoption** | Limited customer awareness and installer familiarity persists, impaired by limited HPWH availability, visibility. Greater retail engagement may support BIY/DIY market segments. |

# Market assumptions integrated into Plan

- Phase III activities expected to launch late 2027
- Existing HPWH program landscape continues to morph – early Phase III activities include taking inventory of California policies/program/industry activities
    - Programs will have incentives supporting HPWH
- Bill impacts – not all use cases for HPWH currently show bill savings but some do
- Federal standard goes into effect May 6, 2029.

# Policies support HPWH adoption

**Jan. 1, 2026**
T24 prescriptive path requires HPWH for residential new construction (few exceptions)

**Jan. 1, 2027**
Bay Area Air Management District zero-NOx standard for residential-size water heaters

**May 2029**
Federal standard requires electric storage WHs to be HPWHs

**2030**
* CA 6M HP goal (a portion will be HPWHs)
** PROPOSED (CARB): 40% of WHs < 2M Btu/hr to be zero emission*

**2045**
*PROPOSED (CARB): 50% of WHs < 2M Btu/hr to be zero emission*

**MTI APPLICATION** **MTI IMPLEMENTATION**

# Logic Model – barriers to adoption

Customer value proposition and demand result in limited supply chain business case

Complex product requirements that customers do not value

High costs (equipment and installation)

Some California housing stock is less than ideal for heat pump water heaters

Complex and inconsistent California program landscape and requirements for supply chain and customers

**Key**

- Market
- Financial
- Technology

# Logic Model – opportunities

Federal standard requiring HPWH for electric tanks > 20 gallon <120

California 2030 heat pump goal (and California Heat Pump Partnership work )

**Key**

- Market
- Financial
- Technology

# Strategic interventions

1. Influence product development & match technology to housing stock
2. Aggregate statewide buying power to attract market partners and build momentum in scalable submarkets
3. Develop, support, and coordinate statewide operational infrastructure

# Targeted approach to removing barriers

| Barriers | Influence product development & match technology to housing stock | Aggregate statewide buying power to attract market partners & build momentum in scalable submarkets | Develop, support, and coordinate statewide operational infrastructure |
|---|---|---|---|
| 1. Customer value proposition and demand result in limited supply chain business case | | X | X |
| 2. Complex product requirements that customers do not value | X | X | X |
| 3. High costs (equipment and installation) | X | X | |
| 4. Some California housing stock is less than ideal for heat pump water heaters | X | X | |
| 5. Complex and inconsistent California program landscape and requirements for supply chain and customers | X | X | X |

# A Deeper Dive - Strategic Interventions

# MTI to elevate impact through coordination & collaboration

1. Build and maintain clear understanding of current and changing HPWH landscape
2. Elevate current programs' effectiveness
3. Supply chain coordination

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# Influence Product Development & Match Technology to Housing Stock

## Strategic Intervention 1

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Influence product development & match technology to housing stock

CalMTA will:

1. Use research tools to assess California housing stock
2. Match housing segments with existing equipment types and identify gaps
3. Support split-system technology development and adoption
4. Leverage existing training efforts to help installers confidently select the right equipment
5. Collaborate with manufacturers and EE programs to develop a product roadmap with a pathway for lower-GWP refrigerant and solutions for equipment types.

# Collaboration opportunity

## Influence product development & match technology to housing stock

- Collaborate with EE programs to develop a shared product roadmap
- Leverage existing training efforts to help installers confidently select the right equipment
- Develop shared HPWH product criteria
- Shared recommendation on 120V product

# Product plan examples

## Increase market share

- **Develop a custom California housing stock database for the retrofit market** - identify and aggregate attributes that influence ease-of-adoption in the retrofit market
- **Assess impact of 2025 Energy Code (Title 24)** - percentage of new builds that install HPWHs
- **Develop a dynamic tool that prioritizes advantageous HPWH product installation** - based on fluctuating variables, like current electric rates and local codes

## Product development

- **Develop a HPWH product expansion roadmap** with manufacturers that matches California's current technology gaps and housing needs
- **Evaluate split-system HPWH equipment installation in the field** using quick-connect refrigerant lines – assess the impact of line set length and refrigerant charge levels on field performance
- **Standardize the CTA-2045-B communication protocol for load-shifting** - collaborate with manufacturers to resolve compatibility issues with proprietary systems

# Product barriers and opportunities

| Product barriers | Product development opportunities |
|---|---|
| Hot water recovery performance | • Thermostatic mixing valves<br>• Split-system HPWHs<br>• Advanced compressor technologies |
| Electrical requirements / panel capacity | • Shared-circuit 120V HPWHs<br>• Dual-voltage HPWHs<br>• Panel-readiness audit / optimization programs<br>• Meter collar adapters |
| Space requirements and ventilation needs | • Split-system HPWHs<br>• Thermostatic mixing valves |
| High total installed costs | • Reduce HPWH "feature bloat"<br>• Reduce manufacturer production costs |
| Ease of installation | • 120V “plug-in” HPWHs<br>• Dual-voltage HPWHs (to avoid/delay electrical upgrades)<br>• Quick-connect refrigerant lines (for split-system HPWHs) |

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# Aggregate Statewide Buying Power to Attract Market Partners & Build Momentum in Scalable Submarkets

## Strategic Intervention 2

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Aggregate statewide buying power to attract market partners & build momentum in scalable submarkets

CalMTA will:

1. Coordinate with existing EE/equity programs on outreach, training, marketing, and incentives using collective buying power to reduce equipment/installation costs and drive additional sales
2. In near-term, prioritize easy-to-install markets (e.g., existing electric, solar, propane, retail, etc.)
3. Partner with manufacturers to decrease cost and engage supply chain leaders to champion HPWH adoption
4. Apply lessons learned and market experience to enable market actors to confidently expand into other submarkets.

# Collaboration opportunity

**Aggregate statewide buying power to attract market partners & build momentum in scalable submarkets**

- Development of Scale-Up Plans by submarket
- Partner with manufacturers to decrease cost and engage supply chain leaders to champion HPWH adoption

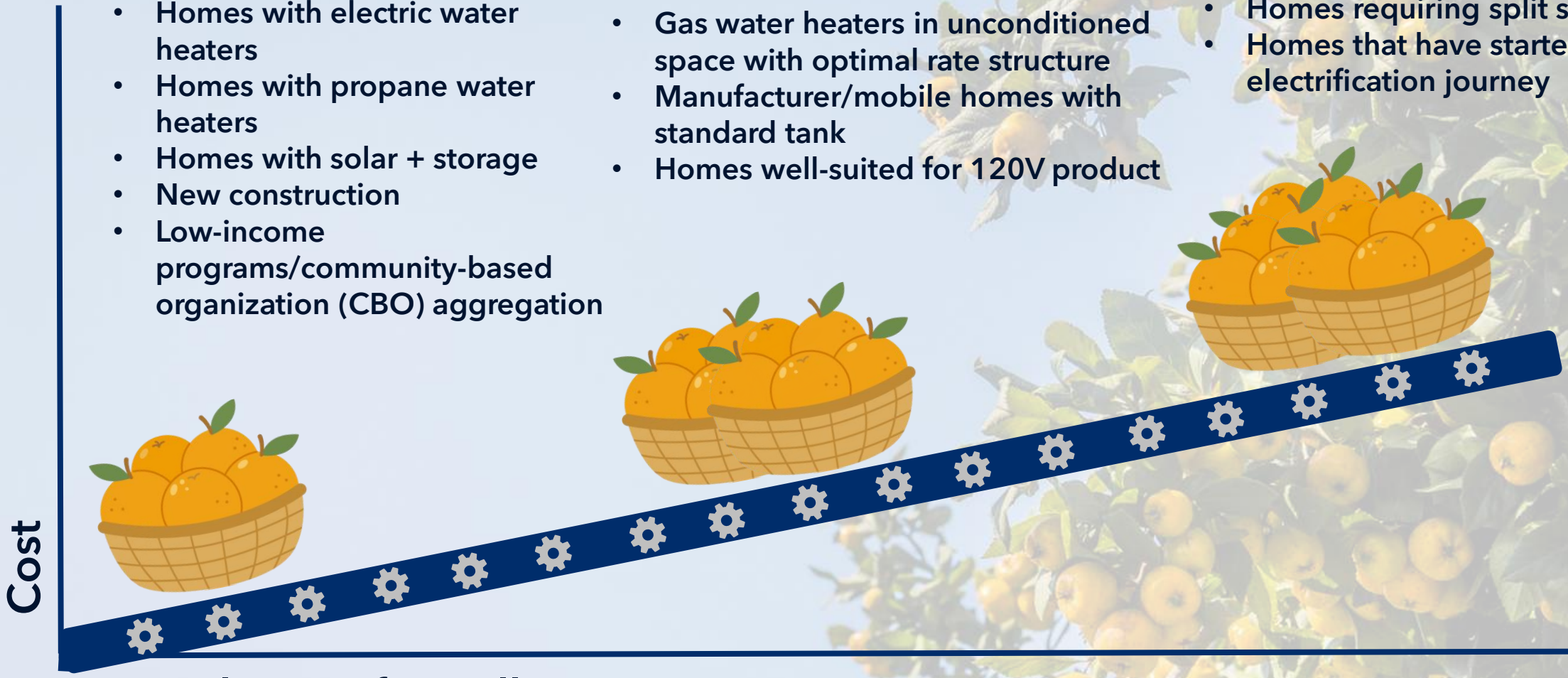
*Capturing the low-hanging fruit*

# Aggregating market demand by segments

- Homes with electric water heaters
- Homes with propane water heaters
- Homes with solar + storage
- New construction
- Low-income programs/community-based organization (CBO) aggregation

- Gas water heaters in unconditioned space with optimal rate structure
- Manufacturer/mobile homes with standard tank
- Homes well-suited for 120V product

- Homes requiring split systems
- Homes that have started their electrification journey



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# Develop, Support, and Coordinate Statewide Operational Infrastructure

## Strategic Intervention 3

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Develop, support, and coordinate statewide operational infrastructure

CalMTA will:

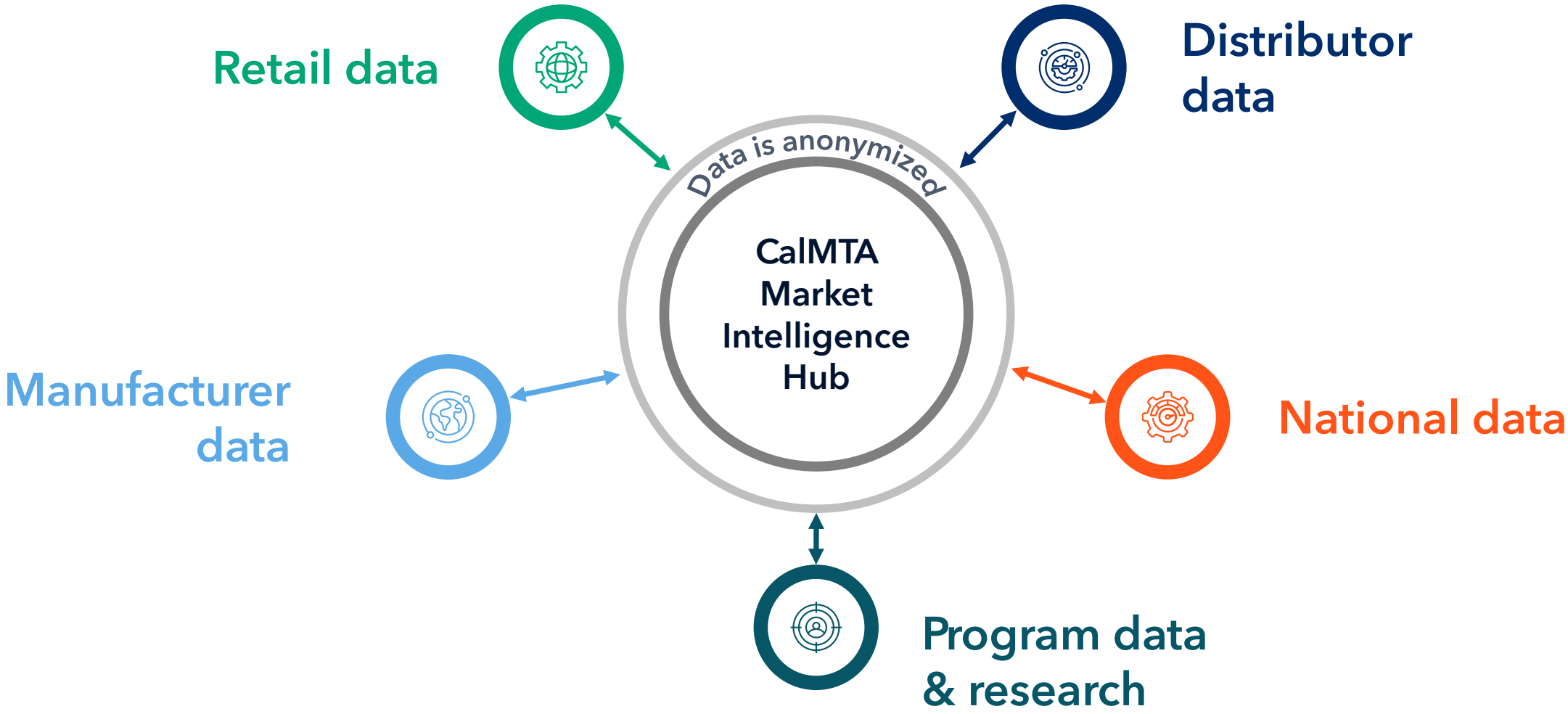
1. Develop/support a coordinated statewide system for water heater sales and data collection with supply chain and program partners
2. Share anonymized data with market and EE partners to inform resource allocation and program design
3. Collaborate with programs to create consistent, accessible market tools and messaging
4. Align supply chain messaging to ensure a consistent customer experience
5. Coordinate with EE programs to align on and conduct research.

# Collaboration Opportunity

## Develop, support, and coordinate statewide operational infrastructure

- Develop/support a coordinated, statewide system for water heater sales and data collection with supply chain and program partners
- Create consistent, accessible marketing tools and messaging
- Align supply chain messaging to ensure a consistent customer experience

# A vision for data and research



# Theory of market change

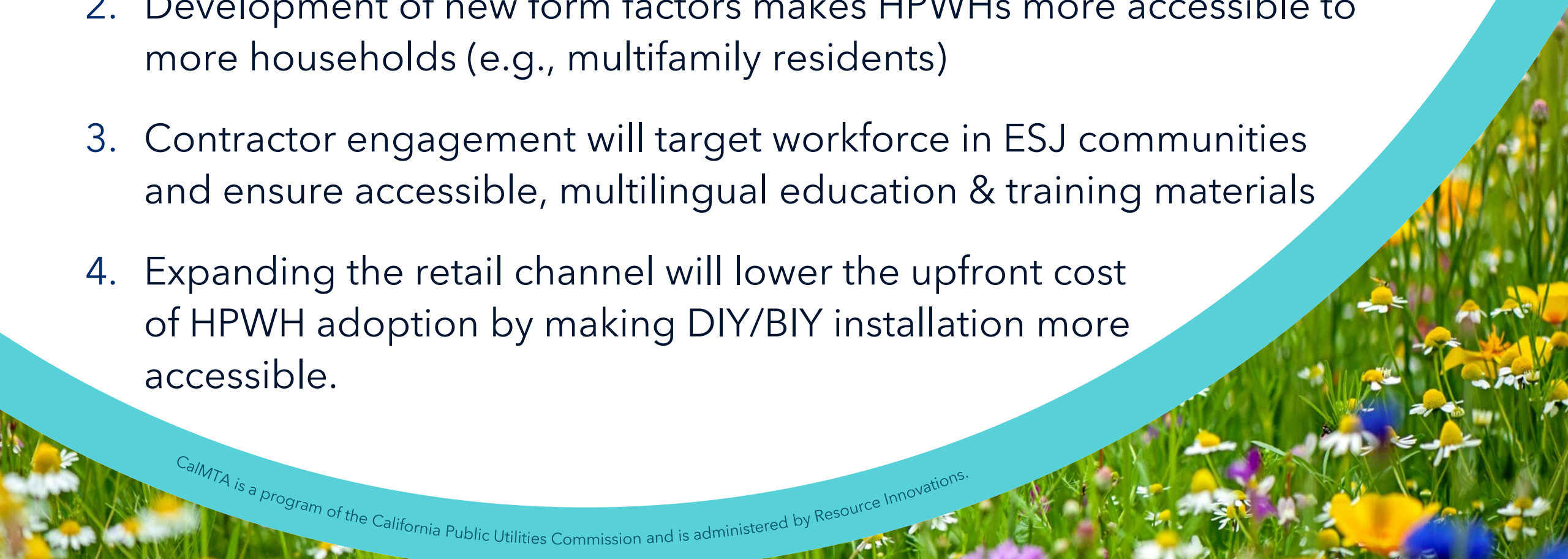
| IF | THEN |
| --- | --- |
| **If** a statewide product roadmap leveraging ENERGY STAR is developed that addresses California technology needs AND is paired with increased sales in submarkets | **then** manufacturers will experience the clarity necessary to build a business case and have a clearer incentive to support new form factor development and partner on product roadmap. |
| **If** we aggregate program efforts to prioritize easy-to-install markets in partnership with manufacturers to build momentum and sell more HPWHs | **then** installer experience will improve and acceptance of the technology will increase, resulting in a more evident business case |

# Theory of market change

| IF | THEN |
| --- | --- |
| **If** installers have a positive experience and accept the technology | **then** installation efficiency will improve and installation costs for customers will decline. |
| **If** certain tools and operational infrastructure are shared across programs | **then** market partners will experience greater consistency and decreased administrative burden, and will gain greater confidence in CA HPWH programs strengthening their business case |

# Driving impact for ESJ communities

1. Segmentation targets housing stock more prevalent in ESJ communities (e.g., mobile/manufactured or propane-heated homes)
2. Development of new form factors makes HPWHs more accessible to more households (e.g., multifamily residents)
3. Contractor engagement will target workforce in ESJ communities and ensure accessible, multilingual education & training materials
4. Expanding the retail channel will lower the upfront cost of HPWH adoption by making DIY/BIY installation more accessible.



## Vision for the future

# HPWHs contribute to California goals

- HPWHs play a central role in California achieving its heat pump and electrification goals.
- HPWHs are able to serve the majority of California housing stock.
- Majority of water heaters sold are heat pump water heaters
- HPWHs installed in California utilize lower GWP refrigerants and include load flexibility capabilities.

# Questions & Discussion

# 4. Residential HPWH: Appendix F – Evaluation Plan

Ellen Rubinstein |CalMTA
Residential Evaluation Lead

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# Evaluation Plan development

- Review PTLM
- Develop MPIs/milestones
- Review of MPIs/milestones by leadership, MTAB, CPUC

→

- Draft evaluation plan
- Review by CalMTA leadership and EAG
- Adjust milestones and refine plan

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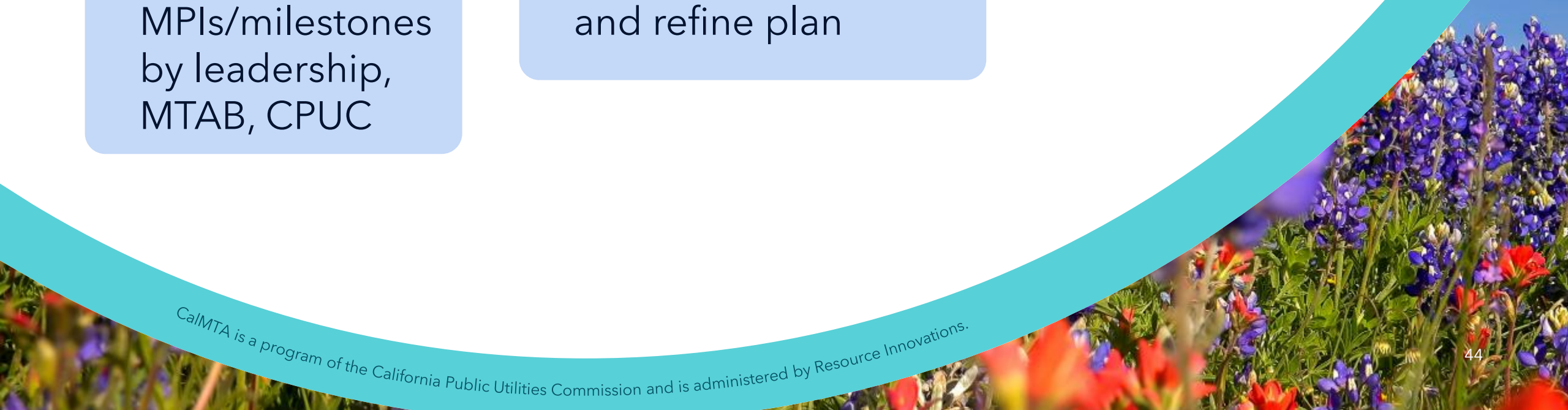
- Present to MTAB
- Address written feedback



# Evaluation objectives

1. Review and assess the MTI program theory and logic model (PTLM)
2. Monitor market dynamics and characteristics; assess market developments
3. Measure market progress and equity in accordance with the market progress indicators (MPIs)
4. Assess equity outcomes and equity research questions

# Evaluation objectives (continued)

5. Assess MTI causality using evidence-based assessments and a "preponderance of evidence" approach

6. Assess MTI implementation effectiveness

7. Review BMA and TMA, unit energy savings, incremental and co-created MTI impacts, and cost-effectiveness model inputs & assumptions

# Data collection and analysis

| Data collection and analysis activity | |
|---|---|
| **CalMTA program data and materials review** | |
| **Secondary data and literature review** | |
| **Sales and program data collection and analysis** | ESRPP sales data |
| | Circana/NeilsenIQ data |
| | PA program and CEDARS data |
| | Other sales or shipment data |
| **Primary data collection and analysis: market actors** | MTI staff, stakeholder, SME, and program partner interviews |
| | Manufacturer interviews |
| | Distributor and retailer interviews |
| | Installer surveys |
| | Consumer and building owner/manager surveys |
| **Forecasting and C/E model reviews** | |

# 1 Assess program theory & logic model

- Compare PTLM and outcomes to actual outputs and market interventions
- Assess extent to which MTI interventions address market barriers and lead to theorized outcomes
- Recommend PTLM and MPI improvements.

# 2 Monitor market

- Use MTI information, coupled with primary and secondary data collection, to track market dynamics, characteristics, and developments
- Analyze data to provide ongoing insights that inform the MTI strategy and improve the MTI's performance.

# 3 Key HPWH MPIs

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## Product variety and availability

- # manufacturer agreements
- # programs supporting varied solutions
- % installers having suitable HPWH solutions
- % sold through retail

## Installer comfort & confidence

- % installers use tools to match HPWH to homes
- % installers comfortable & confident in selecting suitable solutions

## Incremental cost

- % decrease in installed costs
- retail-distributor price parity

## Shipments and features

- # shipped to CA
- % lower GWP refrigerants
- % meeting industry load shift requirements

## Statewide infrastructure & coordination

- # programs agreements
- # programs aligned on definition, messaging
- % programs & partners contrib. to & using hub

**Market Share Overall & for Gas WH Replacements**

# 3 HPWH milestones

**2028**
HPWH product and program support roadmaps ready for use

**2028**
2+ manufacturers enter into agreements with CalMTA

**2028**
2+ programs enter into agreements with CalMTA to provide ongoing support

**2029**
15% increase in HWPH sales in early submarkets

**2029**
35% of installers in early submarkets have HPWH solutions for their customers' homes

**2029**
Average 15% decrease in installed HPWH costs in early submarkets

# 3 HPWH milestones

**2029**

50%+ of active programs in CA are aligned on qualified HPWH product definition

**2029**

50%+ of active programs in CA use shared messaging about HPWH benefits

**2029**

Market Intelligence Hub (MIH) ready for use

**2029**

Majority of manuf., medium & regional retailers, and programs contribute data to MIH

**2032**

10+ partner orgs/programs support HPWHs with a variety of form factors / solutions

**2032**

50%+ of installers use tools to match HPWHs technologies to homes

# 3 HPWH milestones

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2032: 50% of installers feel comfortable & confident matching HPWHs to homes

2032: 50% of installers have suitable HPWH solutions for customers' homes

2032: Average HPWH retail price within 10% of average distributor price

2032: TREND: increasing % of HPWHs sold through retail

2032: TREND: increasing # of HPWHs shipped to California annually

2032: 30% of all water heaters installed annually in existing homes are HPWHs (market share)

# 3 HPWH milestones

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**2032**

10% of all water heaters installed annually in existing homes as replacements for gas WHs are HPWHs

**2032**

1+ value stream tested with 2+ market actors or programs

**2037**

TREND: increasing % of HPWHs use lower GHP refrigerants

**2037**

TREND: increasing % of HPWHs meet industry standard load shift requirements

**2037**

33% of all water heaters installed annually in existing homes are HPWHs

**2037**

13% of all water heaters installed annually in existing homes as replacements for gas WHs are HPWHs

# 4 Evaluate equity

- Assess ESJ MPIs
- Assess customer experience
- Assess other aspects of equity, for example:
  - Is the MTI reaching its target audiences in ESJ as well as non-ESJ communities?
  - What factors support/constrain effective program delivery in ESJ communities?
  - Are program partners and market actors in ESJ communities aware and using the market intelligence hub comparably to those in non-ESJ communities?
- Recommend strategy improvements to help ensure comparable MTI effectiveness in ESJ and non-ESJ communities.

# 5 Evaluate causality

## Example: Has the MTI accelerated and increased market adoption of HPWHs in existing California homes?

| Example questions | Example data sources/evidence |
|---|---|
| Did the MTI lead partner programs to include a greater diversity of HPWH product tiers/offerings? How? | • *MTI Salesforce documentation of meetings and conversations with program partners*<br>• *Program partner interviews*<br>• Program partner materials (e.g., programs' pre- versus post-partnership HPWH QPLs) |
| Did the MTI lead installers to believe there is a HPWH solution for the majority of their customers? | • *Installer surveys*<br>• *Program partner and manufacturer interviews (questions addressing training and tools about home-to-technology matching)* |

# 6 Assess MTI implementation effectiveness through process evaluation

## Purpose:

- Assess MTI implementation fidelity and quality
- Identify implementation enablers and barriers
- Generate actionable recommendations for improvement

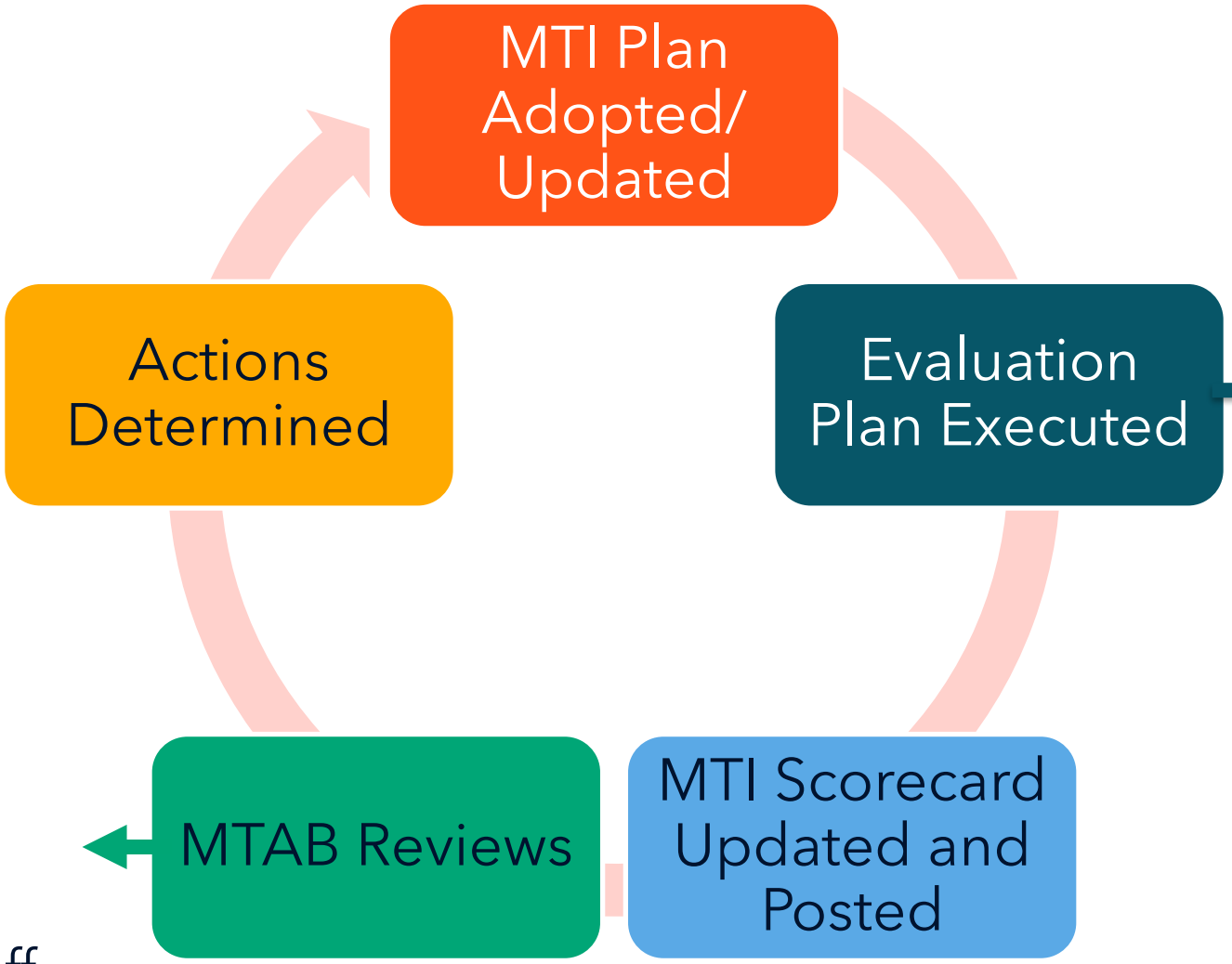
## Assessments:

- MTI roadmaps, tools, and data hub
- Engagement and coordination with:
  - Manufacturers
  - Program administrator partners
  - Stakeholders and SMEs
- Installer and consumer experiences

# 7 Review forecasts and cost-effectiveness

- Review the MTI's market adoption forecast, including inputs and assumptions
- Review unit energy impacts, PA net verified impacts, and C-E model
- Recommend new/additional data sources
- Recommend forecast and modeling updates as appropriate.

# Monitoring, reporting, and review




MTI market progress and evaluated incremental impacts reported publicly

At least annually; underperforming MTIs prioritized on agenda with recommendations from evaluators/staff

# Questions & Discussion

# Break (10 min.)
# We will be back soon.

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# 4. Residential HPWH: Market Adoption

Isaac Schultz, Engineering Manager
Karen Horkitz, Market Research & Evaluation Lead

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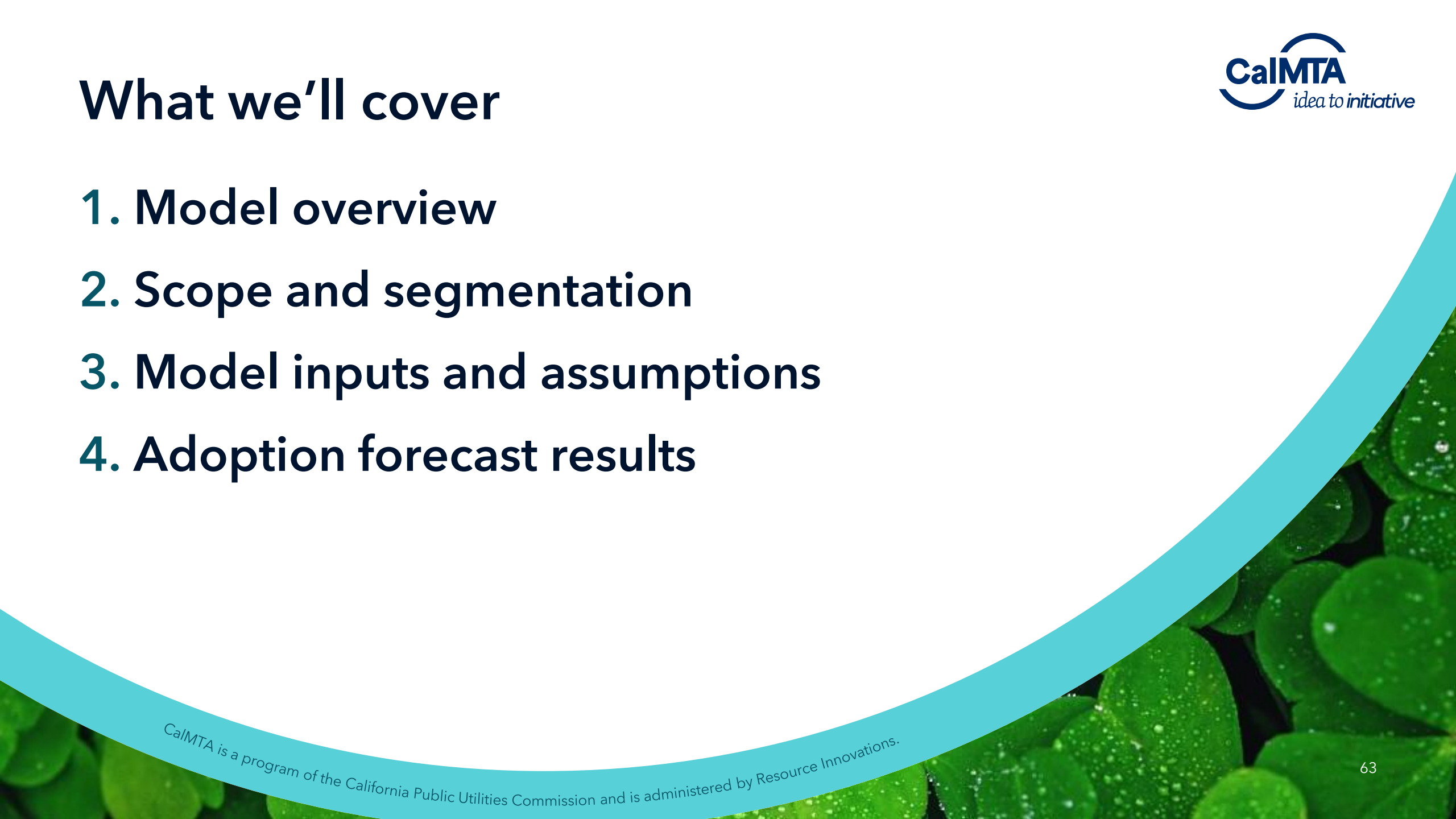
# What we'll cover

1. Model overview
2. Scope and segmentation
3. Model inputs and assumptions
4. Adoption forecast results



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# Model Overview

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# Model overview

- Discrete choice model
  - Modeling customer choices between competing technologies
- Considers factors that influence a choice of one option over another
  - Relative lifetime ownership costs
  - Availability and product recommendations
  - Market shares of competing water heater options are calculated each year.

# Market adoption forecasting model

## Inputs influencing adoption

Upfront costs

Lifetime utility bills

Sensitivity to relative costs

## Constraints to adoption

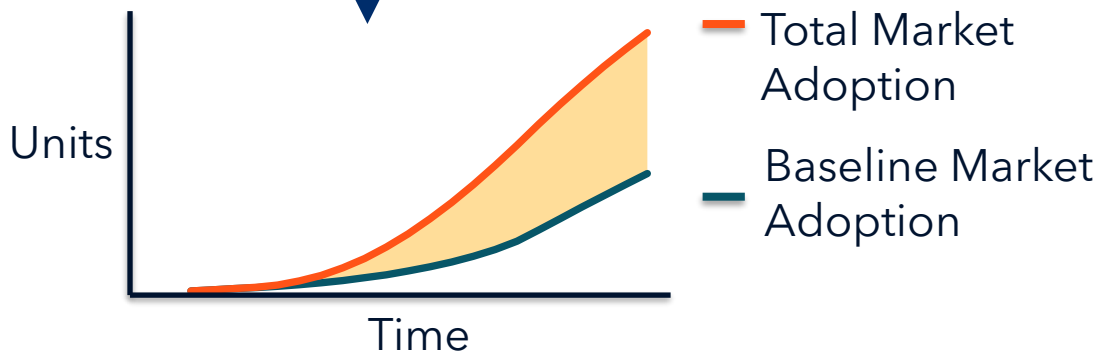
Product availability

Installer confidence/ recommendation

## Outputs

Market shares (unconstrained)

Market shares (constrained) x Annual sales = Annual sales by water heater option



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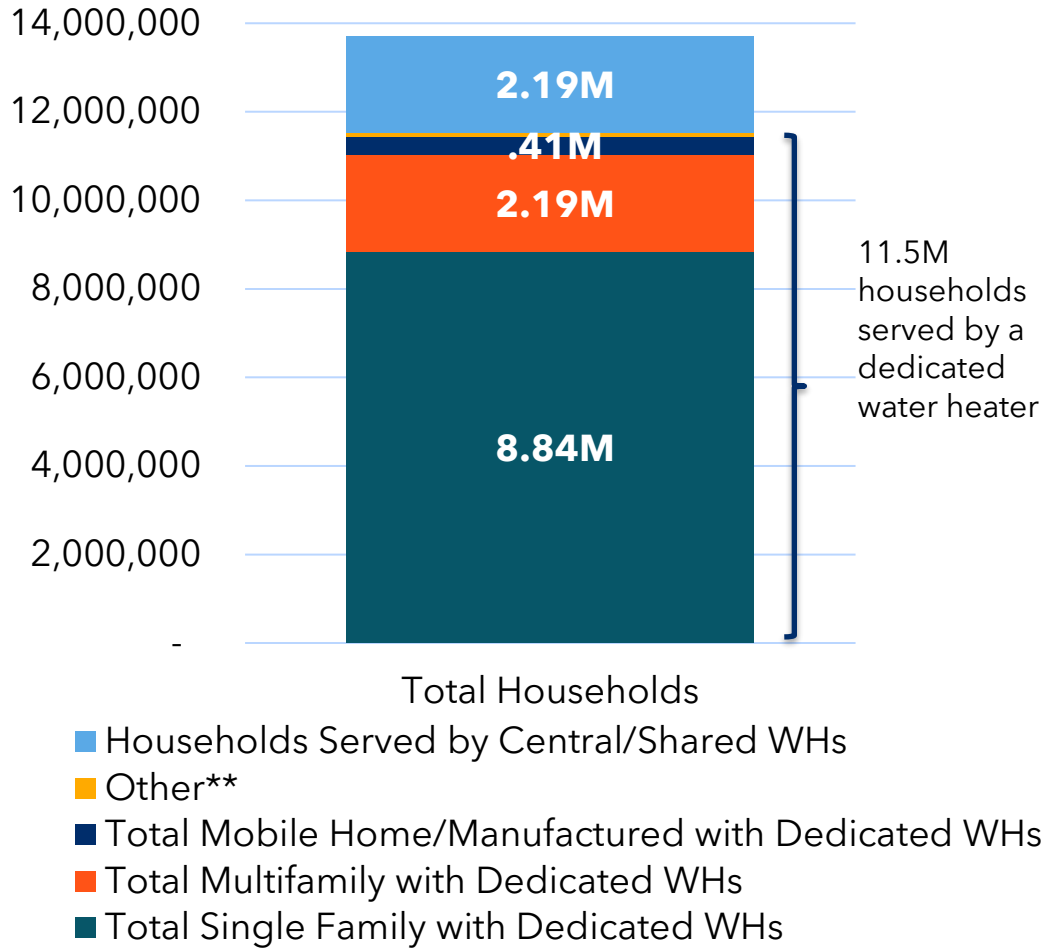
# Scope and Segmentation

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Model scope

- Dedicated water heaters in existing residential homes in California
- Two baseline water heaters in existing stock:
  1. *Gas WH (77% of stock)*
  2. *Electric Resistance WH (23% of stock)*
- Two types of homes with gas water heaters:
  1. *Homes that require electrical upgrades to install a 240V HPWH*
  2. *240V capable without upgrade*




Source: CalMTA HPWH Market Characterization Report, 2025

# Model segmentation

| Segment | Baseline equipment | 240V Capable | HPWH Option | Existing Stock Size | Annual WH Sales |
|---|---|---|---|---|---|
| **Group 1: 120V fuel substitution** | **Gas** | ✗ | 120V | 2.61 Million | 154,639 |
| **Group 2: 240V fuel substitution** | **Gas** | ☑ | 240V | 6.25 Million | 360,824 |
| **Group 3: Electric baseline** | **Electric Resistance** | ☑ | 240V | 2.69 Million | 153,969 |

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# Inputs and assumptions

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Key adoption forecast inputs

| Model input | Notes and data sources |
|---|---|
| **Upfront costs** | Equipment and installation labor costs<br>*(eTRM measure ID SWWH025-10 & SWWH014-08)* |
| **8760 load shapes** | Energy modeling results<br>*(CPUC DEER prototype models EnergyPlus / Prototype System)* |
| **Utility rates** | Hourly electric / gas rates per IOU used to calculate customer bills<br>*(extracted from MIDAS 2025)* |
| **Utility rate forecasts** | Forecasted electricity and gas rates<br>*(California Energy Demand Forecast 2025-2045)* |
| **HPWH size and efficiency** | Program data distributions<br>*(TECH Clean California downloaded June 9, 2025)* |
| **Availability and product recommendation** | Constraint to adoption, anchored to MPIs |

# Key drivers of adoption

**Reduction in relative costs of ownership**

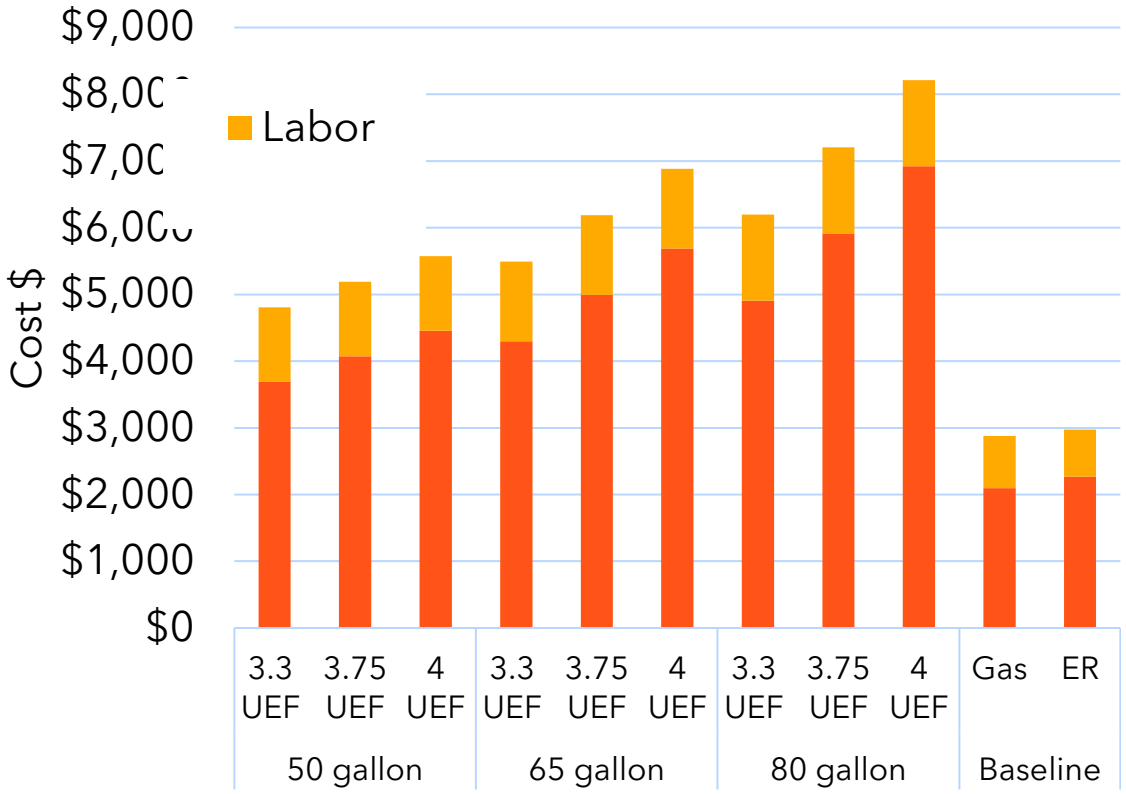
- Total installed HPWH costs **decrease** in MTI-identified submarkets
- Retail channel sees an increase in HPWH sales and is competitive with distributor channel
- Utility rates become more favorable to fuel substitution over time

**Availability and product recommendation**

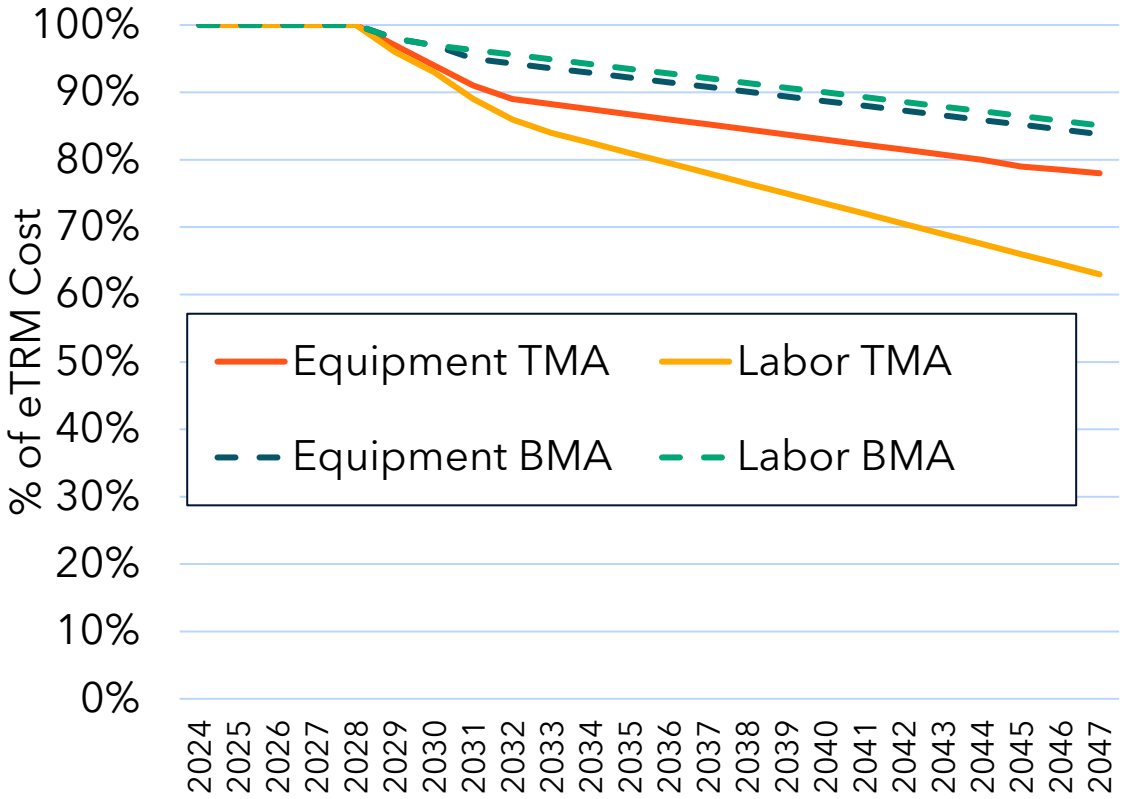
- Increased installer confidence and acceptance of heat pump water heater technology
- Improved statewide coordination, product consistency, and submarket execution

# Customer economics – equipment and labor costs

## Cost data




## Forecasted cost declines

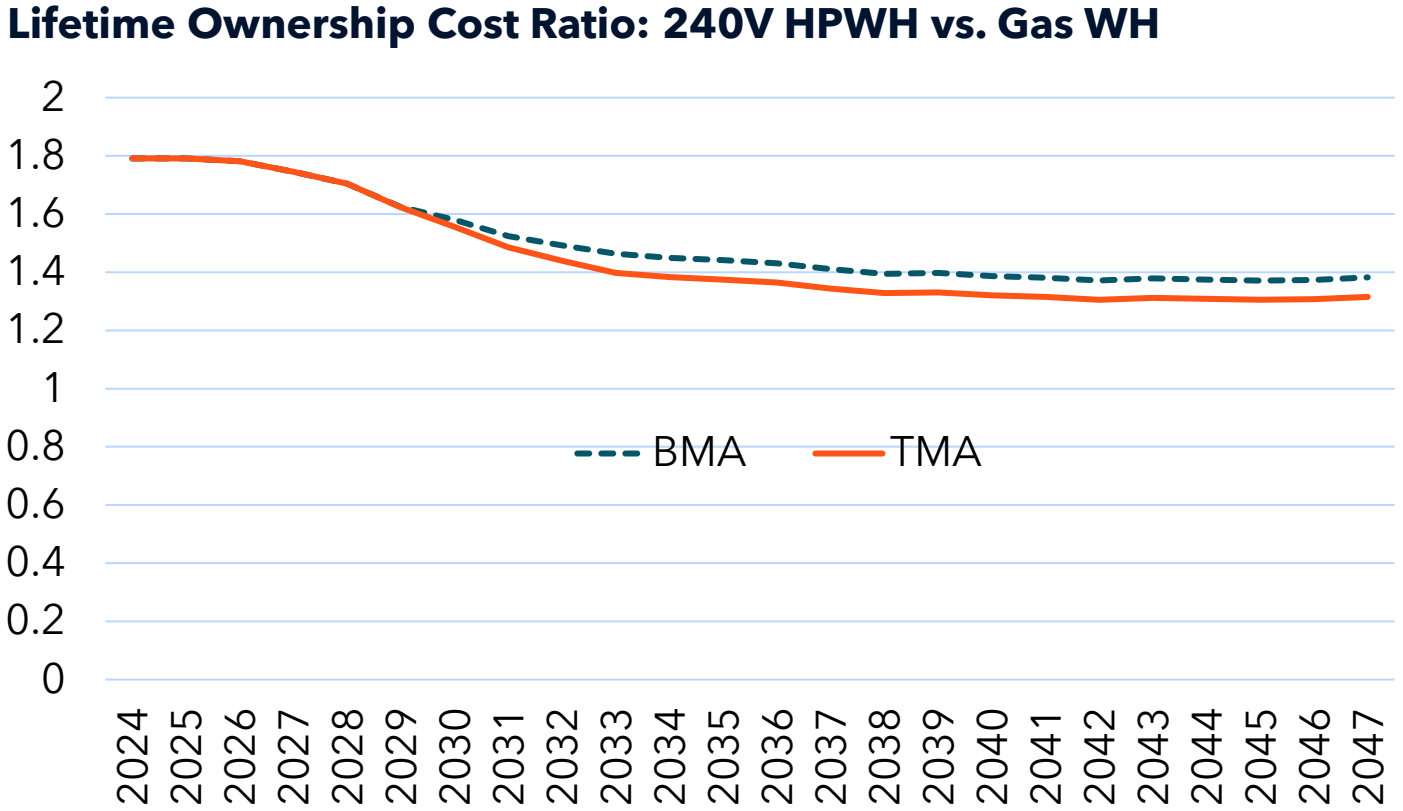



*Source: eTRM updated 2026*

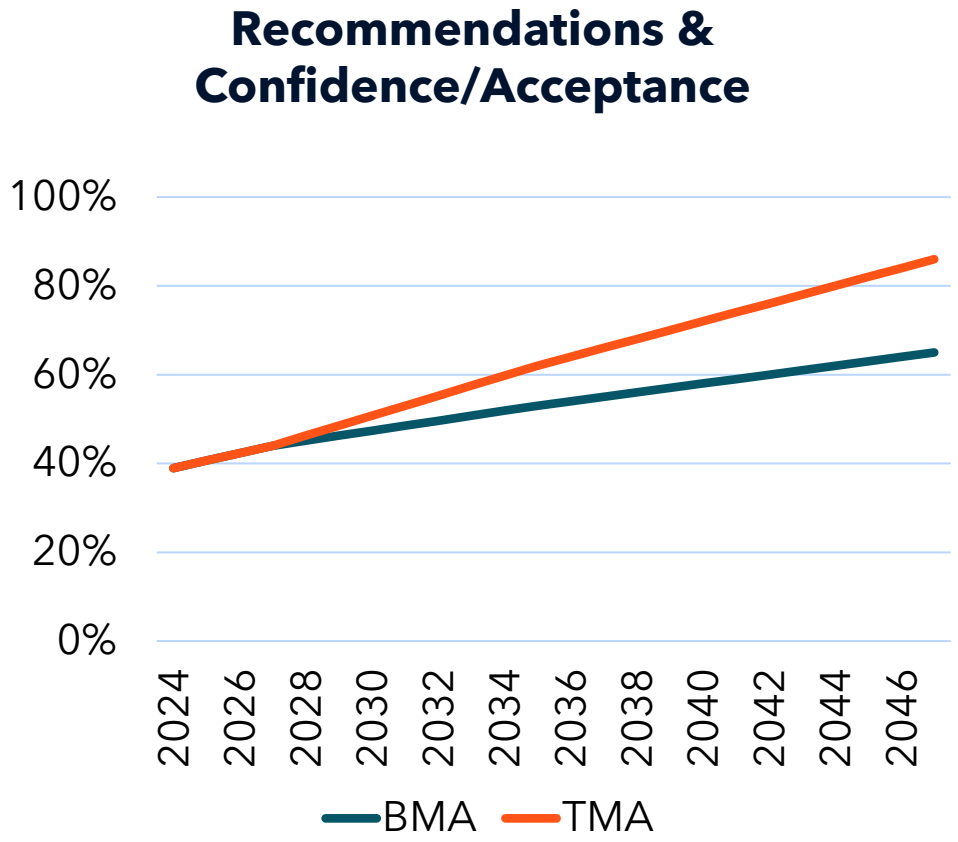
# Customer economics – relative lifetime costs

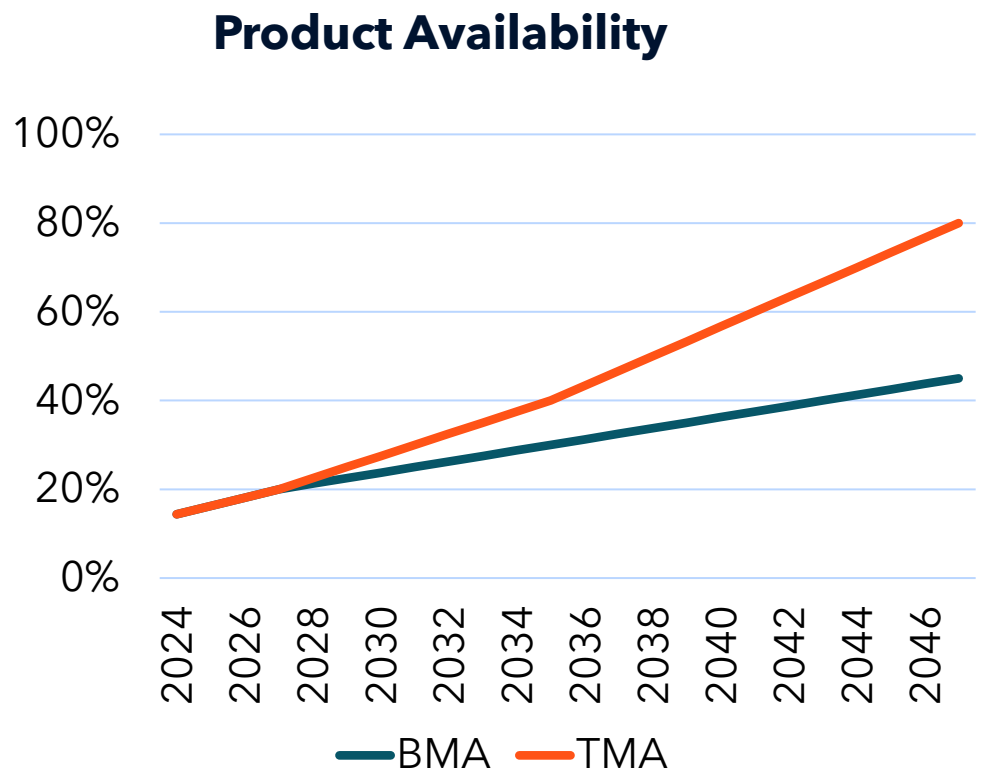
The relative cost of ownership between a HPWH and a baseline unit decreases over time as:

- Gas rates increase at a faster rate than electric rates (CEC forecasts)
- Installation and labor costs decrease over time



# Product recommendation and availability




- Installer recommendation of a HPWH solution for gas WH customer
- Timely availability of appropriate, "fit-for-purpose" products (choosing a HPWH does not mean time without hot water)

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# Adoption Forecast Results

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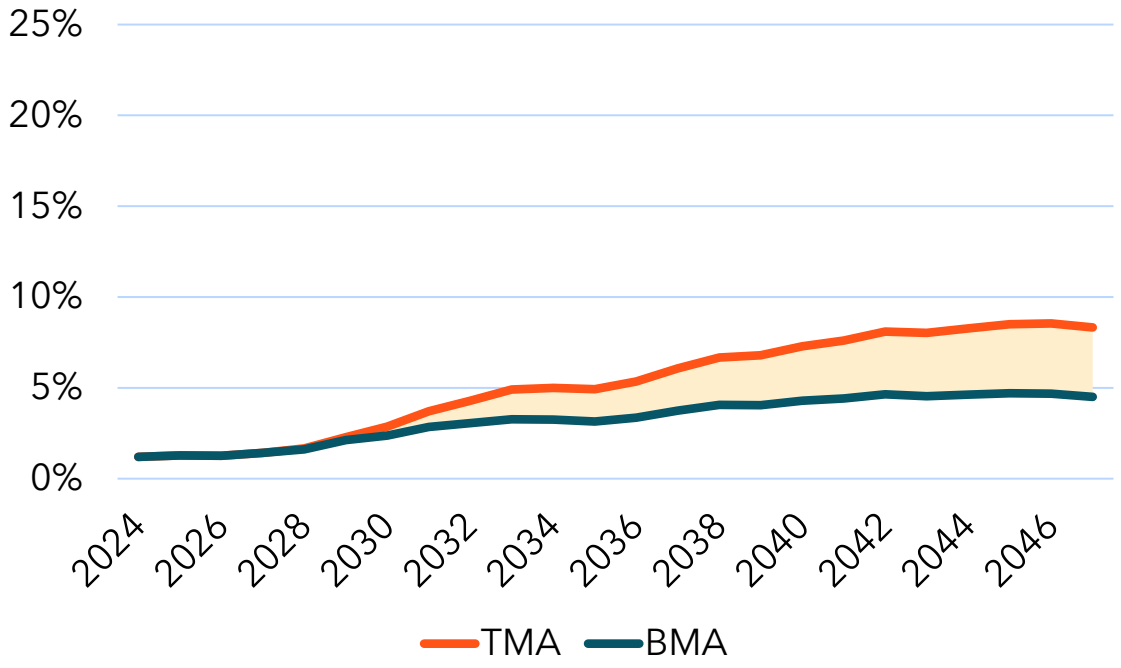
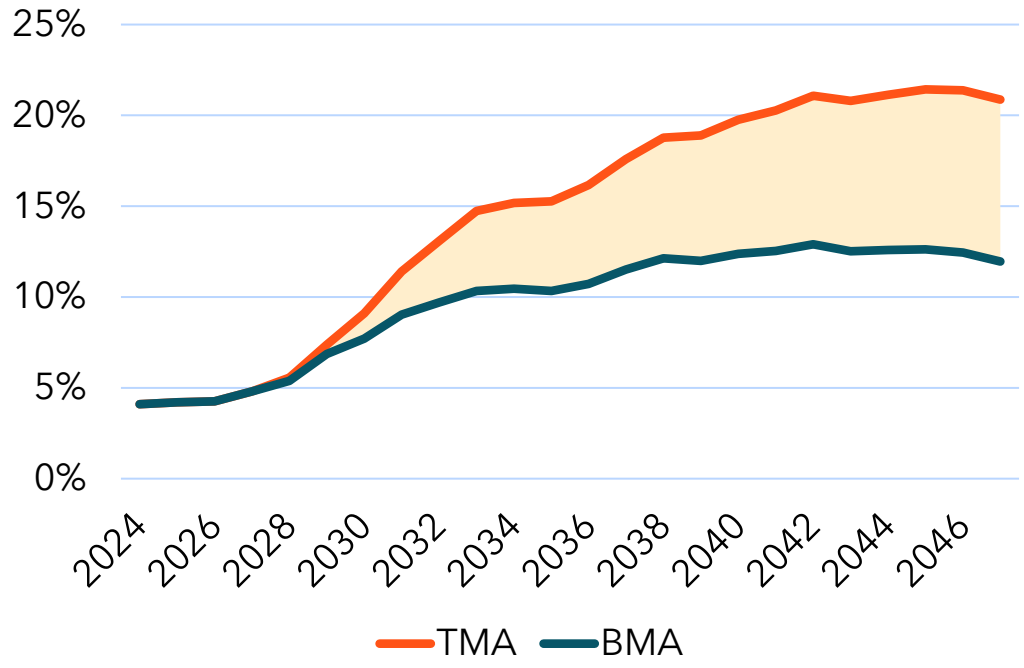
# Market shares – fuel substitution

## 120V Fuel Substitution



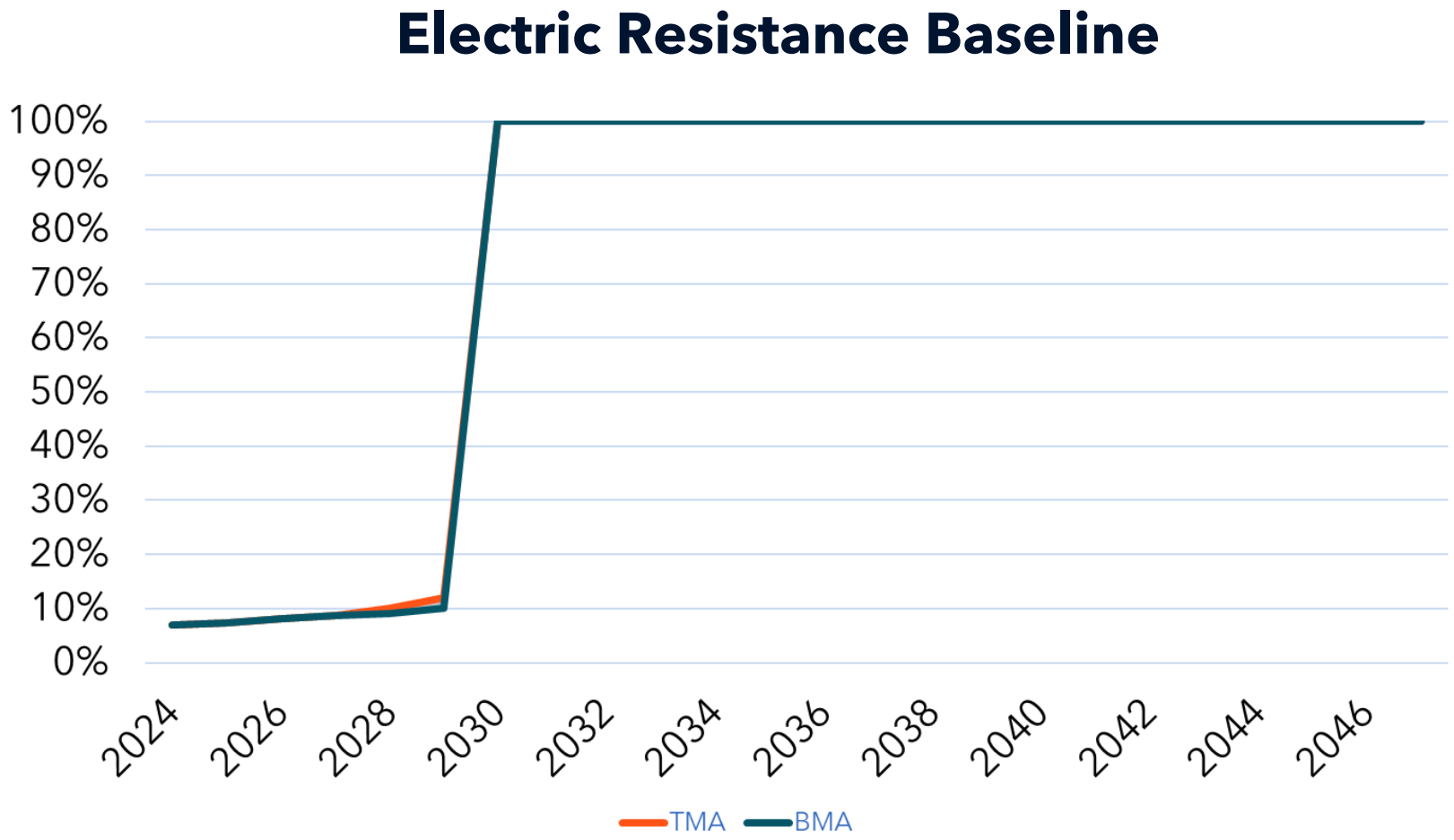

Annual product flow – 154,639

## 240V Fuel Substitution



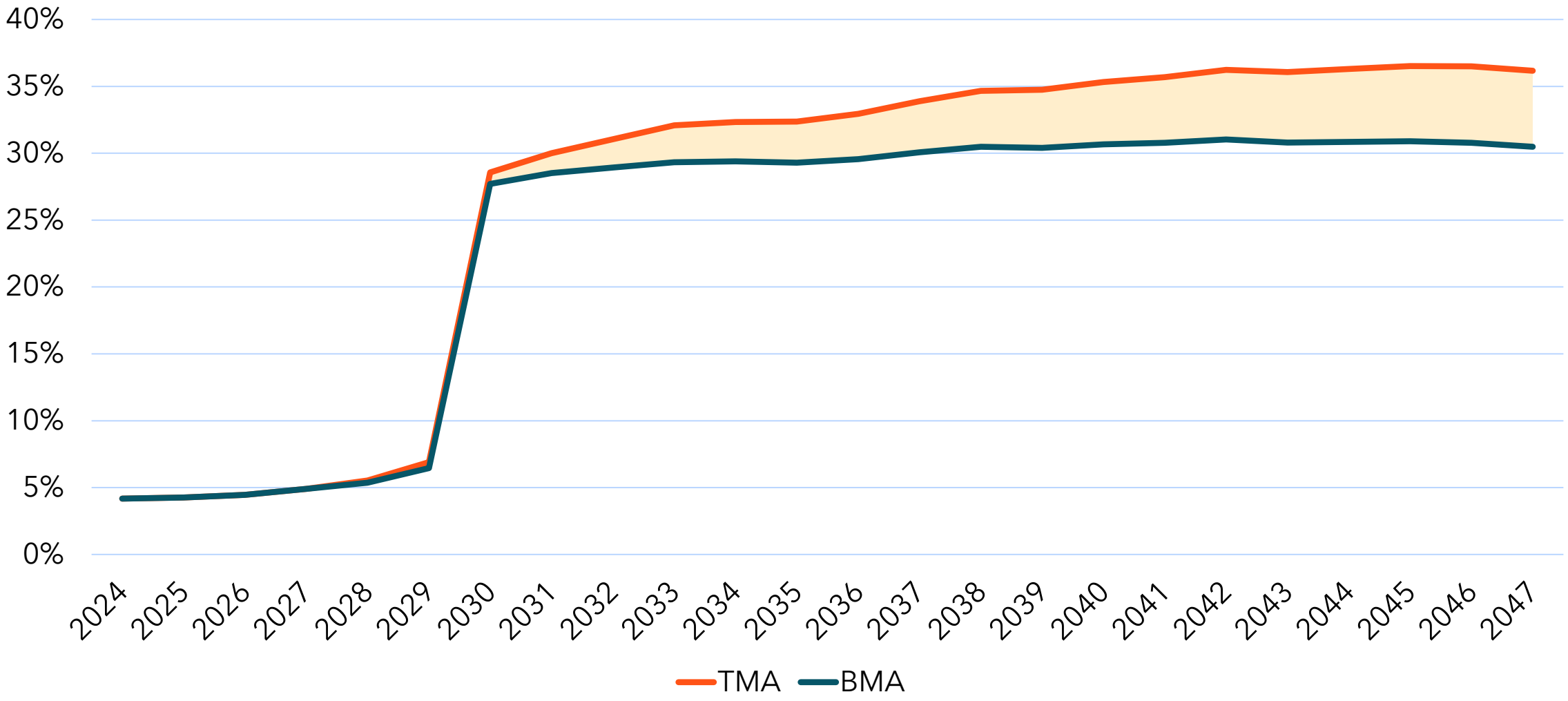

Annual product flow – 360,824

# Market shares – electric resistance baseline

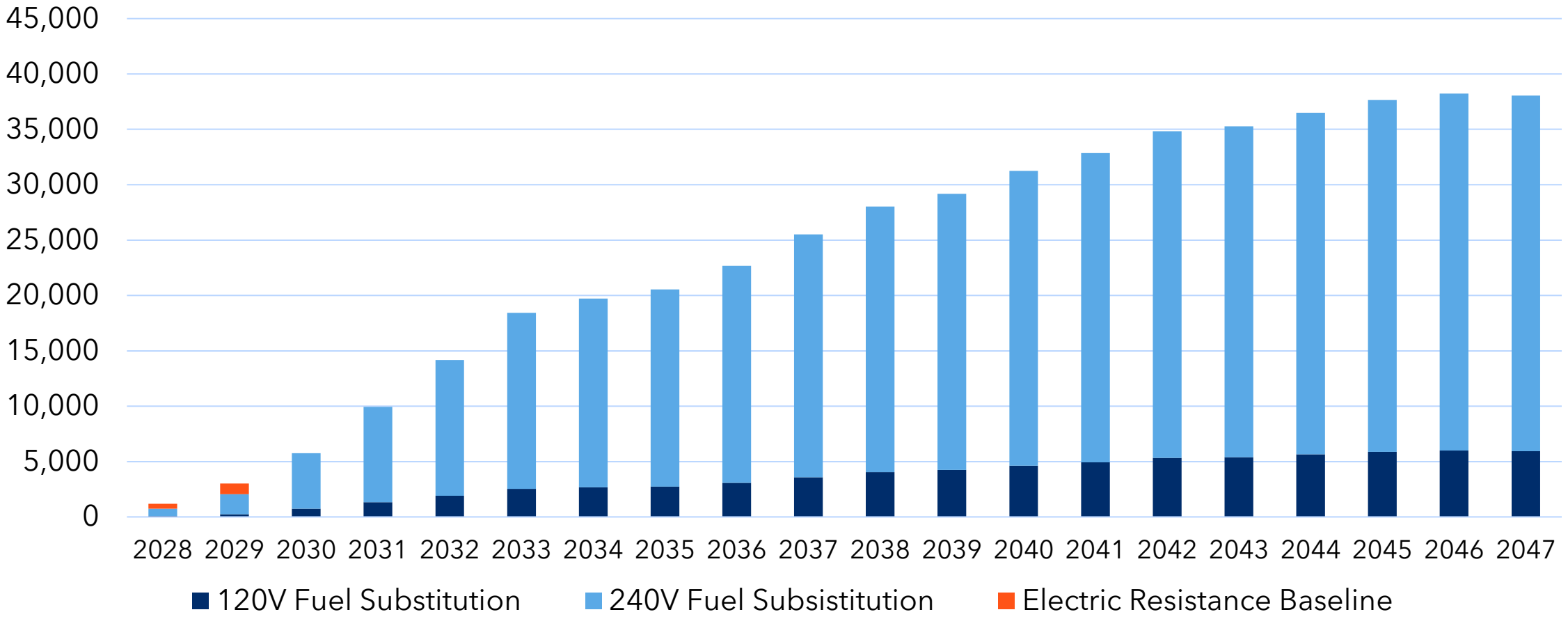



Annual product flow – 153,969

# Market share – all groups



# HPWH annual incremental installations




Total cumulative incremental installations = 482,765

# Break (10 min.)
# We will be back soon.

# 5. Residential HPWH: TSB and Cost-Effectiveness

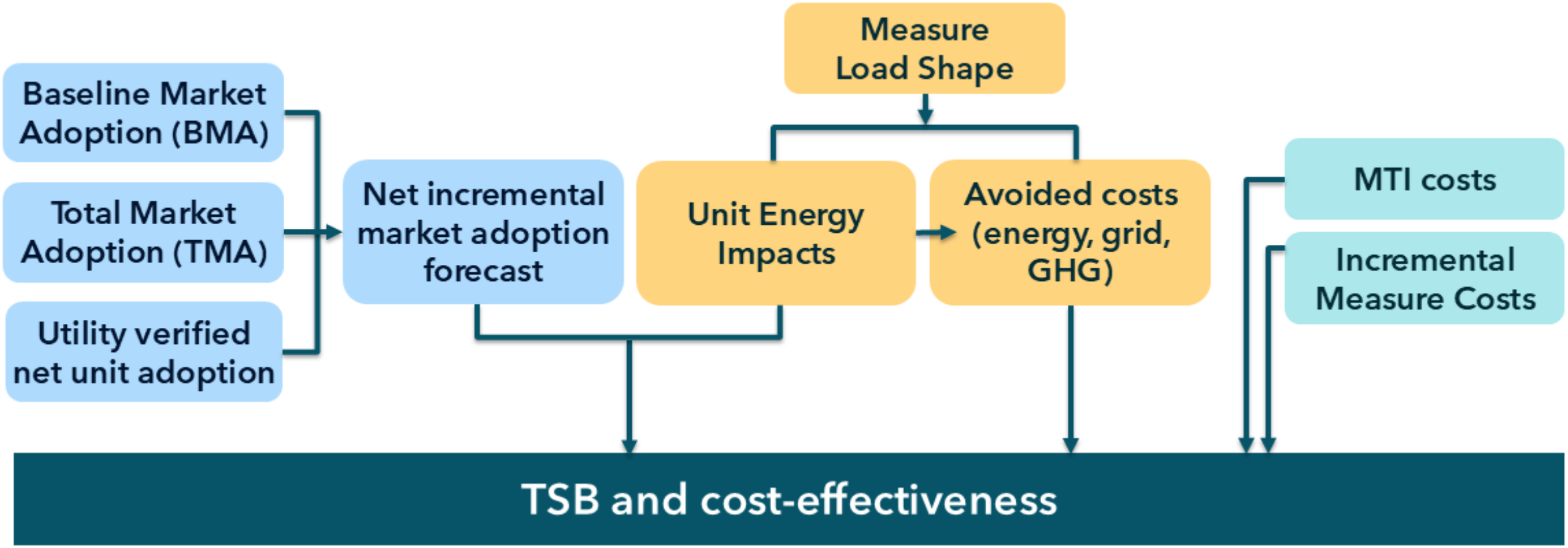
Isaac Schultz, Engineering Manager

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# What we'll cover

1. Overview of Process
2. Inputs to TSB and Cost Effectiveness Calculations
3. Total System Benefits
4. Cost effectiveness
5. Sensitivity Analysis
6. Key Takeaways

# TSB and cost-effectiveness model process overview



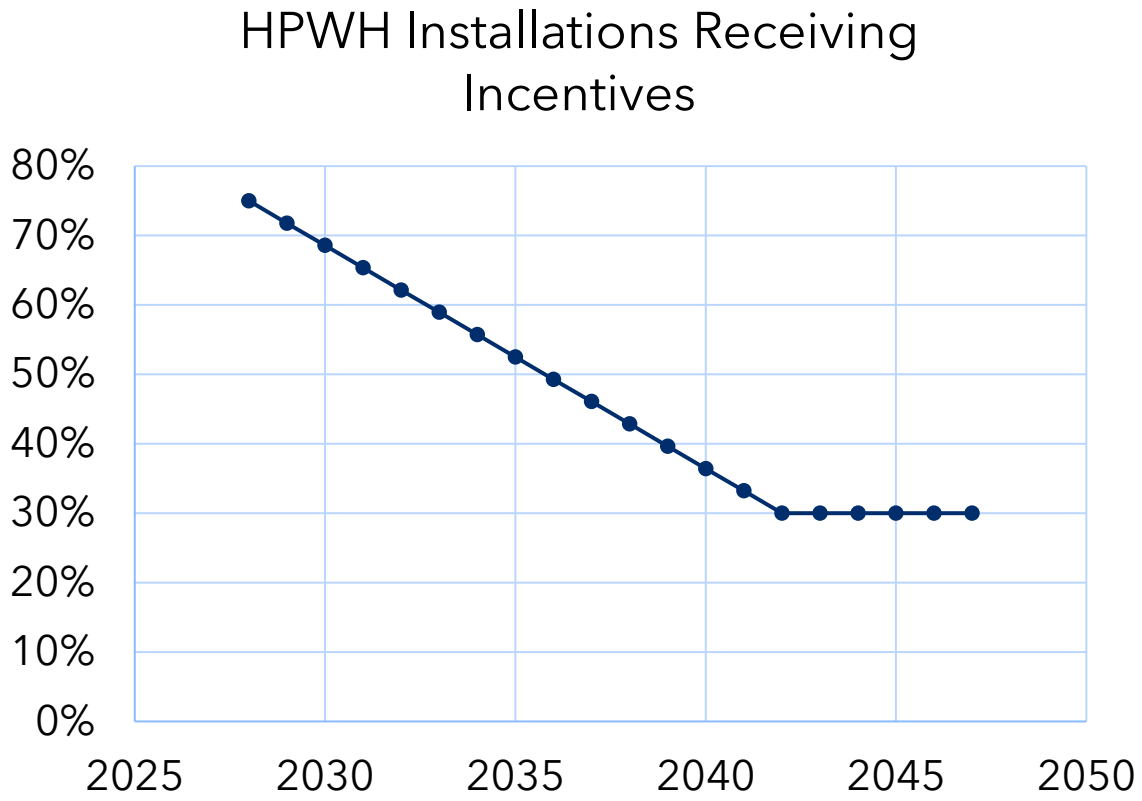
# TSB and cost-effectiveness inputs

| Input | Value (source) |
|---|---|
| **HPWH EUL** | 20 years<br>*(eTRM)* |
| **Unit Energy Savings** | 63 unique savings shapes<br>*(CPUC DEER prototype models EnergyPlus / Prototype System)* |
| **Avoided Costs** | Gas, electricity, and refrigerant avoided costs<br>(CPUC 2024 Avoided Cost Calculator (ACC), Electric and Gas Models, v1b;<br>Refrigerants: CPUC 2022 ACC Refrigerant Calculator, v1b) |
| **Discount Rates** | TRC – 7.3% , SCT – 5.1%<br>*(2024 ACC)* |
| **MTI Lifetime** | 2028-2047 |
| **MTI Costs** | ~$42M *(MTI team estimate)* |
| **Incremental Unit Costs** | TMA minus BMA equipment and labor costs<br>*(eTRM measure ID SWWH025-10 & SWWH014-08)* |
| **PA-verified units** | 47% (based on historical and estimated future program activity) |

# Incremental HPWH units credited to MTI

$$Net\ Incremental\ Adoption = Y^{TMA} - Y^{BMA} - Y^{PA}$$

- PA-verified units are estimated to account for ~47% of all installations
  - Cost-effectiveness and TSB are calculated using the remaining 53% of incremental installations



# Net Incremental Adoption

$$Net\ Incremental\ Adoption = Y^{TMA} - Y^{BMA} - Y^{PA}$$

Where $Y$ represents cumulative adoption of HPWH Units over the forecast period of 2028 to 2047. $TMA$, $BMA$, and $PA$ represent net incremental adoption attributed to the TMA, BMA, and PA-verified savings respectively

| Model Segment | HPWH Installations |
|---|---|
| Statewide Incremental Adoption | 482,765 |
| IOU Territory Incremental Adoption ("co-created") | 376,557 |
| Net incremental adoption | **199,575** |

# HPWH TSB - PRELIMINARY

| Test | TSB – Energy | TSB – Grid | TSB – GHG | TSB – Refrigerant | TSB – Total |
|---|---|---|---|---|---|
| TRC | 56.0 M | 8.4 M | 436.7 M | -15.2 M | **486.0M** |
| SCT Base | 91.9 M | 13.6 M | 976.3 M | -24.4 M | **1,057.3 M** |

| TRC Ratio | PAC Ratio | SCT (Base) Ratio |
|---|---|---|
| 1.80 | 16.32 | 2.91 |

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# Sensitivity Analysis

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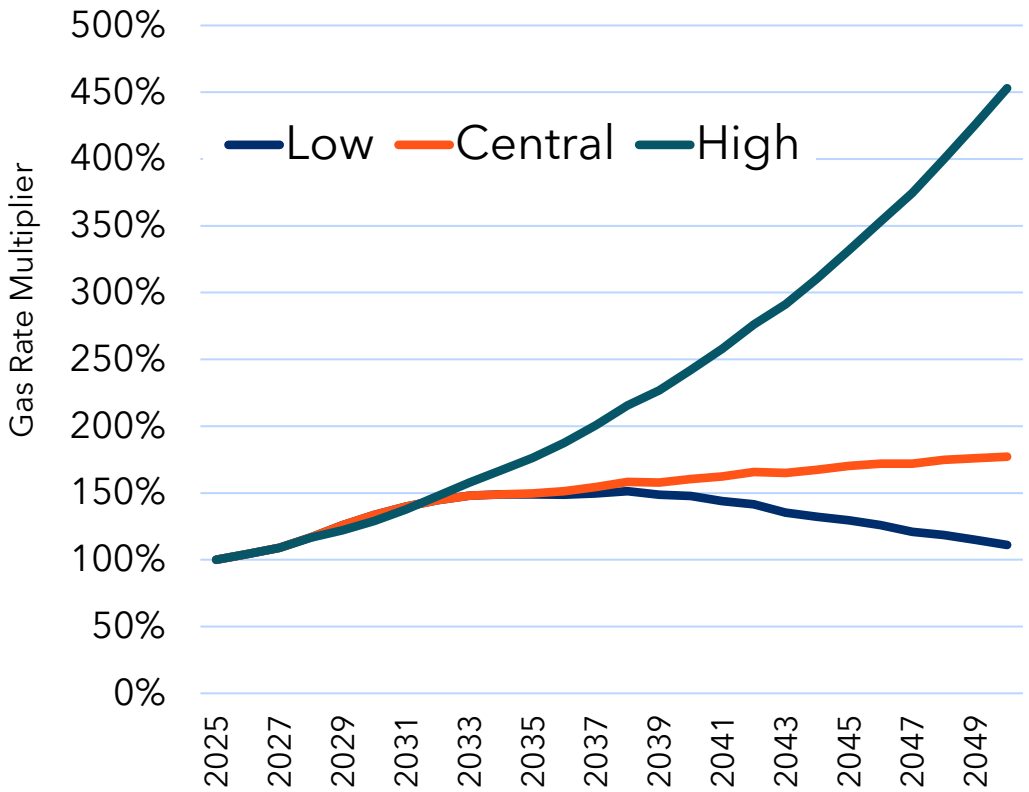
# Sensitivity Analysis #1: High Gas Forecast

## Using **CEC High Gas** Forecast

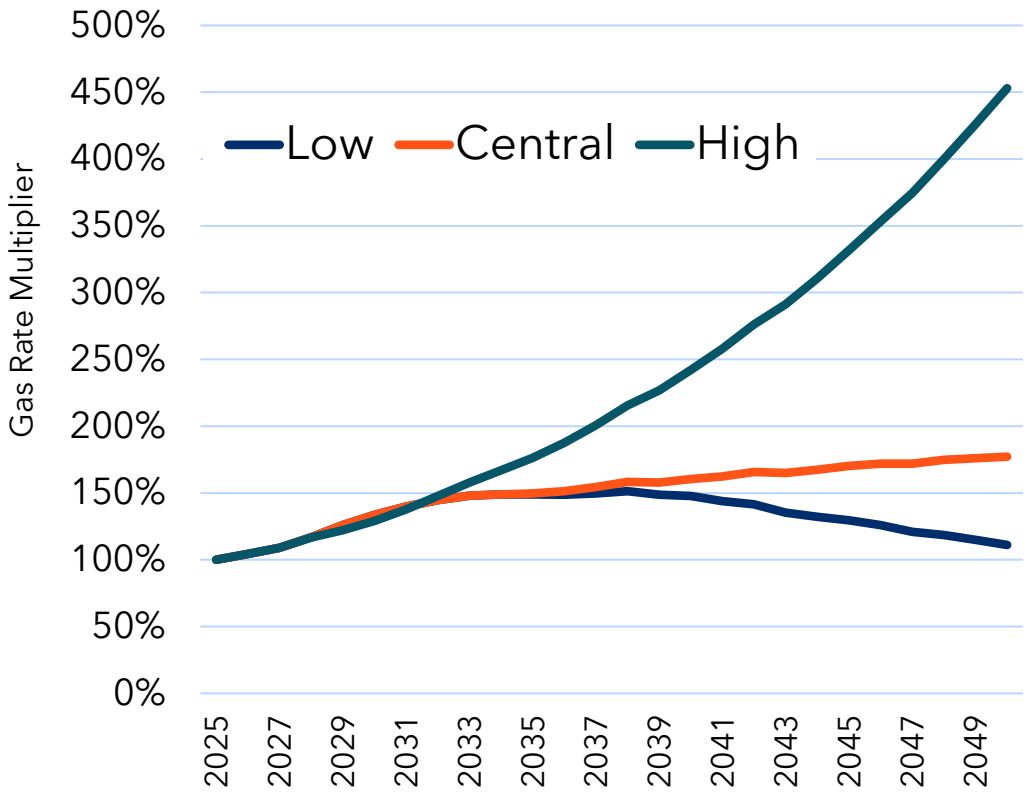



| Scenario | TRC | TSB $ |
|---|---|---|
| Base Model | 1.80 | 486.0 M |
| **High Gas Forecast** | **1.95** | **763.6 M** |

| Scenario | Statewide Incremental | IOU Incremental ("co-created") | Net Incremental |
|---|---|---|---|
| Base Model | 482,765 | 376,557 | 199,575 |
| **High Gas Forecast** | **776,159** | **605,404** | **320,864** |

# Sensitivity Analysis #2: Low Gas Forecast

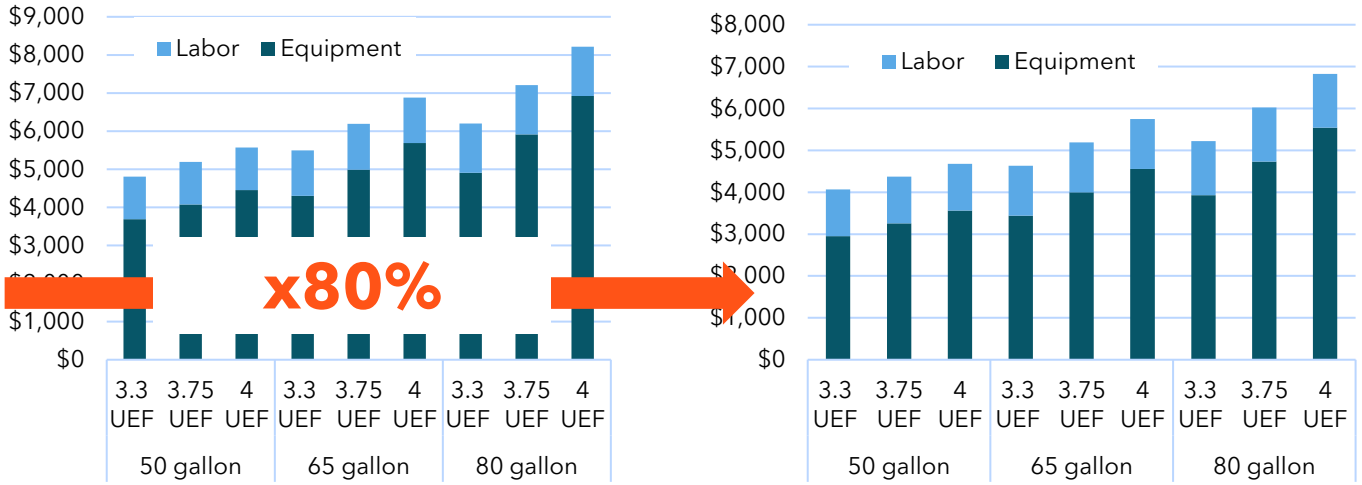
## Using **CEC Low Gas** Forecast




| Scenario | TRC | TSB $ |
|---|---|---|
| Base Model | 1.80 | 486.0 M |
| **Low Gas Forecast** | **1.66** | **373.4 M** |

| Scenario | Statewide Incremental | IOU Incremental ("co-created") | Net Incremental |
|---|---|---|---|
| Base Model | 482,765 | 376,557 | 199,575 |
| **Low Gas Forecast** | **362,337** | **282,622** | **149,790** |

# Sensitivity Analysis #3: Lower HPWH equipment costs

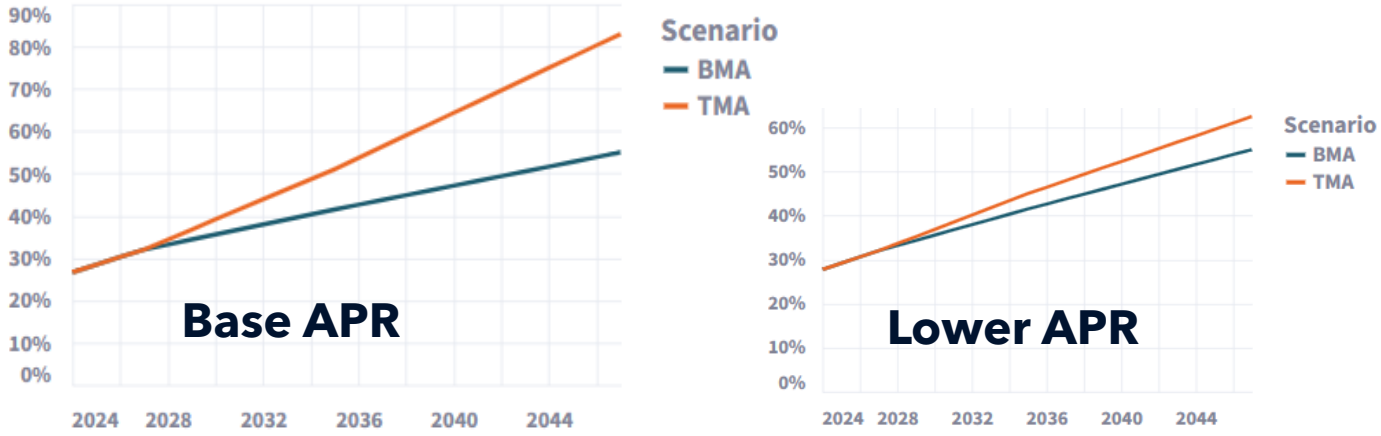



| Scenario | TRC | TSB $ |
|---|---|---|
| Base Model | 1.80 | 486.0 M |
| **Lower Equipment Costs** | **2.72** | **638.1 M** |

Upfront **equipment costs** at 80% of their current eTRM values

| Scenario | Statewide Incremental | IOU Incremental ("co-created") | Net Incremental |
|---|---|---|---|
| Base Model | 482,765 | 376,557 | 199,575 |
| **Lower Equipment Costs** | **636,219** | **496,251** | **263,013** |

# Sensitivity Analysis #4: Slower progress in availability and product recommendation

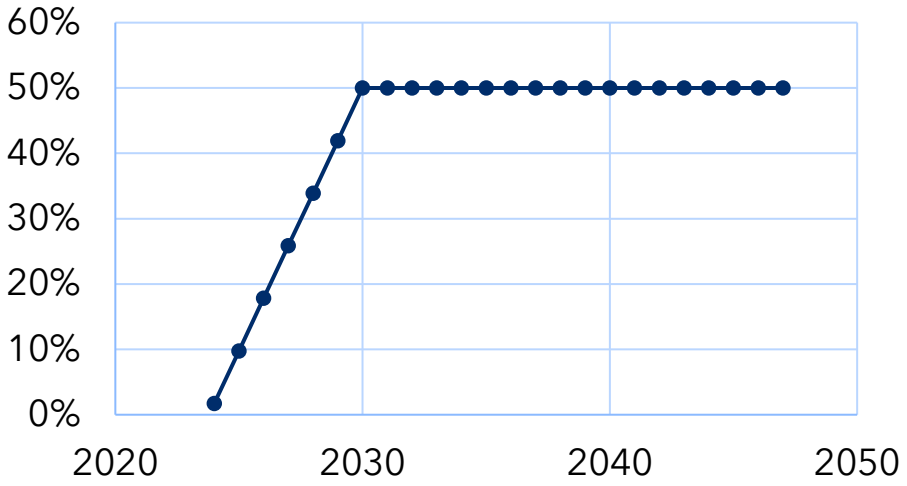



| Scenario | TRC | TSB $ |
|---|---|---|
| Base Model | 1.80 | 486.0 M |
| **Lower APR** | **1.64** | **287.5 M** |

Availability and product recommendation ~20% lower at the end of the MTI lifetime

| Scenario | Statewide Incremental | IOU Incremental ("co-created") | Net Incremental |
|---|---|---|---|
| Base Model | 482,765 | 376,557 | 199,575 |
| **Lower APR** | **283,641** | **221,240** | **117,257** |

# Sensitivity Analysis #5: "Electrification-friendly" rates (50% by 2030)




Share of all customers using electrification-friendly rates increases to 50% in 2030

| Scenario | TRC | TSB $ |
|---|---|---|
| Base Model | 1.80 | 486.0 M |
| **Electrification -friendly rates** | **1.83** | **574.4 M** |

| Scenario | Statewide Incremental | IOU Incremental ("co-created") | Net Incremental |
|---|---|---|---|
| Base Model | 482,765 | 376,557 | 199,575 |
| **Electrification-friendly rates** | **572,904** | **446,865** | **236,839** |

# Sensitivity Analysis #6: Low gas, higher APR constraints

Combination of two changes which have **negative impact** on HPWH adoption:

1. Low CEC gas rate forecast

2. Lower reduction in APR constraint in TMA

| Scenario | TRC | TSB $ |
|---|---|---|
| Base Model | 1.80 | 486.0 M |
| **Low adoption scenario** | **1.51** | **227.7 M** |

| Scenario | Statewide Incremental | IOU Incremental ("co-created") | Net Incremental |
|---|---|---|---|
| Base Model | 482,765 | 376,557 | 199,575 |
| **Low adoption scenario** | **219,926** | **171,542** | **90,917** |

# Sensitivity Analysis #7: EV Ramp, lower upfront cost, high gas forecast

Combination of three changes which have **positive impact** on HPWH adoption:

1. Ramp to electrification friendly rates

2. Lower upfront costs

3. High CEC gas forecast

| Scenario | TRC | TSB $ |
|---|---|---|
| Base Model | 1.80 | 486.0 M |
| **High Adoption Scenario** | **2.84** | **852.0 M** |

| Scenario | Statewide Incremental | IOU Incremental ("co-created") | Net Incremental |
|---|---|---|---|
| Base Model | 482,765 | 376,557 | 199,575 |
| **High Adoption Scenario** | **860,145** | **670,913** | **355,584** |

# Sensitivity analysis summary

| Sensitivity Analysis | TRC | TSB $ | Net incremental installations |
|---|---|---|---|
| **Base Model** | **1.80** | **486.0 M** | **199,575** |
| #1 CEC High Gas Forecast | 1.95 | 763.6 M | 320,864 |
| #2 CEC Low Gas Forecast | 1.66 | 373.4 M | 149,790 |
| #3 Lower HPWH Equipment Costs | 2.72 | 638.1 M | 263,013 |
| #4 Higher APR constraints | 1.64 | 287.5 M | 117,257 |
| #5 Electrification friendly rates | 1.83 | 574.4 M | 236,839 |
| #6 Low adoption combination scenario | 1.51 | 227.7 M | 90,917 |
| #7 High adoption combination scenario | 2.84 | 852.0 M | 355,584 |

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# Key Takeaways

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations.

# Key modeling takeaways

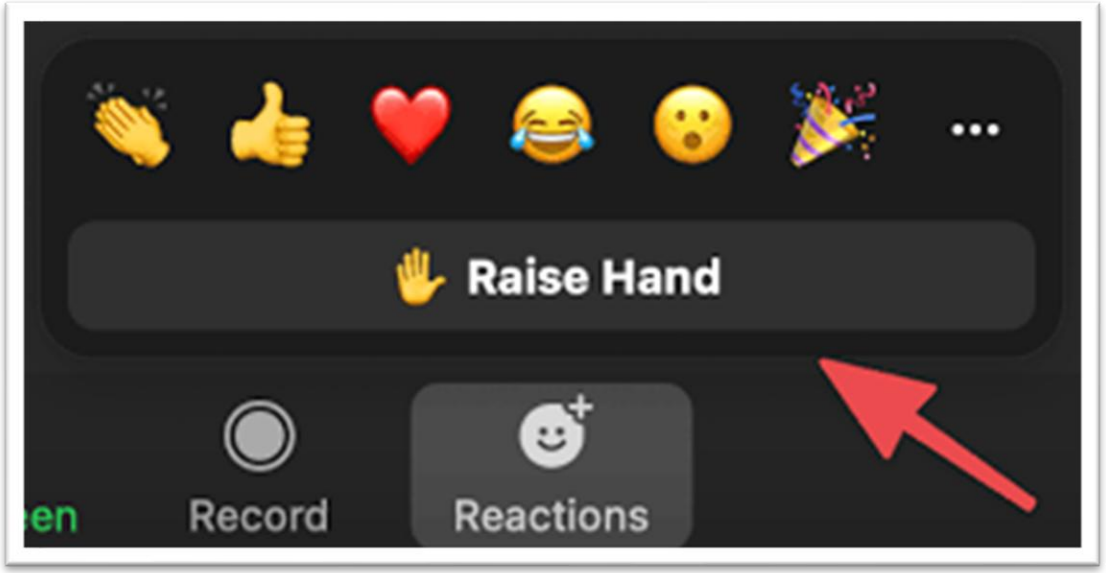
- HPWH market shares increase over time as:
  - Barriers (including product availability, installer recommendations) to adoption are removed
  - Incremental HPWH costs decline (equipment and labor prices drop, gas rates increase faster than electric rates)
  - 2029 federal standard impacts trickle down to the fuel substitution market
- Higher upfront costs and utility bills continue to exert downward pressure on HPWH adoption
- Benefits of avoiding gas consumption outweigh the added costs of electricity, especially for GHG.

# Discussion

- Alternative baseline scenarios (policy)
- Sensitivity analysis assumptions
- Propane segment

# 8. Public Comment

Raise your hand using the “Reactions” feature and we will allow you to unmute yourself.



# 9. Next Meeting and Next Steps

Stacey Hobart, Principal of Engagement & Communications

# MTAB activities

## April

- MTAB members will start new terms
- MTAB and public will receive full HPWH MTI materials for review and comment about mid-April
- 1st Quarter Activities Report Webinar on **4/28**

## May

- Next meeting is set for **5/6** in person in the Bay Area
- Organizational Review will be completed at the end of May and sent to MTAB members for review.

# Transformative Energy Solutions

## for the public good

Market transformation is a proven approach that works to remove market barriers so that energy efficient, equitable, and climate-friendly approaches become the new standard practice for all Californians.

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