CalMTA

9/19/24

Market Transformation Advisory Board (MTAB) Meeting

1

Welcome, Agenda & Introductions

Agenda

Time	Agenda Item	Presenter
10:00 a.m.	**1. Welcome, Agenda & Introductions**	Stacey Hobart
10:10 a.m.	**2. COI Declarations & Review draft MTAB meeting notes 8/26/24**	Stacey Hobart
10:15 a.m.	**3. *Idea to Initiative*: Induction Cooking Market Transformation Theory & Logic Model**	Tom Bougher, Hope Lobkowicz & Elaine Miller
11:50 a.m.	*Break (10 min)*	
12:00 p.m.	**4. *Idea to Initiative*: Room Heat Pumps Market Transformation Theory & Logic Model**	Tom Bougher, Hope Lobkowicz & Elaine Miller
1:35 p.m.	**5. Comment Summary on Draft Advancement Plan: Foodservice Water Heating**	Jeff Mitchell
1:40 p.m.	**6. Public Comment**	
1:50 p.m.	**7. ABAL Update & Upcoming Meetings**	Stacey Hobart
2:00 p.m.	*Adjourn*	

Phone participants will be muted throughout the meeting and can raise their hand during the public comment period to be unmuted.

2
COI Declarations & Review Draft MTAB Meeting Notes from 8/26/24

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
- Those with competitive interest can recuse from discussion, but must leave MTAB if responding to RFP
- Agree not to influence remaining MTAB
- Interpretation, if needed, done by CPUC staff

Transparency

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

[MTAB Charter with Conflict of Interest]

CalMTA COI Policies

- The CalMTA program has robust COI policies to ensure decision-making is transparent, impartial, and unbiased.
- 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.

CalMTA

Draft MTAB meeting notes – 8/26

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

Idea to Initiative Part 1: Induction Cooking Market Transformation Theory and Logic Model

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

idea to initiative

TIMELINE

CalMTA

AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
INTRO	PART 1	PART 2	PART 3
Idea to Initiative Campaign Overview	**Market Transformation Theory + Logic Models**	**Market Forecasting, Cost Effectiveness + Cost Estimates**	**Evaluation Plans**
MTAB MEETING	MTAB MEETING	MTAB MEETING	MTAB MEETINGS
Aug. 26	Sept. 19	Oct. 25	Nov. 20 + 21

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idea to initiative

Induction Cooking Product Assessment

Tom Bougher, 2050 Partners

Induction Cooking product definition

Permanently-installed, consumer-grade cooktops and ranges

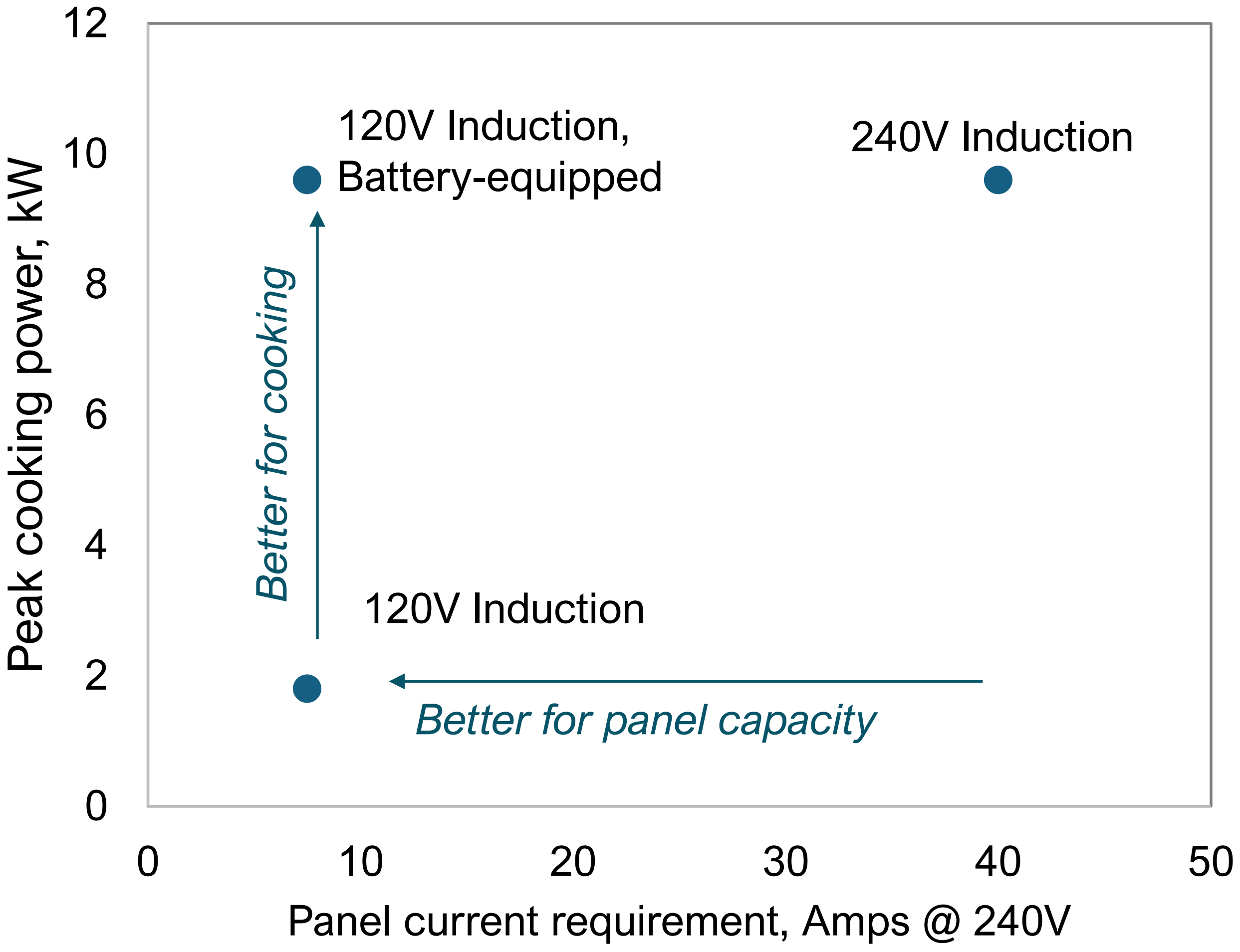
- All induction
  - o Includes battery-equipped induction cooking products
  - o Does **not** include portable induction cooktops
- ENERGY STAR certified radiant

PART 1

Product definition details

Product Type	Voltage	ENERGY STAR Required?	Installation
Induction cooktop	240	No	Permanent
Induction range	240	No	Freestanding & slide in
Radiant cooktop	240	Yes	Permanent
Radiant range	240	Yes	Freestanding & slide in
Battery-equipped induction cooktop	120 or 240	No	Permanent
Battery-equipped induction range	120 or 240	No	Freestanding & slide in

Product solution for panel capacity

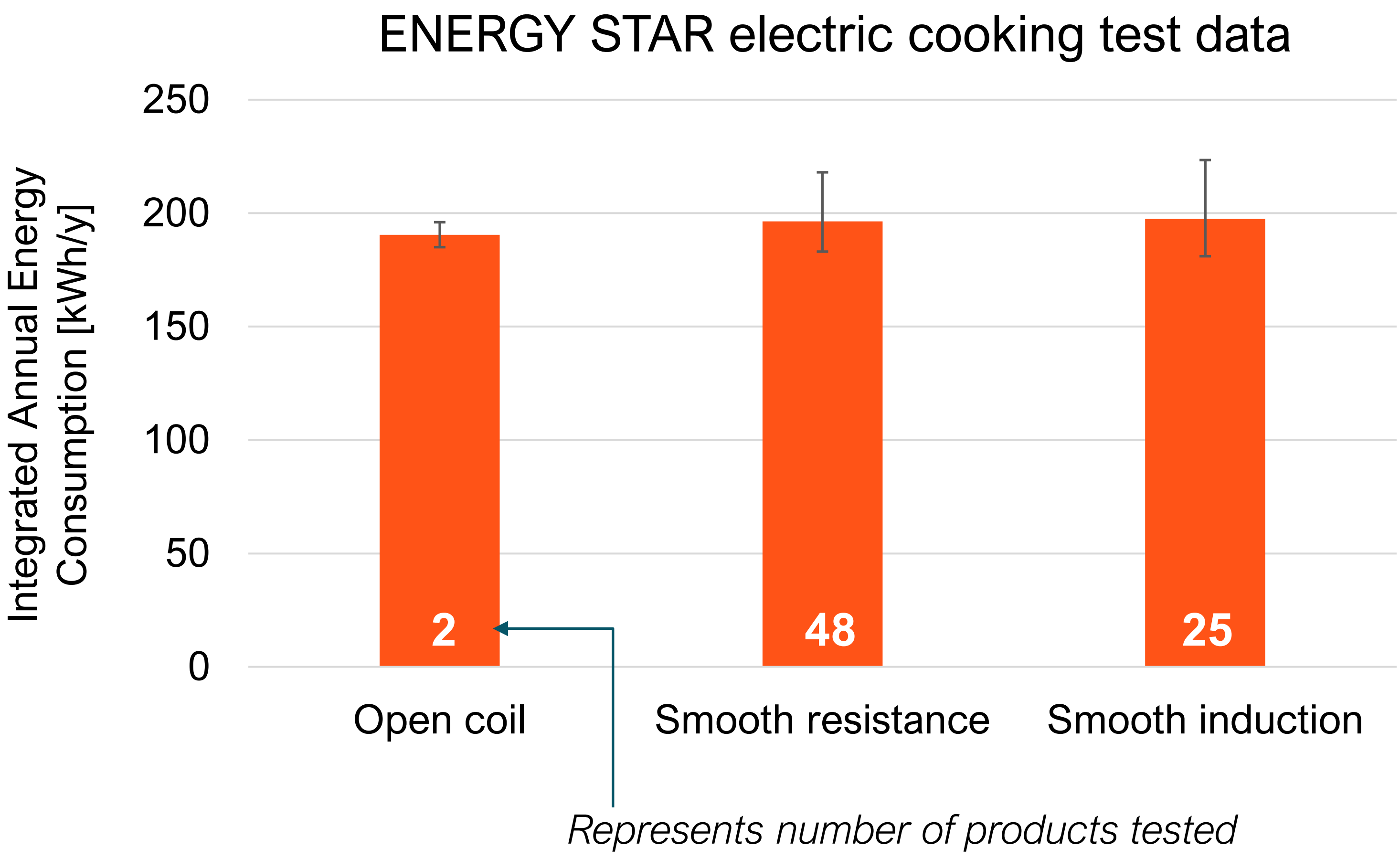


- Adding 240V induction cooking appliances would require panel optimization or upgrade in 38% of CA MF homes & 30% of SF homes.[1]
- An estimated 59% of MF and 32% of SF homes have 100A panels, which would require load management for further electrification.[2]

1 Opinion Dynamics. 2024. *Fuel Substitution Behind the Meter Infrastructure Market Study: Equity Segment DRAFT REPORT*. May 8

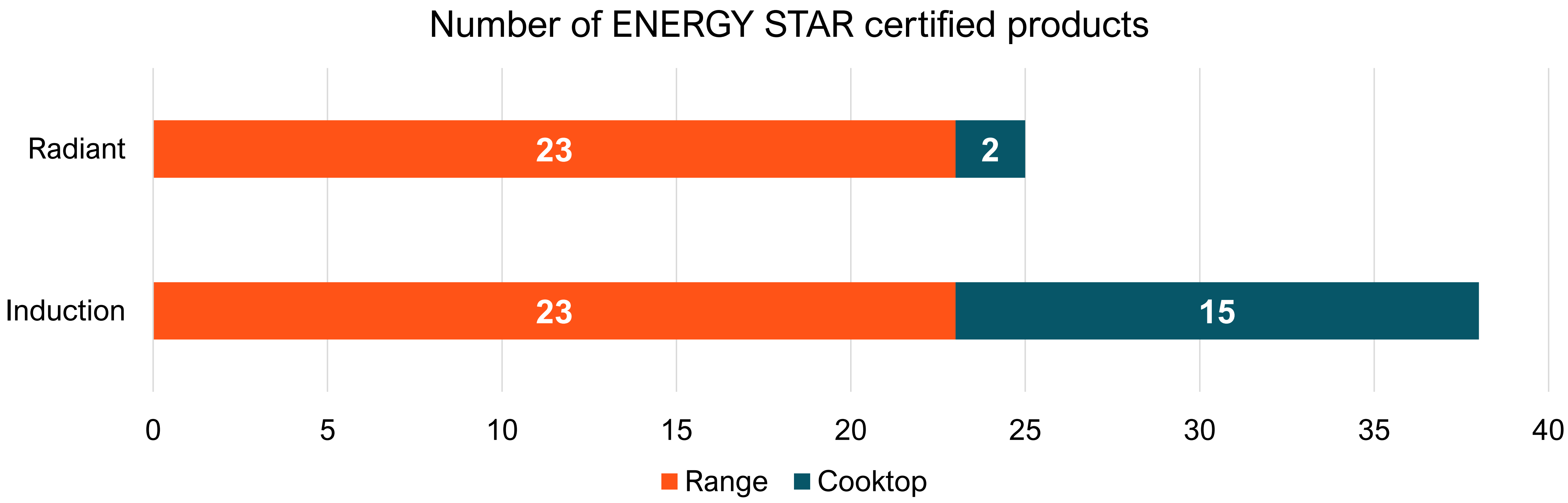
2 Fournier et. al., Quantifying the electric service panel capacities of California's residential buildings, Energy Policy, Volume 192, 2024, 114238, ISSN 0301-4215.

Energy consumption of electric cooking



- Similar energy consumption for different types of electric cooktops
- Low power mode energy consumption is slightly higher for induction compared to resistance based on tested products

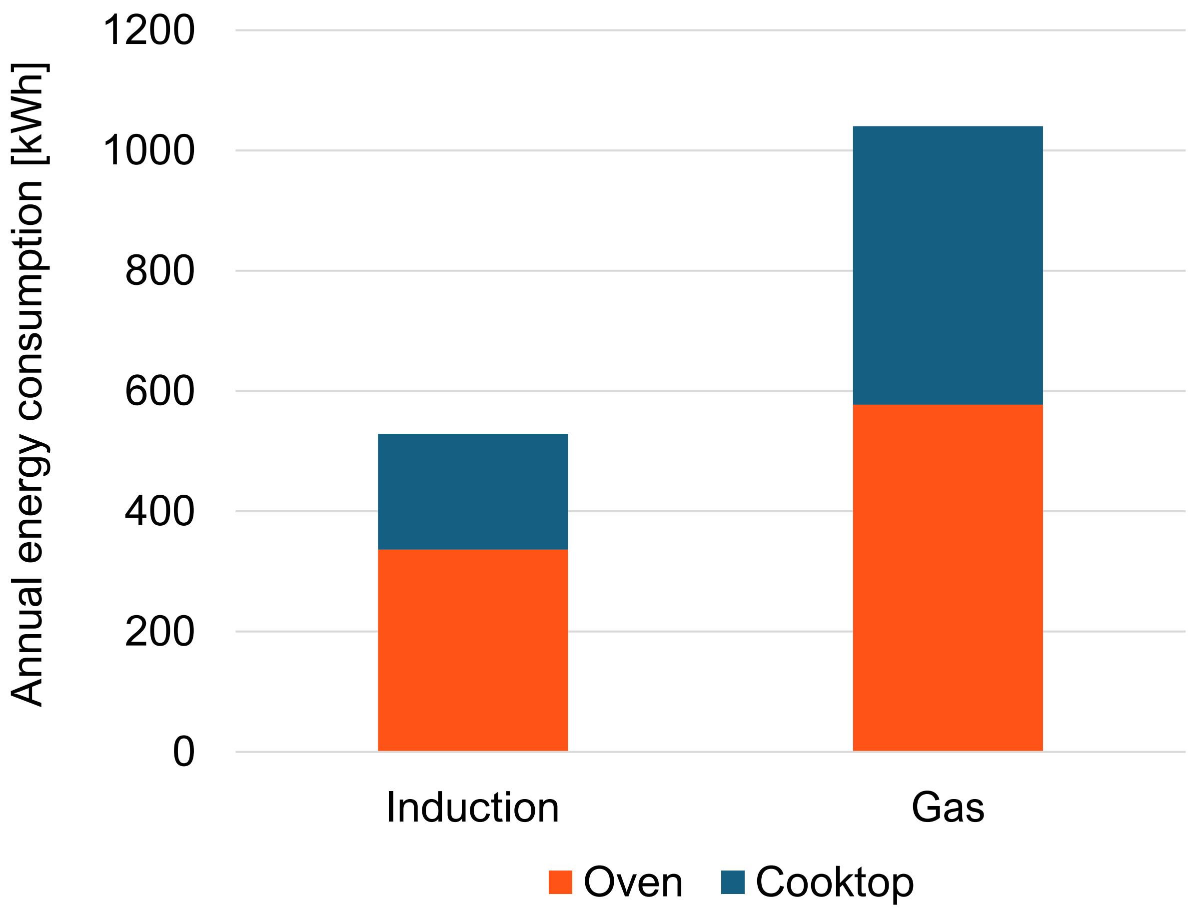
Energy consumption of electric cooking



Listed on ENERGY STAR website as of September 1st, 2024

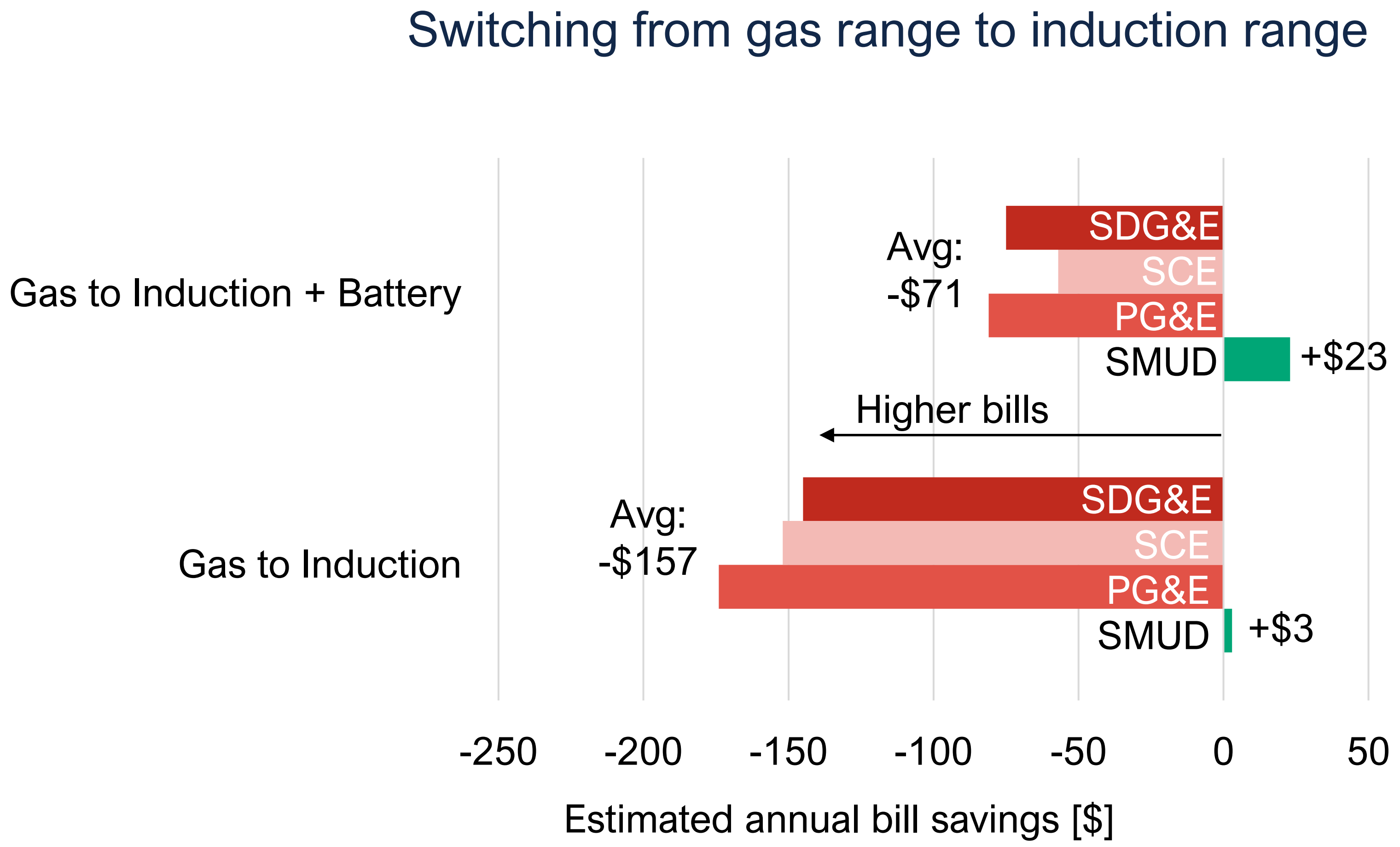
Implications of electric ovens

- In California, ranges comprise:
  - 75% of the SF market
  - 96% of the MF market
- 63% of electric cooking energy consumption is from oven
- Standard electrical resistance heating
- This negatively affects bill impacts for fuel switching



PART 1

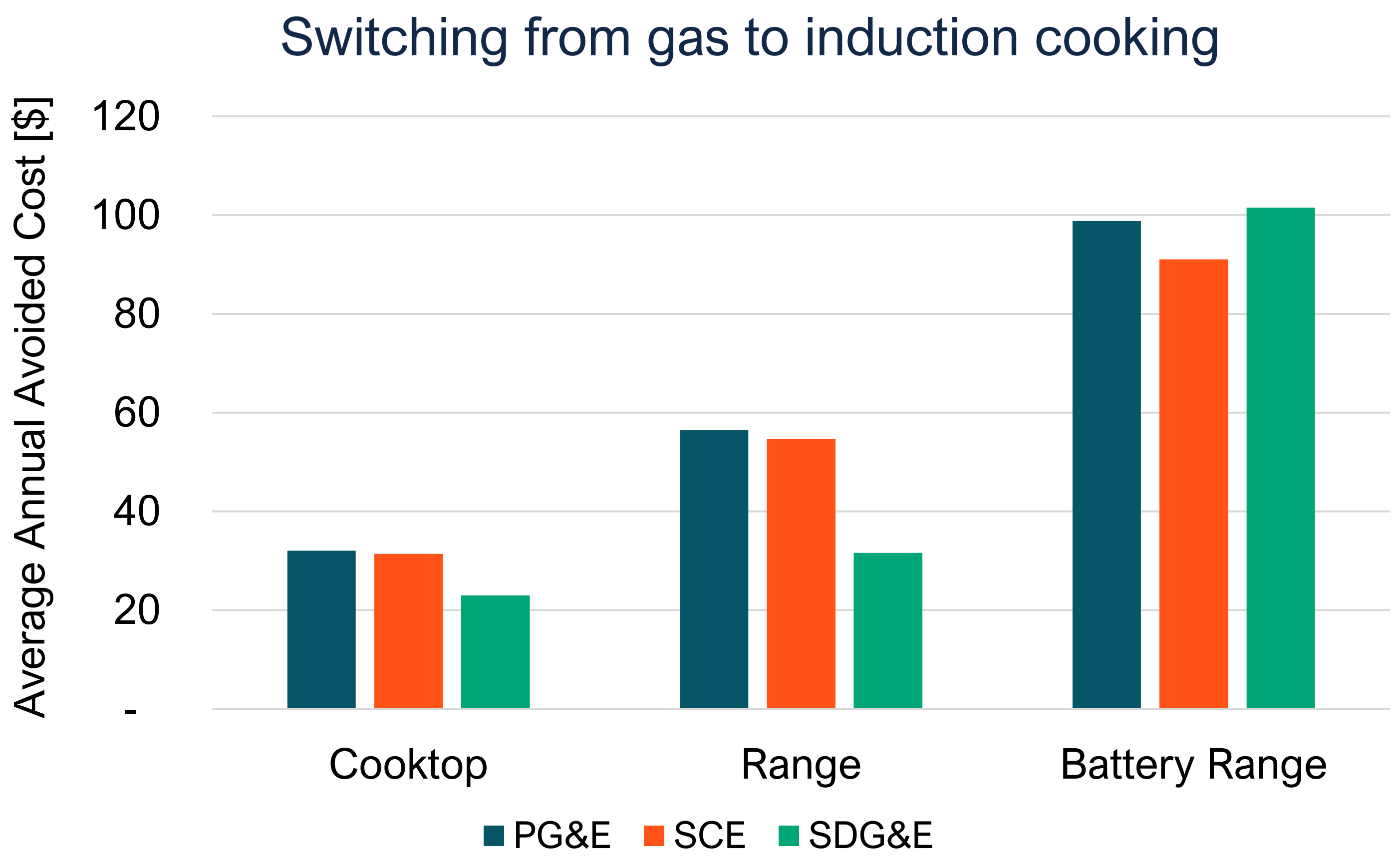
Bill impacts – gas to induction



Note: SMUD uses PG&E gas, SCE uses SoCalGas

- Both induction products have same energy usage. Battery-equipped range saves money through shifting charging to low TOU rate hours
- We estimate 9-13% energy savings possible due to reduced HVAC loads for induction, not included in this analysis

Avoided cost benefits – induction



Average annual avoided cost for one appliance, 2024-2052

- Avoided costs are optimized by demand shifting with batteries
- The battery-equipped range uses 15% more energy but has has 2x the avoided cost benefit of a standard induction range

Health & safety of gas cooking

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INDOOR AIR QUALITY

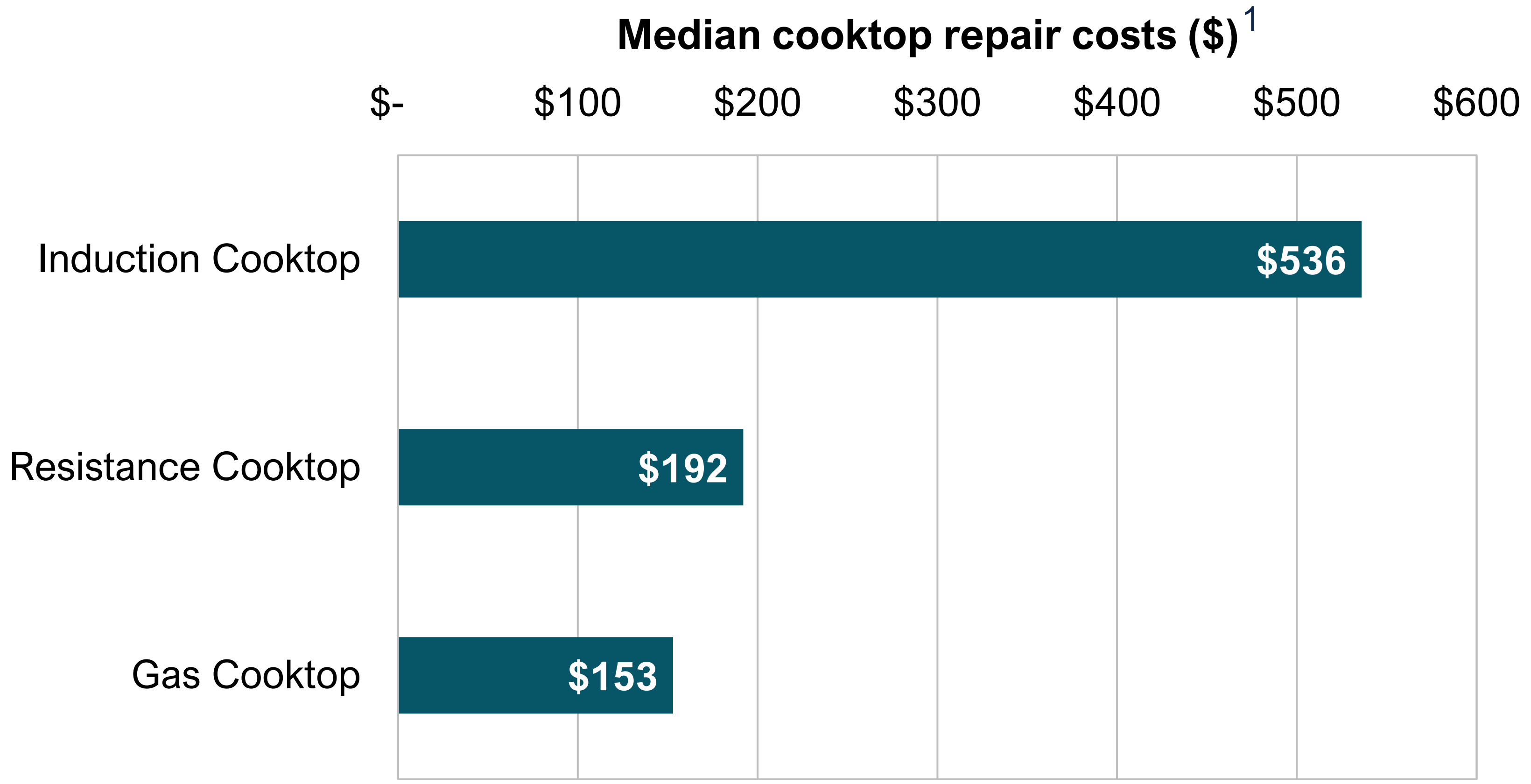
- 2022 analysis attributed 12.7% of childhood asthma in US to gas cooking[1]
- Same study found 20% of CA childhood asthma would be prevented by removing gas cooking
- Gas cooking air quality disproportionately affects ESJ community and those in small MF homes

SAFETY

- Over 200,000 natural gas leaks per year require emergency response
- 15,700 people burn themselves on a hot cooktop or range annually in the US[2]

[1] Casey N. et. al., The burden of natural gas leaks on public sector emergency response in the United States, Energy Policy, Volume 192, 2024,
[2] Non-Fire Cooking Burns, UTMB News, November 21, 2022

Induction reliability & repair costs



Service rate for induction:[2]

25% in 2020

12% in 2024

Service rate for resistance:

5% in 2020

[1] Angi. "How Much Does Oven Repair Cost?" Accessed July 31, 2024.
[2] Yale Appliance. "Most Reliable Induction Ranges." Accessed July 31, 2024.

Induction cooking product plan

Short-term outcomes	Long-term outcomes
• More 120V products at lower cost, emphasizing battery-equipped products • 24″ products for multifamily	• Radiant will fall out of PD in future as ENERGY STAR gets more stringent • ENERGY STAR & test procedures accommodate 120V and battery equipped products

Future work

Field data from battery-equipped 120V ranges; monitor product reliability

Product summary – induction cooking

ENERGY STAR radiant included – provides same energy/GHG benefits with high product availability, but without ideal cooking experience

All 120V products can solve the electrical panel capacity barrier; only battery-equipped can provide the same cooking experience

Switching from gas to induction can have negative bill impacts – made larger by oven

Demand shifting induction with batteries can improve TOU bills and avoided costs benefits

Questions?

Induction Cooking Market Characterization

Key Findings and Conclusions

Hope Lobkowicz, Cadmus Group

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Key finding:

Widespread adoption of efficient electric cooking in the residential sector will require product innovation, panel upgrades, or panel optimization strategies

> “Most cooktop locations won't have that level of wiring, so you'll have to run a new wire which is potentially a significant cost.”
> *–Home Remodeler*

Electrical upgrades

- Cost barrier cited by California PAs, manufacturers, property managers and home remodelers
- An estimated 32% of SF housing units and 59% of MF units have 100 Amp panels[1]

[1]Fournier et. al., Quantifying the electric service panel capacities of California's residential buildings, Energy Policy, Volume 192, 2024, 114238, ISSN 0301-4215.

120V battery-equipped products

“When upgrading from gas, getting enough electricity to an induction range used to be expensive and complex. But Charlie plugs in to the outlet you already have. Easy peasy.”
– Copper’s website

- Mainstream kitchen appliance manufacturers interviewed do not have plans to enter the battery-equipped 120V market
- Opportunity to engage manufacturers to develop additional models at lower price points

“Charlie” 120V range

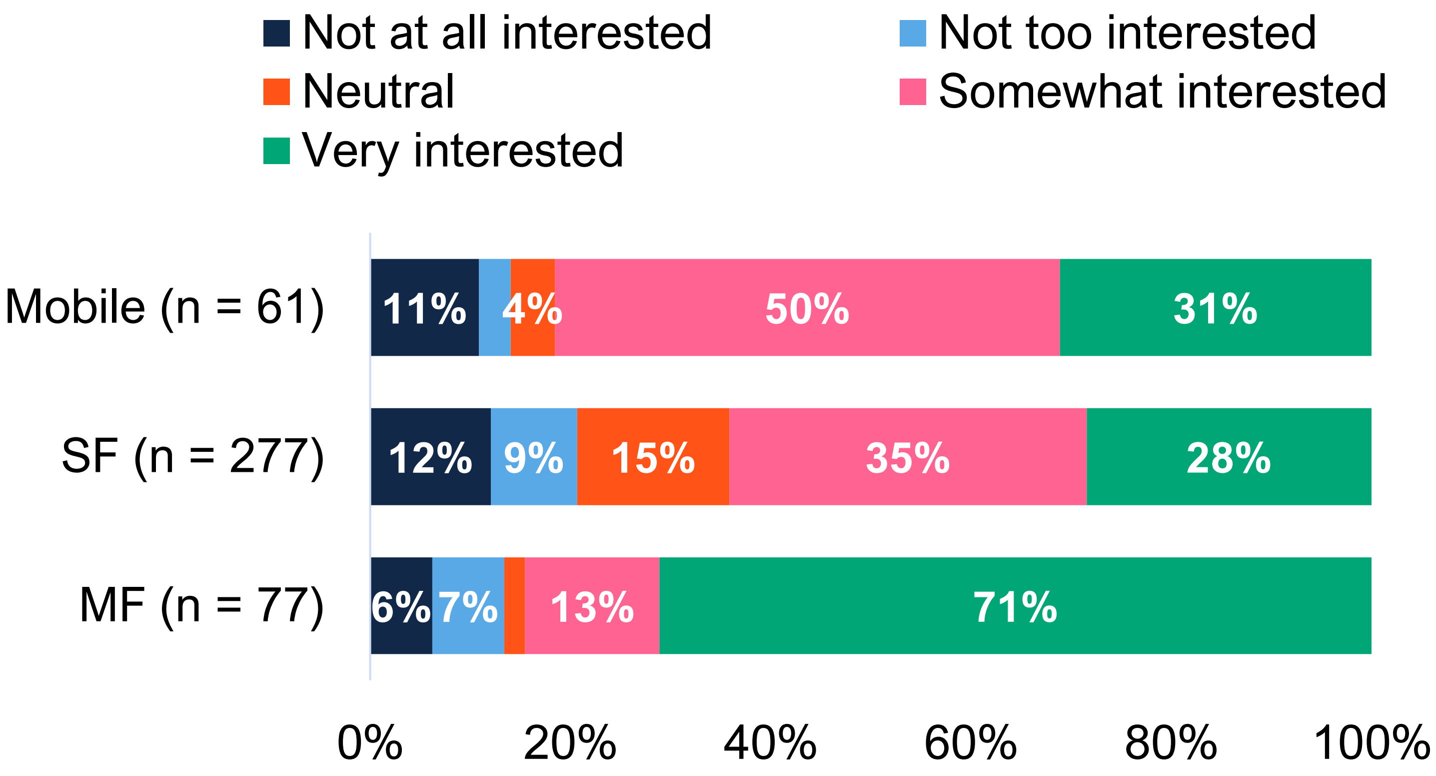
Key finding:

There is an opportunity to build on the interest in induction cooking among gas users through strategies such as loaner programs and in-person demonstrations

Consumer attitudes

- 58% of Californians who are aware of induction have a positive impression
- 19% of gas users would prefer an induction cooking product
- Substantial interest in loaners among MF households

Interest in participating in a loaner program



Source: CalMTA residential survey.

Key finding:

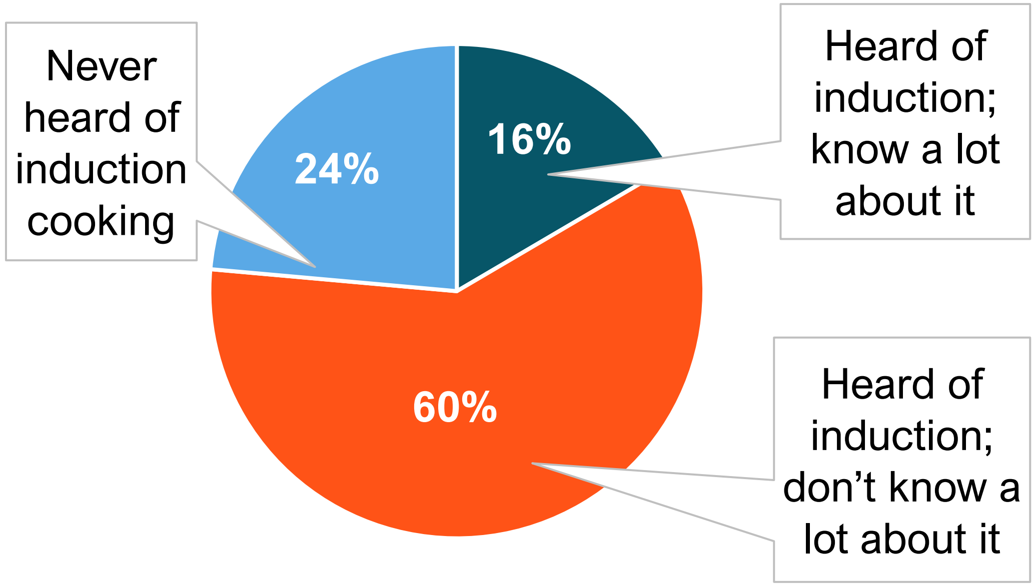
There is an opportunity to accelerate market adoption of induction cooking by promoting safety benefits and improving awareness of induction in general

PART 1

Awareness and benefits

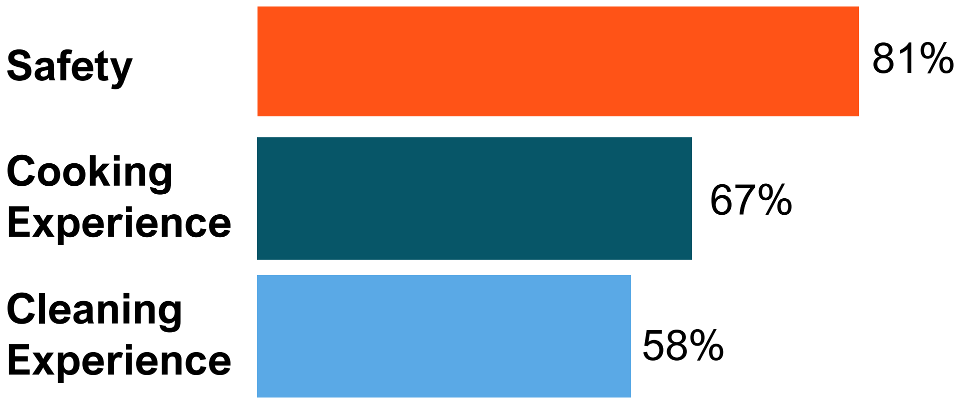
- Majority of Californians have “heard of induction, but don’t know much about it”
- Surveys and FGs found safety (cool cooktop) is a strong value proposition, but not often promoted

Awareness of induction



n=769

Why consumers want to switch to induction



n=166. Respondents could select more than one reason

Source: CalMTA residential survey

Promotional messages

Online

"This powerful, smart, energy-efficient induction cooktop offers fast performance and innovative technology that gives you peace of mind in the kitchen. Save energy, time, and cook worry-free with induction technology.

The induction burner features precise temperature control and immediately goes down to a higher or lower temperature setting. No more spills due to over-boiling, means less time cleaning the cooktop."

In-Store

Key finding:

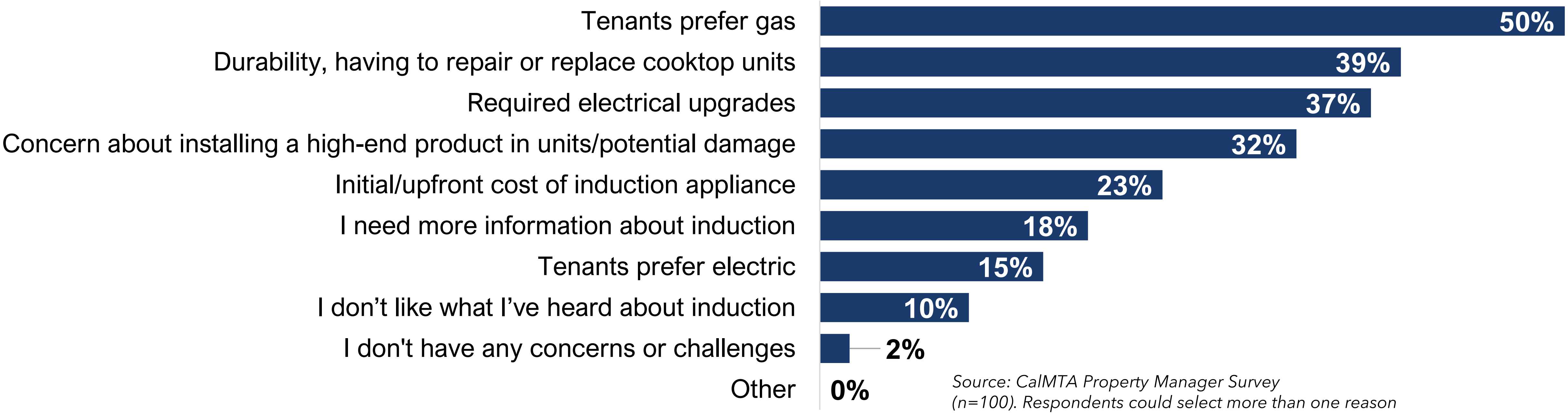
Property managers are interested but cautious about induction

"[It would] depend on the market rents; if [rent] justifies putting in an induction range because, from what I'm aware of, they are a little bit pricier than your standard like heating element cooktops."
– *Property manager*

Property manager attitudes

Survey of PMs found that 42% would be “very likely” to install induction cooktops, but **interviews** uncovered a more cautious position, with many concerned about cost and payback

Additional barriers to induction (Property Managers)



Source: CalMTA Property Manager Survey (n=100). Respondents could select more than one reason

Key finding:

Induction cooking products are underrepresented at brick-and-mortar retail locations and retail sales associates often promote gas

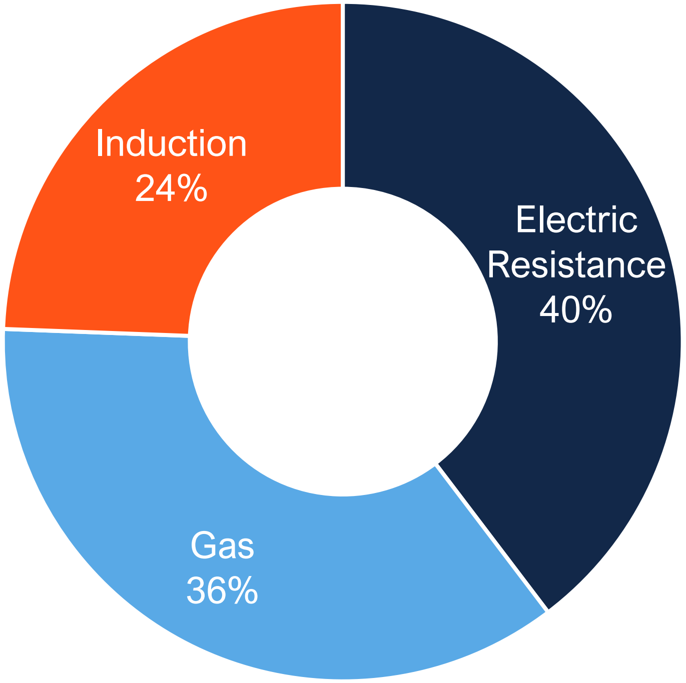
Shopping findings

Online shopping and store research found stores stock a fraction of induction models available online.

"Why would you want induction? Gas is the best way to go."

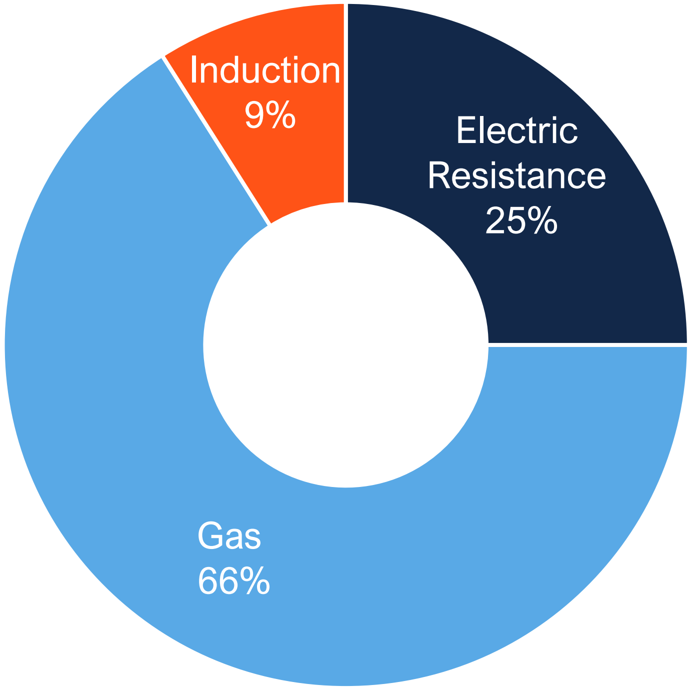
– Store Associate

Online



n=793 cooktop or range models

In-Store



n=271 cooktop or range models

Key finding:

Home builders and remodelers have been slow to switch to induction

Increased consumer awareness and demand, increased production, and falling prices could all help improve adoption in the new construction sector

Barriers for new construction

- Builders cited concerns about availability and low quantities of induction cooktops; manufacturers described builders as cost-sensitive actors who don't typically choose induction
- Homebuilders and remodelers also cited concerns about consumer preference for gas

Questions?

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MT Theory and Logic Model – Induction Cooking

Elaine Miller, CalMTA Team at Resource Innovations

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PART 1

MT theory - vision

Induction cooking offers an improved cooking experience with clear benefits

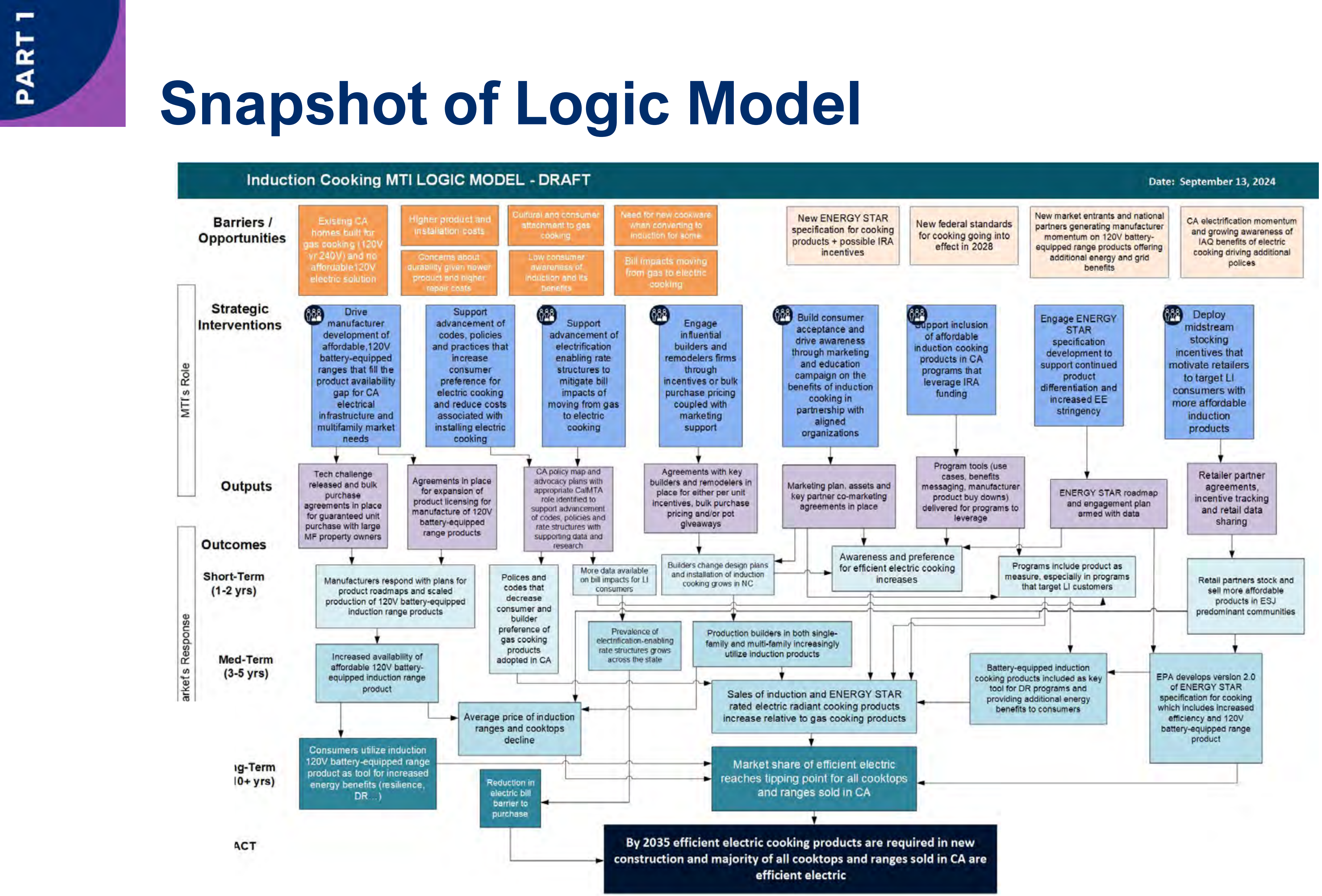
Cooking represents highest profile end-use in an all-electric homes and serves as linchpin technology to full electrification

Induction products are available but product availability of 120V products, consumer awareness, market share and overall availability of affordable products remain low

Overcoming consumers' reluctance and addressing availability of affordable, 120V product need to be addressed at scale now

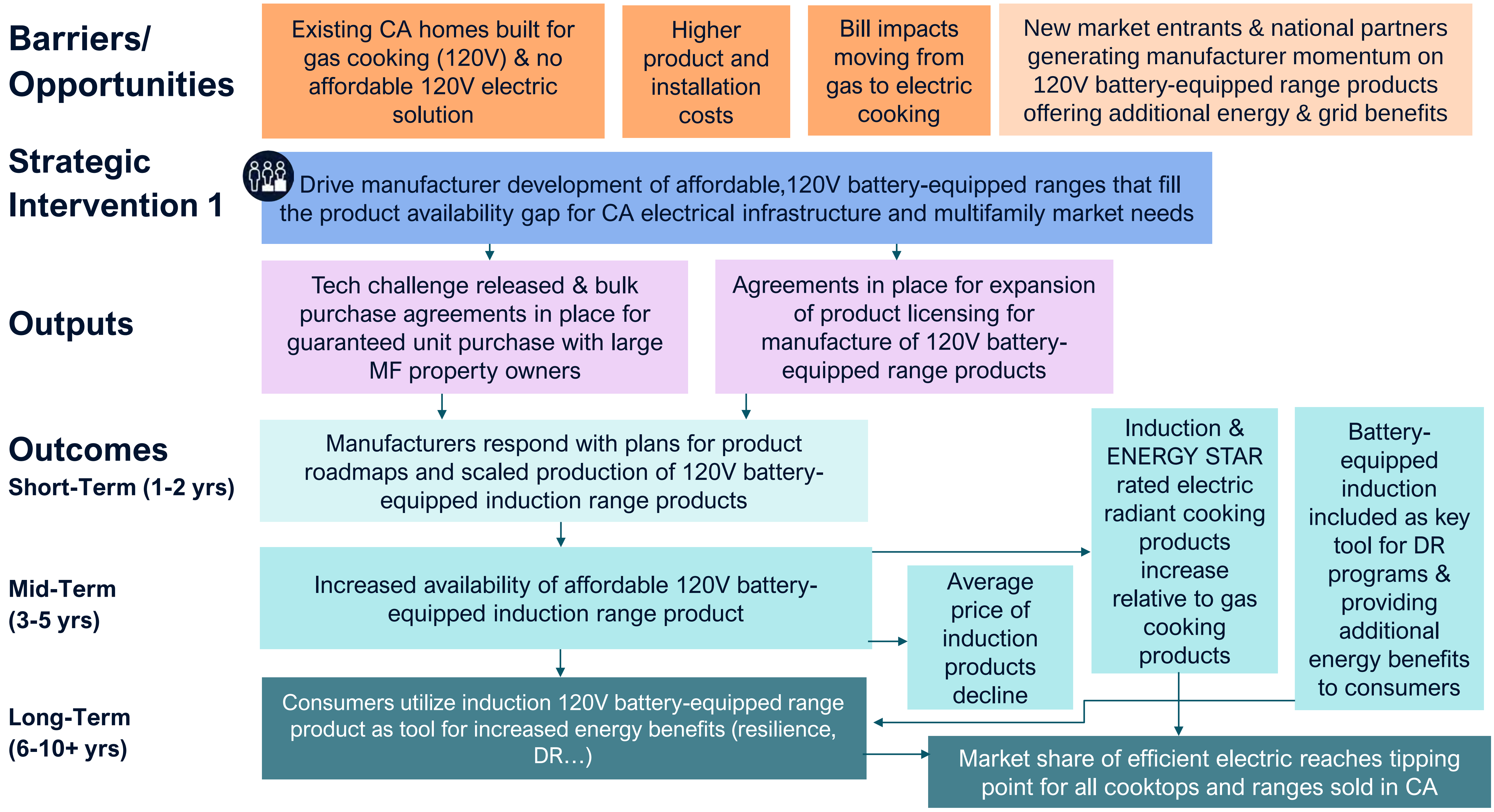
If we can capitalize of induction's benefits, overcome product availability, cost challenges and persuade consumers to overcome their attachment to gas stoves, we can facilitate a faster and easier transition to an all-electric home

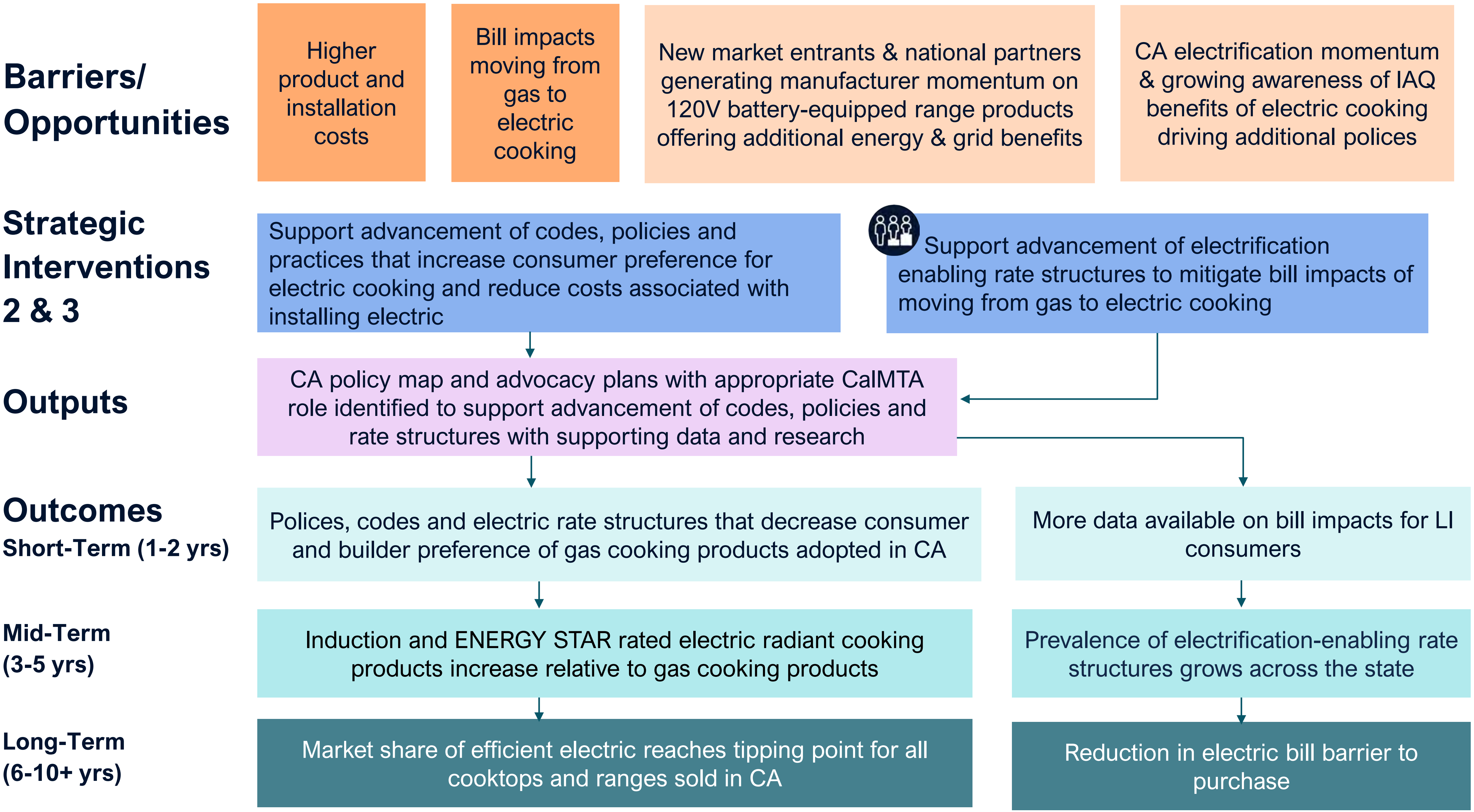
Snapshot of Logic Model

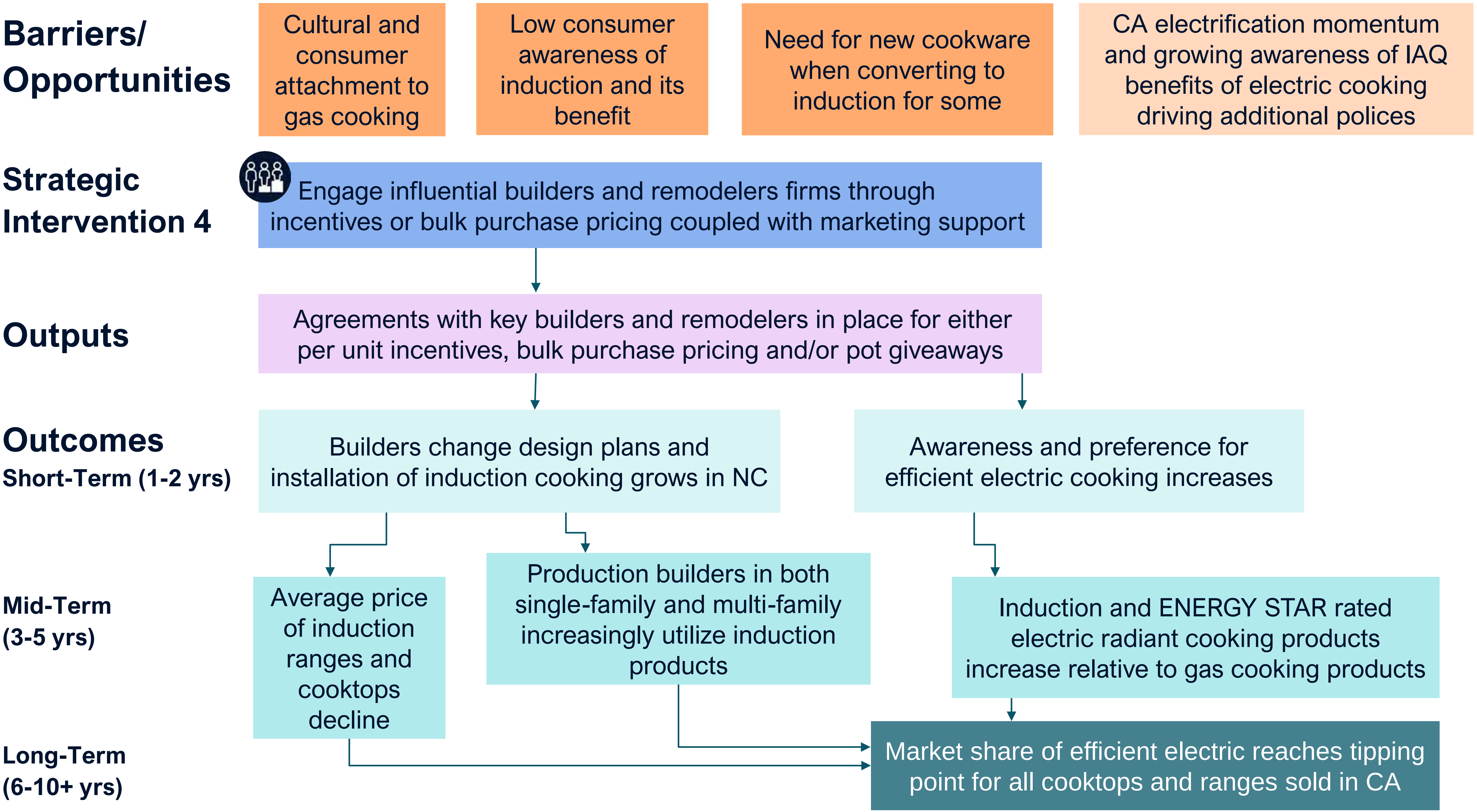


Long-term impact

- By 2035 efficient electric cooking products are required in new construction, and
- Majority of all cooktops and ranges sold in CA are efficient electric


Barriers/ Opportunities
Existing CA homes built for gas cooking (120V) & no affordable 120V electric solution
Higher product and installation costs
Bill impacts moving from gas to electric cooking
New market entrants & national partners generating manufacturer momentum on 120V battery-equipped range products offering additional energy & grid benefits
Strategic Intervention 1
Drive manufacturer development of affordable,120V battery-equipped ranges that fill the product availability gap for CA electrical infrastructure and multifamily market needs
Outputs
Tech challenge released & bulk purchase agreements in place for guaranteed unit purchase with large MF property owners
Agreements in place for expansion of product licensing for manufacture of 120V battery-equipped range products
Outcomes
Short-Term (1-2 yrs)
Manufacturers respond with plans for product roadmaps and scaled production of 120V battery-equipped induction range products
Mid-Term (3-5 yrs)
Increased availability of affordable 120V battery-equipped induction range product
Average price of induction products decline
Induction & ENERGY STAR rated electric radiant cooking products increase relative to gas cooking products
Battery-equipped induction included as key tool for DR programs & providing additional energy benefits to consumers
Long-Term (6-10+ yrs)
Consumers utilize induction 120V battery-equipped range product as tool for increased energy benefits (resilience, DR…)
Market share of efficient electric reaches tipping point for all cooktops and ranges sold in CA


Barriers/ Opportunities
Higher product and installation costs
Bill impacts moving from gas to electric cooking
New market entrants & national partners generating manufacturer momentum on 120V battery-equipped range products offering additional energy & grid benefits
CA electrification momentum & growing awareness of IAQ benefits of electric cooking driving additional polices
Strategic Interventions 2 & 3
Support advancement of codes, policies and practices that increase consumer preference for electric cooking and reduce costs associated with installing electric
Support advancement of electrification enabling rate structures to mitigate bill impacts of moving from gas to electric cooking
Outputs
CA policy map and advocacy plans with appropriate CalMTA role identified to support advancement of codes, policies and rate structures with supporting data and research
Outcomes
Short-Term (1-2 yrs)
Polices, codes and electric rate structures that decrease consumer and builder preference of gas cooking products adopted in CA
More data available on bill impacts for LI consumers
Mid-Term (3-5 yrs)
Induction and ENERGY STAR rated electric radiant cooking products increase relative to gas cooking products
Prevalence of electrification-enabling rate structures grows across the state
Long-Term (6-10+ yrs)
Market share of efficient electric reaches tipping point for all cooktops and ranges sold in CA
Reduction in electric bill barrier to purchase



Barriers/ Opportunities
Cultural and consumer attachment to gas cooking
Low consumer awareness of induction and its benefit
Need for new cookware when converting to induction for some
CA electrification momentum and growing awareness of IAQ benefits of electric cooking driving additional polices
Strategic Intervention 4
Engage influential builders and remodelers firms through incentives or bulk purchase pricing coupled with marketing support
Outputs
Agreements with key builders and remodelers in place for either per unit incentives, bulk purchase pricing and/or pot giveaways
Outcomes
Short-Term (1-2 yrs)
Builders change design plans and installation of induction cooking grows in NC
Awareness and preference for efficient electric cooking increases
Mid-Term (3-5 yrs)
Average price of induction ranges and cooktops decline
Production builders in both single-family and multi-family increasingly utilize induction products
Induction and ENERGY STAR rated electric radiant cooking products increase relative to gas cooking products
Long-Term (6-10+ yrs)
Market share of efficient electric reaches tipping point for all cooktops and ranges sold in CA

Barriers/ Opportunities

- Cultural and consumer attachment to gas cooking
- Low consumer awareness of induction & its benefits
- Need for new cookware when converting to induction for some
- New ENERGY STAR specification for cooking products & possible IRA incentives
- CA electrification momentum & growing awareness of IAQ benefits of electric cooking driving additional polices

Strategic Intervention 5

Build consumer acceptance and drive awareness through marketing and education campaign on the benefits of induction cooking in partnership with aligned organizations

Outputs

Marketing plan, assets and key partner co-marketing agreements in place

Outcomes

Short-Term (1-2 yrs)

- Builders change design plans and installation of induction cooking grows in NC
- Awareness and preference for efficient electric cooking increases
- Programs include product as measure, especially in programs that target LI customers

Mid-Term (3-5 yrs)

- Production builders in both single-family and multi-family increasingly utilize induction products
- Induction and ENERGY STAR rated electric radiant cooking products increase relative to gas cooking products

Long-Term (6-10+ yrs)

- Market share of efficient electric reaches tipping point for all cooktops and ranges sold in CA

Barriers/ Opportunities

- Higher product and installation costs
- Bill impacts moving from gas to electric cooking
- Need for new cookware when converting to induction for some
- New ENERGY STAR specification for cooking products & possible IRA incentives
- CA electrification momentum and growing awareness of IAQ benefits of electric cooking driving additional polices

Strategic Intervention 6

Support inclusion of affordable induction cooking products in CA programs that leverage IRA funding

Outputs

Program tools (use cases, benefits messaging, manufacturer product buy downs) delivered for programs to leverage

Outcomes

Short-Term (1-2 yrs)

- Awareness and preference for efficient electric cooking increases
- Programs include product as measure, especially in programs that target LI customers

Mid-Term (3-5 yrs)

Induction and ENERGY STAR rated electric radiant cooking products increase relative to gas cooking products

Long-Term (6-10+ yrs)

Market share of efficient electric reaches tipping point for all cooktops and ranges sold in CA

Induction with battery-equipped included as key tool for DR programs and providing additional energy benefits to consumers

Barriers/ Opportunities

Low consumer awareness of induction benefits

New ENERGY STAR specification for cooking products & possible IRA incentives

CalMTA idea to initiative

Strategic Intervention 7

Engage ENERGY STAR specification development to support continued product differentiation and increased EE stringency

Outputs

ENERGY STAR roadmap and engagement plan armed with data

Outcomes

Short-Term (1-2 yrs)

Awareness and preference for efficient electric cooking increases

Mid-Term (3-5 yrs)

Induction and ENERGY STAR rated electric radiant cooking products increase relative to gas cooking products

EPA develops version 2.0 of ENERGY STAR specification for cooking which includes increased efficiency and 120V battery-equipped range product

Long-Term (6-10+ yrs)

Market share of efficient electric reaches tipping point for all cooktops and ranges sold in CA

Barriers/ Opportunities

- Higher product & installation cost
- Low consumer awareness of induction benefits
- Cultural and consumer attachment to gas cooking some
- Need for new cookware when converting to induction for some
- New ENERGY STAR specification for cooking products & possible IRA incentives
- New market entrants & national partners generating manufacturer momentum on 120V battery-equipped range products offering additional energy & grid benefits

Strategic Intervention 8

Deploy midstream stocking incentives that motivate retailers to target LI consumers with more affordable induction products

Outputs

Retailer partner agreements, incentive tracking and retail data sharing

Outcomes

Short-Term (1-2 yrs)

Retail partners stock and sell more affordable products in ESJ predominant communities

Mid-Term (3-5 yrs)

Average price of induction ranges & cooktops decline

Induction and ENERGY STAR rated electric radiant cooking products increase relative to gas cooking products

EPA develops version 2.0 of ENERGY STAR specification for cooking which includes increased efficiency & 120V battery-equipped range product

Long-Term (6-10+ yrs)

Market share of efficient electric reaches tipping point for all cooktops and ranges sold in CA

PART 1

Theory of market change

CalMTA idea to initiative

IF	THEN
If major manufacturers see large demand signals from multifamily building owners & programs,	**then** they will be motivated to develop induction products that meet the needs of multifamily & 120V electrical infrastructure.
If consumers understand the superior cooking experience & positive health impacts of induction,	**then** they will demand induction cooking products.
If builders and remodelers understand the benefits of induction and hear from their consumers that they want induction,	**then** builders will demand affordable induction products from manufacturers.

Theory of market change continued

IF	THEN
If consumers have financial tools through electrification rates and program support to mitigate electric bill impacts of transitioning from gas to electric cooking,	**then** they will overcome the bill impact barrier of moving to electric and demand induction cooking products.
If California codes continue to push for residential electrification and consumers / builders value induction cooking,	**then** new construction will increasingly utilize induction cooking products and eventually require electric cooking only.

Theory of market change continued

CalMTA idea to initiative

IF	THEN
If retailers are rewarded for selling more affordable induction products to consumers,	**then** induction market share of affordable products will grow in the retail channel.
If affordable product availability, consumer acceptance and market share of induction grows to be the majority of cooking products sold in the California market,	**then** it will be easier for regulatory agencies to push for a transition away from the sale of gas cooking appliances.

Break (10 min)
We will be back soon.

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Idea to Initiative Part 1 continued: Room Heat Pumps Market Transformation Theory & Logic Model

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Room Heat Pumps Product Assessment

Tom Bougher, 2050 Partners

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Name change: Room Heat Pump

Portable/Window Heat Pump → **Room Heat Pump** ✓

- De-emphasizes portable heat pumps – less efficient and less desirable
- Adds through the wall heat pumps – second sub-category of room heat pump, along with window units
- Room air conditioner with reverse cycle is the federal appliance category for window heat pumps – room heat pump is common language for manufacturers, C&S, etc.

Product definition details

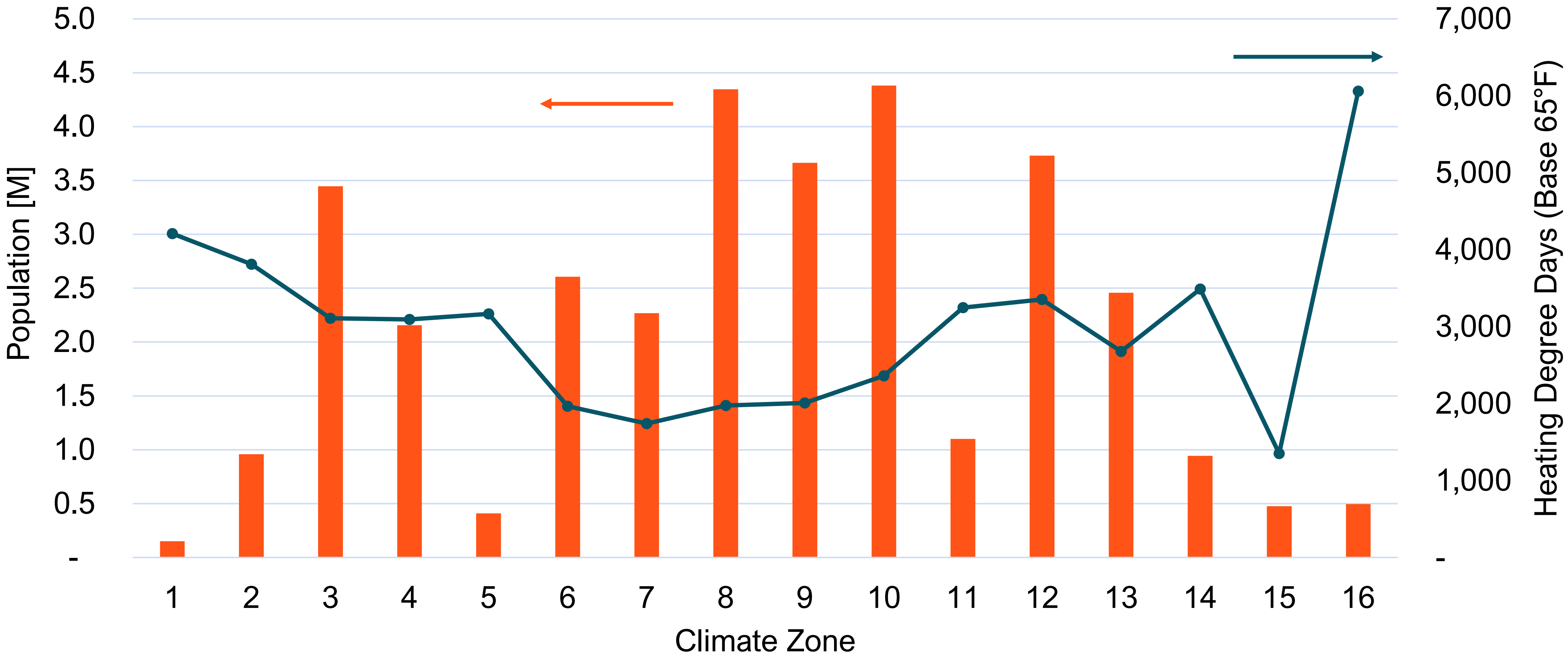
- 120V plug-in
- Inverter-driven, variable capacity
- Change for installation: from self-install to install without certified HVAC technician or electrician
- This enables installation by building maintenance staff in MF, or lower cost installation staff (e.g., big box paid installation)

All-weather RHP performance

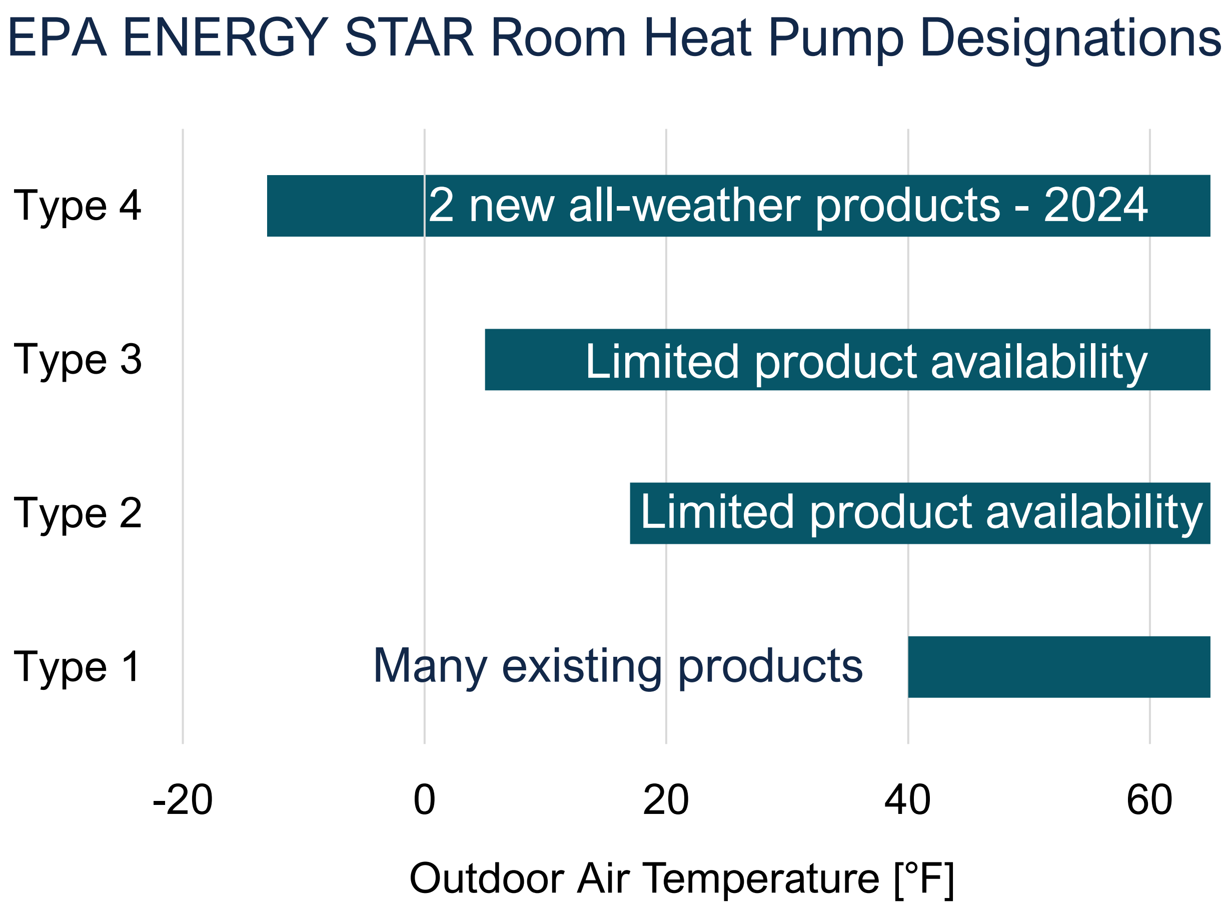
Metric	Units	Midea	Gradient
Cooling Capacity	BTU/h	9,000	9,000
Cooling Efficiency	CEER	16	16.6
Heating Capacity	BTU/h	9,000	9,000
Min Operating Temperature	°F	-13	-7
Heating Efficiency	COP	2.35	2.6
Heating Efficiency	HEER		9.3
Refrigerant		R32	R32
Full Capacity Min Temp	°F	5	17
Form Factor		Saddlebag	Saddlebag
Weight	lb.	120	125

New all-weather saddlebag products rival performance of ductless mini-splits

California climate



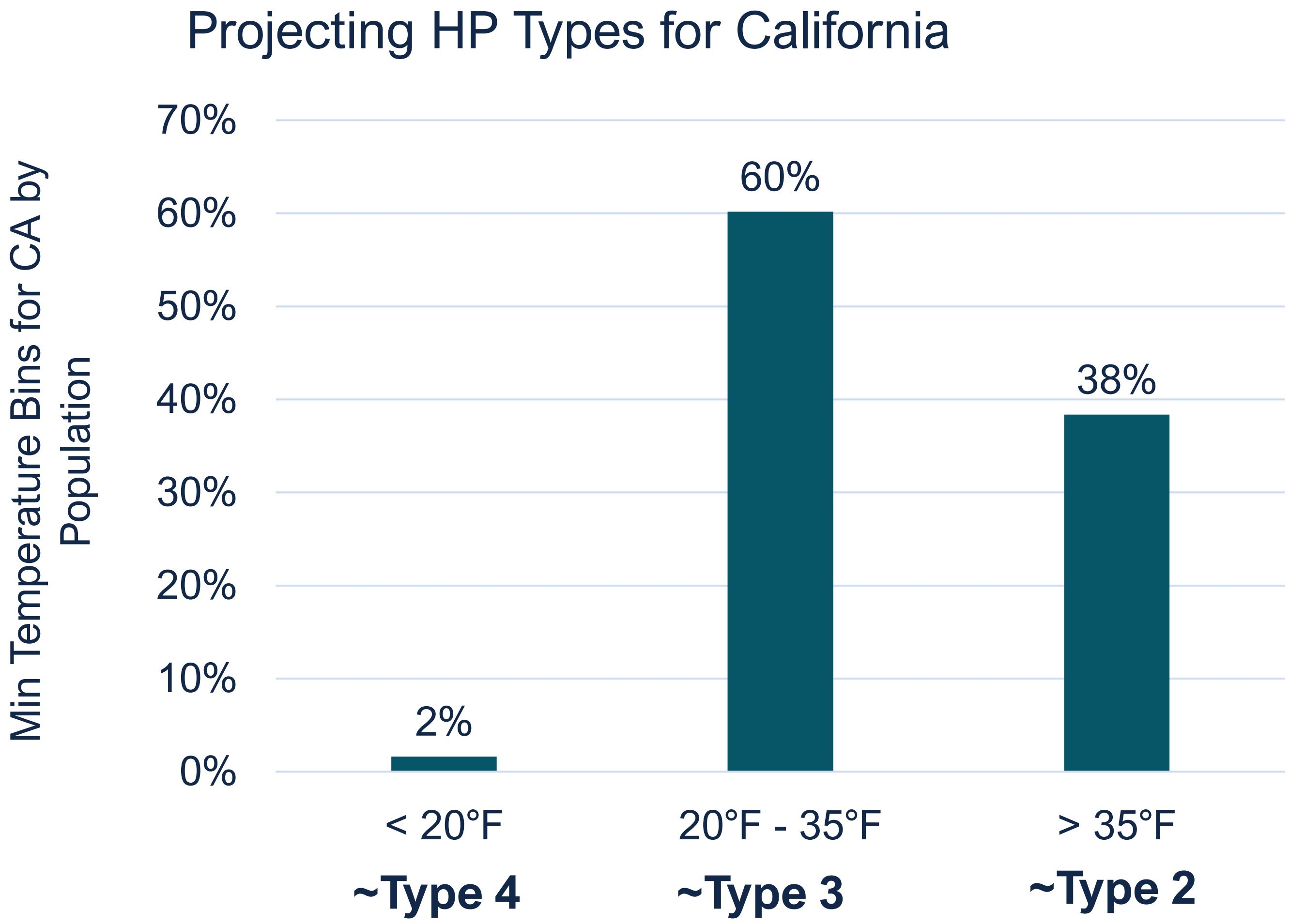
HP needs for California



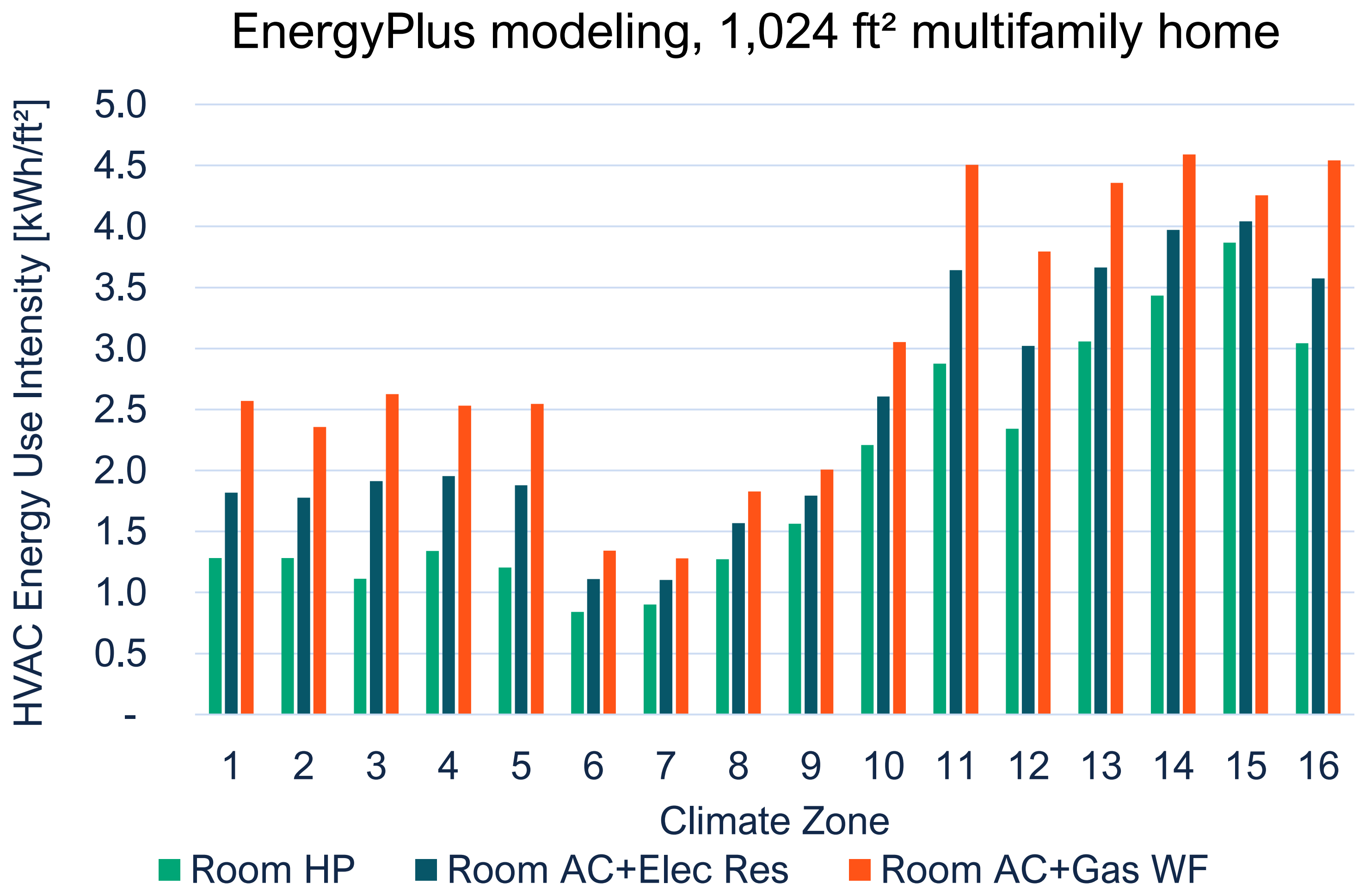
PART 1

HP needs for California

- Looking at California climate needs based upon 4 “Types” of room heat pumps in ENERGY STAR test procedure
- Based on typical weather year (not extreme events)
- A RHP operating down to 20°F could cover 98% of population



Energy savings

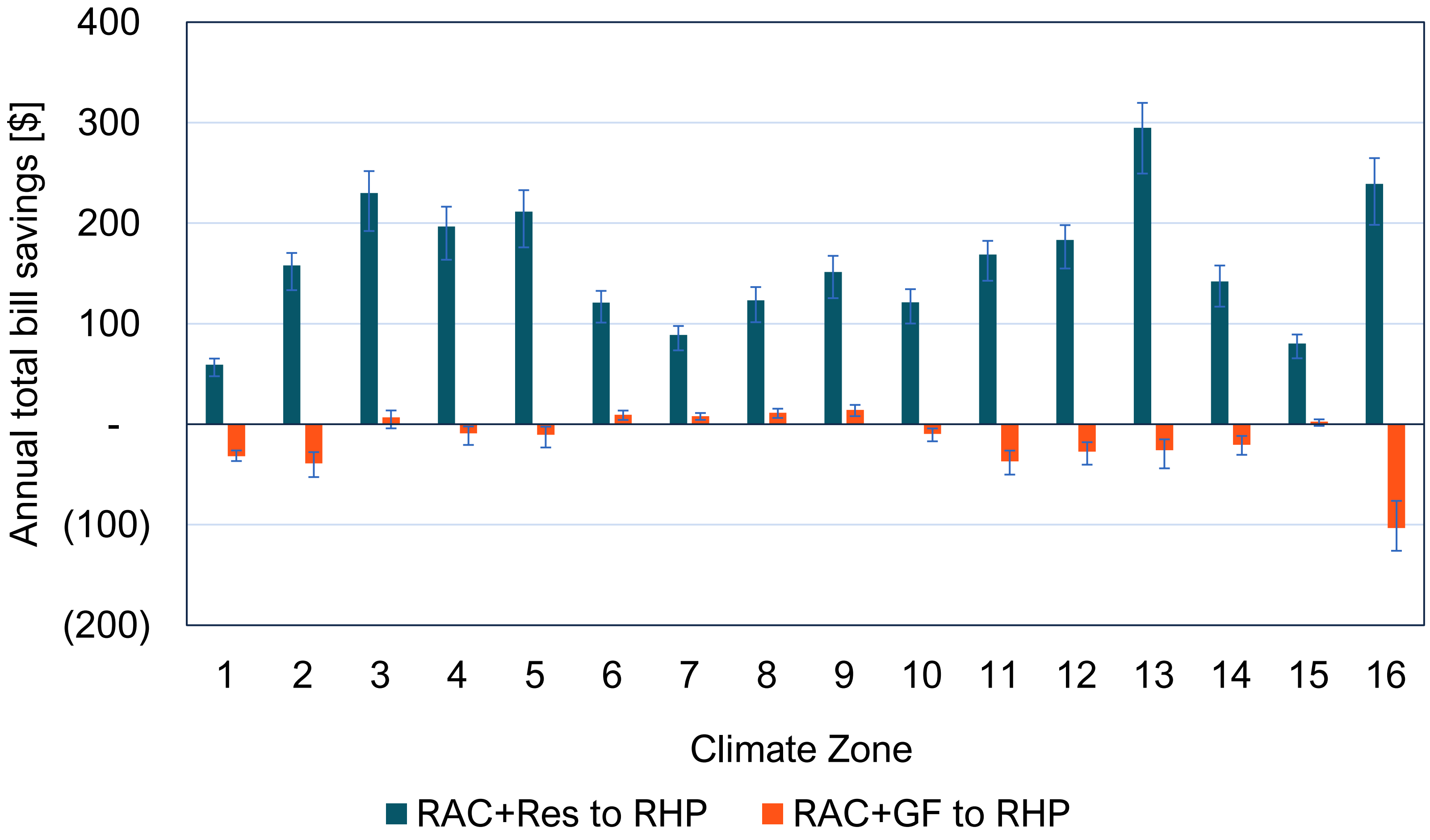


Room Heat Pump savings:

- 29% from electric resistance
- 55% from Gas wall furnace
- PHP uses 40% more energy than RHP on average

Bill impacts – fuel switching implications

Bill savings by CZ for switching to RHP from electric baseboards (Res) & gas wall furnaces (GF)



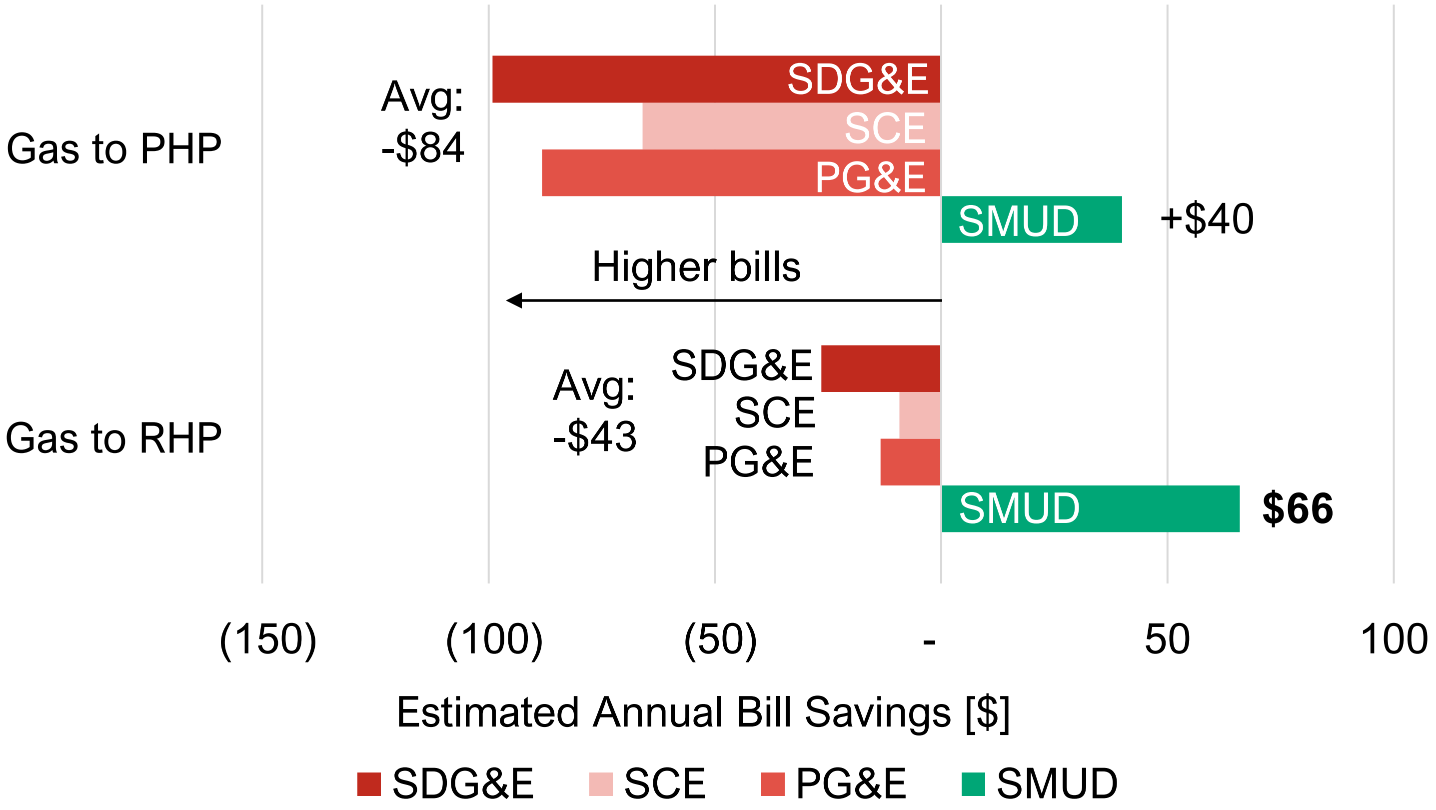
1,024 ft² MF dwelling, Avg of one TOU rate per IOU

Avg of 24 MF units to account for variation in shared walls, floor, and orientation

RHP modeled according to specifications of all-weather saddlebag product

Bill impacts – fuel switching implications

Average bill savings for switching from gas wall furnace to HP



SMUD uses PG&E gas, SCE uses SoCalGas

1,024 ft² MF dwelling, one TOU rate per IOU, averaged across all climate zones

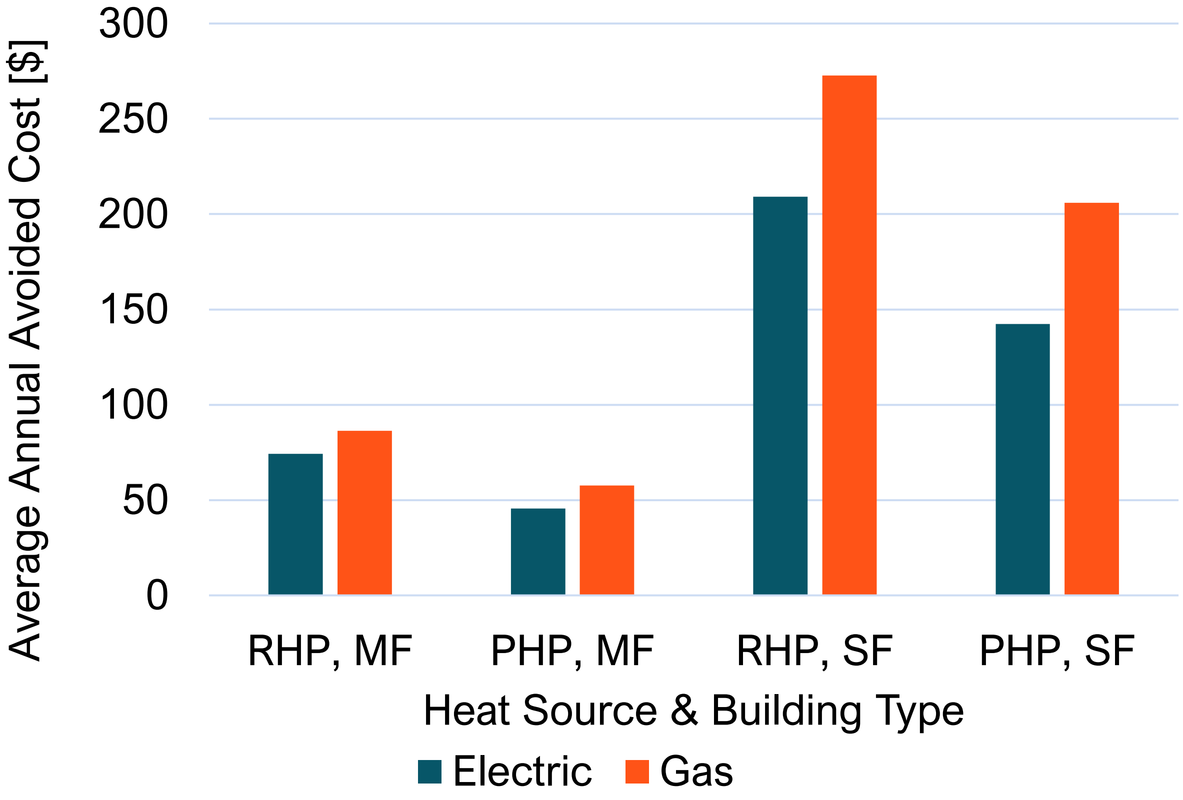
Spark Gap (ratio of electricity to gas prices):
~ 5-6.5 for IOU rates
~2 for SMUD rates

Avoided cost benefits

- Similar benefits for switching from electric or gas
- RHP has 32% higher benefit on average compared to PHP
- Single-family benefit more than 2x that in multi-family (per dwelling) due to higher heating loads
- Average of one IOU per climate zone

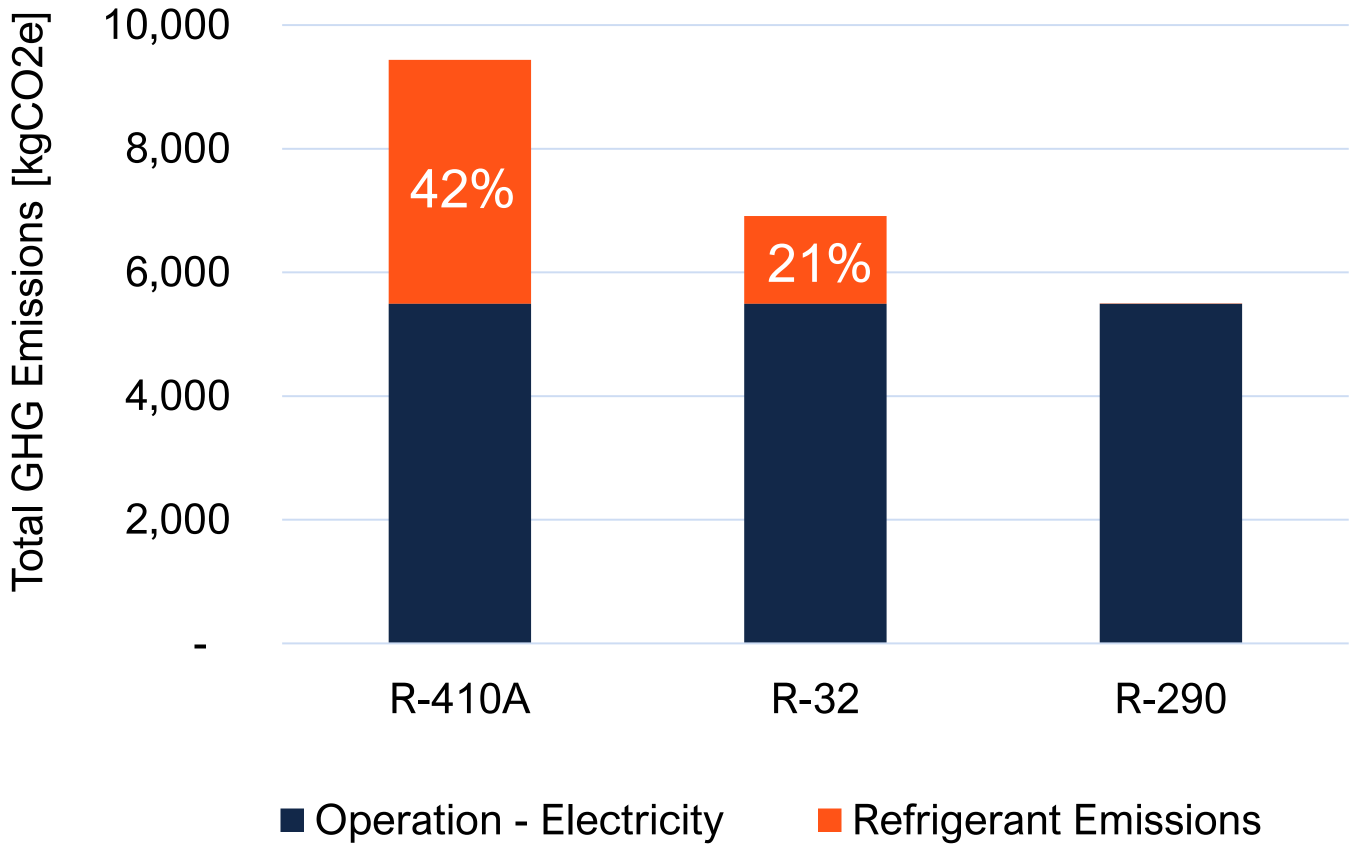
SDG&E:	CZ07
SCE:	CZ10
PG&E:	CZ12

Avoided cost benefit switching to HP from electric resistance or gas wall furnace



Average annual avoided cost per HP, 2024-2052

Refrigerant impacts – lifecycle GHG



- Simplified life cycle assessment, CZ12, MF home
- Plot using 20-year GWP for refrigerant
- Switching from R-32 to R-290 represents 21% potential GHG reduction
- Change requires long-term investment in safety research & advocacy

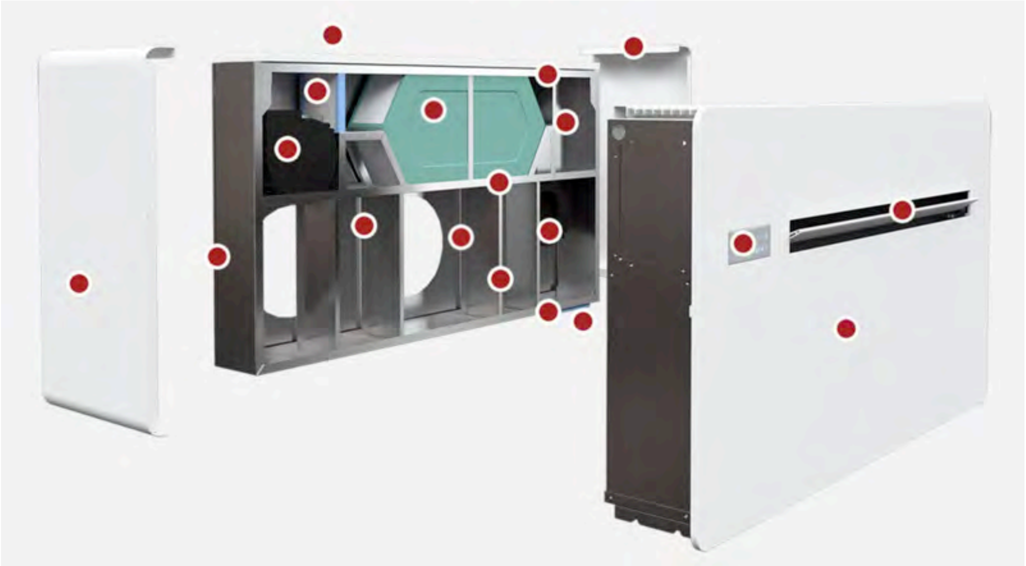
Air filtration & ventilation

- MERV 13 air filters required in new MF for Title 24, recommended by ASHRAE and CDC
- Ventilation can provide cooling savings (economizing) and improve IAQ

Friedrich Kuhl Window AC with MERV 13 filter

Currently not available in 120V heat pump

Ephoca AIO Wall Mounted Pro with ERV



Not room heat pump, not self-install

Room Heat Pump product plan

CalMTA idea to initiative

Short-term outcomes

- HP product for vertical window openings
- Balance price and heating performance for CA consumers

Long-term outcomes

- Transition to natural refrigerants
- Add air filtration & ventilation as product options

Future work

- Lab & field testing – heating performance, user behavior, & bill impacts

Product summary – Room Heat Pumps

MTI is prioritizing window heat pumps over portable heat pumps – better performance, better aesthetics, and better for fuel switching

New all-weather heat pumps represent a leap in performance (and cost)

There is a huge opportunity for bill savings switching from resistance heat, switching from gas needs to be done more carefully

Near-term product needs: HP for vertical window openings and HP for CA climate

Long-term product needs: air filtration & low GWP refrigerants

Questions?

CalMTA
idea to initiative

Room Heat Pumps Market Characterization

Key Findings and Conclusions

Hope Lobkowicz, Cadmus Group

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

Key finding:

The unavailability of room heat pumps in brick-and-mortar stores and insufficient product differentiation in online storefronts has dampened product awareness and demand

PART 1

Shopping findings

Room HPs are not easy to find and buy.

Total RHP Models ID'd	31
Avail Online at Major Retailers	17
Stocked In-Store	0

Various heat pump product names:

- "Portable AC"
- "Portable Air Conditioner with 9,500 Heating BTU"
- "Window AC"
- "Room Air Conditioner and Heater"

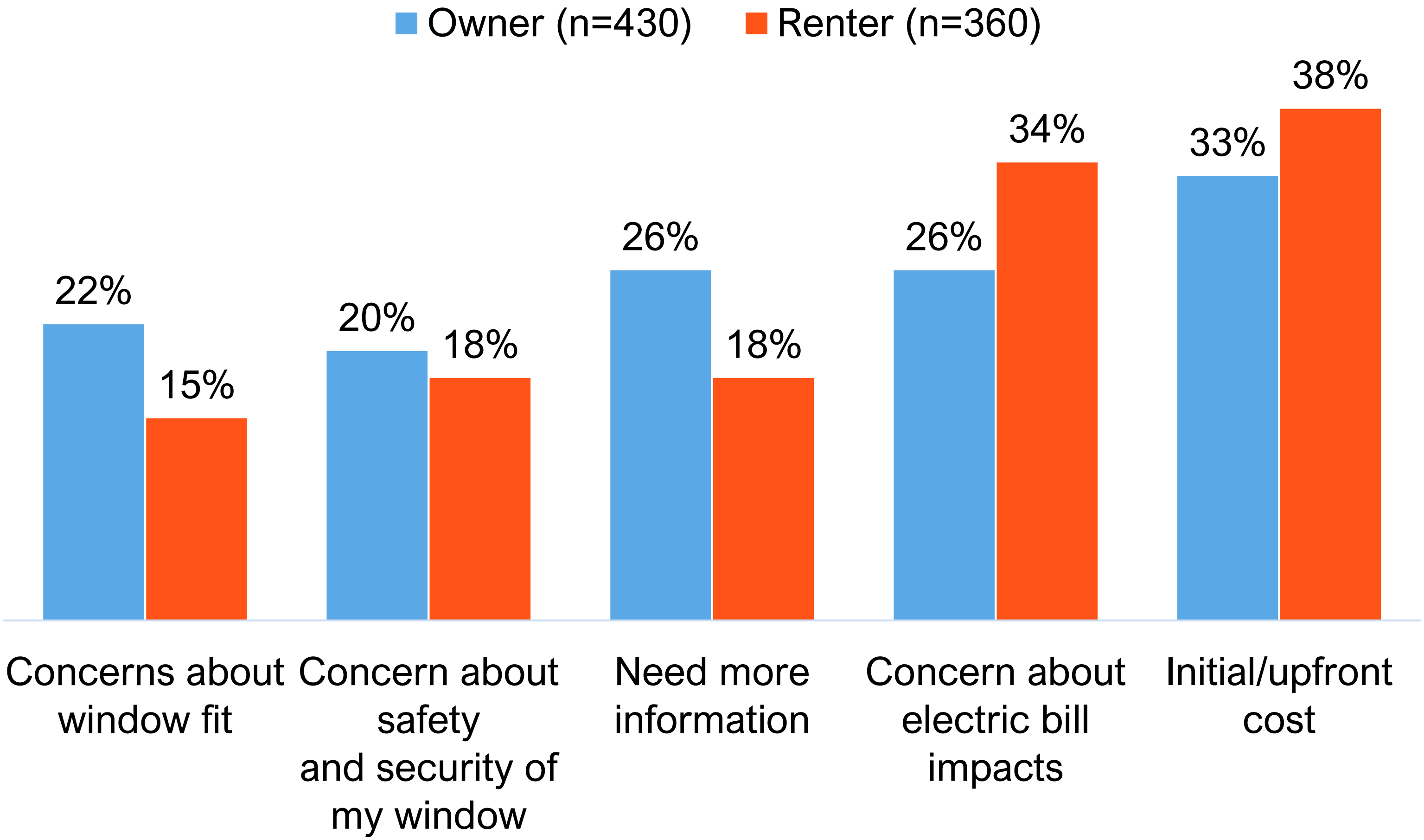
Websites reviewed: Lowe's®, Home Depot®, Best Buy® and WalMart.®
Stores Visited: Lowe's®, Home Depot®, Best Buy® Costco,® Sam's Club® (7 locations)

Key finding:

The operational costs of using room heat pumps in certain scenarios, such as switching from gas heat, is a large barrier to adoption

Barriers to adopting a RHP

- Consumers are wary of electric bill increases, and look for efficient options when shopping
- RHPs offer an opportunity to save on electric costs for homes with electric resistant heat, but not gas



Source: CalMTA Residential Survey

Key finding:

There is significant market opportunity and energy savings potential for room heat pumps to replace space heaters and displace other heating modes, based on how consumers currently use their space heaters

Space heater habits

- Space heater users often use their space heater daily (40%)
- Space heater users typically turn down or off other sources of heating (94%)

Future outlook

- 40% of Californians are either *somewhat* or *very likely* to purchase a new space heater in the next five years
- Opportunity exists for education on bill impacts/savings of RHPs

Data Source: CalMTA Residential Survey

Key finding:

Room heat pumps are highly applicable to small dwellings such as multifamily apartments, but property manager and renter concerns need to be addressed if there is to be widespread market adoption in this market segment

Barriers and opportunities for property managers

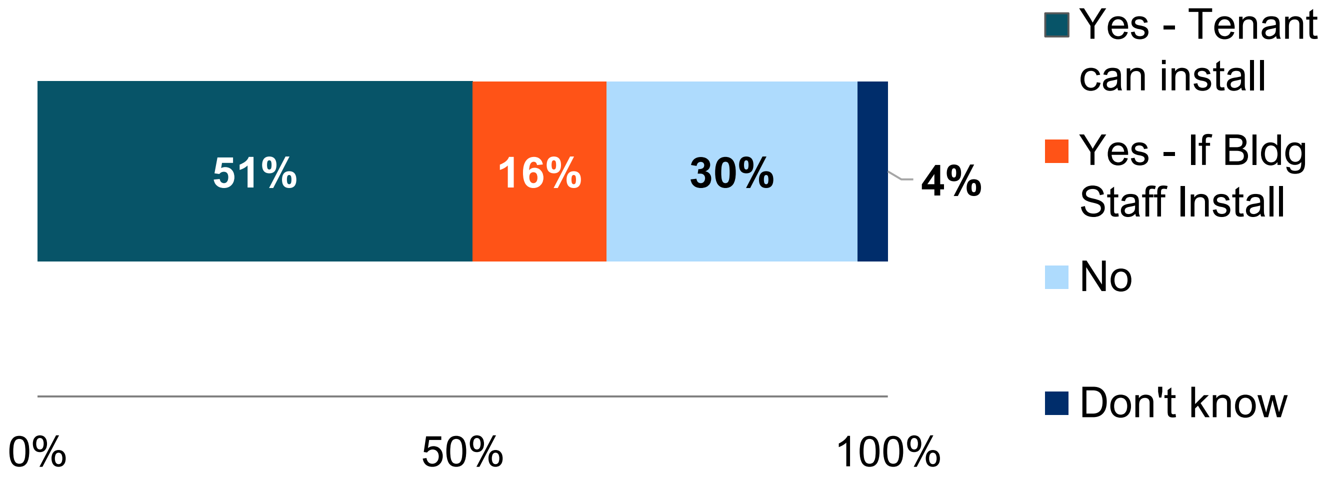
Opportunities

- Tenant satisfaction
- Improved rentability
- No professional installation
- Ability to mitigate health risks during severe temps

Barriers

- Electric bill impact
- Window installation
- Heating & cooling performance

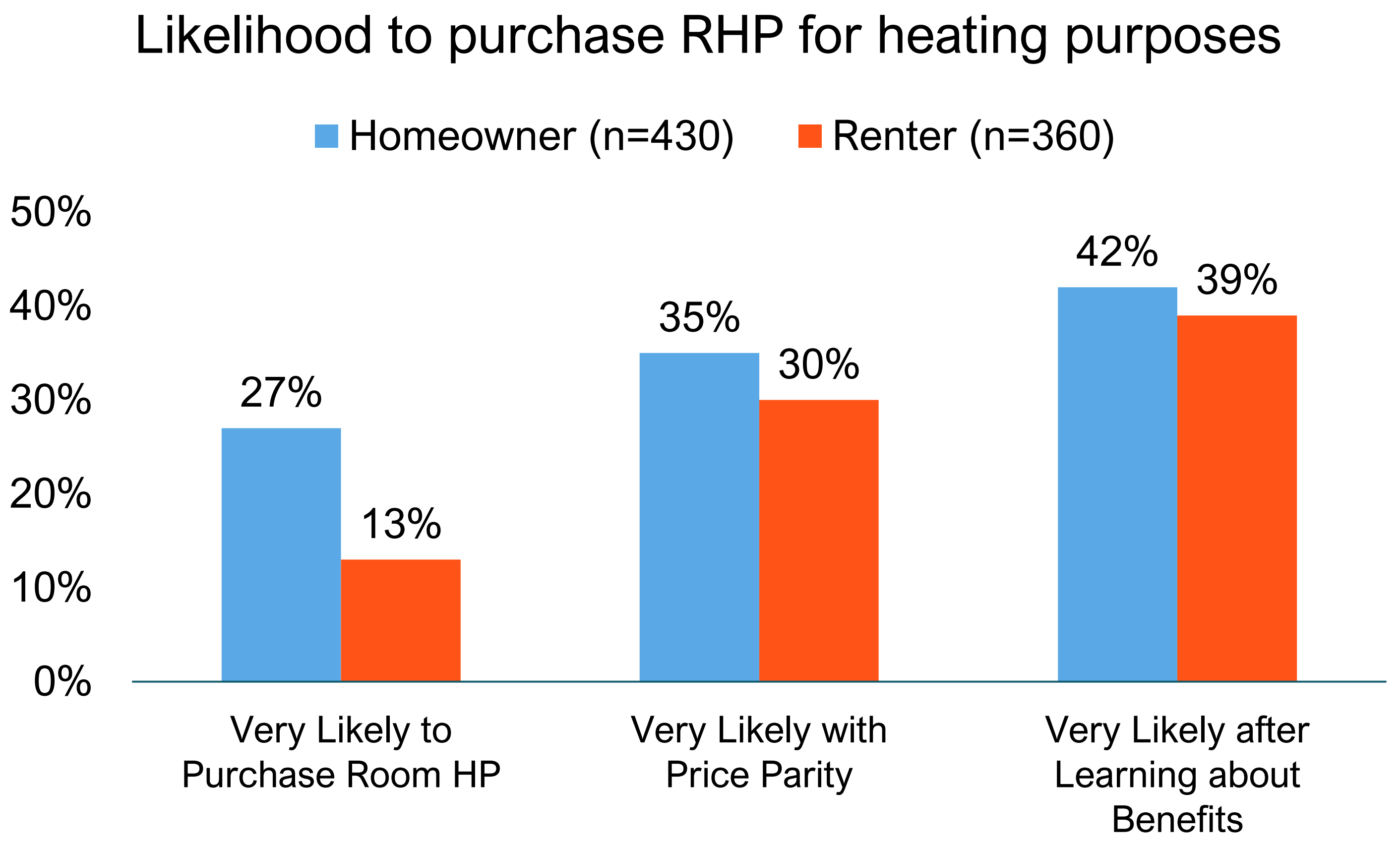
Percent of property managers allowing window AC units



Source: CalMTA Property Manager Survey (n=100)

Likelihood to purchase RHP

Renters are less likely than homeowners to purchase room heat pumps.



Source: CalMTA Residential Survey

Key finding:

Product innovation is needed to serve the California market with a room heat pump that fits horizontal sliding and casement windows, as the currently-compatible portable models are less efficient and less aesthetically desirable among consumers

Window types

55% of CA homes have either sliding, casement or a mix of both window types which will not fit Window HP form types

Traditional slider window

Midea "U-Shaped" HP; Source: Midea

Why does it matter?

CalMTA

Window types

- ✓ High efficiency
- ✓ Eligible for forthcoming ENERGY STAR Spec
- ✓ Soon eligible for IRA incentives
- ✓ Sleeker look

Portable types

- ✖ Less efficient
- ✖ Not currently eligible for forthcoming ES Spec
- ✖ Not eligible for IRA incentives
- ✖ Consumers don't like style

Image credit: NYC Pigeon Air Conditioner

Key finding:

Technology competitions and bulk purchase agreements have been effective at spurring product innovation

Tech challenges

- Gradient and Midea won contracts to manufacturer new devices for the New York City Housing Authority (NYCHA) which resulted in new cold climate saddlebag models
- Manufacturers are also interested in similar opportunities for a CA product, reporting a 10,000-20,000 unit purchase commitment could be the “carrot” for a slider window product

Source: Midea

Sizing

CalMTA idea to initiative

- Cold climate capabilities make the products quite large and heavy
- Manufacturers reported larger/heavier cold climate units aren't conducive to retail
- Opportunities to engage manufacturers and retailers for CA-climate appropriate products

Pictured: Participant from RHP Installation Pilot with Gradient Model

Questions?

CalMTA idea to initiative

MT Theory and Logic Model – Room Heat Pumps

Elaine Miller, CalMTA Team at Resource Innovations

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

MT theory - vision

Room heat pumps are a new class of products that could fill critical market gap

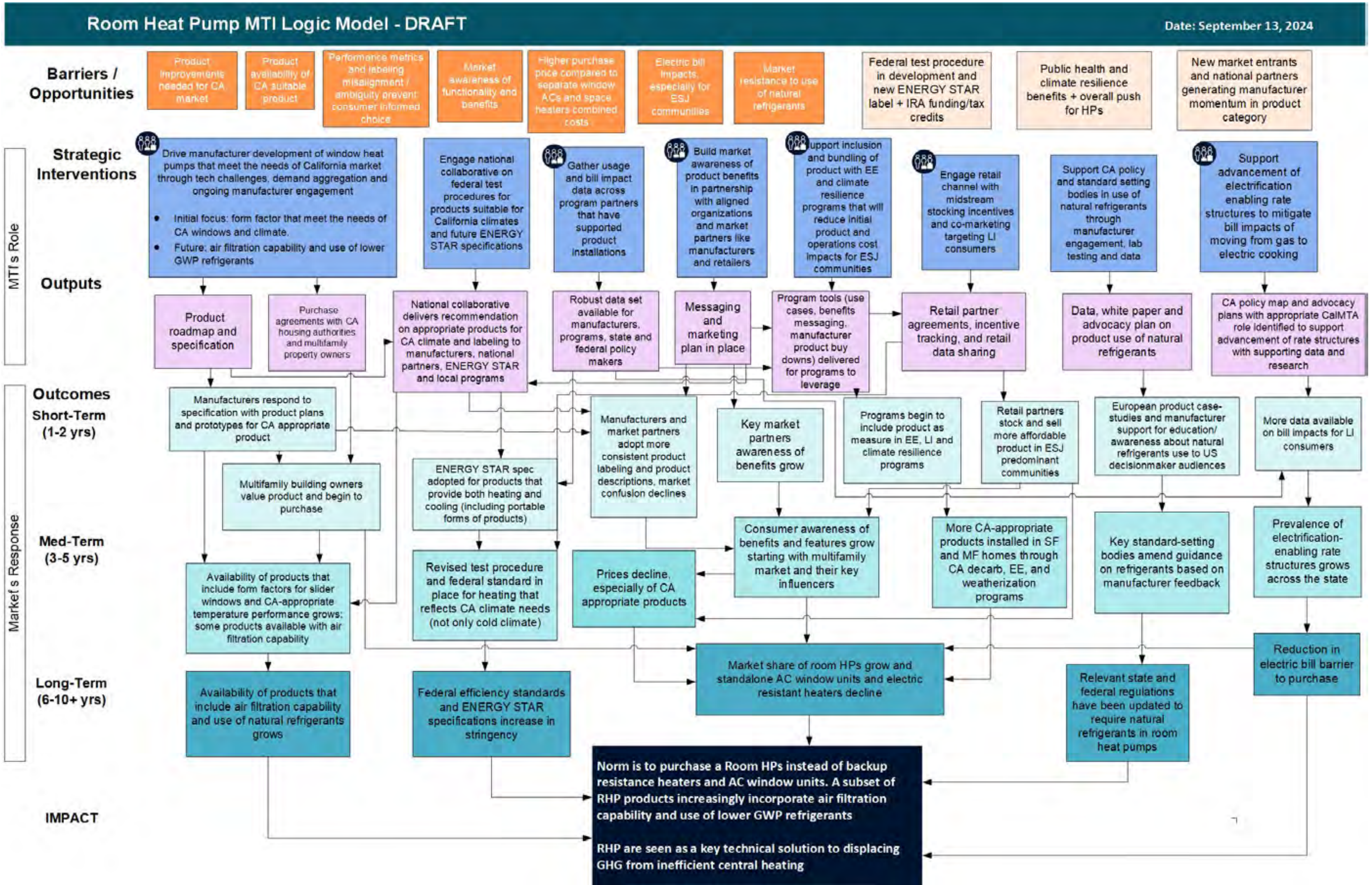
But there is a gap in products that serve the California market

Through a manufacturer engagement, demand aggregation, ENERGY STAR specification development, leverage of IRA funding, and market awareness building, this MTI will work to ensure that the market delivers affordable, climate appropriate room heat pumps

Room HP will add to California's goal of 6M heat pumps by 2030 and fill a critical need in the multifamily, small residential and renter markets

Over time, products will also provide consumers with air filtration capability and use of natural refrigerants

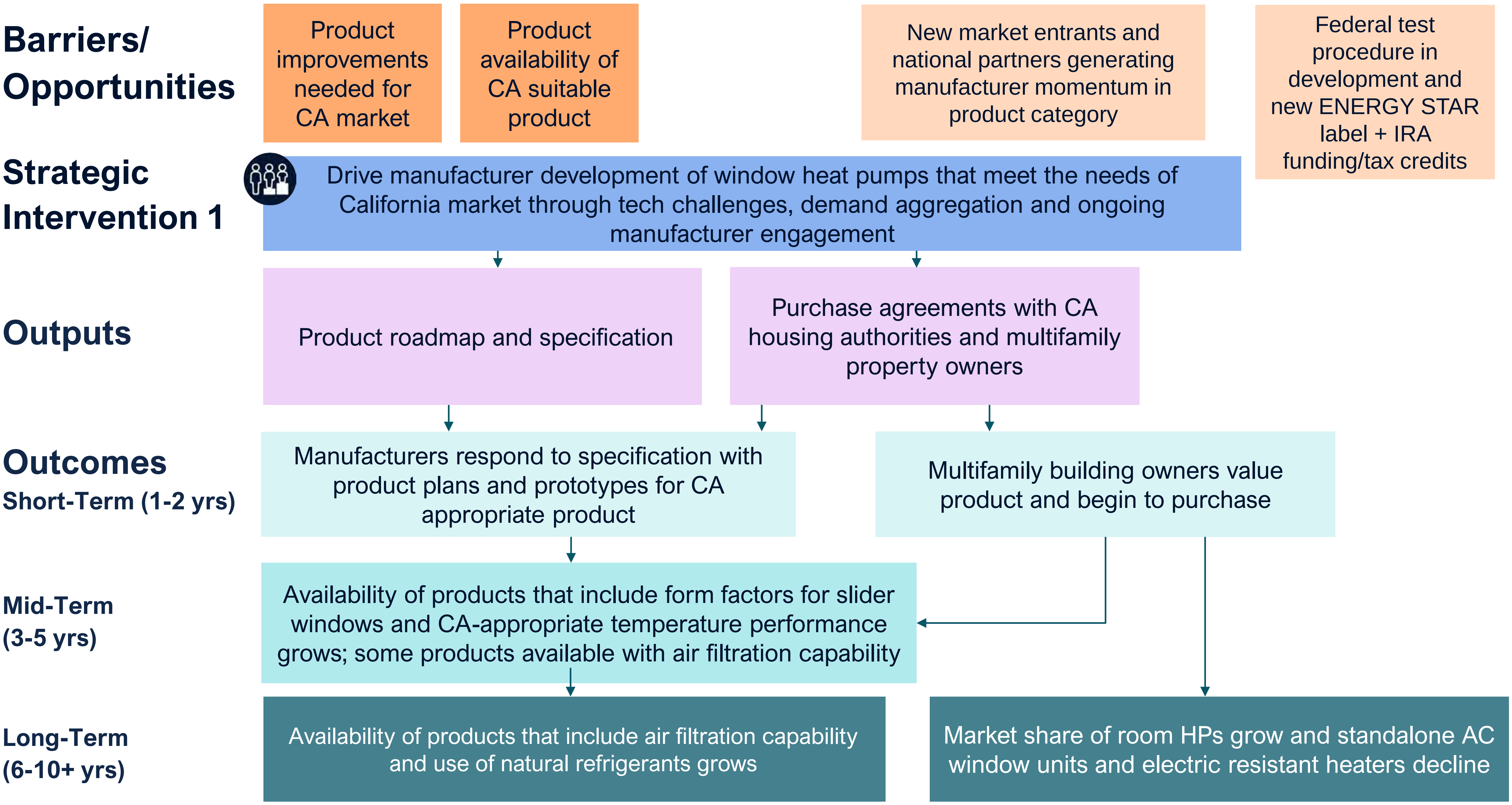
Snapshot of Logic Model



Long-term impact

- Norm is to purchase a Room HPs instead of backup resistance heaters and AC window units; a subset of RHP products increasingly incorporate air filtration capability and use of lower GWP refrigerants

- RHP are seen as a key technical solution to displacing GHG from inefficient central heating


Barriers/ Opportunities
Product improvements needed for CA market
Product availability of CA suitable product
New market entrants and national partners generating manufacturer momentum in product category
Federal test procedure in development and new ENERGY STAR label + IRA funding/tax credits
Strategic Intervention 1
Drive manufacturer development of window heat pumps that meet the needs of California market through tech challenges, demand aggregation and ongoing manufacturer engagement
Outputs
Product roadmap and specification
Purchase agreements with CA housing authorities and multifamily property owners
Outcomes
Short-Term (1-2 yrs)
Manufacturers respond to specification with product plans and prototypes for CA appropriate product
Multifamily building owners value product and begin to purchase
Mid-Term (3-5 yrs)
Availability of products that include form factors for slider windows and CA-appropriate temperature performance grows; some products available with air filtration capability
Long-Term (6-10+ yrs)
Availability of products that include air filtration capability and use of natural refrigerants grows
Market share of room HPs grow and standalone AC window units and electric resistant heaters decline

Barriers/ Opportunities

- Product improvements needed for CA market
- Performance metrics and labeling misalignment / ambiguity prevent consumer informed choice
- Market awareness of functionality and benefits
- Federal test procedure in development and new ENERGY STAR label + IRA funding/tax credits

Strategic Interventions 2 & 3

- Engage national collaborative on federal test procedures for products suitable for California climates and future ENERGY STAR specifications
- Gather usage and bill impact data across program partners that have supported product installations

Outputs

- National collaborative delivers recommendation on appropriate products for CA climate and labeling to manufacturers, national partners, ENERGY STAR and local programs
- Robust data set available for manufacturers, programs, state and federal policy makers

Outcomes

Short-Term (1-2 yrs)

- ENERGY STAR spec adopted for products that provide both heating and cooling (including portable forms of products)
- More data available on bill impacts for LI consumers

Mid-Term (3-5 yrs)

- Revised test procedure and federal standard in place for heating that reflects CA climate needs (not cold climate only)

Long-Term (6-10+ yrs)

- Federal efficiency standards and ENERGY STAR specifications increase in stringency

Barriers/ Opportunities

- Market awareness of functionality and benefits
- Performance metrics and labeling misalignment / ambiguity prevent consumer informed choice
- Public health and climate resilience benefits + overall push for HPs

Strategic Intervention 4

Build market awareness of product benefits in partnership with aligned organizations and market partners like manufacturers and retailers

Outputs

- Messaging and marketing plan in place
- Program tools delivered for programs to leverage

Outcomes

Short-Term (1-2 yrs)

- Manufacturers and market partners adopt more consistent product labeling and product descriptions, market confusion declines
- Key market partners awareness of benefits grow

Mid-Term (3-5 yrs)

- Consumer awareness of benefits and features grow starting with multifamily market and their key influencers

Long-Term (6-10+ yrs)

- Market share of room HPs grow and standalone AC window units and electric resistant heaters decline

Barriers/ Opportunities

- Higher purchase price compared to separate window ACs and space heaters combined costs
- Electric bill impacts, especially for ESJ communities
- Market awareness of functionality and benefits
- Federal test procedure in development and new ENERGY STAR label + IRA funding/tax credits

Strategic Intervention 5

Support inclusion and bundling of product with EE and climate resilience programs that will reduce initial product and operations cost impacts for ESJ communities

Outputs

Program tools (use cases, benefits messaging, manufacturer product buy downs) delivered for programs to leverage

Outcomes

Short-Term (1-2 yrs)

Programs begin to include product as measure in EE, LI and climate resilience programs

Mid-Term (3-5 yrs)

- Consumer awareness of benefits and features grow starting with multifamily market and their key influencers
- More CA-appropriate products installed in SF and MF homes through CA decarb, EE, and weatherization programs
- Prices decline, especially of CA appropriate products

Long-Term (6-10+ yrs)

Market share of room HPs grow and standalone AC window units and electric resistant heaters decline

Barriers/ Opportunities

- Higher purchase price compared to separate window ACs and space heaters combined costs
- Market awareness of functionality and benefits
- Product availability of CA suitable product
- Federal test procedure in development and new ENERGY STAR label + IRA funding/tax credits

Strategic Intervention 6

Engage retail channel with midstream stocking incentives and co-marketing targeting LI consumers

Outputs

Retail partner agreements, incentive tracking, and retail data sharing

Outcomes

Short-Term (1-2 yrs)

Retail partners stock and sell more affordable product in ESJ predominant communities

Sales data

Mid-Term (3-5 yrs)

- Consumer awareness of benefits and features grow starting with multifamily market and their key influencers
- Prices decline, especially of CA appropriate products
- Revised test procedure and federal standard in place for heating that reflects CA climate needs (not cold climate only)

Long-Term (6-10+ yrs)

Market share of room HPs grow and standalone AC window units and electric resistant heaters decline

CalMTA idea to initiative

Barriers/ Opportunities

- Market resistance to use of natural refrigerants
- Public health and climate resilience benefits + overall push for HPs

Strategic Intervention 7

Support CA policy and standard setting bodies in use of natural refrigerants through manufacturer engagement, lab testing and data

Outputs

Data, white paper and advocacy plan on product use of natural refrigerants

Outcomes

Short-Term (1-2 yrs)

European product case-studies and manufacturer support for education/awareness about natural refrigerants use to US decisionmaker audiences

Mid-Term (3-5 yrs)

Key standard-setting bodies amend guidance on refrigerants based on manufacturer feedback

Long-Term (6-10+ yrs)

Relevant state and federal regulations have been updated to require natural refrigerants in room heat pumps

Barriers/ Opportunities

Electric bill impacts, especially for ESJ communities

Public health and climate resilience benefits + overall push for HPs

Strategic Intervention 8

Support advancement of electrification enabling rate structures to mitigate bill impacts of moving from gas to electric cooking

Outputs

CA policy map and advocacy plans with appropriate CalMTA role identified to support advancement of rate structures with supporting data and research

Outcomes

Short-Term (1-2 yrs)

More data available on bill impacts for LI consumers

Mid-Term (3-5 yrs)

Prevalence of electrification-enabling rate structures grows across the state

Long-Term (6-10+ yrs)

Reduction in electric bill barrier to purchase

Market share of room HPs grow and standalone AC window units and electric resistant heaters decline

Theory of market change

IF	THEN
If major manufacturers see large demand signals from multifamily building owners and programs,	**then** they will be motivated to develop room heat pumps that meet the needs of California’s dominate window form and climate needs.
If consumers understand the benefits of room heat pumps like offering both heating and cooling capability and, eventually, air filtration,	**then** they will demand room heat pumps over single-function electric resistance heaters and window AC units.

Theory of market change

CalMTA
idea to initiative

IF	THEN
If this MTI can serve as an advocacy partner to other organizations working to allow the use of natural refrigerants through manufacturer engagement, lab testing, and data sharing,	**then** California policy makers will have increased support to allow HVAC manufacturers to utilize natural refrigerants, especially in the case of hermetically sealed product.
If retailers are rewarded for selling more affordable ENERGY STAR-certified room heat pumps to consumers,	**then** room heat pump market share will grow in the retail channel and serve as a data source to future ENERGY STAR specifications

PART 1

Theory of market change

IF	THEN
If utility rates advance to reward customers (or not dramatically penalize) them for moving from gas HVAC through more electrification enabling rate structures,	**then** consumers and property management firms will not be financially penalized with higher electric bills when moving to a heat pump technology like room heat pumps.

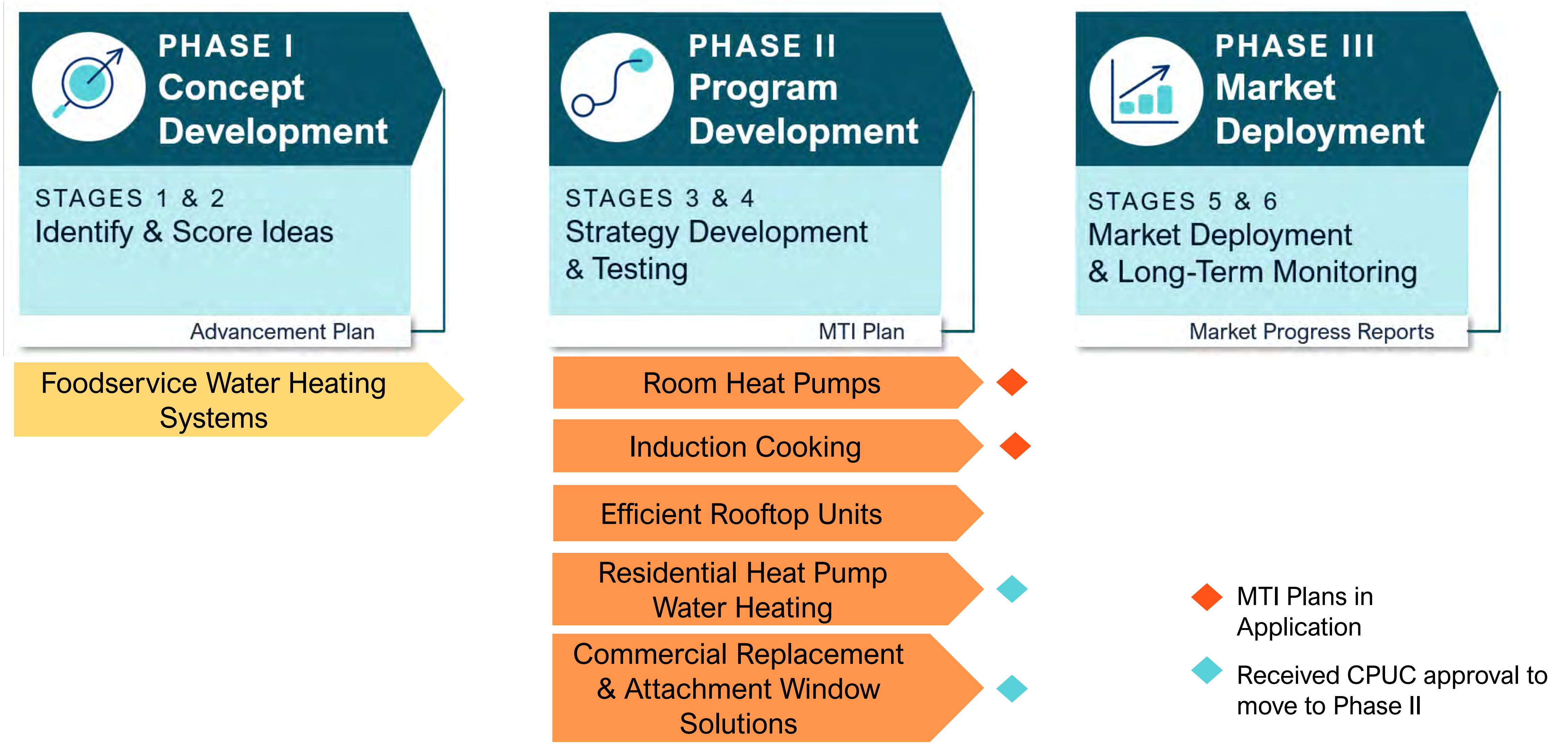
Questions?

5

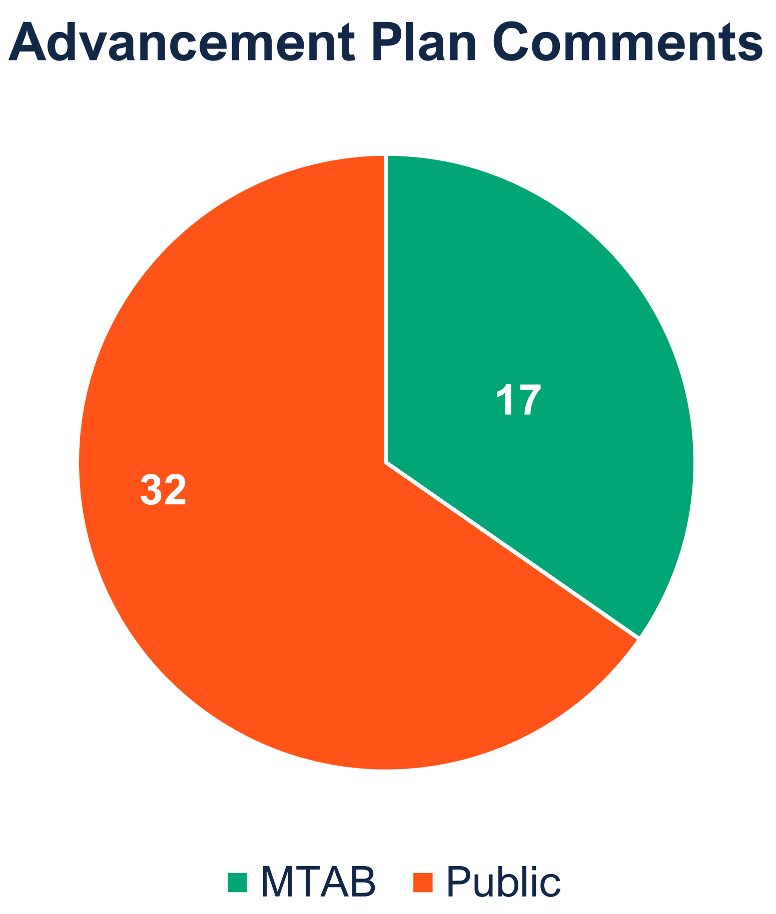
Comment Summary on Draft Advancement Plan: Foodservice Water Heating

Jeff Mitchell, CalMTA Team at Resource Innovations

MTI Development - status of ideas



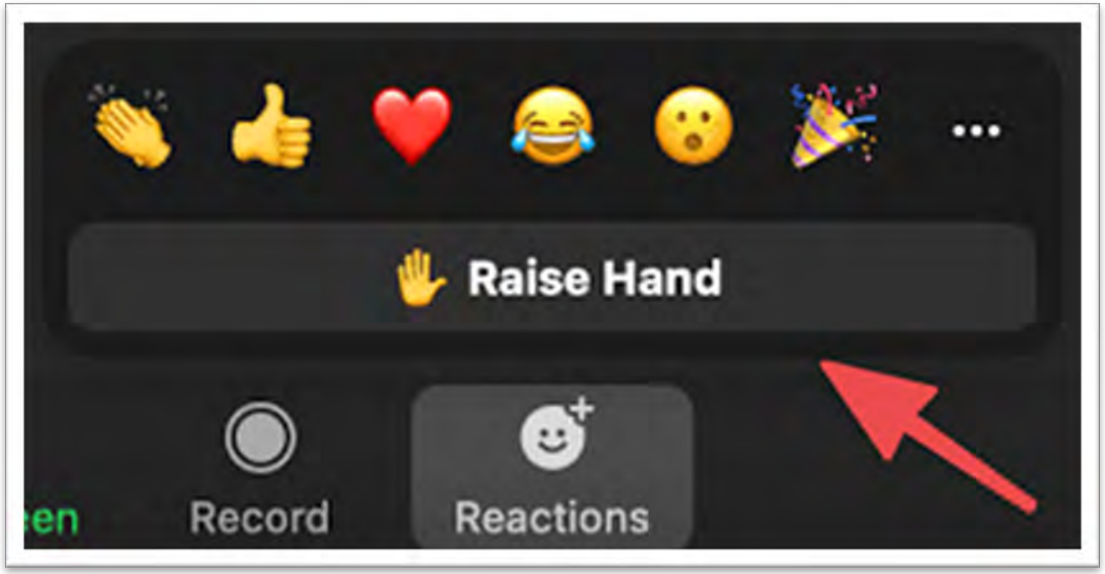
Foodservice Water Heating Systems



Comments / Questions?

6. Public comment

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



7
Updates & Upcoming Meetings

2025 Annual Budget Advice Letter (ABAL)

- CalMTA developed the ABAL in collaboration with the MTAB
- We submitted the 2025 ABAL on 8/19; protests were due on 9/6
- CPUC received one protest from CalPA on the grounds that the ABAL didn’t include sufficient detail and calculations to confirm the reasonableness of the budget request
- On 9/13, CalMTA submitted a reply to CalPA's protest and on 9/16 filed a substitute sheet to add a missing footnote regarding FTE calculations to the budget table
- CPUC Energy Division suspended the ABAL and will determine whether to approve the advice letter
- Funding must be approved by 12/31/24 to allow for continued operation of CalMTA

Upcoming MTAB Meetings 2024

	Monday, Sep 23 (Virtual) 3:00 to 5:00 pm	Friday, Oct 25 (Virtual) 11:00 am to 2:00 pm	Nov 20 & 21 (in person) Irwindale, CA
MT Idea Advancement Plans			
Efficient Streetlighting			Idea is now included for reconsideration with Stage 2 scoring for ideas under consideration
Idea to Initiative Education			
Induction Cooking		Market Forecasting, cost effectiveness & Cost estimates	Draft MTI Plans Evaluation Plans
Room Heat Pumps			
New Batch Ideas			
2024 Request for Ideas	Stage 1 scoring & prioritization		Stage 2 scoring & prioritization
Admin & Ops			
Application			Application overview
Quarterly updates			3rd Q report with financials + pilot updates

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for the public good

CalMTA

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