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Document Title:	Building Decarbonization Coalition Comments - Presentation - Single-family Residential
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Submitted On: 5/26/2020
Docket Number: 19-DECARB-01

Presentation - Single-family Residential

MAY 22 Building Decarbonization Workshop, Single-Family Panel, Building Decarbonization Coalition presentation

Additional submitted attachment is included below.

Building Decarbonization Coalition

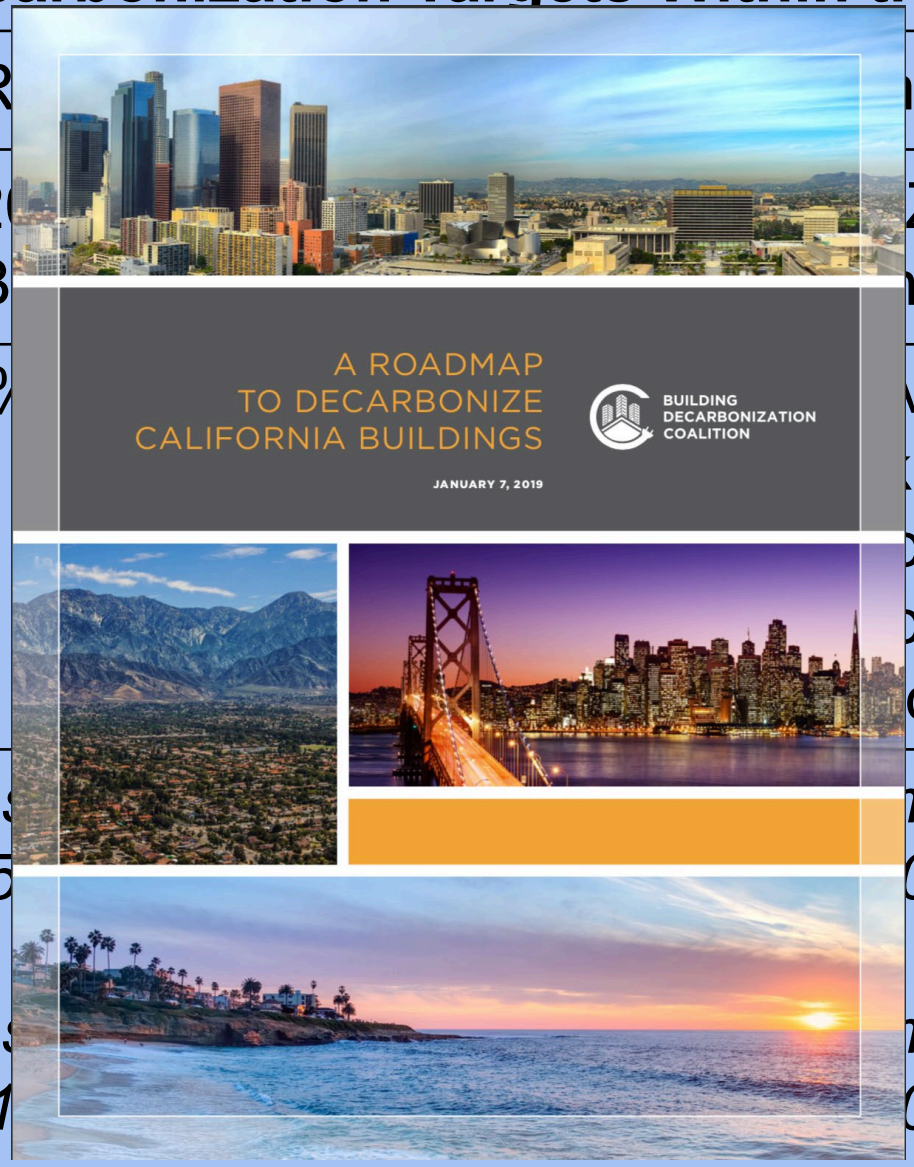
Single Family Residential

AB 3232 Workshop
May 22, 2020


POINTENERGY INNOVATIONS
SANDEN
Delivering Excellence
CITY OF BERKELEY
CalCCA
California Community Choice Association
Sonoma Clean Power
CARBON LIGHTHOUSE
CITY OF LOS ANGELES
FOUNDED 1781
SEAL OF THE CITY AND COUNTY OF SAN FRANCISCO
ORO EN PAZ
FIERRO EN GUERRA
TerraVerde ENERGY
CAL SMACNA
Greenbank Associates
NRDC
NATURAL RESOURCES DEFENSE COUNCIL
Local Government Commission
Leaders for Livable Communities
ANN V EDMINSTER
DESIGN AVEnues LLC
SIERRA BUSINESS COUNCIL
SIERRA CLUB
ABS
APPLIED BUILDING SCIENCE
BAY AREA AIR QUALITY MANAGEMENT DISTRICT
FRONTIER energy
Western HVAC Performance Alliance Inc.
wsp
MENLO SPARK
PLANNING EXCELLENCE
AMBAG
Association of Monterey Bay Area Governments
CITY OF OAKLAND
California Housing Partnership
CITY OF PALO ALTO UTILITIES
CUSHMAN & WAKEFIELD
STEFFES
CUSTOMER FOCUSED. SOLUTION DRIVEN. FIELD PROVEN.
INVESTOR CONFIDENCE PROJECT
CLEAResult
Turner
A-1 GUARANTEED
Heating & Air, Inc.
FAMILY OWNED & OPERATED
AO Smith
Innovation has a name.
U.S. GREEN BUILDING COUNCIL
USGBC
Rheem
EPRI
ELECTRIC POWER RESEARCH INSTITUTE
SIEGEL & STRAIN Architects
ARDENNA ENERGY
IR
Ingersoll Rand
Redwood Energy
Leaders in ZNE Design
WRNS STUDIO
GLUMAC
A TETRA TECH COMPANY
SEA
stone energy associates
SMUD
RHTR
RURAL HARD TO REACH LOCAL GOVERNMENT PARTNERSHIPS' WORKING GROUP
MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS
ASSOCIATION FOR ENERGY AFFORDABILITY INC.
STOPWASTE
at home • at work • at school
the Energy Coalition
SPAN.IO
Powering forward. Together.
TRC
Results you can rely on
JouleSmart
Guttmann Blaevoet
CONSULTING ENGINEERS
PERFORMANCE SYSTEMS DEVELOPMENT
Gensler
INTEGRAL GROUP
Sensgreen
LA DWP
Los Angeles Department of Water & Power
CESC
SILICON VALLEY POWER
CITY OF SANTA CLARA
OPEN
SILICON VALLEY CLEAN ENERGY
CITY OF Fremont
MAZZETTI
COLMAC WATERHEAT
A division of Colmac Industries.
Stantec
WAYPOINT ENERGY
EDF
ENVIRONMENTAL DEFENSE FUND
Finding the ways that work
SUSTAINABLE SFUSD
WRCOG
Western Riverside Council of Governments
SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company
williams+paddon
ARCHITECTS + PLANNERS
Xcel Energy
ReplaceNow
pickmysolar
ehdd
architecture
EAST BAY COMMUNITY ENERGY
BRADFORD WHITE
WATER HEATERS

Figure 1: Decarbonization Targets Within the Building Sector

	R	ercial
New Buildings	2 B	Zero Emissions g Code
Retrofits	%	vels from the overall : m building sector m building sector om building sector
•*Increase the s* *heating from 5* *2030.* •*Increase the s* *heating from 1* *2030.*		*mps for space* *025 and 100 % in* *mps for water* *025 and 100 % in*



GOAL 1: Customers, contractors and policymakers are aware of and demand building decarbonization measures.

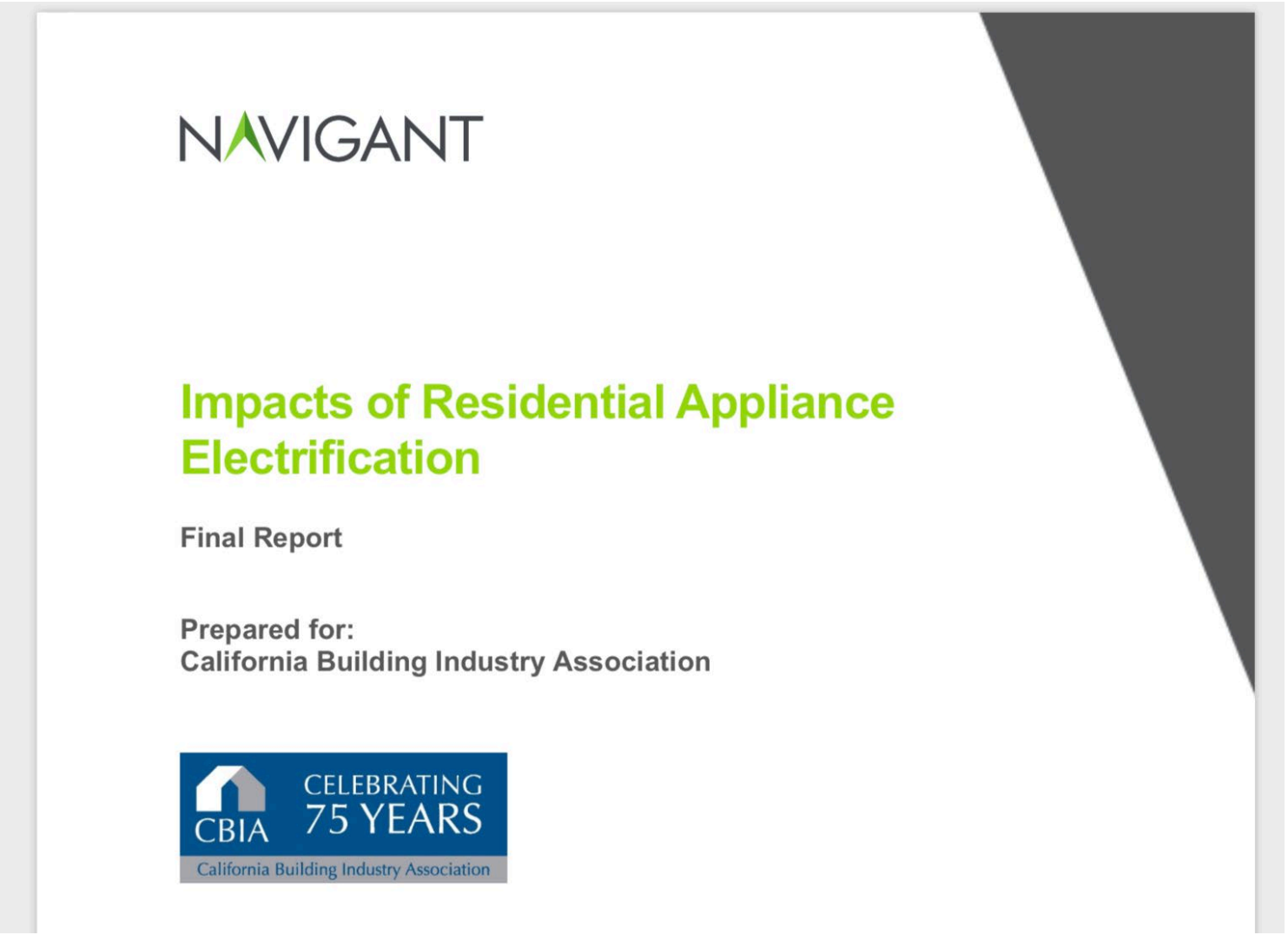
GOAL 2: Customers receive a good value from adopting building decarbonization measures.

GOAL 3: Building decarbonization provides a better value to contractors than fossil-fuels.

GOAL 4: Supply-chains and delivery agents are able to meet rising demand for carbon-free building technologies with a quality product.

GOAL 5: Policies are aligned to maximize customer awareness of and interest in building decarbonization, the customer, builder and contractor value proposition, and the industry's ability to meet rising demand.

New Build



"..electric appliances have similar or lower costs than natural gas appliances.."

"…estimated total installed cost increase in 2020 for electric appliances is … $185 to $418 for a new single-family home" *

* Does not include eliminating gas infrastructure

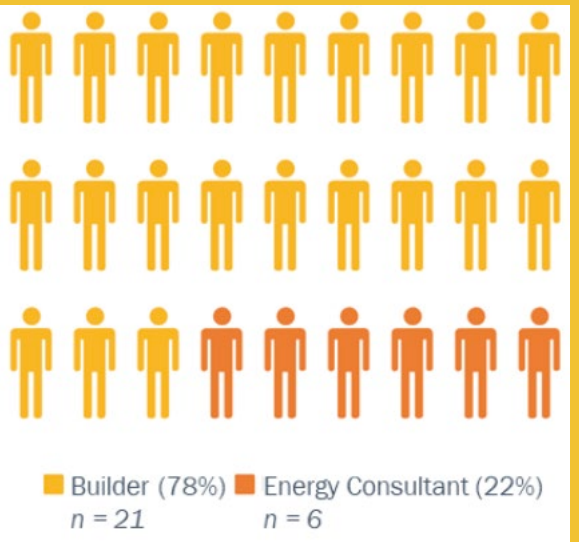


Figure 2: Survey Respondent Type

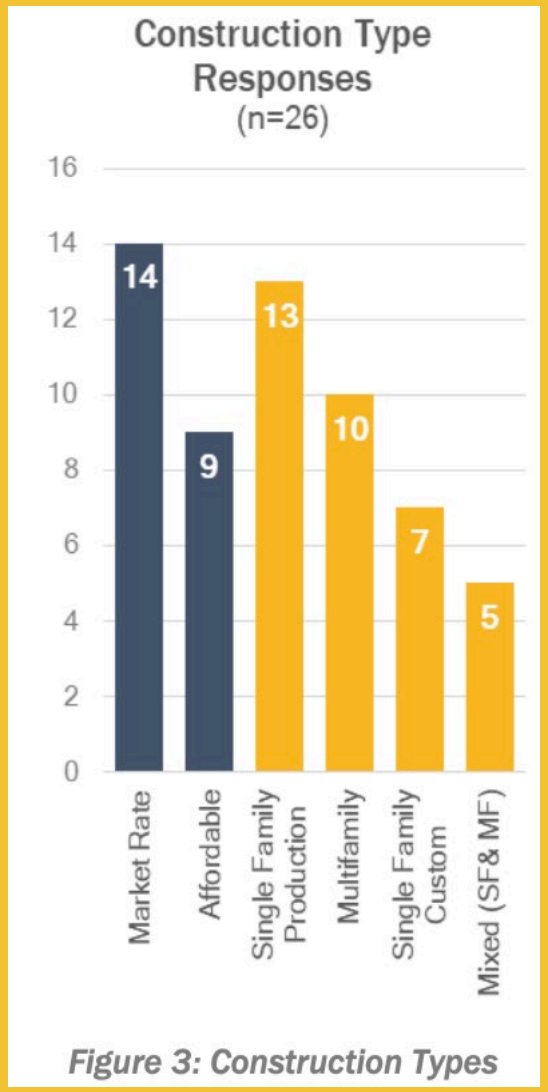


Figure 3: Construction Types

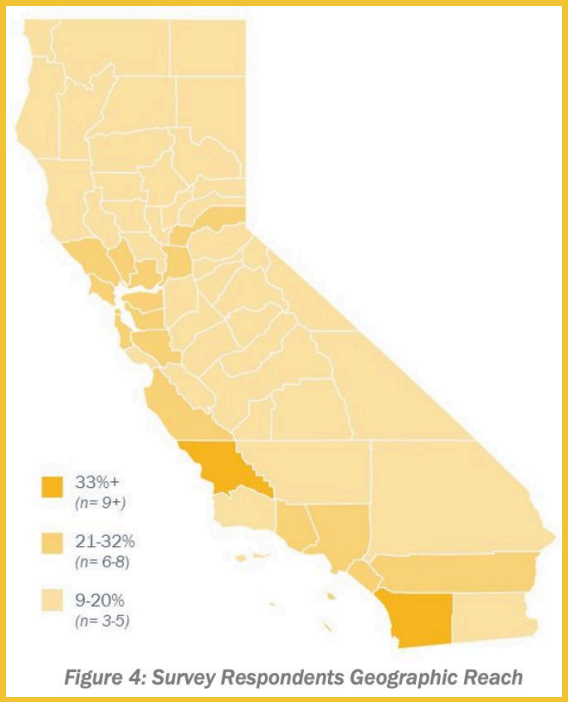
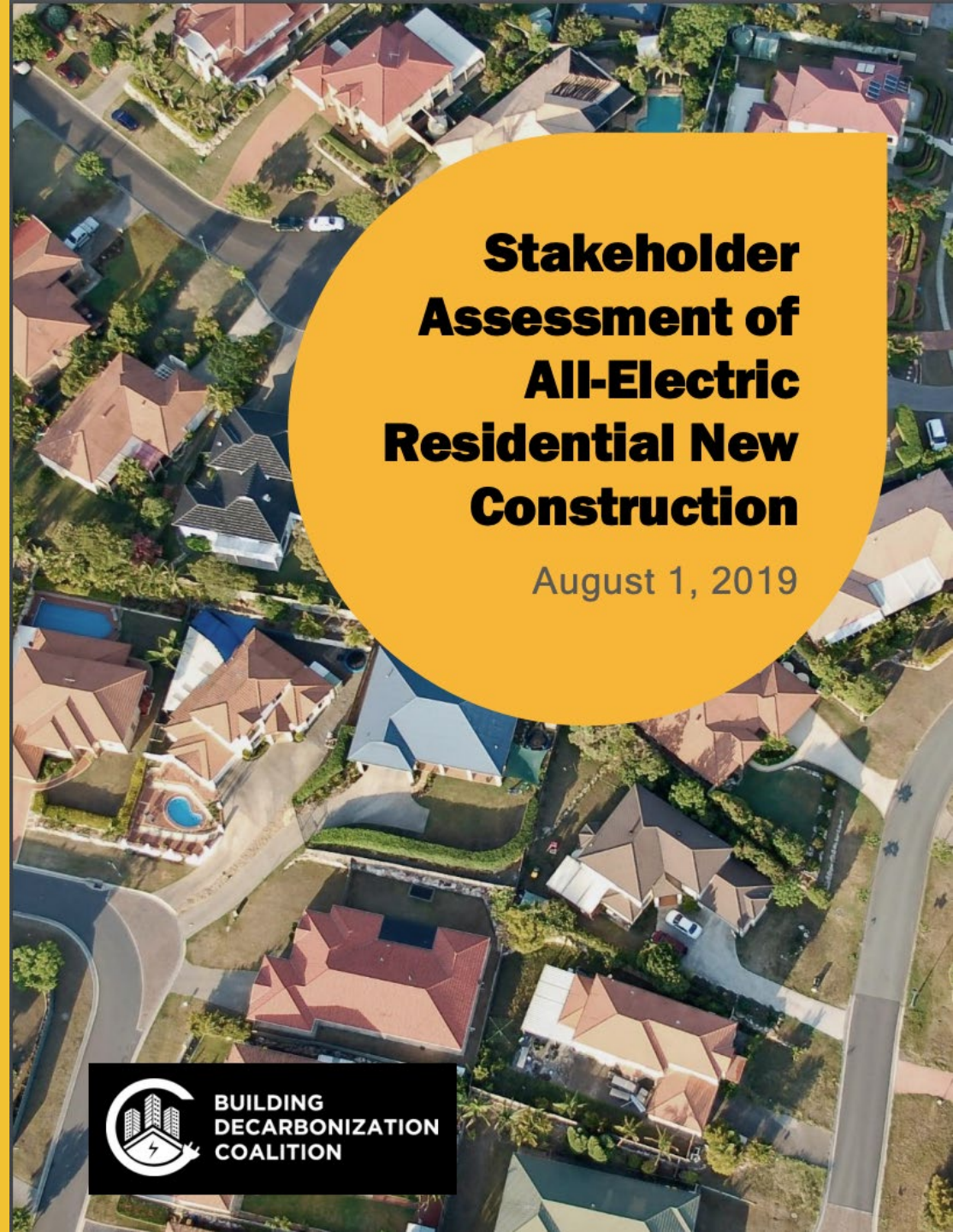


Figure 4: Survey Respondents Geographic Reach



Stakeholder Assessment of All-Electric Residential New Construction

August 1, 2019

BUILDING DECARBONIZATION COALITION

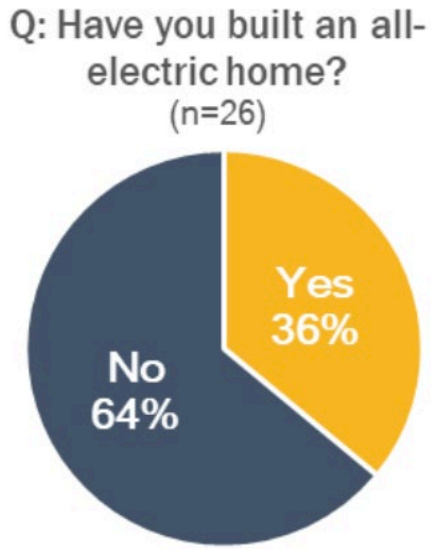


Figure 5: All-Electric Experience

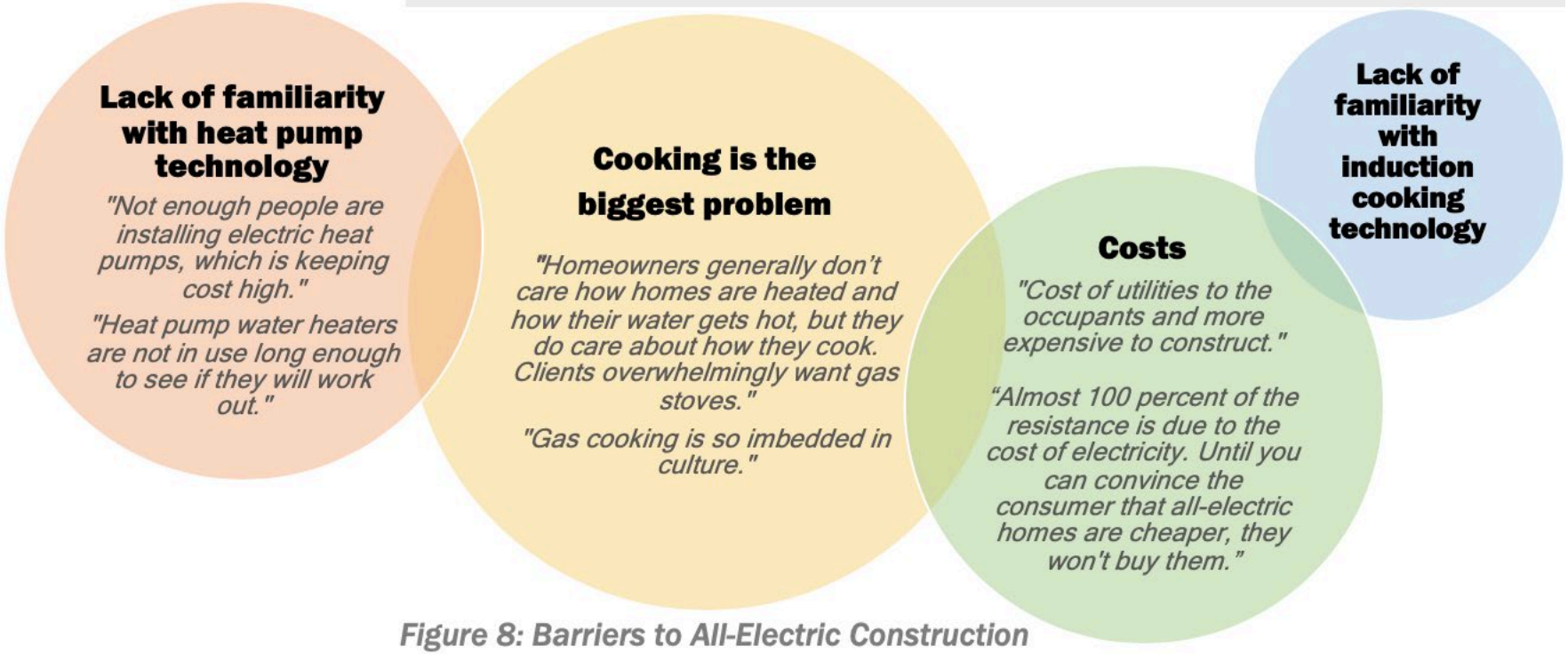


Figure 8: Barriers to All-Electric Construction

Q: How interested are you in building all-electric homes?

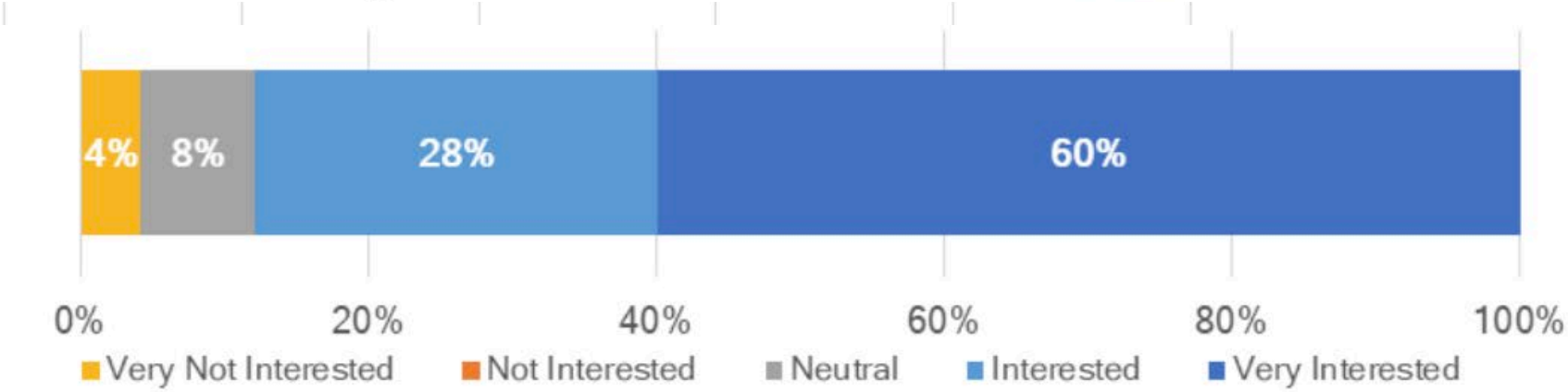
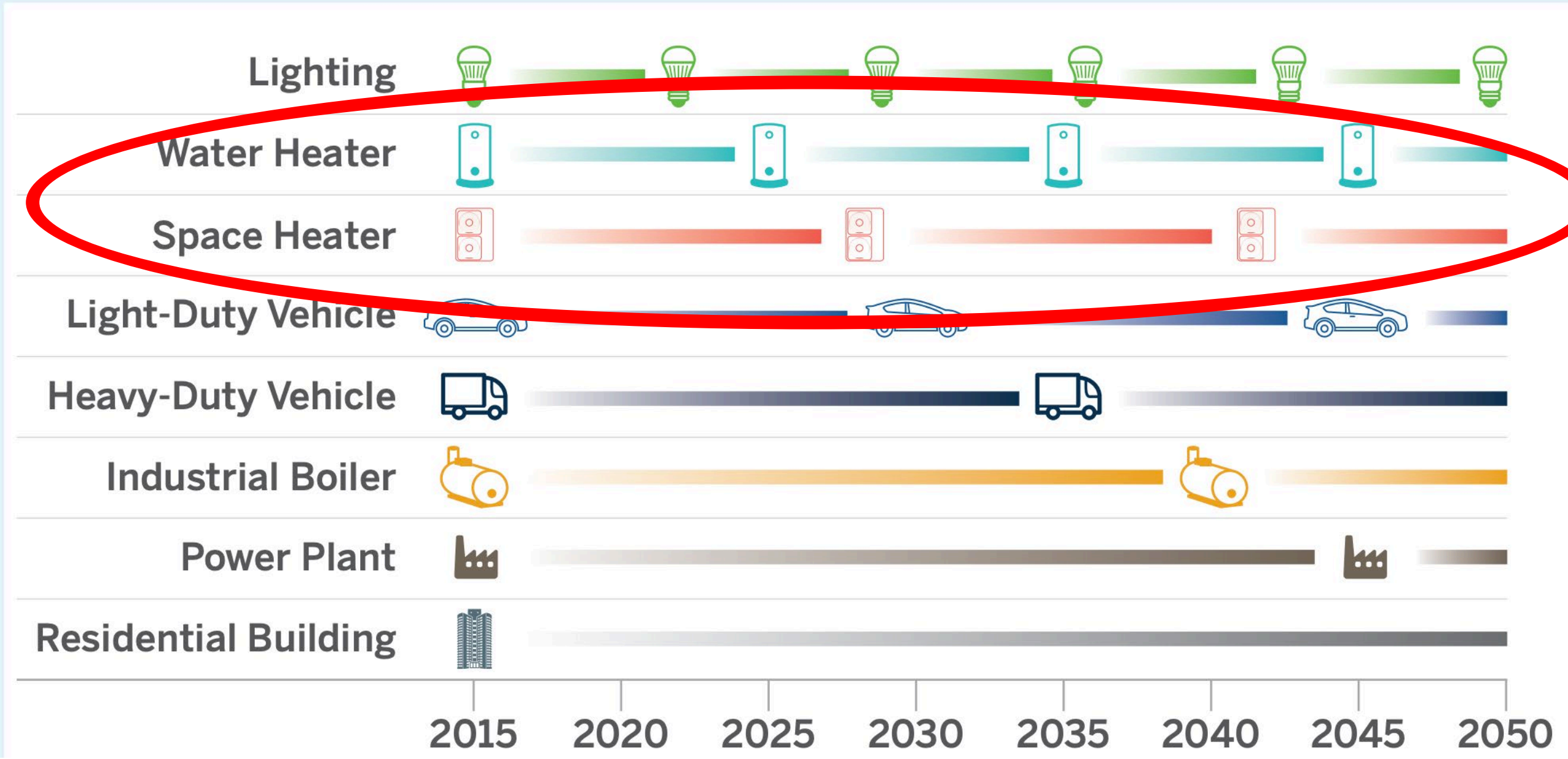


Figure 14: Interest in Building All-Electric Homes

Existing Buildings

Stock Turnover



Emergency

BUIL

"So why would [a plumber] want to learn something like that when he can put in his normal water heater he's always put in, and get several done in a day if he wanted to?"

Final Report

April 22, 2020

EMI CONSULTING

Panel Upgrades and Wiring

Panels: $2,500-$4,000
220V Wiring: $300-$1,000

Recommendations

New Construction

- New Construction
  - Stop State funding for gas infrastructure expansion
  - Code compliance incentives
  - Technical support and training for builders
  - Consumer campaign
  - Emissions-based code

Recommendations

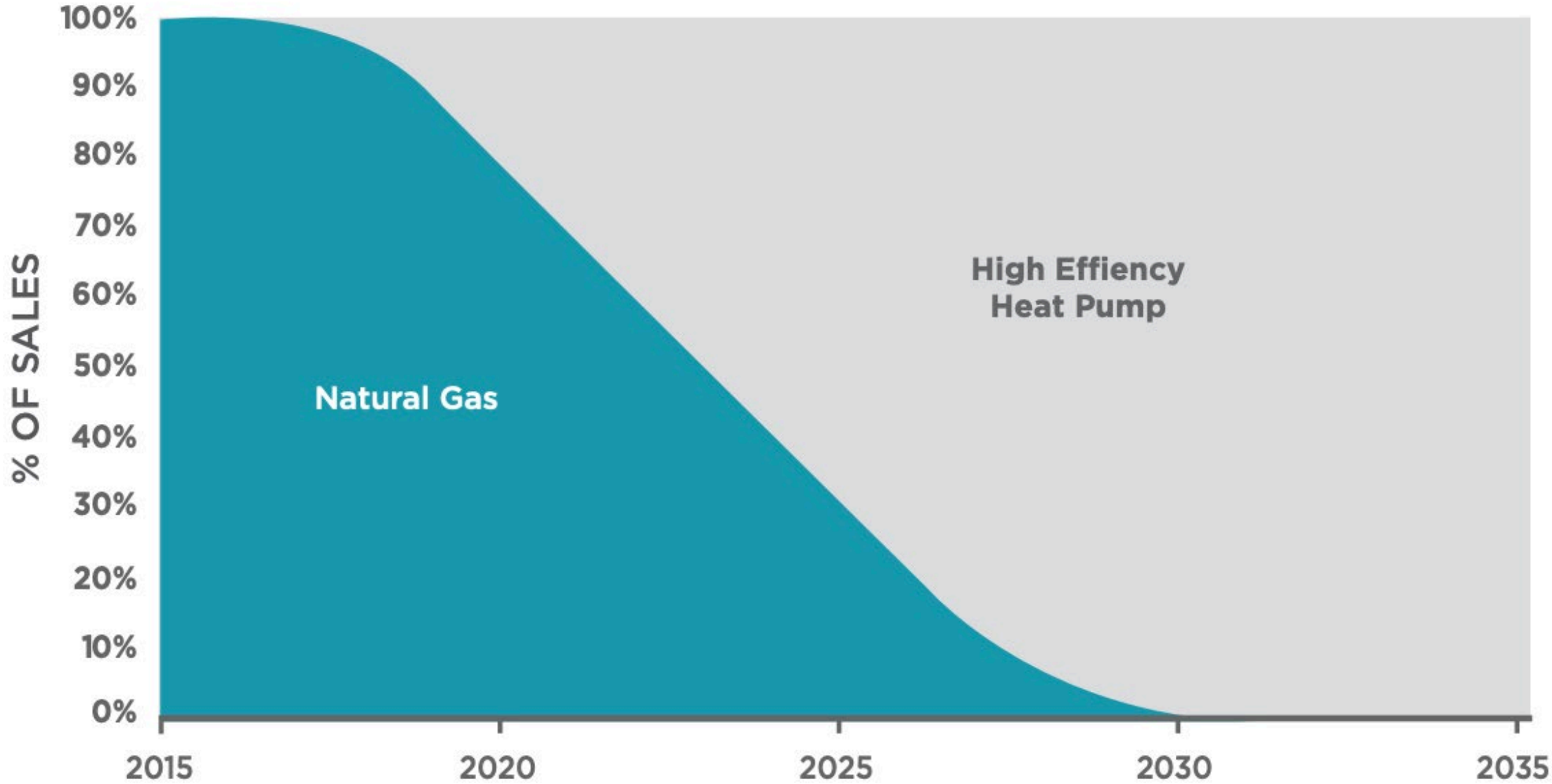
- Existing buildings
  - Clean Heat Initiative
  - Clean Cooking Initiative
  - Building electric infrastructure modernization
  - Consumer campaign

Cross-cutting

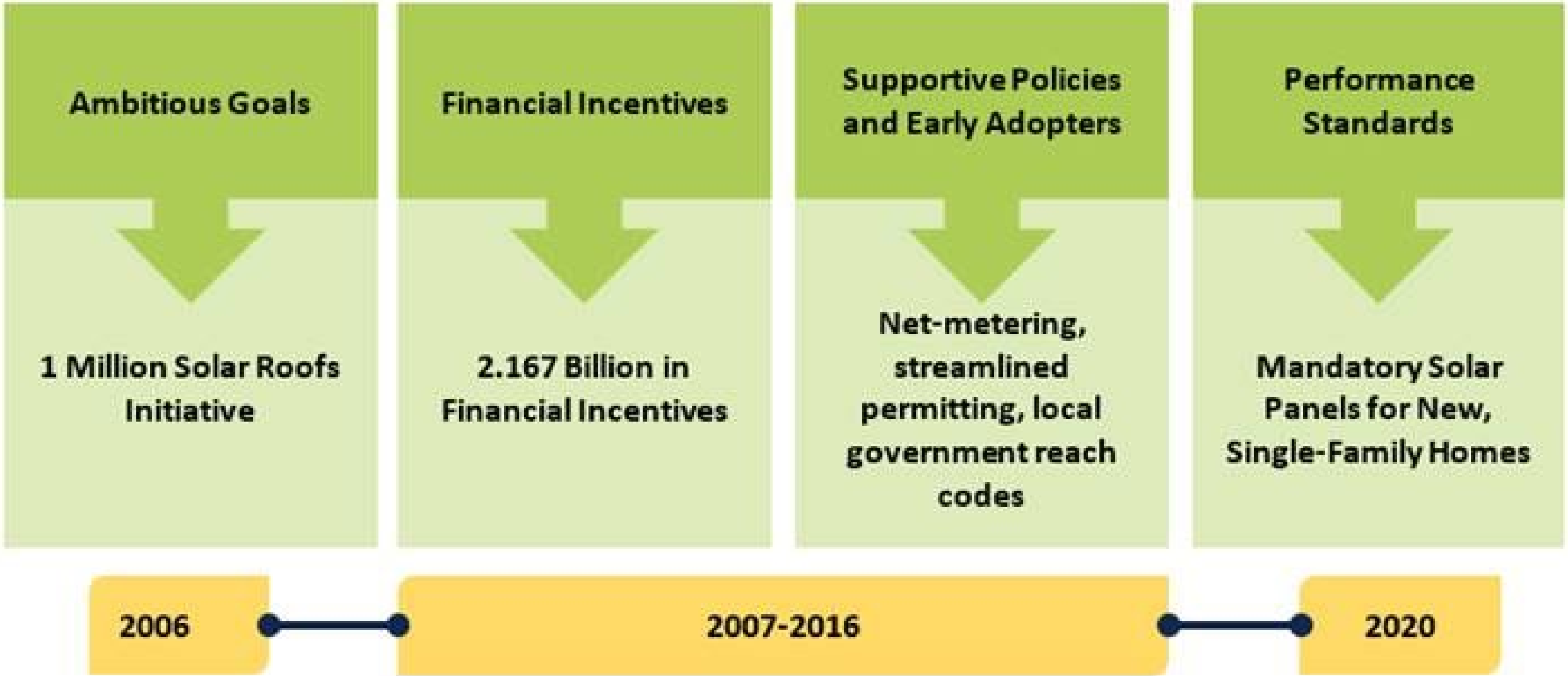
- Low-income electrification programs
- Electrification-friendly rates
- Financing
- Technology leadership standards
- Proceeding to transition state off of gas

Water Heating

Increase the share of high efficiency heat pumps for water heating from 1% of sales in 2018, to 50% in 2025 and 100 % in 2030.



California's Clean Energy Market Transformation Path



California prepares to shift away from natural gas, while keeping power reliable and affordable

By Liane Randolph, Special to CalMatters

Thank you!

Appendix

Gas Infrastructure Costs

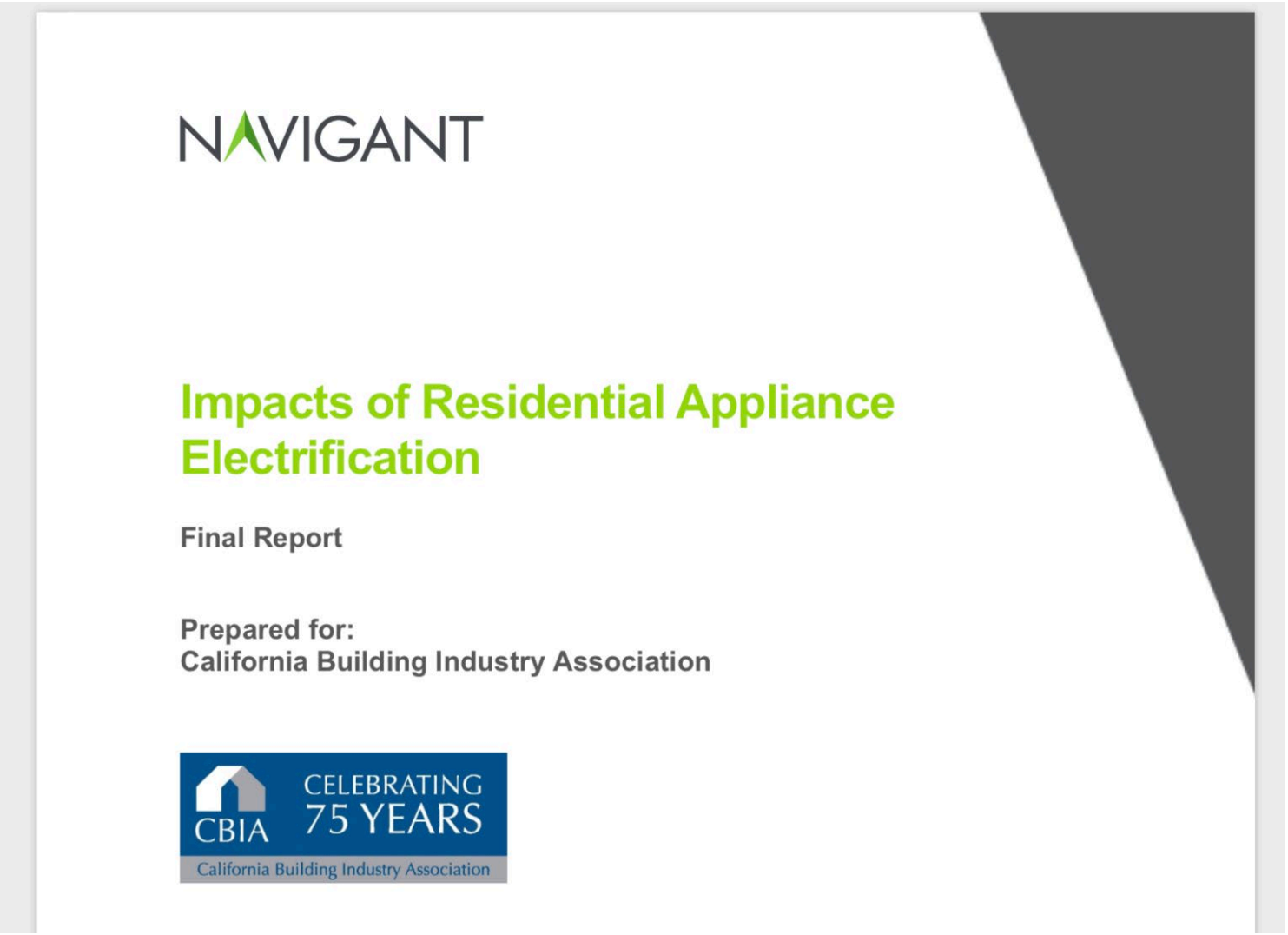
$6,000-$15,000

$270-$850

$750-$2,400

Every $1,000 increase in house price prevents 8,870 California families from affording

-NAHB, 2019



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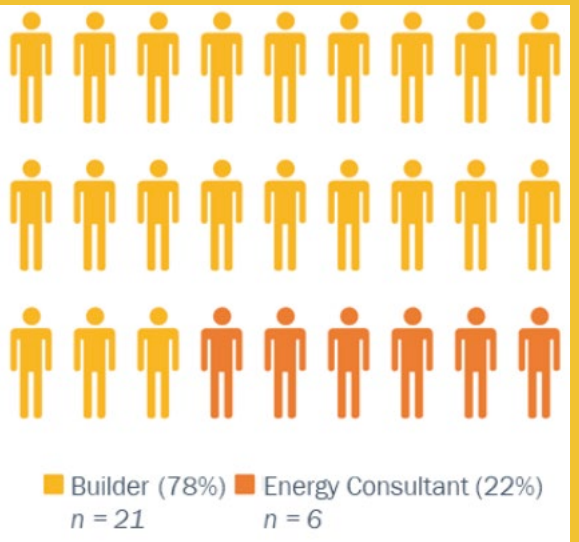

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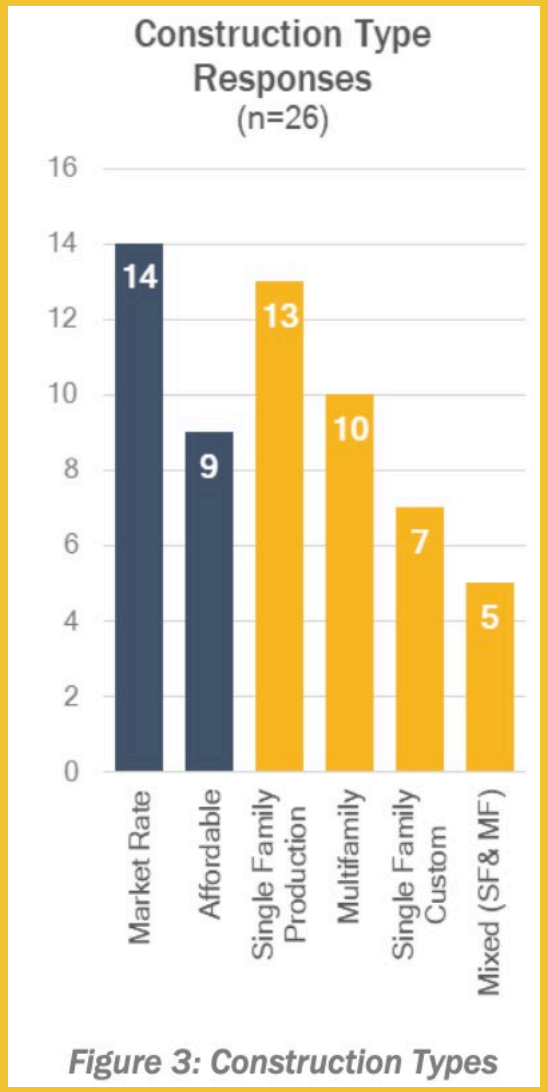

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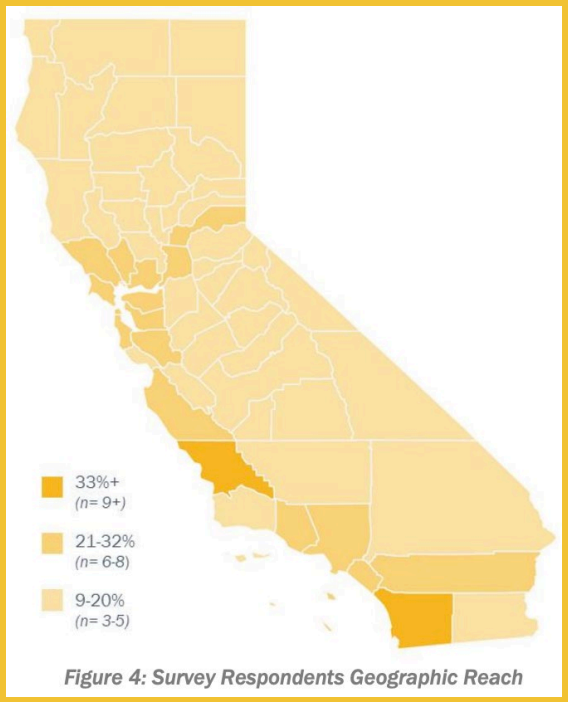

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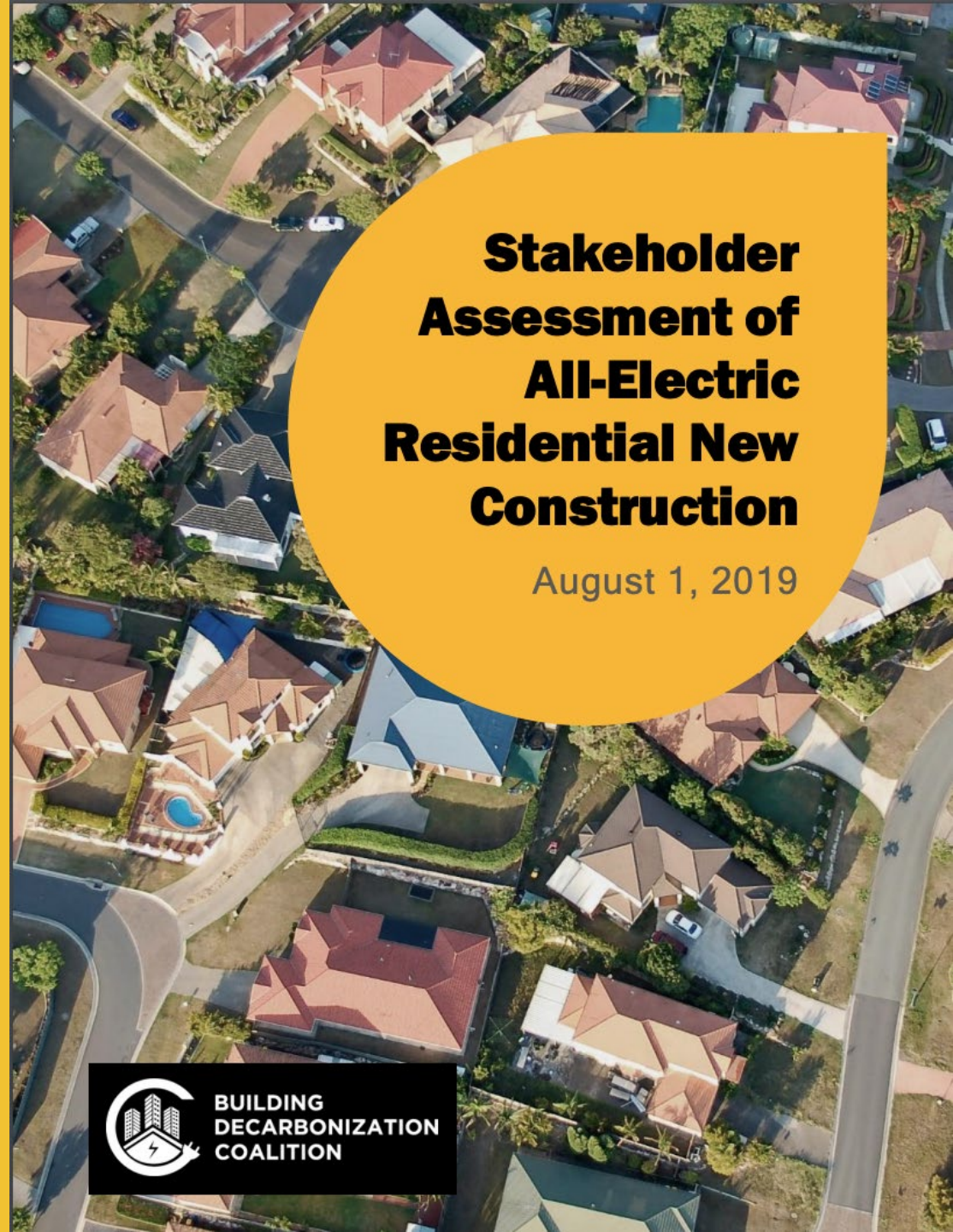

Stakeholder Assessment of All-Electric Residential New Construction

August 1, 2019

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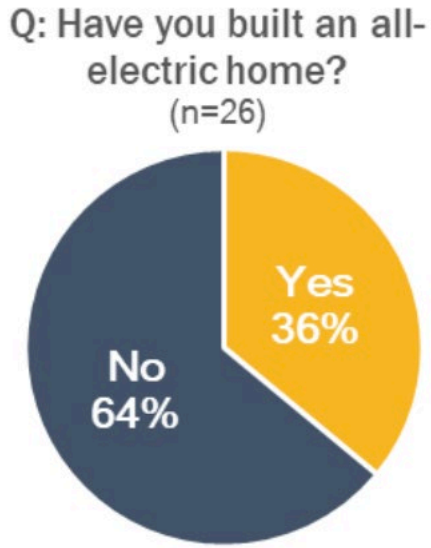

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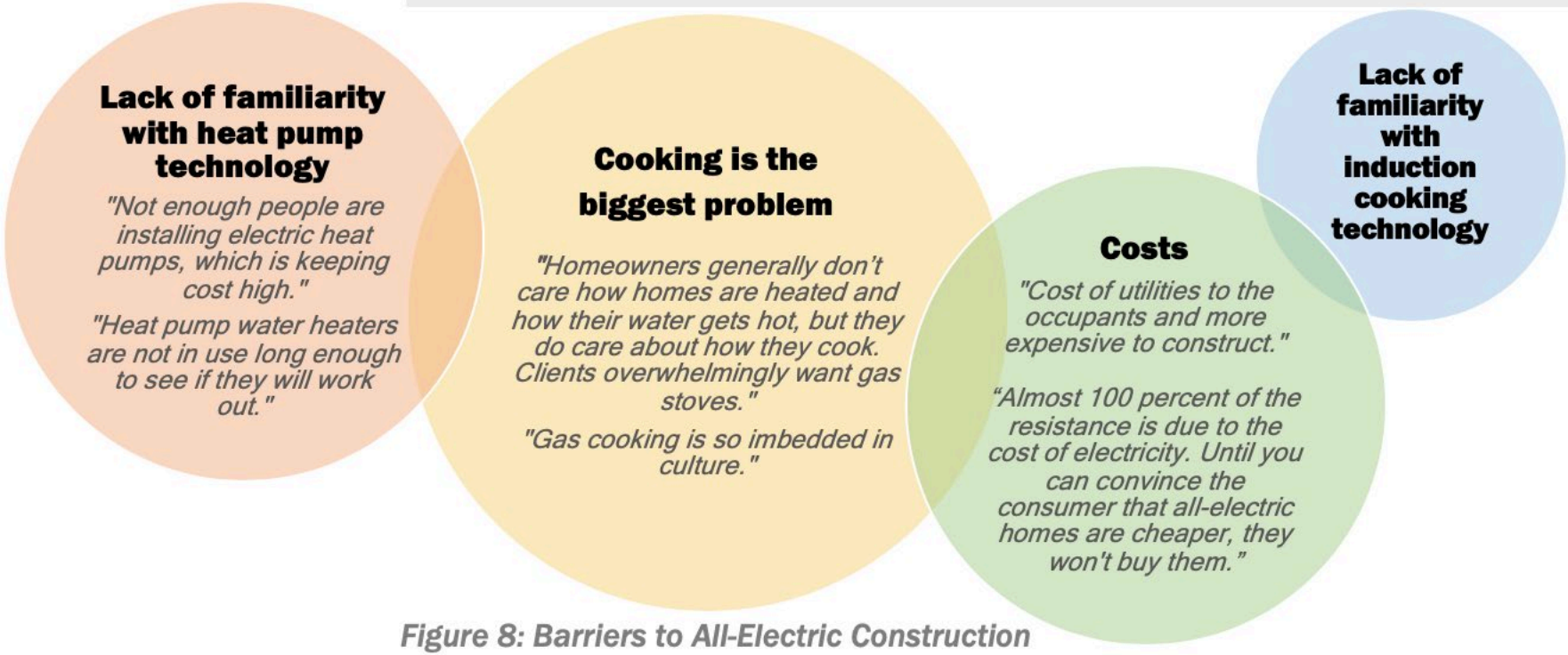


Figure 8: Barriers to All-Electric Construction

Q: Do you agree the construction of an all-electric home is practical today?

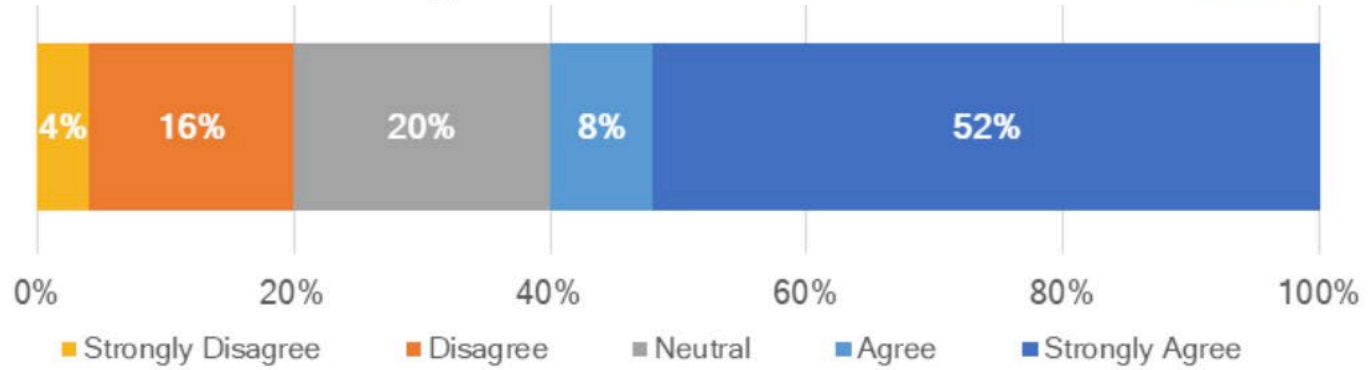
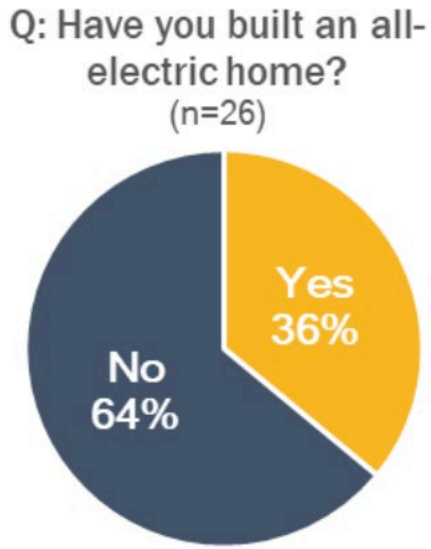


Figure 7: Practicality of All Electric Construction

Consumer Reports Prefers Induction

Top 6 of 8 Ranges for 2020 were electric, top 2 were Induction

Fuel	Model	Rating	Cost
Induction	GE Profile PHS930SLSS	86	$2,432
Induction	Kenmore Elite 95073	84	$1,525
Gas	LG Signature LUTD4919SN	84	$3,000
Induction	LG LSE4617ST	82	$2,500
Induction	LG LSE4616ST	82	$1,700
Smoothtop	Whirlpool WGE745c0FS	82	$1,000
Gas	Samsung NY58J9850WS	81	$2,725
Induction	Frigidaire Gallery FGIF3036TF	81	$1,035



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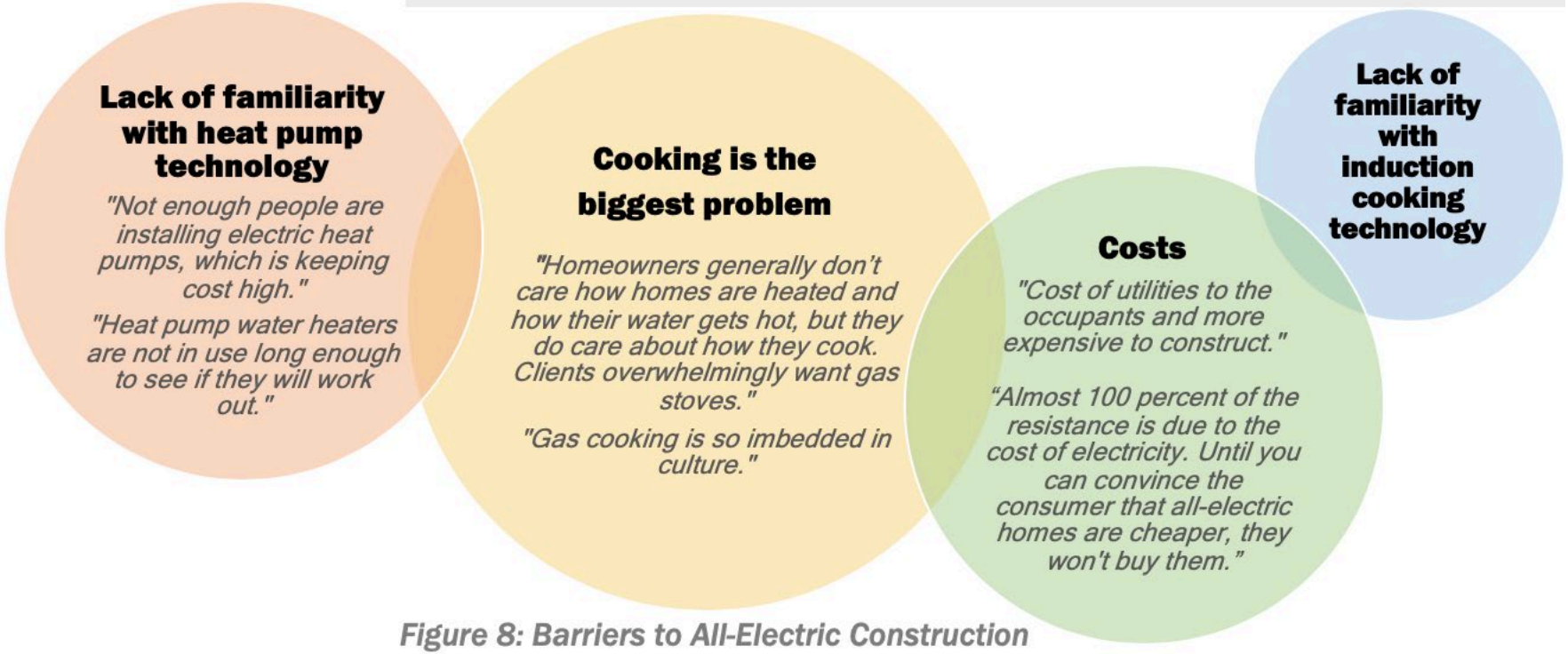

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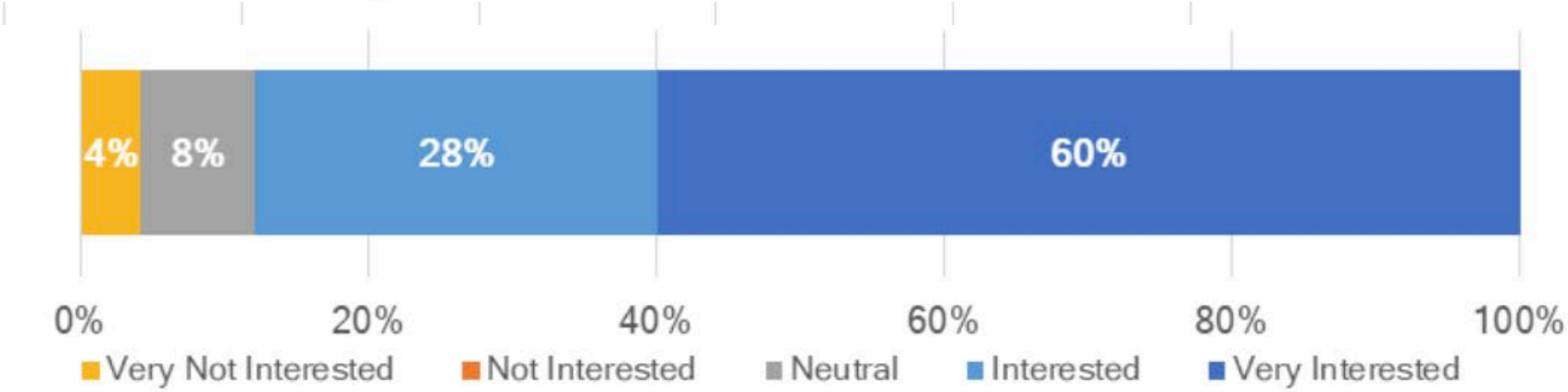
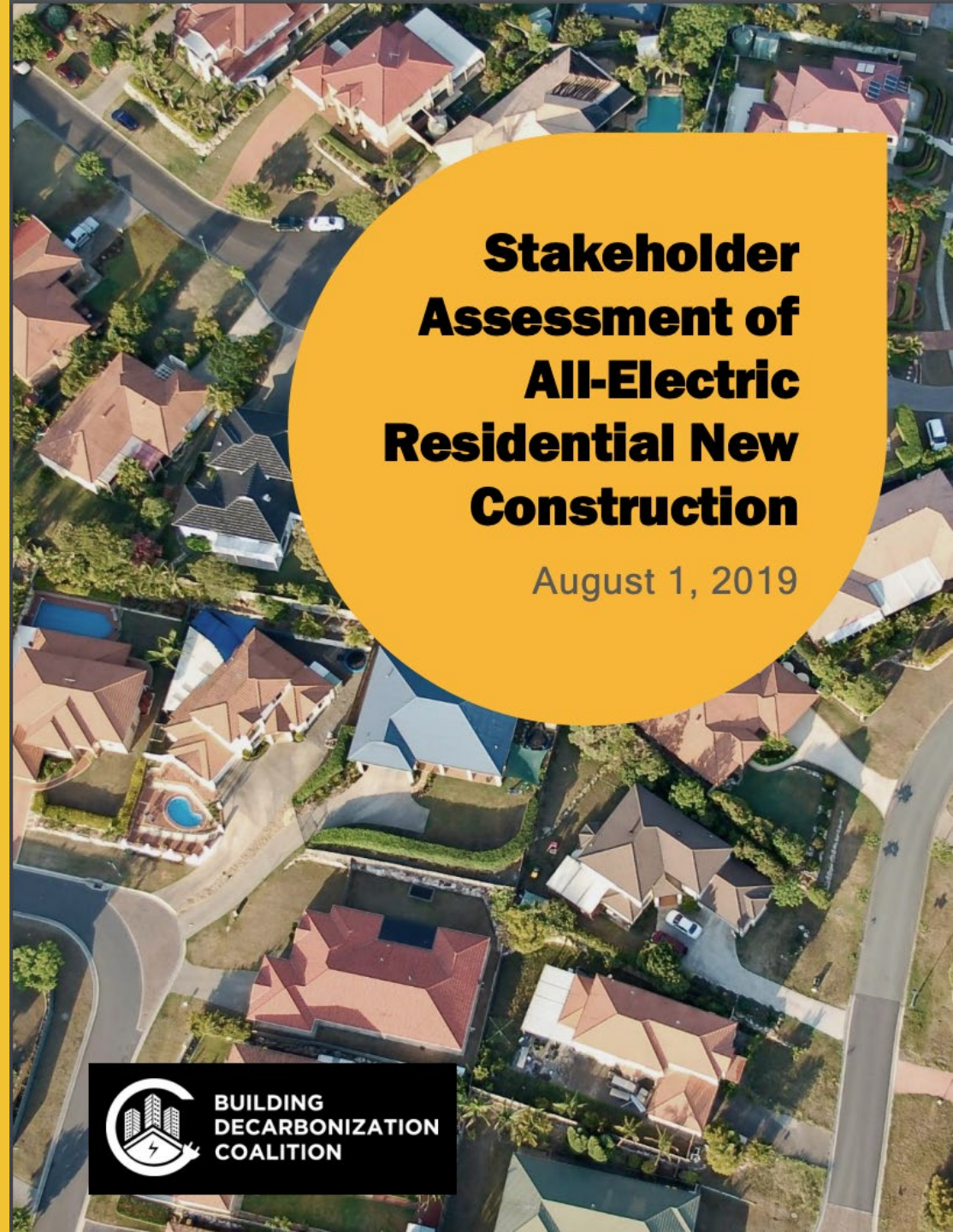


Figure 14: Interest in Building All-Electric Homes

Recommendations

Conduct general awareness campaigns that demonstrate the features and benefits of all-electric homes, including providing:

- o Information regarding true operating costs for all-electric homes.
- o Support for hands-on experiences with induction cooking.
- o Talking points on the features and benefits of all-electric construction that builders can use with their customers



Existing Buildings

Contractor Value Proposition

- Cost at distributer or retail
- Ease of program use

Average Installed Cost of Gas WH and HPWH

Gas Home

Gas Storage
(existing buildings)

$

$1,000-$1,600

0.63 UEF

Gas Tankless
(new construction)

$$-$$$

$3,700-$5,700

0.81 UEF

Electric Home

Heat Pump

$$-$$$

$2,100 to $7,900

3.0 UEF

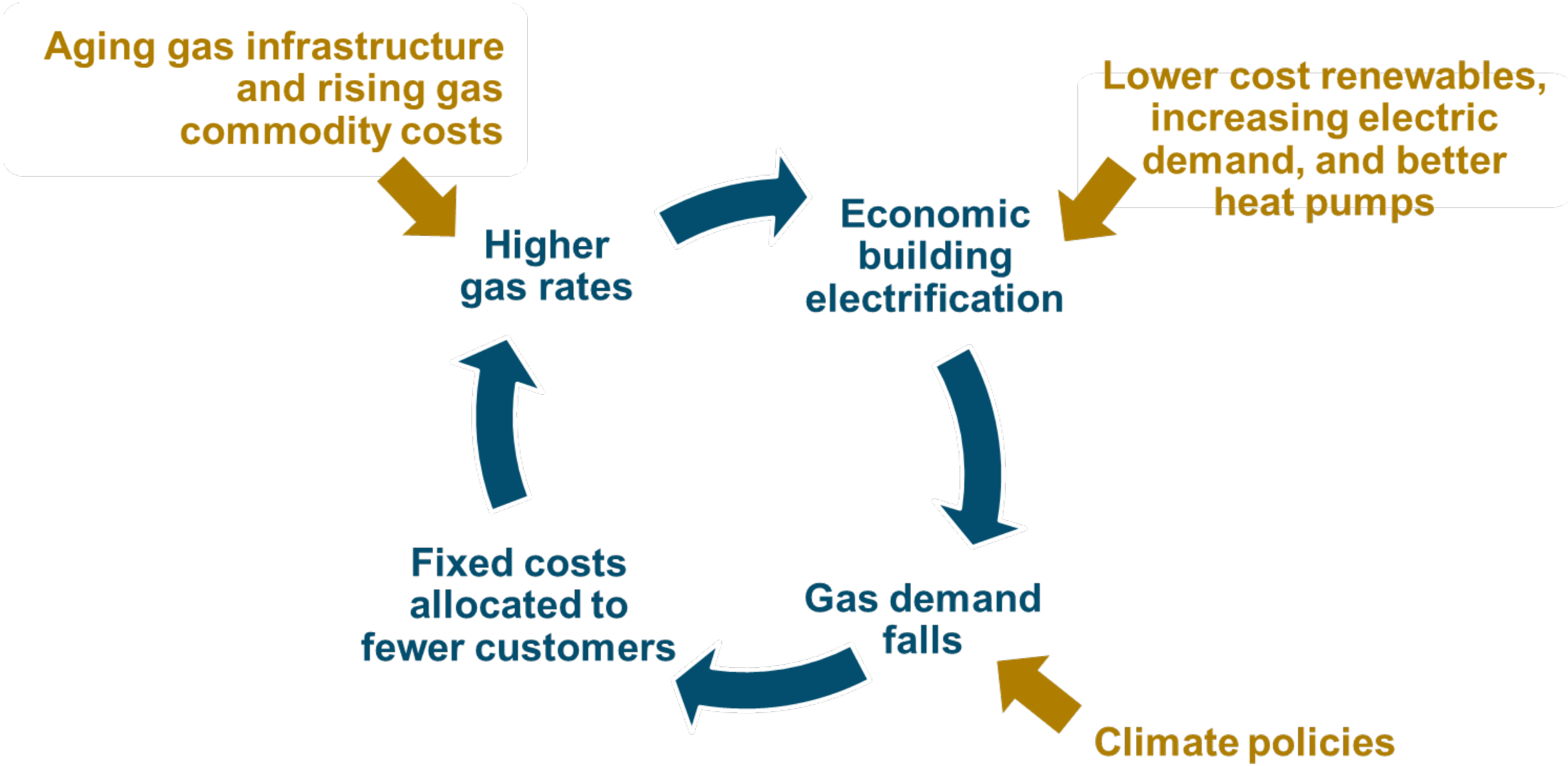
$450 Million California Building Electrification funding over the next 9-months

SMUD®

Panel Upgrades and Wiring

Panels: $2,500-$4,000
220V Wiring: $300-$1,000

Rising Gas Costs Lead to Downward Spiral of Gas System, Exposing Low-income Households



Induction Study

Frigidaire FGIF3036TF - Electric Induction Cooktop

- Number of Elements: 4
- Cooktop Controls: Digital Button 1-9 (and power boost)
- Oven Type: Convection
- Tested Elements*: 9.4” 3.6 kW; 7.0” 2.8 kW
- Retail Price: $1,199

*Maximum Input Rate (kW) in power boost mode

GE Profile PHS930SL2SS - Electric Induction Cooktop

- Number of Elements: 4+1 warmer
- Cooktop Controls: Digital Touchpad 0-100% (5% Increments)
- Oven Type: Convection
- Tested Elements*: 11.0” 3.7 kW; 8.0” 2.5 kW
- Retail Price: $2,399

*Maximum Input Rate (kW)

Samsung NE58K9560WS - Electric Induction Cooktop

- Number of Elements: 4
- Cooktop Controls: Digital Rotary (Analogue Look)
- Oven Type: Dual-Fan Convection
- Tested Elements*: 11.0” 3.3 kW; 7.0” 1.8 kW
- Retail Price: $2,199

*Maximum Input Rate (kW) in power boost mode

Whirlpool WFE515S0ES1 - Electric Resistance Glass-Ceramic Top

- Number of Elements: 4
- Cooktop Controls: Rotary Dial 1-9
- Oven Type: Standard Non-Convection
- Tested Elements: 9.0” 2.5 kW; 6.0” 1.2 kW
- Retail Price: $579

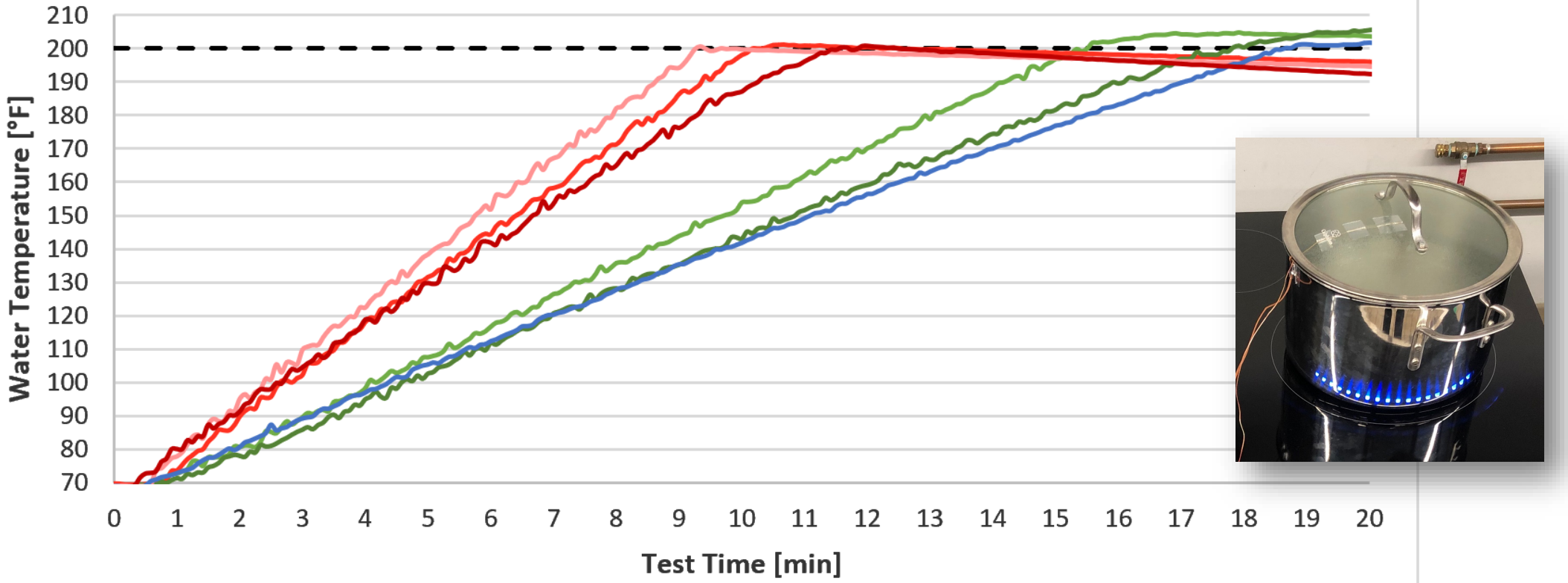
Frigidaire FFEF3016USB - Electric Resistance Coil

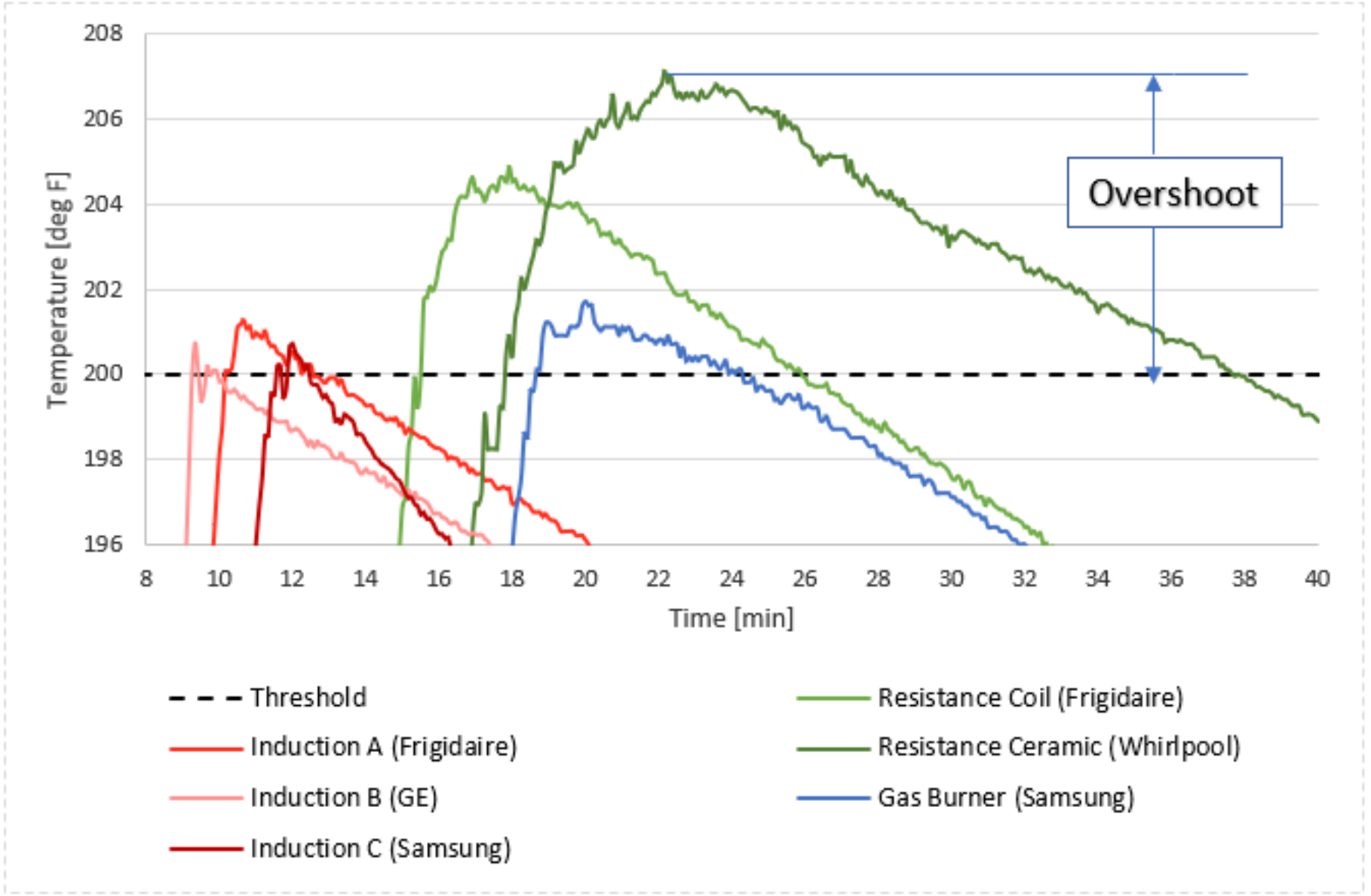
- Number of Elements: 4
- Cooktop Controls: Rotary Dial 1-9
- Oven Type: Standard Non-Convection
- Tested Elements: 8.0” 2.4 kW; 6.0” 1.5 kW
- Retail Price: $579

Samsung NX58H5600SS – Gas Burner Range

- Number of Burners: 5
- Cooktop Controls: Analog rotary dials
- Oven Type: Convection
- Tested Burners: 3.8” 17 kBtu/h; 2.9” 9.5 kBtu
- Retail Price: $799

Water Heat-Up Rate*





*calculated based on a single high-input element or burner heating 12 lb of water from 70 to 200F in an 8 qt pot

Figure 10: Temperature Overshoot Results for 12-lb of Water