

present

'Watts For Lunch'

Building Electrification

February 27, 2020

Watts for Lunch

- Interactive CCA updates
- Understand customer priorities
- Local peer networking
- Forum for learning/idea sharing
 - best practices
 - new technology, services
 - programs and incentives

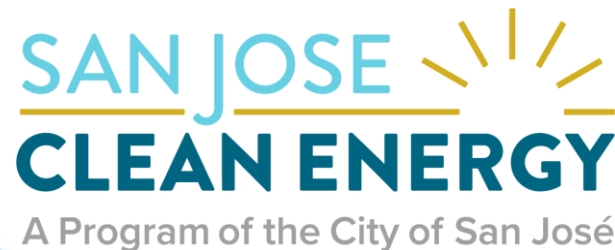


AGENDA:

- | | |
|------------------|---|
| 11:00 am | SVCE and SJCE Intro and Welcome |
| 11:10 am | Host Attendee Introductions |
| 11:20 am | John Supp , Manager of Account Services, Silicon Valley Clean Energy
<i>"Reach Codes Across Santa Clara County: An Overview"</i> |
| 11:35 am | "Watt Do You Think" Interactive polling |
| 11: 45 am | Panama Bartholomy , Director, Building Decarbonization Coalition
<i>"Why Electrification, and What's Happening in Policy and Practice?"</i> |
| 12:10 pm | Lunch is served |
| 12:40 pm | Asim Tahir , District and Renewable Energy Lead, Google
<i>"Innovative All-Electric Construction Approaches at Google"</i> |
| 1:10 pm | "Watt Do You Think?" Interactive polling |
| 1:20 pm | Zach Struyk , Deputy Director, Account Management and Marketing,
San Jose Clean Energy - Summary of Launch Year & Intro to the Team
- Green Tariff Development (Mark Bachman) - CALeVIP (Kevin Meehan) - Program Roadmap (Kevin Meehan) |
| 1:40 pm | Don Bray , Director of Account Services and Community Relations,
Silicon Valley Clean Energy
- 2019 Accomplishments - Procurement - Newly Available Volume Discount Pricing (GreenPrime Direct & ECO-Investment) -
Forthcoming programs (CALeVIP & Resilience) |
| 2:00 pm | Wrap Up, Forthcoming Event Announcement
Adjourn to Networking |

Meet Our Teams...

And Each Other!





John Supp

Manager of Account Services

Reach Codes – Buildings and EV Charging

Purpose

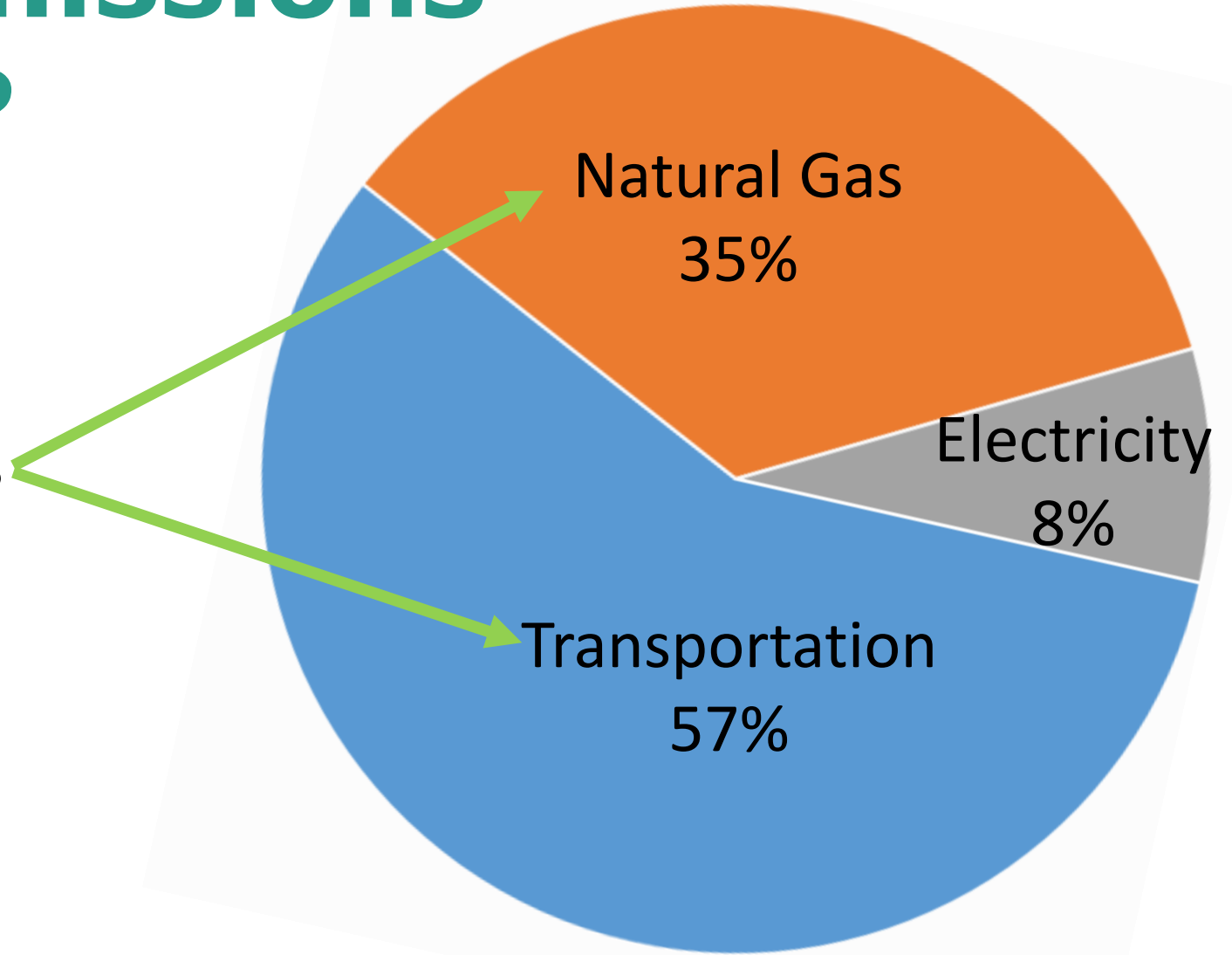
Cities encouraging/requiring

Electric HVAC (and more) in new construction

Enhanced EV infrastructure

Where are Emissions in 2018?

Priority areas



Major Goals

Reduce statewide greenhouse gas emissions (GHG)

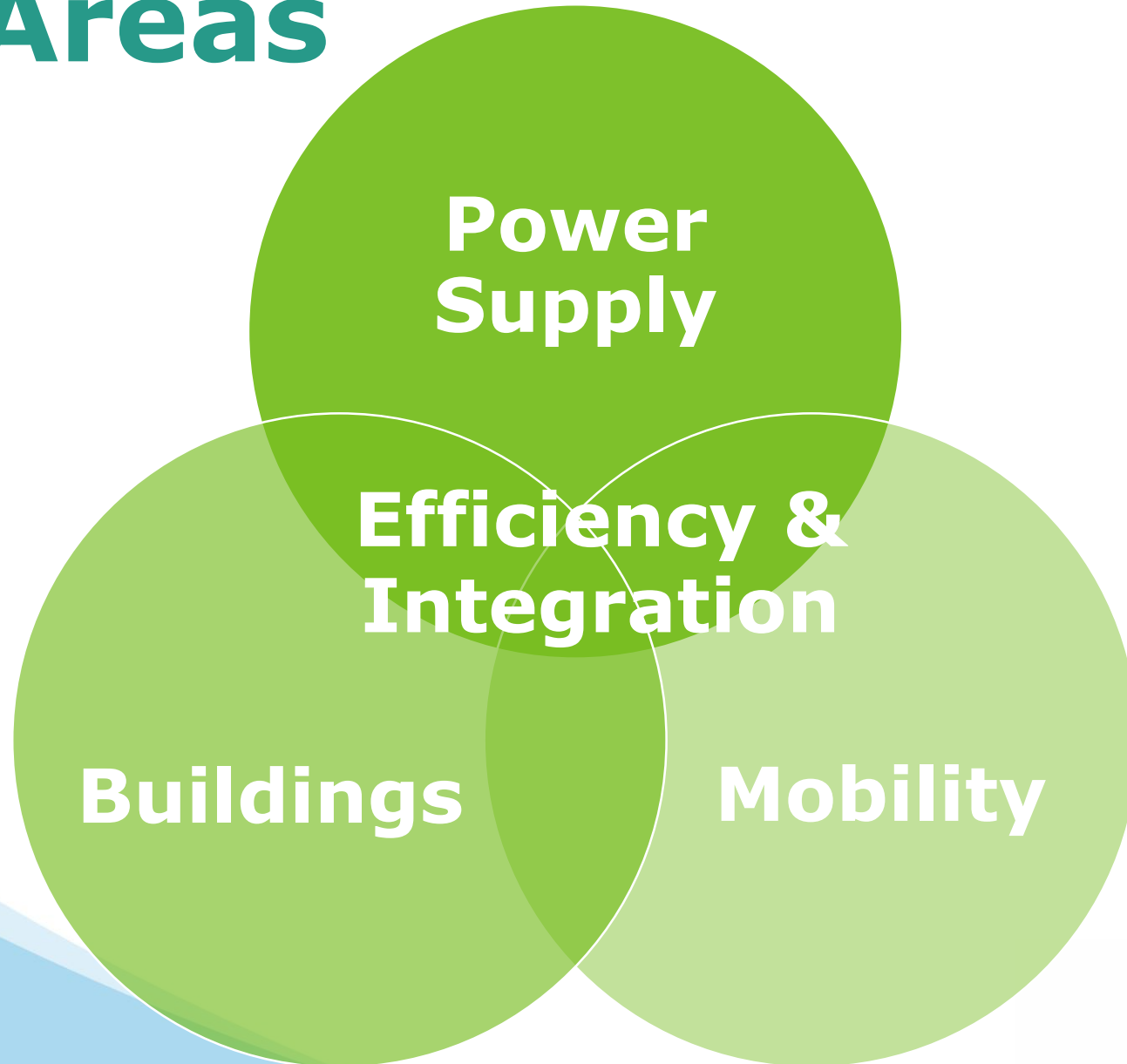
Natural Gas

Transportation Fuels

Electricity – via SJCE & SVCE



Focus Areas



A photograph of a red sports car, possibly a Ferrari, driving on a paved road. In the background, there is a large white wind turbine and some trees. The scene is set in a grassy field under a clear sky. The image is partially obscured by a green curved shape on the right side of the slide.

Mobility (57%)

Personal/Fleet Vehicles

Mass Transit

Freight

Charging Infrastructure



Buildings (35%)

Lighting
HVAC
EV charging
Cooking
Refrigeration
Renewables
Energy Storage



Buildings

Key role

- Energy for the building
- Transportation
Employee
Customer
Goods & Services

Existing and New Construction

- Retrofits cost more, larger market segment
- New construction saves money, smaller market

Anything not addressed during construction becomes a retrofit need in the future.

Solution: support cities in adopting building codes that save money during construction and minimize future retrofit costs.

Solution – Reach Codes

Cities seeking support leveraged regional services

- Collaboration with SVCE, San Jose/SJCE & PCE
- Technical code consultants hired
- Multiple stakeholder engagements
- Drafted Building and EV infrastructure code language
- Templates for staff reports, presentations
- Tools and training for post-implementation

Result – Reach Codes

Cities vote(d) for two major considerations for Buildings:

Encourage or Require electric HVAC systems

Encourage or Require enhanced EV charging

Result – Buildings

Cities vote(d) for two major considerations for Buildings:

Encourage all-electric by increasing standards for buildings with natural gas

Limit use of natural gas to low usage systems

Require electricity for all* systems

* where appropriate

Result – EV infrastructure

Start with CalGreen, then increase one or more of

Quantity – service more spaces*

Readiness – upgrade from conduit/capacity only

Charging speed – include faster charger where appropriate

* check out load managed charging

Approved Zero Emission Building Codes in California as of 2/21/2020

Jurisdiction	Approach			Systems			Building Types								Add-Ons		
	Natural Gas Infrastructure Moratorium	All-Electric Reach	Electric-Preferred	Whole Building	Water Heating	Space Heating	Low Rise Residential	City-Owned Properties	High Rise Residential	Hotel	Retail	Office	Restaurant	Life Sciences	Additional Solar	Electric Vehicles	Natural Gas In Lieu Fee
Alameda	X			X				X									
Berkeley	X		X	X			X	X	X	X	X	X	X	X			
Brisbane*		X			X	X	X	X	X	X	X	X	X				
Campbell		X			X	X	X									X	
Carlsbad	X	X			X		X								X		
Cupertino		X		X			X	X	X	X	X	X	X			X	

...and more...

Over 25 jurisdictions

<http://www.buildingdecarb.org/active-code-efforts.html>



**Any
Questions?**

Watt Do You Think?

Interactive polling provided through your smartphone!

Please navigate to:

www.zeetings.com/SVCE

Panama Bartholomy

Director

Building Decarbonization Coalition



SVCE and SJCE
'Watts For Lunch'
February 27, 2020



Greenbank Associates



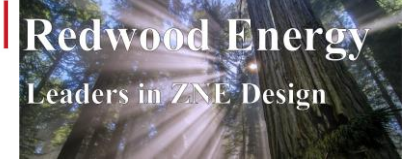
CLEAResult®



Turner
Smith
Innovation has a name.



SIEGEL & STRAIN Architects



WRNSSTUDIO GLUMAC



SMUD

R H T R
RURAL HARD TO REACH
LOCAL GOVERNMENT PARTNERSHIPS'
WORKING GROUP



STOPWASTE
at home • at work • at school

the Energy Coalition

SPAN.10

Powering forward.
Together.



Gensler



Berkeley natural gas

By Sarah Ravani Updated 7:

Berkeleyside
@berkeleyside

Rep Darin Cline of @PGE4Me says the utility supports all-electric buildings, and invites city officials to visit its all-induction kitchen for a tour. #berkmtg



an



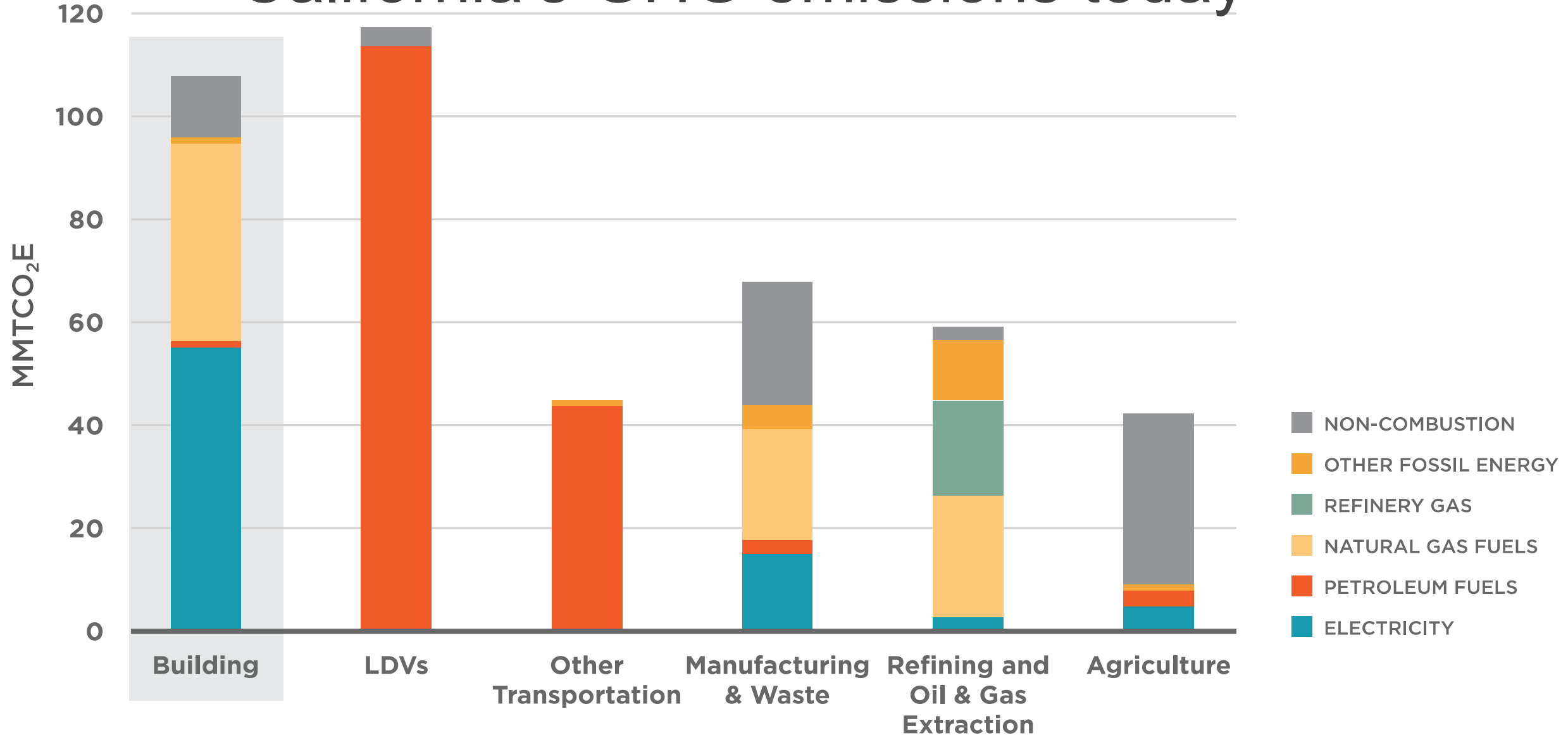
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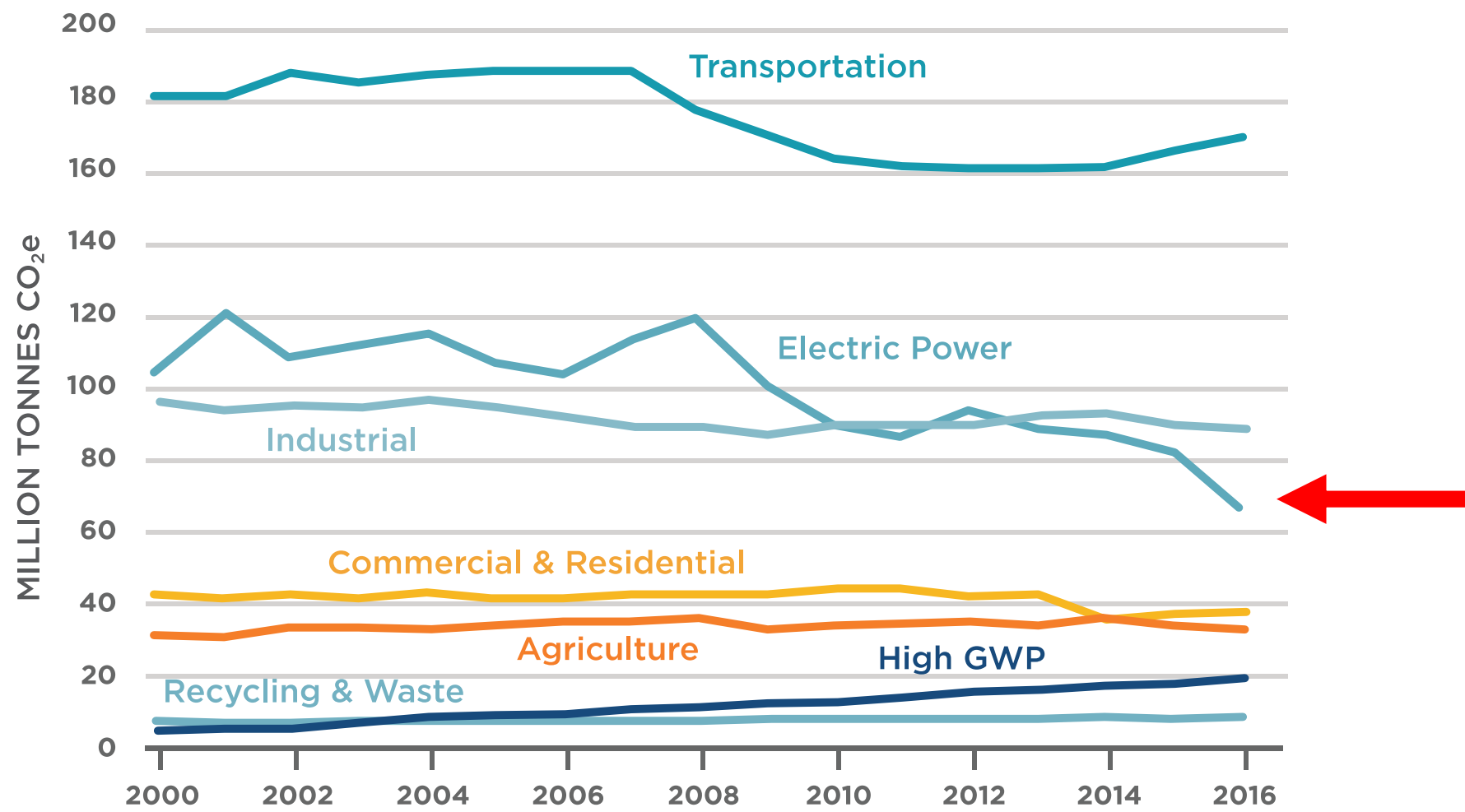
60+ CA Local Governments Actively Exploring Zero-Emissions Reach Codes

Northern California	Southern California
<u>Bay Area</u> • Alameda County: Albany, Berkeley, Dublin, Fremont, Hayward, Oakland • Marin County • Santa Clara County: Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, Sunnyvale • San Mateo County: Brisbane, Burlingame, East Palo Alto, Menlo Park, Millbrae, Portola Valley, Redwood City, San Mateo City and County • San Francisco • Sonoma County: Cloverdale, Petaluma, Santa Rosa, Sebastopol, Sonoma, Windsor, Healdsburg <u>Central Valley</u> • Sacramento, Davis <u>Humboldt:</u> Arcata	<u>Central Coast</u> • City of San Luis Obispo <u>Santa Barbara</u> • Santa Barbara, Goleta <u>Ventura</u> • Ojai, Thousand Oaks <u>Los Angeles</u> • City and County of LA, Santa Monica, West Hollywood, Malibu <u>San Diego</u> • Carlsbad (adopted!), Chula Vista, Encinitas, Escondido

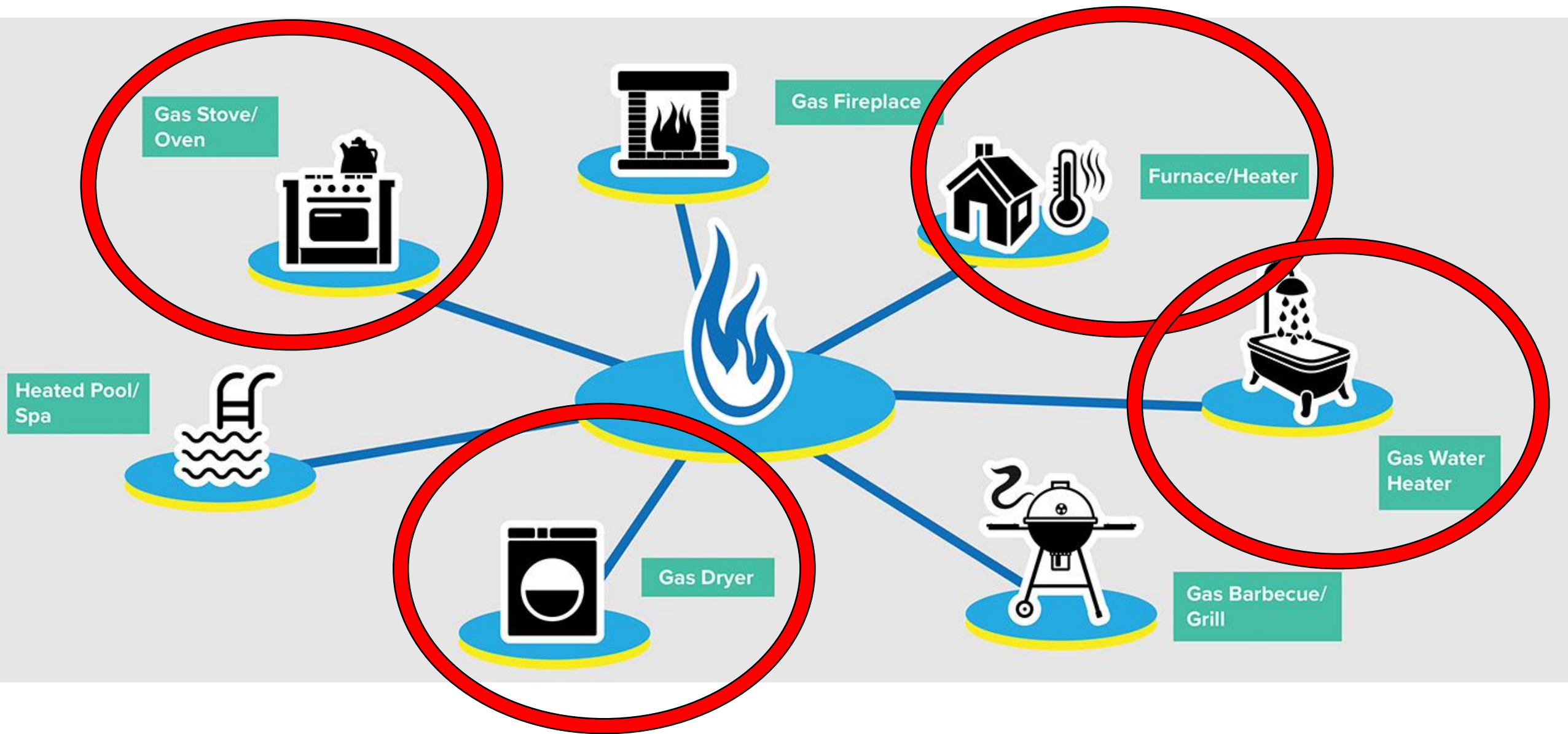
Buildings represent ~25% of California's GHG emissions today



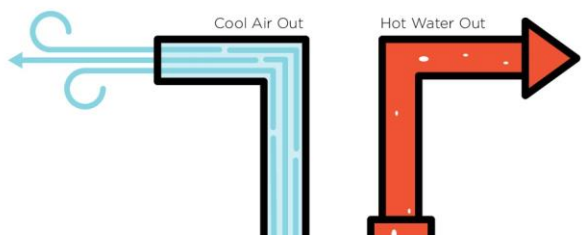
Electricity is getting cleaner,
moving toward 100% carbon-free by 2045



Source: CA Air Resources Board, Emission Inventory 2018.
https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf







HOW DO HEAT PUMPS WORK?

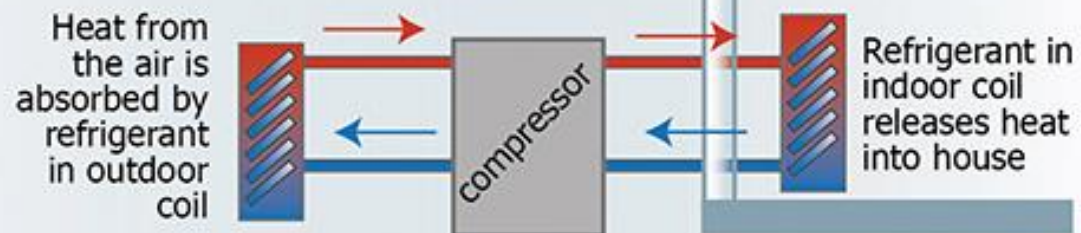
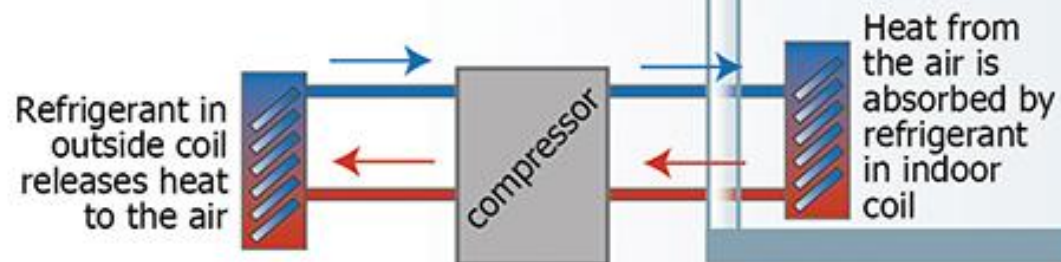
HOW AN AIR SOURCE HEAT PUMP WORKS



SUMMER



WINTER



© Collaborative Efficiency

Air Source VRF Systems



Commercial Application - Air Source Heat Pump

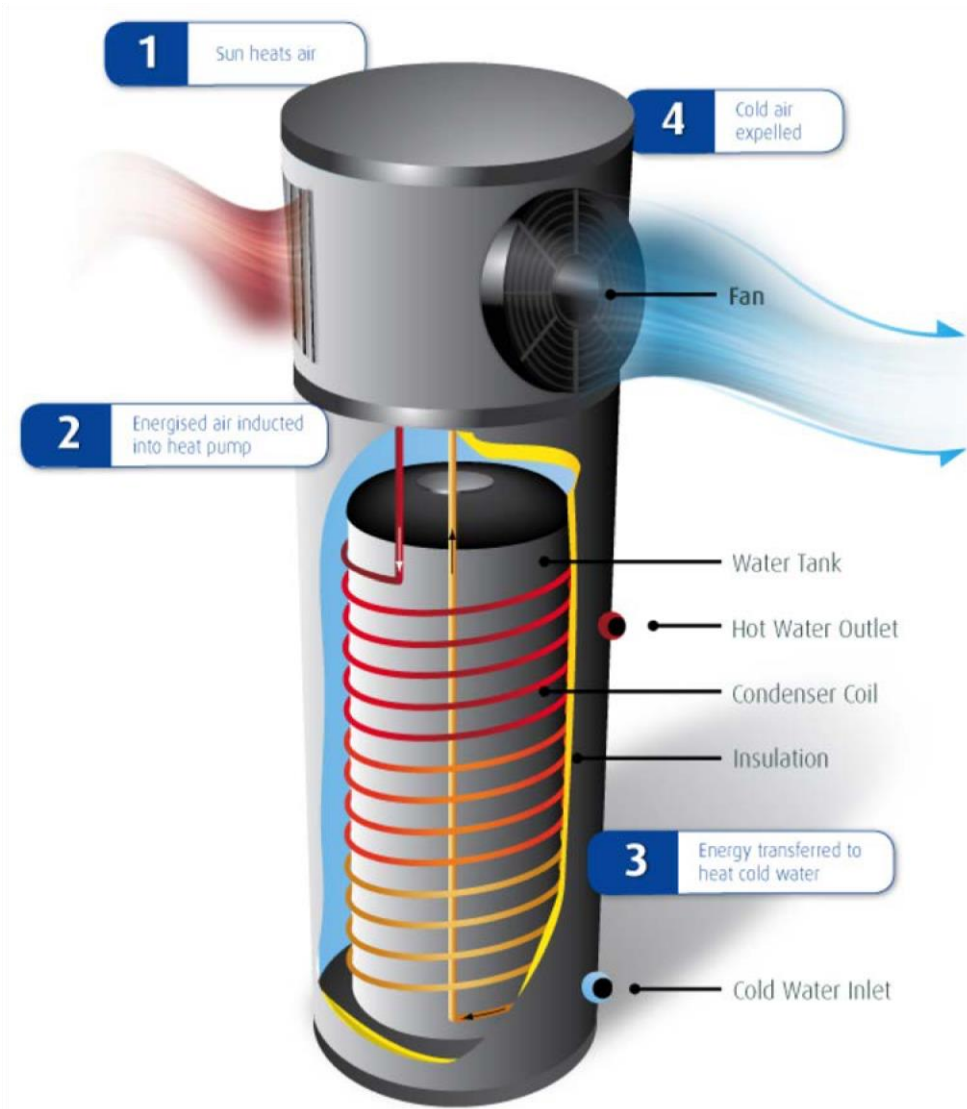


Output:

Hot Water for
Space Heating

Domestic Hot
Water

Commercial Application - Heat Pump DHW



Electric systems provide heat more efficiently

Natural Gas Boiler

1 therm input



0.8 therms heating

Electric Resistance Heater

1 kWh input



1 kWh heating

Electric Heat Pump

1 kWh input

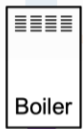


3-4.5 kWh heating

GAS



253 lbCO₂ / MMBtu of heat
\$11.80 / MMBtu of heat

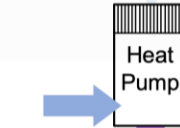


Boiler

Electricity

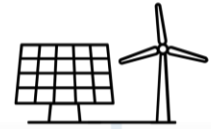


29 lbCO₂ / MMBtu of heat
\$11.72 / MMBtu of heat

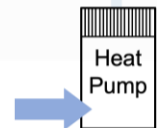


Heat Pump

Renewables

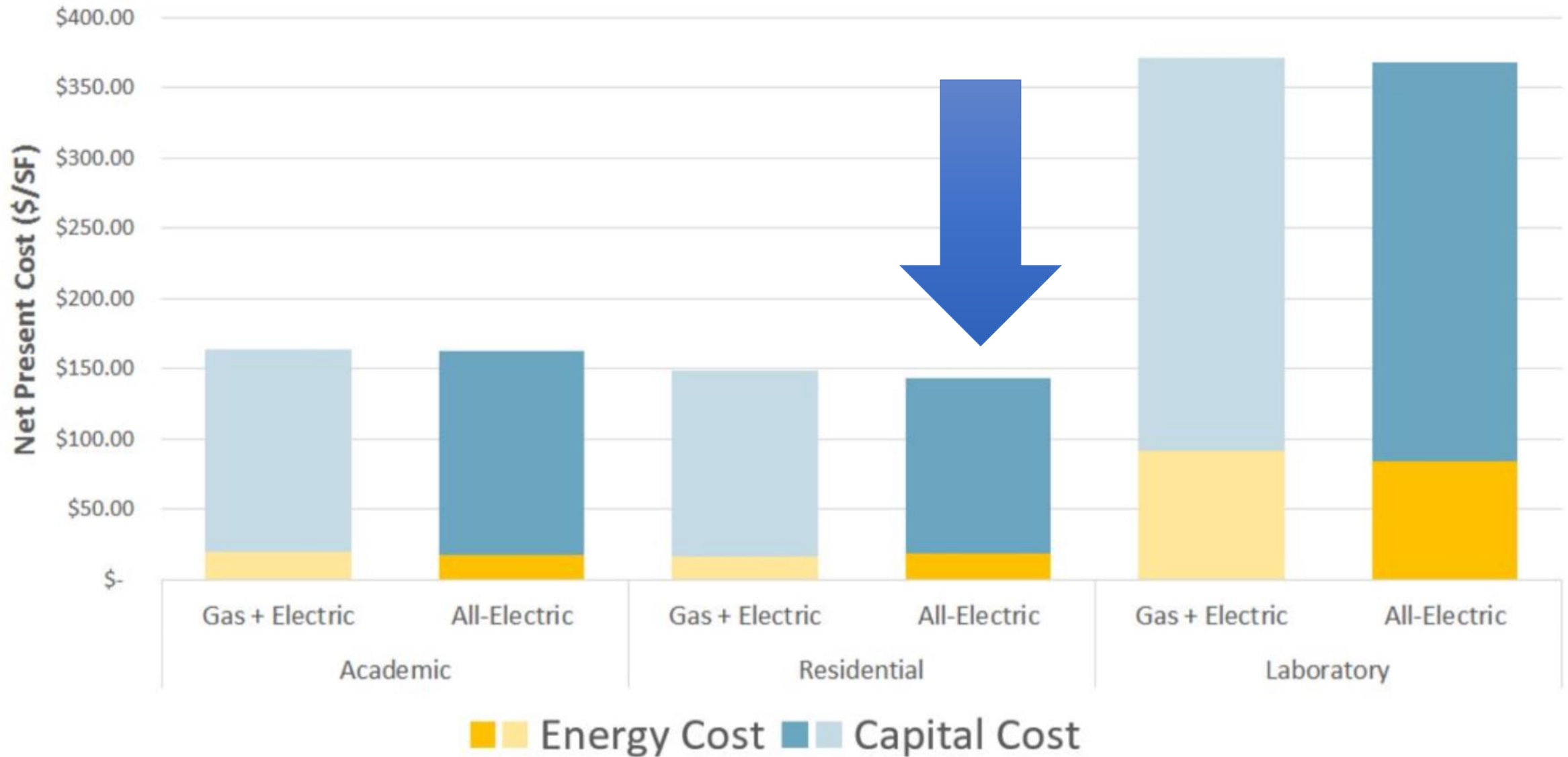


0 lbCO₂ / MMBtu of heat
\$12.46 / MMBtu of heat



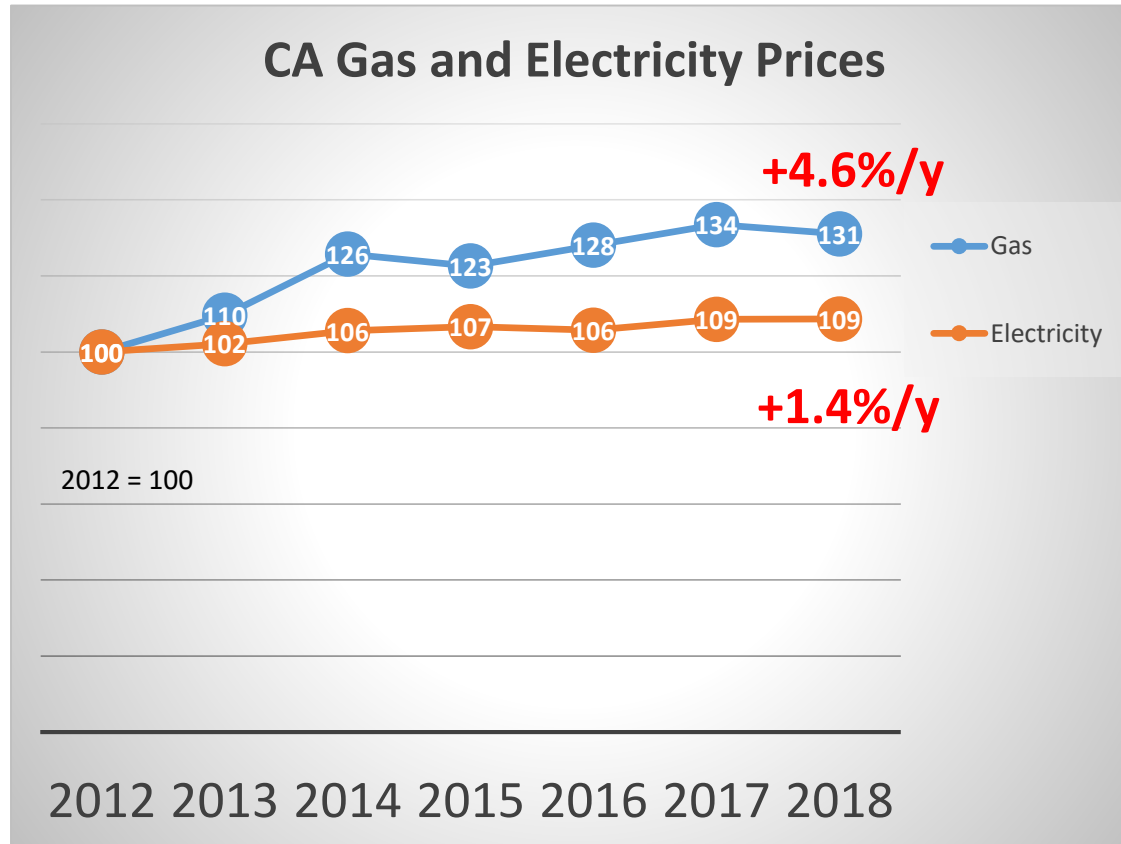
Heat Pump

UC Carbon Neutral Buildings Cost Study



Gas prices are increasing faster than electricity prices

CA gas prices increased 3x faster than electricity prices from 2012 to 2018



Trend expected to continue:

- SoCalGas was approved for **25%** revenue increase 2018-2021 (**8% p.a.**)
- PG&E filed for a **26.6%** increase for gas distribution over 2018 (**6% p.a.**)

In comparison:

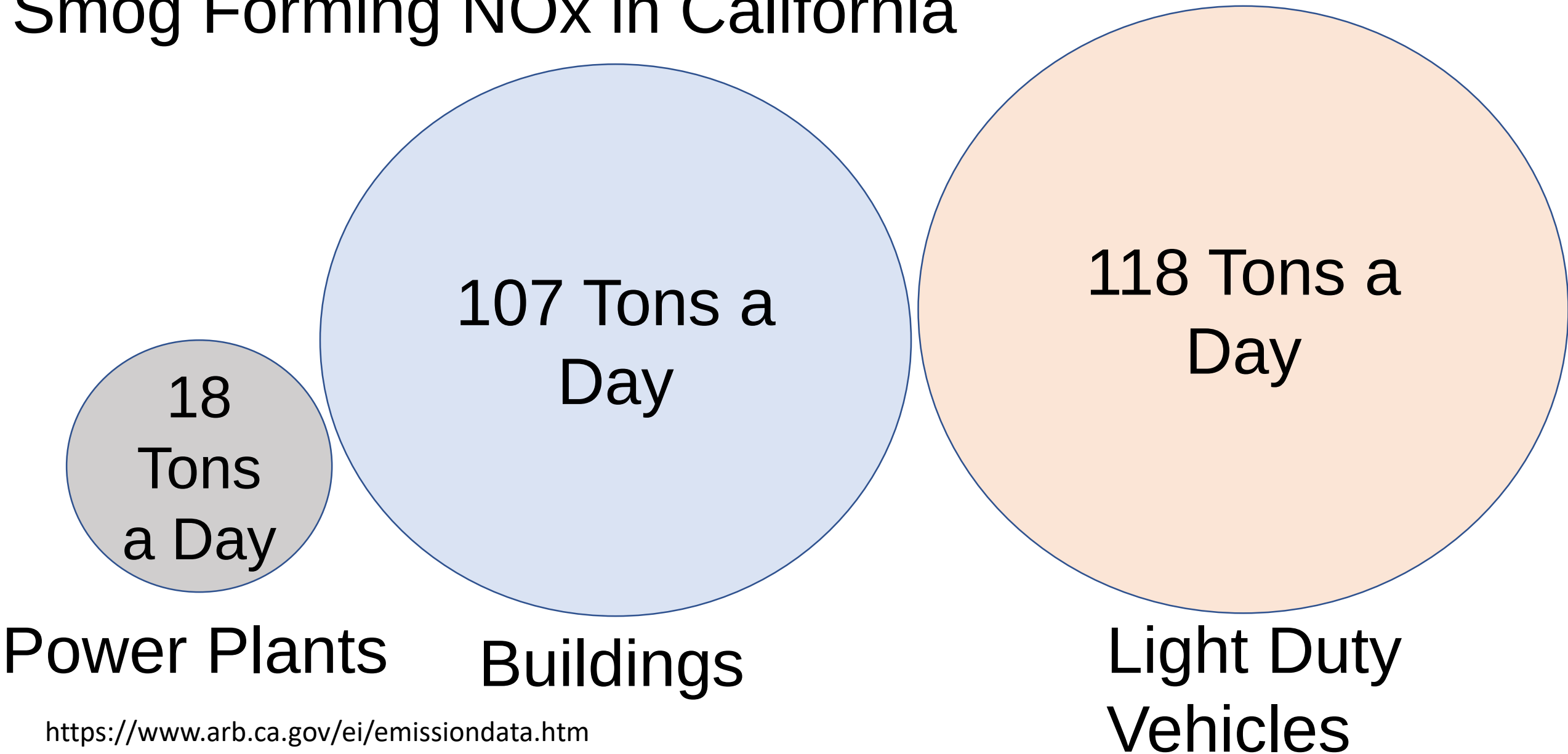
- SCE filed for 14% by 2020 over 2018 (**7%/y**)
- PG&E filed for a 24% increase for electric generation and distribution over 2018 (**6%/y**), in part due to costs associated with wildfires

Source: EIA

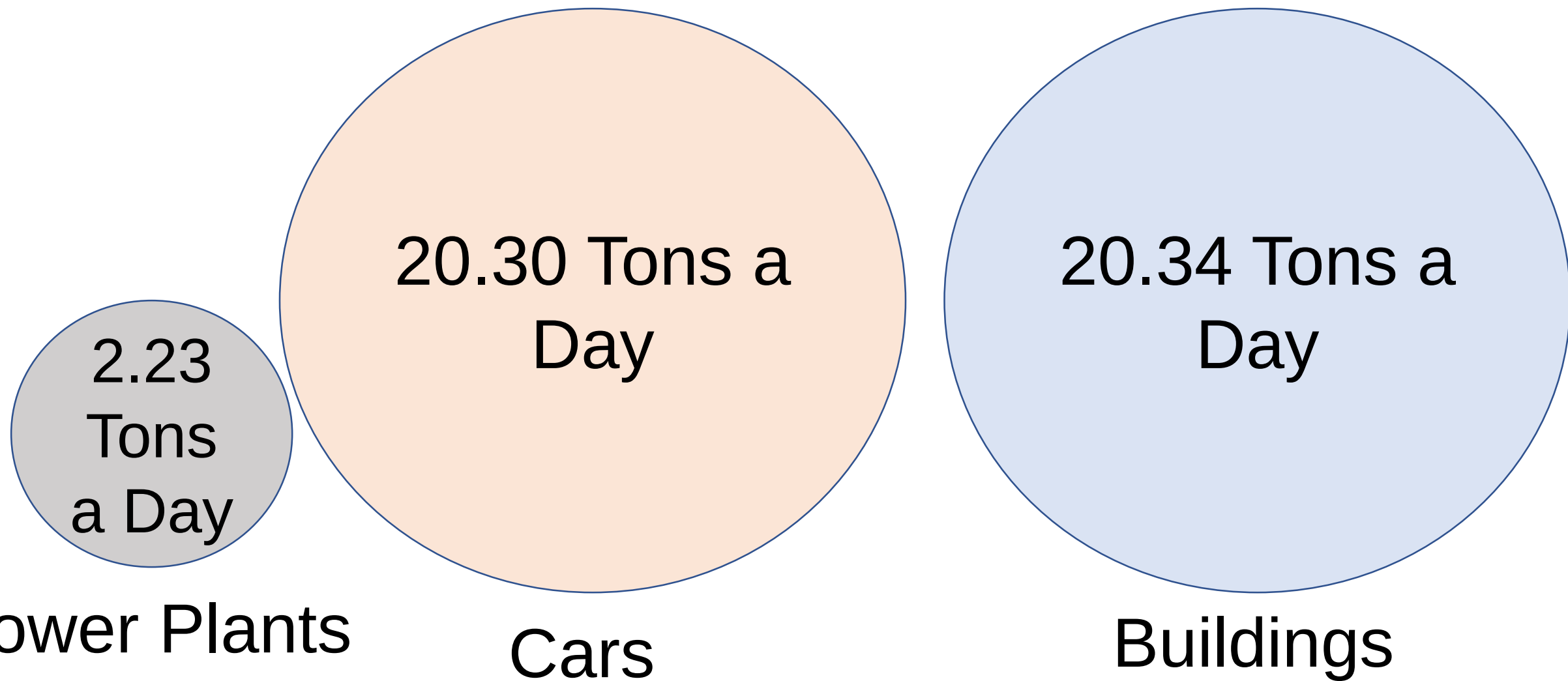
<https://www.eia.gov/dnav/ng/hist/n3010ca3m.htm>

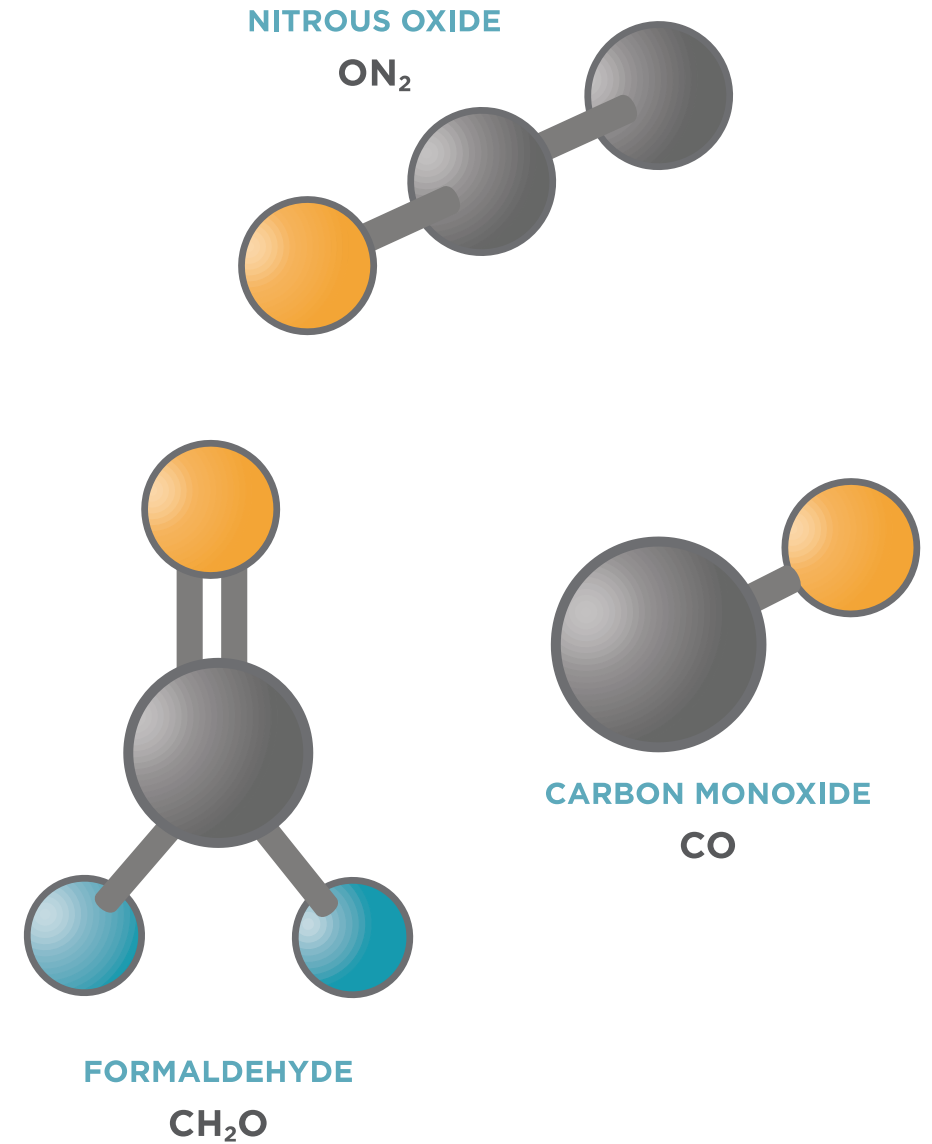
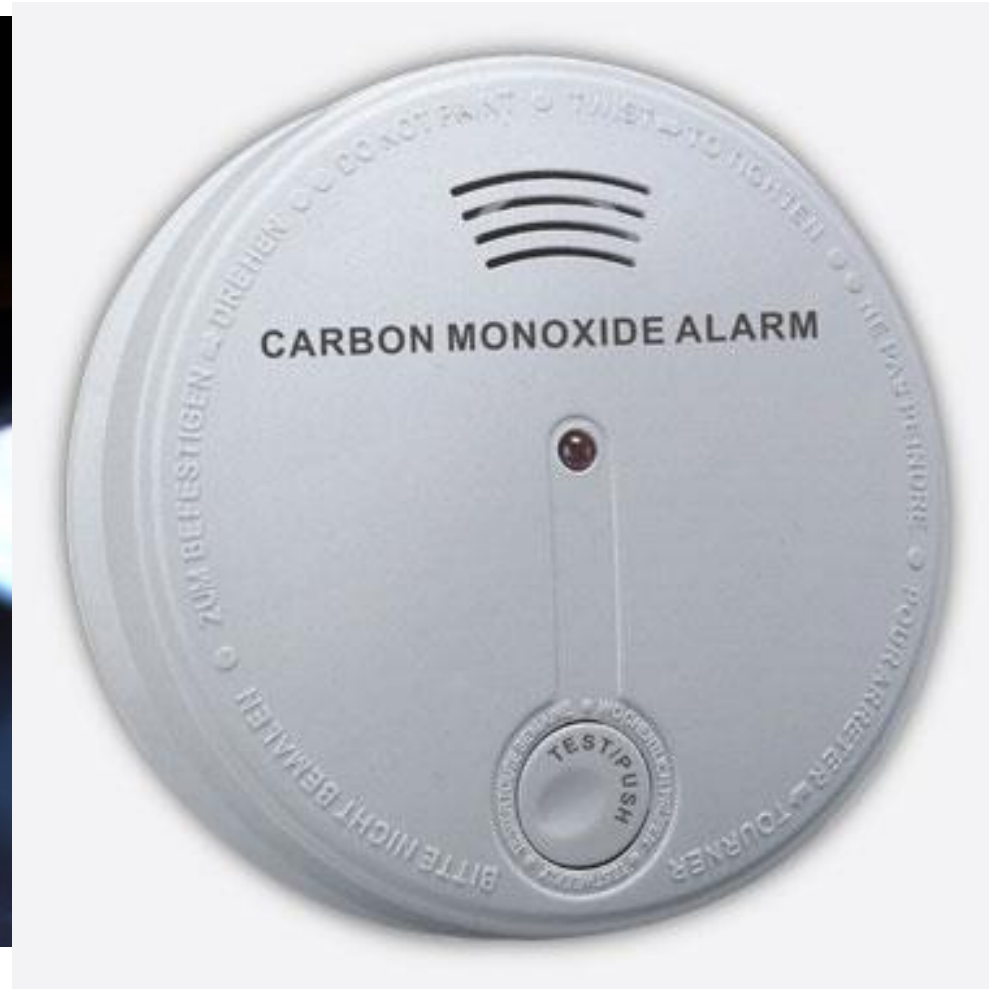
<https://www.eia.gov/electricity/data/browser/#/topic/7?agg=2,0,1&geo=g&freq=M>

Smog Forming NOx in California



NOx in BAAQMD





Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California

Jennifer M. Logue,^{1,2} Neil E. Klepeis,^{3,4} Agnes B. Lobscheid,¹ and Brett C. Singer^{1,2}, 2014

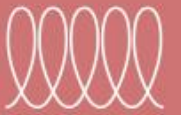
Cooking with Gas Can Harm Children

*Children living in a home with a gas cooking stove have a **42%** increased risk of current asthma and a **24%** increased lifetime risk of asthma.*



[Cooking with Gas Can Harm Children: Cooking with gas stoves is associated with increased risk of childhood respiratory illnesses, including asthma Andee Krasner, MPH* and T Stephen Jones, MD, MPH](#)

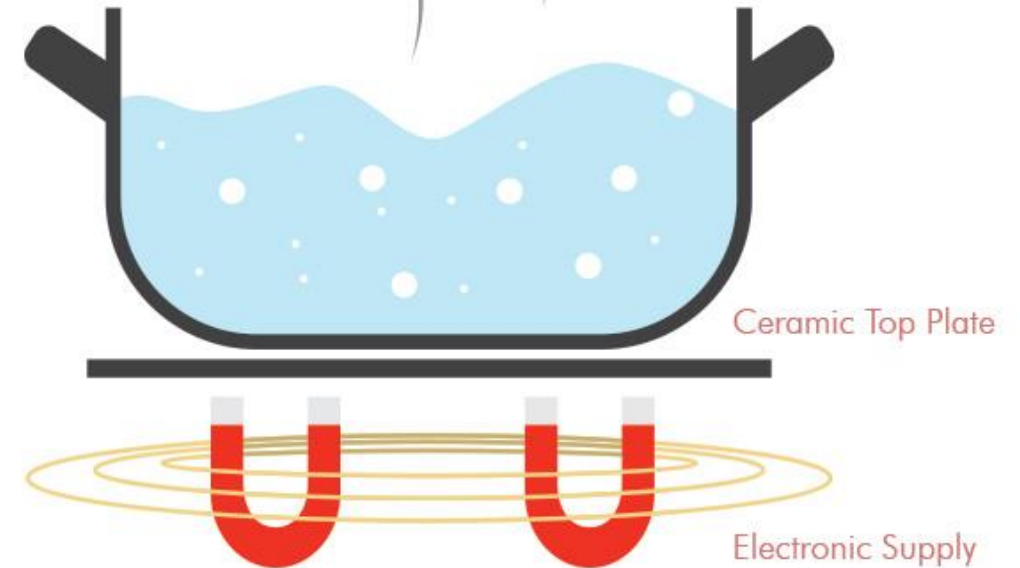
How an Induction Cooktop Works



1 Friction from the magnetic field vibrates the molecules of the induction pan, cooking your food

2 Magnetic friction occurs between the range & the induction pan

3 The range generates a high frequency alternating magnetic field



Induction Cooking Increasing Choice of Top Chefs





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

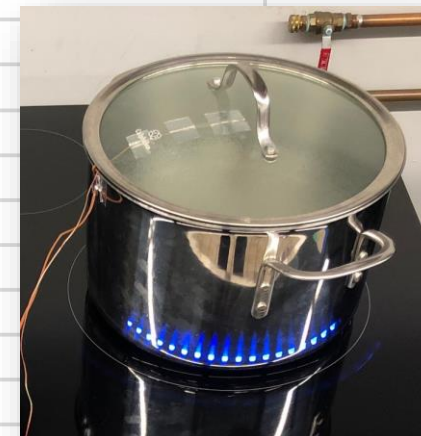
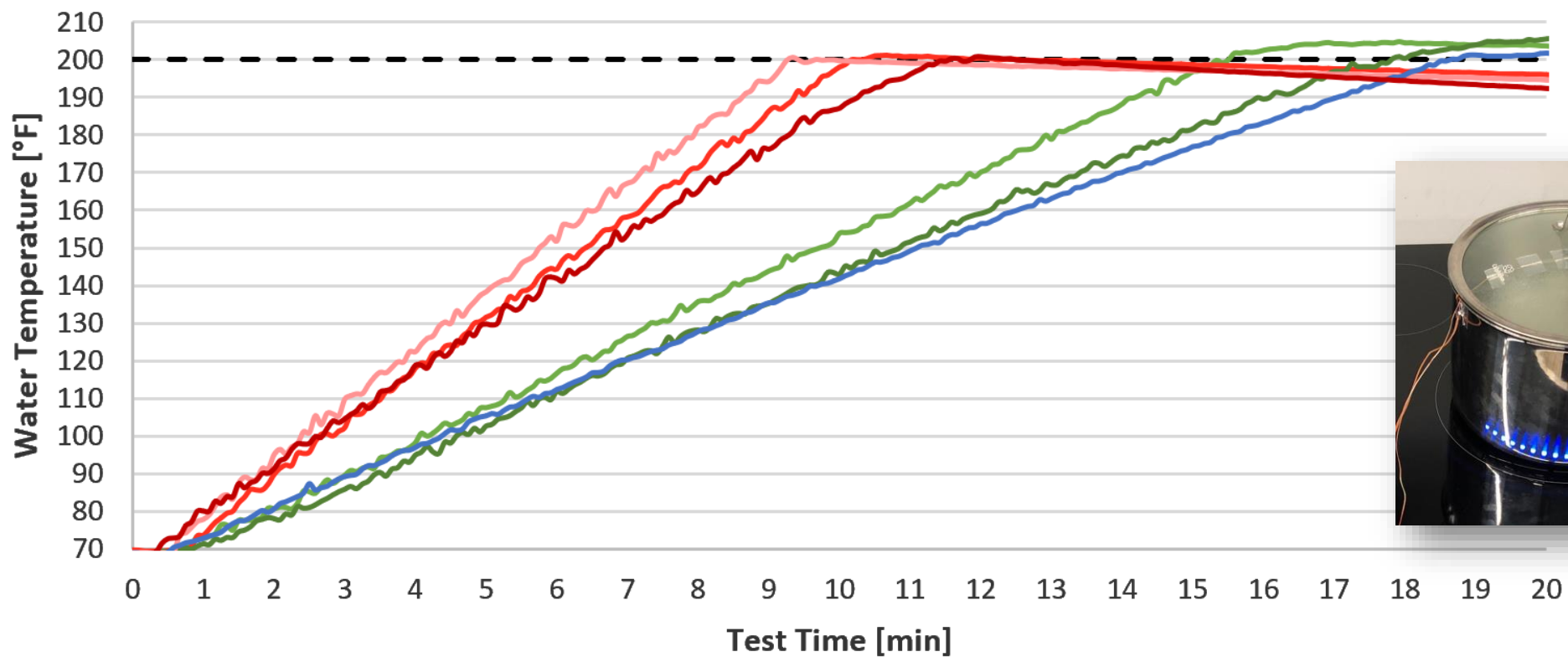
- Number of Elements: 4
- Cooktop Controls: Rotary Dial 1-9
- Oven Type: Standard Non-Convection
- Tested Elements: 8.0" 2.4 kW; 6.0" 1.5 kW
- Retail Price: \$579



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*



-- Threshold

— Induction A (Frigidaire)

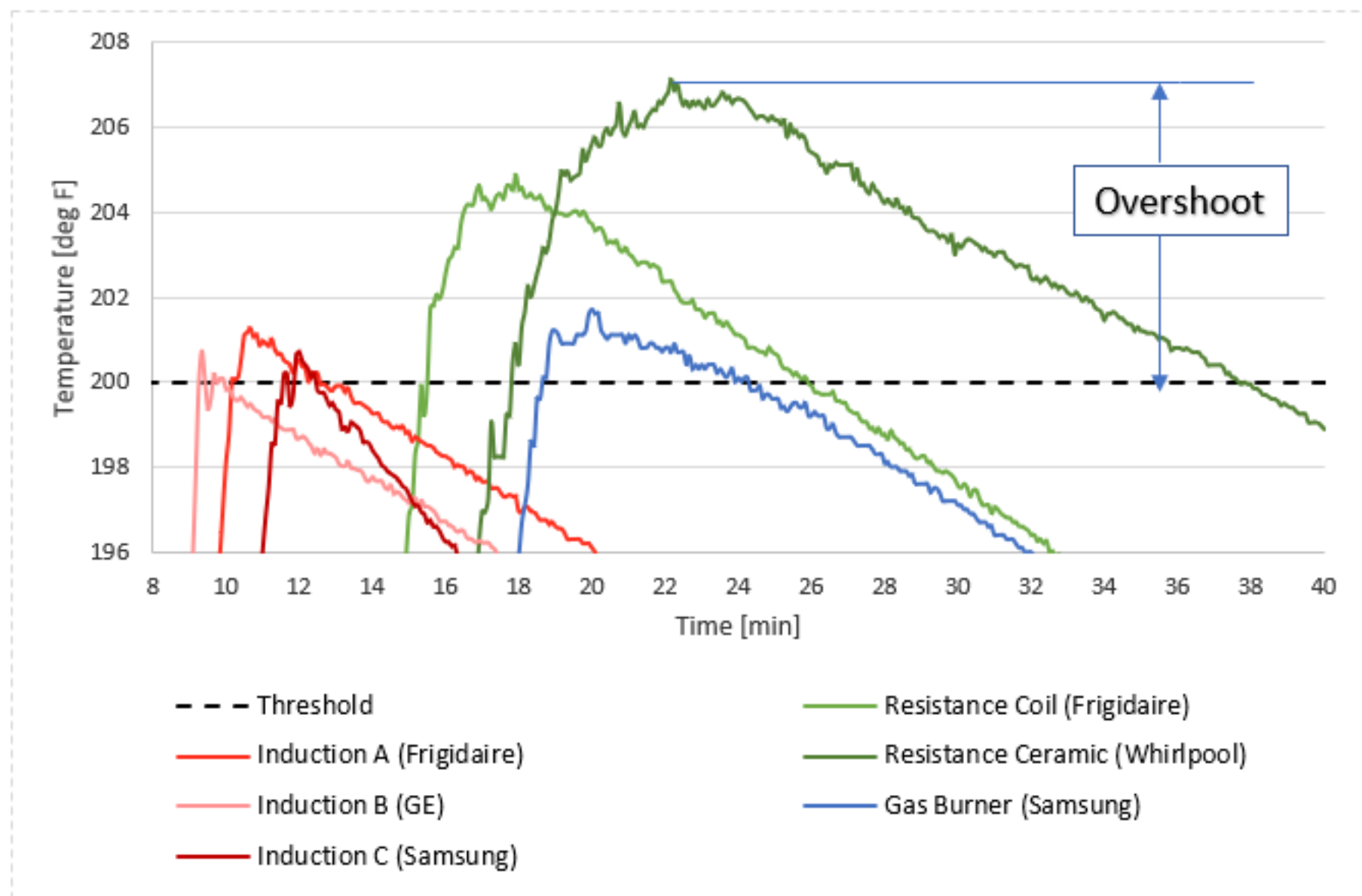
— Induction B (GE)

— Induction C (Samsung)

— Resistance Coil (Frigidaire)

— Resistance Ceramic (Whirlpool)

— Gas Burner (Samsung)



*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

Benefits of Induction:

Fast

Flexible

Modular

Efficient

Controllable

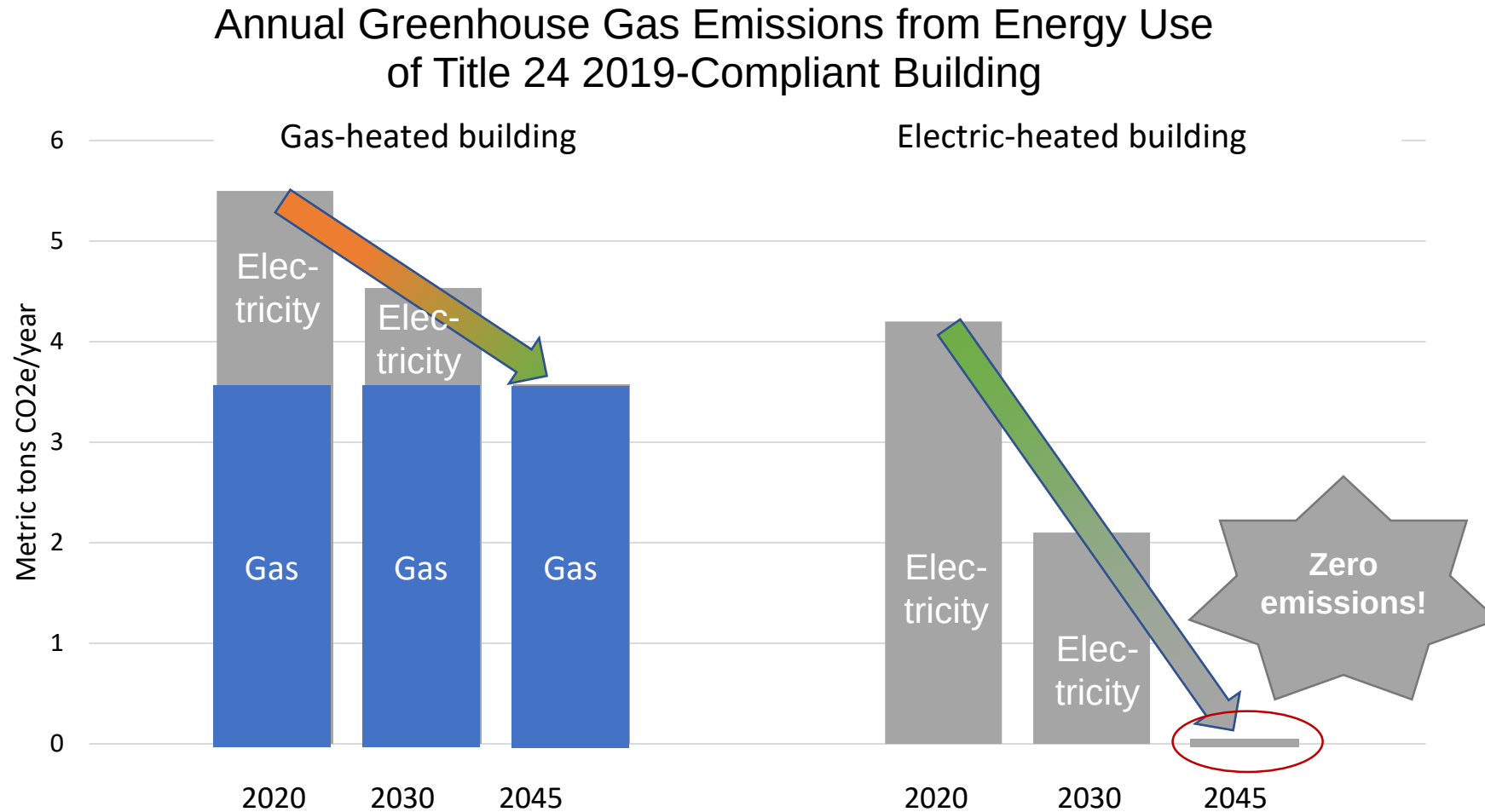
Safer

Easier to Clean

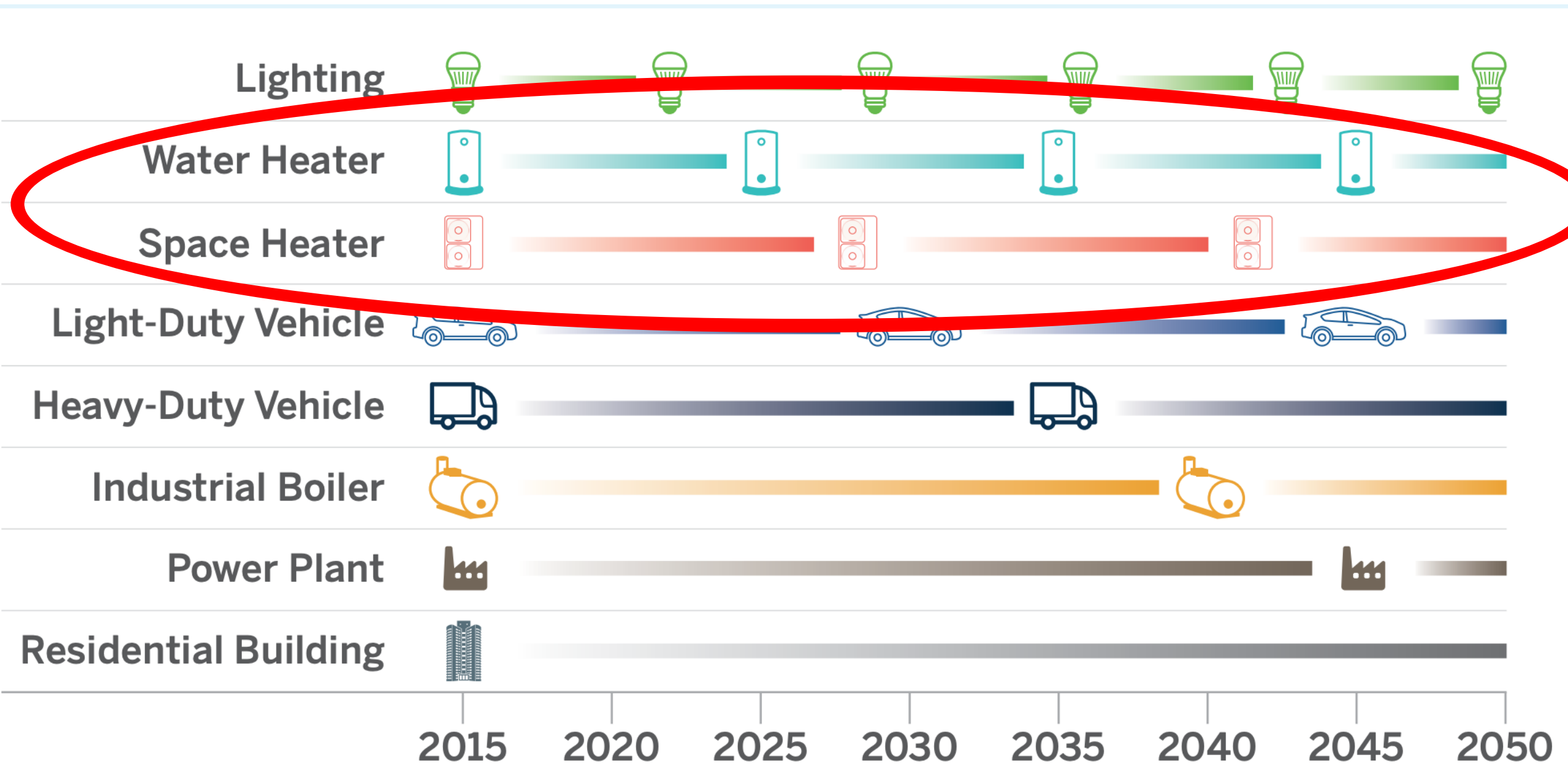
Less Heat Released to the Kitchen



Electric Heat Offers Pathway To Zero Emissions



Stock Turnover



Electric Buildings are ...

Cheaper

More Equitable

Healthier

More Climate Friendly

Safer

CPUC Decarbonization Plans

1. All Electric Rates
2. Programs:
 - Incentives (eg Rebates)
 - Financing (eg Loans for all-electric customers)
 - Emerging Technology
3. Market Transformation

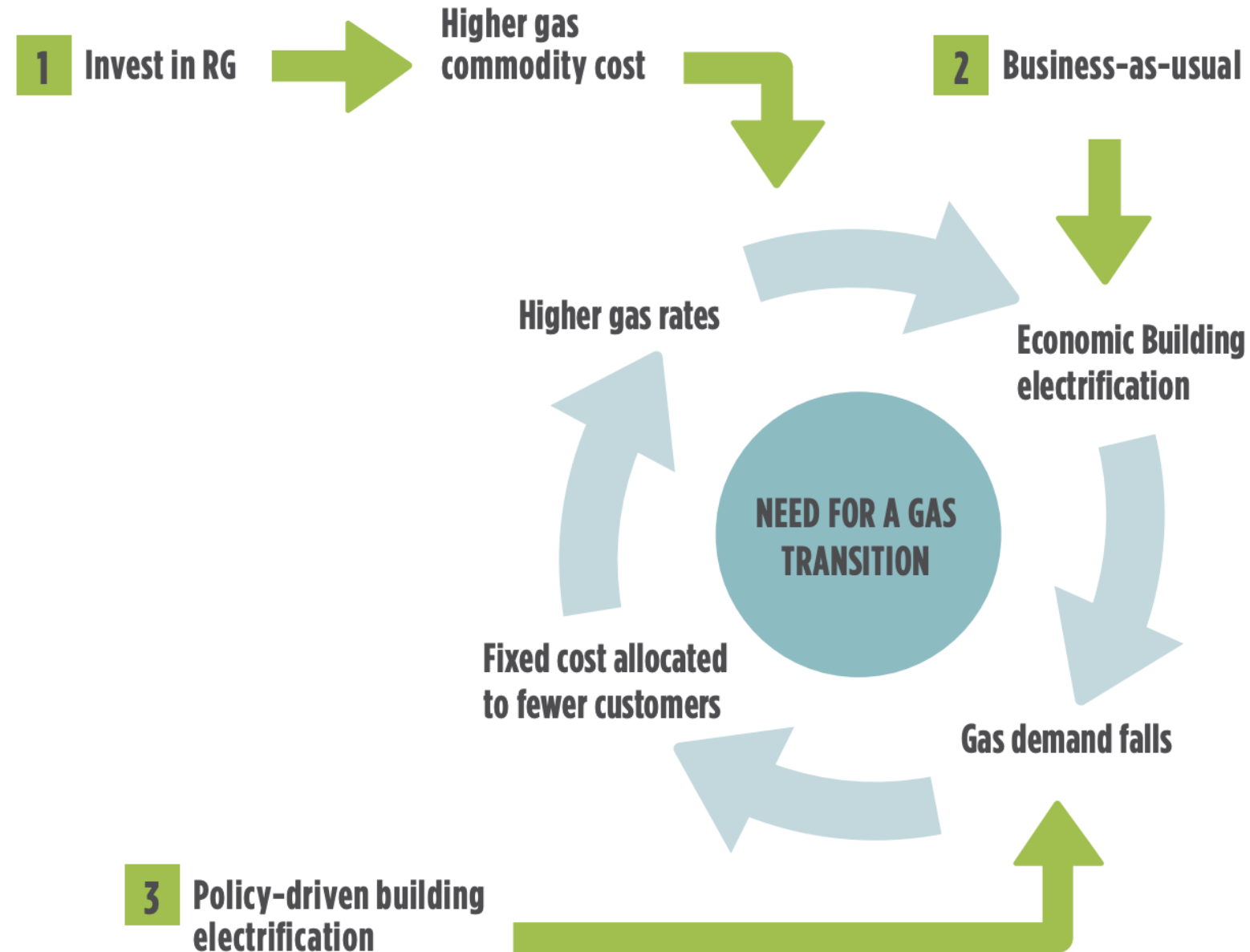


Overall: Focus goals on GHG emission rather than energy reduction.

PG&E and CCA Programs



FIGURE 2. *Spiraling From Increasing Gas Rates to Economic Electrification.*
Source: E3



Takeaways

- Public policy and rising gas costs are driving building electrification
 - First local governments
 - Then State
- By end of 2020 much of the Bay Area and Silicon Valley will have adopted building electrification policies
 - 40% of Californians will live in a jurisdiction that has adopted
- This will lead to increasing gas rates as ratepayers leave the system
- This will make electrification more affordable and more ratepayers will leave
- This will further raise rates

Where is your portfolio in this cycle?



Join us!

Buildingdecarb.org/join

A large group of people are gathered outdoors on a grassy area, surrounded by trees. Many people are sitting on the grass, some on blankets and others on folding chairs. The scene is bright and sunny, suggesting a pleasant day. The text is overlaid on the right side of the image.

Get To Know Your Peers

Lunch is Served...

**Presentations
Resume @ 12:40**

Asim Tahir

District and Renewable Energy Lead

Google

Watt Do You Think?

Interactive polling provided through your smartphone!

Please navigate to:

www.zeetings.com/SVCE

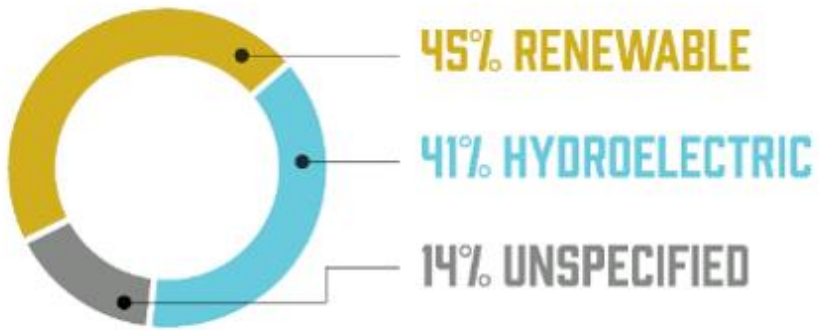
SAN JOSÉ CLEAN ENERGY

Watts For Lunch



SJCE CELEBRATING ONE YEAR OF SERVICE

GreenSource



TotalGreen



SERVING

332,500
CUSTOMERS

SAVING OUR COMMUNITY

\$3 MILLION
EACH YEAR

YOUR ENERGY CHOICES

GREENSOURCE

86% CARBON-FREE
45% RENEWABLE



TOTALGREEN

1,250+ CUSTOMERS
100% CARBON-FREE
100% RENEWABLE

OUR IMPACT

OUR CLEANER POWER HAS REDUCED
SAN JOSE GREENHOUSE
GAS EMISSIONS BY
18%

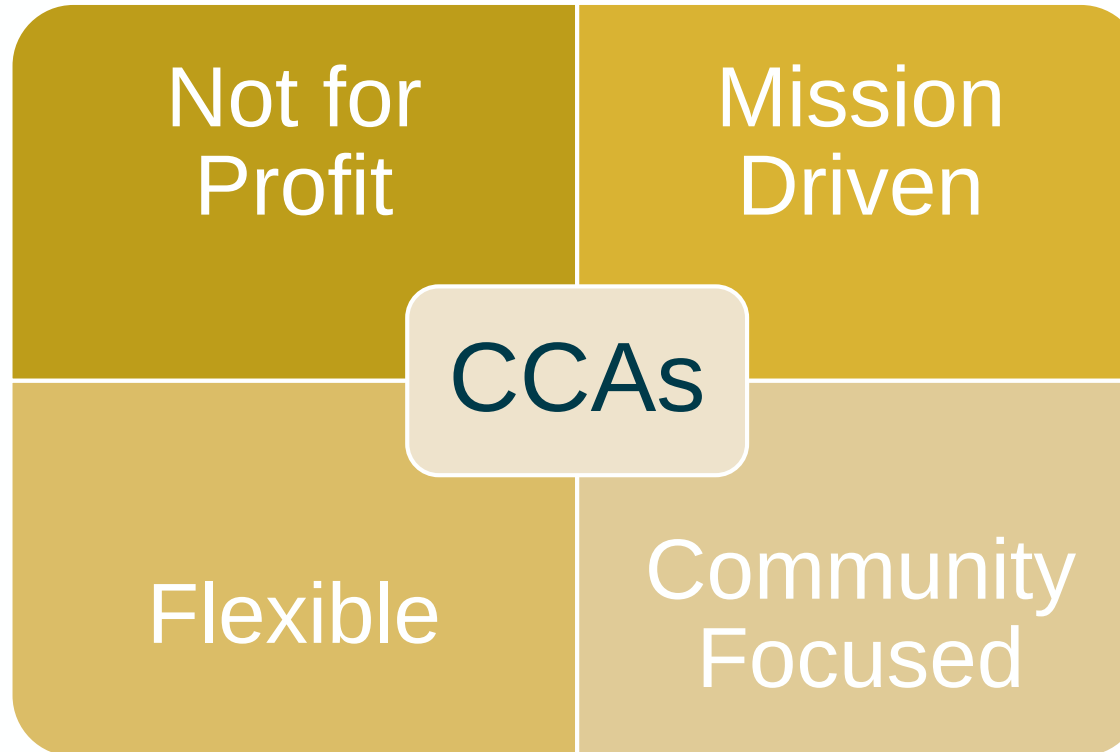


WE'RE PARTNERING WITH THE CALIFORNIA
ENERGY COMMISSION TO ADD
1,500 NEW PUBLIC ELECTRIC VEHICLE
CHARGING STATIONS BY 2024

CCA UNIQUE ADVANTAGE

- Can offer lower costs for extended term
- No profit requirement

- Rates not regulated by CPUC
- Significant long-term renewable procurement
- Can innovate on new structures and technologies



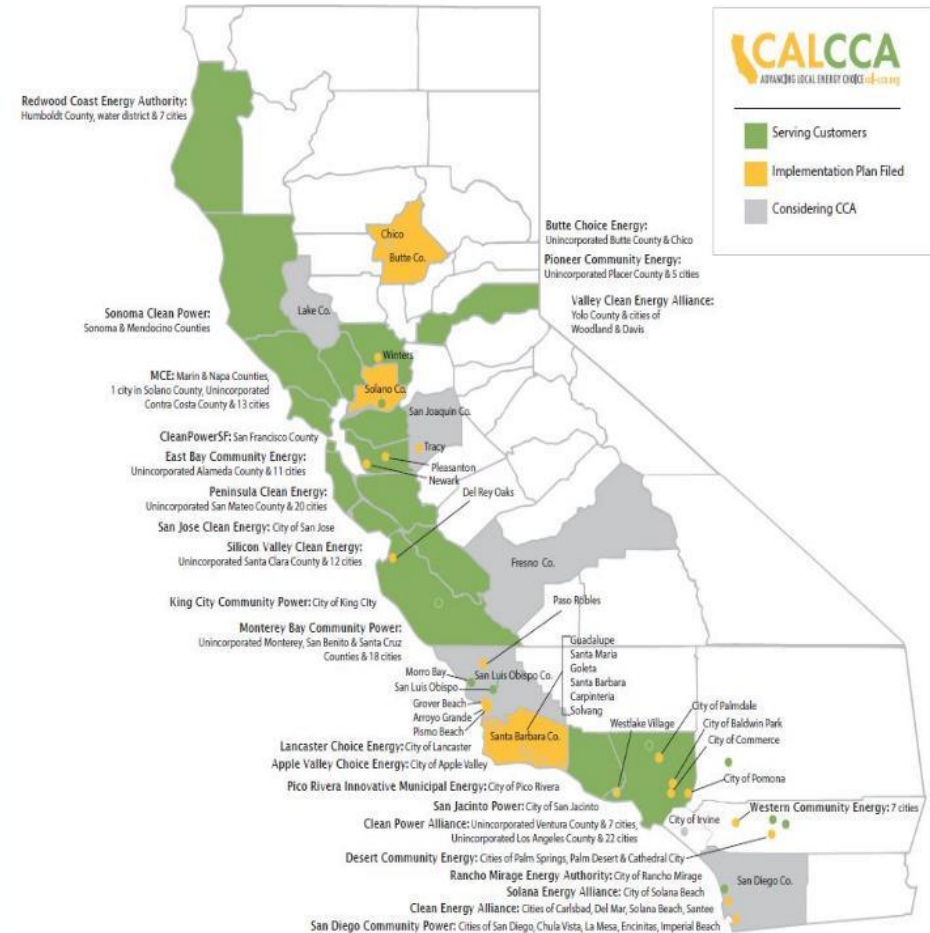
- Motivated to reach 100% renewable energy and reduce emissions
- Economic development and community benefit goals

NEW TARIFF DEVELOPMENTS

- By end of 2020, SJCE plans to develop a Green Tariff offering that will work across CA CCA territories
- SJCE will work with partners as part of the American Climate Cities Challenge



WORLD
RESOURCES
INSTITUTE



SAN JOSE
CLEAN ENERGY

CALEVIP- EV CHARGING INFRASTRUCTURE

- \$14 million in rebates available starting May/June 2020
 - Public, multi-family housing & workplace locations in San Jose
 - ~1,400 new Level 2 ports
 - ~100 new Direct Current Fast Charging ports
- Leveraged \$10M from California Energy Commission
- 25% of rebates to go to sites in Disadvantaged and Low-Income Communities



PROGRAM GUIDING PRINCIPLES

1. Maximize greenhouse gas reduction opportunities
2. Align with Climate Smart San José
3. Promote equity, affordability and support disadvantaged communities
4. Produce community benefits
5. Maintain or improve the financial stability of SJCE

PROGRAM AREAS

Vehicle
Electrification

Building
Electrification

Distributed
Energy
Resources

Energy
Efficiency

Program
Specific Rates

Resiliency



Don Bray

Director of Account Services and Community Relations

SVCE Update

Vision for 2030 & Beyond



- High penetrations of affordable renewable energy plus firm low-carbon resources
- All-electric buildings & vehicles
- Unprecedented demand flexibility via connected and controllable loads
- Rapid deployment of storage – behind-the-meter, utility-scale, stand-alone and with solar
- Emergence of distribution system-level markets and dynamic pricing programs

Community Accomplishments - 2019



2.3 Billion Pounds

Carbon emissions avoided by
providing clean energy



\$21.5 Million

On-bill savings for SVCE
customers



4 Million MWh

Carbon-free
energy delivered



19.8%

Community-wide emissions
reductions from 2015 baseline



\$775,000

Payments to solar customers
for surplus generation

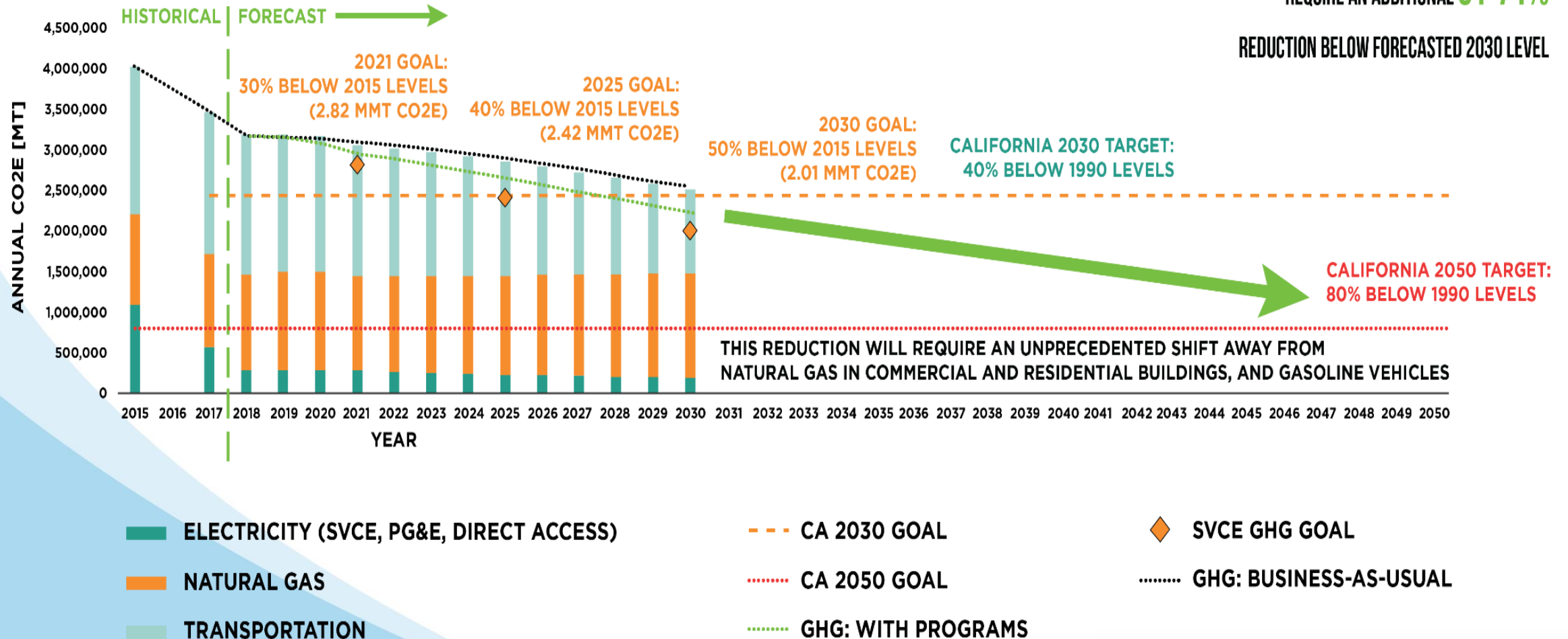


\$8+ Million

Committed investment in local
electrification programs

Emissions Progress & Goals

ACHIEVING CA'S 2050 GHG GOAL WILL
REQUIRE AN ADDITIONAL **61-74%**
REDUCTION BELOW FORECASTED 2030 LEVEL



SVCE Energy Supply

2018 Power Content Label	Net Purchases (MWh)	Percent of Total Retail Sales (MWh)
Specific Purchases		
Renewable	1,939,985	54%
Biomass & Biowaste	38,676	1%
Geothermal	270,127	8%
Eligible Hydroelectric	100,286	3%
Solar	410,503	12%
Wind	1,120,393	31%
Coal		0%
Large Hydroelectric	2,051,000	46%
Natural Gas		0%
Nuclear		0%
Other		0%
Total Specific Purchases	3,990,985	100%
Unspecified Power (MWh)		0%
Total	3,990,985	100%
Total Retail Sales (MWh)	3,561,280	

Projects In Development

Solar + Storage Projects

Recurrent Energy “RE Slate,” Kings County, CA
82.5 MW / 99 MWh

EDF “Big Beau Solar,” Kern County, CA
70 MW / 88 MWh

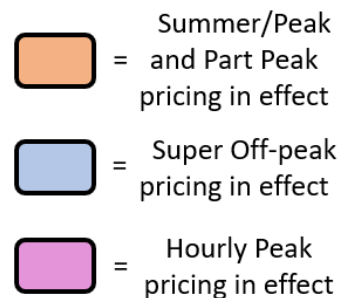
Geothermal Projects

ORNI 50, LLC “Ormat” Binary Geothermal, Mono County, CA
7 MW

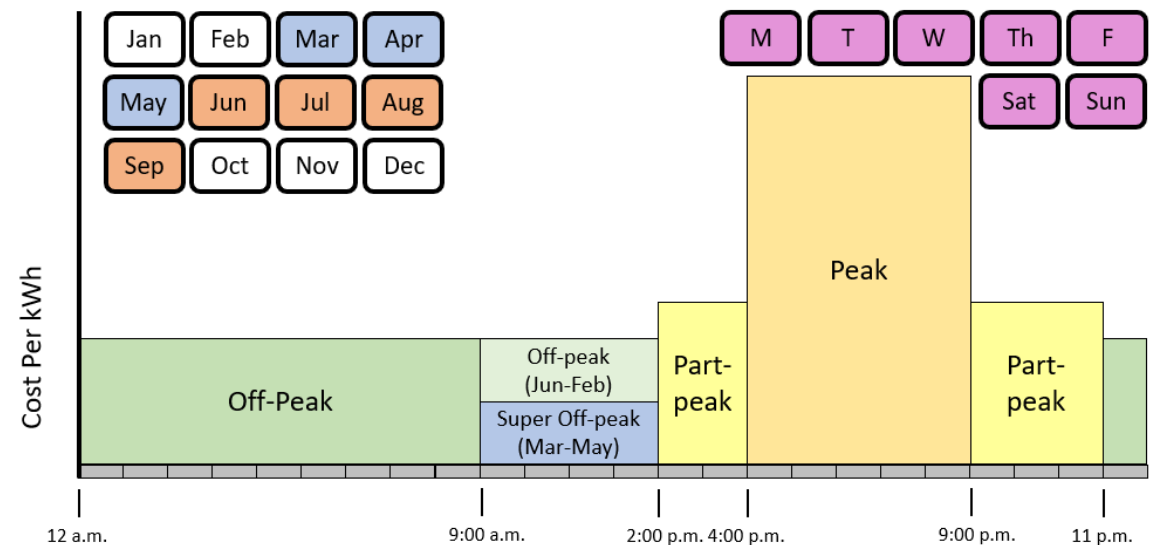
C&I Transition to “B” Rates

- Now voluntary, soon mandatory . . .
- A1, A6, A10, E19, E20, and Standby rates sunseting, replaced by “B” rate equivalent
- Peak pricing hours shifting from Noon to 6 PM to 4 PM to 9 PM, 7 days a week
- Summer season shortened to four months

New TOU (B)



“B”-Class
C&I Rates



Carbon-Free Electricity Choices



GreenStart

Default option – carbon free and lower cost than PG&E

- 50% wind + solar, 50% hydropower



GreenPrime

Voluntary option - \$0.008/kWh premium to GreenStart

- 100% renewable wind + solar, Green-e Certified



GreenPrime Direct (new)

Voluntary option – available to large customers

- 100% renewable PPA 'sleeve'; volume & term-based commitment

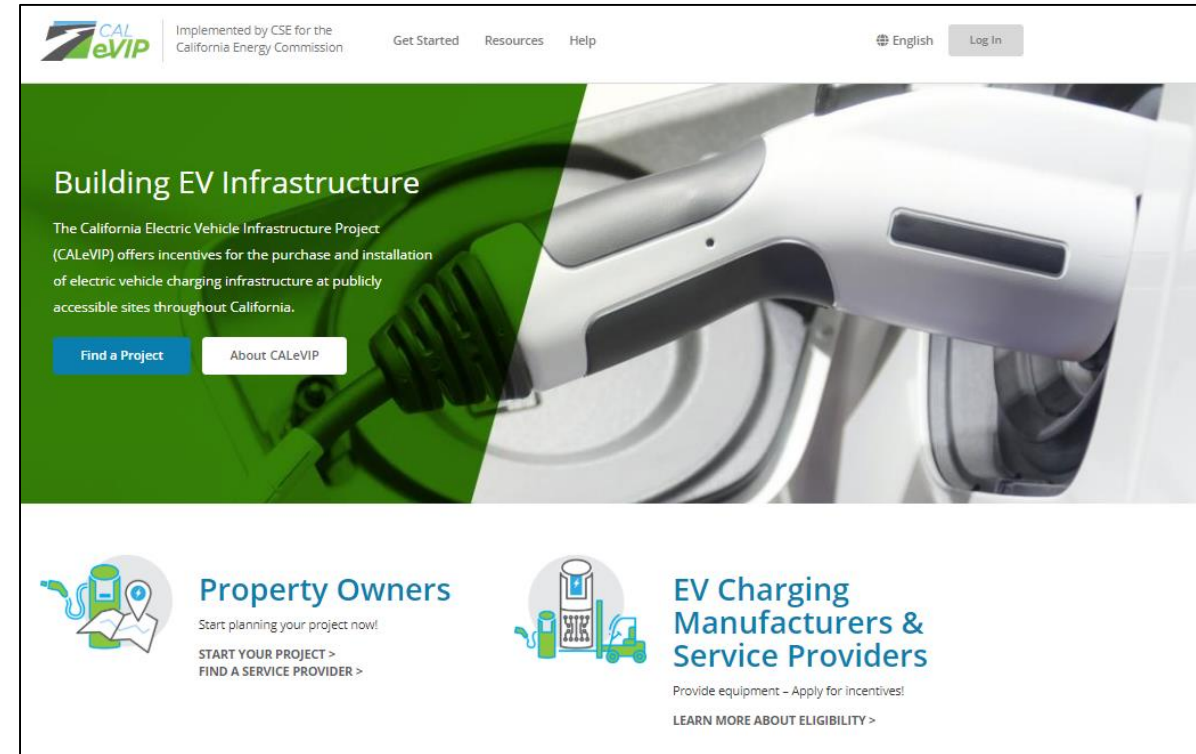
Eco-Investment Discount Program

- Opportunity to apply percentage of SVCE generation bill amount toward decarbonization, electrification, or demand flexibility projects at local facilities

	Illustrative – for discussion purposes only*		
Commitment Term	3 Years (e.g. 2020-2022)	5 Years (2020-2024)	7 Years (2020-2026)
Co-Investment Percentage*	4%	7%	10%
Representative Co-Investment Amount (full term)*	\$150,000	\$500,000	\$900,000

CALeVIP Overview

- \$12M from CEC and SVCE, in SVCE territory
- CALeVIP broadly targets public DCFC and public/private L2
- Additional \$2M from SVCE for Fleet, DCFC near MFH, and MFH/SMB tech assistance
- Likely late-spring launch
- CALeVIP incentives are first-come, first-served – so be ready!



Supporting Community Resilience

- Four public agencies jointly released RFP for 30+MW of battery storage at homes and businesses, to support community resilience
- Batteries will form a “virtual power plant” to provide grid services to SVCE when not in use for back-up power
- Currently evaluating 19 proposals
- Final program details Spring 2020
- **Program scheduled to launch in summer 2020**



East Bay Community Energy, Peninsula Clean Energy,
Silicon Valley Clean Energy & Silicon Valley Power

Distributed Resource Adequacy Capacity

Request for Proposal (RFP)

Issuance Date: November 5, 2019

Due Date: December 23, 2019 (5 p.m. PST)

Thank You!!!



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