

# IT'S TIME FOR OUR BUILDINGS TO MATCH OUR AMBITIONS

JOIN US

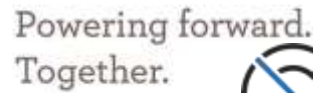


**BUILDING  
DECARBONIZATION  
COALITION**





Greenbank Associates





A kiss for a gas cook!



# The Gas COOK BOOK

for **YOUNG PEOPLE**







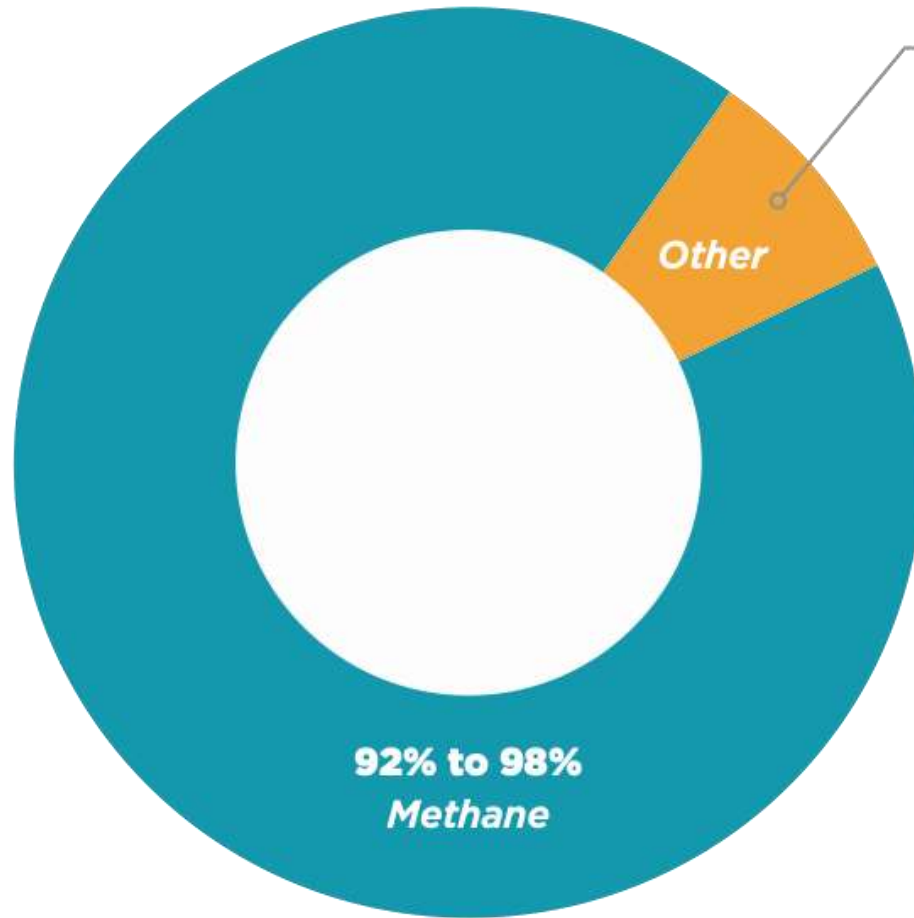
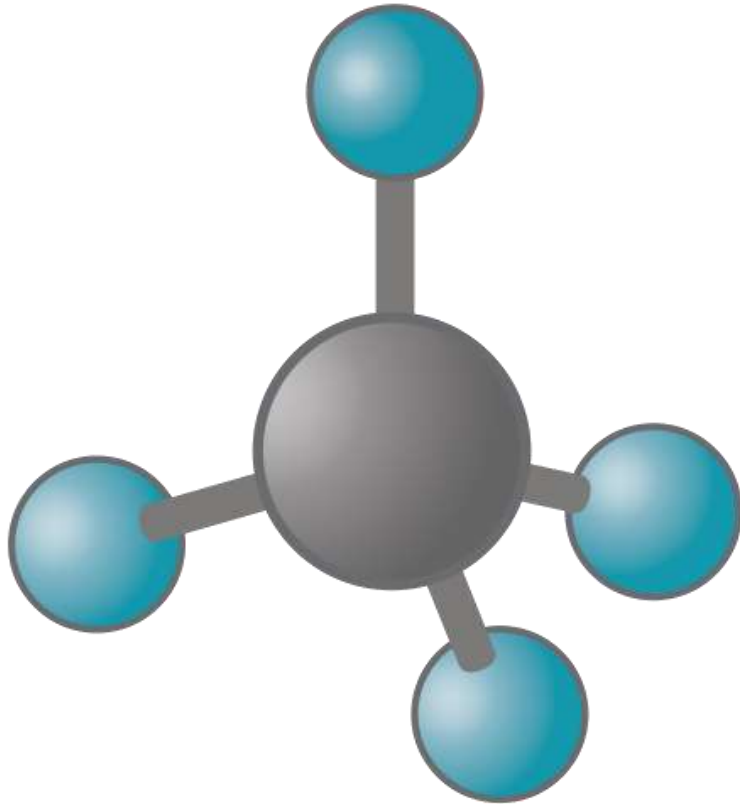
*Handsome is and  
handsome does  
- that's the*

The new gas cookers make you a better cook because they are so easy to use— and a prouder housewife because they are so attractive to look at.

**GAS** idea!

~~Natural Gas~~

Methane



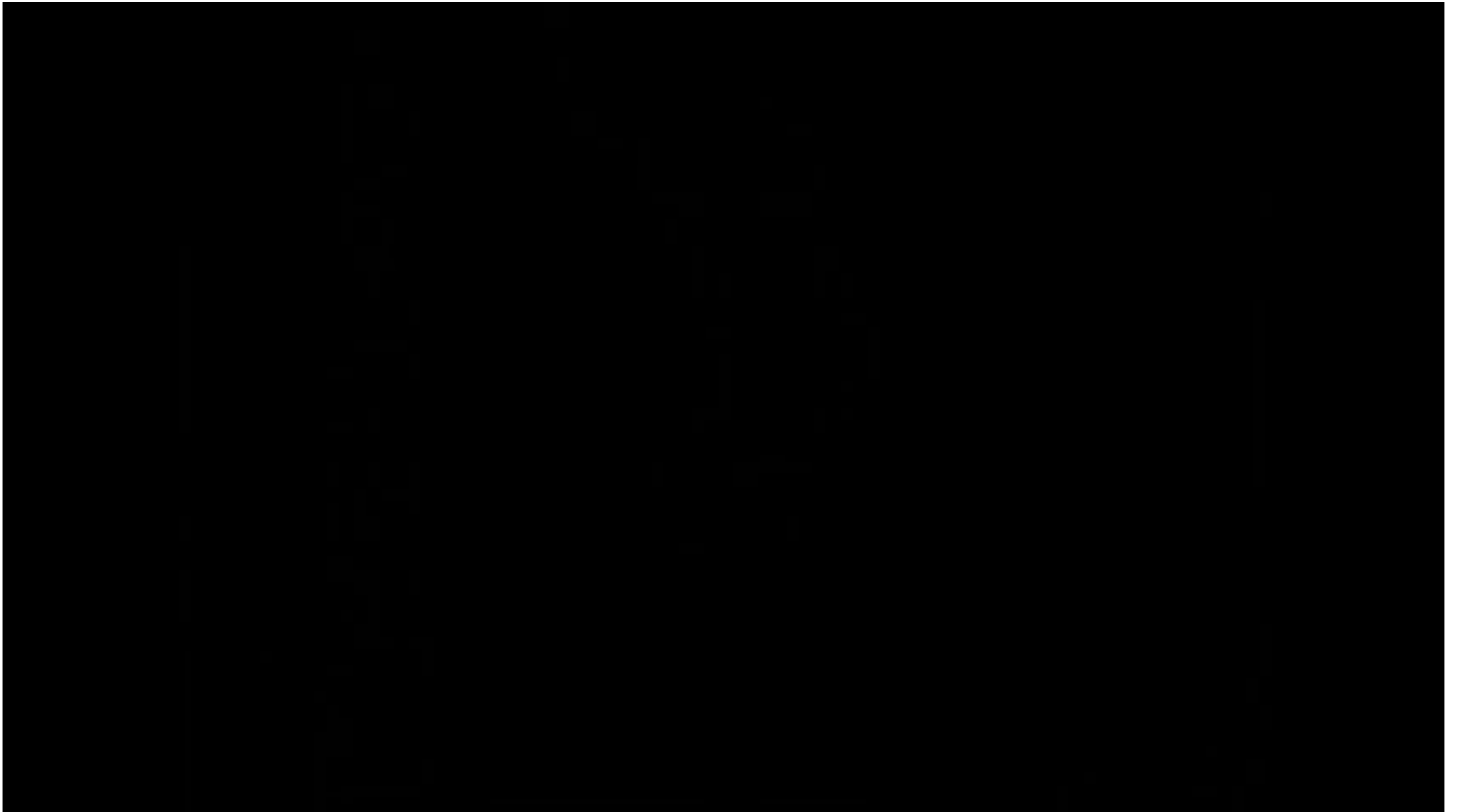
- NATURAL GAS LIQUIDS** | 2 to 7%
- CARBON DIOXIDE** | 0 to 2%
- OXYGEN** | 0%
- NITROGEN** | 0.1 to 1%
- HYDROGEN SULFIDES** | 0.000001%
- Varying amounts of water and sand



**METHANE IS**

**84x more potent**  
than CO<sub>2</sub> in the short run



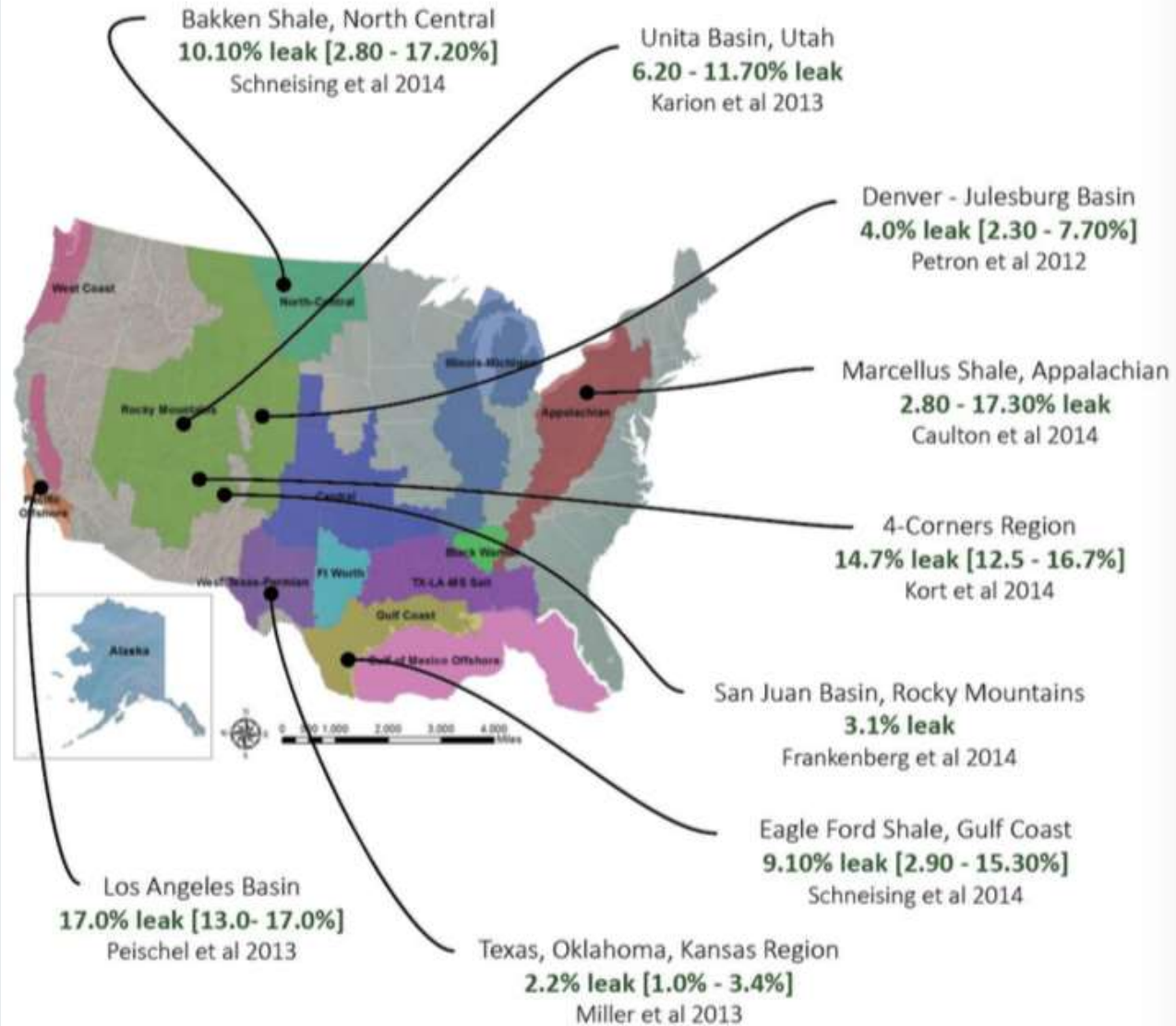




# We Import 84% of the Methane We Use



# Leakage Varies by Production Zone





# Leakage Attributed to California Natural Gas Demand

	Portion of CA Supply	Leak Rate Used (% of Production)	Leak Rate Sources	Total Production in Study Area (Billion Cubic Feet)
Permian	13.0%	2.2% [no range]	Presto 2017	2,000 Screenshot
San Juan	3.0%	3.1% [2.6 - 3.5%]	Kort 2014, Frankenburg 2015	1,300
Anadarko	13.0%	1.6% [0.6 - 2.0%]	Miller 2013, Presto 2017	1,500
Western Canada	0.01%	0.6% [no range]	Atherton 2017	951
Rocky Mountains	31.5%	4.1% [1.1 - 5.6%]	Petron 2014, Petron 2012, Robertson 207	600
Southwest Wyoming	26.0%	0.38% [0.12 - 0.86%]	Brantley 2014, Robertson 2017	516
California	10.0%	CEC full lifecycle used	CEC Study	Lifecycle used.

**3.6% [2.4 - 4.3%]**

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Air quality data from Google / Aclima

Google Earth



**Los Angeles Area**

[About leaks in Los Angeles Area](#)

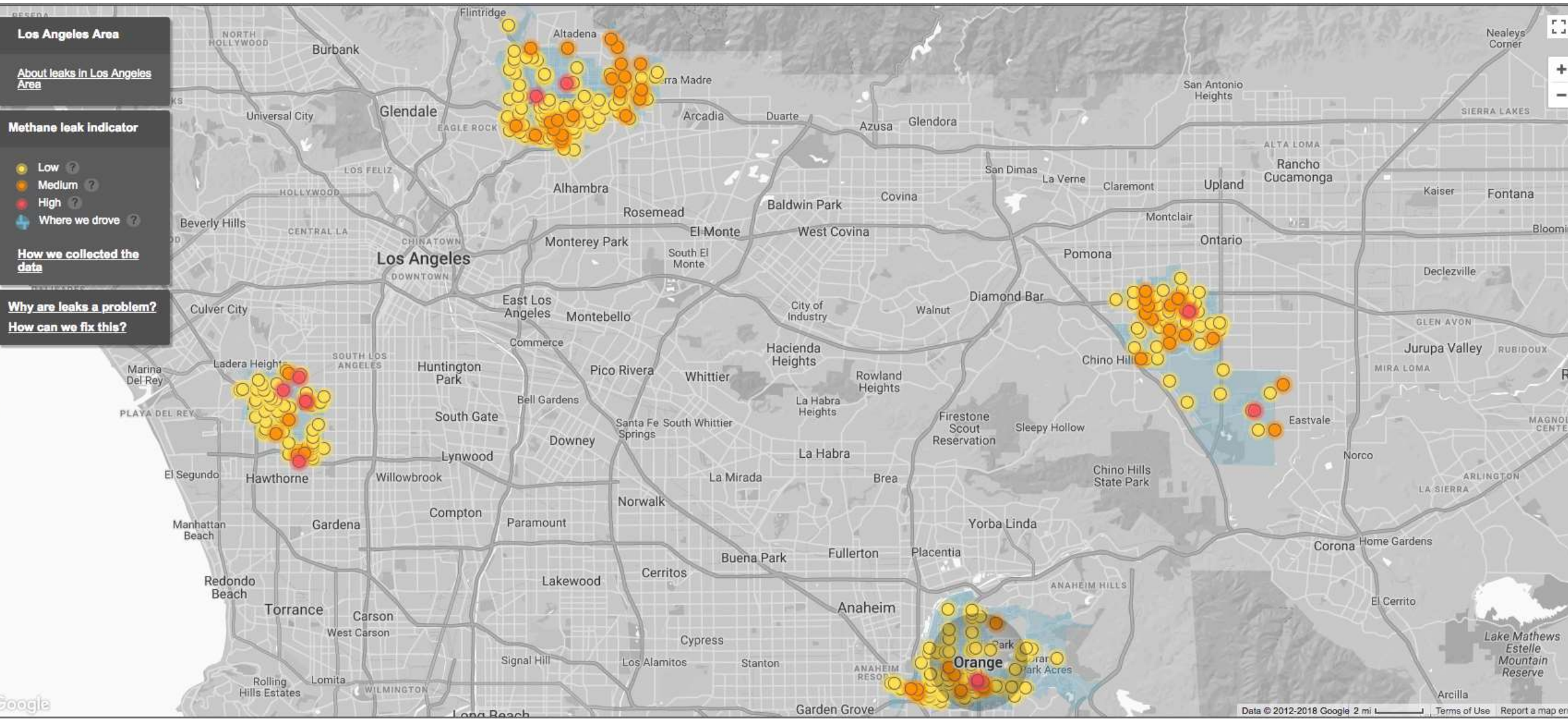
**Methane leak indicator**

- Low ?
- Medium ?
- High ?
- + Where we drove ?

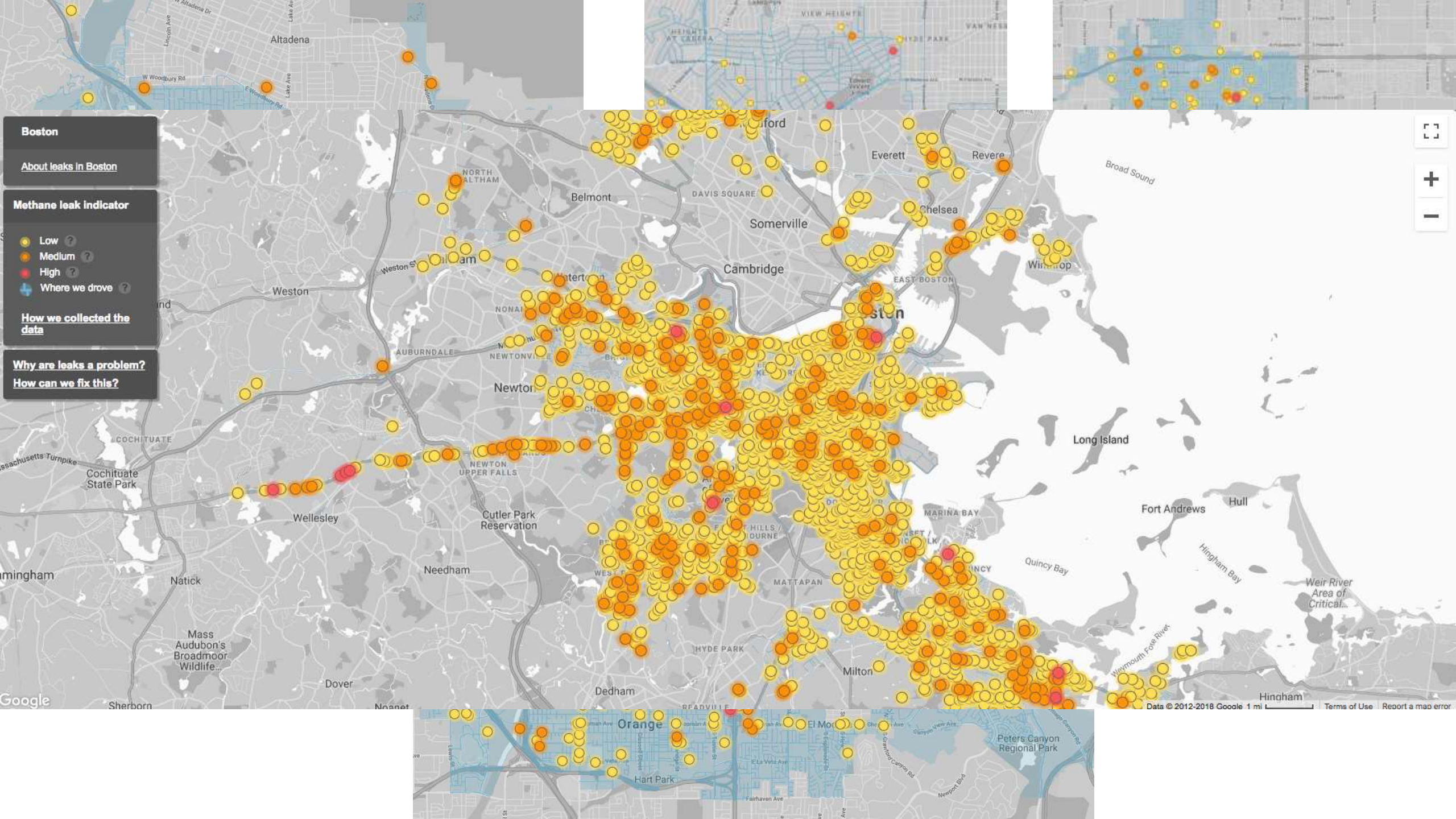
[How we collected the data](#)

**Why are leaks a problem?**

[How can we fix this?](#)











Tweets **249** Following **7** Followers **303** Likes **2**

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## Gas Watchdog

@GasWatchdog

Nat gas & methane leaks happen more often than you think. This feed automatically posts news articles on leaks that threaten our safety & health. [#GasWatch](#)

Joined April 2018

Tweet to Gas Watchdog

2 Followers you know



### Tweets Tweets & replies



Gas Watchdog @GasWatchdog · 1h  
PSA in Hammerfest LNG leak probe [#gaswatch](#)



#### PSA in Hammerfest LNG leak probe

Safety watchdog to investigate incident that resulted in evacuation at Equinor-run plant in northern Norway  
[upstreamonline.com](#)

Gas Watchdog @GasWatchdog · 2h



Pipeline data sought as Aliso Canyon rebuilds gas storage [#gaswatch](#)

CALIFORNIA: Pipeline data sought as Aliso Canyon

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Dana Jones - JVS @dana... ×

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Import your contacts from Gmail

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### Trends for you · Change

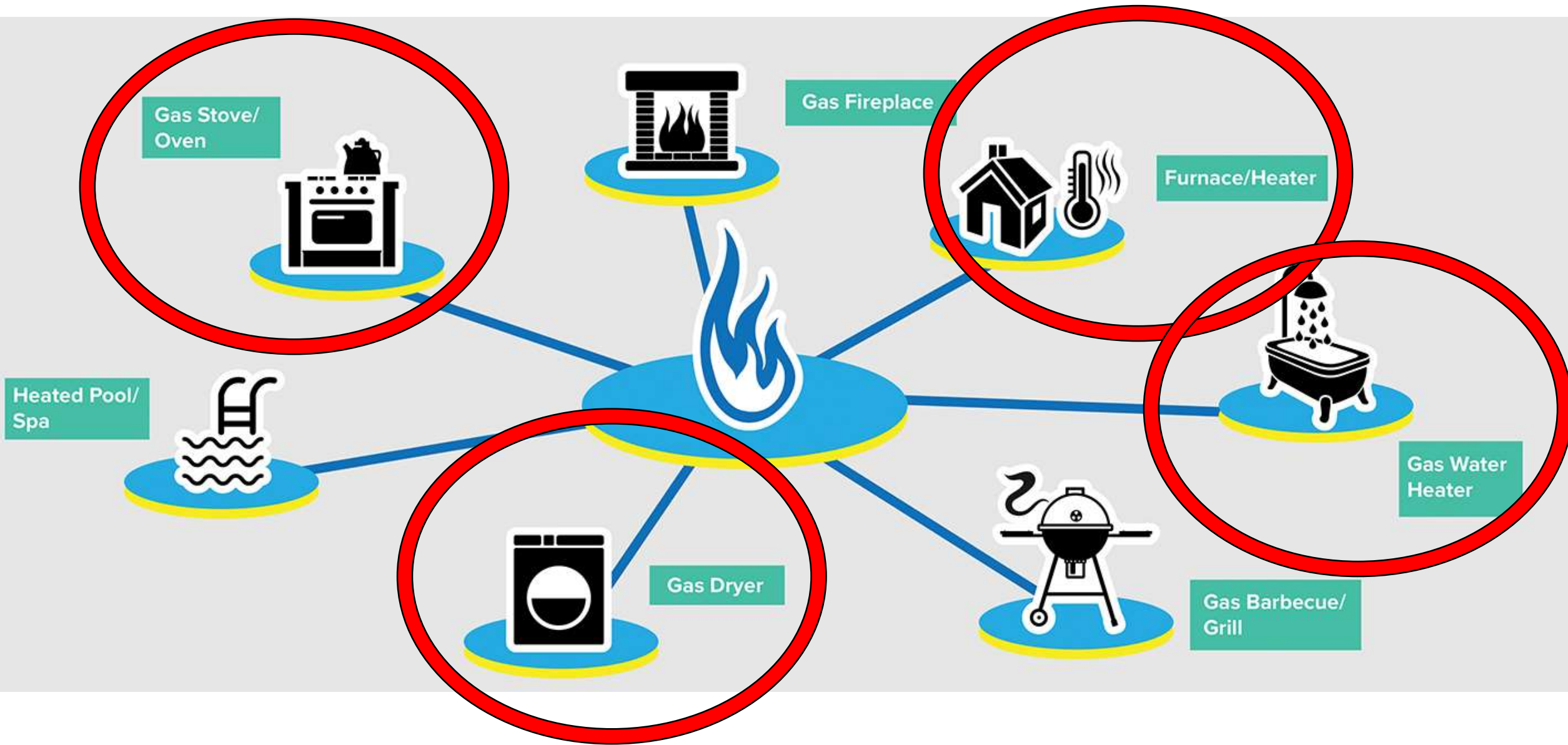
[#WorldRefugeeDay](#) 🇷🇺  
@gfriend, @GreenForAll and 2 more are  
Tweeting about this

[#WednesdayWisdom](#)  
87.1K Tweets

[Dwight Howard](#)  
Hornets finalizing a deal to send Dwight  
Howard to the Nets, ESPN reports



**C H O I C E**







Cost

# Gas Infrastructure Costs

\$6,000-\$15,000



\$7,000 X

9,897 = ~60,000 families priced out

\$270-\$850

\$750-\$2,400

Every \$1,000 increase  
in house price prevents  
9,897 California families  
from affording  
-NAHB, 2019





NAVIGANT

## Impacts of Residential Appliance Electrification

Final Report

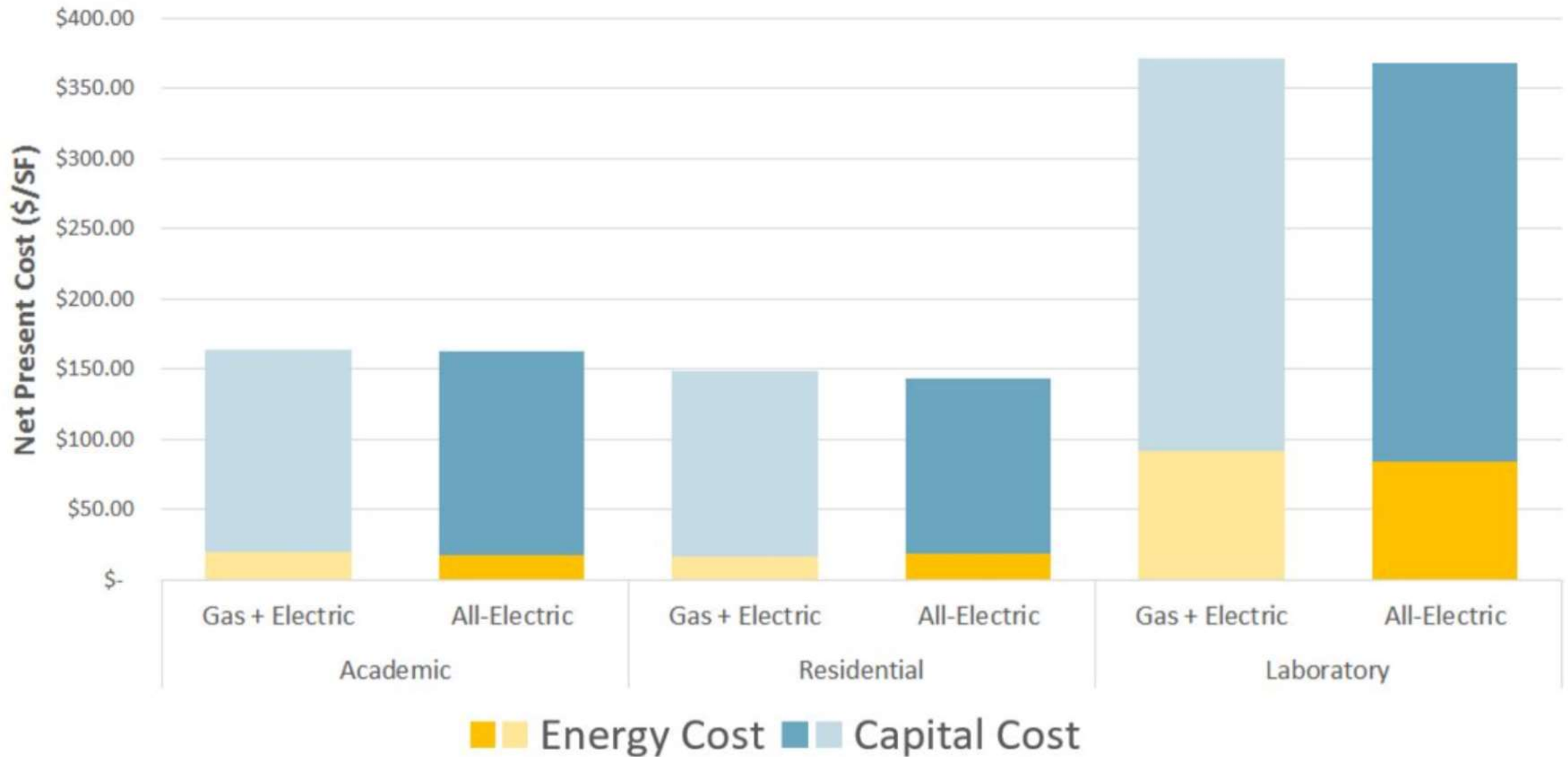
Prepared for:  
California Building Industry Association



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

Replacing natural gas appliances with electric reduce an existing home's total GHG emissions by 35-66% in 2020 and 55-60% for new homes.

# UC Carbon Neutral Buildings Cost Study





Equity

# Lifting the High Energy Burden in America's Largest Cities:

How Energy Efficiency Can Improve Low  
Income and Underserved Communities

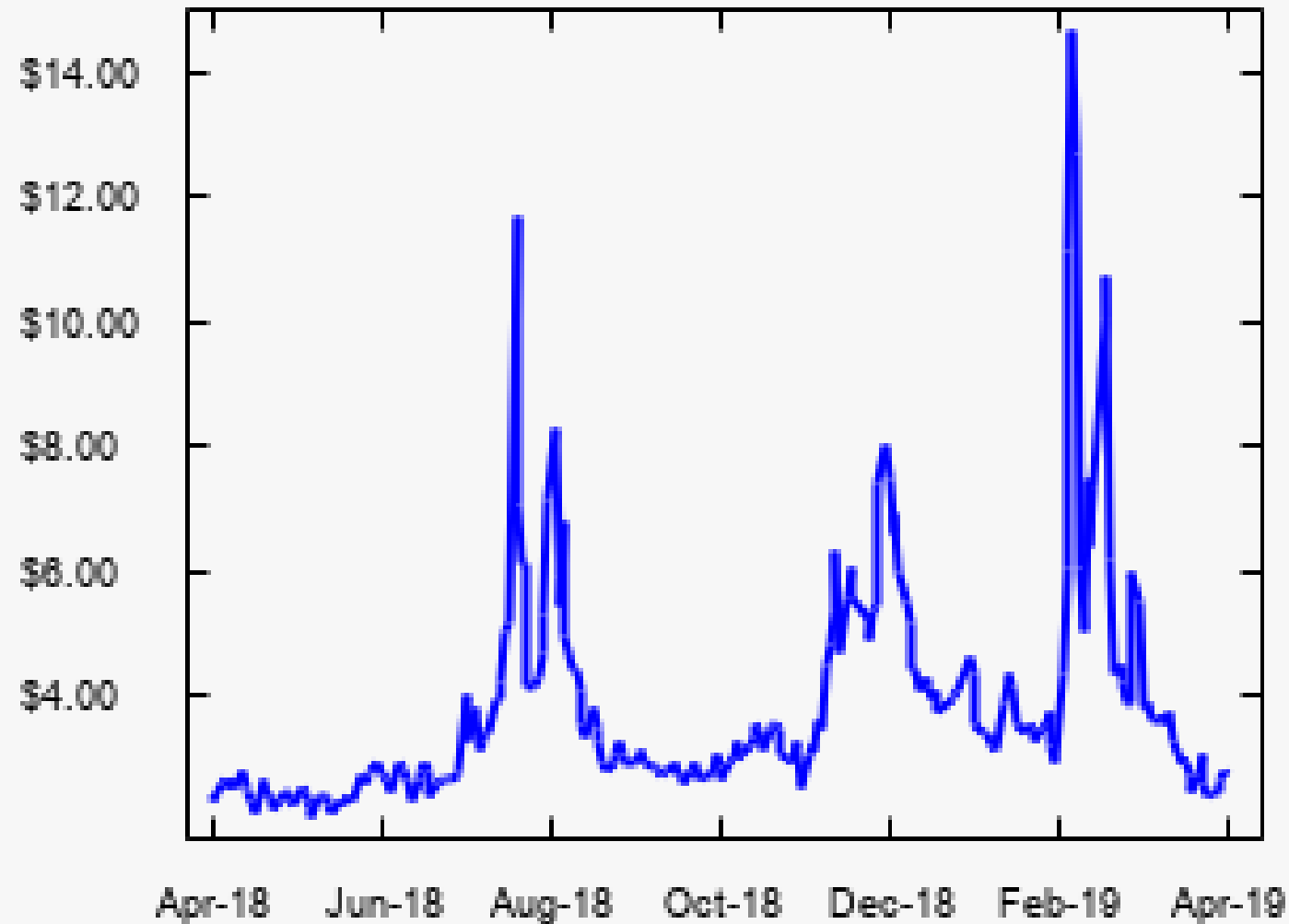
Ariel Dreobl and Lauren Ross





# California Regional Avg.

California Natural Gas Prices



Published 04/05/2019



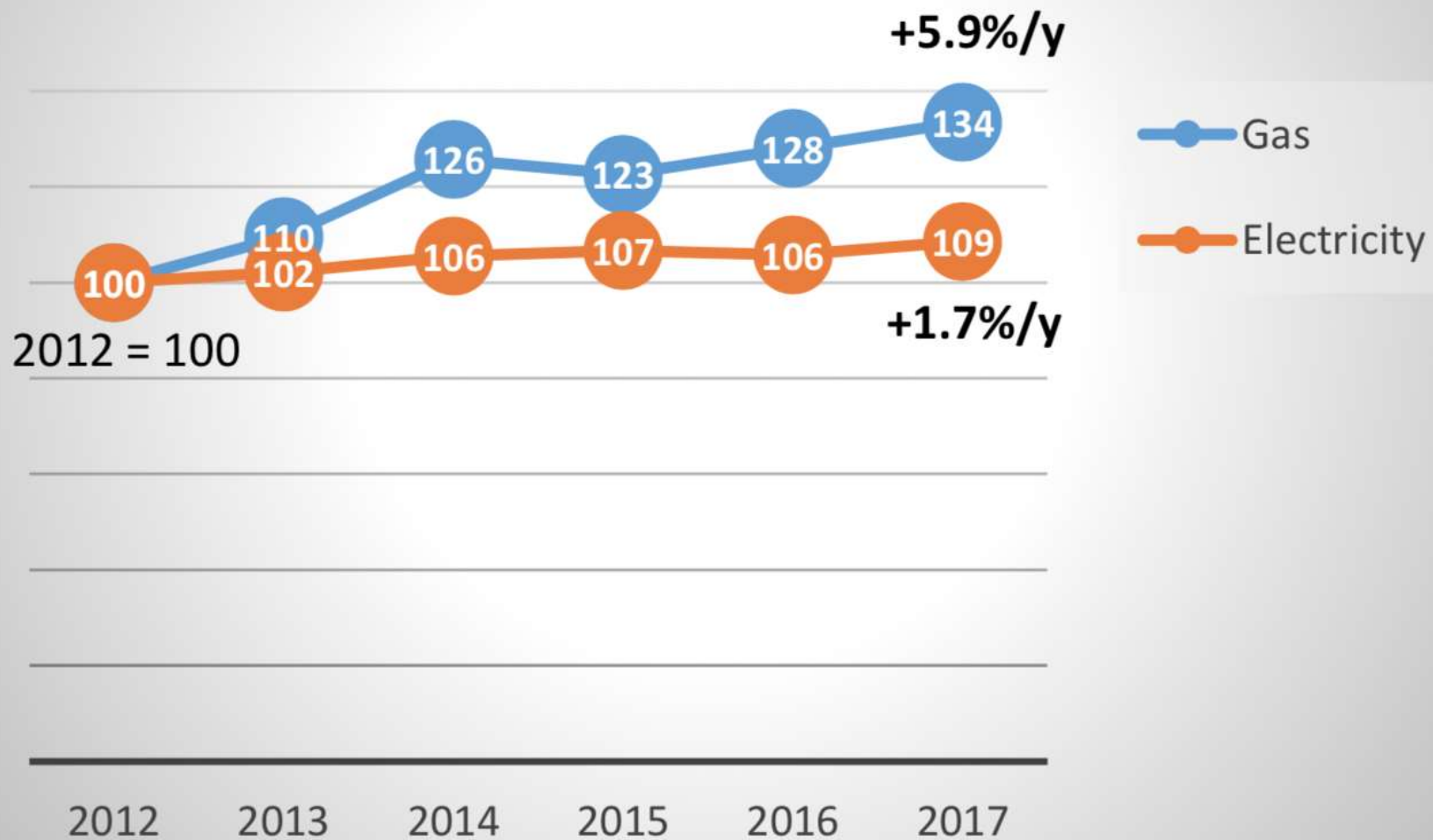
[naturalgasintel.com](http://naturalgasintel.com)

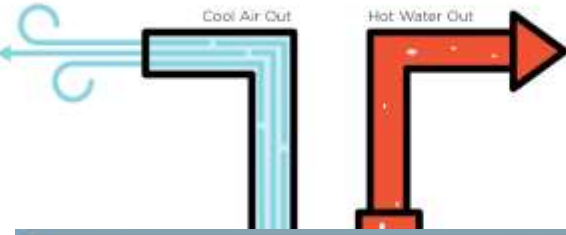
## SoCalGas Test Year 2019 GRC Request (2019-2022 Cycle)

<b>Year</b>	<b>Increase (\$000)</b>	<b>GRC Rev. Req. (\$000)</b>	<b>% Increase</b>
2018 (As-Expected Authorized)		\$2,509,000	
2019	\$480,000	\$2,989,000	19.13%
2020	\$255,400	\$3,244,400	8.54%
2021	\$200,800	\$3,445,200	6.19%
2022	\$212,800	\$3,658,000	6.18%
<b>Sum of 2019-2022 Increases</b>	\$1,149,000		
<b>% Increase by 2022 (over 2018)</b>	45.80%		
<b>Cumulative Increase in Revenues</b>	\$3,300,600		



# CA Residential Gas and Electricity Prices





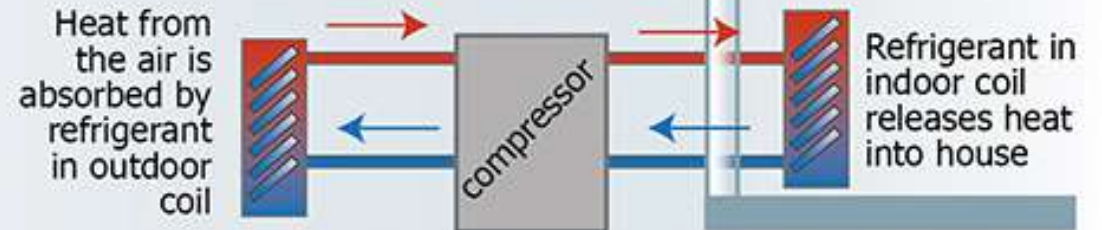
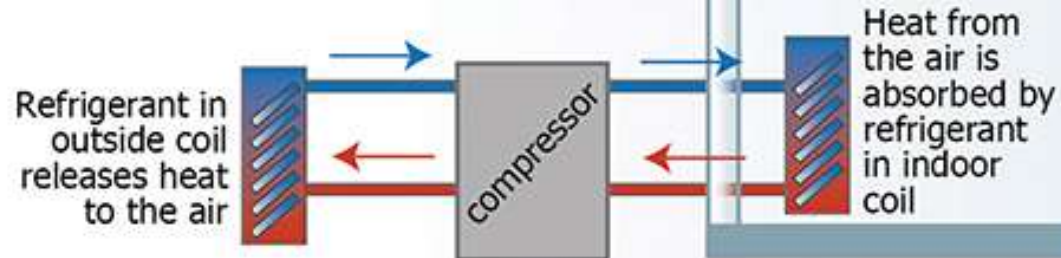
**HOW DO  
HEAT PUMPS  
WORK?**

# HOW AN AIR SOURCE HEAT PUMP WORKS

**SUMMER**



**WINTER**

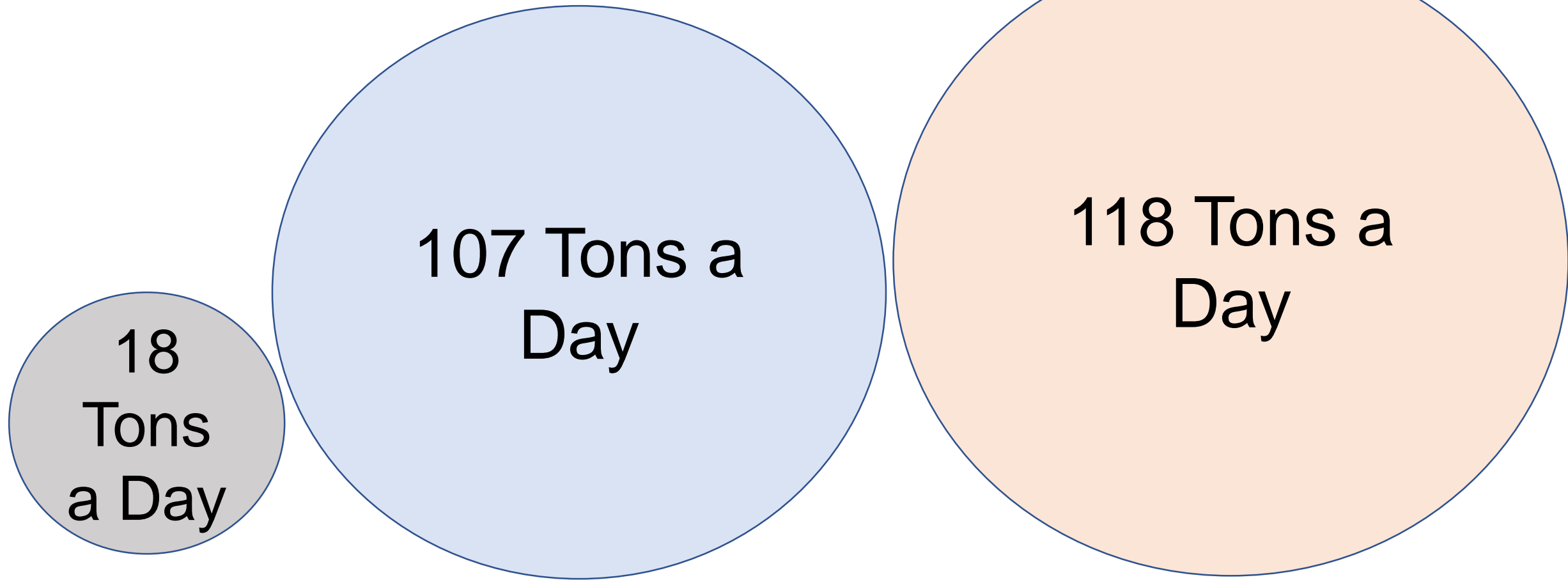


© Collaborative Efficiency



Health

# NOX in California



**Power Plants**

**Buildings**

**Light Duty  
Vehicles**



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

**Jennifer M. Logue,<sup>1,2</sup> Neil E. Klepeis,<sup>3,4</sup> Agnes B. Lobscheid,<sup>1</sup> and Brett C. Singer<sup>1,2</sup>, 2014**



# Air Board: Residential Cooking Exposure Study Finds Unhealthy Levels

Making a fried chicken dinner produced average indoor nitrogen dioxide levels of up to **400 parts per billion**, which is well over ARB's indoor air quality guideline and ambient air quality standard of **250 parts per billion** for one hour

Indoor formaldehyde levels exceeded 400 micrograms per cubic meter during oven cleaning in a gas stove. This exceeds the California Office of Environmental Health Hazard Assessment's Acute Reference Exposure Level (REL) guideline of 94 micrograms per cubic meter for one hour, and exceeds ARB's indoor guideline action level of 100 parts per billion as well.

# Air Board: Residential Cooking Exposure Study Finds Unhealthy Levels

## Air Board Advice:

1. Have gas stoves cleaned and properly adjusted annually for carbon monoxide and gas pressure by a trained professional.
2. Use a low-noise range exhaust hood.
3. Use heat-proof side shields along with the exhaust hood.
4. Avoid over-heating food and spilling food on burners.
5. Use the self-cleaning oven cycle only when the house is not occupied and is well ventilated, especially during the first hour or two.
6. Consider microwaving food when possible



Control panel features:

- Settings:** Timer On/Off, Set Clock, Cook Time, Delay Time (Time of Day)
- Function Buttons:** Bake, Start, Broil, Cancel, Self Clean
- Display:** Digital display showing 12:34
- Navigation:** +, - buttons
- Other:** Automatic Oven label, Rear indicator light



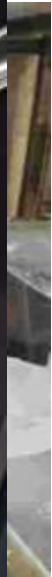
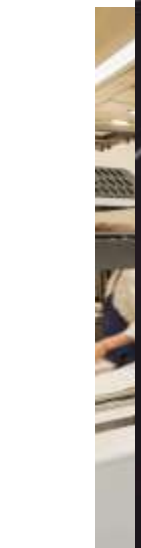




Ind



induction zone



# Consumer Reports Prefers Induction

Top 9 Ranges for 2018 were electric, top 2 were Induction

Fuel	Model	Rating	Cost
Induction	Kenmore Elite 95073	89	\$1,530
Induction	Kenmore 95103	88	\$1,000
Electric Smoothtop	Samsung NE58F9710WS	85	\$1,800
Induction	GE Profile PHS930SLSS	83	\$2,430
Electric Smoothtop	Samsung NE59J7850WS	82	\$1,300
Electric Smoothtop	Samsung NE59J7750WS	82	\$1,600
Induction	LG LSE4617ST	82	\$3,330
Induction	Frigidaire Gallery FGIF3036TF	82	\$990
Gas	LG Signature LUTD4919SN	81	\$3,000

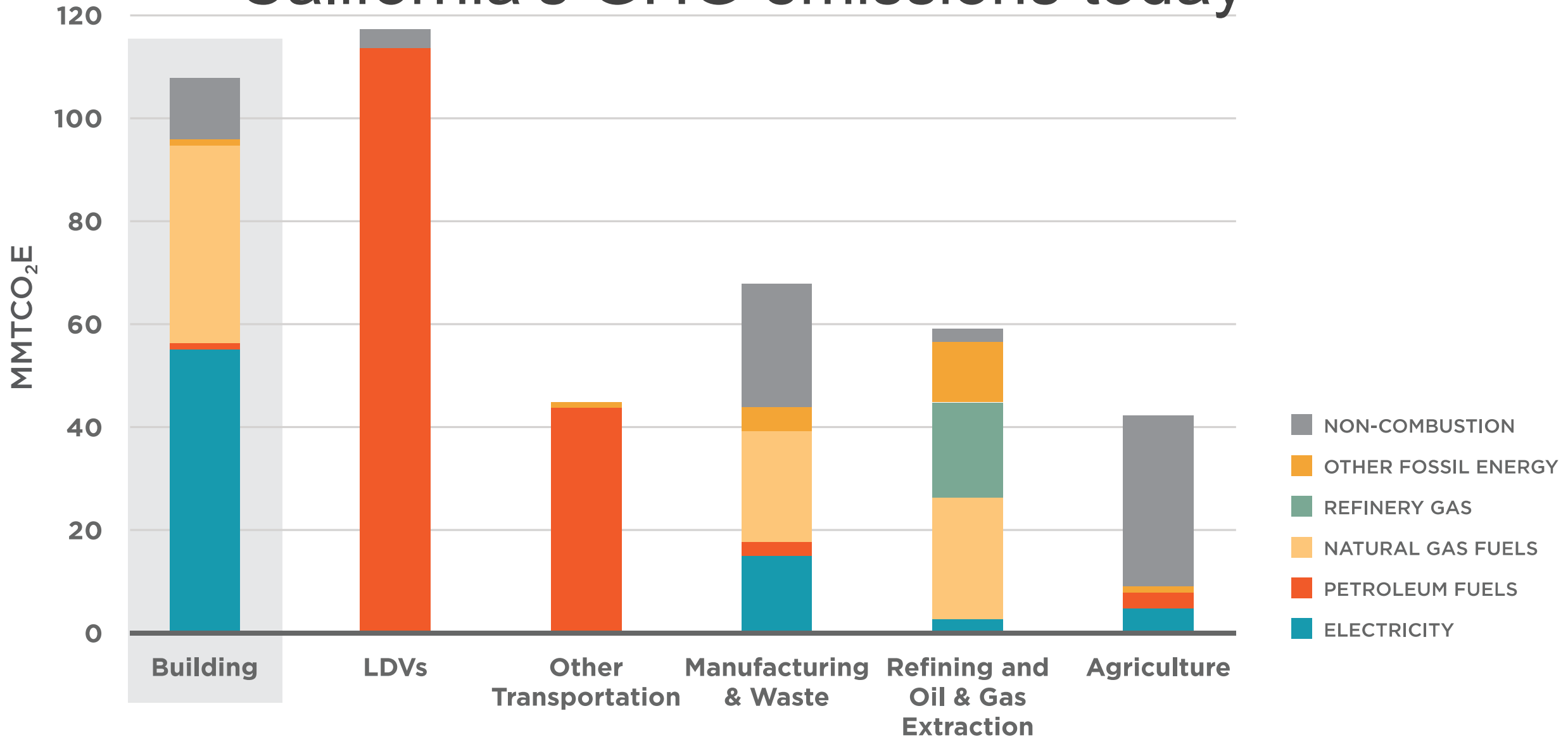






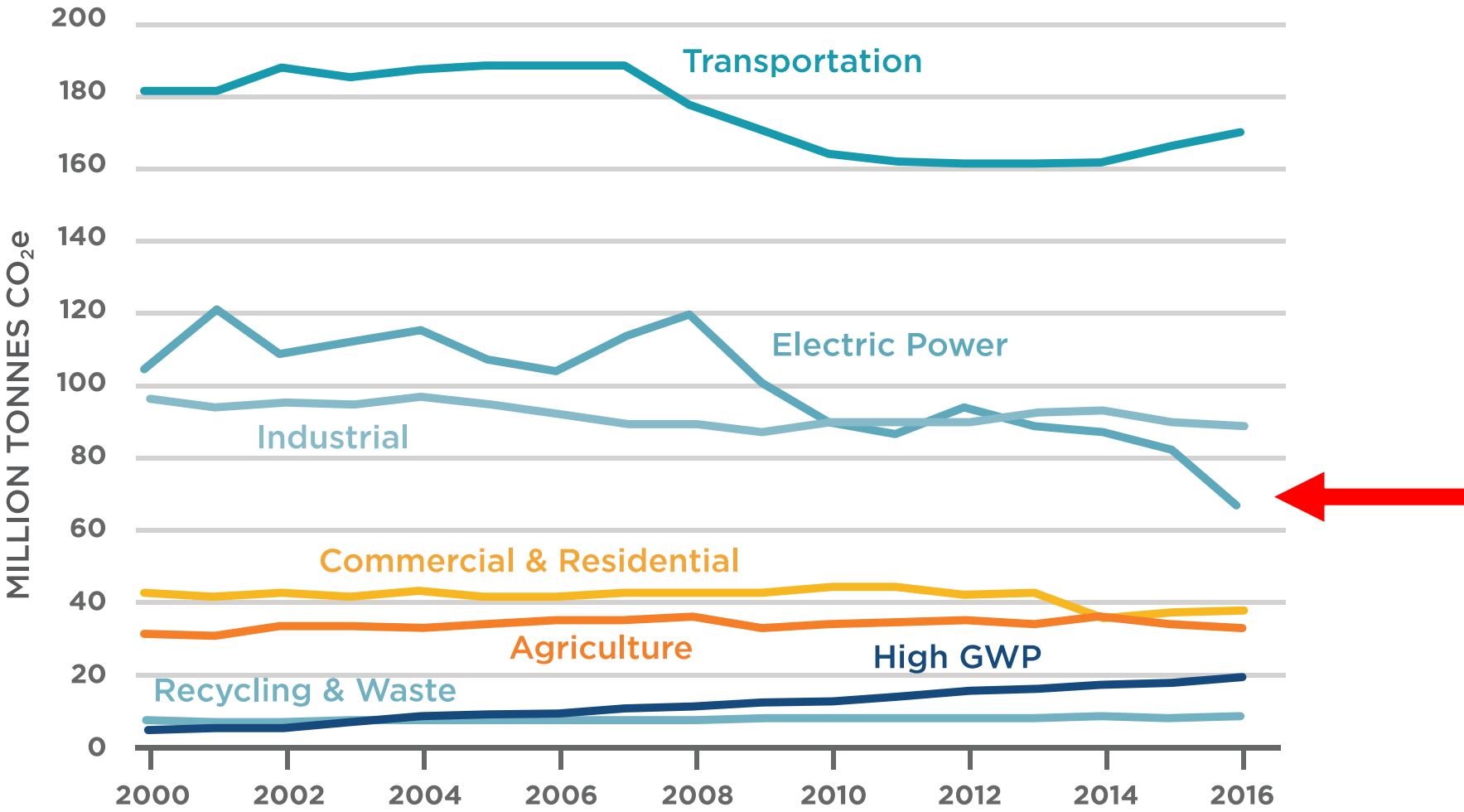
Climate

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





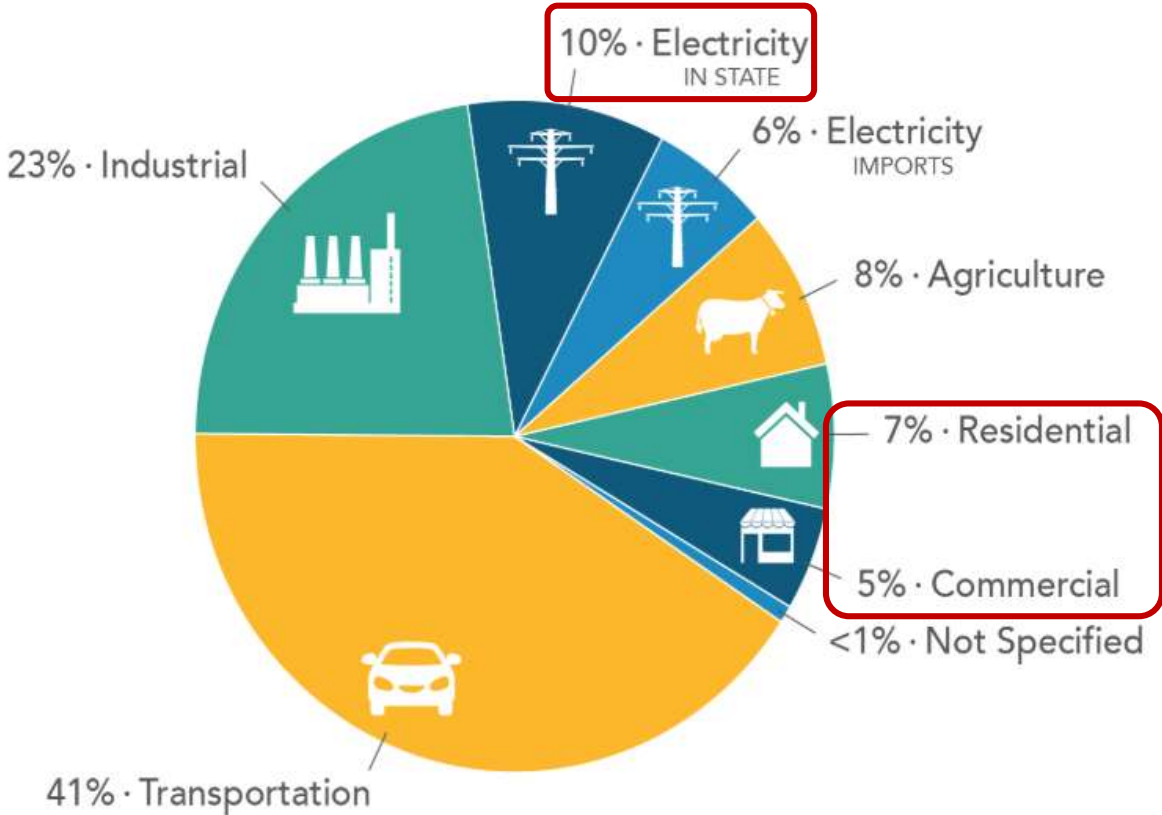
# Electricity is getting cleaner, moving toward 100% carbon-free by 2045



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](https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf)

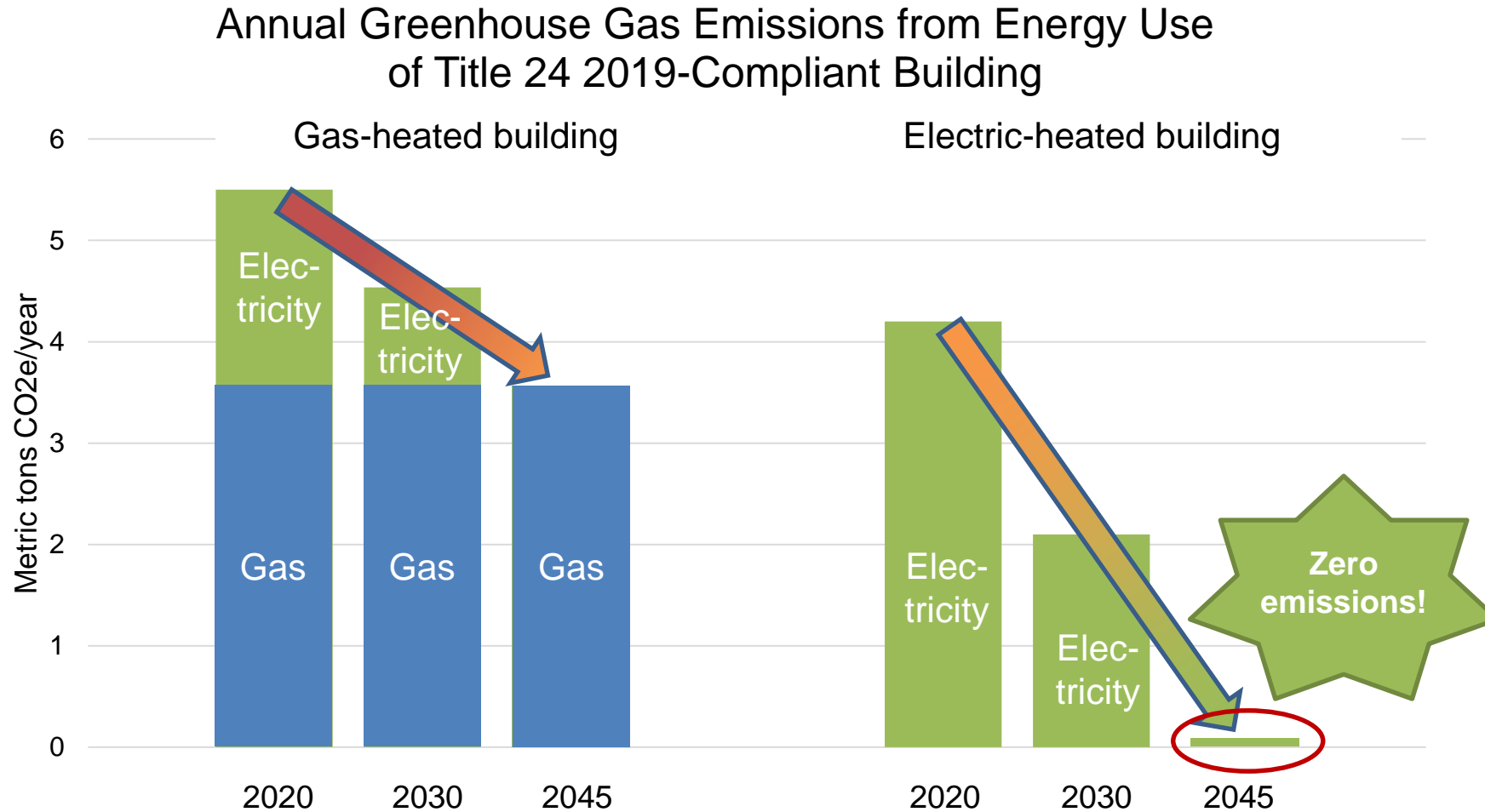
# Building emissions > all in-state power plants

## Emissions by Economic Sector



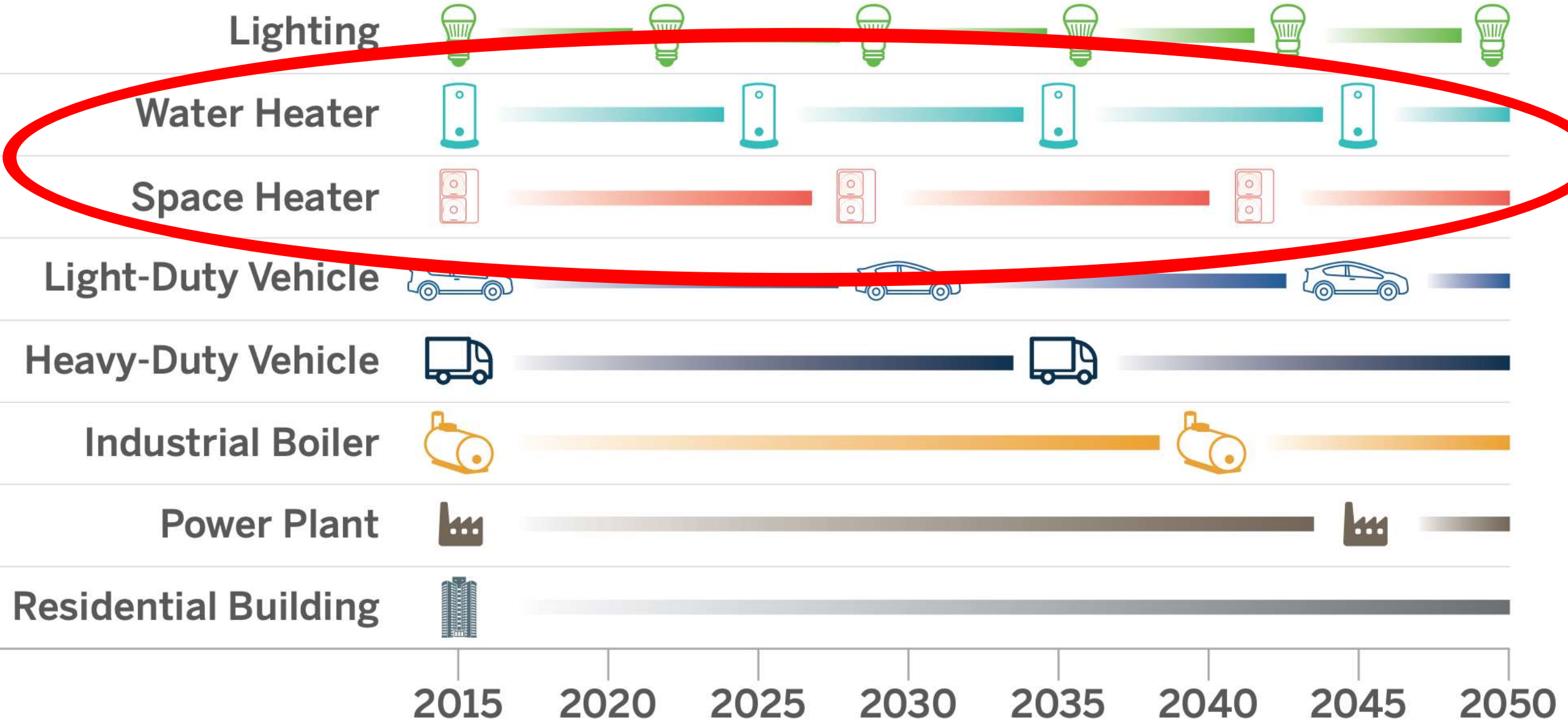
429.4 MMTCO<sub>2</sub>e  
2016 TOTAL CA EMISSIONS

# Electric Heat Offers Pathway To Zero Emissions





# Stock Turnover









Energy Research and Development Division  
**FINAL PROJECT REPORT**

# Deep Decarbonization in a High Renewables Future

Updated Results from the California PATHWAYS Model



**Energy+Environmental Economics**

**California Energy Commission**

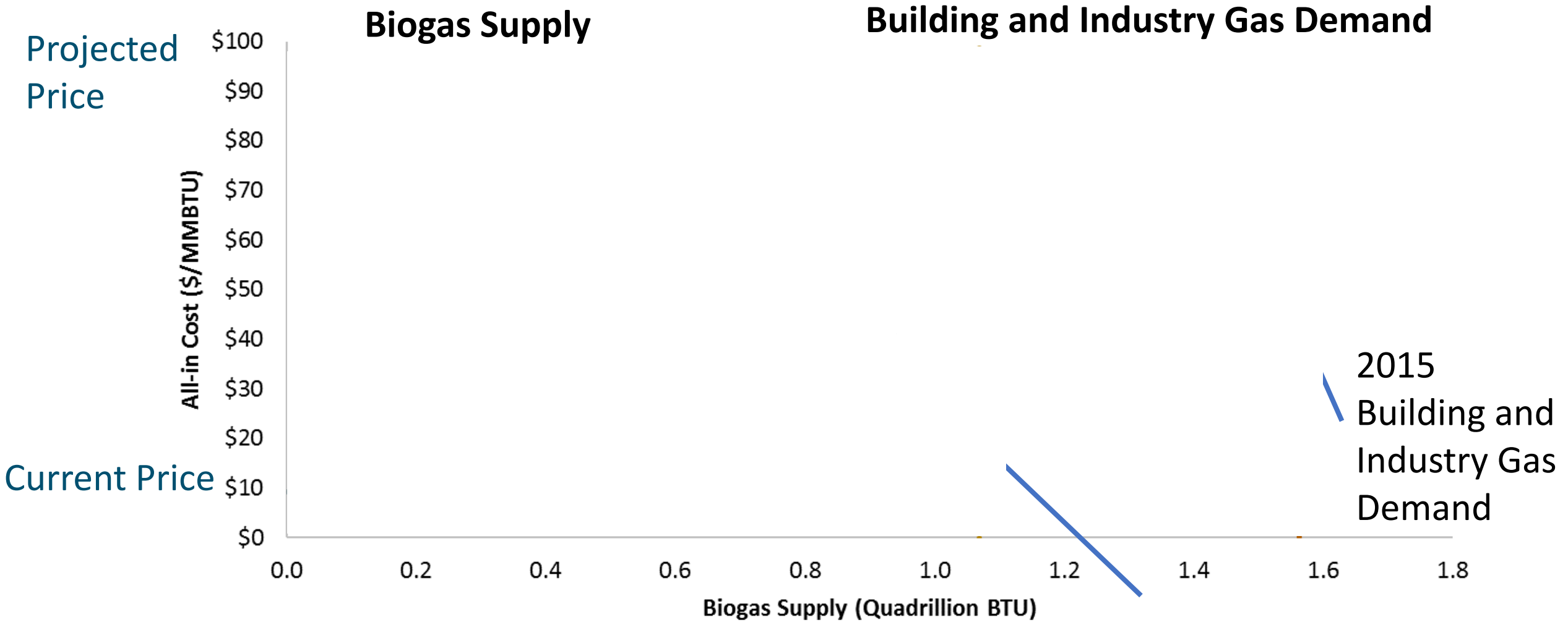
Edmund G. Brown Jr., Governor

June 2018 | CEC-500-2018-012





# Biogas supply & gas demand in 2050



2050 demand with high natural gas efficiency and no building electrification

# Current SMUD Electrification Programs

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## **All-Electric New Homes Program**

Up to \$5,000 per home

- \$500 for pre-wiring (required)
- \$1,500 for HPSH
- \$1,500 for HPWH
- \$1,500 for induction cooktop

Discussion of whether program will require no gas to site

## **Electrification Focus in Home Performance Program (existing homes)**

Up to \$13,750 per home

- \$2,500 for wiring and panel upgrades
- \$2,500 for HPSH
- \$3,000 for HPWH
- \$250 for induction cooktop
- \$3,000 for insulation and sealing

...and miscellaneous items

Midstream HPWH program under development



# CPUC Decarbonization Plans

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1. All Electric Rates

2. Resource Acquisition:

- 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.

## California is building the homes of the future, today

Homes built to the new codes will:



### BE EXTREMELY ENERGY EFFICIENT

New homes will feature high efficiency windows, appliances, and lighting and heating.



### HAVE SOLAR POWER

All eligible residential buildings and homes will have access to renewable energy resources, such as rooftop solar.



### INCENTIVIZE SOLAR + STORAGE

In some cases, the rules will allow a limited trade-off between solar + storage and efficiency. The credit is meant to help incentivize on-site energy storage for individual households, an essential tool for achieving emission reductions.

### Encouraging All-Electric:

*Provisions in the code will encourage more electricity use and all-electric homes to reduce natural gas consumption. Technology such as electric water heaters are becoming increasingly cost effective.*





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Local Governments Empowering Our Communities

# Codes and Standards

The BayREN Codes & Standards Program is a joint effort of the Bay Area cities and counties to increase compliance with the California Energy Code.

[FIND OUT MORE](#)

Electric Buildings are ...

Cheaper

More Equitable

Healthier

More Climate Friendly

Safer

# New homes will no longer be heated by gas from 2025, government says

Fossil fuel heating systems banned in bid to tackle emissions

**Chiara Giordano** | Wednesday 13 March 2019 22:52 | 177 shares | 18 comments



 Like Click to follow Indy Politics

## THE HOLLAND TIMES

HOME / SUBSCRIPTION / ARCHIVE / FIND YOUR WAY / CONTACT

28 June 2018, National

# The Netherlands to go completely gas-free



**Depreciation**  
**NEXT EXIT**





Welcome to Santa Rosa

FROM THE  
ASHES  
WE WILL  
RISE

