

MARIN COUNTY LOW CARBON CONCRETE ORDINANCE

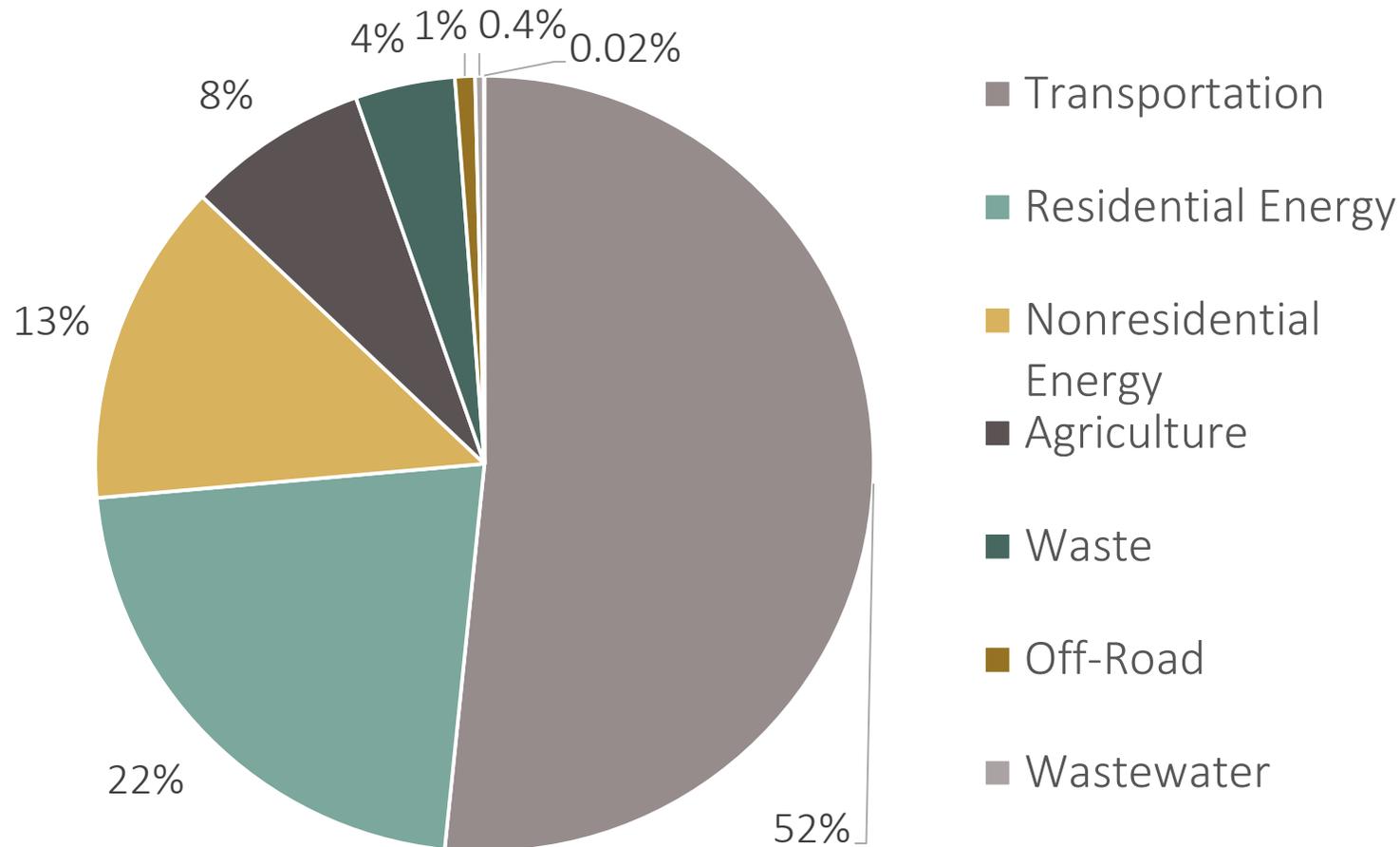
Alice Zanmiller
Planner
County of Marin

Climate Protection Committee Meeting
December 2, 2019



This work is funded through a Climate Protection Grant from the Bay Area Air Quality Management District. The opinions, findings, conclusions, and recommendations are those of the author and do not necessarily represent the views of the District. The District, its officers, employees, contractors, and subcontractors make no warranty, expressed or implied, and assume no legal liability for the information in this report.

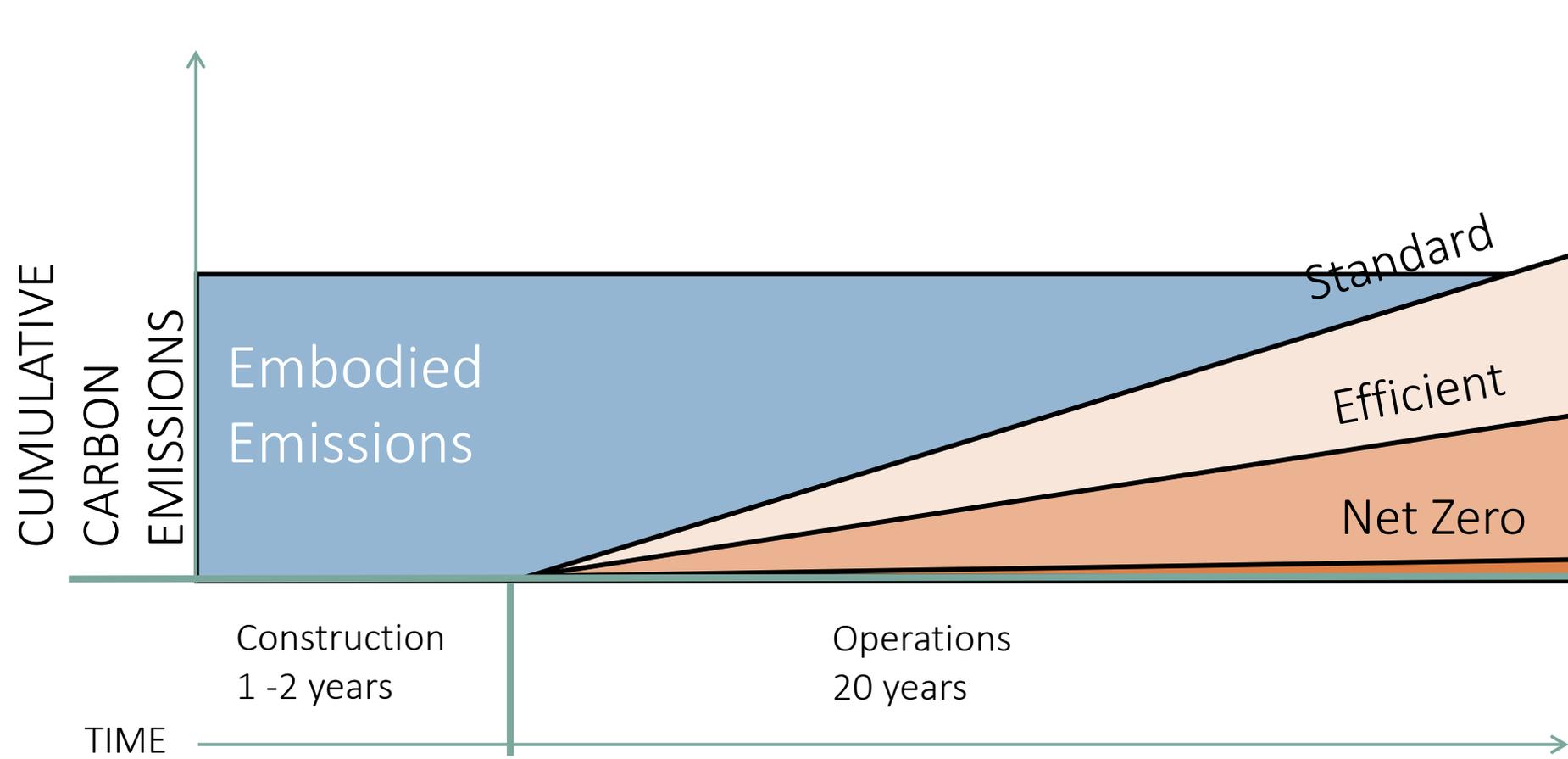
LOCAL CLIMATE ACTION CONTEXT – WHAT'S MISSING?



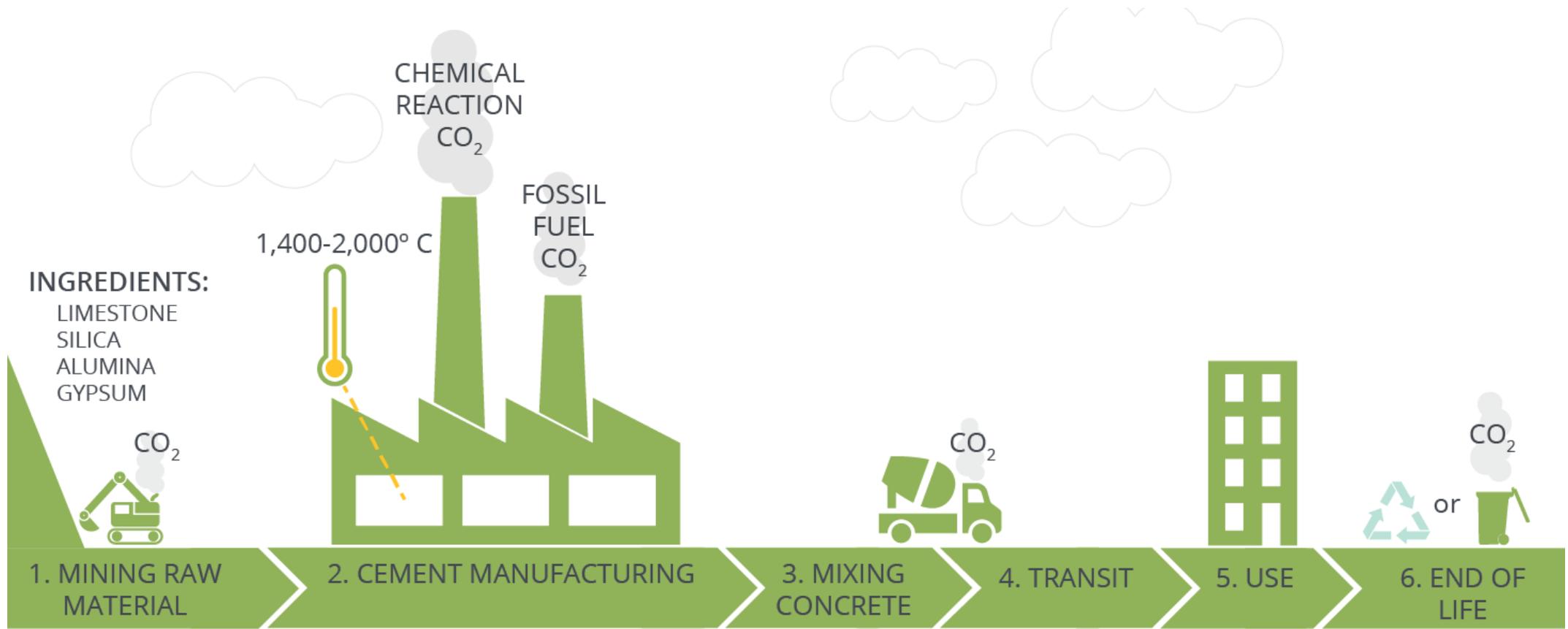
<https://www.flickr.com/photos/viennacafe/5865602500>

[https://commons.wikimedia.org/wiki/File:YM_Wealth_\(ship,_2004\)_002.jpg](https://commons.wikimedia.org/wiki/File:YM_Wealth_(ship,_2004)_002.jpg)

EMBODIED VS. OPERATIONAL CARBON EMISSIONS IN BUILDINGS



Source: Larry Strain, Siegel & Strain Architects



Source: Architecture 2030

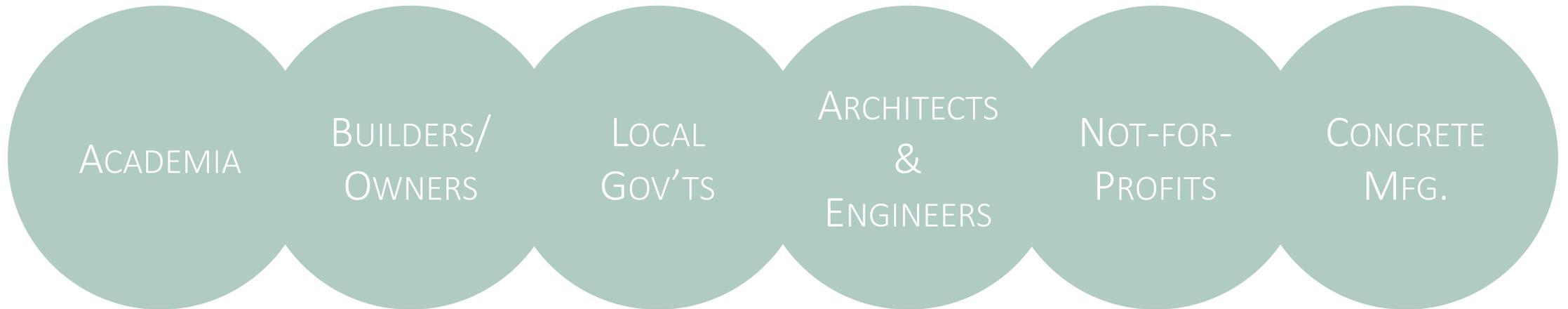
BAY AREA LOW CARBON CONCRETE CODE

- Funded by BAAQMD's 2018 Climate Protection Grant Program under "Fostering Innovative Strategies with long-term impacts in reducing GHG emissions."
- A first-of-its-kind effort to address embodied emissions in an area of local government control.
- Partnership with local government, engineers, and academia, as well as a robust stakeholder group.



BAY AREA LOW CARBON CONCRETE CODE

- Formation of a Bay Area Concrete Working Group as an extension of the Embodied Carbon Network



BAY AREA LOW CARBON CONCRETE CODE

- Model code language for adoption by local governments
 - Low embodied-carbon concrete specifications for residential and non-residential applications
 - **Adopted unanimously by County of Marin on November 19, 2019**
- Opportunity for these standards to be adopted across Bay Area jurisdictions; and for the framework to be replicated beyond our region.

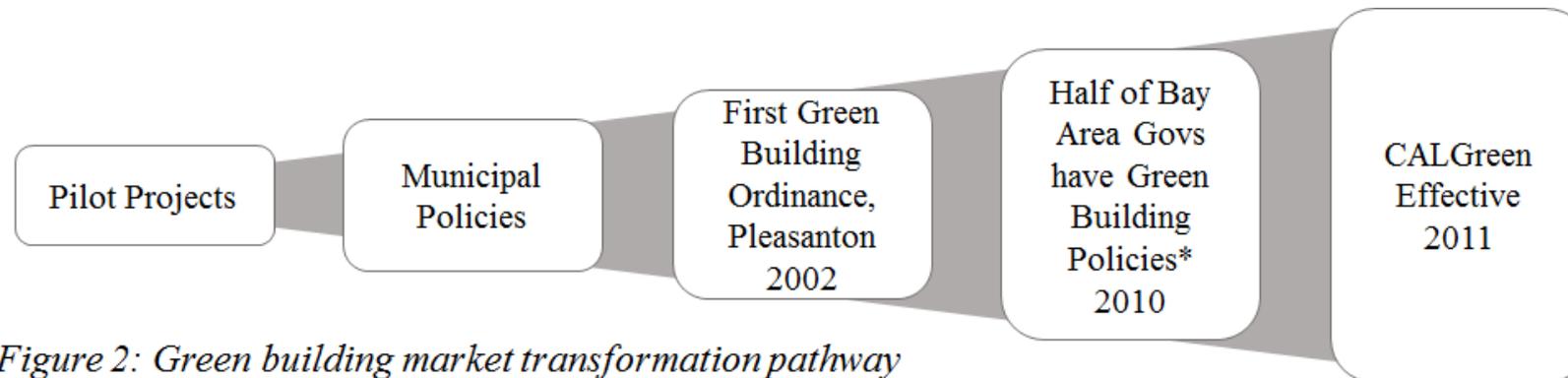


Figure 2: Green building market transformation pathway

* Bay Area Regional Collaborative Bay Area Green Building Policy Assessment Aug. 20, 2010

BAY AREA LOW CARBON CONCRETE CODE

	Cement limits	Embodied Carbon limits
Minimum specified compressive strength f'_c , psi	Maximum ordinary Portland cement content, lbs/yd ³ (2)	Maximum embodied carbon kg CO ₂ e/m ³ , per EPD
up to 2500	362	260
3000	410	289
4000	456	313
5000	503	338
6000	531	356
7000	594	394
7001 and higher	657	433
up to 3000 light weight	512	578
4000 light weight	571	626
5000 light weight	629	675

BAY AREA LOW CARBON CONCRETE CODE

- Four pilot projects receiving technical assistance to apply the specifications. These projects will:
 - Serve as case studies for other projects
 - Provide more granular GHG emission savings estimates
 - Help refine specifications as needed.



Source: LMS Architecture

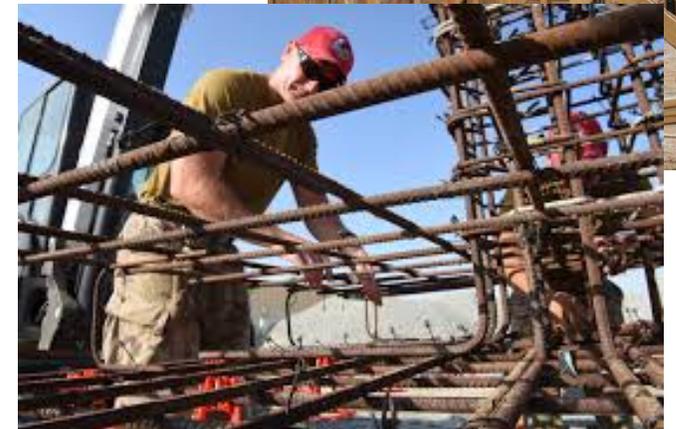
NEXT STEPS

- Working to develop resources for other jurisdictions to support adoption
 - Template Ordinance
 - Template Staff Reports
- Develop overview of process for other regions
- Monitor implementation, refine process, and share lessons.

Interested in adopting a similar policy in your jurisdiction? Reach out!

BARRIERS, OPPORTUNITIES, & QUESTIONS

- How can this process expand to other building materials?
- How can we support innovative building materials without burdening applicants (both cost & process)?
- What is the right role for local government to play in materials regulations?
- How should we prioritize embodied carbon policy models in built out communities vs. places that are still growing?
- How do we address consumption emissions in an economy rooted in consumption and growth?



THANK YOU

ALICE ZANMILLER, PLANNER

AZANMILLER@MARINCOUNTY.ORG





Building Electrification Trends and Opportunities

Panama Bartholomy
Building Decarbonization Coalition

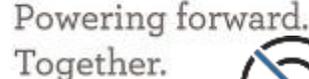
Climate Protection Committee
December 2, 2019



Greenbank Associates



Innovation has a name.



An EDISON INTERNATIONAL Company

Finding the ways that work



WATER HEATERS 2

Berkeley bans SO



B 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



U.S. city to do



A vertical graphic with a green top section containing the text "ATLA" and "Accelerate ITSM service delivery". Below this is a blue section with a white search bar. The bottom section is white with a yellow awning and two people, one in a blue shirt and one in a green dress, standing under it. The text "How-to guide and best practices for modern" is partially visible.

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

Northern California

Bay Area

- **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

Central Valley

- Sacramento, Davis

Humboldt: Arcata

Mendocino: Fort Bragg, Point Arena, Willits

Santa Cruz: City of Santa Cruz

Southern California

Central Coast

- City of San Luis Obispo

Santa Barbara

- Santa Barbara, Goleta

Ventura

- Ojai, Thousand Oaks

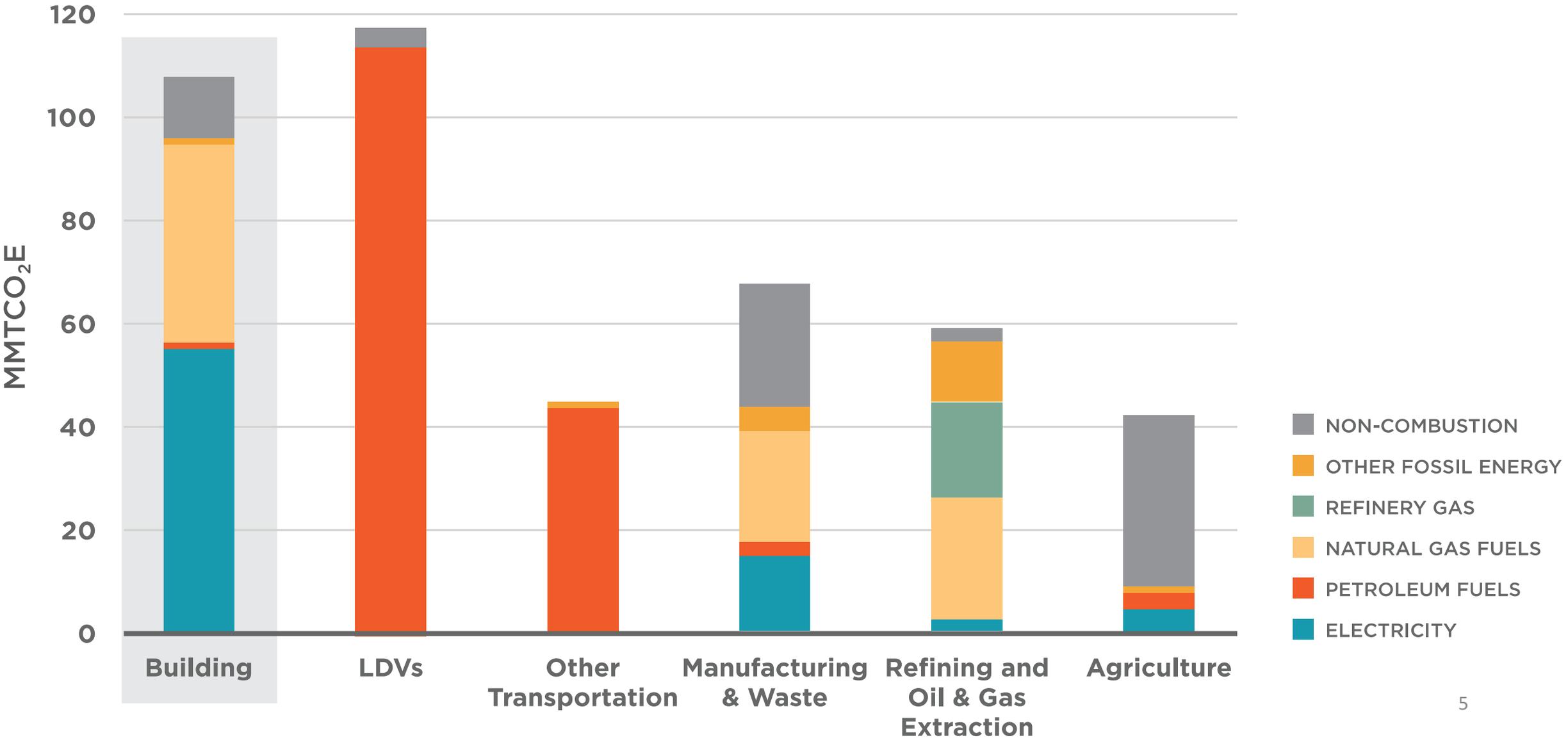
Los Angeles

- City and County of LA, Santa Monica, West Hollywood, Malibu

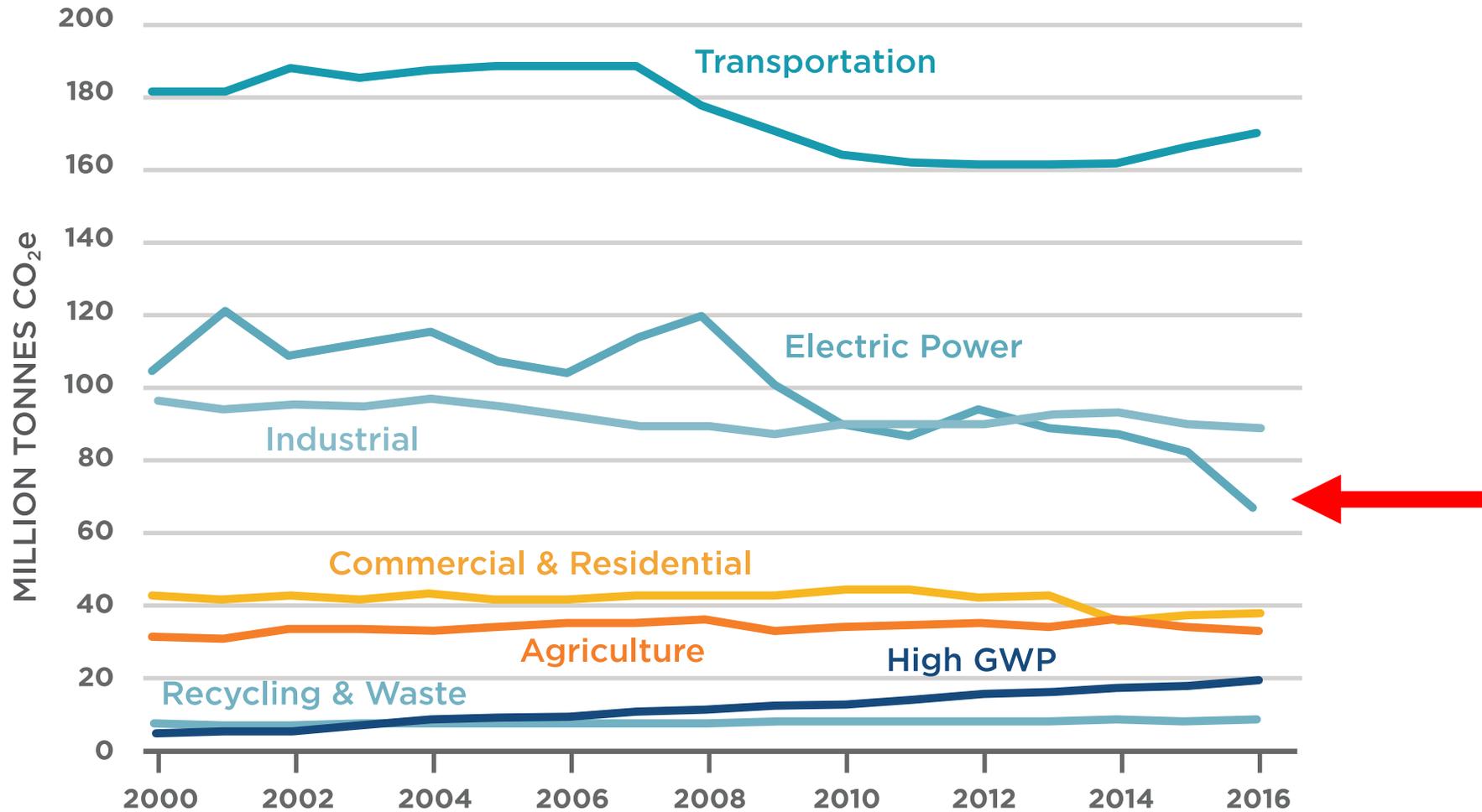
San Diego

- Carlsbad (adopted!), Chula Vista, Encinitas, Escondido

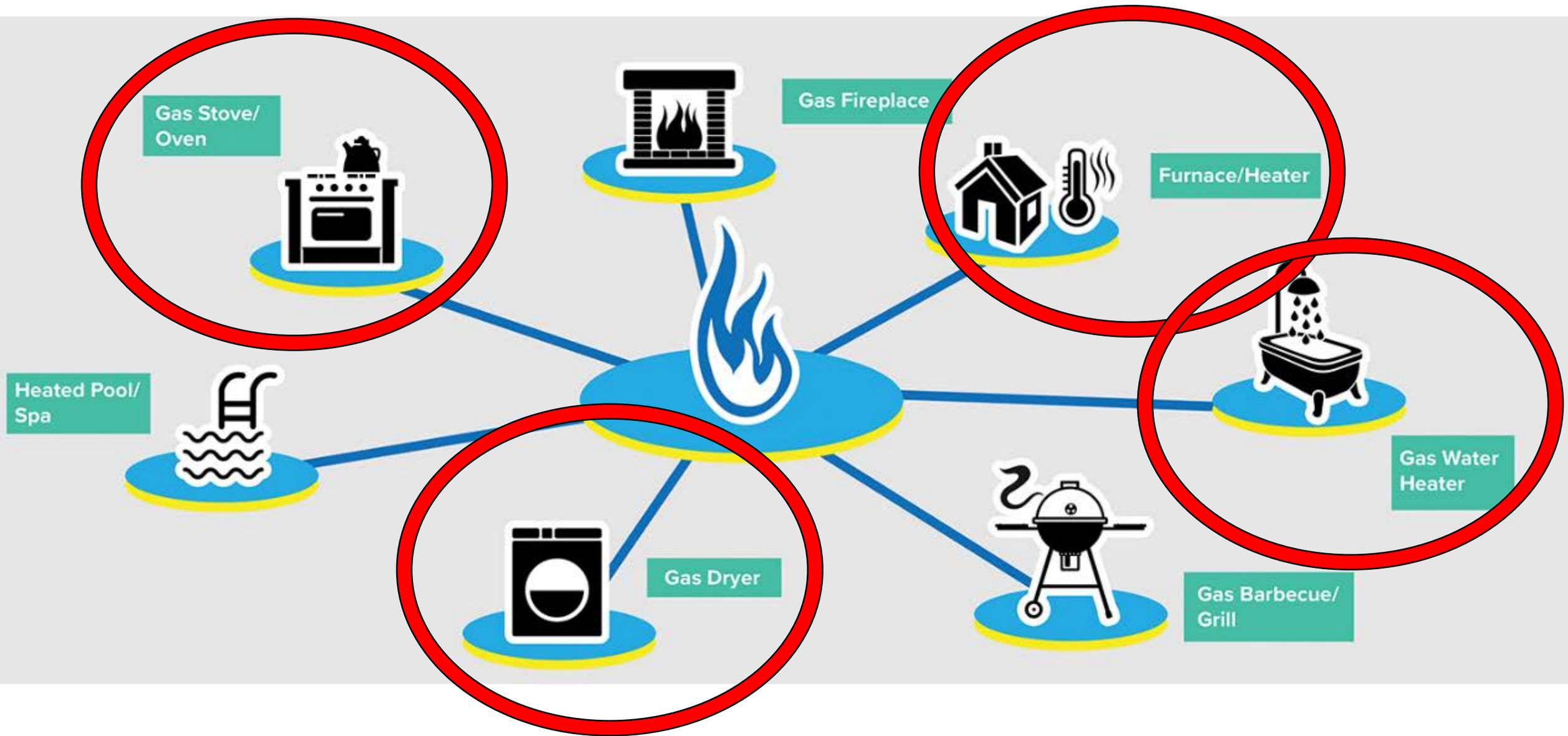
California's GHG emissions today – Buildings 24%



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

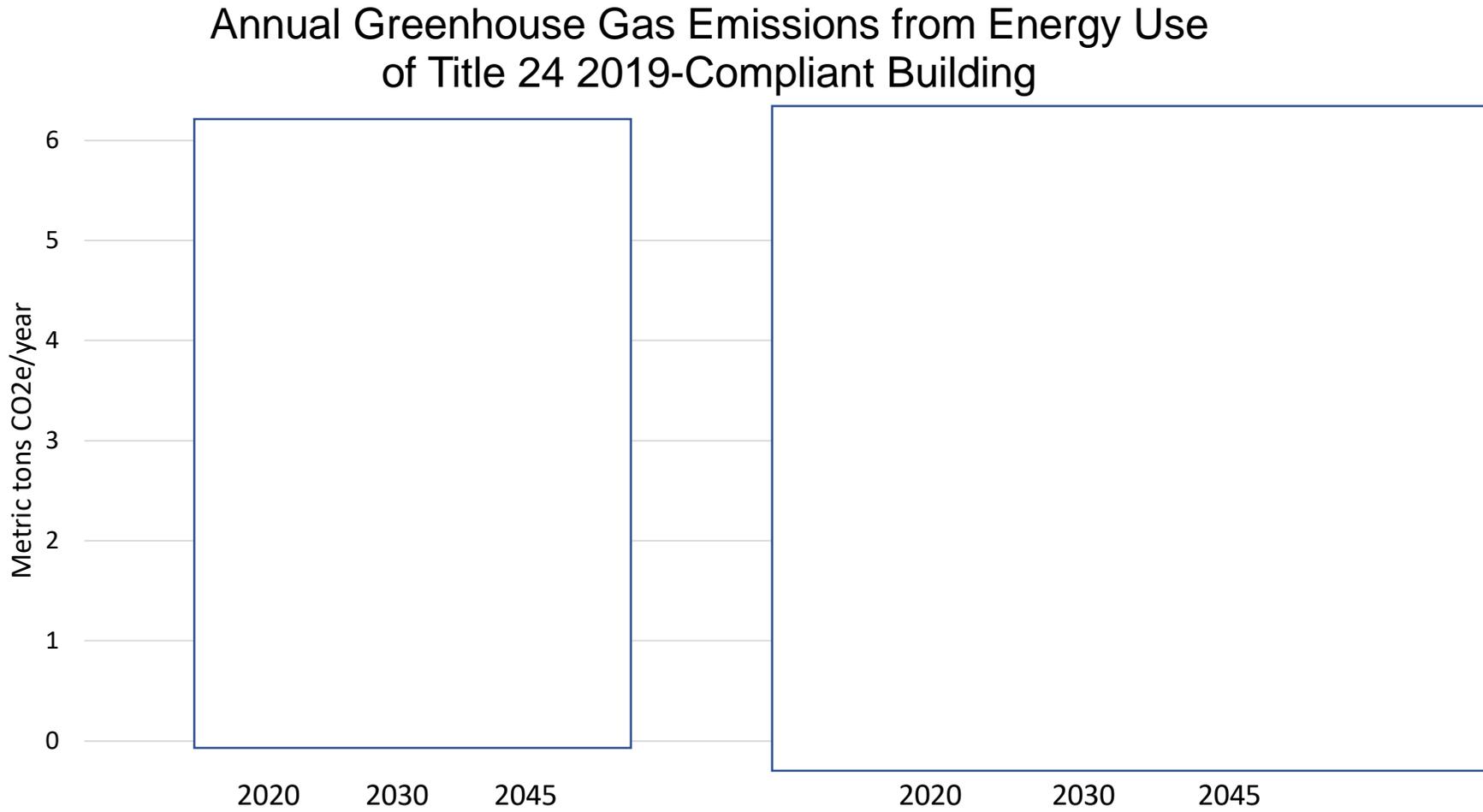


Source: CA Air Resources Board, Emission Inventory 2018.
https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf





Electric Heat Offers Pathway To Zero Emissions

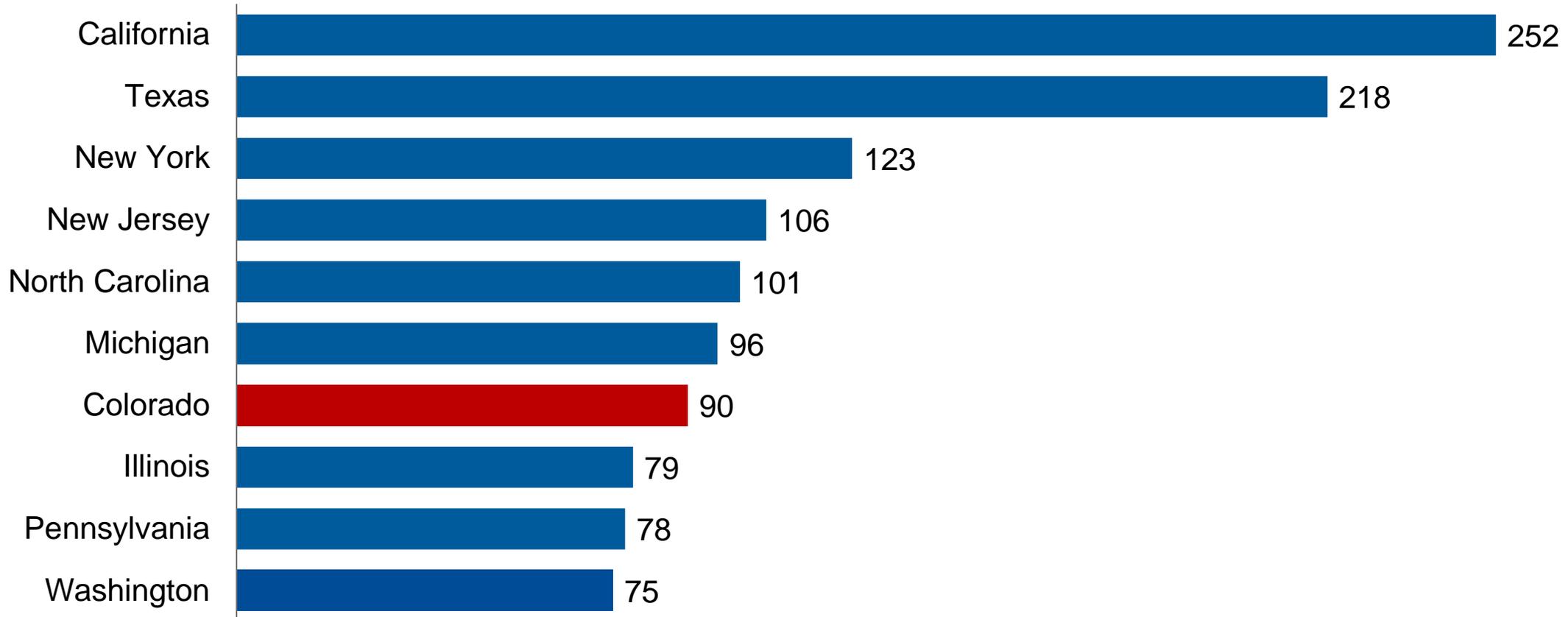


NRDC analysis, climate zone 13 (Fresno)
with rooftop solar. Including methane leakage

California top state for new gas connections from 2013 to 2017

New Natural Gas Customers, 2013-2017

Residential and Commercial Sectors, thousands of customers



Gas Infrastructure Costs

\$6,000-\$15,000



\$7,000 X

9,897 = ~60,000 families priced out

\$750-\$2,400

\$270-\$850



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

NAVIGANT

Impacts of Residential Appliance Electrification

Final Report

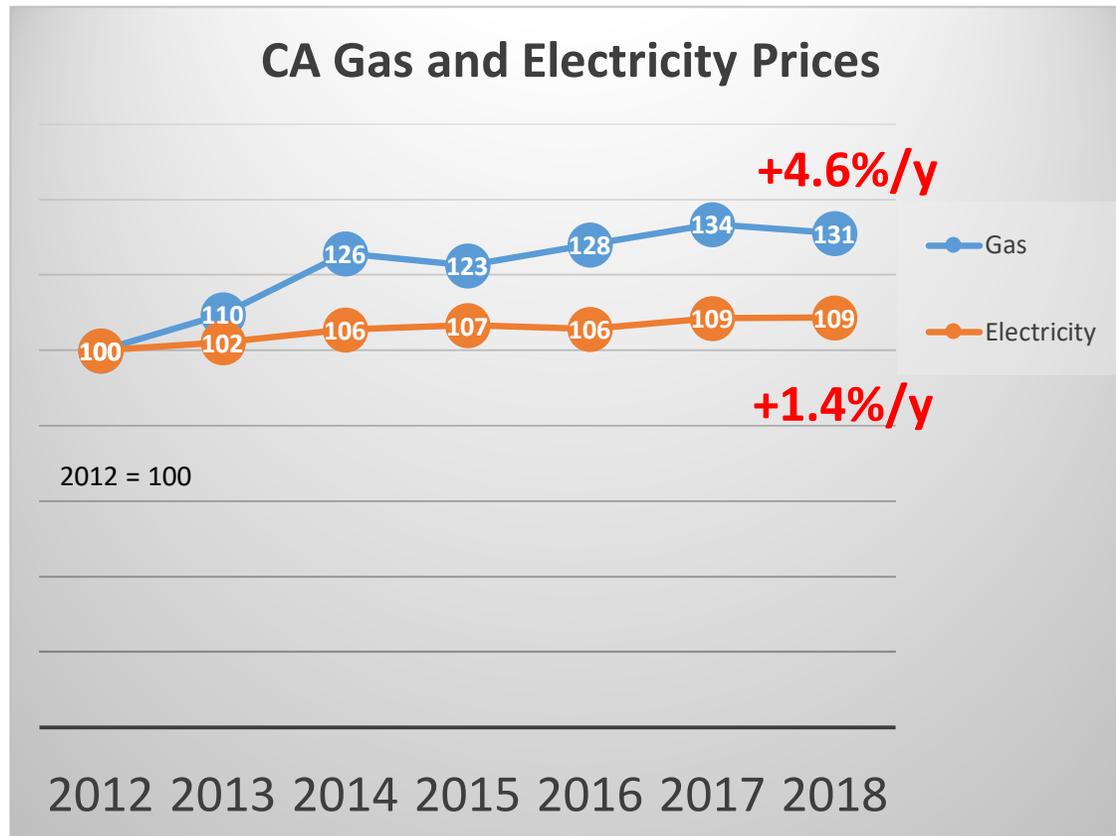
Prepared for:
California Building Industry Association



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

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

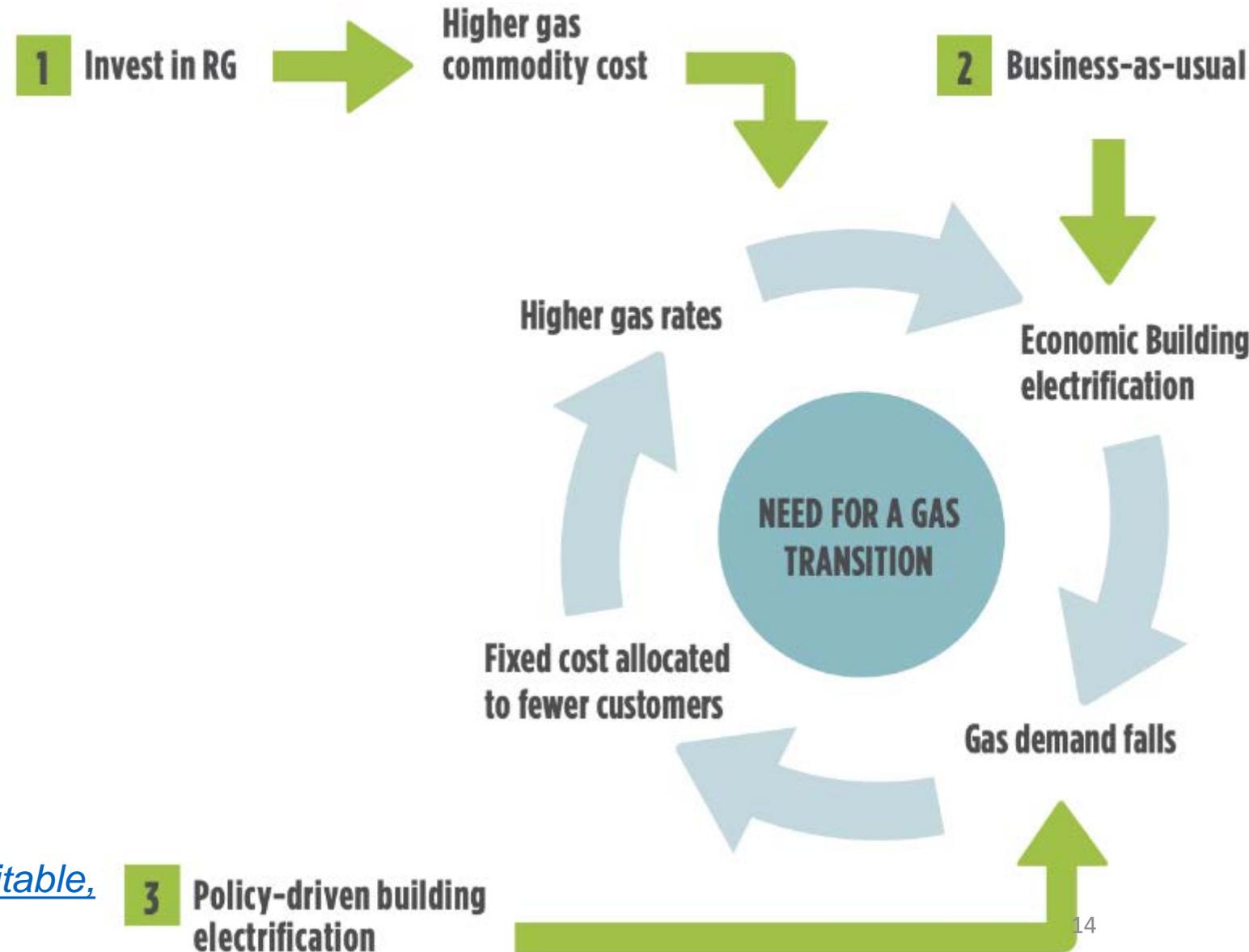
Source: EIA

<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>

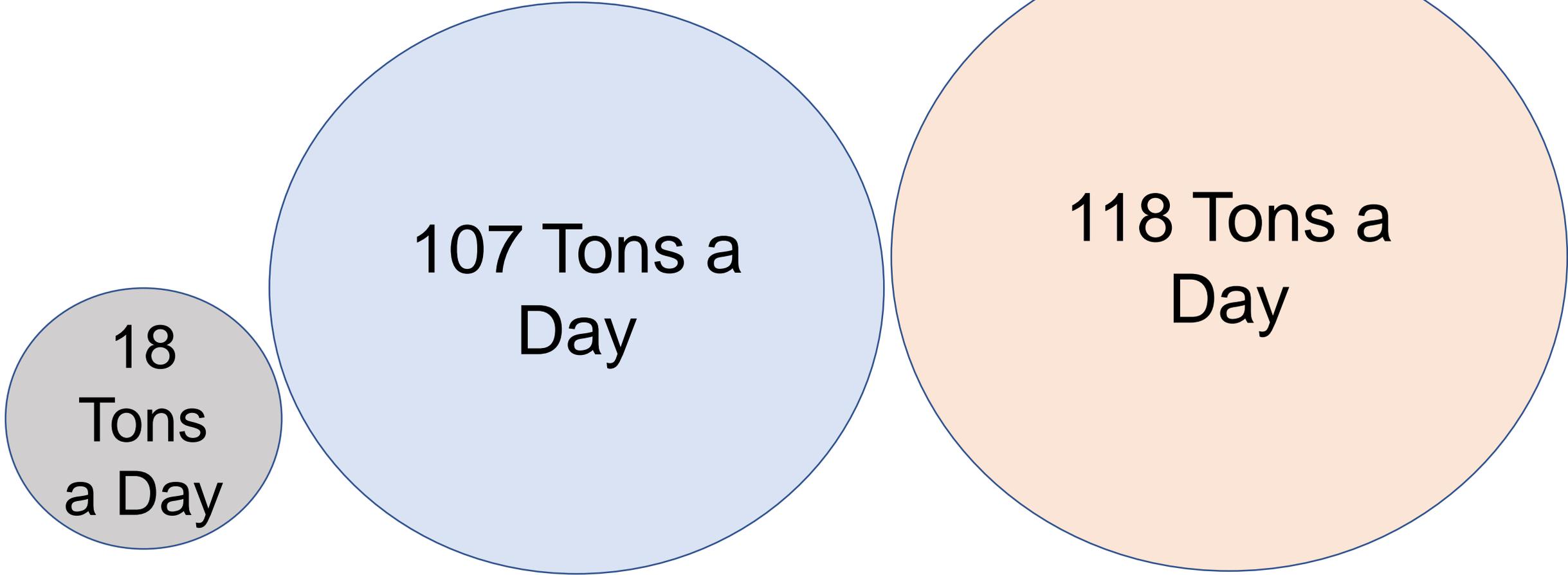
Rising Gas Costs Lead to Downward Spiral of Gas System

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



[California's Gas System in Transition: Equitable, Affordable, Decarbonized, and Smaller](#)

NOx in California

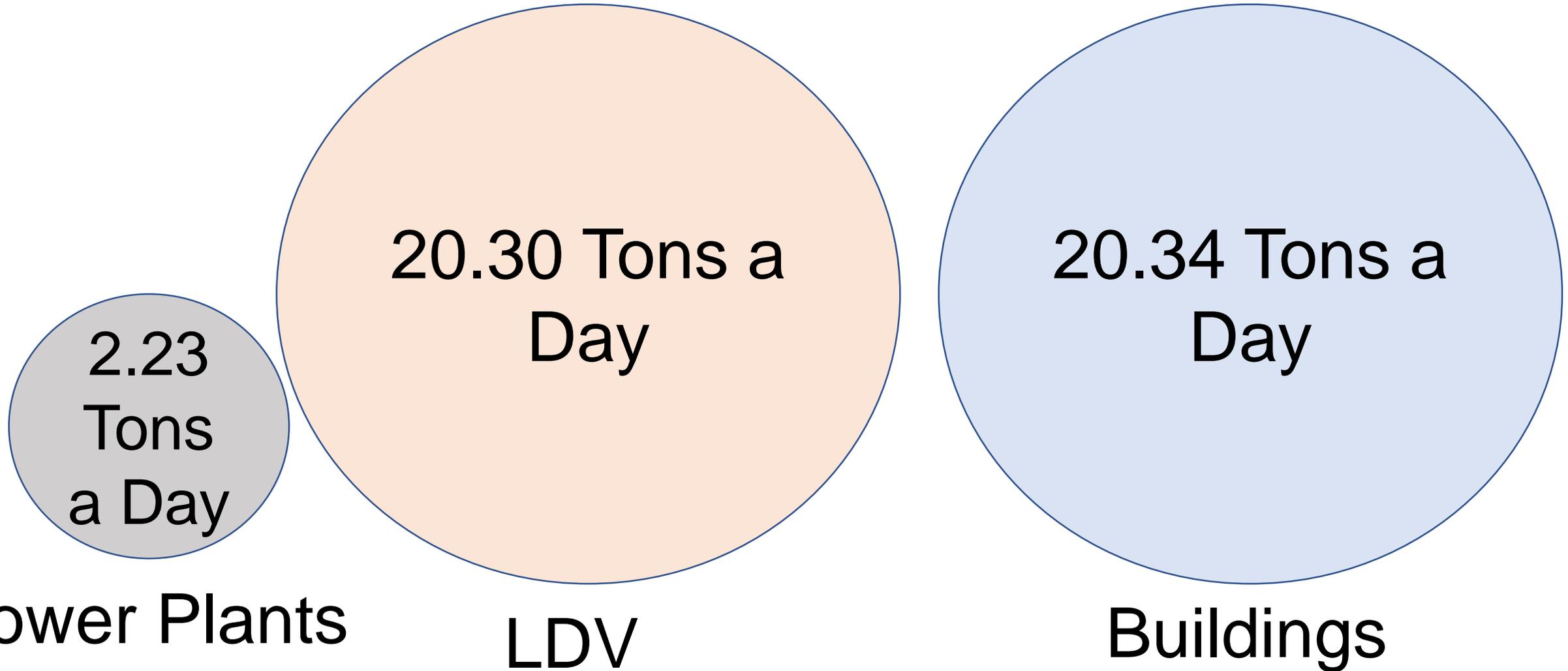


Power Plants

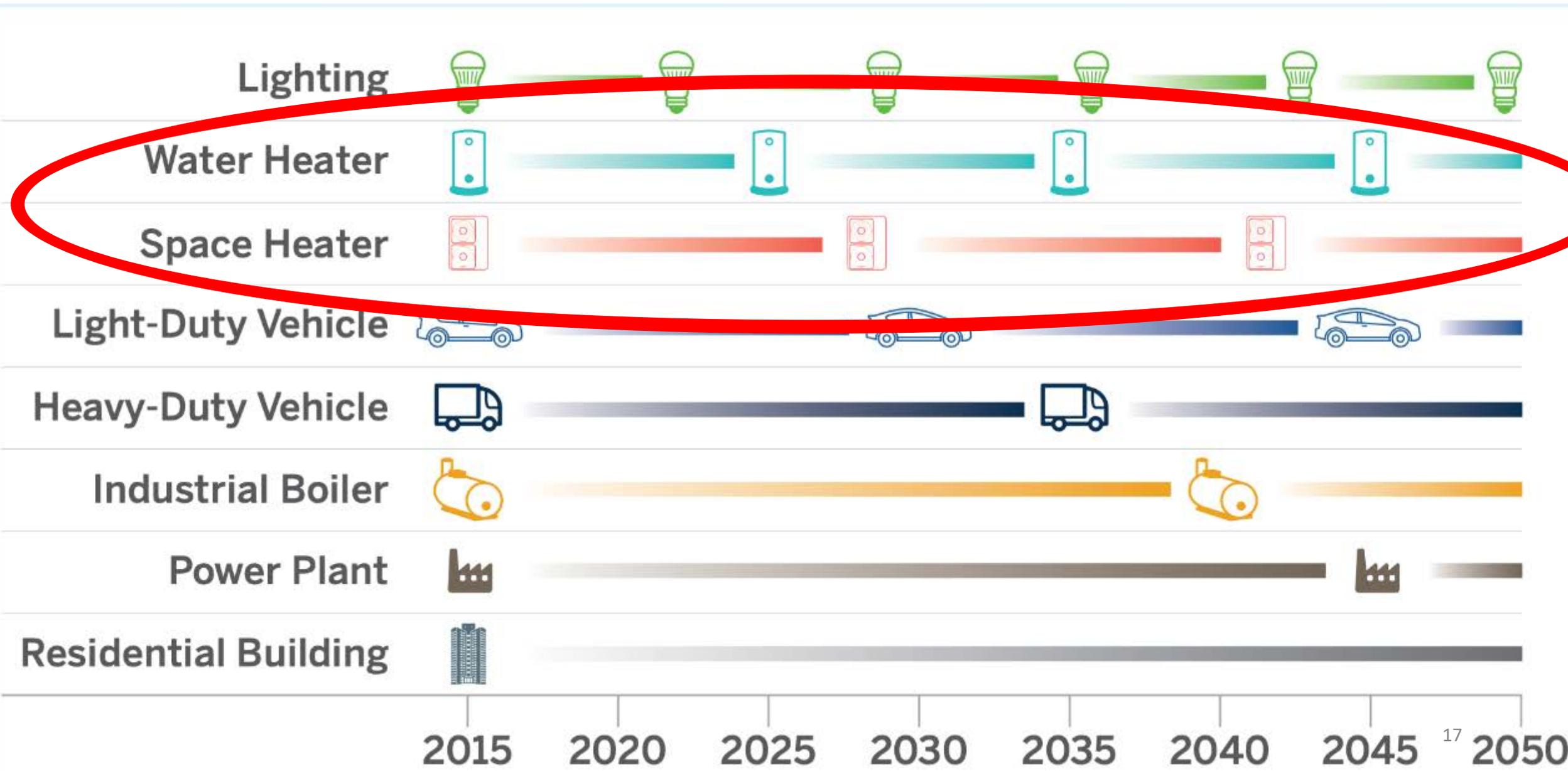
Buildings

**Light Duty
Vehicles**

NOx in BAAQMD



Stock Turnover



Electric Buildings can be ...

Cheaper

More Equitable

Healthier

More Climate Friendly

Safer

CPUC Decarbonization Plans



1. All Electric Building Rates

2. Resource Acquisition:

- Incentives (eg Rebates)
- Financing (eg Loans for all-electric customers)
- Emerging Technology

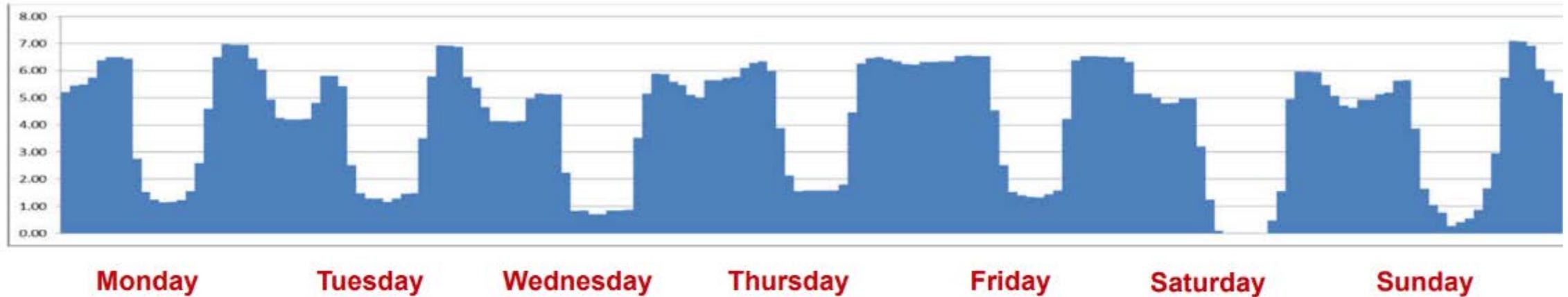
3. Market Transformation

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

Title 24 2022 - Time Dependent Source Energy

Patterns of TDS and Carbon Emissions are Identical

Time-Dependent Source Energy (kBtu/kWh)



BIZ & TECH // BUSINESS

California Restaurant Association sues Berkeley over natural gas ban



Mallory Moench

Nov. 21, 2019

Updated: Nov. 21, 2019 4:16 p.m.



Trends

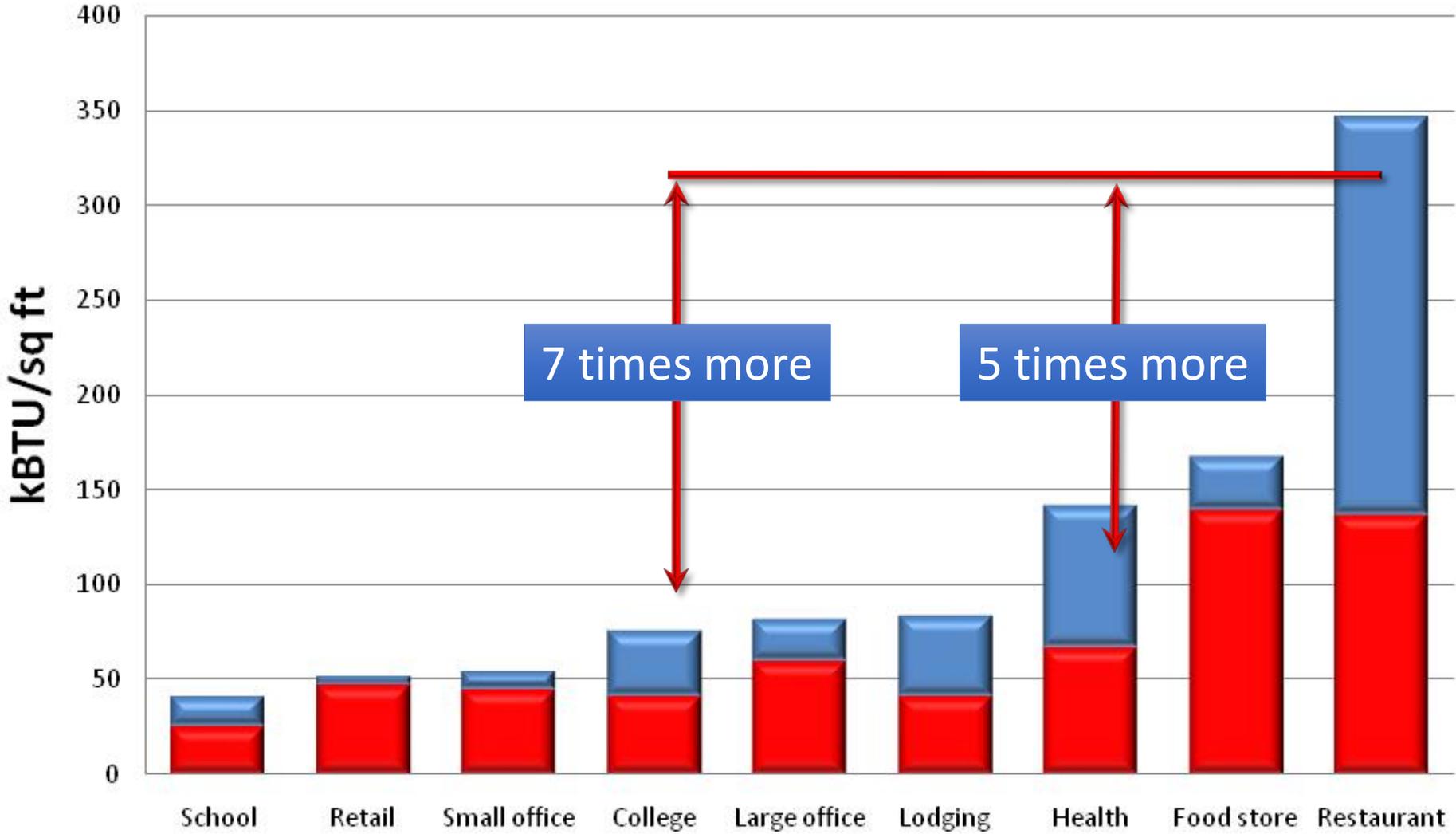
- Vacancies
- Burton
- Obama
- Vanishing Violence
- Skiing

Shuttered Stores: North Beach's crisis

Food Service is Energy Intensive!

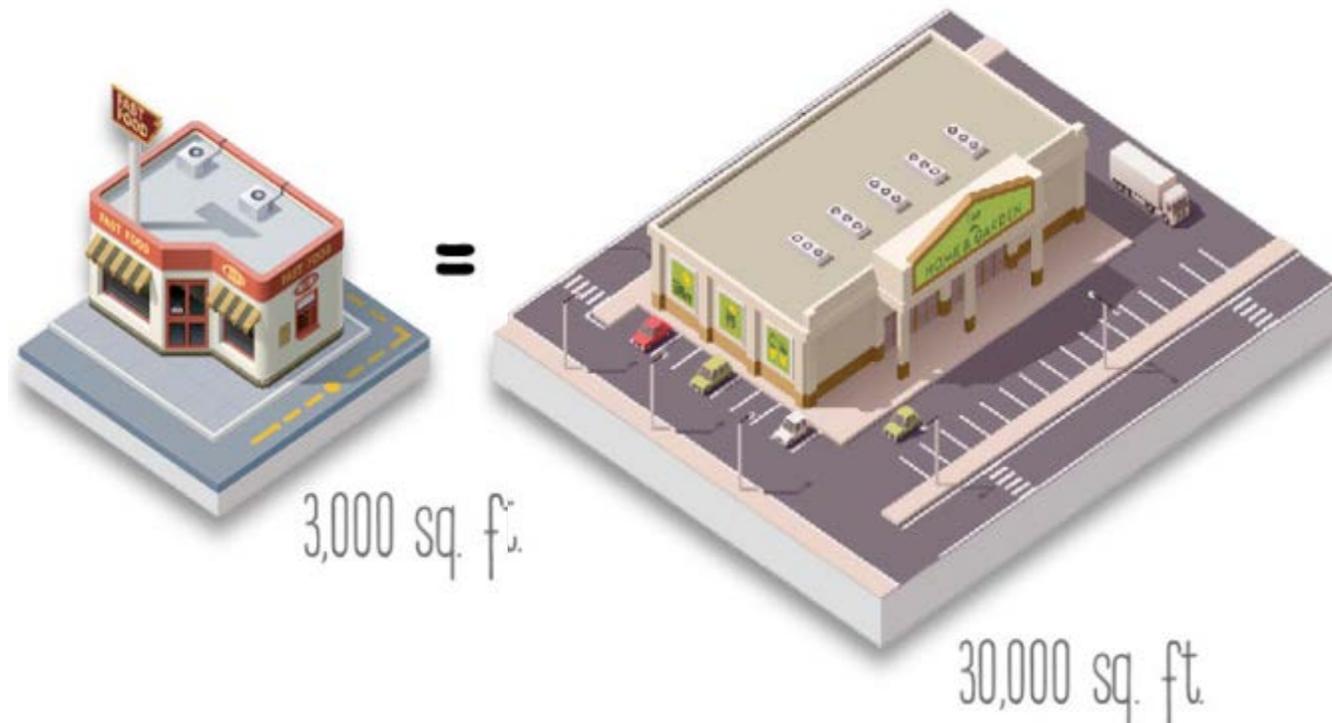
Energy Intensity

■ electricity ■ gas

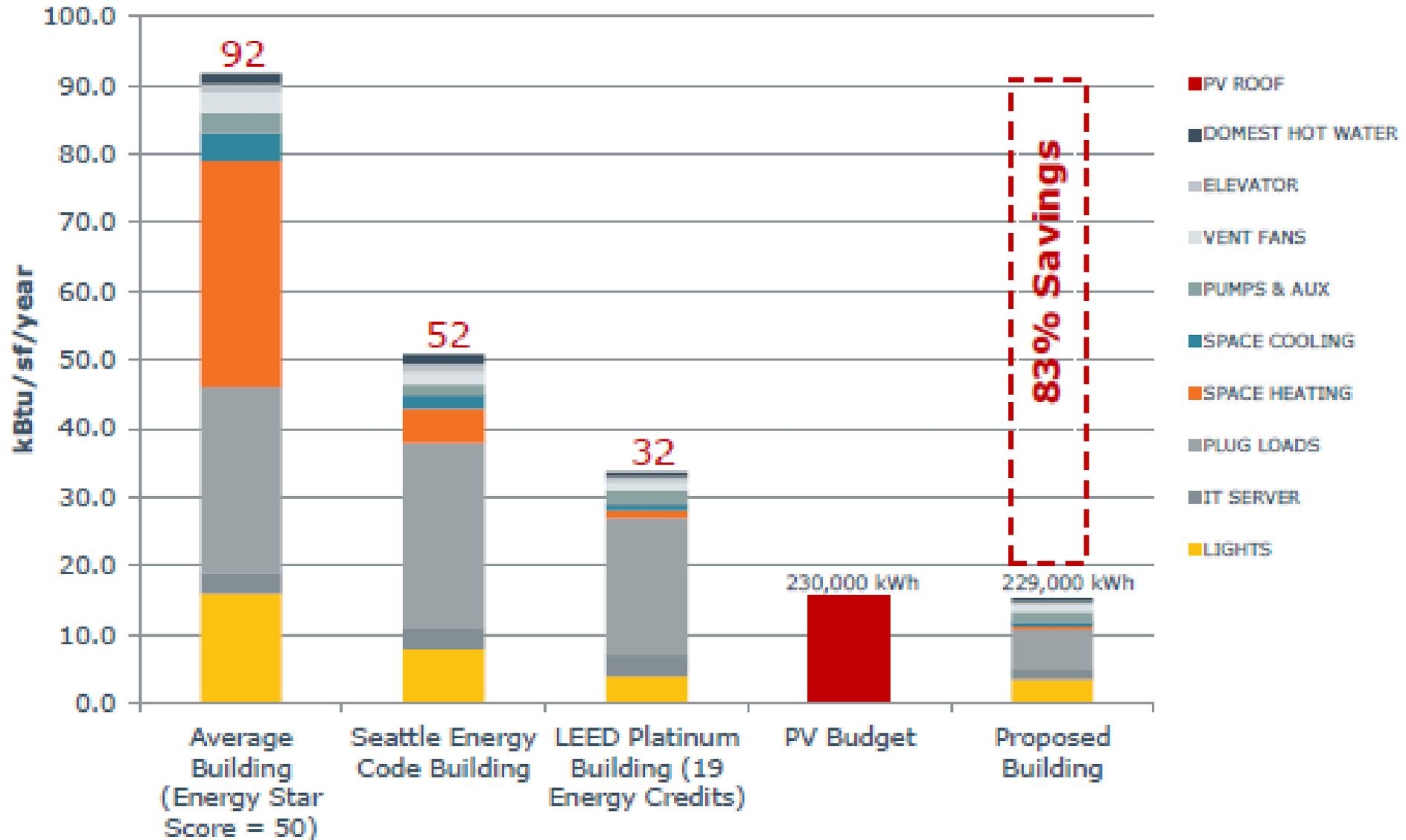


Source:
www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF

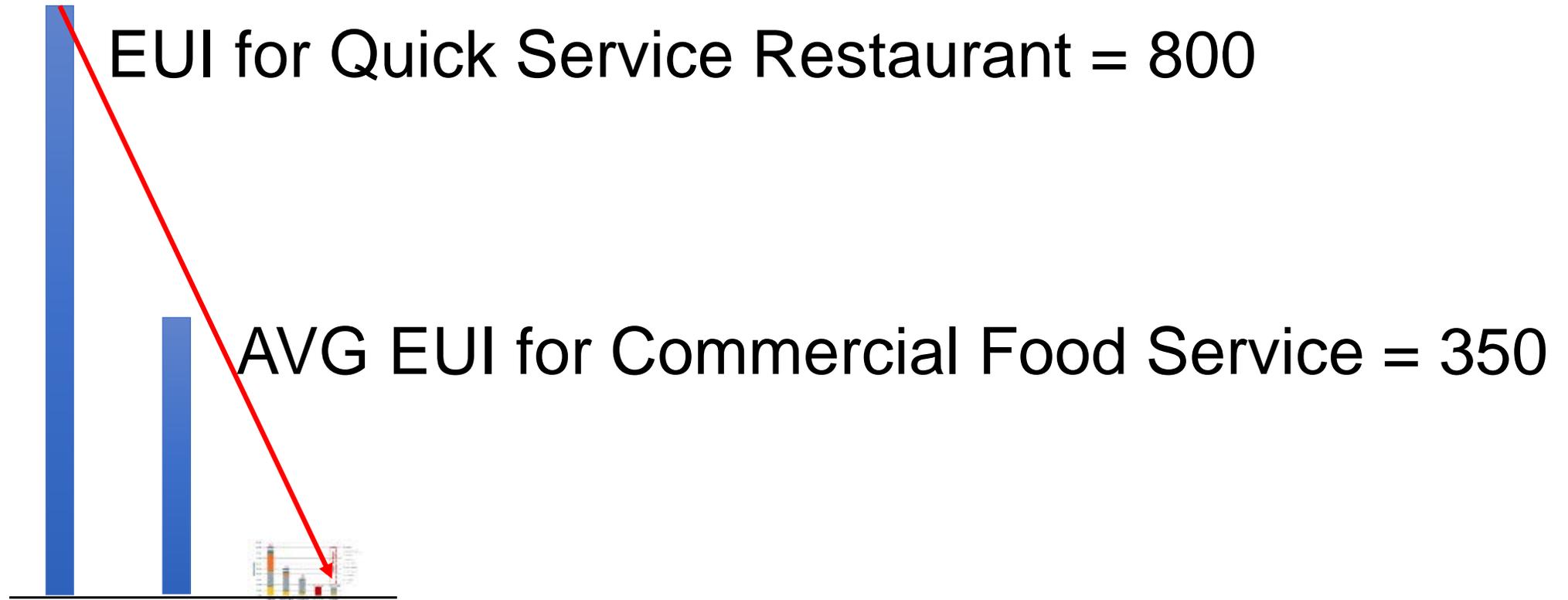
That means that a 3000 sq. ft. restaurant can have the same energy bill as a 30,000 sq. ft. retail store



The Energy Use Intensity Challenge



The Challenge for Food Service



How much energy does the food service industry buy?



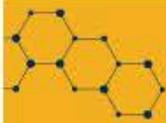
\$43 Billion a Year*

Equipment, Supply, Tabletop and Furniture = \$13 Billion**









About 20,000 PG customers in Sonoma County still have no natural gas service

in Press by — 360 Feed Wire

Print Share

November 2, 2019 - 12:21 AM EDT

PRINT EMAIL SMALL LARGE

About 20,000 PG customers in Sonoma County still have no natural gas service

Nov. 02-- Nov. 2--More than 20,000 PG natural gas customers in Sonoma County Friday at lunchtime still have no service.

On Saturday, the utility turned off the gas to about 24,600 county customers because of the Kincadee fire.

About 4,400 residences and businesses have gas again, the majority of which are in Cloverdale and parts of Geyserville, Graton and Forestville, said PG spokeswoman Deanna Contreras.

The complex restoration process requires going door-to-door to homes and businesses, and crews were in Windsor Friday, lighting pilot lights to get gas flowing to thousands of residents, she said. Crews were scheduled to be in Healdsburg Saturday to do the same, although PG does not anticipate reaching every customer until Monday afternoon.

Utility workers were unable to contact about 1,000 customers without gas service, something that needs to be done before restoration can occur, Contreras said. If the first attempt to make contact is unsuccessful, customers will have to schedule an appointment, she said.

Are you a registered bidder on EnergyNet?
ENERGYNET
Your Trusted Advisor for 20 years
877-351-4488 | EnergyNet.com

Membership Login

Username or E-mail

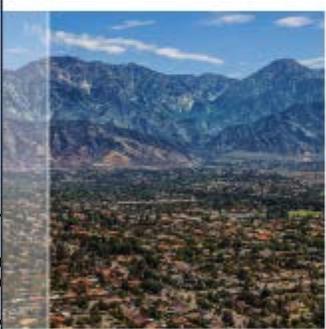
Password

Remember Me

Log In

[Forgot Password](#)

Figure 1: Decarbonization Targets Within the Building Sector

	R		Commercial
New Buildings	20 B		Zero Emissions Building Code
Retrofits	%		Levels from the overall : from building sector from building sector from building sector
<ul style="list-style-type: none"> • Increase the space heating from 50% in 2025 to 100% in 2030. • Increase the water heating from 10% in 2025 to 100% in 2030. 		  	<ul style="list-style-type: none"> • 25% for space heating in 2025 and 100% in 2030. • 25% for water heating in 2025 and 100% in 2030.

Suggestions

BAAQMD

- Use regulatory authority to drive down natural gas use in buildings
- Provide rebates for gas-to-electric appliance replacements - Low-income focus
- Provide technical resources to support member jurisdictions

Local Agencies

- Stop new gas hook-ups
- Adopt policies to move existing buildings off of gas appliances at appliance replacement



Join us!

Buildingdecarb.org/join

Air District Building Decarbonization Program

Climate Protection Committee Meeting
December 2, 2019

Axum Teferra
Planner II

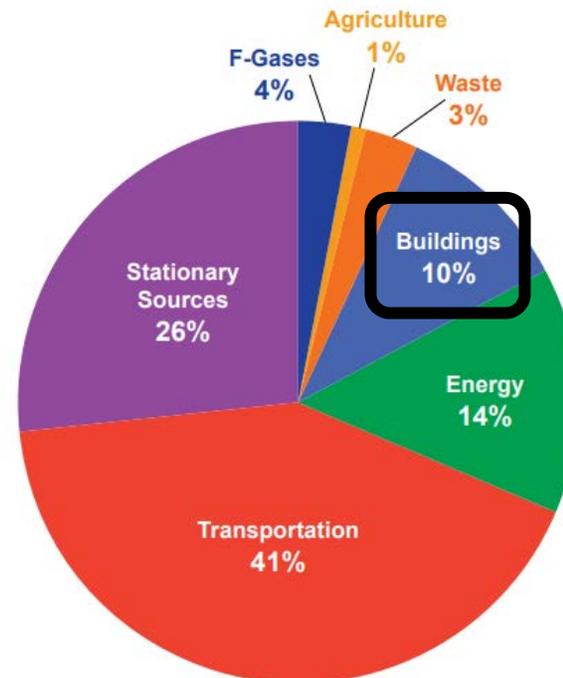
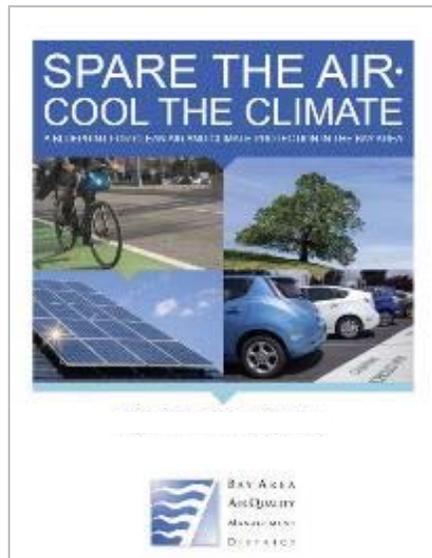




From Clean Air Plan to a Building Decarbonization Strategy

The 2017 Clean Air Plan envisions the elimination of fossil fuels in our buildings by:

- Maximizing energy efficiency in both new and existing buildings;
- Increasing production of on-site renewable energy such as rooftop solar;
- Developing and deploying technologies for on-site energy storage; and
- Switching from natural gas to clean electricity, or other renewable energy, for space and water heating, clothes drying, cooking, and other domestic uses.

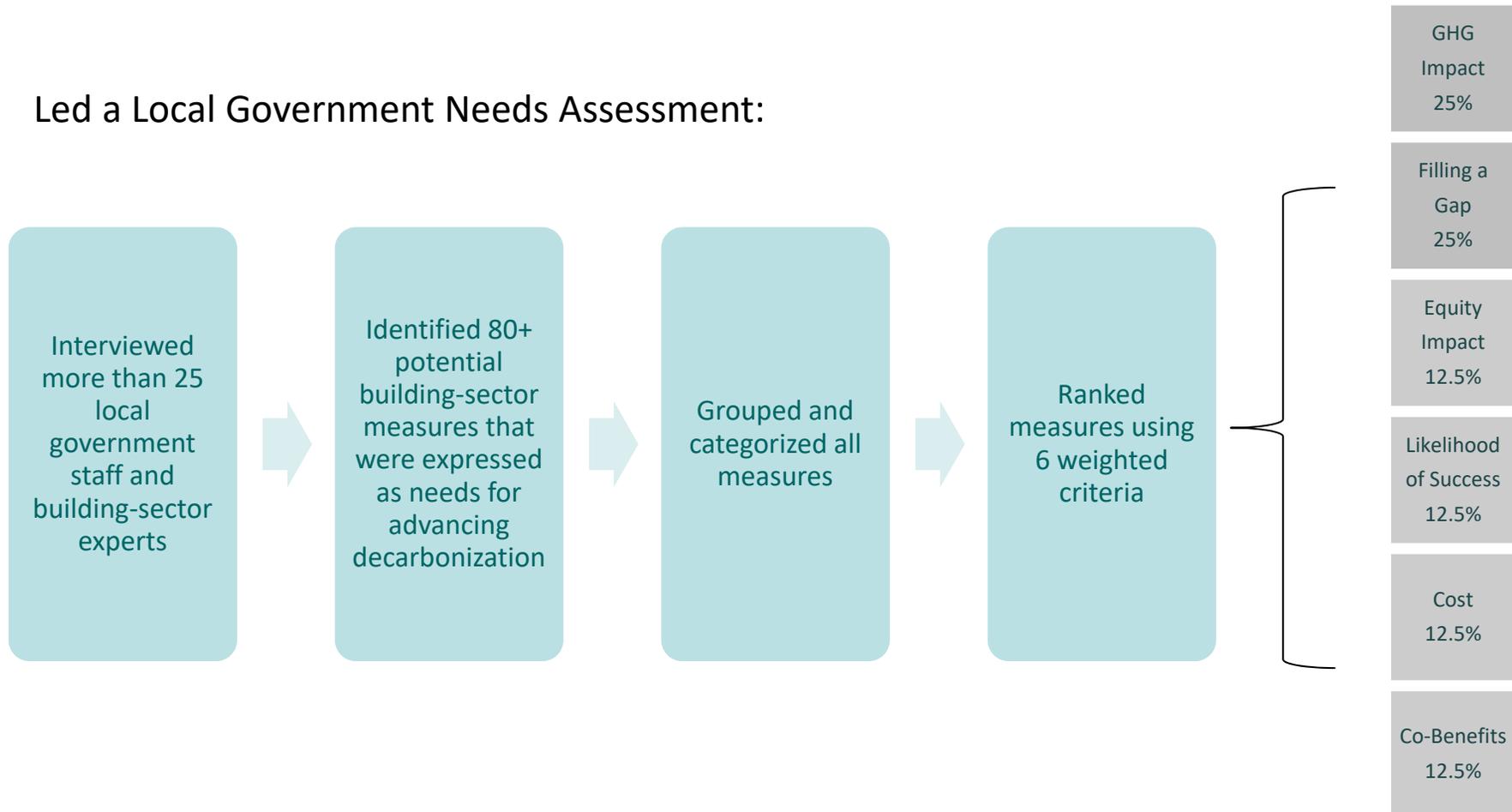


2015 Bay Area GHG Emissions by Source Category, based on 100-yr GWP (Total= 85 MMT CO₂e)



Identifying Air District Actions

Led a Local Government Needs Assessment:





Building Sector Strategies

LOCAL GOVERNMENT POLICY SUPPORT

Create a comprehensive clearinghouse with a suite of building decarbonization tools for local governments.

INCENTIVES

Learn from current heat-pump incentive grants, and identify opportunities to scale successful programs to the region.

COORDINATION

Strengthen collaborations with the Building Decarbonization Coalition, BayREN, BARC and other regional partners.



Local Government Building Decarbonization Clearinghouse

The Local Government Building Decarbonization Clearinghouse is a collaborative effort to aggregate and share a suite of building decarbonization policy tools with municipalities. Resources in the clearinghouse will include:

- **Model policies**
- **Best practices case studies**
- **Technology guides**
- **Cost-benefit analyses**
- **Presentation tools for municipal staff**
- **And more...**





Incentive Programs

Learn from currently operating Air District-funded Pilot Heat Pump Incentive programs, meant to:

- Encourage coordination across incentive programs
- Signal to regional heat pump market
- Explore different incentive structures



Pilot incentive programs will kickstart public outreach and education on heat pump technologies, demonstrate successful program design, and inform future incentive structures.

Regional Collaboration



The Air District's
Climate Tech Marketplace event,
September 2018



Preparing for the
Growth of Energy Storage
– What Cities Need to Know



BayREN - Air District
Battery Storage Forum,
November 2019





Building Decarbonization Program Next Steps

- 1 Launch the Local Government Building Decarbonization Clearinghouse
- 2 Identify pathways for scaling existing pilot incentive programs and potential funding sources
- 3 Continue collaborations with BayREN, BARC, and local governments