



RICAPS

Regionally Integrated Climate Action Planning Suite

Multi-city Working Group
January 24, 2022

RICAPS technical assistance is available through the San Mateo County Energy Watch program, which is funded by California utility customers, administered by Pacific Gas and Electric Company (PG&E) under the auspices of the California Public Utilities Commission and with matching funds provided by C/CAG and additional funding provided by Peninsula Clean Energy.



Welcome!

What are we trying to accomplish today? 3-4 RICAPS programs to support Replace on Burnout Ordinance Adoption by 2023

Introductions & acknowledgements



Existing Buildings Working Group

County of San Mateo

8 Jurisdictions

2 working sessions

Agenda

- **Climate Deadlines for Building Decarbonization: What do Cities Need to do to Be on Track for Carbon Neutrality by 2045?**
 - Ryan Gardner, Rincon Consultants
 - Share-out of existing building electrification jurisdiction working group results: hurdles & solutions
 - Group discussion: what stood out, what is missing?
- **Workshopping existing building electrification solutions**
 - Breakout groups by hurdle
 - Brainstorm corresponding solutions and identify other hurdles that were overcome
 - Group share-out
 - Closing



***Is there anything else
you would like for us to
cover today?***



Existing Building Electrification Context

Ryan Gardner, Rincon Consultants

Existing Initiatives to Support Existing Building Electrification

- Peninsula Clean Energy Model Reach Codes
- RICAPS Residential Case Studies for Electrification (upcoming)
- RICAPS Commercial Electrification Best Practices Review (Published)
- Electrification incentives (ex. Heat Pump Hot Water Heater Program) via BayREN, Peninsula Clean Energy

Perceived Hurdles & Solutions



Perceived Hurdle:
All-electric buildings cost more.

Solution:

With the 2022 Building Code, all-electric ready (rewiring and panel capacity) buildings are required for all building types. Heat pump water heaters or HVAC appliances are also required depending on climate zone. Under the 2022 code, installing natural gas increases time and material costs.



Perceived Hurdle:
Uncertainty around electrical rates for operation of all-electric buildings could lead to higher operating costs, reducing operating income and leveraged debt, reducing competitiveness for tax-exempt bond finance and low-income housing tax credits.

Solution:

All-electric buildings, particularly when paired with solar generation and battery storage outperform mixed-fuel buildings in operating cost and costs to construct across California climate zones.

Additionally, locking in natural gas infrastructure into building operations will lead to increases in operating costs, as natural gas prices could more than double as residential demand declines and more residential buildings go all-electric, according to GridWorks. Building all-electric affordable housing now will insulate residents and developers from future price increases for natural gas services.

2 – Affordable Housing



All-electric multifamily residences in San Mateo County (Climate Zone 3) are cheaper to build and operate than mixed-fuel developments, particularly when combined with on-site solar generation and heat pumps for water and space heating. However, affordable housing is sometimes exempted from all-electric reach codes because of fears that additional requirements will slow or block much needed affordable housing development. This is of particular concern for projects that leverage multiple sources of funding (ex. Low Income Weatherization Program) which can have difficult application processes and long turnaround times.



**2023 is the last year for
replace-on burnout to
capture all appliance
replacements before 2045**

Costs to Electrify a Single-Family Home



\$18,600 more expensive than typical replacement costs

	Electrification Cost	Replace In-Kind Cost	Incremental Cost
Water Heating (includes 240V circuit)	\$6,100	\$2,000	\$4,100
Space Heating	\$20,700	\$6,132	\$14,568
Cooking	\$1,098	\$1,155	-57
Clothes Drying	\$925	\$925	\$0
Total	\$28,823	\$9,057	\$18,611
Panel, if required	\$3,700		
Total non-optimized cost	\$32,523		

Source: PCE, 2020

Residential Buildings: Replace on Burnout

Scenario: 'Replace on Burnout Ordinance' Implementation year: 2023

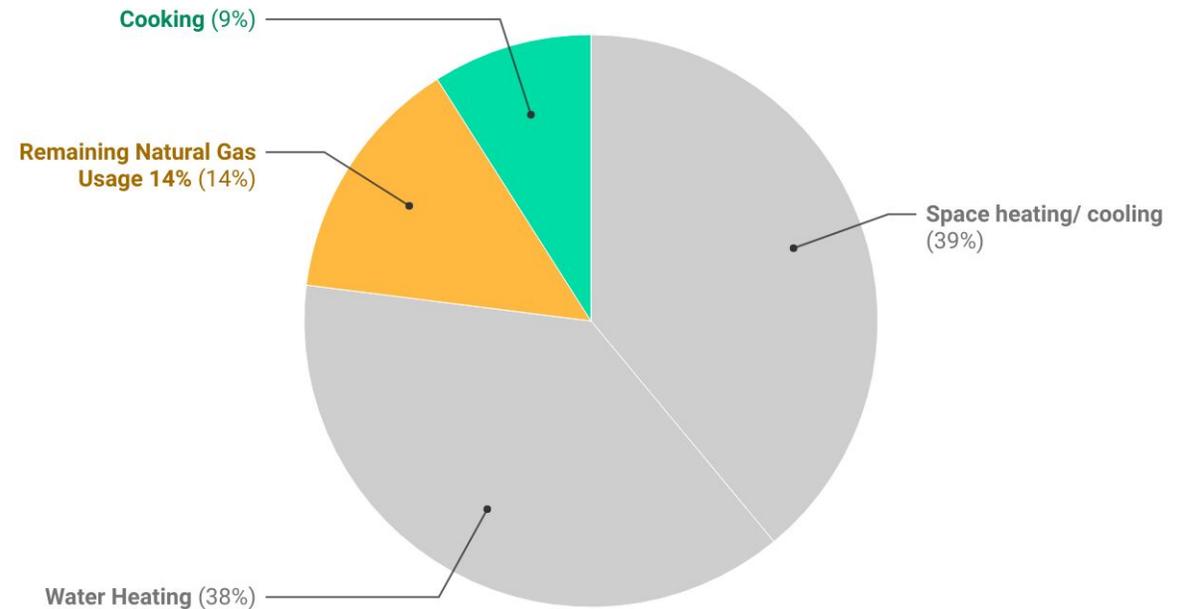
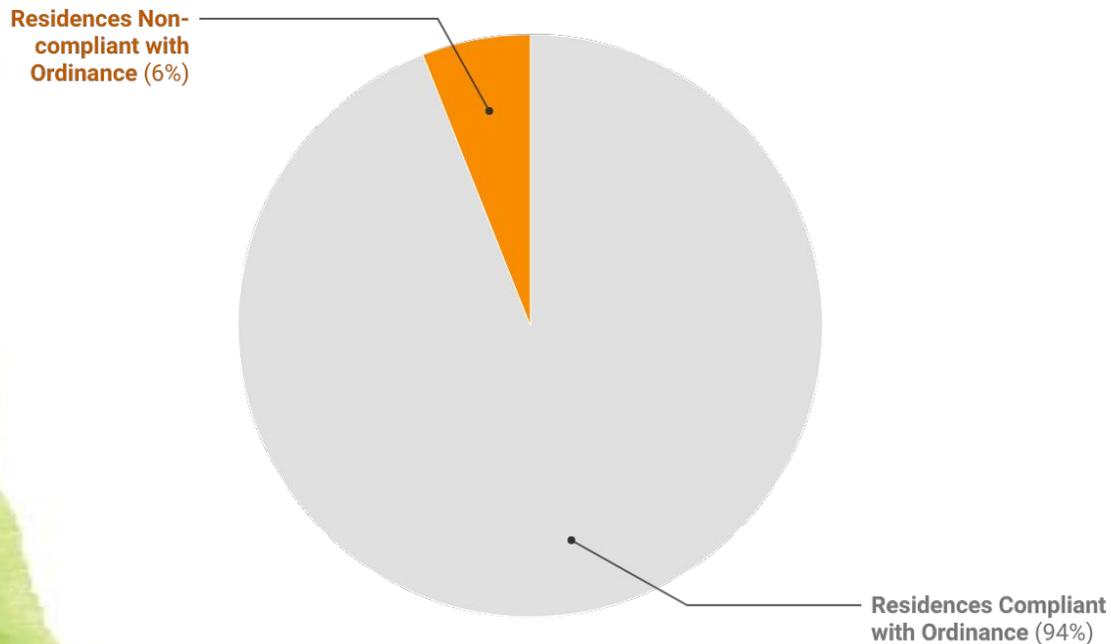
Appliance Type	Average appliance lifespan	Year of replacement with electric appliance
Water Heater	13	2036
HVAC	21.5	2044
Stovetop	12	2035

Cost effective appliance replacement = only buying an electric new appliance when the gas-powered one reaches its end of useful life

Source: Rincon SPARQ Tool Assumptions

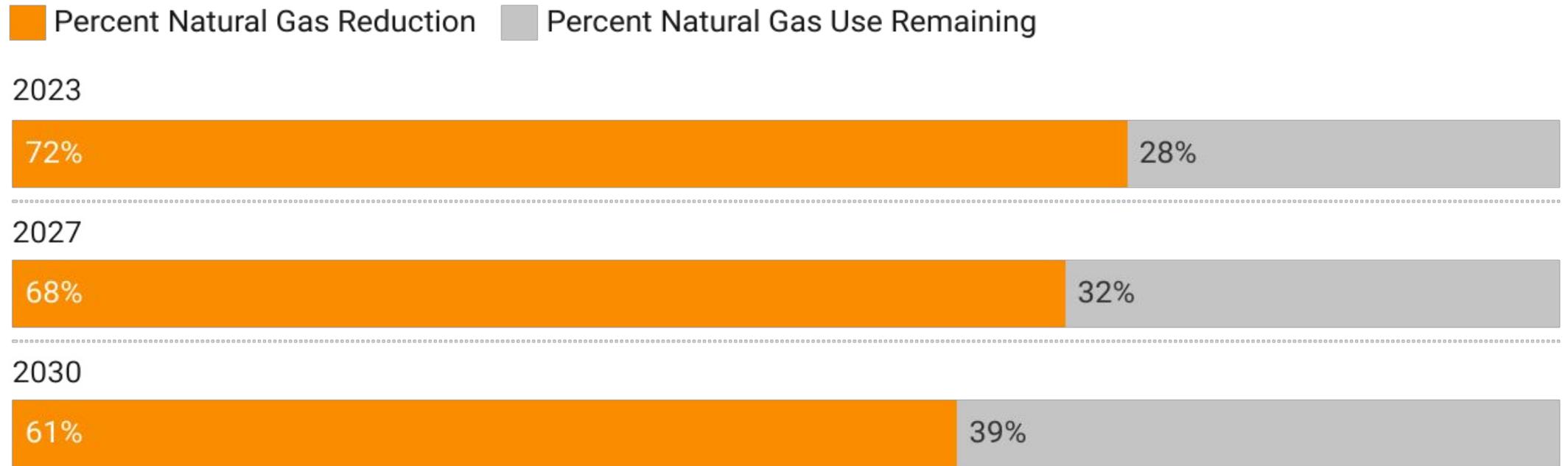
Assumptions: 72% Gas Uses Replaced

Assumed 94% Compliance Rate – would need Compliance Mechanism



Source: Rincon SPARQ Tool Assumptions

72% in gas reduction by 2045 is the maximum achievable with this set of assumptions (2023 ordinance passage)



39% remaining gas usage will have to be replaced before end of useful life for carbon neutrality by 2045

Source: Rincon SPARQ Tool Assumptions

Commercial Buildings: Replace on Burnout



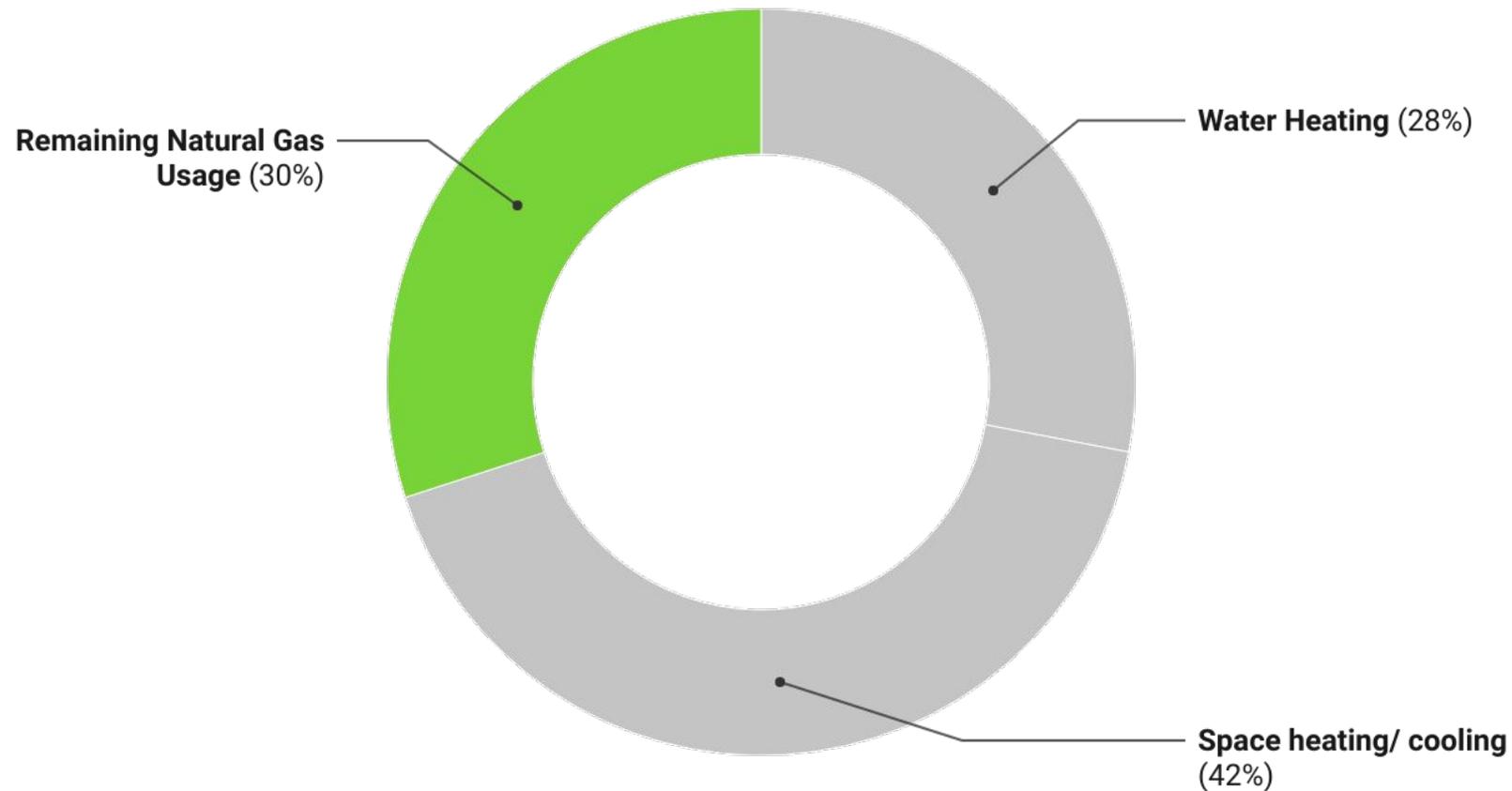
Scenario: 'Replace on Burnout Ordinance' Implementation year: 2023

Appliance Type	Average appliance lifespan	Year of replacement with electric appliance
Water Heater	10	2035
HVAC	23	2046

Cost effective appliance replacement = only buying an electric new appliance when the gas-powered one reaches its end of useful life

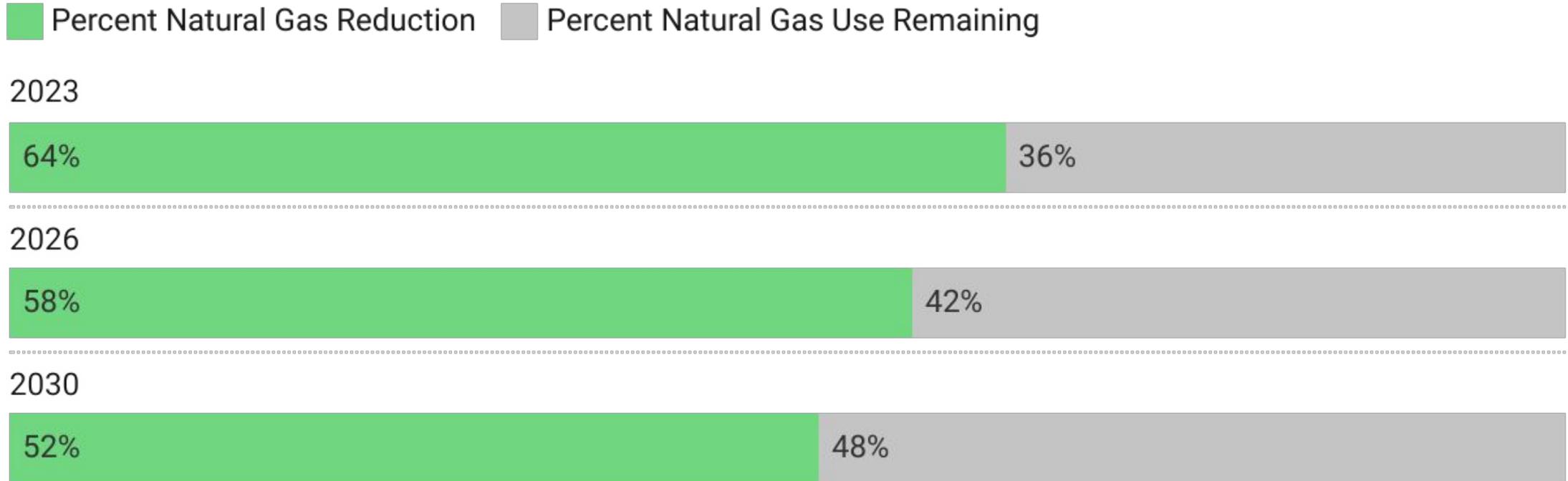
Source: Rincon SPARQ Tool Assumptions

Assumptions: 70% of Gas Use Replaced, 94% Compliance Rate



Compliance rate assumed to be same as Residential. Source: Rincon SPARQ Tool Assumptions

64% in gas reduction by 2045 is the maximum achievable with this set of assumptions (2023 ordinance passage)



48% remaining gas usage will have to be replaced before end of useful life for carbon neutrality by 2045

Source: Rincon SPARQ Tool Assumptions



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Working Group: What We Heard

“People don’t trust grid reliability, and they do trust gas”

“We hope CAP adoption catalyzes more policies and programs to get residents to make the switch (to all-electric).”

“When the ordinance is implemented, there is a big difference in the way the planning staff understands it and the way the building staff implements it”



Working Group: Electrification Hurdles

Technical: commercial building technology & strategies; hard-to electrify sectors (ex. industrial), timing lag in installation, PGE capacity for grid updates, duplicate/ backup power and generators, difficulties with biotech and lab space, lack of knowledge about building performance standards

Feasibility: workforce and contractor availability and training; appliance availability in commercial settings, timeliness of service and replacement (PG&E, contractors, difficulties with multifamily and commercial)

Political/Perceptions: mixed political support, resistance to time of sale (Real Estate), grid reliability "trust gap", misinformation

Equity/cost: (cost effective replacement); time of emergency, PG&E cost transfer to home owners/ uncertainty of transformer/ panel upgrades, realities of a 'one-size fits all' approach leading to inequalities, unknowns of cost of replacement

Compliance: fear of making permit process more onerous less permit compliance; difficulties in compliance (baseline), lack of permits for stoves/dryers.

Coordination: Jurisdiction/ planning/ building coordinating with PG&E for transformer and grid upgrades, costs, data availability, has been difficult, divide between sustainability and building department

Communication: difficulty of getting electeds/ council on board; forming a narrative without getting bogged down in technical details, disjointed resources, misinformation

Working Group: Electrification Solutions

Feasibility: Jurisdiction backup appliances (gas) program, compliance enforcement program (Ex. Davis)

Political/Perceptions: 'one-stop-shop' page for building electrification with vetted resources, yearly letter to elected about strides towards grid reliability,

Compliance: City of Davis style compliance checklist; JPA-funded (or similar funding mechanism) floating compliance staff (specifically to provide technical assistance for small/medium cities), Experiment with time of sale/ other real estate mechanisms

Coordination: Establishing direct, timely contact between jurisdictions and PG&E

Communication: JPA (or similar funding mechanism) to fund a 'floating planner' to address technical challenges for building electrification across the county, simplified code; communication strategies for public and elected officials; Building electrification hub

Solution gaps: Technical, Equity/ Cost

Did We Miss Anything?

