

Leveraging the Capital Improvement Plan to Electrify Our Cities

Resource Management and
Climate Protection Committee

October 18, 2023

Ryan Gardner, Rincon Consultants
Blake Herrschaft, Peninsula Clean Energy



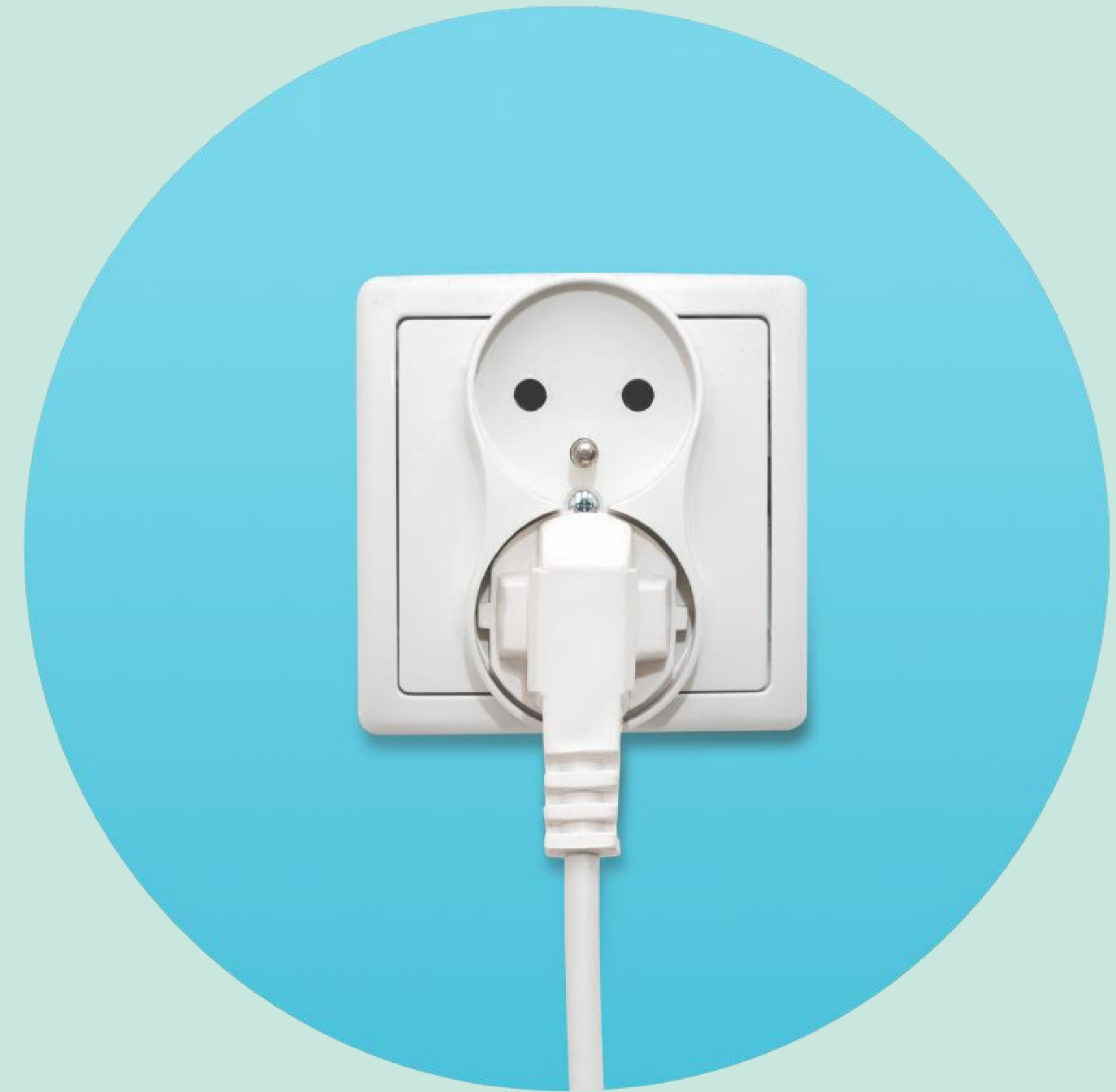
Presentation Goals

1. Discuss reasons behind electrification of buildings
2. Feedback on policy package + implementation roadmap to advance municipal building electrification & achieve carbon neutrality
3. Identify a cohort of cities to bring this program forward



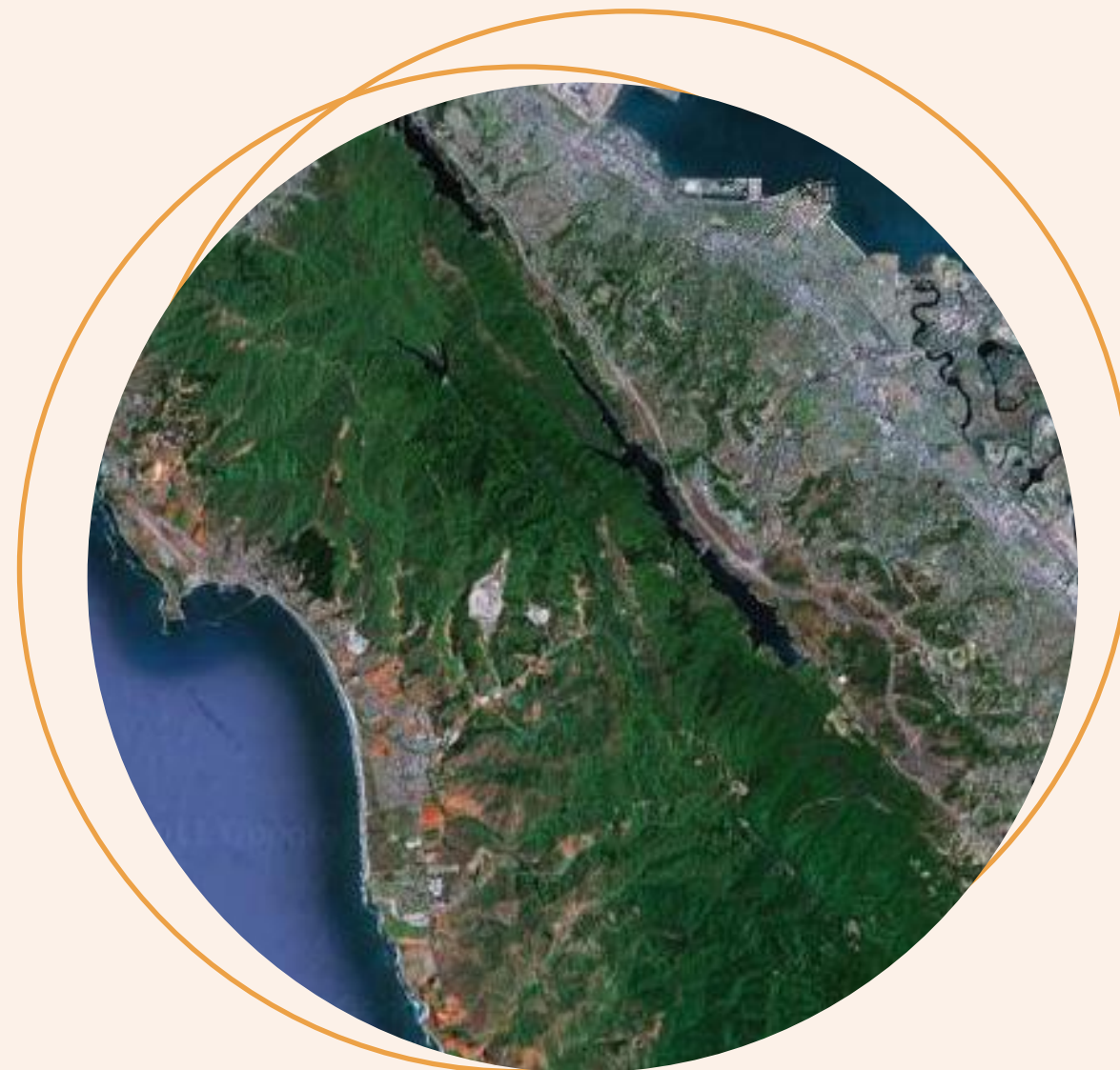
Why Electrify Buildings?

- The State and most cities in San Mateo have **carbon neutrality** goals
- Electrification is the most **cost-effective** option to decarbonize buildings
- Electrification provides **co-benefits** like improved air quality and health outcomes
- Pairing electrification with battery storage/solar provides increased **resiliency**





San Mateo County Carbon Neutrality Targets: 2035; 2040; 2045



San Mateo County Community Climate Action Plan (CCAP; Unincorporated) (2022)

- Carbon Neutrality by 2040
- Electrify 16% of existing buildings by 2030 & 100% by 2040



San Mateo County Government Operations Climate Action Plan (GOCAP) (2021)

- Carbon neutrality by 2035
- Reduce 100% of natural gas use in county buildings by 2035



19 of 21 Jurisdictions Have Climate Action Plans in Place

- Most if not all buildings need to be all-electric (no natural gas) by 2045 to achieve State carbon neutrality target
- Climate action plans first started to get adopted around 2009/10, many are in the process of being updated

If gas appliances are installed now, they will function past the deadlines for carbon neutrality



Cost effective appliance replacement = only buying new electric alternative when original appliance fails

Key takeaway: by replacing gas-for-gas appliances, building emissions from natural gas could be locked in for decades



Water Heater appliance lifespan: 13 years

Replacement year: 2024

Replacement/Electrification Year: 2037

2 years past GOCAP Target



HVAC appliance lifespan: 21.5 years;

Replacement year: 2024

Replacement/Electrification Year: 2045

10 years past GOCAP Target

5 years past CCAP Target

Last year to achieve State Carbon Neutrality Goal



Stovetop: Average Appliance Lifespan: 12 Years

Replacement Year: 2024

Electrification Year: 2036

1 year past GOCAP Target



Project Work Done So Far (2023)

County-Wide Capital Improvement Plan Assessment



Project lead(s): Redwood Energy, Peninsula Clean Energy, TRC

Project Description:

- CIP assessment for all 21 SMC Jurisdictions + County Operations:
 - Suggested next steps + funding and technical assistance opportunities
 - Existing CIP opportunities to electrify + prioritization

Methane Gas Catalog Tool (3 Pilot Cities + County)



Project lead(s): Willdan, Rincon, Energy Watch

Project Description:

- Pilot group to identify all natural-gas equipment: Atherton, Brisbane, Half Moon Bay, County identifying 233 existing pieces of gas equipment countywide
 - Estimated GHG load of 7,000-13,000 MT CO₂e/year for pilot group

Pilot Group + RICAPS Series on CIP Electrification



Project lead(s): Rincon, OOS

Project Description:

- 4-City pilot group to go through the CIP electrification process + monthly working meetings
- 3 months of CIP x electrification RICAPS webinar programming



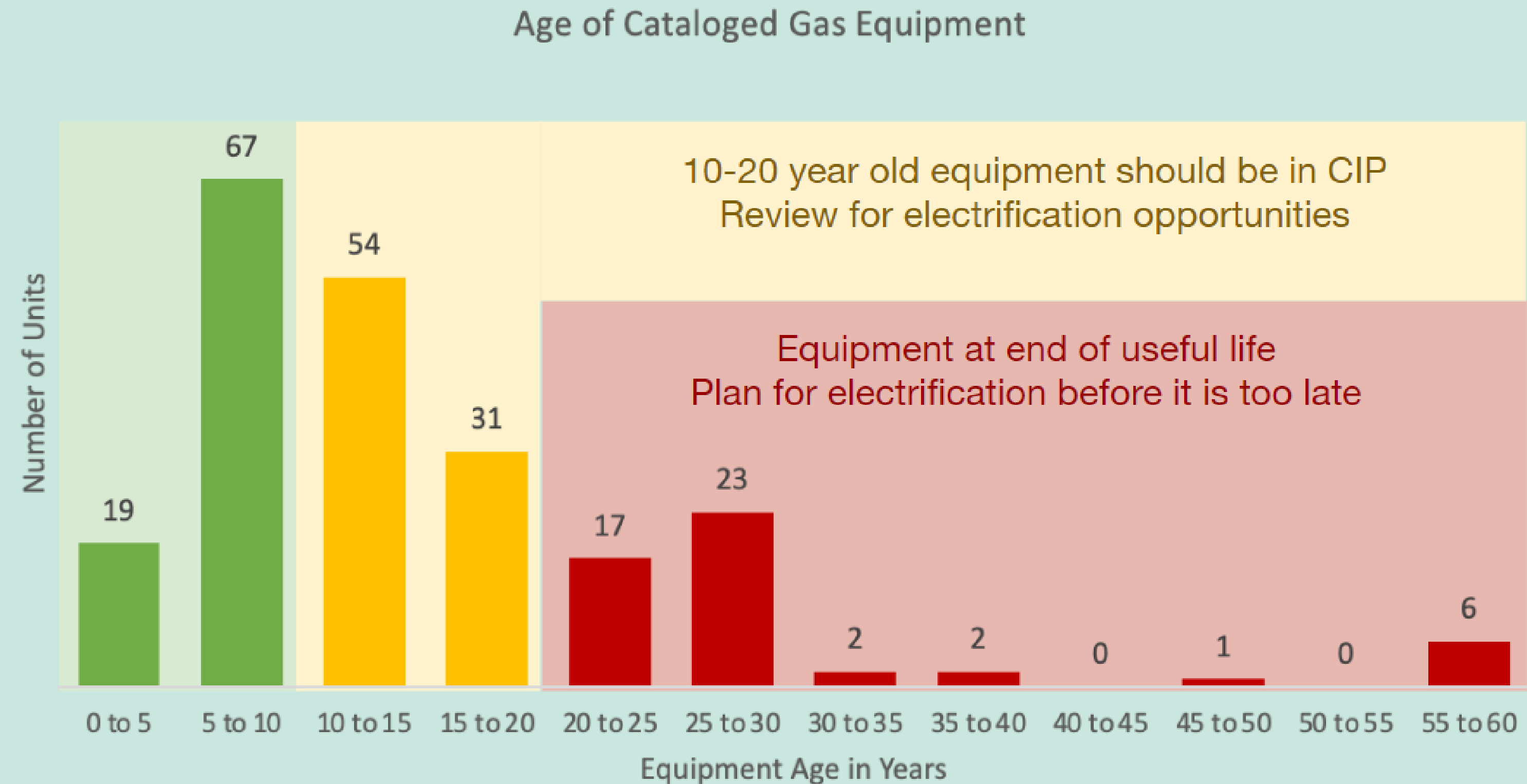
An aerial photograph of a body of water, showing a series of white, concentric ripples or waves that create a textured, almost cellular pattern across the blue surface. The lighting is bright, creating a high-contrast scene.

How do we electrify municipal buildings?

Project Findings

Methane Gas Catalog Results

Existing Gas Equipment is Aging, and Cities Should Plan Ahead for Electrification



Key takeaway: Most cities have had climate plans in place for around 5-10 years, meaning that Cities are still replacing gas appliances (see graph above) when they could electrify, missing an opportunity to move towards climate neutrality.



RICAPS CIP Program Pilot Group Findings

- The most cost-effective time to electrify is at time of replacement.
- The CIP Budget lays out each cities' infrastructure projects over time
- Currently, very few cities are prioritizing or even costing out electric alternatives
- There is a disconnect between facilities/ public works and sustainability goals
- Installation or renovations that maintain, or expand gas or other fossil fuel infrastructure could lock in these emissions from natural gas for multiple decades



County-Wide: 108 Electrification Opportunities Found in Existing CIPs

Atherton- Capital Improvement Plan Assessment

Provided by Peninsula Clean Energy and Silicon Valley Clean Energy's Technical Assistance Program: [AllElectricDesign.org](#)
Technical Assistance Team: [Redwood Energy](#) and [TRC Companies](#)

Assessment Details:

The Redwood Energy team assessed publicly available Capital Improvement Plans (CIP) to identify planned city projects with opportunities for electrification. This assessment includes a Delphi Matrix to help assess and prioritize projects by the following criteria:

Criteria:	Rating
Installation Cost (Less expensive is more points)	7
Progression in Project Timeline (early/distant timeline is more points)	9
Technical Difficulty (easier is more points)	9
Maintenance and Staff Resources (less is more points)	7
Operational Cost Savings (More Savings, more points)	8
Health and Climate Change (More Good Impact, more points)	8

Higher numbers correlate to projects that are considered good opportunities and should be prioritized and considered by the jurisdiction. Cities can use the provided matrix excel sheet to assign their own ratings, allowing for customized prioritization criteria and ranking.

Summary of Priority Projects for Atherton

CAPITAL IMPROVEMENT PROJECT NAME	Suggested Alternative	Installation Cost Differential	Progression in Project Timeline	Technical Difficulty	Maintenance and Staff Resources	Operational Cost Savings	Health and Climate Change	Total Points
Holbrook Palmer Park	EV Charging (3rd-party operated)	50	35	50	47	50	50	282
HVAC at Gilmore House	Upgrade to Ducted Heat Pump	40	40	50	45	45	45	224
Library HVAC upgrade (if furnace)	HVAC upgrade to Ducted Heat Pump	40	40	50	45	45	45	224
Gas & oil Generators	Solar PV + Battery Storage	20	40	45	45	50	40	200
Holbrook Palmer Park	EV Charging (City operated)	25	30	40	35	25	50	175
Library HVAC upgrade (if boiler)	Upgrade to Hydronic Heat Pump	20	40	20	35	45	45	170
Gas & oil Generators	Vehicle to Building EV Charger + Solar	35	40	35	40	50	35	164

Documents Reviewed:

- [Operating and Capital Improvement Budget Fiscal Year 2022-2023](#)

Next Steps:

For further support in assessing please reference the electrification resources provided. Additionally, there are several programs that can help with the next steps of pursuing these opportunities, such as: conducting a site visit and audit, developing a project design and workflow, analyzing incremental costs and payback timelines, assessing financing methods and incentive opportunities. The following free electrification programs are available and ready to support your city in your electrification projects.

- [BayREN Zero Net Energy and Carbon Program](#) (and more)
- [PG&E Government and K-12 Energy Efficiency Program](#)
- [California Energy Design Assistance](#) (major renovations or new construction)



Electrification Technical Assistance Program
[AllElectricDesign.org](#)



Capital Improvement Plan Assessments Conducted for All 21 San Mateo County Jurisdictions + County

- Most have identified a handful of opportunities to go all-electric (including opportunities for EV charging) in named CIP projects for each City.

Key Takeaway

- Cities are missing opportunities to electrify as equipment fails. Gas-for gas replacement is still common in the CIP process despite existing carbon neutrality targets and local building electrification goals.

Example summary assessment from Atherton

Source: TRC; Redwood Energy



Case Study: East Palo Alto Government Center

Key Features of Project:

- 3 story, 50,000 sq ft building (1975), housing multiple government departments
- Project managers opt for all electric in 2021, 6 years after initial HVAC design (2015)
- Construction with all-electric system begins in 2023

Challenges: Cost, executive approval, facilities buy-in, feasibility

How the Government Center went all-Electric:

- Final design decision only added 4% (\$600k) additional cost (\$15 million total budget)
- *Climate policy leadership led to the design change*
- Facilities staff and departmental leadership buy-in

Lessons learned:

- Design in electrification from the beginning
- Early involvement of decision makers



Funding & Technical Assistance for Municipal Electrification

Financial Assistance for Municipal Electrification

Peninsula Clean Energy



New \$10 M Revolving Loan Fund to Support Municipal Electrification (Sept 2023)

Upcoming grant process to open in late 2023/early 2024



PG&E Government & K-12 (GK12)



Government and K-12 (GK12) energy efficient program provides public agencies no-cost replacement of natural gas water heaters with heat pump water heaters, among other financing measures for energy efficiency.

Also includes custom projects (e.g. pools), which can take longer.



California Energy Design Assistance Programs (CEDA)



CEDA promotes the electrification and decarbonization of new building construction or major renovation,

CEDA works in collaboration with project teams to reduce energy demand, consumption, and carbon emissions



Key Takeaway: Governments can take advantage of existing sources of funding to support the transition from gas to electric. Emergent funding includes: Inflation Reduction Act (IRA) incentives.



Technical Assistance for Municipal Electrification

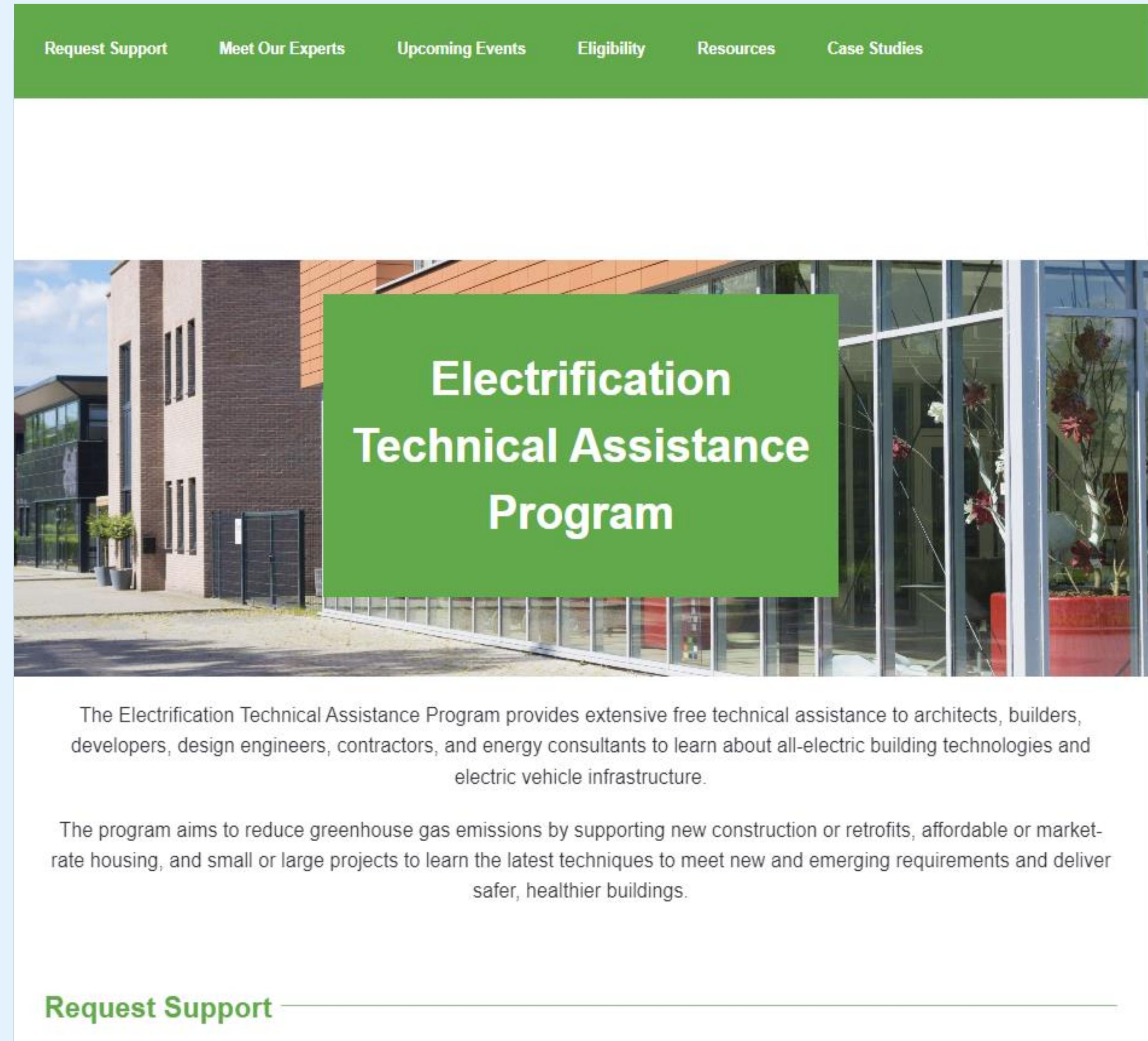
Electrification Technical Assistance Program



Allelectricdesign.org

Free technical assistance to architects, builders, developers, design engineers, contractors, and energy consultants, supporting new construction and retrofits.

Screenshot: program website
Allelectricdesign.org



Policy Package + Implementation Roadmap

Policy Solution: Electrification First Policy + Staff Report

Electrification First Policy (Draft)

Purpose: Solve for problem of CIP projects assuming gas-for-gas replacement, and build in policy mechanism to consider electrification first, when feasible

Requires: All-electric new construction and renovations for City-owned buildings and other infrastructure

Exceptions: Council determines technical infeasibility or prohibitively expensive (e.g. over 20% of total lifecycle costs)

+ *Staff report for staff to attach to City Council demonstrating alignment with climate goals, cost and feasibility research, availability of funding and technical assistance*



Policy Solution: Implementation Roadmap

Purpose: Give City sustainability staff members information and clear steps for accessing existing support for municipal electrification

Includes: description of funding and technical support options, frameworks for project prioritization, descriptions on when and how to engage to access assistance



Feedback + Q&A

Questions + General Feedback

Does the proposed package for (policy; staff report; implementation roadmap) sound effective in implementing all-electric municipal buildings?

What challenges do you anticipate in implementing this policy package?

RICAPS would continue to support the first group of cities through adoption of this policy package.





OFFICE OF
SUSTAINABILITY
COUNTY OF SAN MATEO

THANK YOU

Rgardner@rinconconsultants.com
bherrschaft@peninsulacleanenergy.com

