

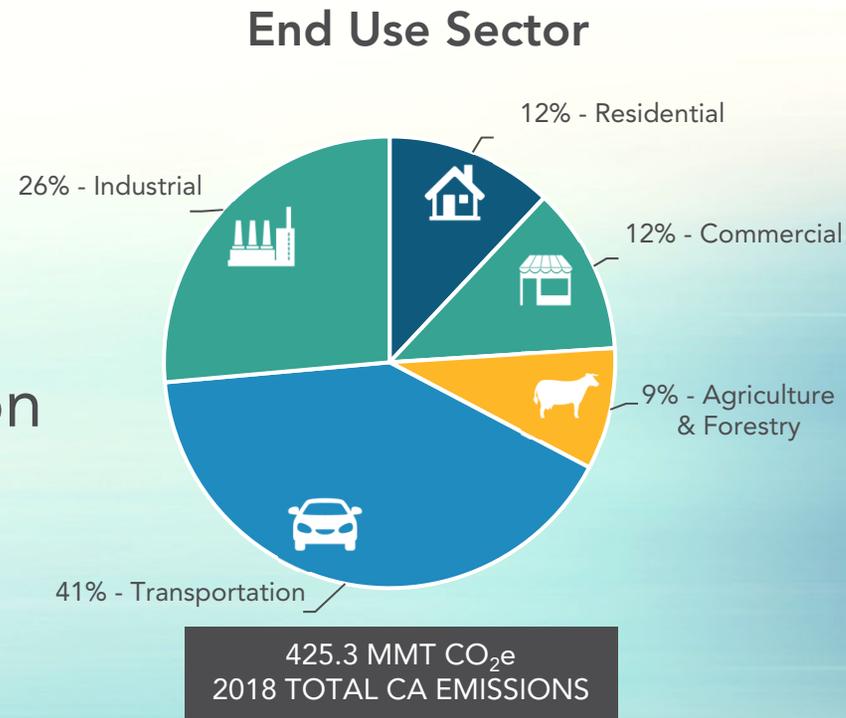


Flipping the Switch: Why Building Decarbonization Matters to CARB

Presented by: Dana Papke Waters
South Coast AQMD Buildings Working Group
May 6, 2021

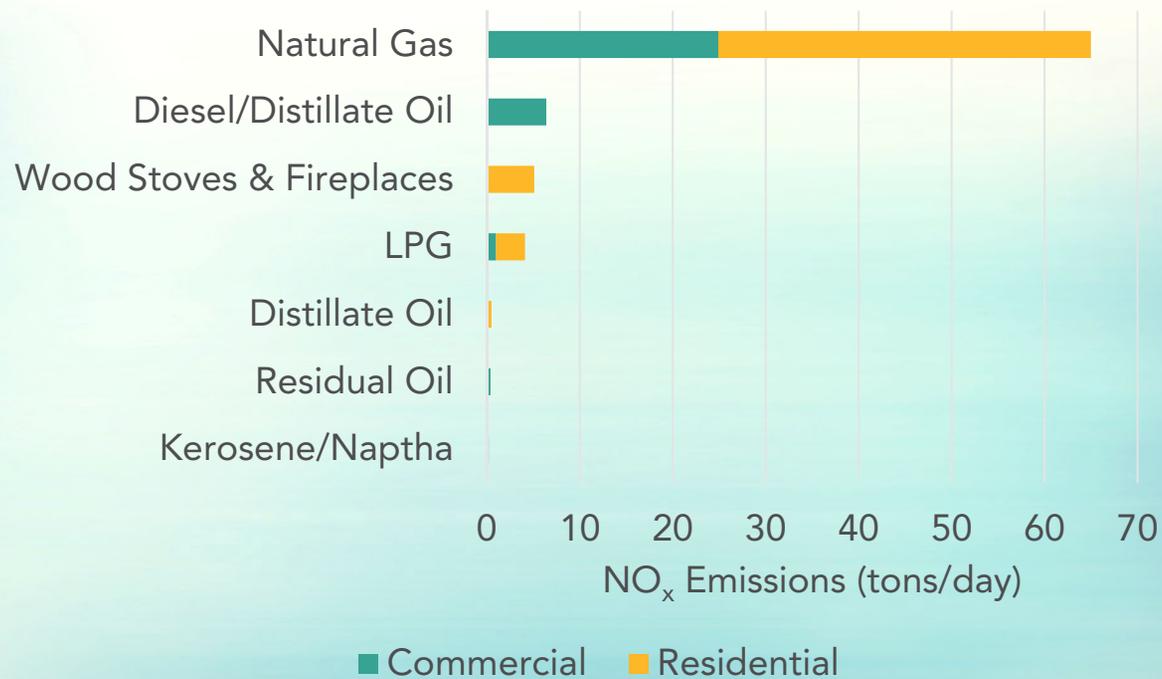
Why Care About Building Decarbonization?

- Buildings cause:
 - 25% of statewide GHG emissions
- Natural gas combustion in buildings:
 - 8% of GHG emissions
 - 5% of NO_x emissions



What are California's NO_x Emissions from Buildings?

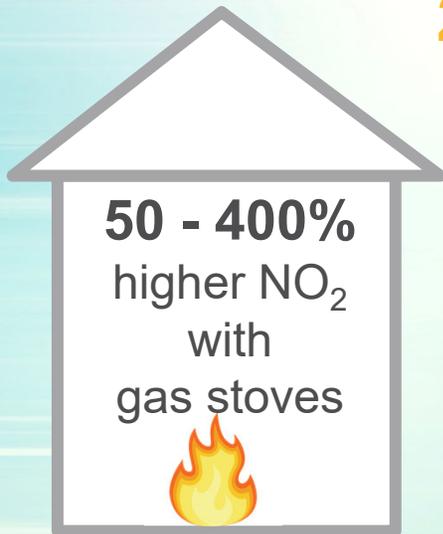
Statewide NO_x Emissions (tons/day) in 2018
Commercial and Residential Buildings



Natural Gas Combustion in Buildings

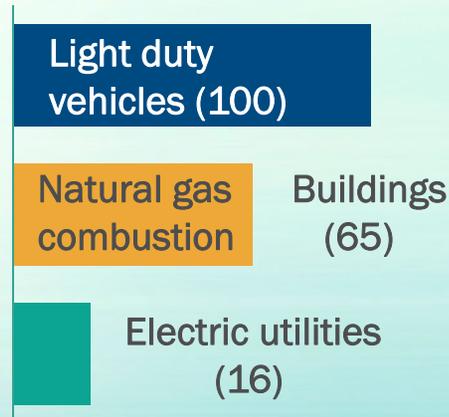
Impacts on Public Health, Air Quality and Climate

Indoor Air



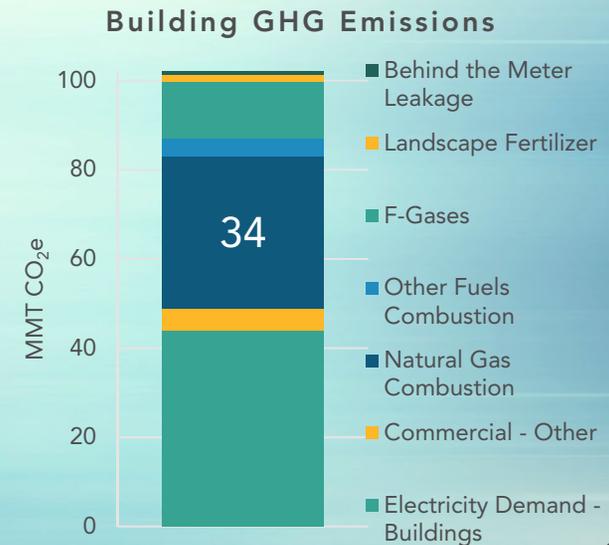
Outdoor Air

**2019 NOx emissions
(65 tons/day)**



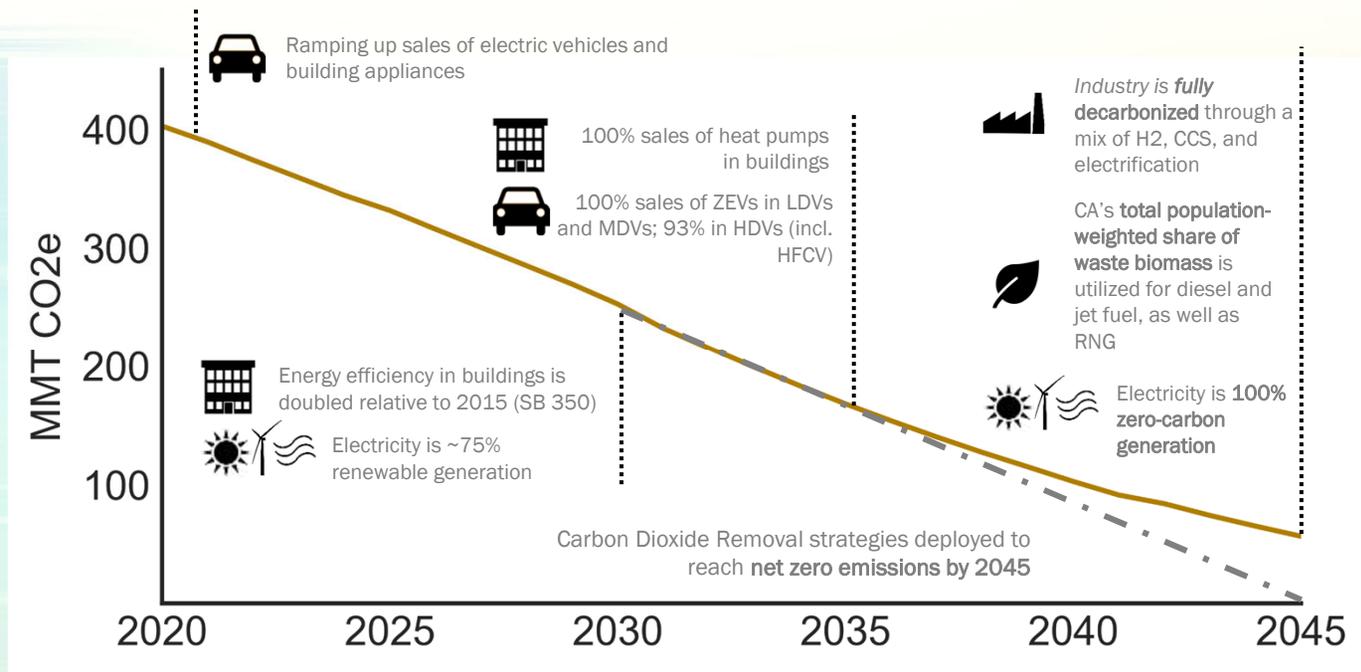
Climate Change

**2018 GHG emissions
(34 MMT CO₂e/year)**



Path for Deep Decarbonization

A scenario with widespread efficiency and electrification paired with zero-carbon electricity, as well as zero-carbon fuels for hard-to-decarbonize sectors

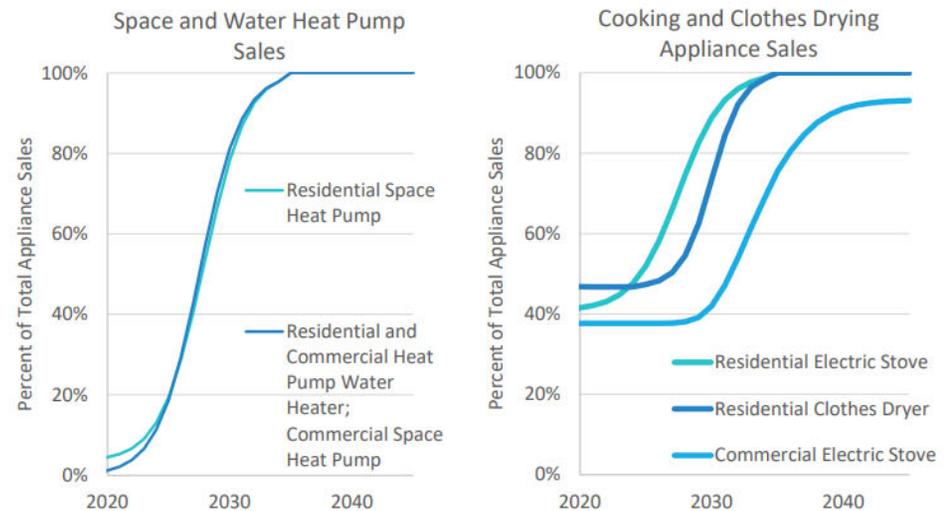


Source: CARB. (2020, November 19). California's Greenhouse Gas Goals and Deep Decarbonization. Board Meeting (Slide 6). Retrieved from <https://ww3.arb.ca.gov/board/books/2020/111920/20-12-5pres.pdf>

Transition of Building Sector

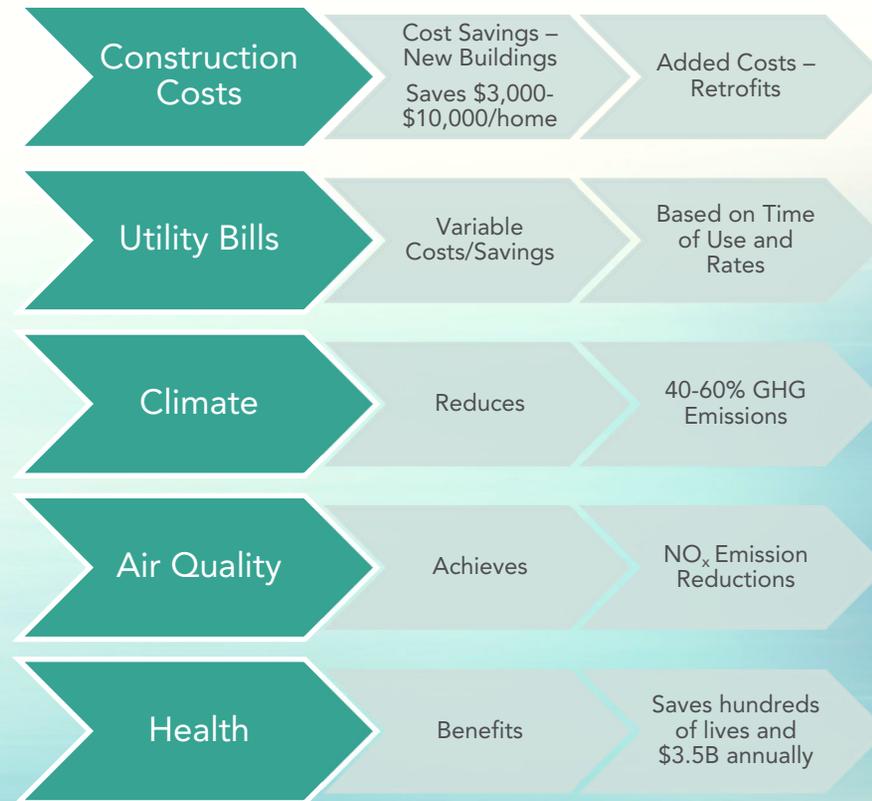
- Today, about half of building energy demand is supplied by natural gas
- Electrify end-uses that currently rely on natural gas

Percent of appliance sales that are electric



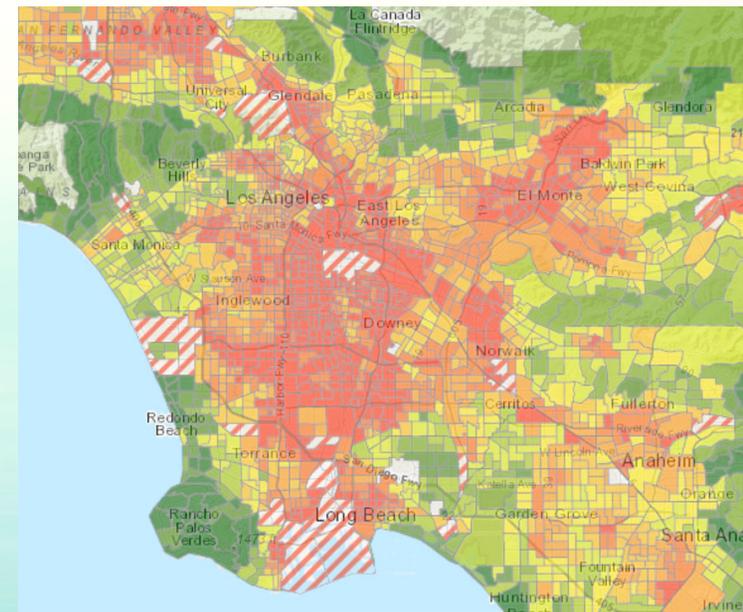
Source: CARB. (2020, November 19). California's Greenhouse Gas Goals and Deep Decarbonization. Board Meeting (Slide 10). Retrieved from <https://ww3.arb.ca.gov/board/books/2020/111920/20-12-5pres.pdf>

Costs/Savings and Benefits: Building Electrification



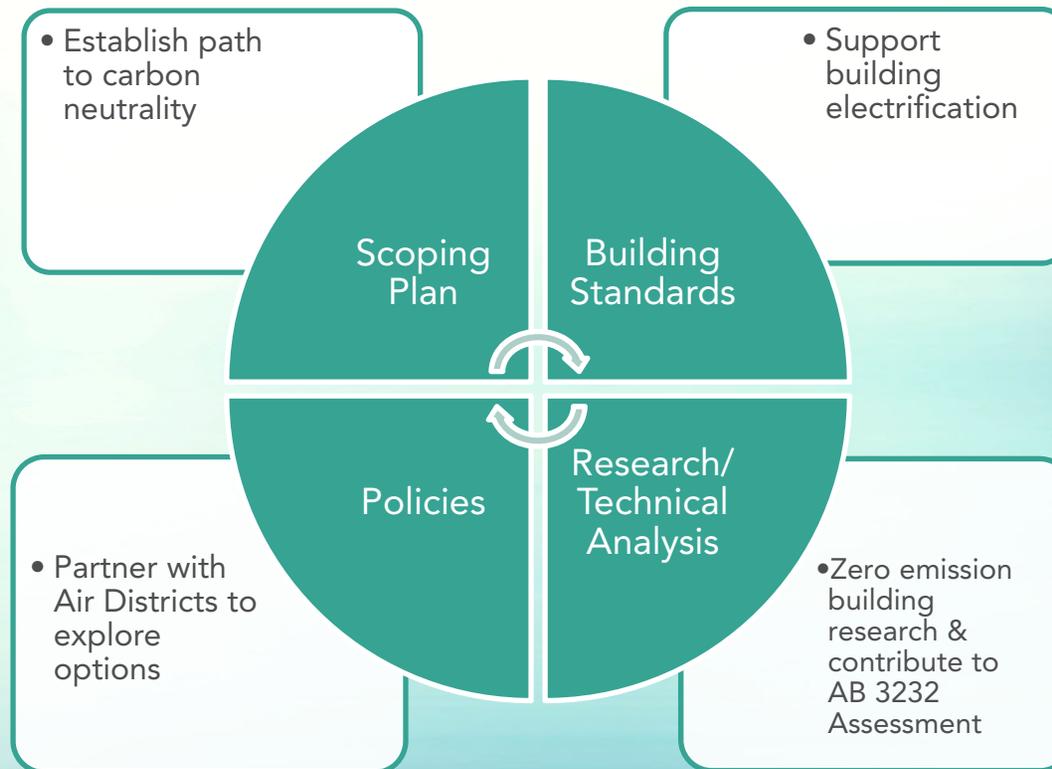
CARB Overall Priorities: Building Decarbonization

- 1) Support achievement of climate and air quality targets
- 2) Result in improved indoor and outdoor air quality and improved health
- 3) Ensure that vulnerable and disadvantaged communities benefit equitably



Map showing the Disadvantaged Communities in the South Coast Air Basin from CalEnviro Screen. Retrieved from: <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30>

Key Focus Areas: What CARB is Doing



State Agency Coordination on Building Decarbonization

Fuel Substitution Working Group

- Group dedicated to creating recommendations to guide development of fuel substitution programs and report on status of efforts underway.

Codes and Standards Cooperative

- Forum to help ensure energy codes and standards meet California's long-term building decarbonization goals efficiently and equitably.

Sustainable Building Working Group

- State agency representatives implementing the Governor's Executive Order N-19-19 to minimize the state government's carbon footprint.

New Southern California Headquarters in Riverside

- World-Class Emissions Testing Facility
- National and International Center for Air Pollution and Climate Change
- Multiple Sustainability Goals
- Anticipated Occupancy – June 2021



Sustainability Goals

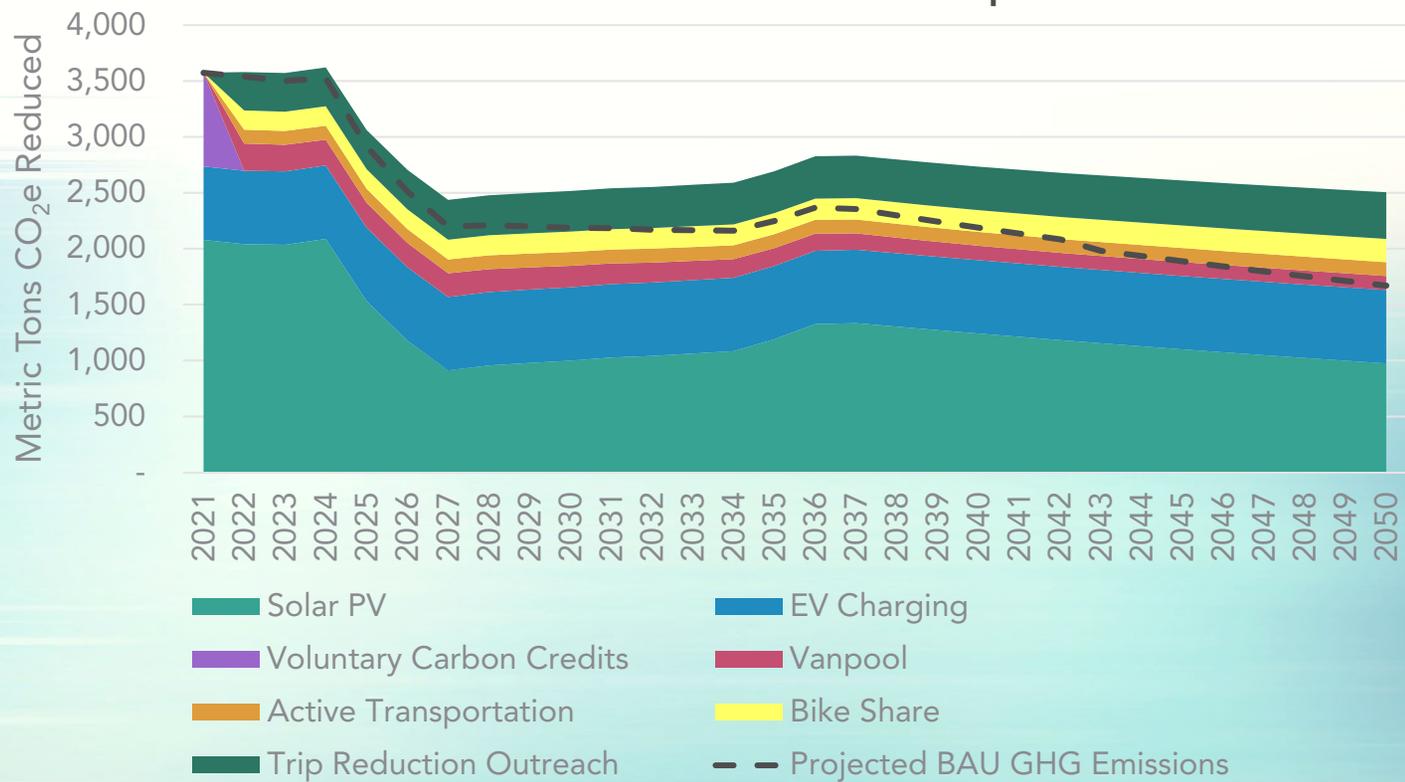
CARB's Southern California Headquarters

- **All-Electric, Zero Net Energy Facility:**
3.75 MW PV Panels
- **Green Building:** LEED "Platinum" Certification
- **EV Chargers:** Provide sufficient fueling capacity for zero emission vehicles (ZEVs);
- **Good indoor air quality:** Protect occupant health, assure comfort, and maximize productivity; and
- **Vehicle Miles Traveled (VMT) Goal:**
Reduce employee commute VMT to 15% below regional average
- **Greenhouse Gas (GHG) Target:** Achieve a zero-net increase in GHG emissions.



Projected Zero Net Carbon Pathway

CARB's Southern California Headquarters

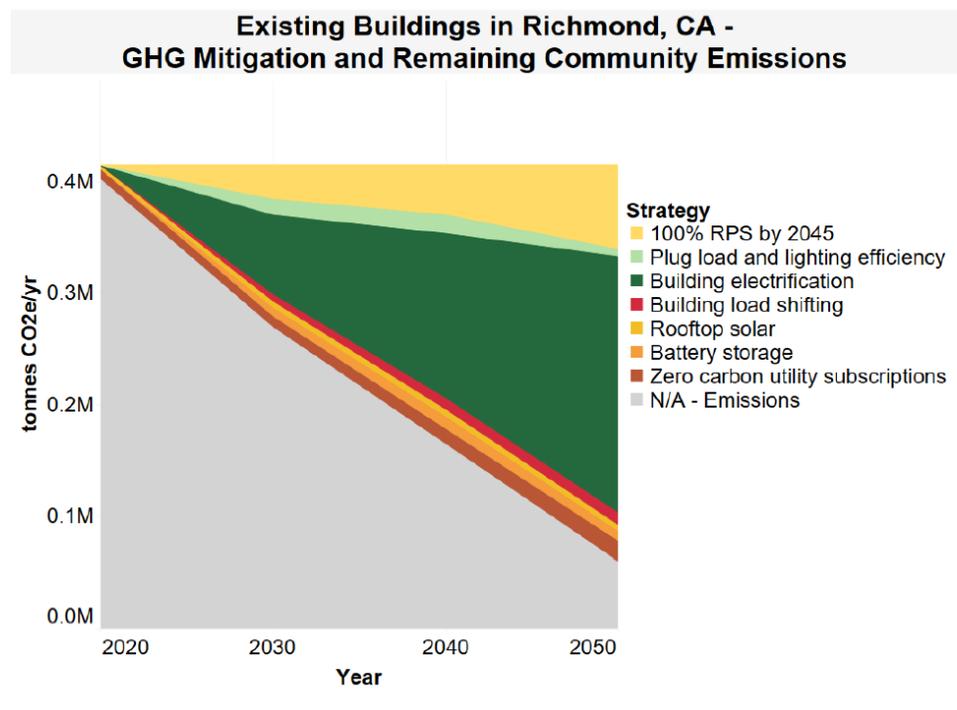


Source: CARB. (2021, March 14). Mitigation Plan: Report to Achieve Zero Net Carbon Emissions and Reduce Vehicle Miles Traveled. Retrieved from <https://ww2.arb.ca.gov/southern-california-headquarters>

ZERO CARBON BUILDINGS AND COMMUNITIES RESEARCH RESULTS AND CONCLUSIONS

Figure 49. Wedge graph of decarbonization of existing building stock in Richmond, 2020-2050

- Zero carbon new construction is feasible in the next ten years for some building types
- Building electrification is the most important strategy
- Richmond Case Study Indicates:
 - Near zero is achievable at the community scale by 2050



Source: Mozingo, L. (2021). Zero-Carbon Buildings in California: A Feasibility Study. University of California – Berkeley: The Center for Resource Efficient Communities and The Center for the Built Environment.

Conclusions

- Building electrification is a key strategy
- Achieves climate goals and air quality targets
- Provides important health benefits
- Equity is a key focus

