

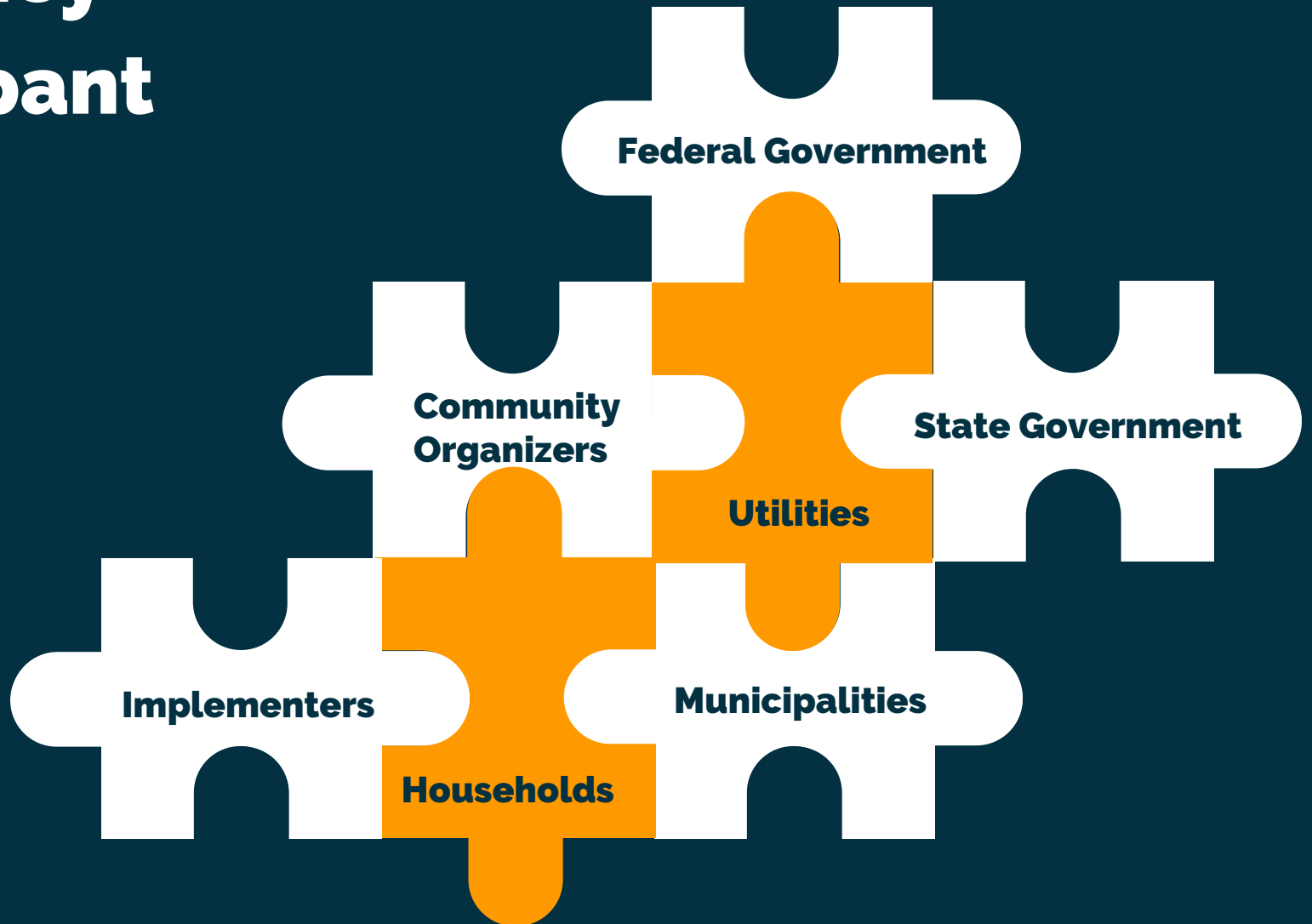
From the ground up: how to **adapt policy design to participant needs** to achieve equitable housing decarbonization

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Yael Nidam Kirsht

University of California, Berkeley
PhD Candidate, Department of City and
Regional Planning

Turner Center for Housing Innovation



Case Study: California

Ranked 1st for energy efficiency policies and programs (ACEEE, 2025)

GHG goals: GHG < 85% 1990 by 2045

Electricity sector

100% renewable energy by 2035

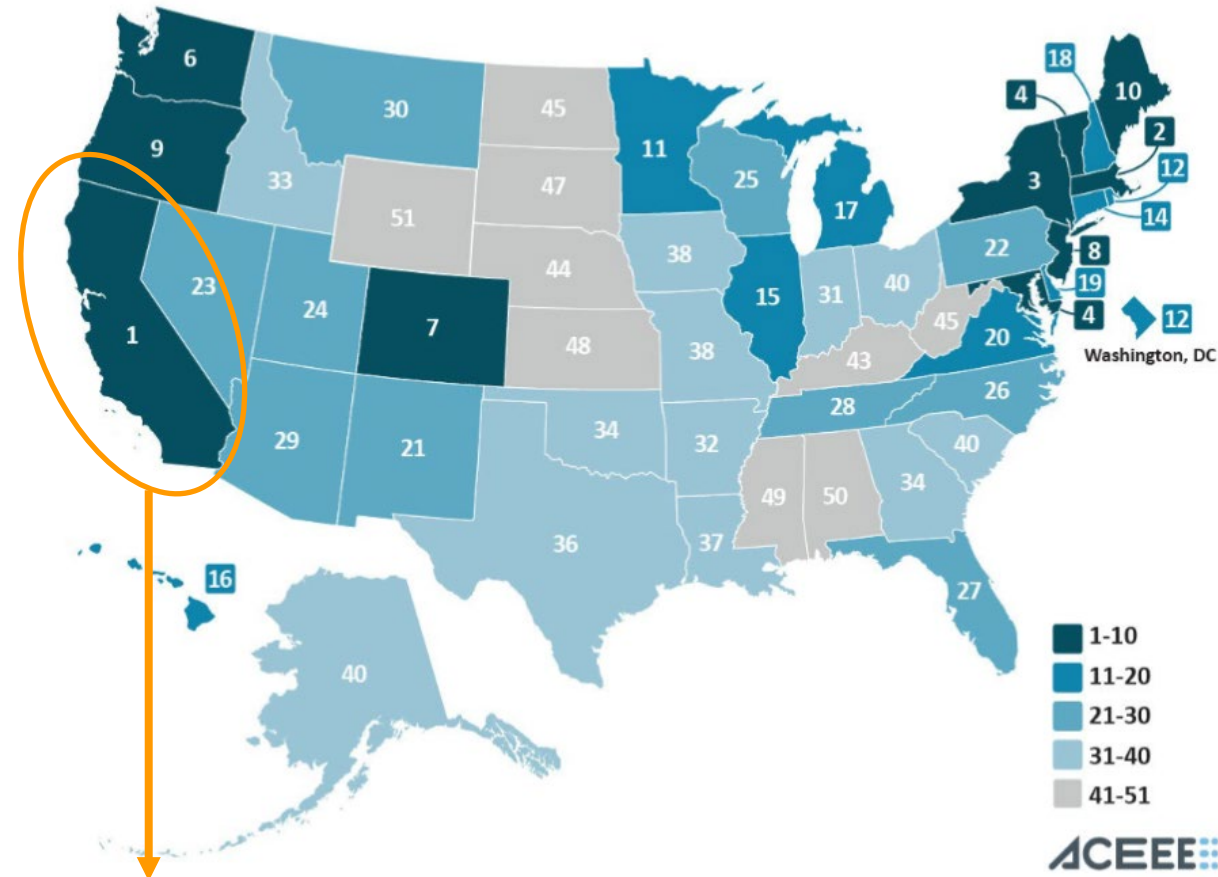
Building sector

- Heat pump installations:
by 2030 - 6 million (~43%)
- All-electric and electric-ready homes
by 2030 - 3 million (~25%)
by 2035 - 7 million (~50%)

Transportation sector

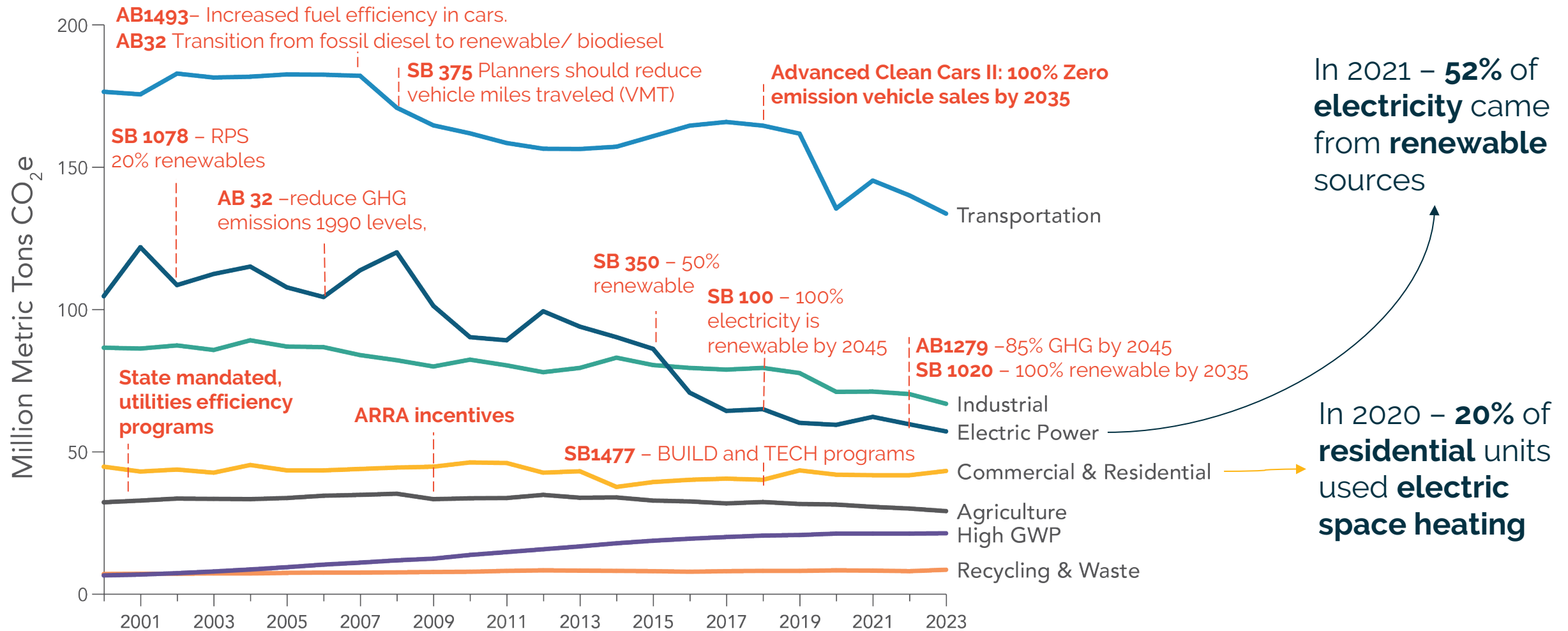
100% Zero Emissions Vehicles by 2035

ACEEE 2025 State energy efficiency scorecard



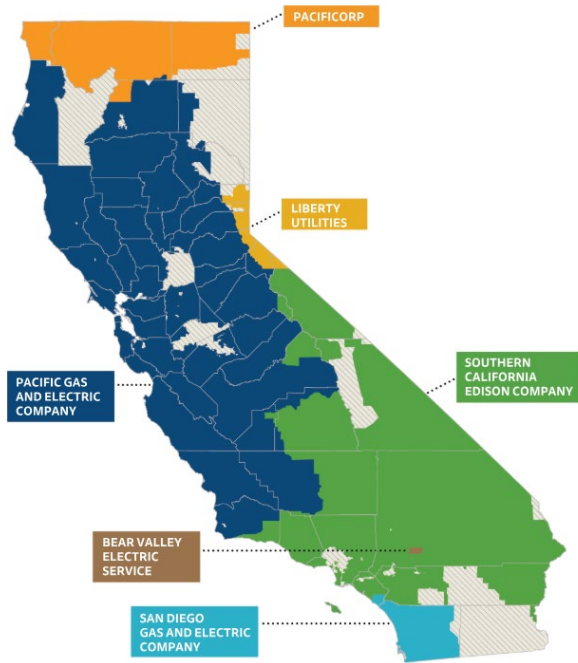
~40 million people
~14 million households

Background: Progress towards goals

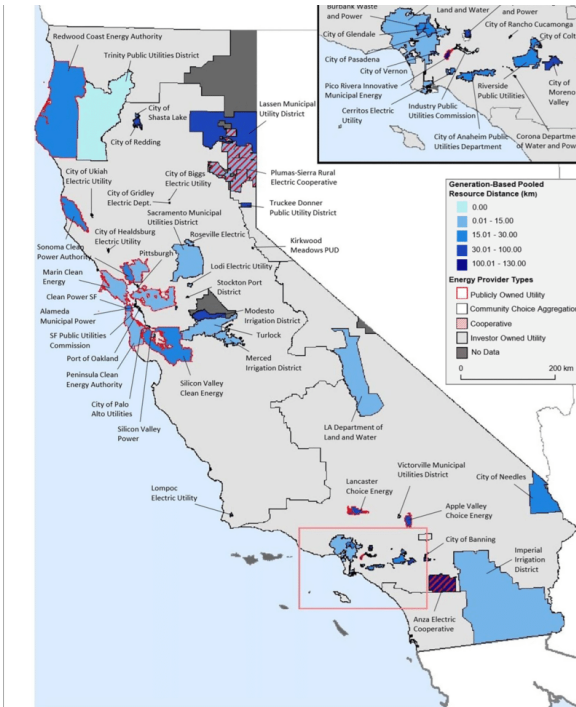


Background: fragmentation of efforts

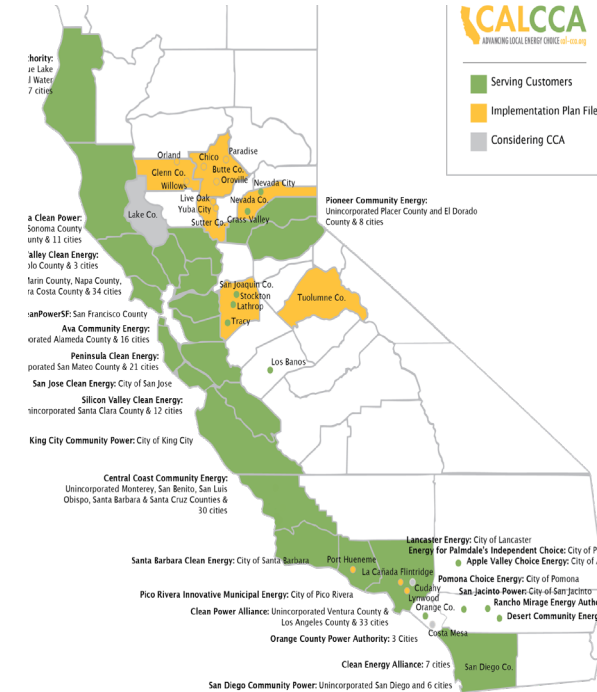
6 Investor-Owned utilities



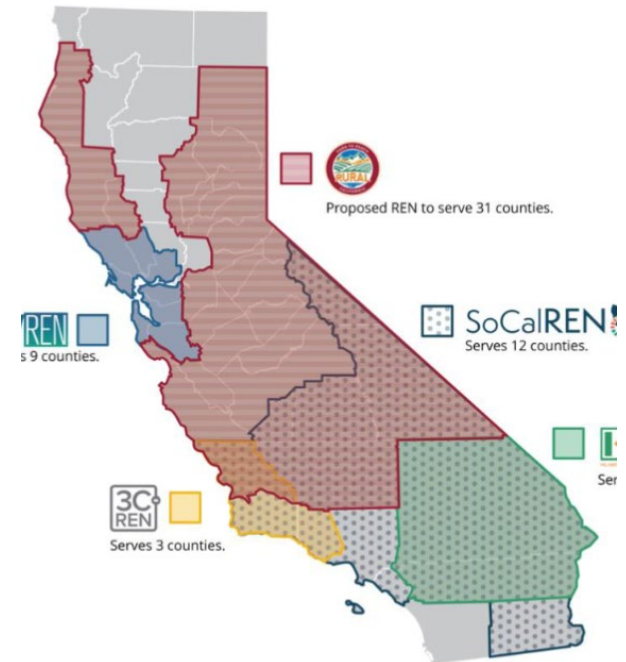
45 Public-Owned utilities



25 Community Choice Aggregators



7 Regional Energy Networks



+ 482 municipalities across 58 counties

Background: diversity of housing conditions and types

Low adoption & adoption disparities

Adoption of energy efficiency measures, electrification, solar panels, and electric vehicles is higher among more affluent households, and those with higher levels of education, who live in single-family homes, and are homeowners

Households with
barriers to
participation
represent significant
share of Californians

70%
Households

Use combustible fuels for
heating/cooking

56%

Housing units built before 1980

35%

Multifamily housing units

44%

Renter households

45%

Low- to moderate-income (LMI)
households

Three-year study funded by the California Air Resources Board

How to overcome low adoption and adoption disparities in the residential sector?

Study timeframe: 2023-2026

Research team: multidisciplinary and cross-sectoral

PAR Advisory Committee

Guide all aspects of the research, including data collection, analysis, interpretation, and knowledge dissemination

Katie Valenzuela, Sacramento City Councilmember, [Building Energy Equity & Power \(BEEP\) Coalition Member](#)

Edgar Barraza, Physicians for Social Responsibility Los Angeles (PSR-LA); [Building Energy Equity & Power \(BEEP\) Coalition Member](#)

Jessica Tovar, Local Clean Energy Alliance (LCEA); [Building Energy Equity & Power \(BEEP\) Coalition Members](#)

Chris Selig, People Organizing to Demand Environmental and Economic Justice (PODER); [Building Energy Equity & Power \(BEEP\) Coalition Member](#)

Michelle Vigen Ralston, Principal and Founder, [Common Spark](#)

Katie Wu, Managing Director, [Common Spark](#)

Fatima Abdul-Khabir, Senior Associate, [Association for Energy Affordability, Inc.](#)

Brendan Wade Brown, Director of Research, [Green & Healthy Homes Initiative](#)

Diana Hernández, Associate Professor of Sociomedical Sciences, [Columbia University](#)

Emma Tome, [California Air Resources Board](#)

Awoe Mauna-Woanya, [California Air Resources Board](#)

Core research team (UC Berkeley):

Management, development, and execution of research

PI Carolina Reid, Associate Professor, Department of City and Regional Planning.

PI Rachel Morello Frosch, Professor, Department of Environmental Science, Policy and Management and the School of Public Health

CI Yael Nidam, Doctoral candidate, Department of City and Regional Planning.

Zack Subin, Associate Research Director in Climate and Housing, [Turner Center for Housing innovation](#).

Smitha Buddhavarapu, Project Policy Analyst, Climate and Housing, [Turner Center for Housing Innovation](#)

Ruby Zalduondo, Graduate student, Department of City and Regional Planning.

Ethan Elkind, Director of the Climate Program, [Center for Law, Energy & the Environment \(CLEE\)](#).

Ted Lamm, Associate Director, [Center for Law, Energy & the Environment \(CLEE\)](#).

Misbath Daouda, Assistant Professor, [School of Public Health](#).

Challenge

**Existing
policies &
programs**



**On-the-ground
implementation
needs**

Research strategy: 126 cross-sector interviews

**Existing
policies &
programs**



**On-the-ground
implementation
needs**



Interview policy & program designers
in **government** agencies (n=21), &
energy **utilities** (n=14)

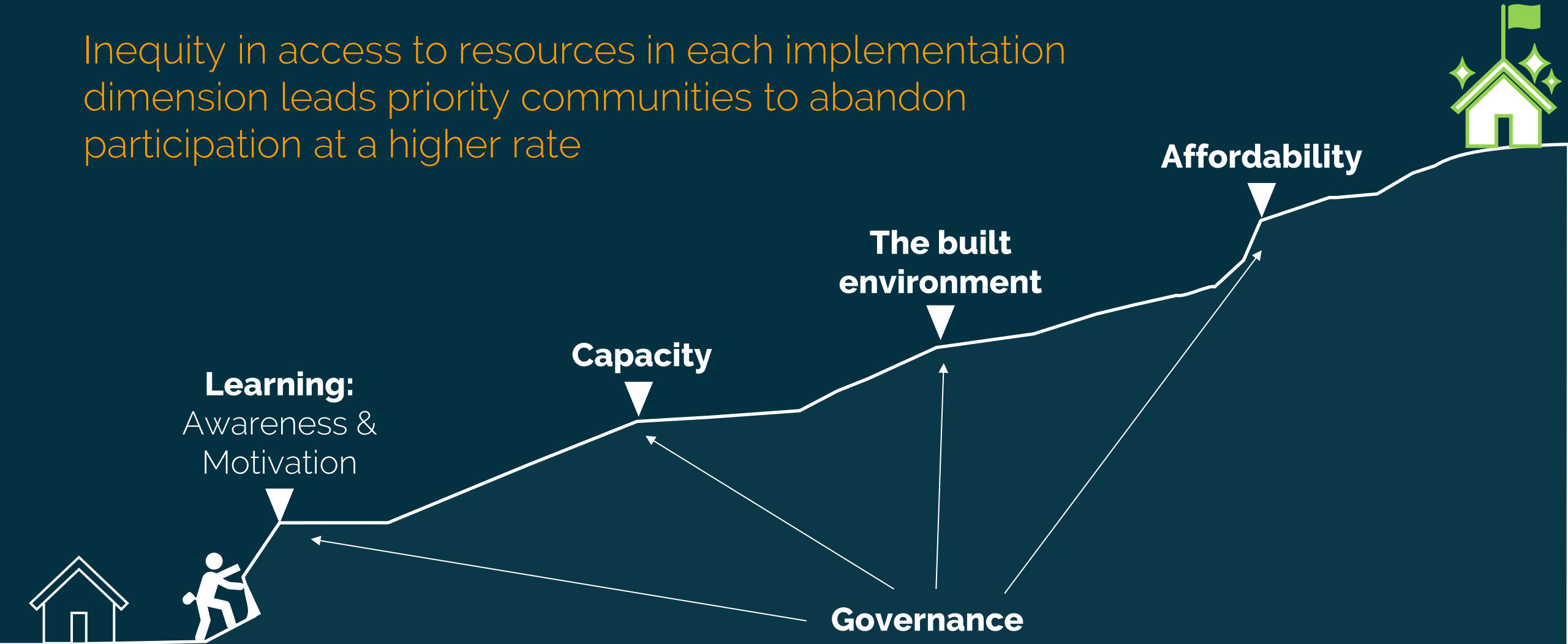


Interview **implementers** (n=12),
community-based-organizations (n=10) &
households (n=69)

Analyze data to understand drivers of the mismatch
between policy design & implementation

The participation burden

Inequity in access to resources in each implementation dimension leads priority communities to abandon participation at a higher rate



Learning

Access to trusted sources of information and understanding of program benefits and motivation to act

Factors shaping learning:

Individual level

- Knowledgeable network (e.g., friends, family, colleagues);

Community level:

- **Community-based organizations** and/or **online communities** with expertise in residential energy programs,
- knowledgeable **workforce**
- Enabling **public policy** (energy assessment at point of sale, reach codes, etc.),
- **Marketing** that resonates with local priorities and **language** access

Capacity

Having the time and ability to navigate and manage complex multi-step programs

Factors shaping capacity:

Individual level

- Having organizational, technical, and administrative capacity.
- Tenure (renter/owner) and housing type (multi-family, manufactured homes)

Community level

- Access to **participant support** service (e.g., energy navigator model);
- Access to **specialized programs** that address the specific needs of renters, multi-family homes, manufactured homes.
- **Workforce** with decarbonization knowledge and skills (train local contractors, streamline certifications)

The built Environment

Level of physical readiness of housing and energy infrastructure for electrification

Factors shaping the built environment:

Individual level

- No “hidden” costs related to the condition of the home - (e.g., are there health and safety prerequisites such as fixing gas leaks, remediating lead/asbestos, upgrading panel capacity)

Community level

- **Funding for health and safety upgrades** (either by increasing program funds or coordinating programs to enable braiding)
- **Local electric grid capacity and transparency** (Is the local transformer ready for additional loads? Is the local circuit capacity ready for more solar connections?)
- **Place-based strategies** to address the cumulative burden of deficiencies across the participation burden dimensions.

Affordability

Ability to cover installation costs and afford the energy bill post-installation

Factors shaping affordability:

Individual level

- Having personal capital

Community level

- **Structure financial incentives to meet participants' needs** (Tax credits, rebates, no-cost direct-install programs)
- **Green financing mechanisms** such as Go-Green financing and Inclusive Utility Investment (IUI) programs
- Ensure **sufficient funding** OR ability to **braid funding** across programs
- **Scope** projects to reach bill neutrality or bill savings
- **Rate schedules** that enable bill neutrality or savings post-implementation

Governance

The level of coordination among government agencies to streamline services to participants; partnerships with community organizations to adapt programs to local needs

Factors shaping governance:

- **Coordination:**
 - Among state-level government agencies
 - Among housing, energy, and health sectors
- **Technical assistance to local governments** to streamline and speed up permitting, and provide local resource centers
- **Inclusion of community partners** in the design, implementation, and evaluation of programs
- **Tenant protections**
- **Technical assistance** to participants, HOAs, and contractors
- **Participation data** parsed by demographics and geographies (lack of)

Adapting policy design to participant needs to achieve equitable housing decarbonization

Traditional approach:

Individuals as system integrators

Focus on equipment and **not** on how it is installed. Each agency manages its own mandate independently



Transformative approach:

"system-supported" interventions

Focus on participant experience and remove barriers. Agencies collaborate to coordinate program design, implementation, and evaluation and provide technical assistance downstream.

Thank you

Stay tuned for publication in 2027

Keep in contact: yaeln@berkeley.edu

