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Berkeley Existing Building Electrification Strategy

Project Scope

- **Build off of new construction ordinance/fossil fuel free goal**
- **Equitable electrification of all existing buildings**
  - Focused on low-rise residential buildings
  - Determine possible implementation date
  - Provide short- and long-term options
- **Building stock analysis**
- **Cost & savings modeling data analysis**
- **Community engagement**
  - Focused on disadvantaged communities
  - Developing equity guardrails
  - Avoiding displacement

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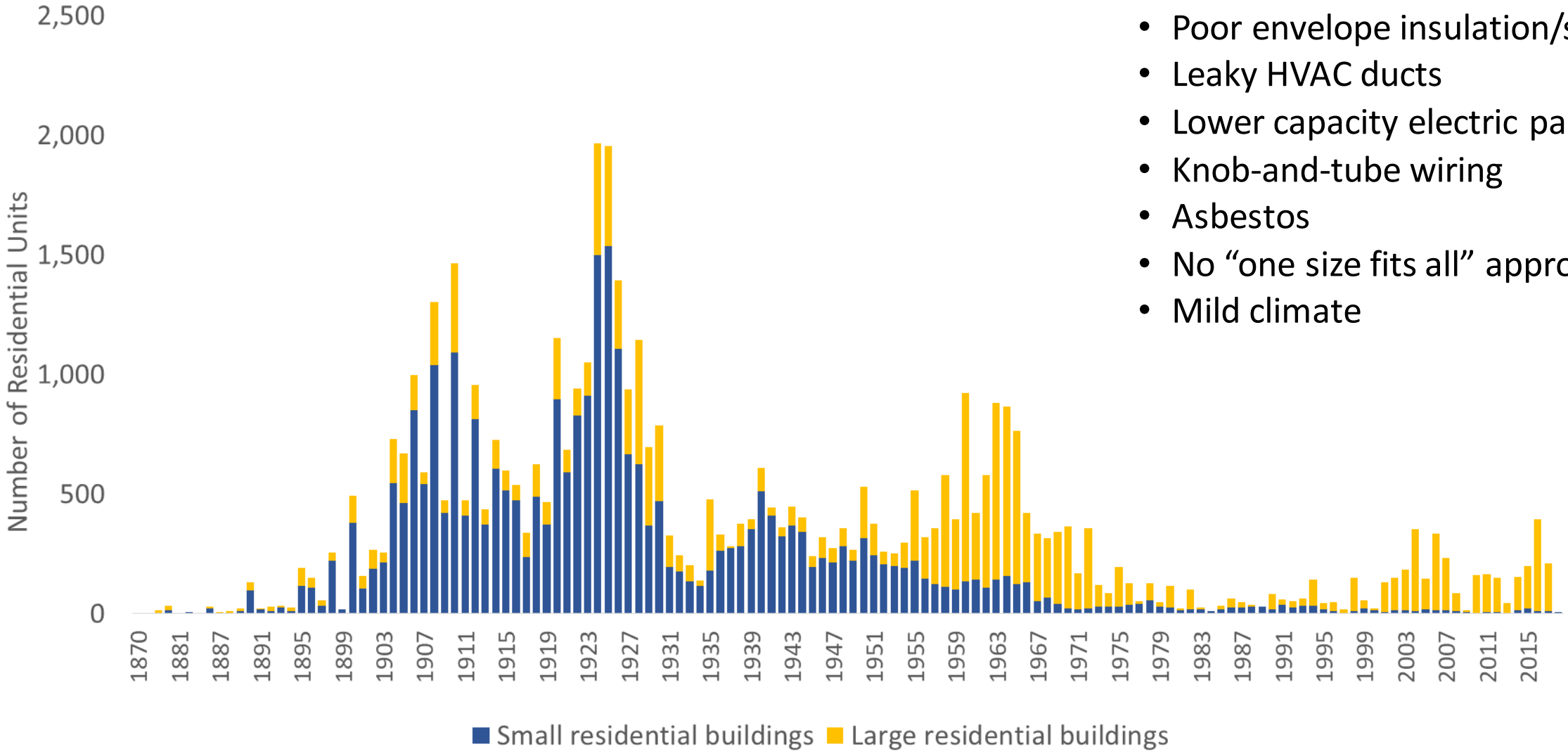
ecology center

Building Stock Analysis

Key Issues: Older Housing Stock



Retrofit Challenges

- Poor envelope insulation/sealing
- Leaky HVAC ducts
- Lower capacity electric panels
- Knob-and-tube wiring
- Asbestos
- No “one size fits all” approach
- Mild climate

Source: Building Electrification Initiative

Cost Analysis

3 Equipment Packages Modeled

Package 1: Economy Products

Package 2: Mid-Tier Products

Package 3: Mid-Tier Products + Envelope

3 Solar Options Per Package

Package X.1: No Solar

Package X.2: Offset New Load

Package X.3: Net Zero Energy

Draft Costs

#	Electrification Package	Energy Bill Savings ($/yr)	Energy Bill Savings (%)	Gross Cost ($)	Incre-mental Cost ($)	Incremental Cost with Current Incentives ($)	Incremental Cost with Incentives + Financing ($)
1.1	Economy Appliances	-$540	-33%	$19,870	$7,930	$7,930	$12,290
1.2	Economy Appliances + Offset Solar	$540	33%	$26,160	$14,220	$14,220	$5,610
1.3	Economy Appliances + NZE Solar	$1,480	89%	$32,270	$20,330	$20,330	$1,470
2.1	Mid-Tier Appliances	$5	0%	$24,750	$12,110	$9,910	$9,880
2.2	Mid-Tier Appliances + Offset Solar	$590	35%	$28,200	$15,560	$13,360	$6,090
2.3	Mid-Tier Appliances + NZE Solar	$1,510	91%	$34,270	$21,630	$19,430	$1,700
3.1	Mid-Tier Appliances + Envelope	$90	5%	$29,320	$16,690	$13,240	$12,540
3.2	Mid-Tier Appliances + Envelope + Offset Solar	$600	36%	$32,350	$19,720	$16,720	$9,470
3.3	Mid-Tier Appliances + Envelope + NZE Solar	$1,510	91%	$38,410	$25,780	$22,320	$4,520

Key Takeaways From Modeling

Challenges

- Mild climate (little AC)
- High labor costs
- High electricity rates
- Older homes may require other upgrades (electric panels, wiring)

Modeling Trends

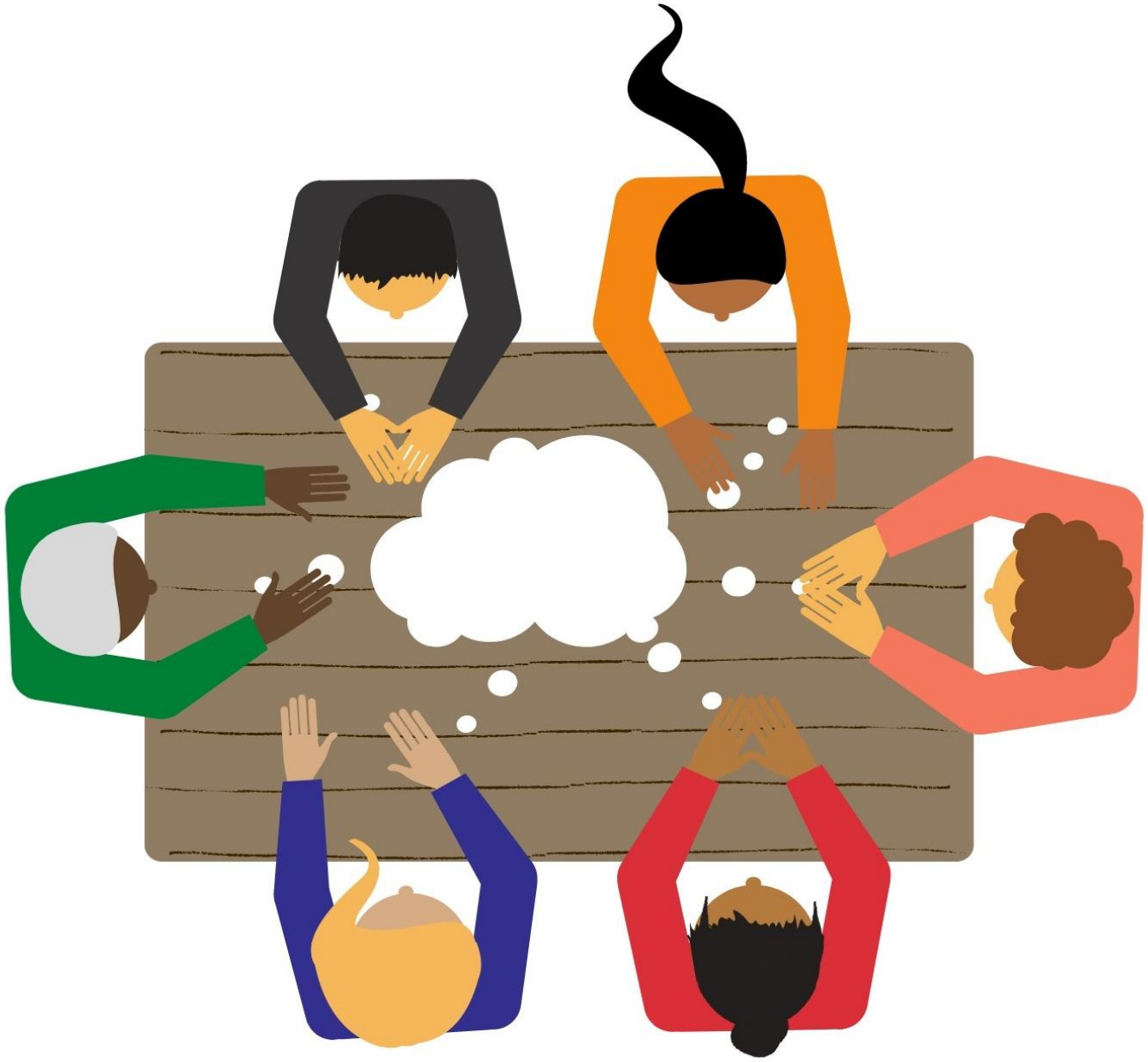
- Economy products increase bills without solar
- Solar dramatically improves economics
- Envelope improvements lack financial payback, but have other resilience benefits not included in model
- Longer paybacks in multifamily

Payback has equity correlations

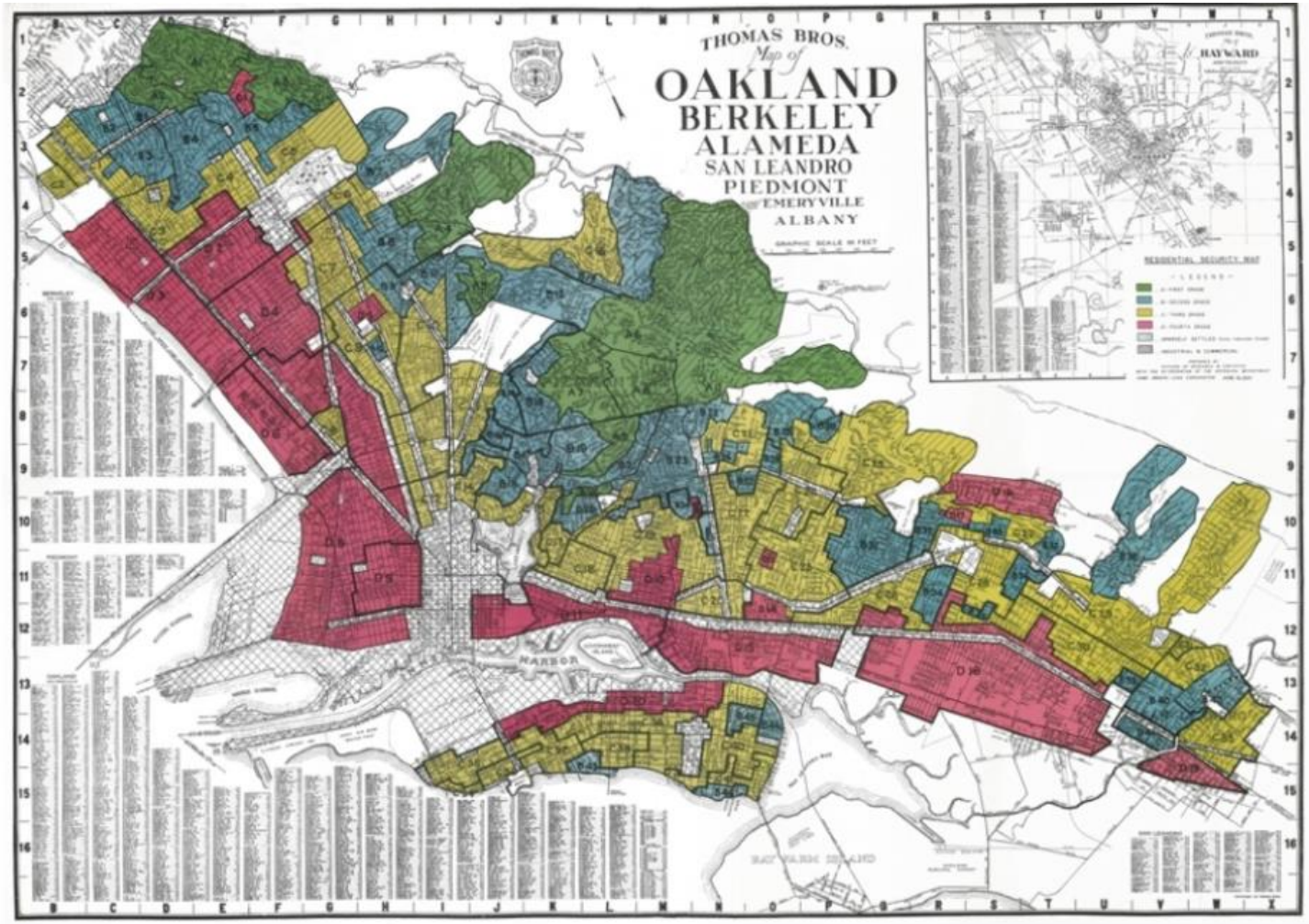
- Home size, home type, neighborhood, education, race

Solar PV on West Berkeley Branch Library

Community Engagement



Redlined Areas



This Thomas Bros map shows how Berkeley was divided into different colored zones indicating the "soundness" of lending in those zones. The red areas were "redlined." Banks would not lend to people buying property there.

Source: Berkeleyside

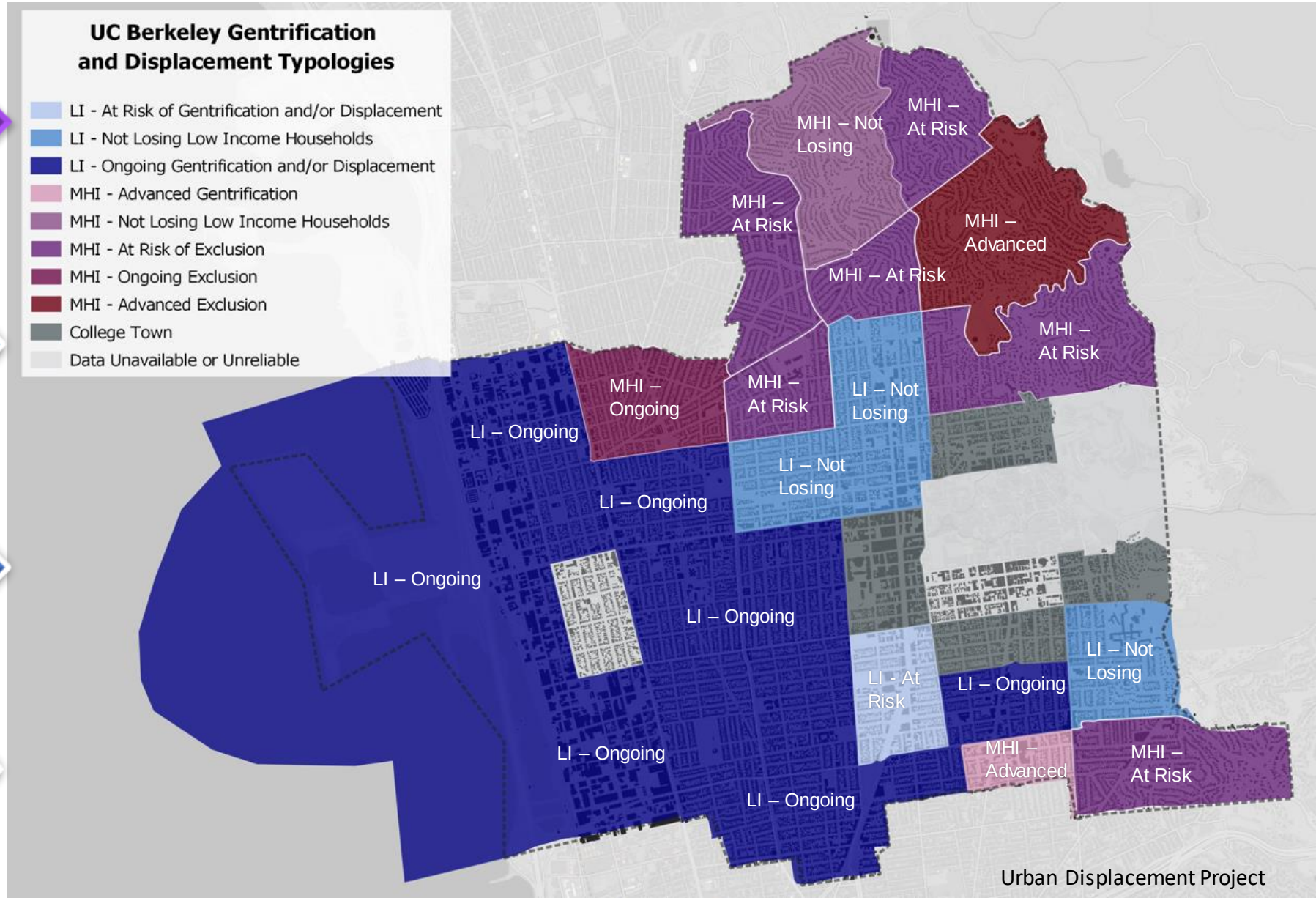
Ongoing Housing Crisis & Displacement Risk

Ongoing gentrification and displacement

Extreme rental rates (median $2600 in 2017)

Poor protections for unsubsidized affordable housing

Disincentives for retrofitting rent-controlled buildings



Feedback

Health, safety, comfort & resilience benefits of electrification should be accessible to all

Upfront and long-term costs are primary concern

Concern of displacement due to housing improvements (increased rent)

Electrification upgrades should be linked with other health/safety upgrades (e.g. lead, asbestos, mold)

More education needed

Need accessible financing and funding options – no new debt

Concern of reliability of electricity supply, especially with PSPS events

Equity Guardrails

ACCESS TO HEALTH & SAFETY BENEFITS

Ensure equitable access to improved health, safety and comfort benefits from electrification like cleaner air and cooling for hot days. Due to the upfront costs of electrification, many households will need financial support to have access to the benefits of electrification, including long-term cost savings.

ACCESS TO ECONOMIC BENEFITS

Ensure all community members, especially communities of color and historically disadvantaged groups have equitable access to funding and financing mechanisms, and to high-road job opportunities.

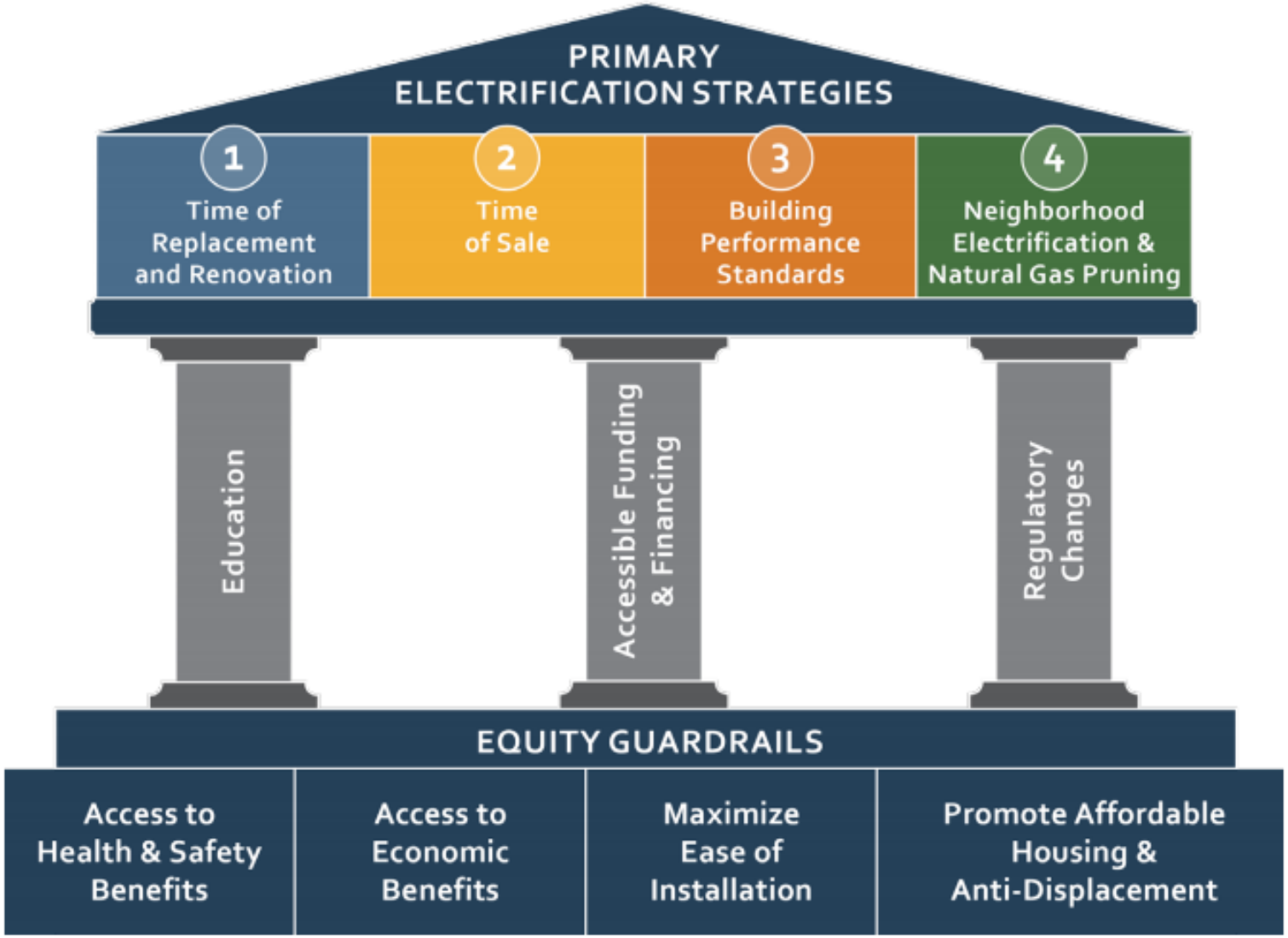
MAXIMIZE EASE OF INSTALLATION

Ensure that incentives and programs for the community provide meaningful support to renters, owners, and vulnerable community members to minimize the procedural burdens associated with installation of electric equipment.

PROMOTE HOUSING AFFORDABILITY & ANTI-DISPLACEMENT

Ensure upgrades don't displace renters or over-burden homeowners. Programs should support housing production, housing preservation, and tenant protections. Ensure funds don't get diverted from developing new housing.

Strategy Overview



What needs changing?

- **Technologies and efficiencies**
  - Panel upgrades are expensive and may be avoided or costs reduced
- **Policy Changes**
  - Obligation to serve
  - Ability to allocate natural gas retrofit funds to electrification (pruning)
- **Equitable Utility Rates**
  - Natural gas rates do not currently reflect the societal costs to climate, safety, health
  - Electricity rates are high and solar improves outcomes, but NEM 3.0 will have impacts
- **Funding and Financing**

Funding & Financing

Investment in the form of funding and financing is going to be key to electrify equitably.

Short term

- Aligning and simplifying existing programs
- Advocate for electricity rates that favor electrification
- Work with local, state and federal partners to develop financing/funding programs

Mid Term

- Promote development of new programs and incentives that are equitable & accessible
- Convey information from pilots/studies/community engagement
- Find solutions for rental properties
- Infrastructure pruning and neighborhood scale electrificaiton