Building Energy Resilience Along the Path to Decarbonization

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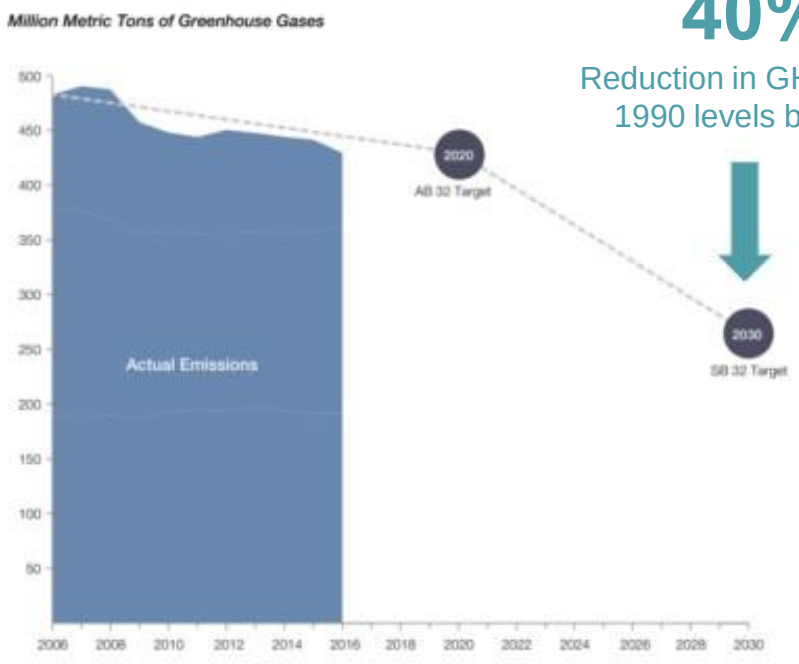
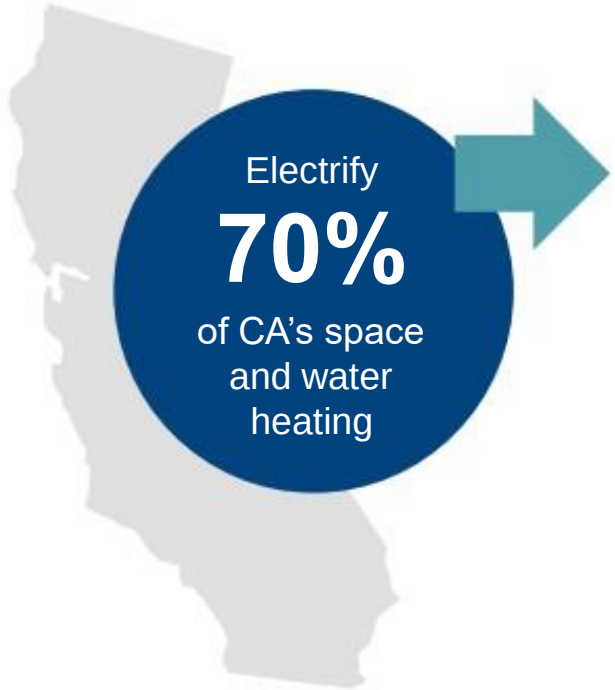
California Grid Decarbonization

State met 2020 goal early, but 2030 goal is more ambitious



40%

Reduction in GHG below 1990 levels by 2030



- How can buildings be more energy resilient?
- What role can buildings play in supporting grid resilience?

Sources:
1. Image: LAO https://lao.ca.gov/reports/2018/3911/climate-policies-overview-122118.pdf
2. Southern California Edison, Pathway 2045 (2019) https://www.edison.com/home/our-perspective/pathway-2045.html

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Priority Technologies

The pathway to building decarbonization in places with rapidly greening grids

- weatherization
- electrical upgrades
- heating equipment upgrade/replacement
- cooling equipment upgrade/replacement
- addition of back-up power
- addition of solar

The Entire Energy System is Changing

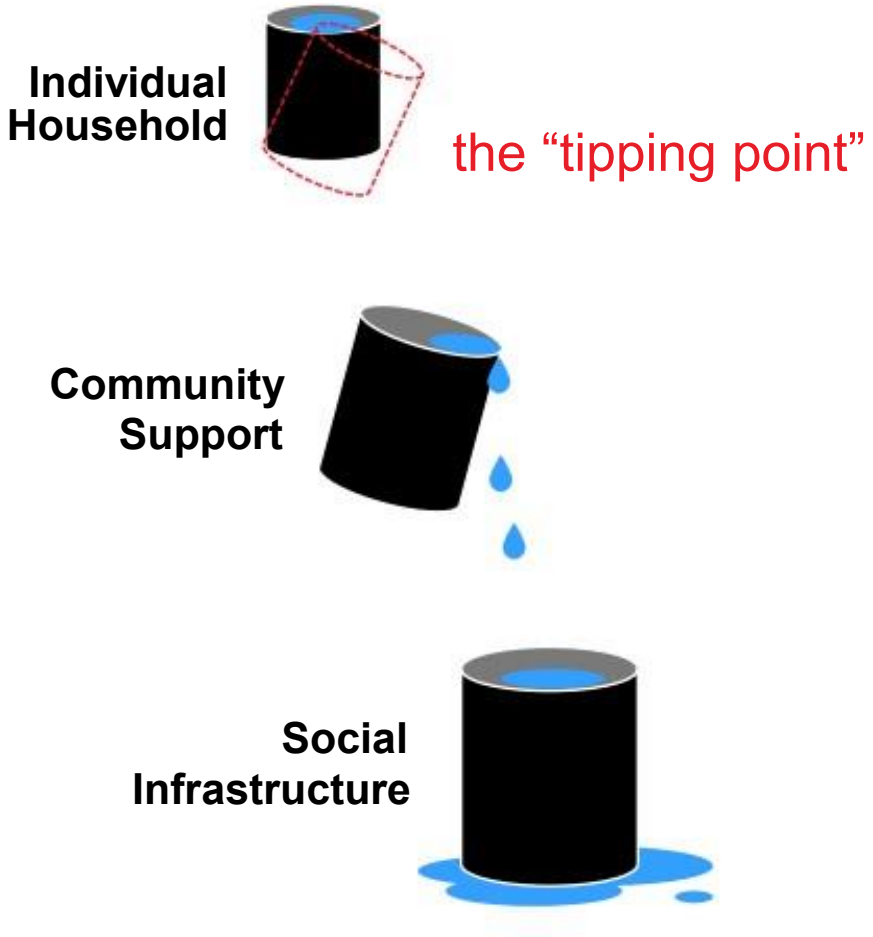
Drivers of change:	Potential impacts:
Climate-driven impacts	Increasing disruptions
Moving energy generation away from fossil fuels towards variable renewable sources	Intermittent, distributed generation
Building and transportation electrification	Increasing demand
The changing and increasing use of aging gas and electric infrastructure	Existing infrastructure is not resilient
Increasing virtual connectivity	Load management; cyber vulnerability

Energy Resilience Starts with Basic Needs

1. **Energy needs being met within the building…**
2. **…for as long as practically possible**

Why?

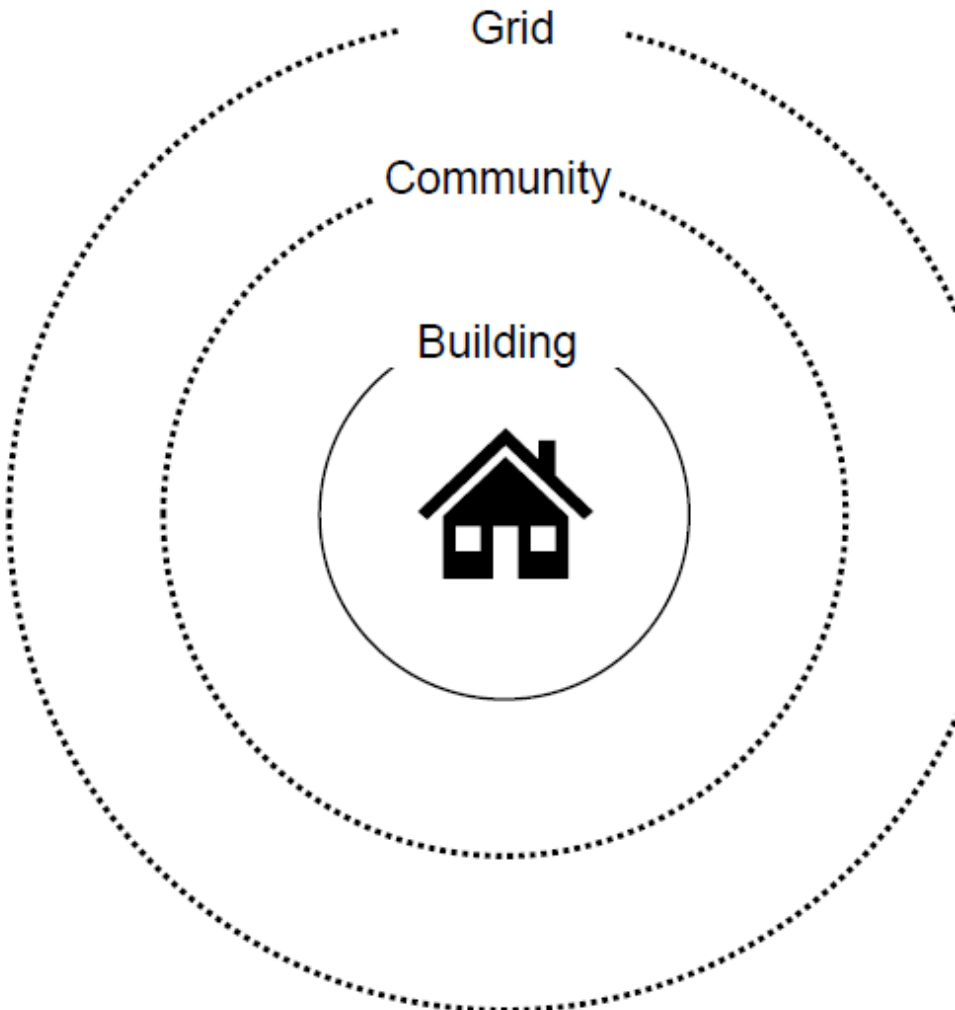
To reduce negative consequences on households and limit or slow the burden placed on social infrastructure



Key Dimensions of Building Energy Resilience

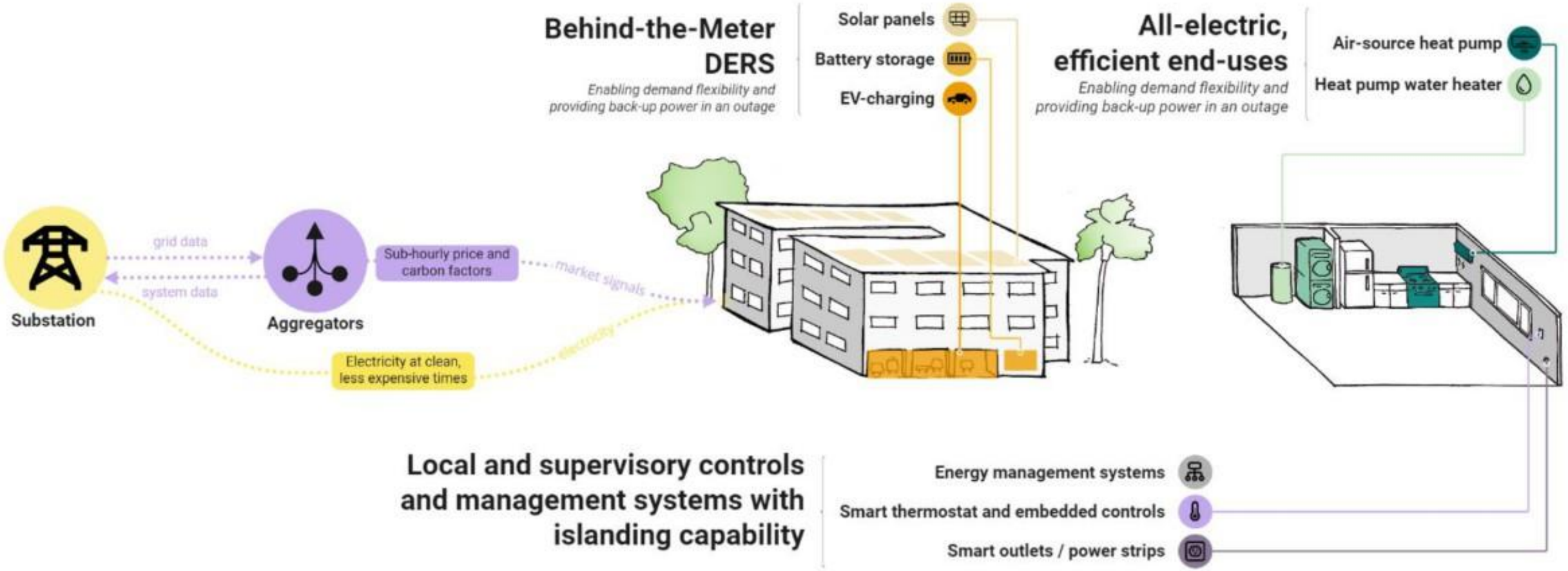
- **Building Energy Resilience:** buildings meet needs of occupants across a range of operating conditions

- **Buildings As Grid Assets:** buildings help manage demand and limit peak loads to support grid resilience



What does good look like?

Building Energy Resilience + Building as Grid Asset



Solutions Vary

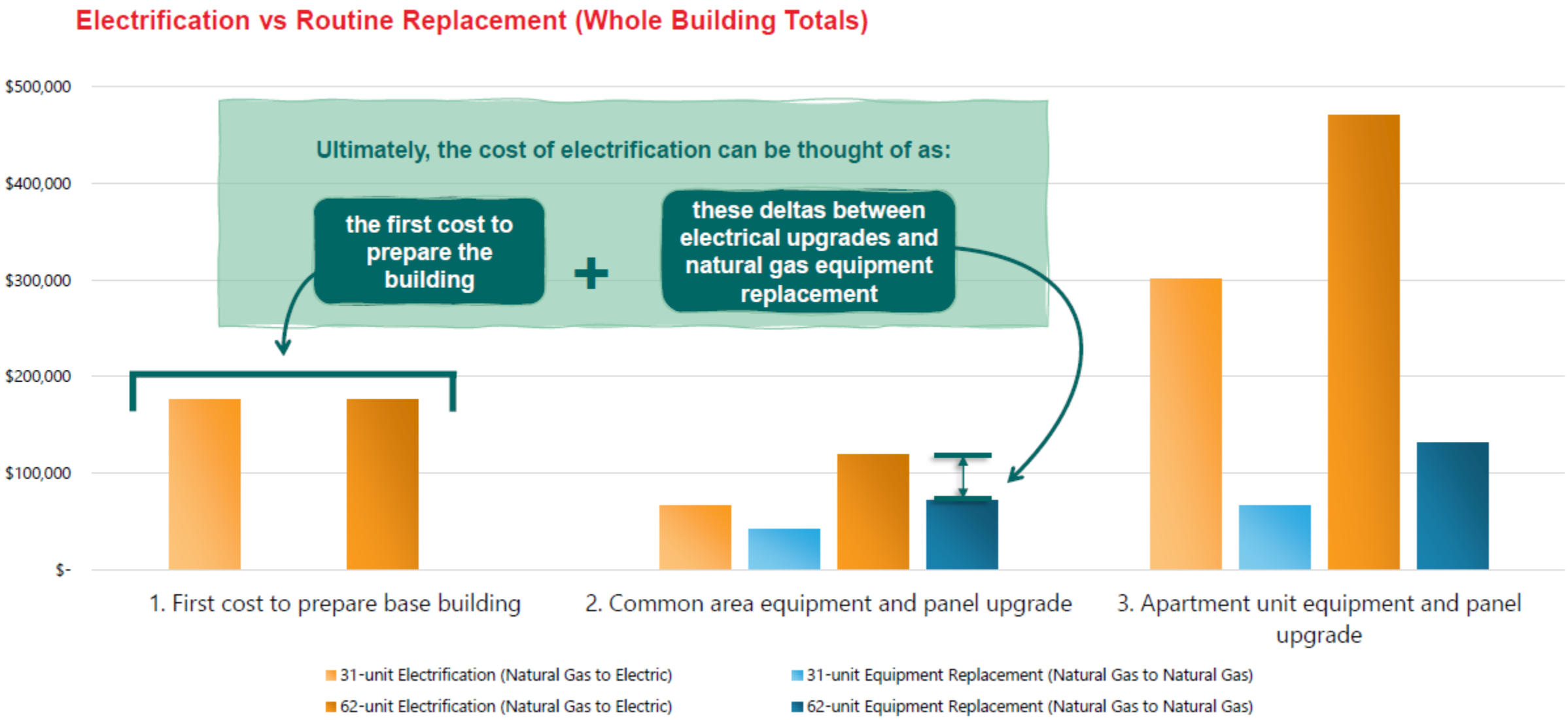
Based on Occupant Needs

Homes: Needs vary based on ability, age, medical needs

Community Resilience Hubs: Local facilities that can support in emergencies

Hospitals: Require highest levels of energy resilience

Upfront Costs Implementation



Barriers exacerbate inequalities

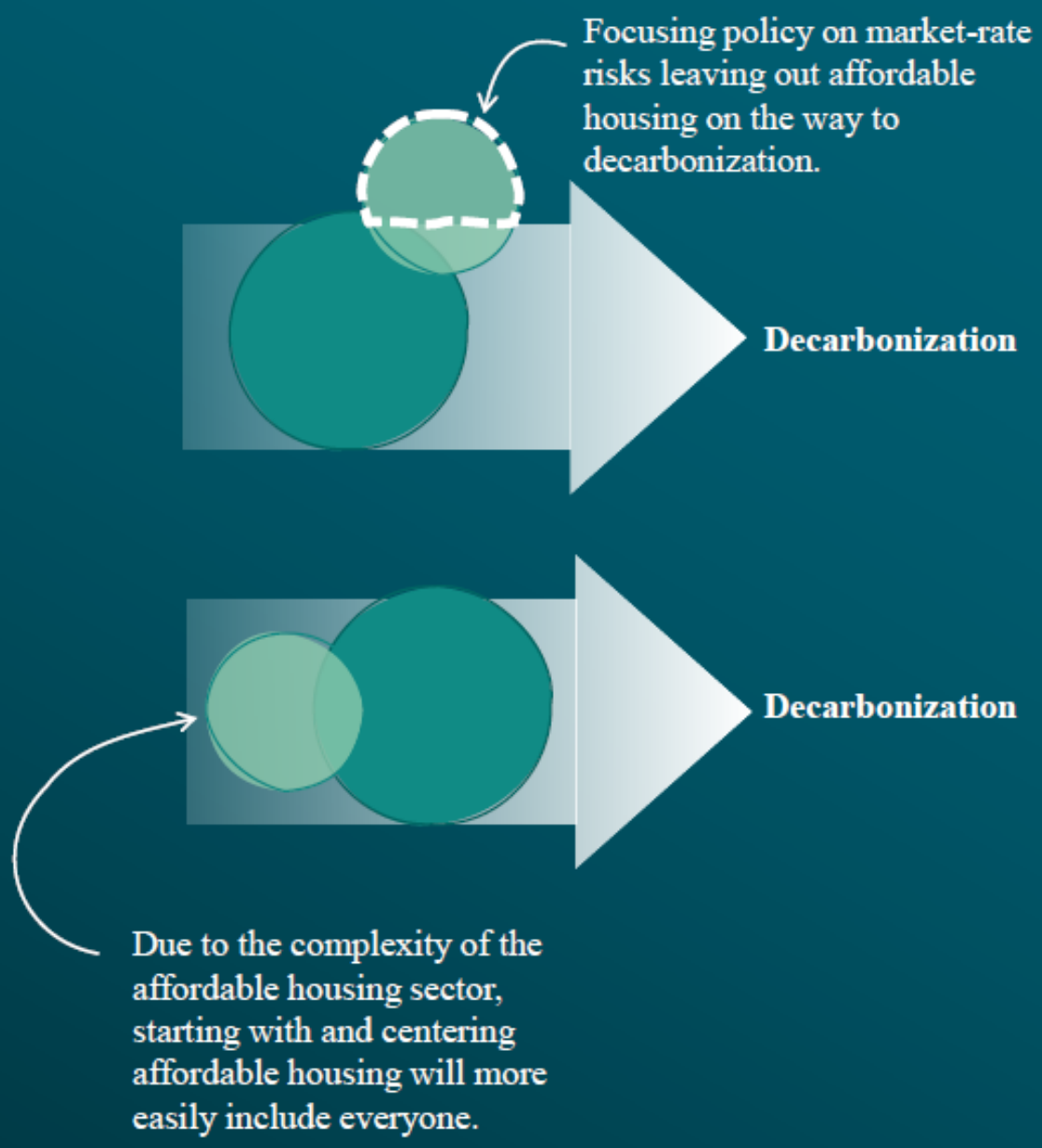
- Low-income communities historically left out
  - Affordable and multi-family housing not well served by energy programs
  - Low-income communities of color bear the burden of climate impacts
  - First costs can trigger displacement
  - Excluding low-income communities of color perpetuates disinvestment

Changing the Frame

- Bottom-up market transformation

Affordable Housing

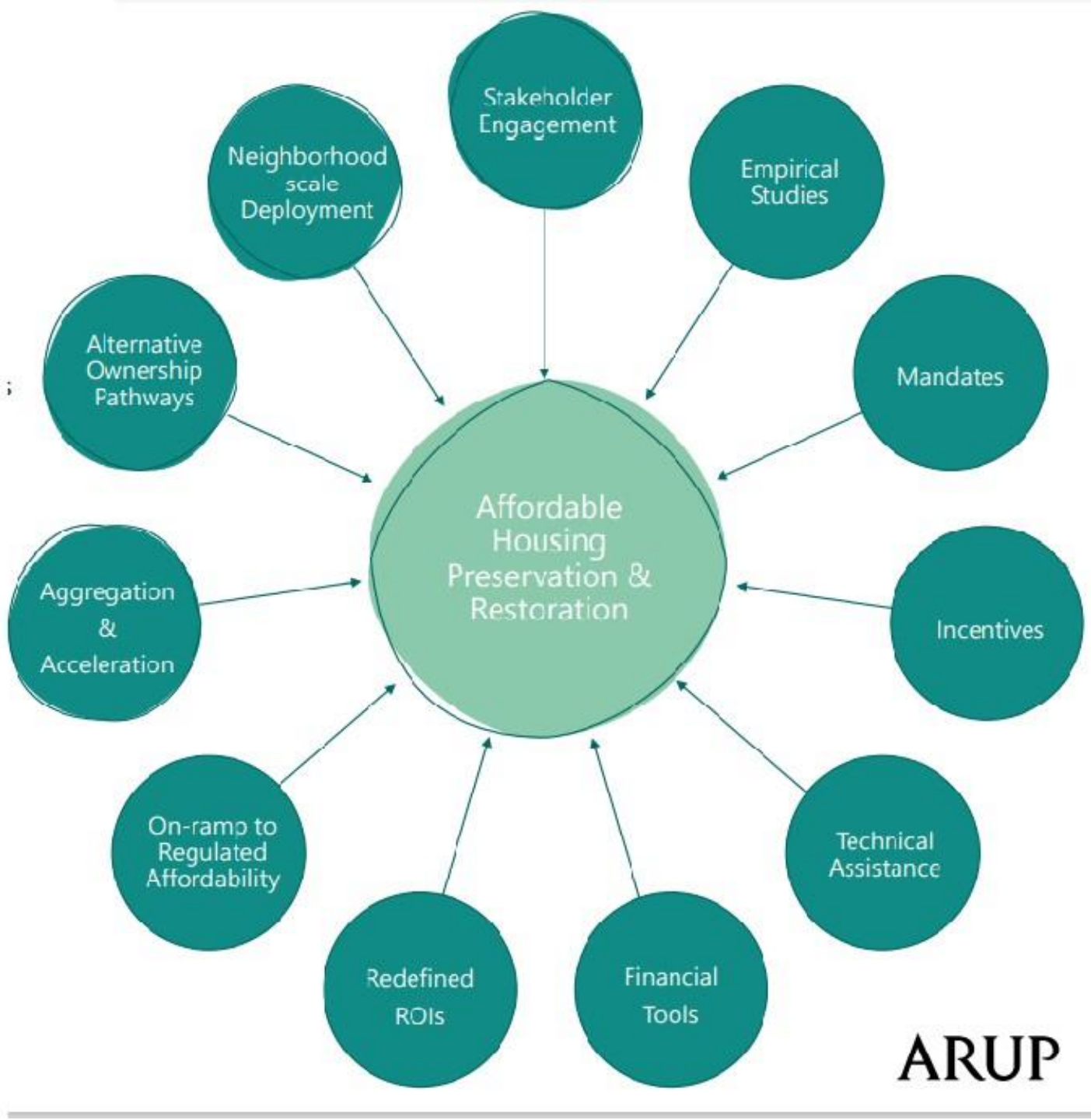
Market rate residential and commercial buildings



Equitable Solutions

Requires an Ecosystem Approach

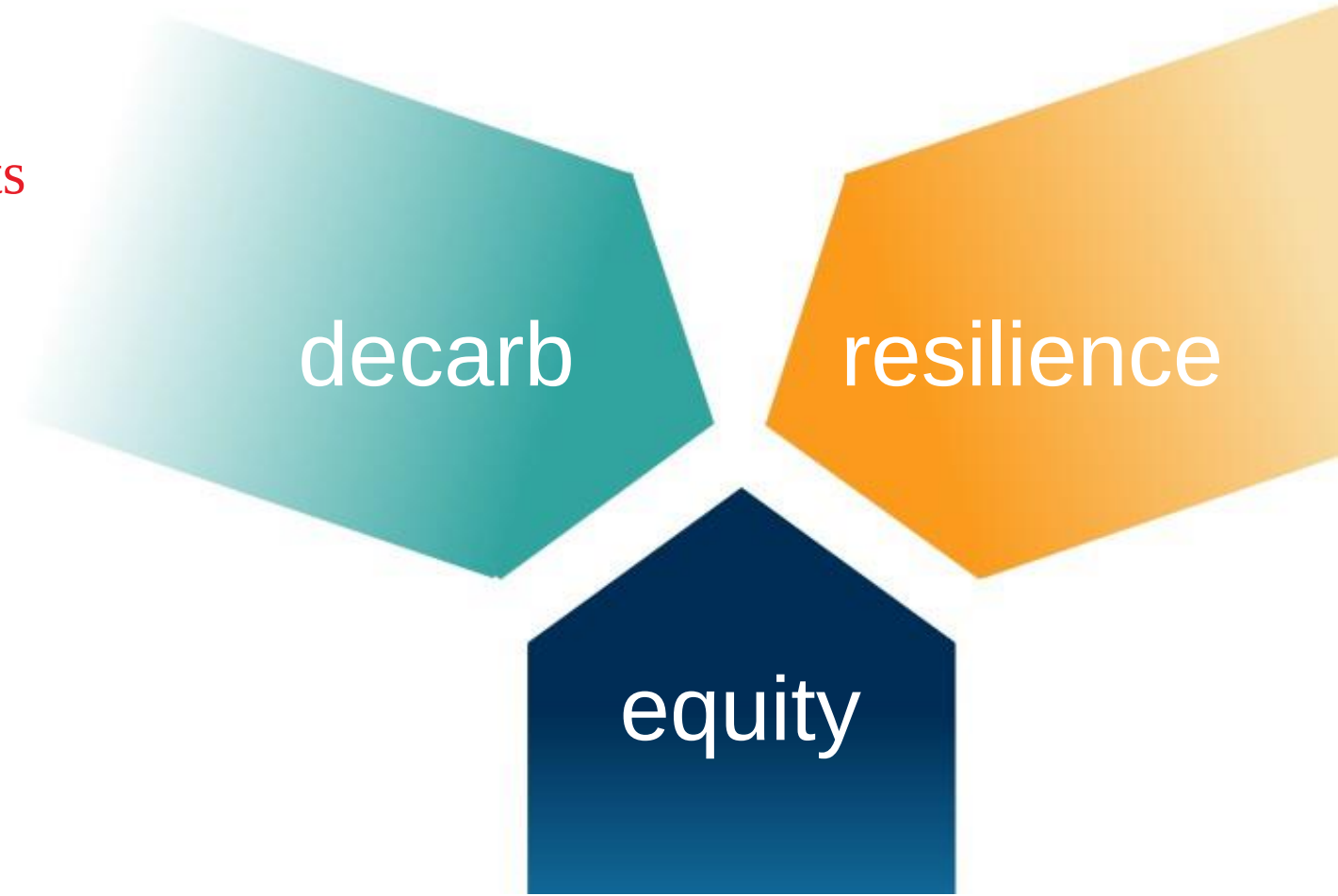
- Put basic needs first and protect low-income communities
- Will require collaboration between utilities, local governments, funders, contractors, providers, others
- Pathways should be scalable across sectors



The Role of Codes and Standards

Rethink What Buildings Need to Accomplish

- How can buildings meet basic needs in a changing climate?
- Set standards for energy resilient buildings and buildings as grid assets
- Work with partners to protect affordable housing
- Build adaptive capacity at building and community scale



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Allow Flexibility and Clarity