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The Oakland EcoBlock Phase 2: A Zero Net Energy, Low Water-Use Retrofit Neighborhood Demonstration Project (poster presented at the CEC EPRI Electrification Summit 2026)

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The Oakland EcoBlock Phase 2:

A Zero Net Energy, Low Water-Use Retrofit Neighborhood Demonstration Project

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Energy Commission EPC-18-013: \$5,000,000 + \$3,491,565 match; Oct 2019 - Nov 2026

Goals:

- Provide **affordable access to solar, energy & water-efficient upgrades**
- Improve **indoor air quality and thermal comfort** as well as **energy resilience**
- **Rapidly reduce greenhouse gases**
- **Strengthen community**
- Develop a **scalable template for block-size retrofits**

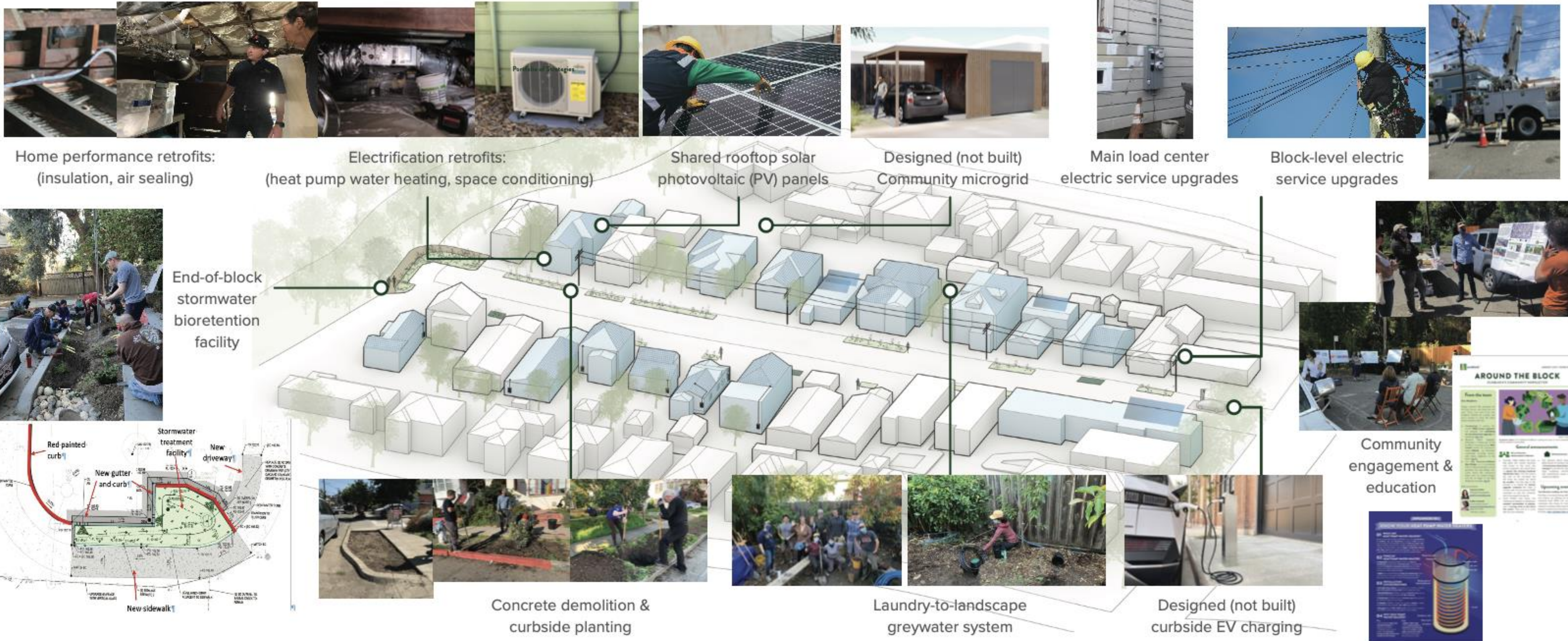
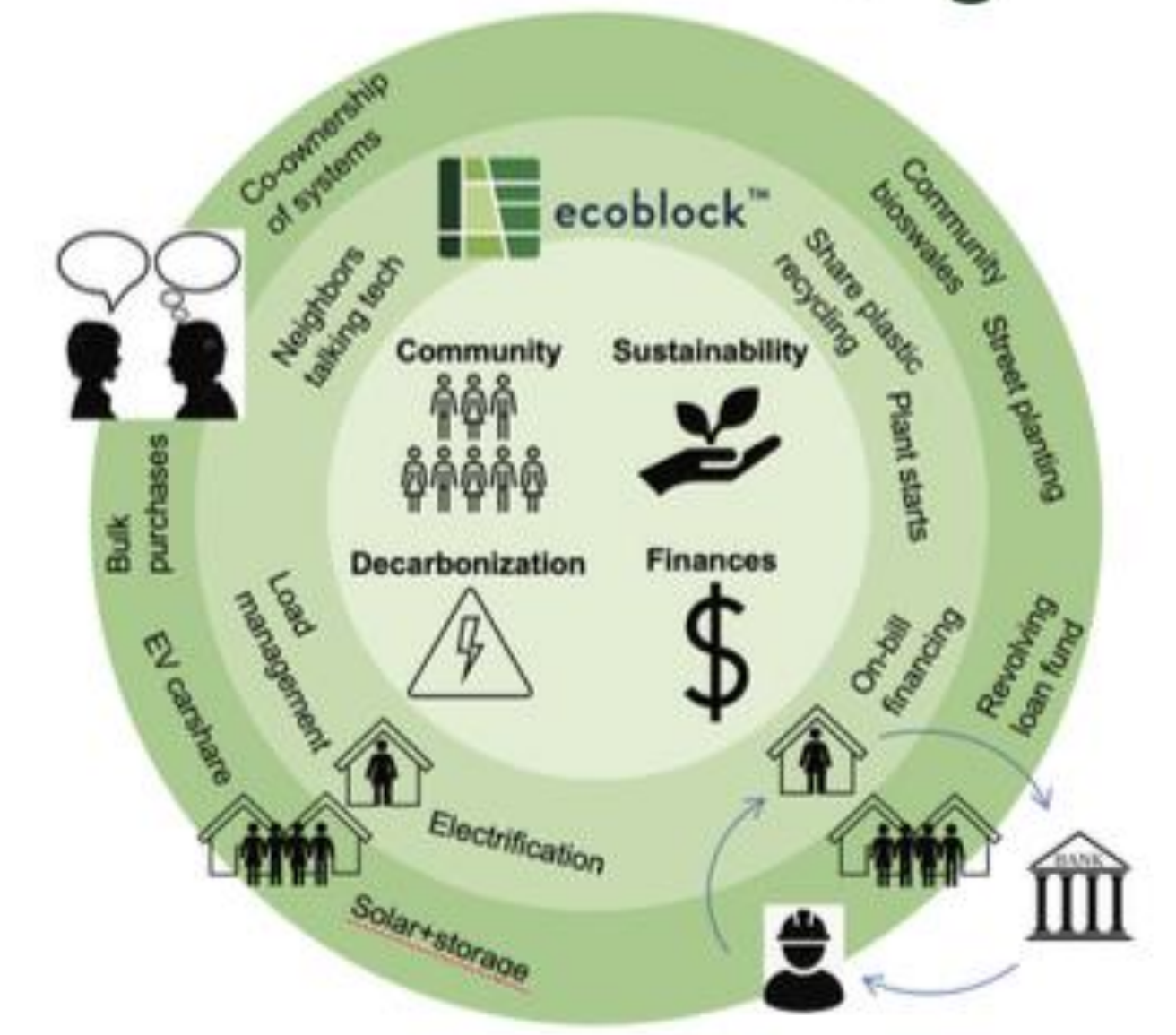
Unique features:

- Retrofits of older, 1-4 unit urban housing
- Shared rooftop solar
- Stormwater mitigation & street planting
- Community ownership via a nonprofit Association
- Design for shared curbside EV charger
- Design for shared solar microgrid (not funded)

Next steps:

- Complete electrification
- Complete rooftop solar
- Connect loads
- Test shared solar credit/Association fee assessment
- Interview residents
- Write up lessons learned in Guidebook
- Papers, workshops, other dissemination

Portfolio of Strategies



Milestones

Social



Block self-nominated: Released an Opportunity Notice to invite blocks to self-organize and participate.
Hire a community liaison: a woman of color, Oakland native
Held block meetings: start with music, always had food, listen to concerns of the community (bulky trash pickup, parking issues, how to get abandoned car hauled away.)
Provide tangible benefits: bioswale at end of block and new sidewalk and plants, trees, mulch
Community-owned solar: helped homeowners develop a homeowners association to co-own the rooftop solar.
Consensus method: community decisions used ranked choice voting with stated objections
Educate: monthly newsletter with project news and color infographics to explain complex technologies and concepts
Provide translation and interpretation: Chinese and Spanish translations for legal documents and interpretation for critical decisions.

Technical



Home performance upgrades in 24 units: vapor barrier, air sealing, insulation in attic and crawlspace/basement where possible
Electrification of space conditioning and water heating
Electrification of cooking and clothes drying (planned)
Upgraded electrical service and new main load center
Rooftop solar (104kW) mostly operational
Laundry to landscape irrigation workshop at one home
Built a bioswale at the end of the block to reduce the flow and clean stormwater before entering creek
Removed concrete (1000 sf) in the sidewalk planting strips to decrease runoff
Planted six trees and mulched planting strips
Design and engineered microgrid with rooftop solar and front-of-the-meter battery (with soundproofed and air conditioned enclosure shed) with grid forming inverter, grounding transformer, reclosure, and all safety equipment.
Designed a **curbside EV charger & EV car share**.

Regulatory & Legal



Worked with **PG&E** on microgrid CMET application and engineering
Worked with PG&E on **solar interconnection** (NEM2.0, NEM-V and NEM2A applications).
Worked with PG&E on **distribution electrical capacity** upgrade from single phase 4 kV to three phase 12 kV overhead electrical lines
Worked with **co-operative lawyer to create Homeowners Association** to co-own solar: Bylaws, Membership Agreement, Easements, filings with County Assessor's office and State
Working with the **City of Oakland** on creek protection permit and other permits for bioswale, curbside EV charging, building permits; discussion of unpermitted work.

Financial



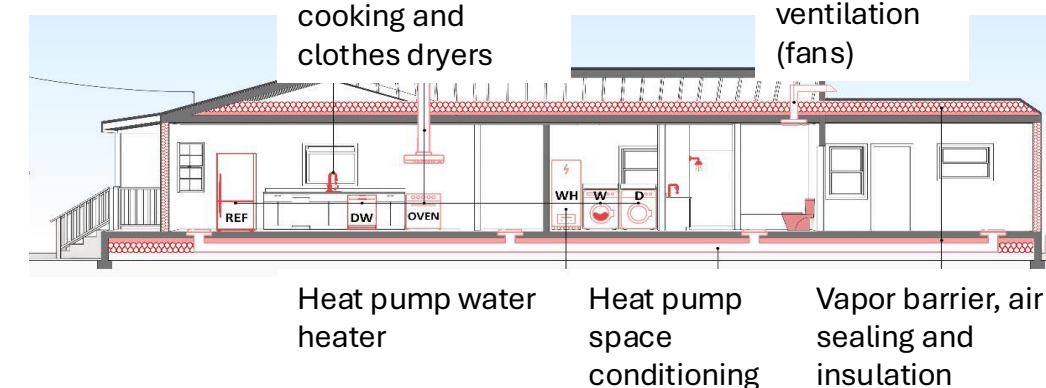
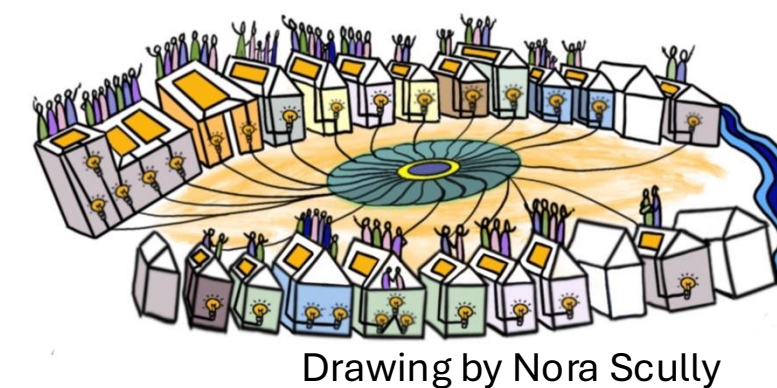
Developed **business models:** zonal decarbonization lends to natural gas decommissioning which aligns with SB1221
Developed detailed **Operation and Maintenance cost estimate** for microgrid
Obtained insurance for co-owned rooftop solar **insurance** as well as Directors and Officers insurance for the HOA.
Found low-cost **loan** and **rebate** information, on bill financing
Working with Ivy Energy and HOA toward **collecting fees** to cover the costs of insurance and **equitably distributing solar credits** among the 25 units.

Challenges

- Energy bills went up in some homes
 - Uninsulated homes
 - Customer didn't work with PG&E to move to electric heat baseline
 - Customer didn't know how to use new thermostat, use wrong setbacks for heat pump/insulation level, system on all the time
- Local government interactions
 - Homeowners concerned about unpermitted work
 - Tenants concerned about rent increases
 - Upgrade permits may trigger property tax re-assessment (although not for solar or like-for-like replacements)
- Renter-occupied buildings
 - Tenant/landlord split incentive (less a problem in 2-3 unit, owner-occupied buildings)
 - Rent increases after upgrades (somewhat mitigated by Oakland's renter protection laws
 - Who pays the HOA fees: owner or tenant?
- Language and technology access barriers
 - All materials need to be available in Spanish and Chinese, including community meetings
 - Some people may need oral communication, not written
- Some residents do not have Internet access

Lessons Learned

- Neighborhood-scale decarbonization leverages **economies of scale**
 - In construction:
 - Fewer truck rolls
 - Bulk purchasing
 - Lower price from contractors (coordinated work, reduced soft costs of customer acquisition
 - Reduces "half day labor" inefficiencies
- **Engage the Community!**
 - "Change moves at the speed of trust"
 - - Stephen M.R. Covey
 - **Tangible projects:** tree planting, share recycling
 - Address quality of life (safety/security, health/safety
- Engage the **neighbor or peer effect** of technology adoption (like solar is "contagious")
 - Provide education and provide opportunities for **neighbors to talk to each other**
- **Microgrids more cost effective** where resilience is valued (rural, wildfire prone)
- Conduct **home performance** along with electrification! (and solar)
 - Fuel switching cooking and clothes dryers
 - Mechanical ventilation (fans)
 - Heat pump water heater
 - Heat pump space conditioning
 - Vapor barrier, air sealing and insulation
- Work towards low cost everywhere
 - Low-power electrification
 - 120V systems, switching
- Preserve existing housing stock!
 - Address equity, support lower embodied carbon



Oakland Policy Lessons for Neighborhood-Scale Decarbonization

Melanie Colburn, City of Oakland



Based on its experience with the EcoBlock pilot project, the City of Oakland is developing policy recommendations to facilitate additional scaled decarbonization projects in existing buildings, with a focus on the residential sector. These policy lessons align with and support the Oakland's Equitable Climate Action Plan and further the city's 'better neighborhoods, same neighbors' vision aimed at encouraging investment while avoiding the displacement of existing communities.

1. Trust is a precondition for participation.

EcoBlock Pilot Context: Fully subsidized (free) upgrades did not secure one-hundred percent block enrollment in the pilot. Fear of exposing pre-existing code violations or unpermitted units contributed to opt-outs.

Oakland Policy Lesson: Owners will not open their homes to a retrofit program they perceive as a pathway to enforcement. A proposed **Decarbonization Amnesty Program**, modeled on the city's ADU Amnesty Program, would shield participating owners from citation of minor and moderate health-and-safety code violations encountered during electrification work. By decoupling participation from enforcement risk, the program addresses a hidden barrier that incentive dollars alone cannot overcome — and signals that the city's priority is decarbonization, not punishment.

2. Block-scale projects require streamlined permitting and inter-departmental coordination.

EcoBlock Pilot Finding: Existing codes and permitting processes are built to manage individual parcels. The pilot negotiated grouped utility review and a single designated inspector to treat 15 buildings as one coordinated project.

Oakland Policy Lesson: Multi-property electrification and decarbonization require siloed city departments planning, building, public works, and the utility liaison—to work together in new ways that current processes do not support. By **streamlining existing codes and permits**, block-scale projects can move through them efficiently. A **Decarbonization Demonstration Ordinance** under development would establish a defined pathway for neighborhood-scale projects, replacing the exceptions made for this first-of-a-kind project with predictable, coordinated interdepartmental review.

3. Municipalities are uniquely positioned to facilitate economies of scale.

EcoBlock Pilot Finding: Bulk procurement and grouped contractor mobilization—solving the "half-day labor problem" of single-home jobs—delivered cost reductions.

Oakland Policy Lesson: The savings available through aggregation are inaccessible to individual owners, who lack the scale to negotiate bulk pricing or coordinate contractor scheduling across properties. Cities are uniquely positioned to play this **facilitator role**—acting as program coordinator across blocks, aggregating procurement, and vetting trusted contractor mobilizations. A city's public-interest commitment and institutional stability also allow it to serve as a trusted underwriter to vendors, conferring confidence that the program will remain rooted in public service rather than private margin extraction.

4. The "neighbor effect" requires programmatic investment.

EcoBlock Pilot Finding: In-person sessions with food and music leveraged and deepened social cohesion. Trusted residents proved the most effective recruiters.

Oakland Policy Lesson: Community engagement is the mechanism through which participation accrues. Effective programs require dedicated resources for meaningful engagement delivered in partnership with existing **neighborhood leaders and networks**. Investing in this layer also produces a co-benefit the technical retrofit cannot deliver on its own: stronger neighborhood social cohesion, which itself contributes to community resilience.