BUILDING
DECARBONIZATION
COALITION

BDC PRESENTS

Neighborhood Scale

The Future of Building Decarbonization

Thursday Jan. 25, 2024
10am PT / 1pm ET

About the BDC

The Building Decarbonization Coalition (BDC) aligns critical stakeholders on a path to transform the nation's buildings through clean energy, using policy, research, market development and public engagement.

The BDC and its members are charting the course to eliminate fossil fuels in buildings to improve people's health, cut climate and air pollution, prioritize high-road jobs, and ensure that our communities are more resilient to the impacts of climate change.

- **Sign up for our newsletter!** https://buildingdecarb.org/newsletter
- **Membership is free!** Join us! buildingdecarb.org/join

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Thank you to our Trailblazer Members!

Upcoming Events

Policy Calls

California
February 20th, 10am PT

National (New Jersey)
February 27th, 10am PT/ 1pm ET

BDC Presents

February 29th, 10am PT/1 pm ET

Topic: Rate Affordability

NY Thermal Energy Networks Summit

March 6th, 8:30am ET in person
Albany Capital Center

Webinar Logistics

- Everyone is muted
- Ask **questions** for our panelists in the **Q&A.**
- Drop **comments** for the whole group in the **chat.**
- This webinar is being recorded and will be placed in our website's Resource Library.
- All registrants will be emailed with a link and additional resources early next week

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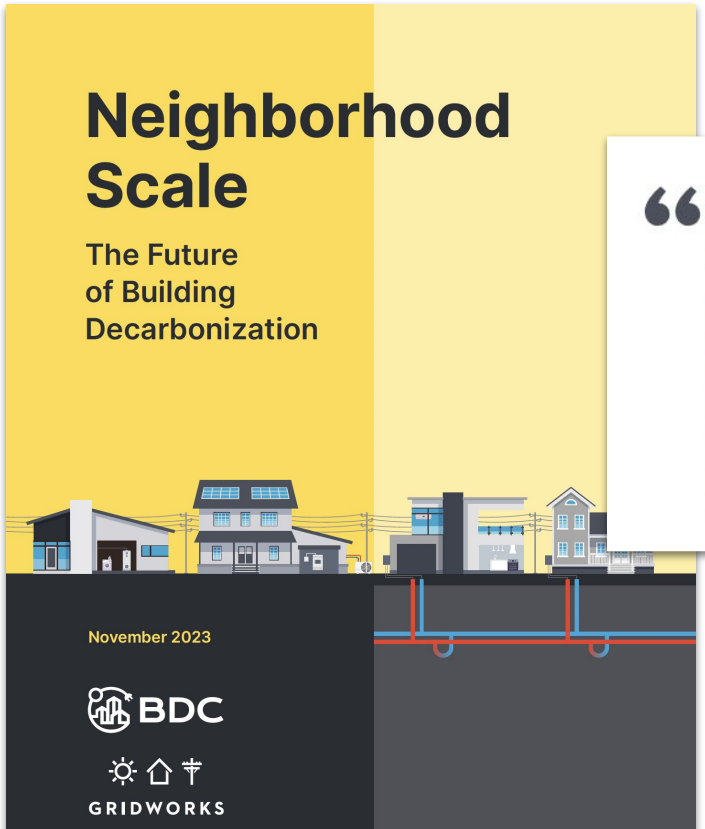
Today's Panelists

Panama Bartholomy
BDC
Executive Director

Rachel Kuykendall
PG&E
Principal Strategic Analyst

Jared Rodriguez
Emergent Urban Concepts
Principal

Announcing: The Neighborhood Scale Whitepaper



> “There seems to be a real ‘roll up your sleeves’ moment right now where people really want to put things into motion.”
>
> **Jose Tengco**
> BlueGreen Alliance

buildingdecarb.org/resource/neighborhoodscale

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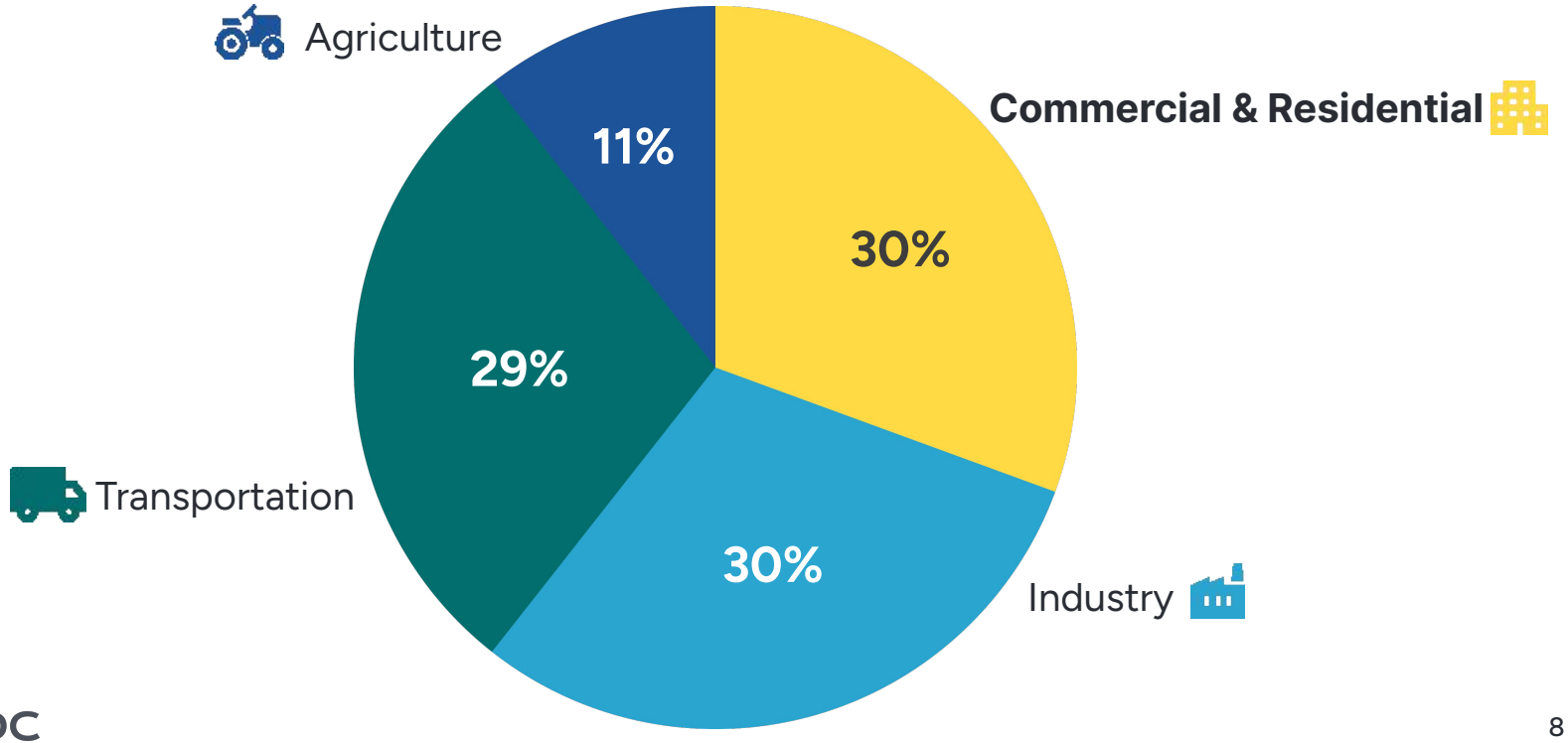
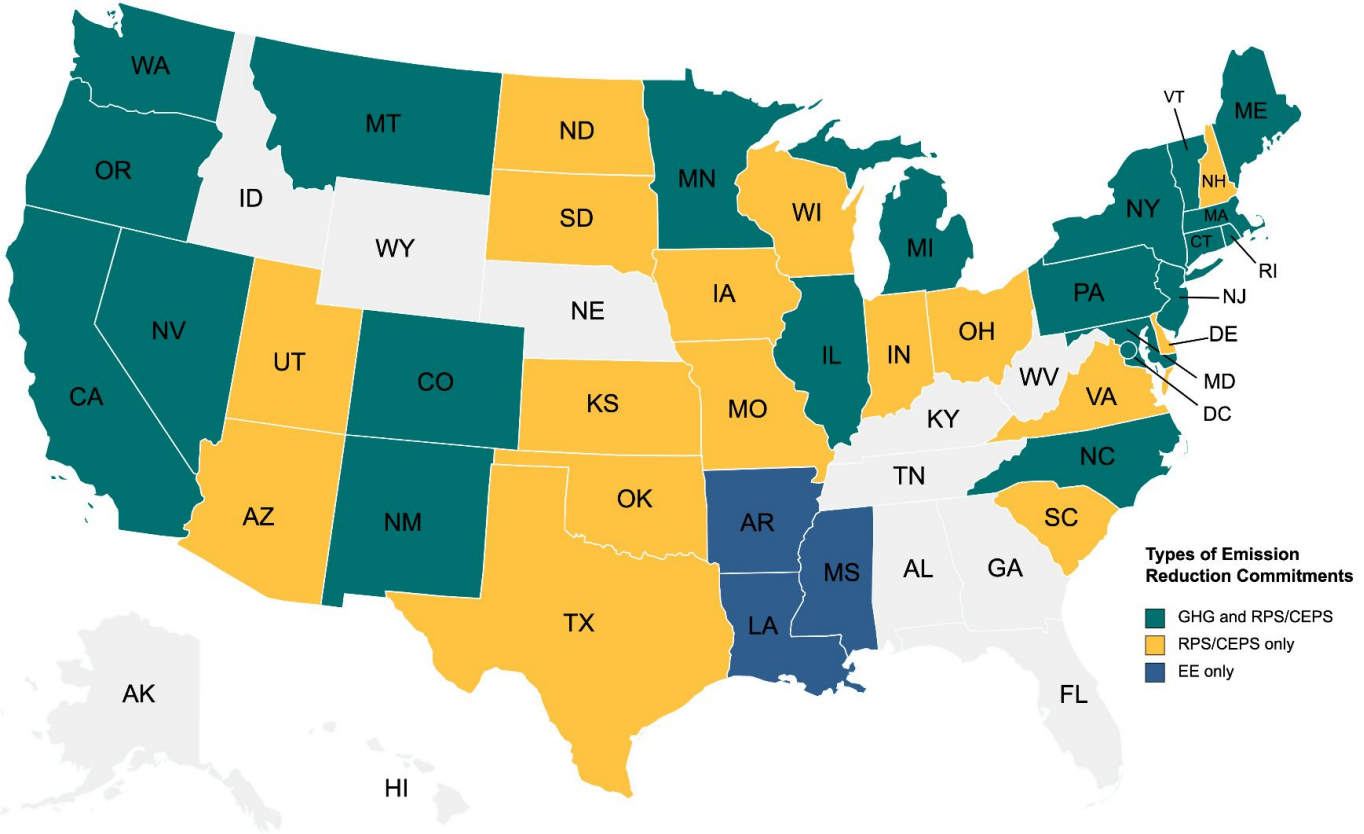
Buildings account for 30% of our greenhouse gas emissions



We need to decarbonize buildings to reach our climate goals



https://www.naruc.org/nrri/nrri-activities/clean-energy-tracker/

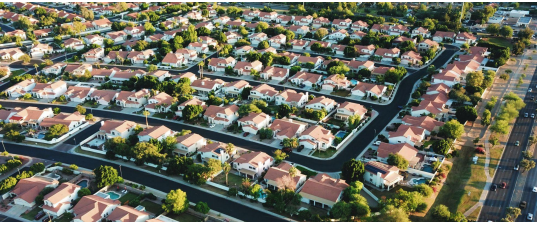
...and there are a lot of buildings (~110M in US)









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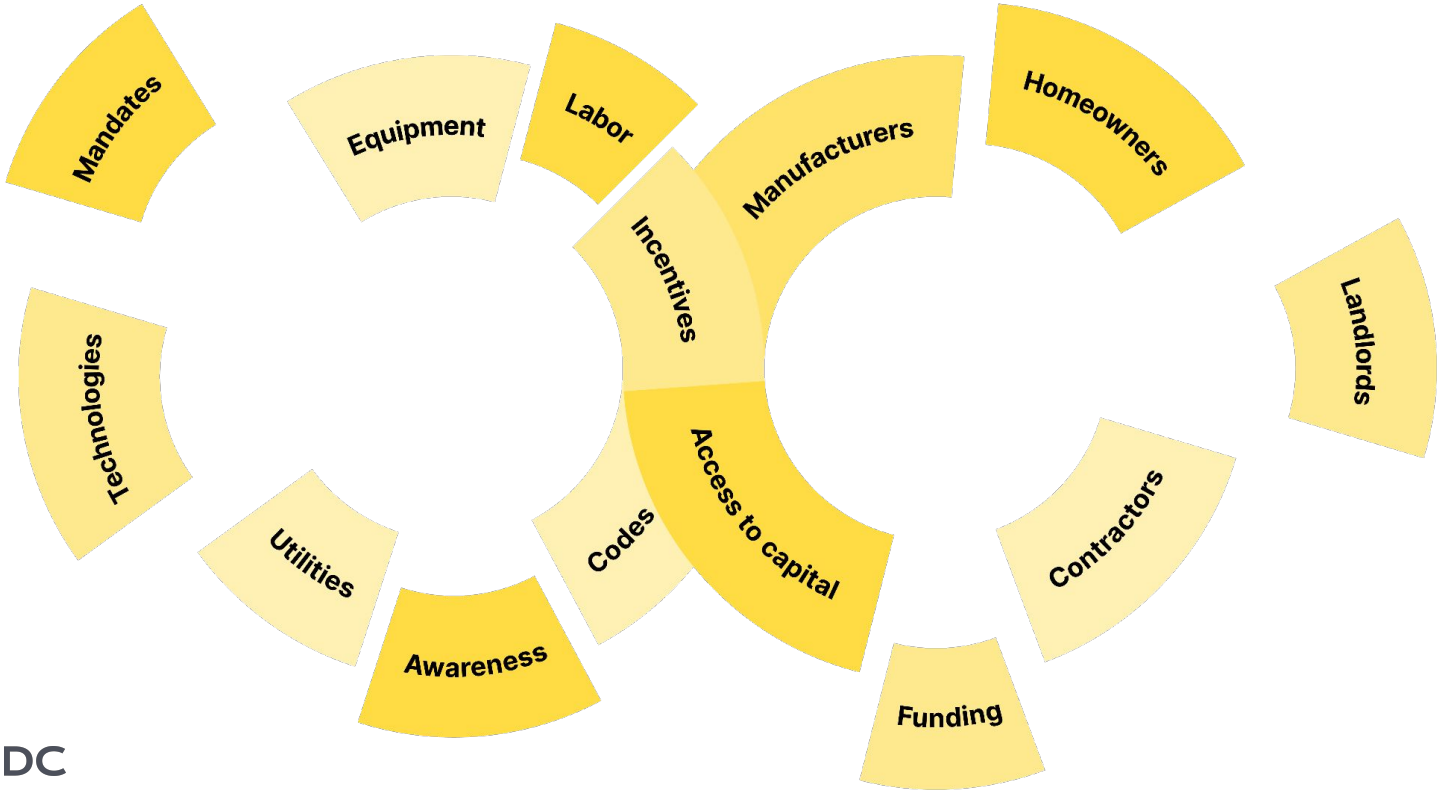
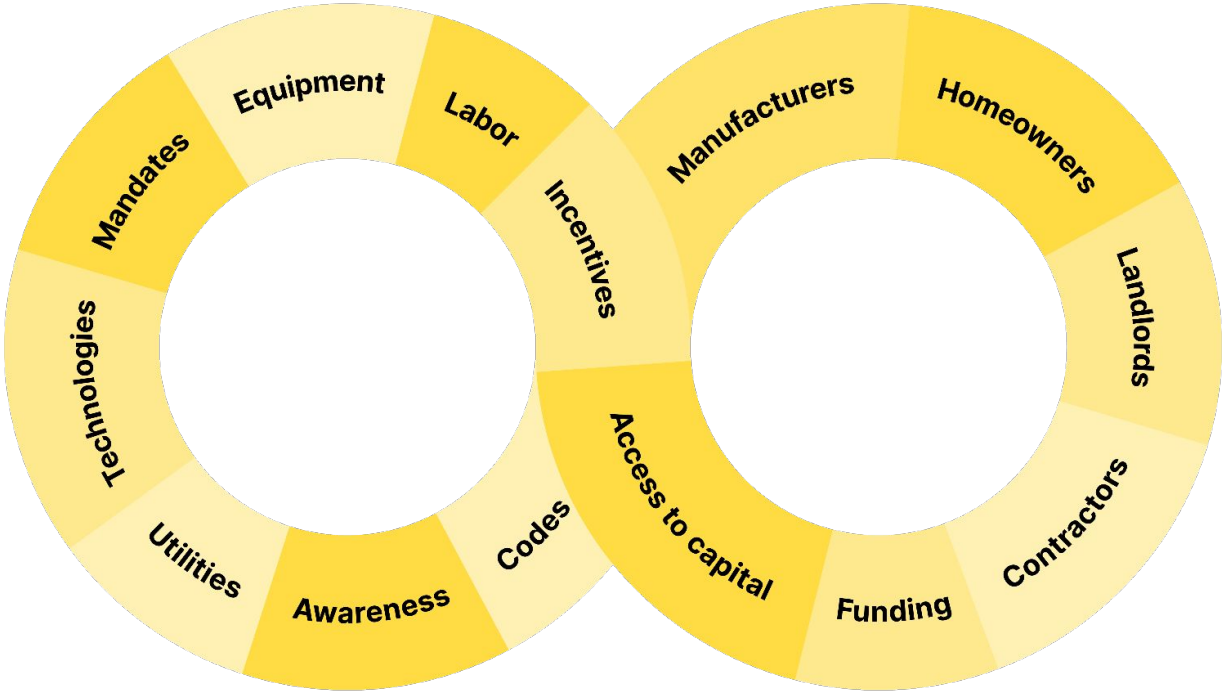
Our current approach to decarbonizing buildings is a mosaic of actors, decisions, and resources*



*this list is representative, not exhaustive; in reality, this list is 10x as long and includes tenants, community leaders, advocates, engineers, regulators, legislators, developers, builders, architects, training programs, education and awareness programs, local governments, customer service agents, and so on...

What we need is a coordinated, scaled, and managed transition



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We need neighborhood-scale building decarbonization

A strategy for transitioning entire communities to decarbonized energy sources and electric appliances with the end goal of managing the transition off of the gas system.

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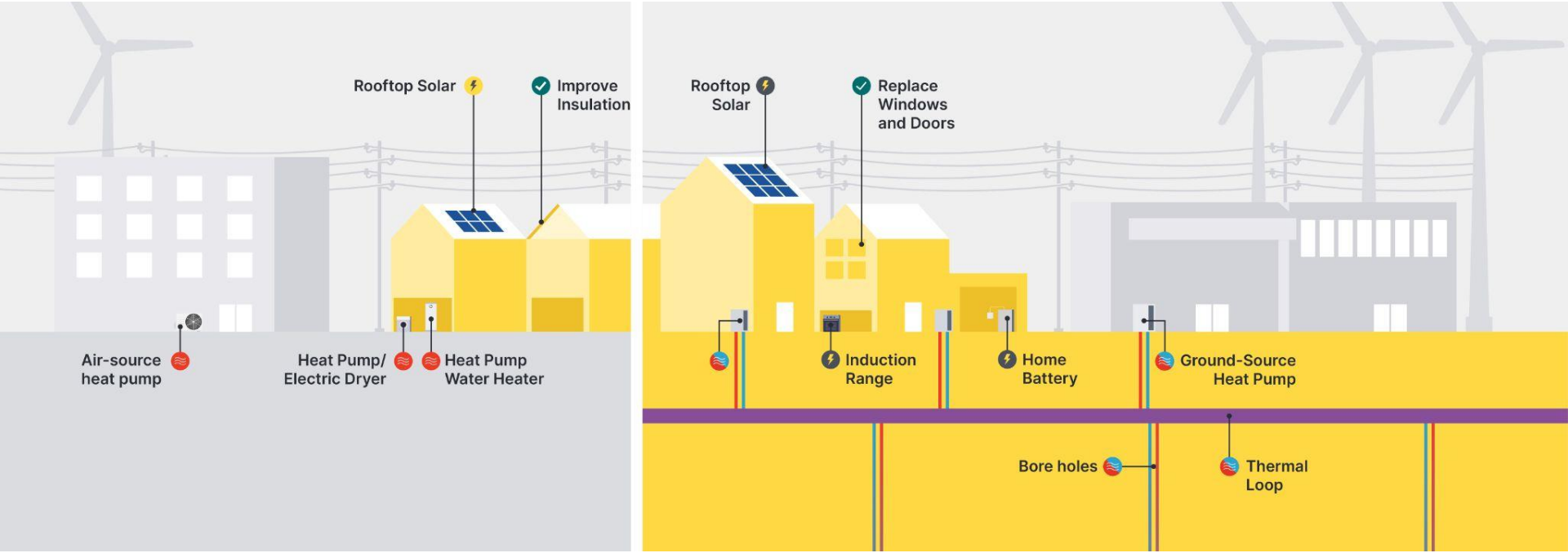
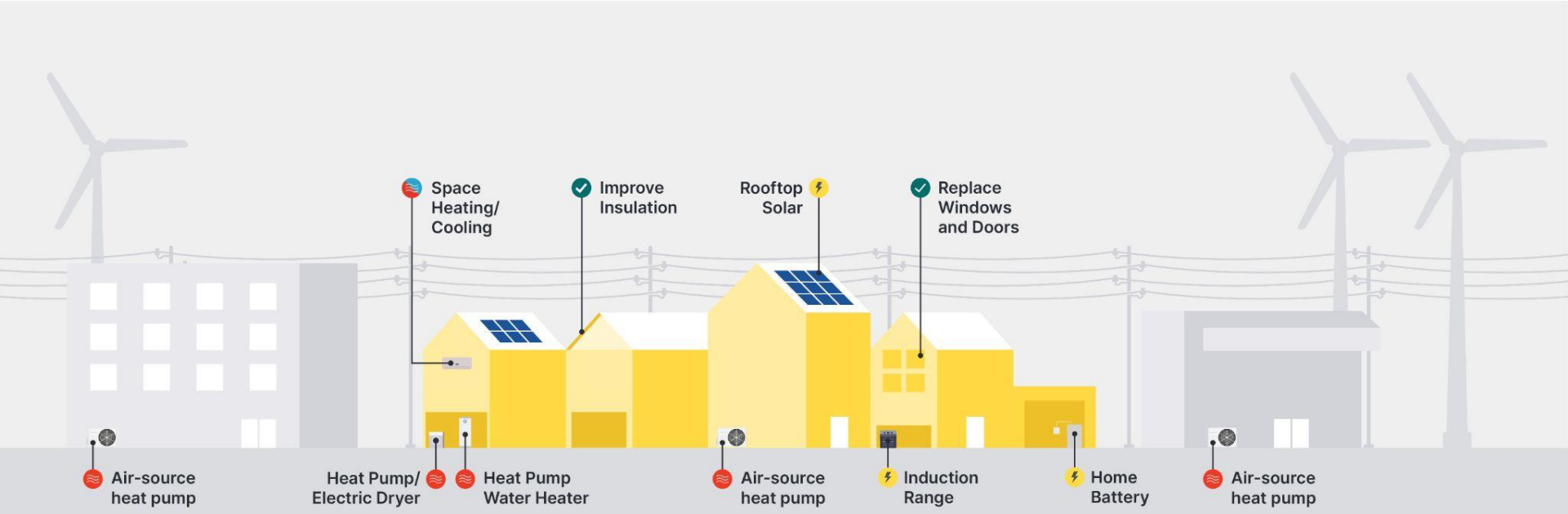
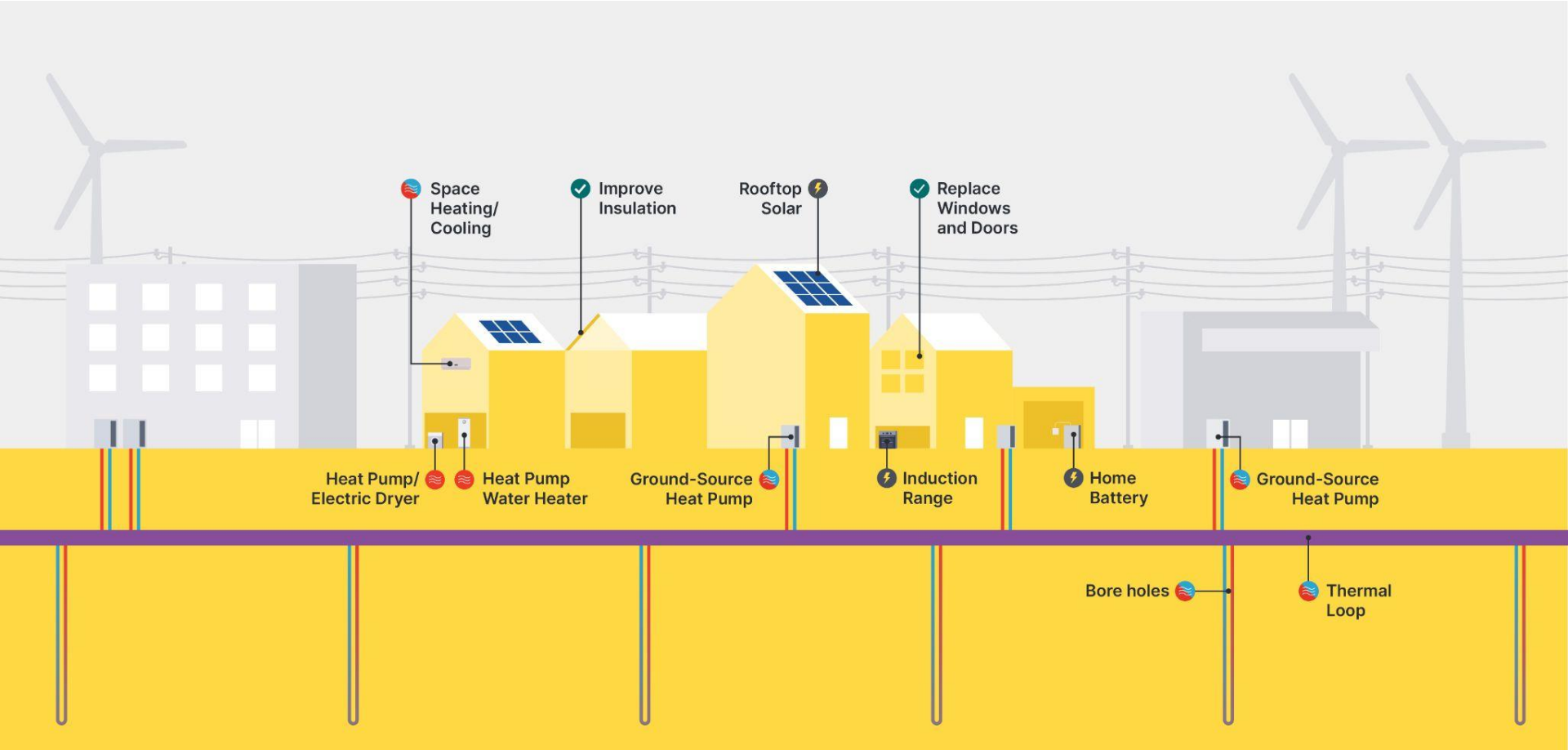
There are two primary pathways for achieving neighborhood decarbonization



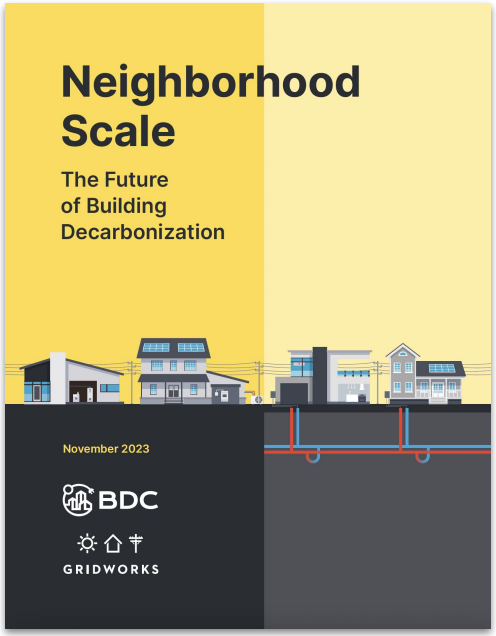
Electric Network



Thermal Energy Network (TEN)



Read our report for our recommendations on how to support neighborhood decarbonization in your community



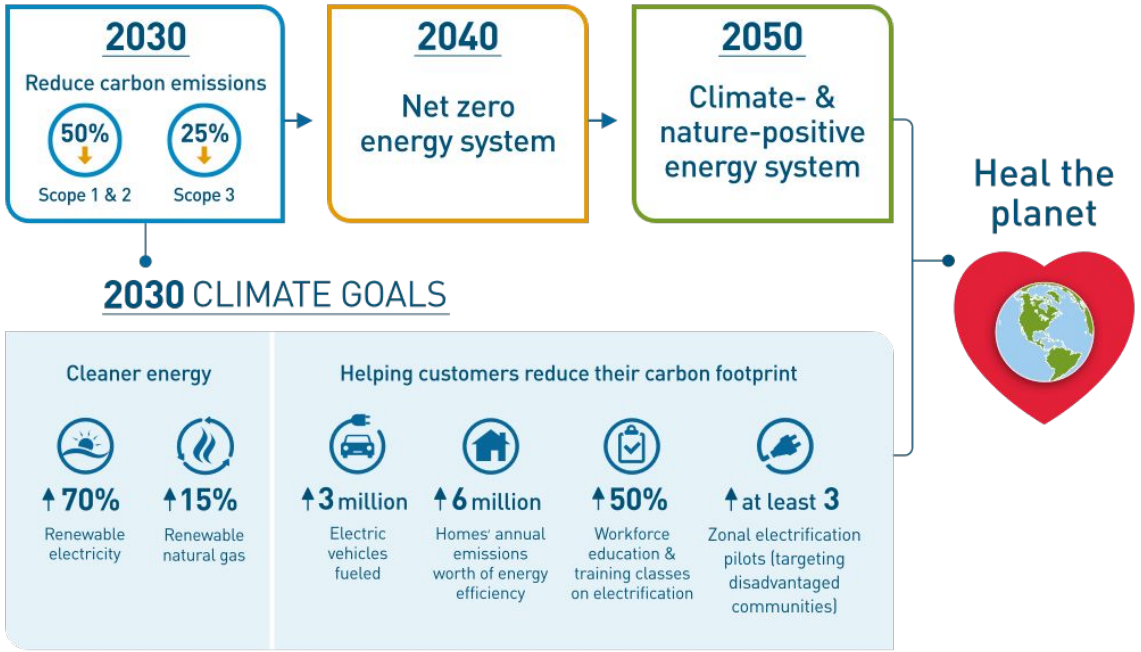
Regulatory, legislative, social, and economic changes are needed to advance neighborhood decarbonization to meet our GHG reduction goals, improve air quality, increase comfort, and manage energy affordability.

buildingdecarb.org/resource/neighborhoodscale

PG&E Neighborhood Scale Electrification Efforts - Current and Future

Rachel Kuykendall
PG&E

PG&E's Climate Goals



Notes:

Scope 1: *Direct* emissions from PG&E's operations.

Scope 2: *Indirect* emissions from facility electricity use and electric line losses.

Scope 3: Emissions resulting from *value chain activities* not owned or controlled by PG&E but that can be indirectly impacted by PG&E actions.

"Scope 4": An emerging term for categorizing emission reductions enabled by a company. PG&E can make a significant contribution by enabling these emission reductions in our service area.

Targeted and Zonal Electrification

	Targeted Electrification	Zonal Electrification
Motivation	Geographic electrification and/or retirement of gas assets, with the goal to reduce gas rates through the avoidance/reduction of gas utility spending.	Geographic electrification and/or retirement of gas assets, based on equity, risk, cost savings, etc.
Primary Actors	Gas utilities	Communities, Regulators, Gas utilities
Scale of Projects	1-2 buildings, generally on PG&E's transmission system	10+ buildings, generally on PG&E's distribution system
How Projects are Funded	Avoided gas spending	Existing energy efficiency/electrification programs, non-ratepayer dollars
PG&E Example	Alternative Energy Program	Zonal Equity Electrification Pilot

Targeted Electrification – A Cost-Based Approach to Electrification

Targeted electrification success story:
~2,000 ft Aldyl-A replacement project

	Status quo gas replacement	Electrification alternative
Pipe replacement/retirement	$1.2M	$20K
Customer electrification	-	$130K
Service retirement	-	$6K
TOTAL	**$1.2M**	**$156K**

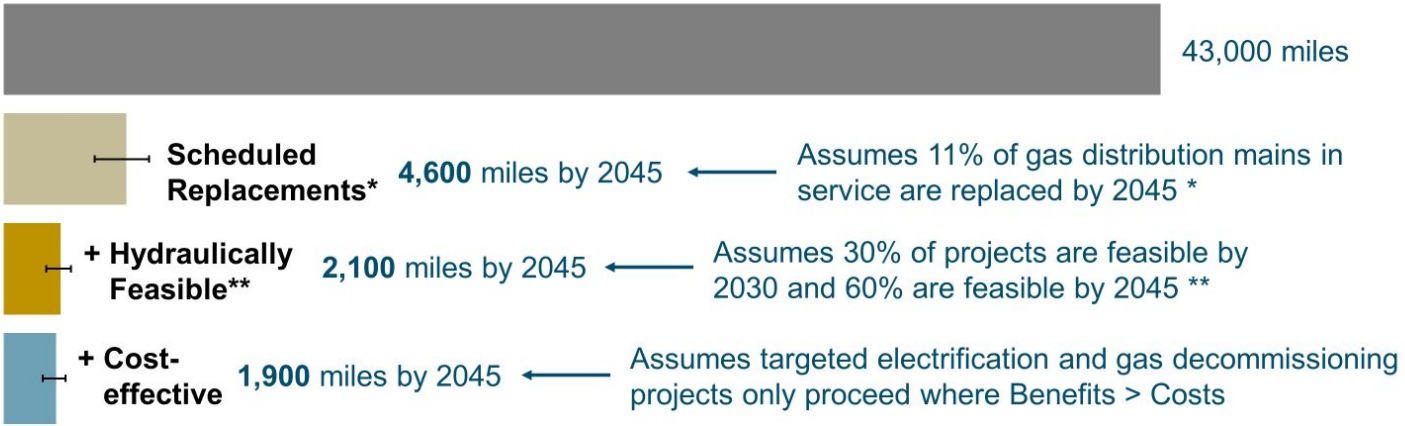
Progress to Date

- PG&E's Gas Investment for the Future (GIF) team evaluates alternatives to gas investments and engaged customers on alternatives to gas service.
- Small-scale projects conducted to date have electrified 102 customers, avoided 80 high-pressure regulator rebuilds and 4.2 miles of distribution main, while enabling the retirement of 22 miles of line.
- On August 10th 2022, PG&E filed an application with the CPUC that asks for up to $17.2 million to pursue targeted electrification at CSU Monterey Bay. Costs of the project would be fully offset by the savings of not having to repair the gas line.

Scaling Early Success

- Scale is dependent on changes to "obligation to serve", external funding, and ability to capitalize behind-the-meter electrification costs.
- Utilities need a streamlined application process for targeted electrification projects to ensure that they can be conducted on a timeline consistent with critical gas safety and/or reliability needs.

Targeted Electrification – A Cost-Based Approach to Electrification



* Error bars reflect a potential range of scheduled pipeline replacements. Low = 163 miles per year (GRC approved); Mid = 219 miles per year (GRC request); High = 260 miles per year (PG&E long-term estimate)
** Hydraulic feasibility based on GIS analysis. ~ 20% of main miles are terminal branches, so this estimate assumes that increasing amounts of non-terminal mains would be feasible over time

Zonal Electrification: Increased focus on Emissions and Equity

The Gas Asset Analysis Tool has various data layers to assess electrification potential of a given geographic area

Progress to Date

- Developed an internal *Gas Asset Analysis Tool* to evaluate potential areas for zonal electrification. The tool includes data such as customer income, prevalence of renters, geographic risks, and electric capacity
- PG&E provides a high-level version of this tool, under NDA, to local governments to allow collaboration on planning efforts
- Submitted a zonal electrification program, targeting low-income neighborhoods, in PG&E's 2023-2027 energy efficiency portfolio

Scaling Early Success

- Similar to targeted electrification "scale is dependent on changes to 'obligation to serve', [significant] external funding, and ability to capitalize behind-the-meter electrification costs"
- Building networks of local, trusted partners is needed to support customer acceptance for community-led electrification

Questions?

Rachel Kuykendall
rachel.kuykendall@pge.com

Planning for **Resource Efficient Decarbonization** at the Neighborhood Scale

A Phased Approach to Eliminating Greenhouse Gas Emissions from Neighborhoods and Communities in Cold Climates.

A **holistic approach,** combined with a realistic phasing plan, can make scaling decarbonization technically and economically feasible.

Presenter: Jared Rodriguez, Emergent Urban Concepts

WE NEED TO NETWORK:
people, plans, and heat

Strategic decarbonization planning entails balancing multiple goals and embracing varied approaches.

ECONOMICS
Upfront costs strain budgets. Energy and maintenance projects can save money over time. Diverting spending from business-as-usual can be leveraged to justify a pivot.

TECH READINESS
The technology to decarbonize big buildings is available, but there is lots of other work to do before replacing main equipment. Take enabling steps first.

SIMPLE SOLUTIONS
Complexity can be expensive and inefficient. How can equipment be used for multiple purposes? What is the simplest way to design a solution?

MAINTAINABILITY
Ongoing costs for maintenance and ability to maintain systems are critical concerns. Find ways to reduce future maintenance by implementing decarbonization measures.

VALUES
Every organization espouses particular values and goals. What priorities exist and how can decarbonization measures advance these goals?

RESILIENCY
Systems should be prepared for disruption and should protect occupants from climate-related threats as much as possible.

BUDGETS & PHASE-IN
Budgets are always tight. Breaking decarbonization into incremental steps can help meet goals, targets, and budgets.

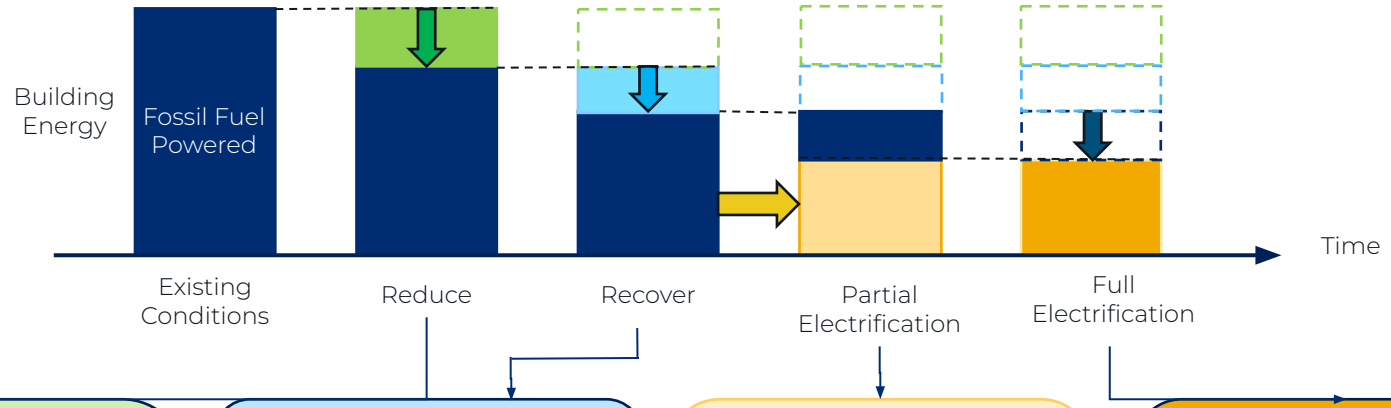
EXISTING PLANS
How can an existing plan or business-as-usual scenario be leveraged to shift gears and implement a new trajectory? Small changes can gradually yield large results.

Forming a Coalition or Consortium is needed to establish goals and identify approaches acceptable to the Community.

image credit: U.S. Dept. of Energy, Geothermal Technology Office

HEAT
is a precious resource

Resource Efficient Decarbonization (RED) is a framework for prioritizing projects within a building or neighborhood.



Reduce Energy Load and Reconfigure

- Building Envelope Improvements
- Control Optimization
- Ventilation Improvements
- Dedicated Outside Air System
- Hydronic Distribution
- Lower Heating Supply Temp.
- Terminal Units Replacement

Recover Wasted Heat

- Waterside Heat Recovery
- Airside Heat Recovery
- Wastewater Heat Recovery
- Thermal Energy Networks

Partial Electrification

Replace fossil fuel inputs and prioritize the techno-economic portion of load

- Air Source Heat Pumps
- Water Source Heat Pumps
- Geothermal
- Thermal Layering

Full Electrification

In-time, replace or remove the remaining peak load equipment

- Heat Pumps
- Thermal Storage
- District Thermal Network
- Grid-interactivity

All paths to Resource Efficient Decarbonization include heat recovery, recycling and storage across the neighborhood.

Buildings lose heat through a variety of processes. Holistic building decarbonization requires recovering and recycling wasted heat through various interventions:

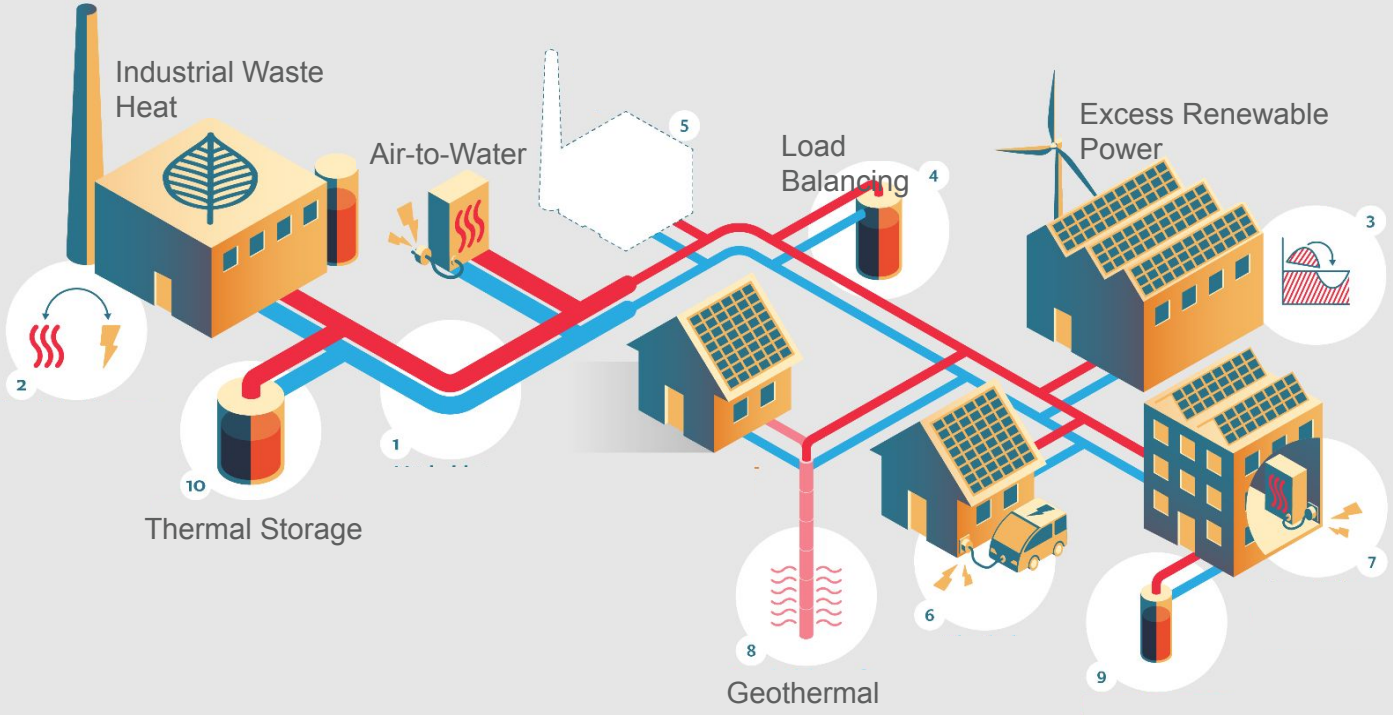
Cooling produces heat. Capture the heat and apply it to other uses, like domestic hot water.

Heat goes down the drain. Extract heat from wastewater with heat pumps and redirect it to other uses.

Think twice about ventilation. Fresh air is fundamental to healthy buildings. Be certain to recover heat and cool from exhaust air.

Save it for later. Incorporate thermal storage technology into designs to save recovered heat for when it's most needed.

Neighborhoods offer different **Thermal Energy Resources** and require varying approaches to Thermal Energy Networks (TENs).



TENs are needed to achieve complete Resource Efficient Decarbonization.

Playing Matchmaker

Identifying "linkable" parties is a first step; thermal resources and customers. Determining the organizing structure and governance is as important as technical solutions.

Coalition Members May Include:

- State and Local Regulators
- Policymakers and Other Officials
- Other Governmental Bodies (City, County, State)
- Economic and Industrial Development Agencies and Organizations
- Public and Private Regulated Utilities
- Activist or Community Based Organizations
- Housing Organizations
- Commercial Developers
- Solution Providers and Manufacturers
- Trade Unions
- Trade Organizations

Thermal Energy Networks may be owned and operated by:

- Government Bodies (City, County, State)
- Municipal Utilities and municipal corporations
- Public and Private Regulated Utilities
- Investor-owned regulated utilities
- Community Based Organizations and non-profits
- Cooperatives

Roles and Next Steps in Your Community

Form the Coalition

1. Engage a Thermal Development Team or advisory firm
2. Identify an acceptable owner or developer to advance Projects
3. Host municipality develops a Thermal Access Agreement and Authorizes the developer to perform

Engage a Project Developer

1. Identify thermal energy resources, other RED projects and potential customers
2. Identify and prioritize projects as a joint effort with the Coalition
3. Identify and procures EPC, maintenance and billing partners
4. Finance and construct the project
5. Identify and secure partners for conveyance if applicable

Thank you.

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Discussion

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Jared Rodriguez
Emergent Urban Concepts
Principal

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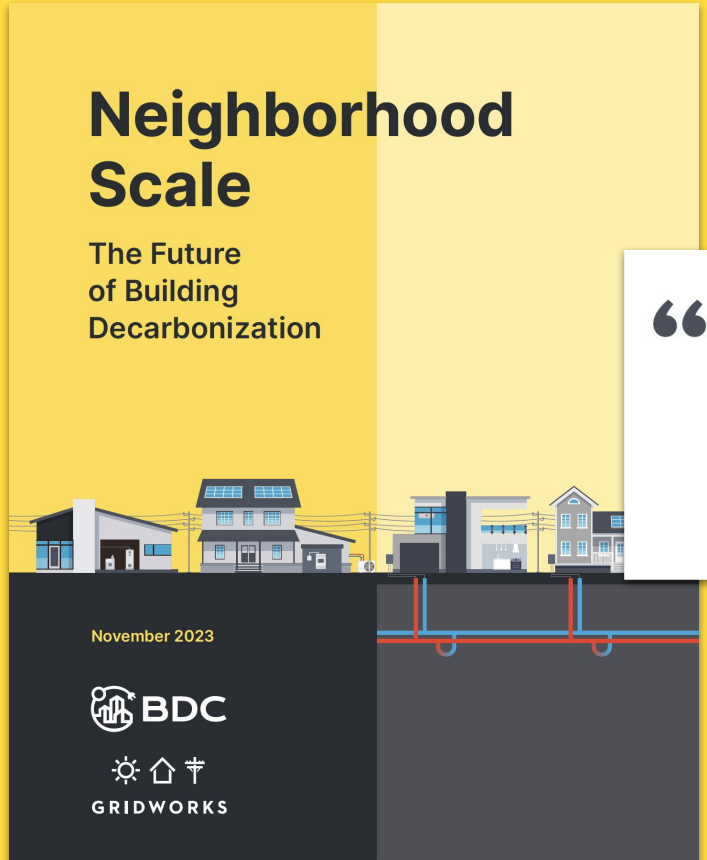
Next Steps for the Building Decarb Community



> “We like collective things, things that are more of a community solution.”
>
> **Jessica Azulay**
> AGREE

buildingdecarb.org/resource/neighborhoodscale

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DECARBONIZATION
COALITION

Thank You
For Joining Us!

Slides and notes will be emailed to all registered participants and will be available on our website soon.