SAHF
STEWARDS OF AFFORDABLE HOUSING FOR THE FUTURE

Climate, Carbon & Energy

Drivers and Solutions to Support Decarbonization in Multifamily Affordable Housing

Stewards of Affordable Housing for the Future

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SAHF by the Numbers

230,000+

People Served by SAHF Members

12

Non-Profit
Housing Providers

SAHF properties are located in

49 states

+D.C., Puerto Rico, and the Virgin Islands

149,000+

Rental Homes for Families, Seniors, and Special Needs Populations

1,950

Multifamily Properties Across the U.S.

SAHF Initiative: The Big Reach

- SAHF members demonstrated that portfolio-wide energy and water reductions can be achieved and measured.
- We are now looking towards including carbon measurement and reduction.

The Drivers

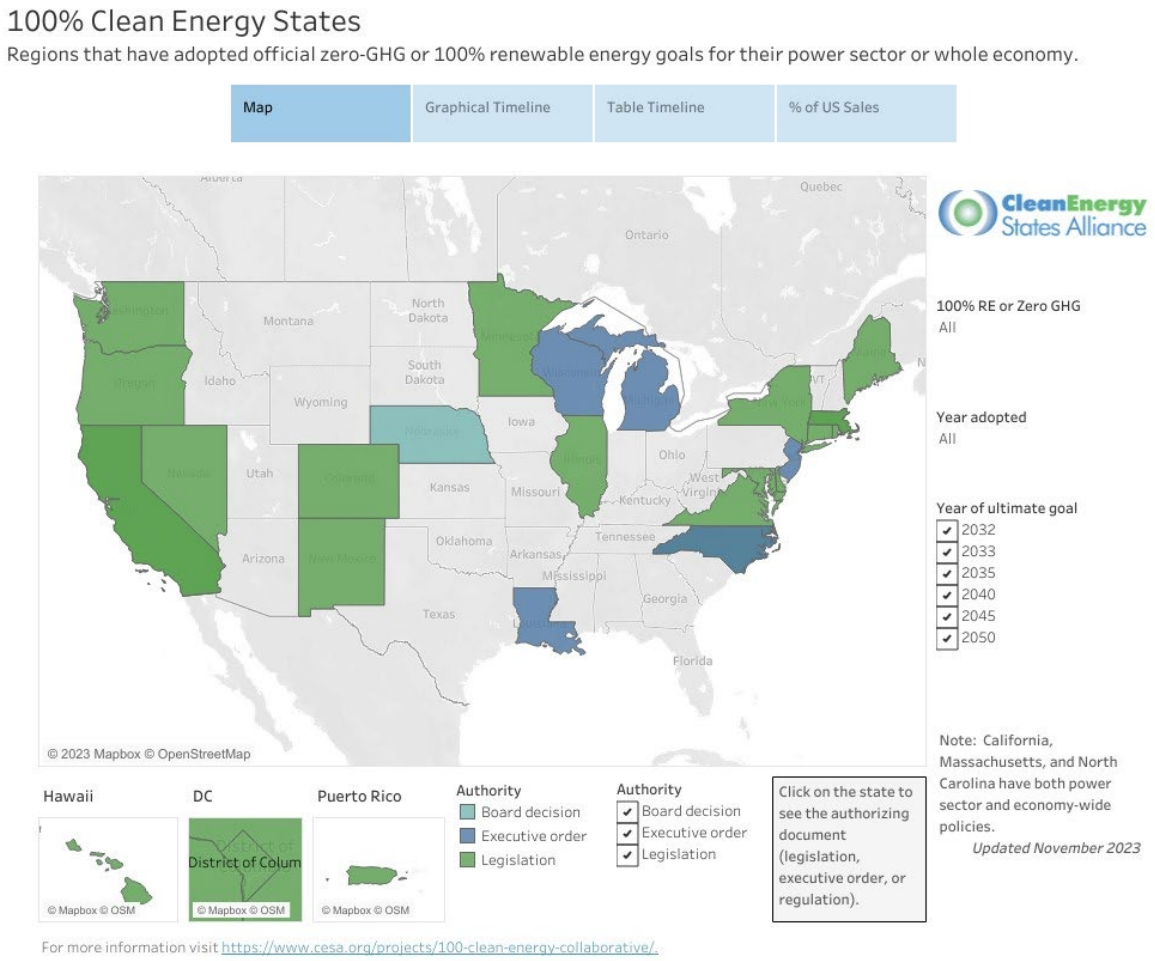
SAHF Climate Risk Findings

- Over half of SAHF member portfolio faced at least one high risk.
- Highest risk was **extreme temperature.**
- Members have been using this data, coupled with other information to make decisions.
- Since 2020, new data and tools available.

Preservation of Affordable Housing (POAH) used the data, coupled with utility outages to identify best candidates for generators.

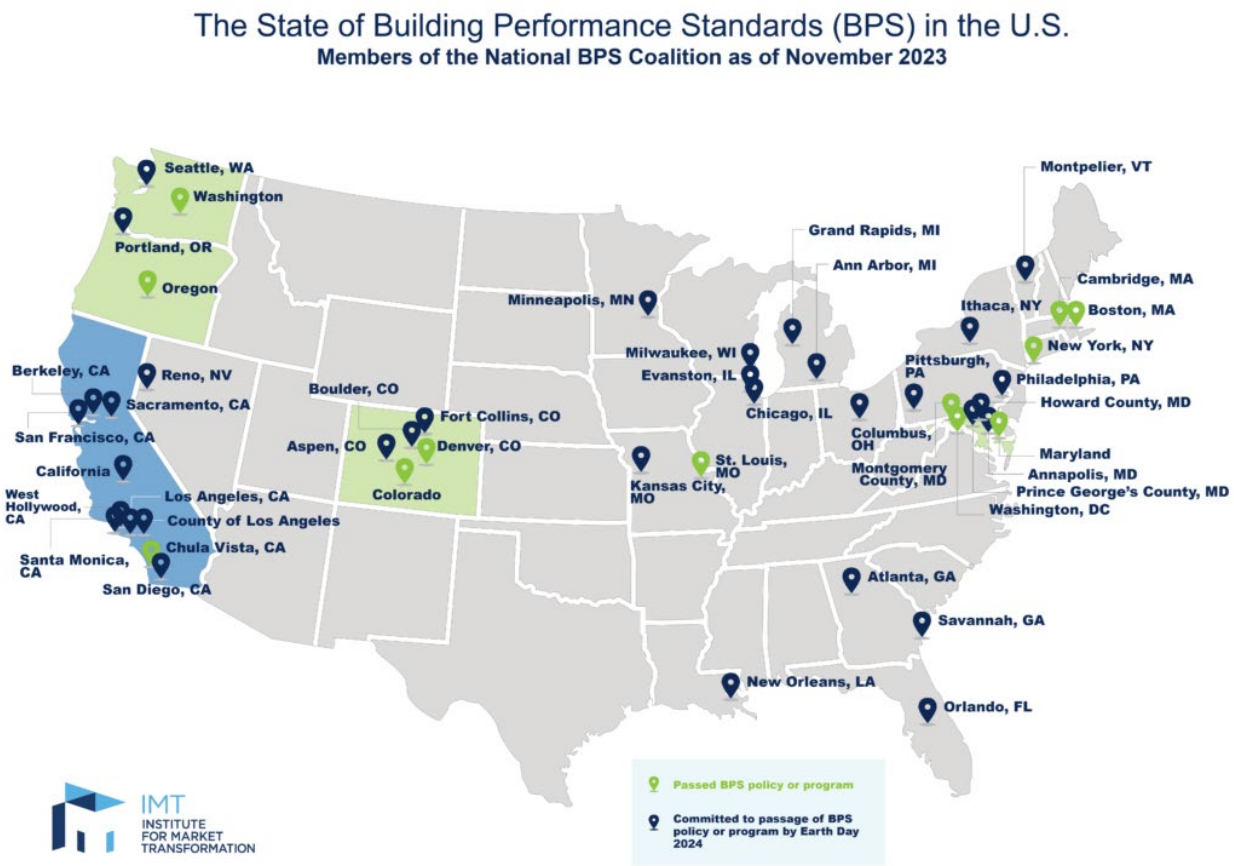
States: Clean Energy Commitments

- 23 states have made clean energy commitments
- Approximately 53% of US population
- Focus on generation of clean energy, but will likely trickle down to buildings
- State-level information here: https://www.cesa.org/projects/100-clean-energy-collaborative/guide/table-of-100-clean-energy-states/



Building Performance Standards

- First comes **energy & water benchmarking**, then comes **building performance standards**
- Federal Definition: *A Building Performance Standard (BPS) is an outcome-based policy and law aimed at reducing the carbon impact of the built environment by requiring existing buildings to meet energy- or GHG emissions-based performance targets.*
- National Building Performance Standards Coalition: launched by the Biden administration, this nationwide group of **state and local governments** are committed to inclusively design and **implement building performance policies and programs**



Example: Boston BERDO

Boston Building Emissions Reduction and Disclosure Ordinance (BERDO)

- Adopted: 2021
- 15+ unit multifamily **properties** included
- Reporting: 2022, Compliance: 2025 (4.1 kg CO2e/sf/year)
- Data verified by a city-defined third party
- Fines - $1000 **per day** for 35+ unit multifamily, $300 **per day** for 15-35 unit multifamily

If an owner has five buildings that don't comply and it takes one year to demonstrate compliance: ***$1.83 million price tag***

Disclosures & ESG

- Investors say **climate change is a risk** , and they **need to measure and price that risk** as they do other investment risks.
- One U.S.-based investment adviser will use the data to review carbon-transition plans. **"You can no longer just say, 'I'm going to be net zero by 2050.' You have to give some indication on how you plan to get there.** And that is interesting, because it allows us to analyze a company's strategy."
- Another U.S.-based global investment adviser who works in the private space echoed this sentiment, stating that **when partners make sustainability claims, "My next question is, 'Prove it?'"**

Incentives

STEWARDS OF AFFORDABLE HOUSING FOR THE FUTURE

Inflation Reduction Act Programs

IRA Programs

- HUD GRRP
- Treasury/IRS Renewable ITC
- DOE Energy Rebates
- EPA GGRF

Program	Agency	Awardee	Resources Type	Eligibility	Application Deadline	Spending Deadline
Green and Resilient Retrofit Program	HUD	Owners of 202s, PRACs, project based Section 8	Loan/Grant		In rolling rounds through May 2024	Mid 2026
Home Energy Rebates	DOE	State energy offices	Rebate	10% Min set aside for low income MF, 40% for LI HH	TBD- States must submit spending plans by 9/24	Through 2031
ITC- Low Income Community Bonus	IRS/Treasury /DOE	Developers/investors	Tax Credit	Development Direct pmt in lieu of credit availability	November 23 (for 23 program year)	1.8 GW annual limit, annual rounds until 2021
GGRF Solar for All	EPA	States, localities, tribes, Nonprofits	Funding for solar	Solar that benefits low income ppl/communities	Apps submitted, awards to grantees in March 24	2028
GGRF National Clean Invest Fund	EPA	Nonprofit financing entities	Debt, equity, credit enhancement- can include predev		Apps submitted, awards to grantees in March 24	2030
GGRG- Clean Comm Invest	EPA	Nonprofit financing entities	TA, funding (loans?)			2029

HUD's Green and Resilient Retrofit Program (GRRP)

Eligible Properties

Properties must be in good standing and demonstrate financial need

PBRA

- New construction
- Substantial rehabilitation
- RAD (executed before 10.01.21)
- Rural housing - Section 515

Section 202 (PRAC is eligible)

Section 811 (PRAC is eligible)

Section 236

Not Eligible – Public Housing, PBV and Moderate Rehab Contracts

Choose Your Own Pathway

Pathway	Allocation	Anticipated Awards	# Awards per Owner
The Elements	$68M	200	4 per period, up to 16
The Leading Edge	$160M	100	3 per period, up to 12
The Comprehensive	$609.5M	300	5 per period, up to 20

Properties can only apply under one pathway at a time.

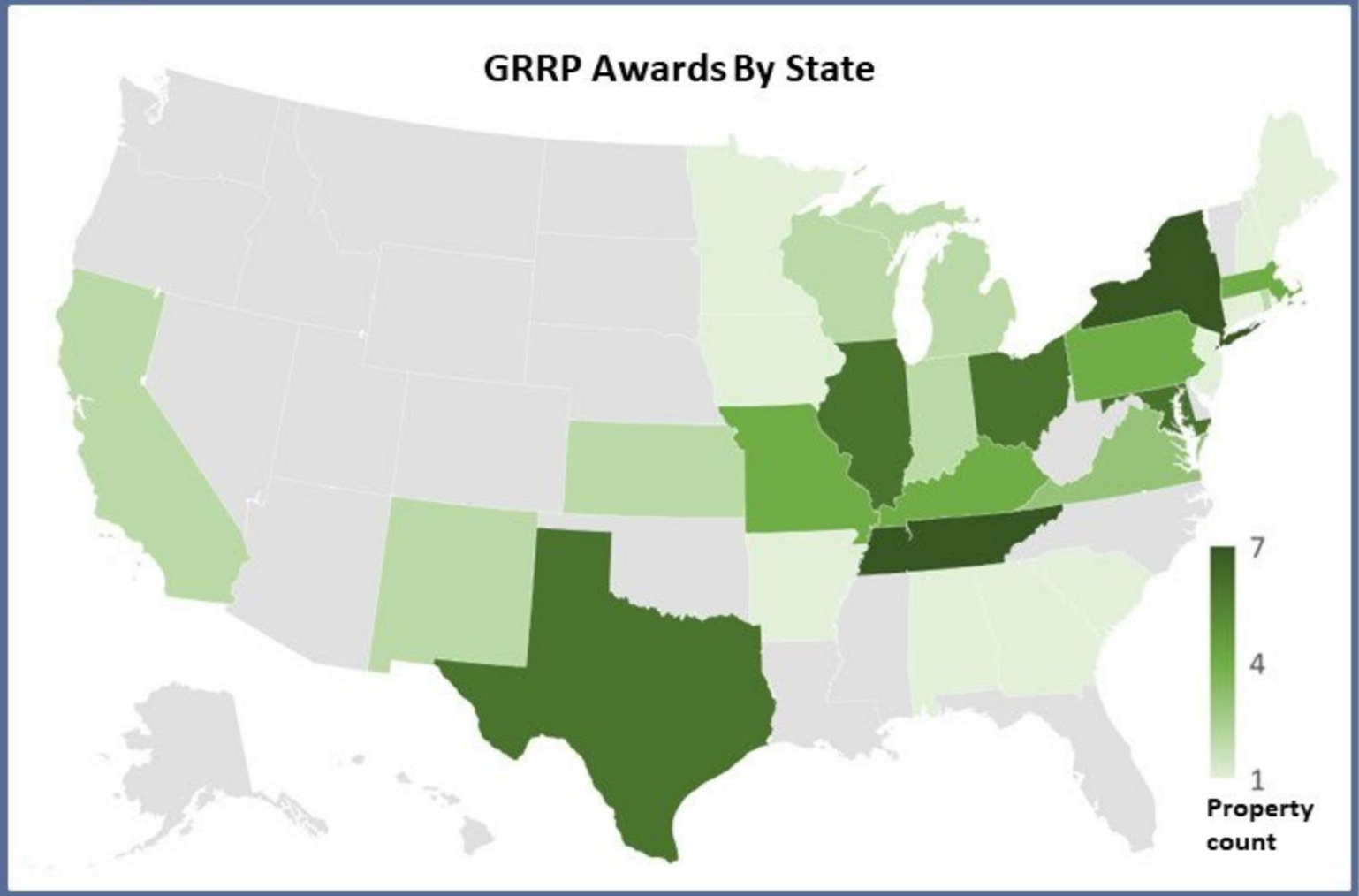
Properties can receive only one award.

Properties can withdraw pending applications and reapply through other pathways.

Limitations on the number of awards per owner per pathway.

TO DATE: Approximately $300 million issued in awards

GRRP Funding Overview



GRRP Statistics

Updated February 2024

$370.6 Million awarded
in 5 of 12 funding rounds

243 Applications

84 Awarded properties

10,456 Homes impacted

25% In non-metro areas

The Elements	The Leading Edge	The Comprehensive
Maximum award: $750k **per property.** $40k per unit.	Maximum award: $10M per property. $60k per unit.	Maximum award: $20M per property. $80k per unit cap.
No minimum number of assisted units, but properties will be ranked by the lowest amount requested award per HUD-assisted unit	**50% or more of units on a property must receive HUD assistance for property to qualify.**	**50% or more of units on a property must receive HUD assistance for property to qualify.**
Modest investment for **early-stage planned recapitalization projects.**	More significant investment for **early-stage planned recapitalization projects. Does not require extensive collaboration with HUD.**	Investment to **initiate a recapitalization project.** Projects can be standalone or part of a larger recapitalization and will require **signification collaboration** with HUD and contractor, who will drive the scope of work.
Allow for upgrades or additions of greener or more resilient building components and systems to existing SOW.	Allow for ambitious upgrades that move towards net zero, resilience. Properties must **demonstrate at least 25% energy reduction. Scope should include achieving a "Qualifying Certification"**	Allow for ambitious upgrades that move towards net zero, resilience. Properties must **demonstrate at least 25% energy reduction. Expect to achieve 40%+ in emissions reductions**
Example applicant: The recapitalization project will replace the in-unit HVAC systems with higher-efficiency electric HVAC systems.	Example applicant: An experienced property owner is ready to move forward with Passive House certification financed by another funding source (e.g. LIHTC).	Example applicant: The property has high REAC scores and low capital needs, but is using older equipment dependent on fossil fuel sources. It is in an area of wildfire risk.

Important Dates

Elements	Leading Edge	Comprehensive
06.29.2023	07.31.2023	08.31.2023
09.28.2023	10.31.2023	11.30.2023
03.28.2024	01.31.2024	02.28.2024
07.31.2024	**04.30.2024**	**05.30.2024**
First Round: $14M, Remaining: $18M	**All Rounds: $40M**	**First Round: $125M, Remaining: $135M**

HUD Webinar: Hoping to award applicants in 2-3 months after submittal.

GRRP Assistance can be structured as a Grant or a Surplus Cash loan and in limited circumstances loans with fully amortizing debt service for Owner contribution on a Comprehensive transaction

Grants

1. Made **only** to the property owner - **affiliates not eligible**
2. Grants **do not** have to be repaid if all requirements met
3. For **The Comprehensive awards**, grants may be used with amortizing loans

Surplus Cash Loans

1. **Term:** later of maturity of first mortgage or up to 30 years
2. **Interest:** not less than 1%
3. **Priority:** May be subordinated to first mortgage, but must be superior to all other financing liens (waivers provided in the event other subordinate liens are held by govt.)
4. **Payment terms:** Surplus cash must be distributed with priority for payments to HUD on the GRRP surplus cash note

   25% for the Elements, 50% for Leading Edge or Comprehensive

   After payment to HUD remaining surplus cash distributed according to project documents

   CAN pay deferred developer fee before this payment, but only for first 10 years

Pre-Project Utility Benchmarking & Needs Assessment

Leading Edge: must submit data in ENERGY STAR Portfolio Manager OR the Multifamily Building Efficiency Screening Tool (MBEST).

Comprehensive: must submit data in ENERGY STAR Portfolio Manager OR the Multifamily Building Efficiency Screening Tool (MBEST).

- ENERGY STAR Score – 60% of funding
  - 12 consecutive months of energy data, not older than 3 years.
  - 12 months of water data.
  - ENERGY STAR Score needs to be confirmed by an approved professional (energy rater, certified energy manager, PE, etc)

Potential benchmarking support: Reimbursement of eligible staff and/or third-party provider costs up to $2,500.

- Reimbursement is separate from this award, but requests must be submitted with application.
- HUD Benchmarking Program offering this service, but 3-4 month timeline.

Projects using MBEST will be required to use ENERGY STAR Portfolio Manager to benchmark prior to closing.

NOT APPLICABLE TO ELEMENTS

Post-Project Utility Benchmarking

Must start benchmarking within 18 months of project completion.

Must submit data for 5 years, but can be excused for data collection challenges.

Owners may also choose to install monitoring meters to streamline future benchmarking, but unclear if an eligible cost.

HUD benchmarking support for up to 4 years. Must work with their contractor, Leidos.

DOE Better Buildings and Climate Challenge participants - $4 per unit HUD management add-on fee available.

Bay Meadow

Elements Round 2

- **100% Project Based Rental Assistance (PBRA)**
- **Location: Springfield, MA**
- **148 units**
- **Award: $750k**
- **Award Type: Grant**
- **Scope of Work**
  - Solar Array
  - Low Flow Water Fixtures
  - Low Flow Toilets
  - Community Room Heat Pump
  - Wx and A/S

  } >25% reduction in usage

- **What made this project a good candidate?**

  Transaction Timeline

  Energy & Water Hog

DESIGN+ BUILDING PERFORMANCE
Preservation of Affordable Housing

Foxwell Memorial Apartments

Elements

- **Family, Special Population, Blind. Section 8**
- **Location: 3700 Greenspring Ave, Baltimore, MD**
- **163 units**
- **Award: $314,268**
- **Award Type: Grant**
- **Scope of Work**
  - Elements: What will you fund? Solar, 102.82 kW
- **What made this project a good candidate?**
  - High flat roof, mostly electric building
  - Converting gas boiler to electric
  - Should have applied for conversion funds, too

Homes for America
non-profit housing development

Renewable ITC

ITC- $500B in Tax Credits Over 10 Years

IRA re-established the ITC to 30% from 26% for projects under 1MW starting construction in 2023 to 2033 providing a 10-year runway for an industry that typically received shorter extensions.

- 2023 applications CLOSED. Another opportunity in 2024 details forthcoming

Adders

Projects can qualify for different adders which can b stacked to increase the 30% credit to 70%.

Fixes LIHTC Basis Issue

Previously the ITCs would negatively impact LIHTC bas this is no longer the case.

New Ways to Monetize

Project partnerships can now monetize the cred by selling it to unrelated third-party investors, simplifying the tax and accounting implications traditional tax-equity. Nonprofits can get a $1/credit from the government (direct pay)

Affordable Housing Rooftop

Sample Timeline For ~~Local Government Community~~ Solar Project : Direct Pay Option

DOE Rebates

DOE Home Energy Rebates

The following rebates are available for **single-family homes** with household income **below 80% AMI** and in **multifamily buildings** where **at least 50% of households** have incomes **below 80% AMI Aggregators can assemble a portfolio of properties.**

Rebate Type	Rebate Amount

Home Energy Efficiency Rebates (HOMES)	• Retrofit of existing buildings
	• Rebate level varies depending on the level of efficiency improvements, not to exceed:
	  • $4,000 per housing unit for energy savings of 20%-34%
	  • $8,000 per housing unit for energy savings of 35% or more
	  • Up to 80% of project costs

Home Electrification Rebates	• New construction and retrofits • Appliance-based rebates with caps • 100% of project costs not to exceed the max rebate level of $14,000 per housing unit

Both rebate programs are administered by State Energy Offices.

DOE Home Energy Rebates – Program Design

DOE Guidance to States:

- Minimum set-asides- 40% ($2.7 B) for LI HHs and 10% ($665 M) for LI MF HHs
- Common area/whole-building energy savings costs eligible
- Minimum affordability standard
- Retrofit projects completed after Aug 16, 2022, are eligible for Home Efficiency Rebates

Key state decisions:

- Silent on how to treat LIHTC – left up to state energy offices to offer any guidance
- Exceed the minimum set asides
- Program design to ensure low-income households are served
- Electrification rebates: allowed but not required for new construction. State decision.

GGRF Programs

National Clean Investment Fund	Clean Communities Investment Accelerator	Solar for All
$14 billion	**$6 billion**	**$7 billion**
2-3 awardees	2-7 awardees	~60 awardees
Focused on providing **financial assistance** to aid in the development and deployment of Qualified Projects	Focused on providing **grant capital** to support local project development	Focused on funding rooftop solar in disadvantaged communities ("Solar for All" programs) with/through state and local governments
Prioritizing scaled deployment, continued operability, and market transformation	Prioritizing seeding the market across geographies to enable and develop qualified projects	

EPA NCIF FINANCIAL ASSISTANCE

At least 40% of funds must be used to provide financial assistance in low income and disadvantaged communities.

Financial assistance constitutes financial products, including:

- ***Debt*** (such as loans, partially forgivable loans, forgivable loans, zero interest and below-market interest loans, loans paired with interest rate buydowns, secured and unsecured loans, lines of credit, subordinated debt, warehouse lending, loan purchasing programs, and other debt instruments)
- ***Equity*** (such as equity project finance investments, private equity investments, and other equity instruments)
- ***Hybrids*** (such as mezzanine debt, preferred equity, and other hybrid instruments)
- ***Credit enhancements*** (such as loan guarantees, loan guarantee funds, loan loss reserves, and other credit enhancement instruments)

Allowable costs in addition to financing for qualified projects include:

- Predevelopment activities
- Market-building activities
- Program administration activities

What is Decarbonization?

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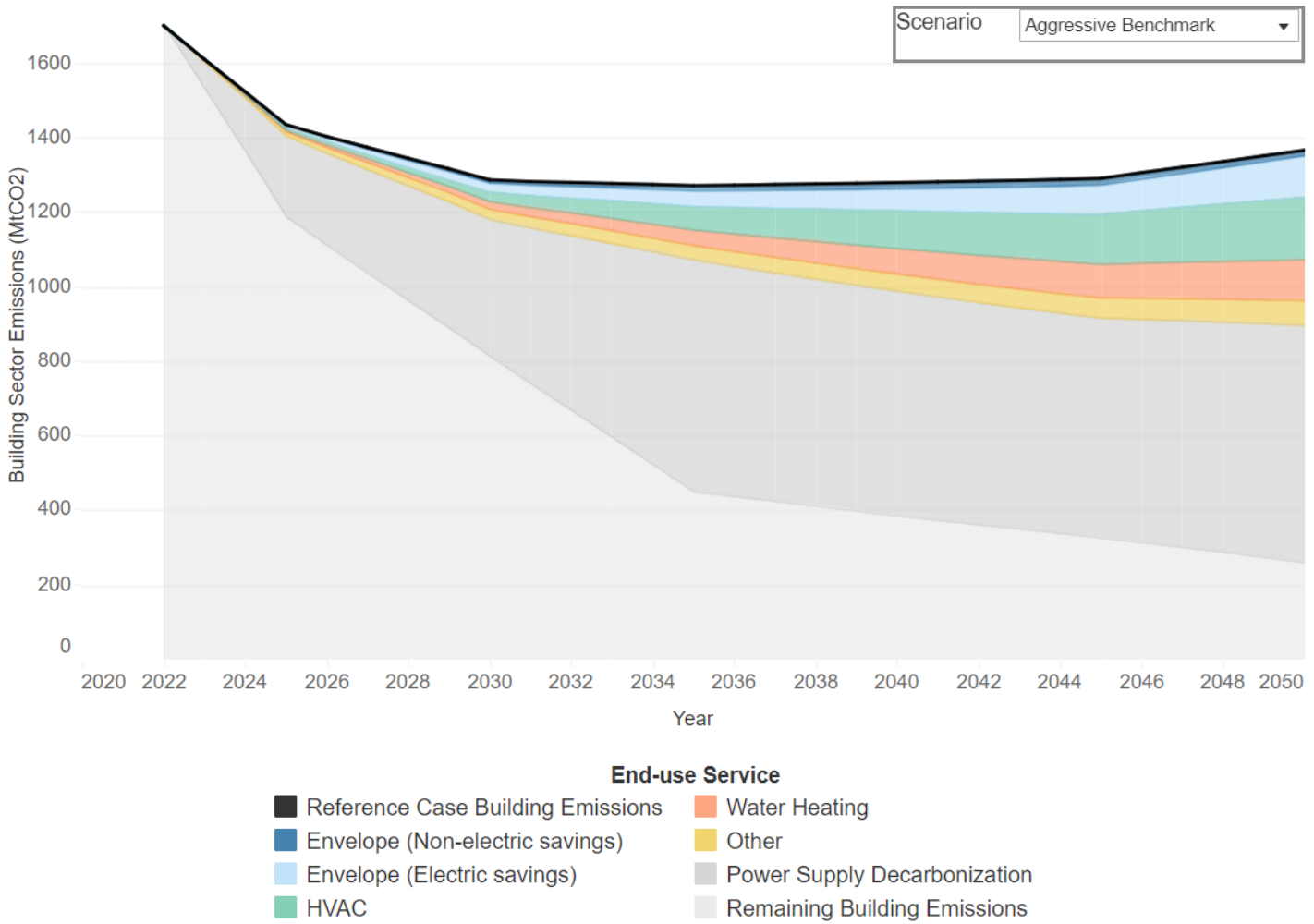
What is Decarbonization?



Decarbonization: the reduction of carbon dioxide emissions into the atmosphere (from buildings)

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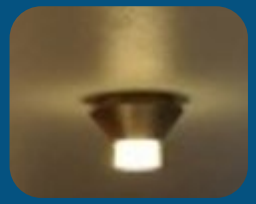
Steps to Decarbonization



Efficiency

- Reducing energy consumption lowers costs and carbon

Electrification

- Converting fossil fuel equipment to efficient electric equipment (i.e. heat pumps) significantly decreases carbon emissions

Onsite clean generation

- Installing or purchasing solar energy ensures a supply of zero-carbon electricity for your building

Grid decarbonization

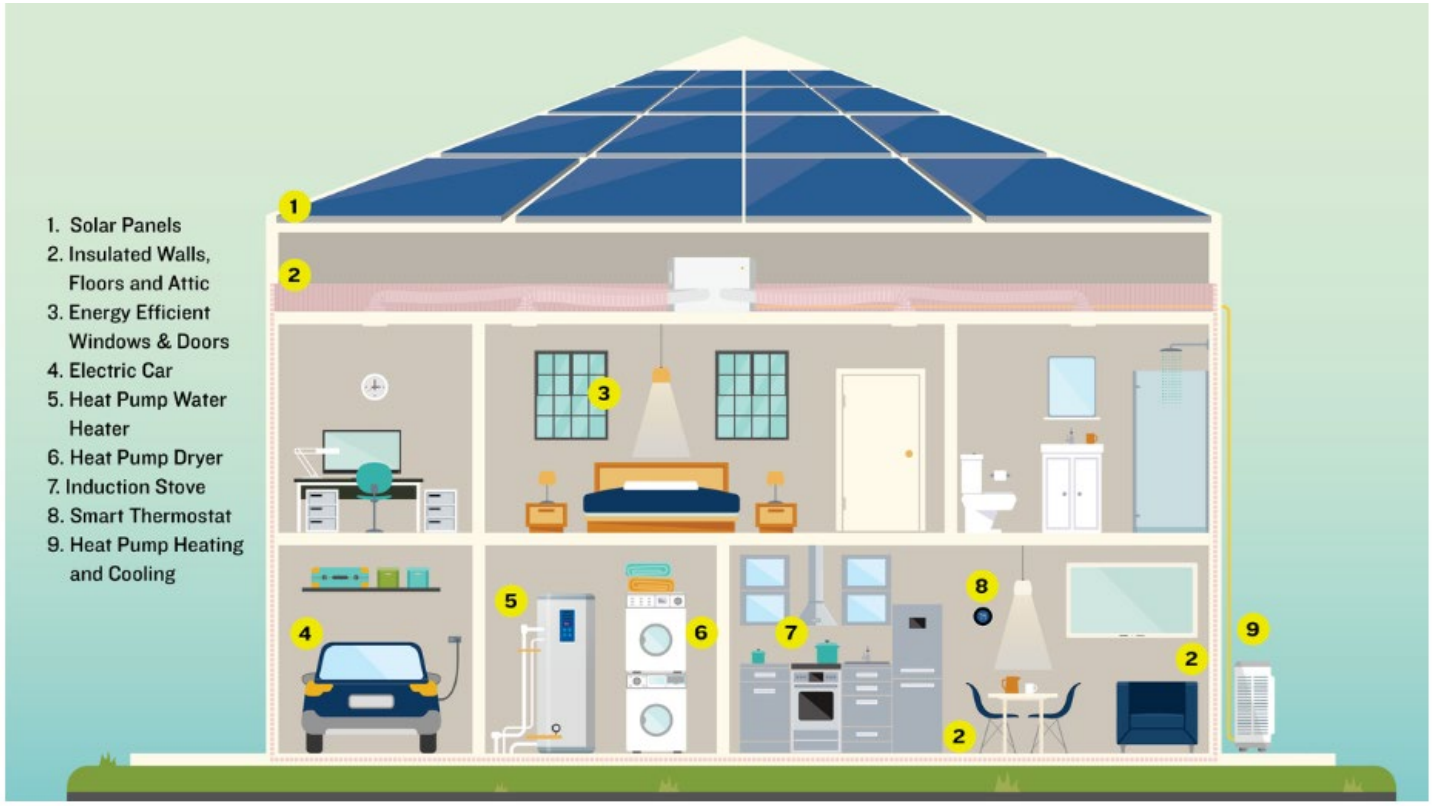
- As the electricity grid supply gets cleaner, the emissions from efficient electric buildings will further decrease.

Step 1: Efficiency

Efficiency: reducing the use of energy and water used to provide building services.

Includes: cooling, heating, hot water, ventilation, lighting, appliances, building envelope, pumps and motors, controls, amenities.

Step 2: Electrification



Electrification: the replacement of on-site fossil fuel combustion for heating and cooking with equipment that runs entirely on electricity.

Step 3: Onsite Clean Generation

Solar

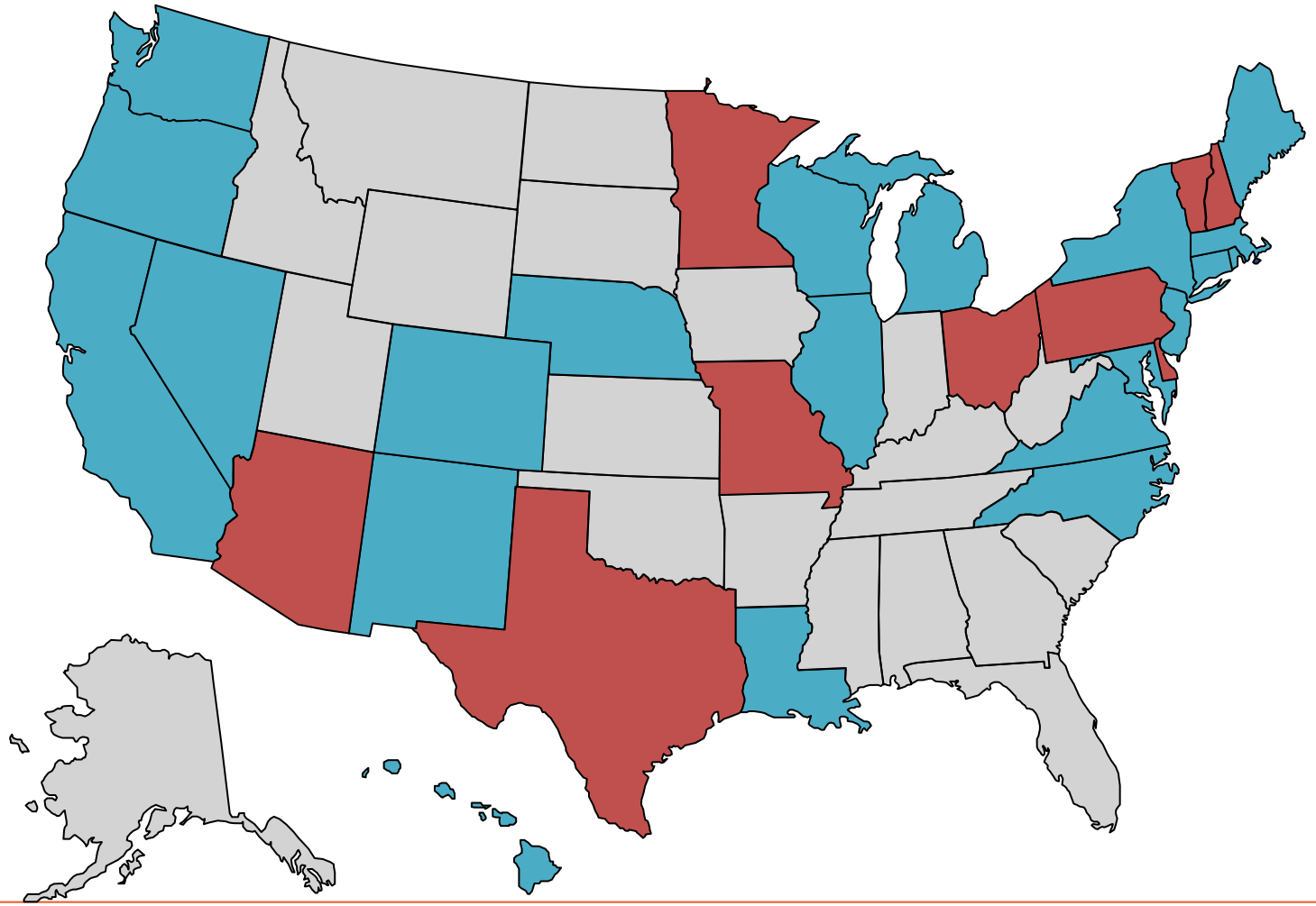
- Solar panels generate carbon-free electricity on site. It can be consumed on site or exported to the grid.

Batteries

- Residential energy usage (typically highest in the evenings) does not align perfectly with when solar is generated (typically midday).
- Storing excess solar electricity in a battery for use later in the evening helps with peak shaving and can maximize renewables consumed on site.

On-site wind power may be applicable for certain buildings, but not most.

Step 4: Grid Decarbonization



100% Renewable or 100% Clean Energy Target

Other Renewable Portfolio Standard

Electrification Costs

Category	Efficiency Measure	Cost Range (per unit)
Water heating	Install heat pump water heater (in-unit tends to be less expensive)	$1,500 - $8,000
Heating	Convert gas boiler to heat pump (in-unit tends to be less expensive)	$5,000 - $30,000
Heating	Convert in-unit PTAC or gas furnace to in-unit PTHP	$4,000 - $12,500
Cooking	Install induction ranges	$1,000 - $3,000
Dryers	Install electric dryers	$1,000 - $3,000
Electric Upgrades	*If additional electric service is required*	*$5,000 - $10,000*
Insulation	*To improve thermal efficiency of the building*	*$5,000 - $50,000*

Incentives can be substantial

	per unit
Total Cost	**$15,000 - $75,000**
Grants/Rebates	$5,000 - $60,000
Tax Credits	$500 - $7,000
Net Cost	**$1,000 - $35,000**

Example Decarbonization Projects

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NeighborWorks® AMERICA

Example Project #1 Garden Style

Measures

- Heat pump water heaters for each building
- Mini-split heat pumps for each unit
- Induction cooktops
- Electric clothes dryers
- Decommission existing central heating and cooling plant; remove gas connection

Example Project #3- Garden Style

Measures

- Heat pumps in each unit for heating and cooling
- Heat pump water heaters in each unit
- Induction cooktops
- Electric clothes dryers
- Remove gas connection

Example Project #2- Mid-rise / High-rise

Measures

- Central VRF heat pump system, for both heating and hot water
- Induction cooktops
- Electric clothes dryers
- Remove gas connection

4. Select Scope of Work

	Recommendation	Cost and Savings					
	HVAC - 3 options	**Initial Investment ($)**	**Incentives ($)**	**Net Out of Pocket ($)**	**Annual Savings**	**LL97 Fine Avoidance**	**Carbon Reduction**
A	Replace Heating Boilers with Condensing Boilers (gas)	($665,000)	$38,700	**($626,300)**	$5,800	$4,600	2.5%
B	Install an Air Source Chiller/Heater (electric)	($2,586,500)	$1,675,300	**($911,200)**	($11,500)	$37,200	20.1%
C	Install Packaged Terminal Heat Pumps (electric)	($3,862,500)	$1,656,100	**($2,206,400)**	$12,300	$35,100	18.9%
	Hot Water & Appliance Electrification	**Initial Investment ($)**	**Incentives ($)**	**Net Out of Pocket ($)**	**Annual Savings**	**LL97 Fine Avoidance**	**Carbon Reduction**
1	Install Heat Pump Water Heater Plant	($875,000)	$664,000	**($211,000)**	($8,900)	$19,600	10.6%
2	Install Electric Cooking Appliances	($971,800)	$530,400	**($441,400)**	($5,100)	$2,200	1.2%
3	Install Heat Pump Dryers	($88,300)	$50,400	**($37,900)**	($8,000)	$1,100	0.6%
	Summary	**($1,935,100)**	**$1,244,800**	**($690,300)**	**($22,000)**	**$22,900**	**12%**
	Efficiency and Renewables	**Initial Investment ($)**	**Incentives ($)**	**Net Out of Pocket ($)**	**Annual Savings**	**LL97 Fine Avoidance**	**Carbon Reduction**
4	Install Exterior Insulation and Finishing System	($3,293,300)	$813,900	**($2,479,400)**	$8,600	$6,800	3.6%
5	Install a New Roof	($587,500)	$332,100	**($255,400)**	$8,400	$6,600	3.6%
6	Overhaul the Building Ventilation System	($334,500)	$200,600	**($133,900)**	$17,200	$12,900	6.9%
7	Install a 150 kW Solar Photovoltaic System	($468,000)	$180,000	**($288,000)**	$28,100	$6,700	3.6%
	Summary	**($4,683,300)**	**$1,526,600**	**($3,156,700)**	**$62,300**	**$33,000**	**18%**

Select Scope of Work

	Recommendation	Cost and Savings					
	HVAC - 3 options	**Initial Investment ($)**	**Incentives ($)**	**Net Out of Pocket ($)**	**Annual Savings**	**LL97 Fine Avoidance**	**Carbon Reduction**
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7	Install a 150 kW Solar Photovoltaic System	($468,000)	$180,000	**($288,000)**	$28,100	$6,700	3.6%
	Summary	**($1,390,000)**	**$472,700**	**($917,300)**	**$53,700**	**$26,200**	**14%**
	TOTAL	**($5,911,600)**	**$3,392,800**	**($2,518,800)**	**$20,200**	**$86,300**	**47%**

57% Grants/Rebates

Additional ~$200k tax credits

GGRF low cost financing - $2.3M / $ 19k per unit

saving $106k / year OpEx

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Challenges with Decarbonization

- New equipment, different maintenance
- Contractor availability
- Energy pricing (electric vs gas)
- Utility allowances
  - Fuel switching
  - shifting costs from owner to tenant

(Free) Tools

Team

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STEWARDS OF AFFORDABLE HOUSING FOR THE FUTURE

Pilot Participants

- Four SAHF members
- Three HPN members

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HOUSING PARTNERSHIP NETWORK

SAHF Carbon-Related Tools

SAHF Carbon Calculator

- Data review
- Baseline setting
- Annual Tracking & Reporting

- Portfolio priority setting
- Scenario testing
- Progress tracking

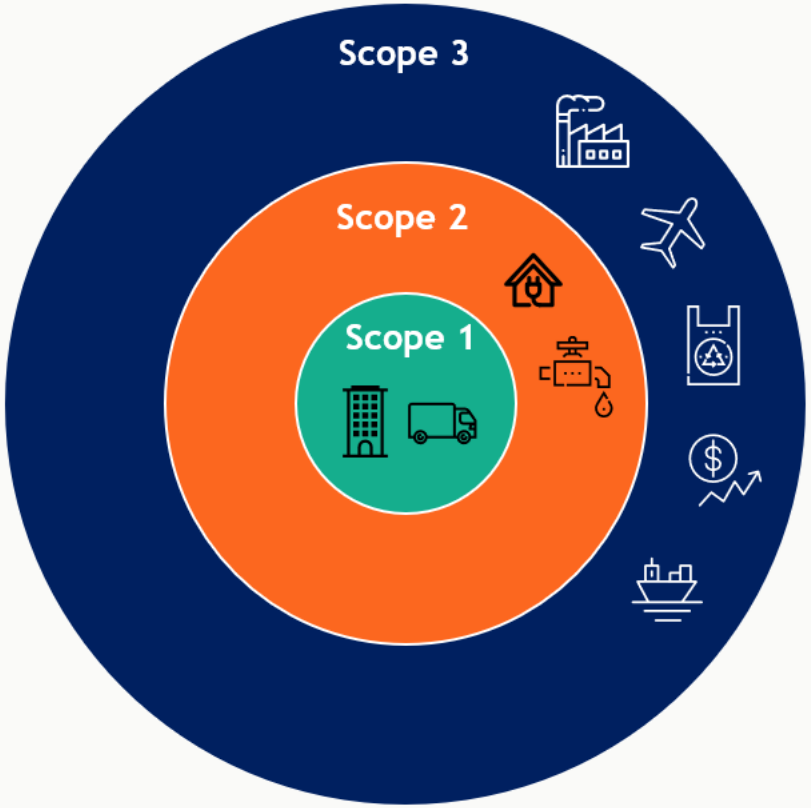
SAHF Carbon Roadmap

Goals & Requirements

- Voluntary programs (DOE BCC)
- Mandatory standards (BEPS/BPS)
- Industry-led policies and practices

SAHF Carbon Tools

- **Scope 1: carbon emissions directly from operations that are owned or controlled by the reporting organization, like the amount of fossil fuel a building uses**
- **Scope 2: Indirect carbon emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting organization. How clean is your utility's energy?**
- *Scope 3: All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. This scope is about corporate decision-making, like transportation to conferences.*



STEWARDS OF AFFORDABLE HOUSING FOR THE FUTURE

Typical Tool User

- Large, diverse portfolios
- Some properties are missing energy data
  - Resident utilities
  - Renewable energy assets
- Fuels and renewable energy recorded separately
  - Rooftop solar
  - Fleet vehicles
  - Fuel for generators, landscaping, etc.

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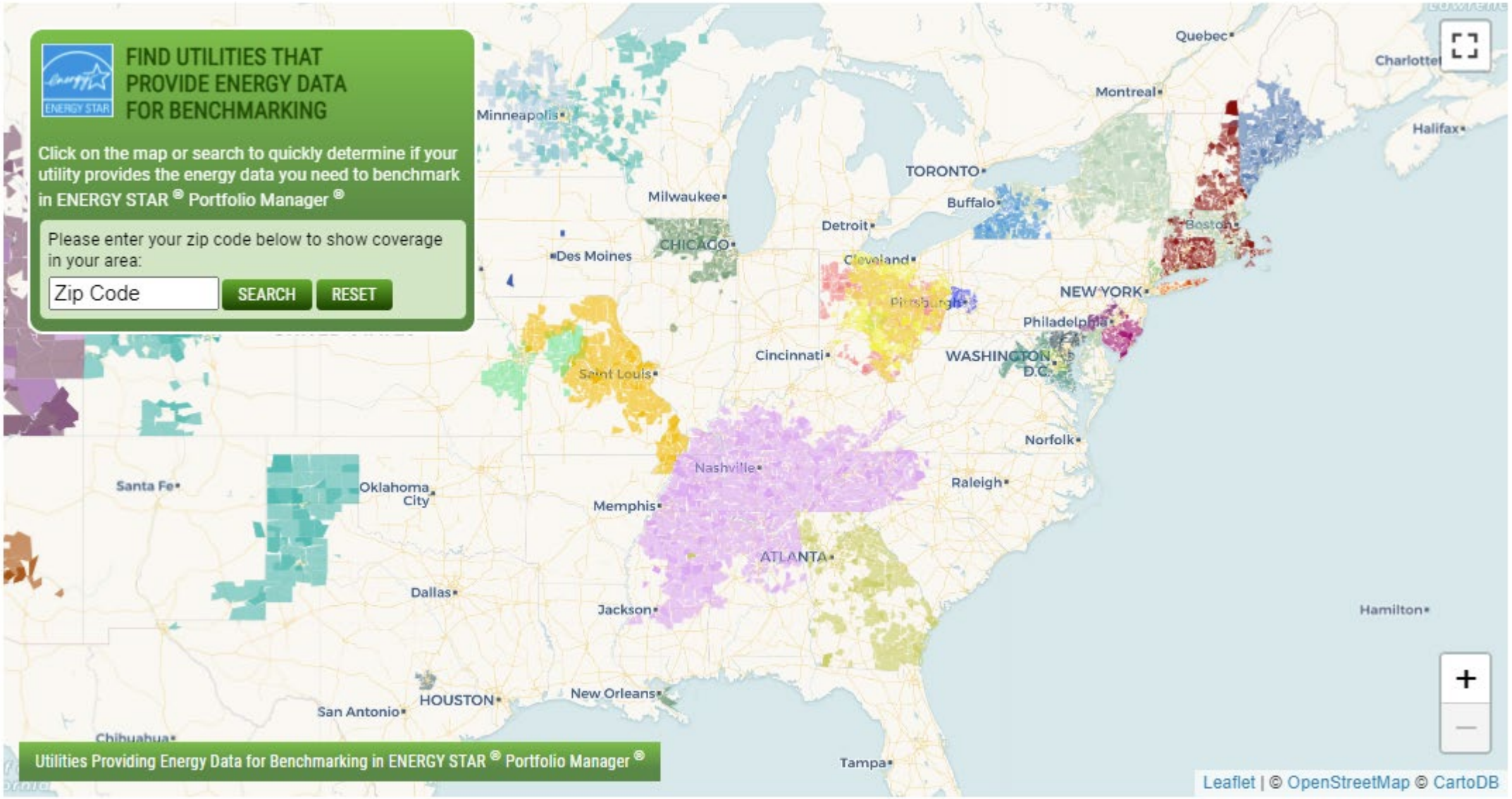
SAHF Calculator – Overview

STEWARDS OF AFFORDABLE HOUSING FOR THE FUTURE

Data Issues: Pervasive

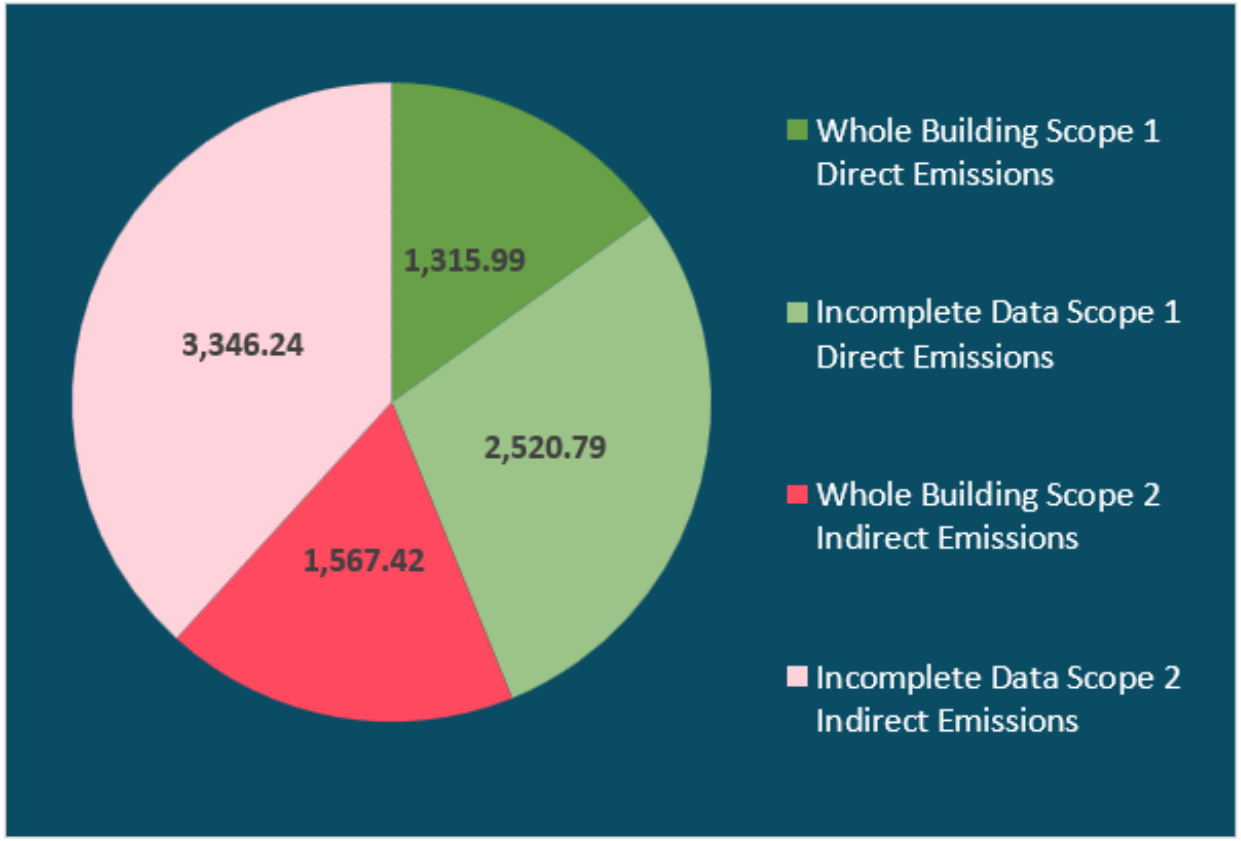


SAHF Aggregated Baseline

- Owner provides property information:
  - Location
  - Square footage
  - Number of units
  - Building type (low rise, mid rise or high rise)
  - All electric – Y/N
- Baseline application:
  - Based on energy use indices from over **12,000 properties** in Bright Power's EnergyScoreCards database with a full year of whole-building energy usage data from **2019**
  - Energy use broken down by fuel (e.g. electricity, natural gas, oil) and by baseline, heating, and cooling

SAHF Calculator Results

Scope 1 & 2 Emissions: Building Data



Whole Building Scope 1 Direct Emissions	1,315.99
Incomplete Data Scope 1 Direct Emissions	2,520.79
Whole Building Scope 2 Indirect Emissions	1,567.42
Incomplete Data Scope 2 Indirect Emissions	3,346.24

SAHF Roadmap – Overview

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SAHF Roadmap

GOAL: Free tool for the affordable multifamily housing sector to create high-level plans to achieve a time-bound measurable goal, like the DOE Better Climate Challenge.

What it is:

- Scenario planning
- Tool to understand progress
- User friendly for those familiar with carbon emissions

What it is not:

- GHG Protocol reporting tool
- Property-level planning tool
- Substitution for technical experts

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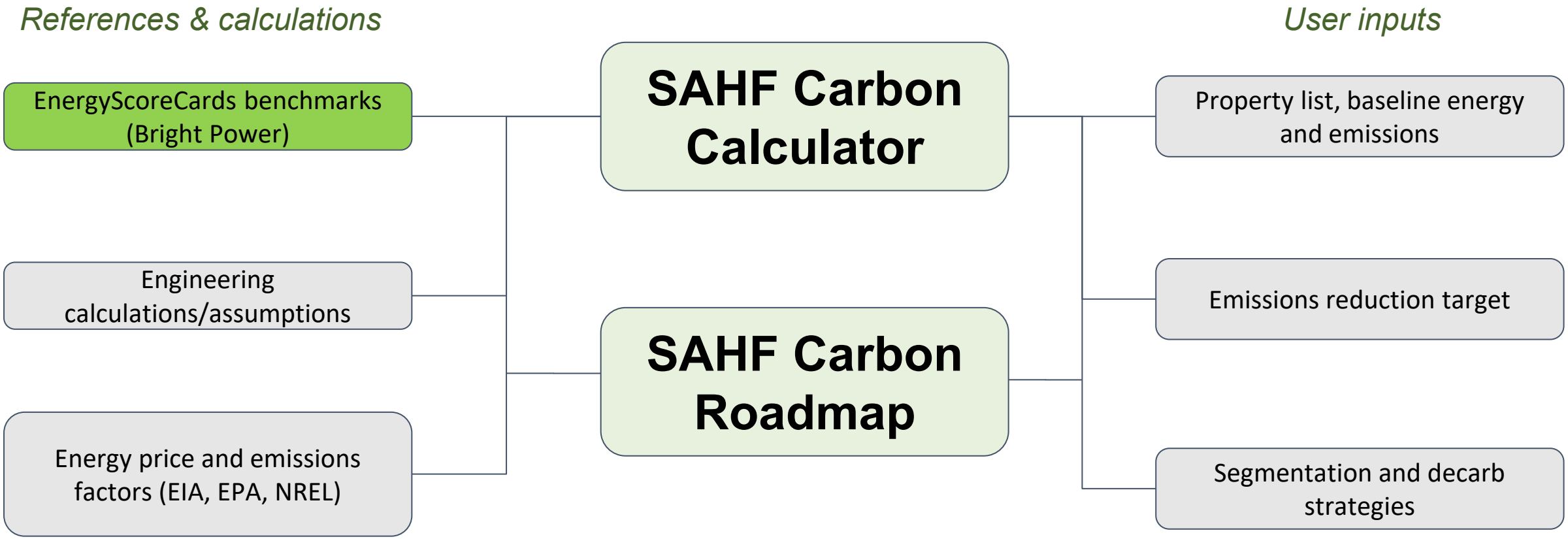
Establishing a Baseline & Roadmap



If the user doesn't have complete whole building energy data available, the SAHF Carbon Calculator will estimate based on benchmarks derived from Bright Power's EnergyScoreCards database.

SAHF Carbon Roadmap Process

- Target: 50% reduction
- Date: 2033

- Acquisitions: 100
- Dispossessions: 50
- New Construction: 200

- Energy efficiency
- Electrification
- Renewable Energy

Emissions Factors

- The roadmap uses emissions intensities for your target year
- Electricity grids are decarbonizing
- NREL's Cambium data sets provide electricity emissions projections through 2050
- We used long-run marginal emissions rates by grid region and the low Renewable Energy Cost scenario

For more information, see:
https://www.nrel.gov/docs/fy23osti/84916.pdf

Cambium 2022 Scenario Descriptions and Documentation

Pieter Gagnon, Brady Cowiestoll, and Marty Schwarz

National Renewable Energy Laboratory

Policy Score

Purpose: Guide portfolio segmentation and strategy selection

Categorization: Low, medium, or high, by state

Components:

- Support for healthy, affordable, decarbonized housing
- Utility policies
- Building policies
- Government-led initiatives
- State policies
- Distributed solar

Sources:

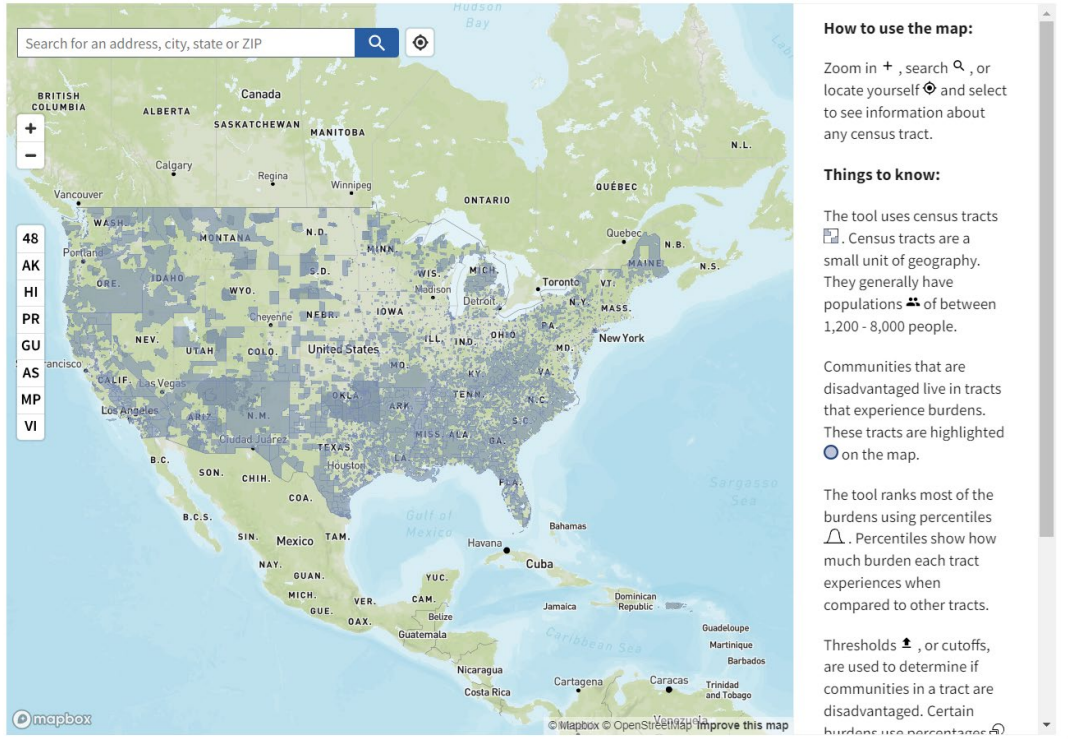
- ACEEE 2022 Pathways to Healthy, Affordable, Decarbonized Housing: A State Scorecard and 2020 State Energy Efficiency Scorecard
- Center for Climate and Energy Solutions State Policy Maps
- Institute for Local Self-Reliance 2021 State(s) of Distributed Solar report and Community Power Map

Additional information: Appendix 2 of the User Guide

Portfolio Segmentation: Why? How?

For larger portfolios, it is necessary to think about segmenting. Updated tool give more guidance and choices:

- Custom data
- Location
  - **EPA CEJST – Justice 40**
- Building features



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Crafting Your Portfolio Strategy

Decarbonization strategy × % of segment × Low/Med/High factor (Optional) = Energy and emission savings

- Light efficiency retrofits
- Moderate efficiency retrofits
- Deep efficiency retrofits

→ Decrease all energy types by %

- Hybrid heat pump DHW
- Heat pump DHW
- Hybrid heat pump heating
- Heat pump heating
- On-site solar
- Offsite emissions reductions

→ Calculated based on user input, default assumptions and calculations

Low/Med/High factor (Optional):

- Low applies 50% total energy savings
- Med applies 75% total energy savings
- High applies 100% total energy savings

Note: Low/med/high factor allows user to tell the tool how aggressive the tool should treat each decarbonization strategy.

Roadmap structure

Carbon Emissions Reduction (MTCO2e)	Reduction Target:	-50%

	Intensity Change	Percent Intensity Change	Remaining Percent Change
Total Progress (Target Year vs Baseline)	**-3.03 kgCO2e/sf**	**-55%**	**ON TRACK**
Current Progress (Current Year vs Baseline Year)	-0.77 kgCO2e/sf		
Projected Progress (Target Year vs Current Year)	-2.26 kgCO2e/sf		

	Absolute Change	Absolute Percent Change	Remaining Percent Change
Total Progress (Target Year vs Baseline)	**-8,547 MTCO2e**	**-43%**	**-7% REQUIRED**
Current Progress (Current Year vs Baseline Year)	-3,855 MTCO2e		
Projected Progress (Target Year vs Current Year)	-4,692 MTCO2e		

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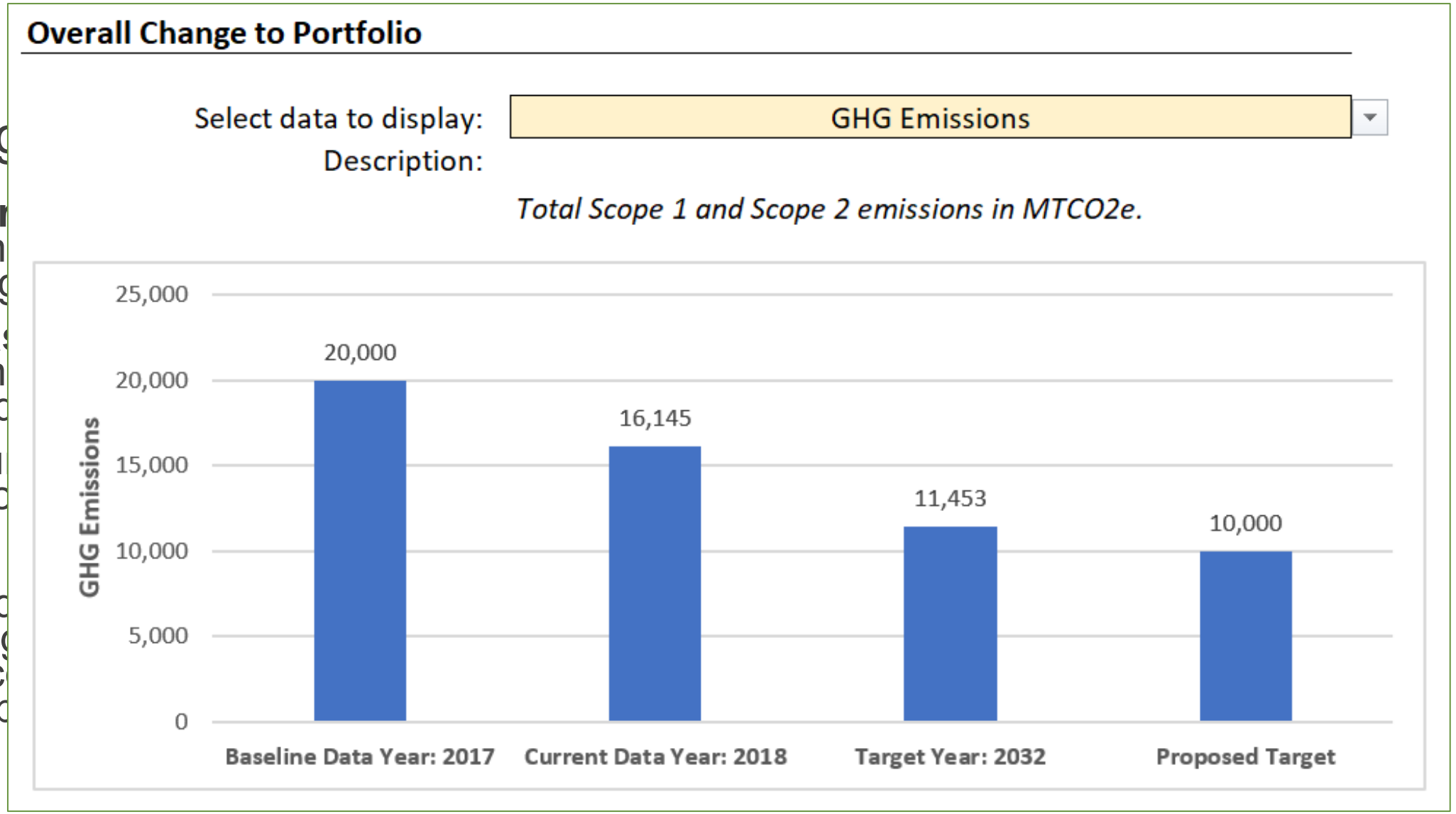
What mix of decarbonization strategies is needed to hit your goal?

Where am going, where did I start, where am now?

Targ

- **Tar**
  em
  targ
- **Bas**
  em
  tiec
- **Cu**
  sco

Upc
prog
acc
disp



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NEW: Property Lists

PROPERTY LIST 1

Segment: NorCalDa/Yes - Refi
Strategy: Deep efficiency retrofits [Roadmap #10]

Percent of Segment Targeted: 25%

Total of Selected Properties → Total units: **22%**

Select	Property Name	State	Zip	Number of Units	% of Units in Segment	Estimated Annual Energy Cost	Annual Site Energy Use Intensity (kBTU/sf)	% of Segment Energy Use	Annual Carbon Emissions Intensity (kgCO2e/sf)	% of Segment Emissions
	Property 2	CA	94134	100	13%	$69,257	21.1	8%	1.78	8%
	Property 14	CA	95987	92	12%	$79,173	25.1	9%	2.17	9%
	Property 18	CA	94102	141	18%	$119,516	21.3	11%	1.98	13%
	Property 20	CA	95630	93	12%	$60,198	28.9	10%	2.07	9%
	Property 21	CA	96080	88	11%	$81,850	11.6	4%	1.65	7%
YES	Property 30	CA	96161	58	7%	$59,858	71.0	15%	4.43	12%
	Property 36	CA	94606	31	4%	$21,636	19.0	2%	1.70	2%
YES	Property 39	CA	94109	66	8%	$112,129	88.7	22%	6.02	19%
YES	Property 49	CA	95901	48	6%	$69,589	44.0	8%	3.71	8%
	Property 50	CA	94102	73	9%	$97,731	40.0	11%	3.41	12%

SAHF Portfolio Tool Pilots: Lessons Learned

1. Lack of renewable energy data, resident data
2. Equity considerations
   - Lack of ability to “claim” renewable energy
   - GHG Protocol – accounting standard
3. Internal and external capacity challenges
   - Scenario and strategic carbon emissions reduction planning
   - Property-level staff
   - Energy-related workforce

FUTURE HOUSING INITIATIVE

Future Housing Initiative:

Driving the transition to low-carbon, multifamily housing with real world data.

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Future Housing | Sponsors. Partners and Supporting Consultants

NEW YORK STATE | NYSERDA Supported

BANK OF AMERICA

be ex building energy exchange

BRIGHT POWER

cpc Community Preservation Corporation

NYC Department of Housing Preservation & Development

Steven Winter Associates, Inc.

Co Equity CONSULTING

KINETIC COMMUNITIES CONSULTING

ERM

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Utility cost estimates – Cooling/Heating

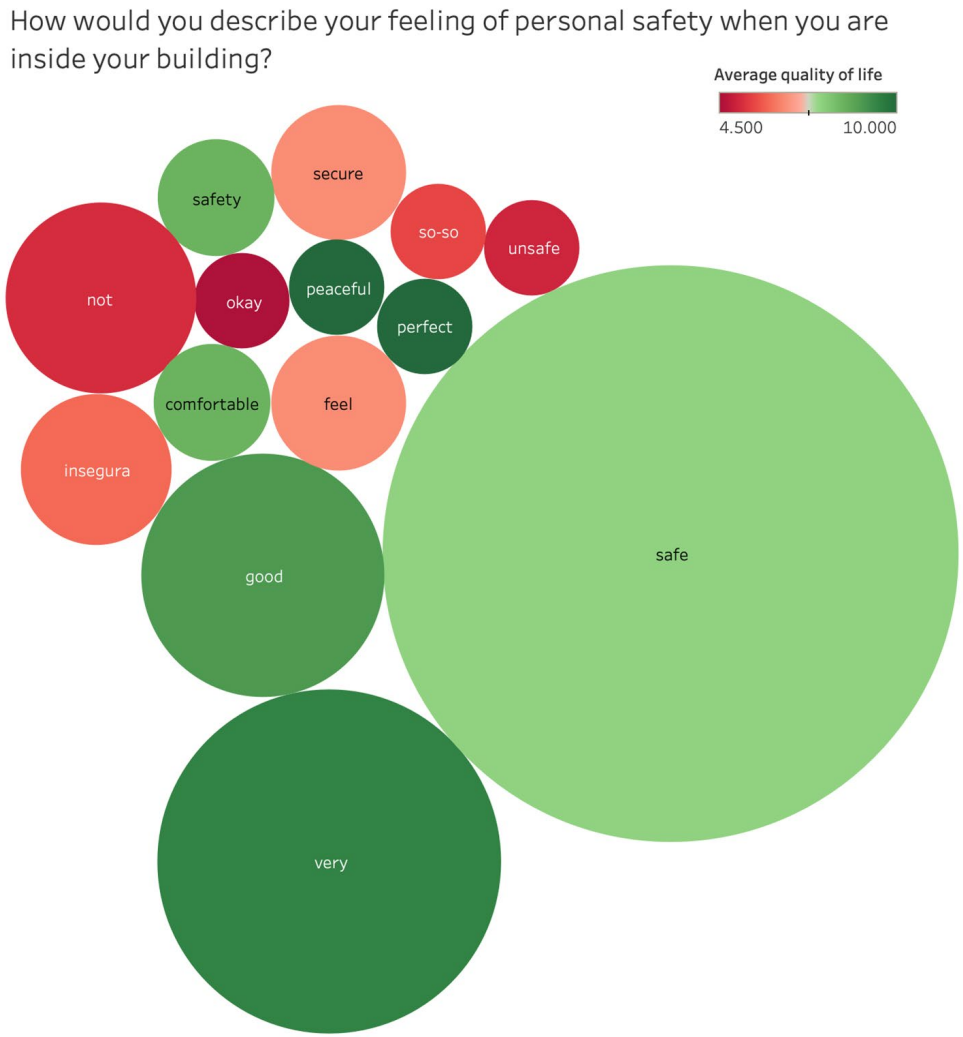
Component	HDC M&O 2023 ($/room/year)	Analysis ($/room/year)
Building electric cooling - Peer Data	$65	$63
Building electric cooling - Future Housing	**n/a**	**$36**
Building electric heat - Peer Data	$156	$142
Building electric heat - Future Housing	**$73**	**$127**
Building gas/oil heat - Peer Data	$195	$207
Building gas/oil heat - Future Housing	**n/a**	**$74**

Resident Priorities | Three Primary Themes

#1. The most important thing to residents is feeling safe in their home and building.

#2. Building management is key to people's experience in buildings.

#3. Residents place a high value on the sense of community within their buildings.



"They close tickets without repairing and say they're out of tickets" - person during a focus group

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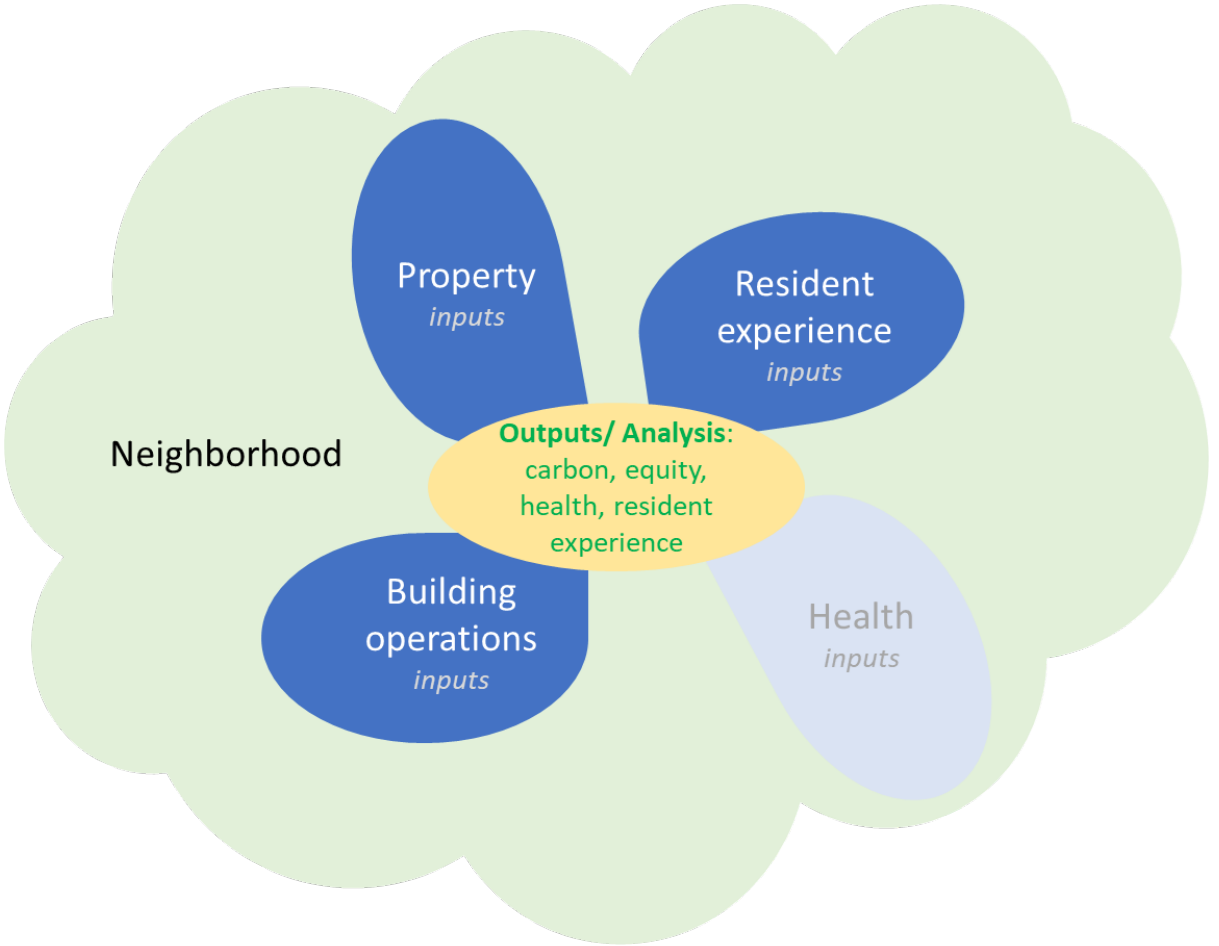
Future Housing | Opportunities to Participate

- Share data
- Adopt a holistic data framework
- Access low-carbon data set
- Collaborate on research or pilots



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Thank you!

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