Better Buildings®
U.S. DEPARTMENT OF ENERGY

Better Buildings Residential Network
Peer Exchange Call Series

Decarbonizing Low Income Homes – The DOE Affordable Home Energy Shot

May 23, 2024

U.S. DEPARTMENT OF ENERGY

Agenda and Ground Rules

- Moderator
  - **Jonathan Cohen,** Better Buildings Residential Network, U.S. DOE Residential Buildings Integration Program (RBI)
- Agenda Review and Ground Rules
- Residential Network Overview and Upcoming Call Schedule
- Opening Poll
- Featured Speakers
  - **Shadae Mayfield Mond,** U.S. Department of Energy (DOE)
  - **Iain Walker,** Lawrence Berkeley National Laboratory (LBNL)
  - **Michael Feldman-Wiencek**, District of Columbia Department of Energy & Environment (DOEE)
- Open Discussion
- Closing Poll and Announcements

Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.
2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

The views expressed by speakers are their own, and do not reflect those of the Dept. of Energy.

Join the Network

Member Benefits:

- Recognition in media, social media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- One-on-One brainstorming conversations

Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year, or equivalent.

Upcoming Calls (2nd & 4th Thursdays):

- *6/13: DOE's New National Blueprint for the Buildings Sector – What it Means for the Residential Sector*
- *6/27: The Changing World of Residential Refrigerants on World Refrigeration Day (June 26)*

Peer Exchange Call summaries are posted on the Better Buildings website a few weeks after the call



Shadae Mayfield Mond

U.S. DOE

U.S. DEPARTMENT OF ENERGY



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Affordable Home Energy Shot Briefing

May 23, 2024

Presenter

Shadae Mayfield Mond

ORISE Science, Technology, and Policy Fellow, Building Technologies Office

The Energy Affordability Challenge

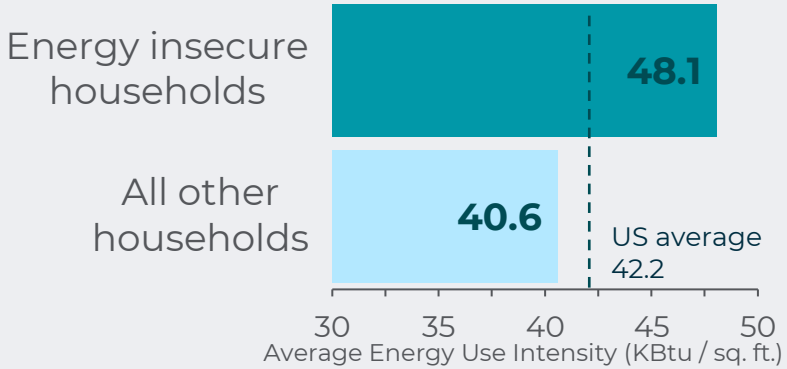
Our imperative is to deliver equitable solutions to households with the highest energy burdens.

High energy burdens
1 in 4 households face high energy burdens (>6% of income spent on energy).

Energy affordability challenges
1 in 5 households were unable to pay an energy bill in full in 2022.

Adverse pollution & health impacts
Black children are nearly **twice as likely** to have asthma compared to the national average.

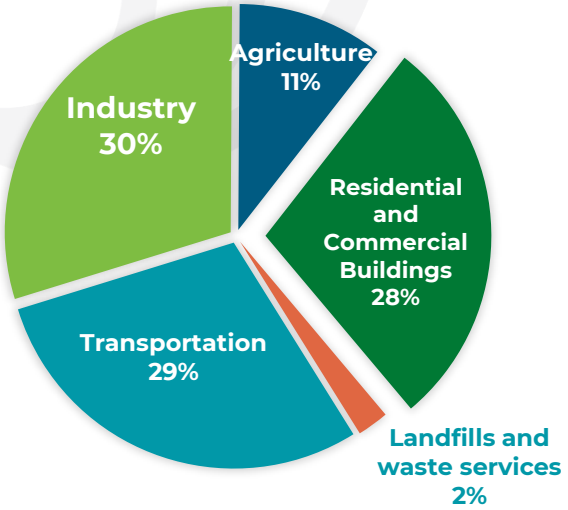
Households that experience energy insecurity live in less efficient homes.



Source: US Energy Information Administration, 2020 Residential

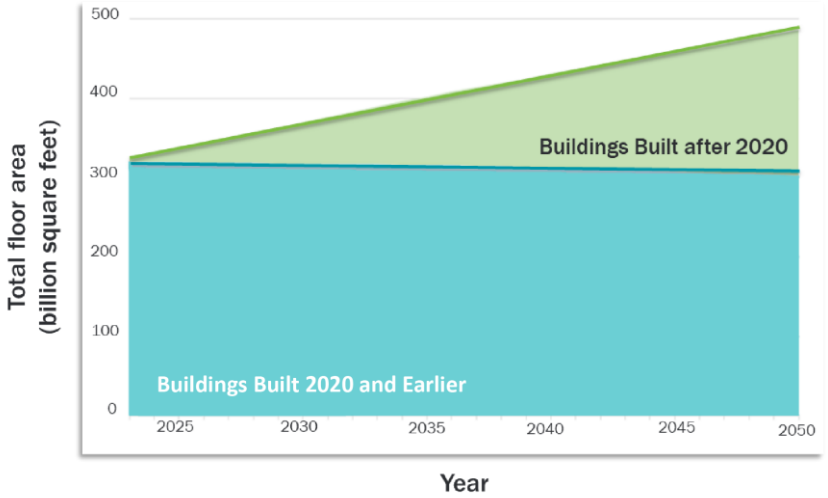
Building Decarbonization Must Be Accelerated

Buildings are a **leading emitter of GHGs** in the United States



Total U.S. Greenhouse Gas Emissions by Sector with Electricity Distributed
Source: U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021, 2021 data

Retrofits are key: The majority of buildings that will exist in 2050 have already been built today



Source: ACEEE calculations based on data in EIA AEO 2023; LBNL Building Performance Standards Overview graphics

Earthshot Mission Enables Energy Affordability

Energy Earthshots drive the major innovation breakthroughs that we know we must achieve to solve the climate crisis.

Ambitious

Affordable housing is the most difficult-to-decarbonize portion of the building sector.

Purposeful

Advancing clean, affordable technology solutions that address household energy needs.

Leading the way

Acting first to lead the private sector to address the specific needs facing affordable housing.

Approach to Affordable Housing*

*single-family, multifamily, and manufactured homes occupied by households earning <80% of the area median income

The Energy Earthshot focuses on the challenges facing the 50M homes that make up the U.S. affordable housing stock.



Focus on multifamily and manufactured homes

Over 60% of multifamily and manufactured buildings serve as affordable housing and face unique decarbonization and affordability challenges.



Create scalable solutions that minimize disruptions to renters

Over 58% of low-to-moderate income households are renters.



Target design barriers specific to older buildings

Affordable housing is more likely to lack adequate insulation and central AC, as well as experience other non-energy hazards such as lead and mold.

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Target

Lead Target

Reduce by 50%+ the cost of retrofit packages needed to decarbonize affordable housing while lowering energy bills by 20% within a decade.



50% lower upfront cost



20% lower energy bills



Within a decade

Three Technology Areas Unlock Cost Savings and Energy Performance

Integrated designs will deliver whole-home solutions

Building Envelope*

Improved livability and comfort make for more resilient homes

- Advanced leakage detection
- Low-impact retrofit techniques
- Panelized exterior insulation

Efficient Electrification*

Smaller, compact equipment and streamlined systems enable affordable and adaptable installations

- Lower-voltage equipment
- Plug-and-play HP designs
- Integrated ventilation packages

Smart Controls*

Flexible energy loads transform homes into energy resources

- Grid-interactive technologies
- Smart electric panels
- Shared circuit control between loads

*Listed technologies are examples of what could be achieved in each area and are not representative of every solution possibility

Community-Centered Principles



Occupant Health & Safety

Advance solutions for healthy homes that also address environmental burdens.



Community Preservation & Resilience

Minimize tenant disruptions and preserve housing affordability.



High-Quality Jobs in Underserved Communities

Create well-paying jobs and strengthen workforce in local communities.



Livability & Comfort

Ensure all upgrades create high-quality, comfortable, and resilient homes.

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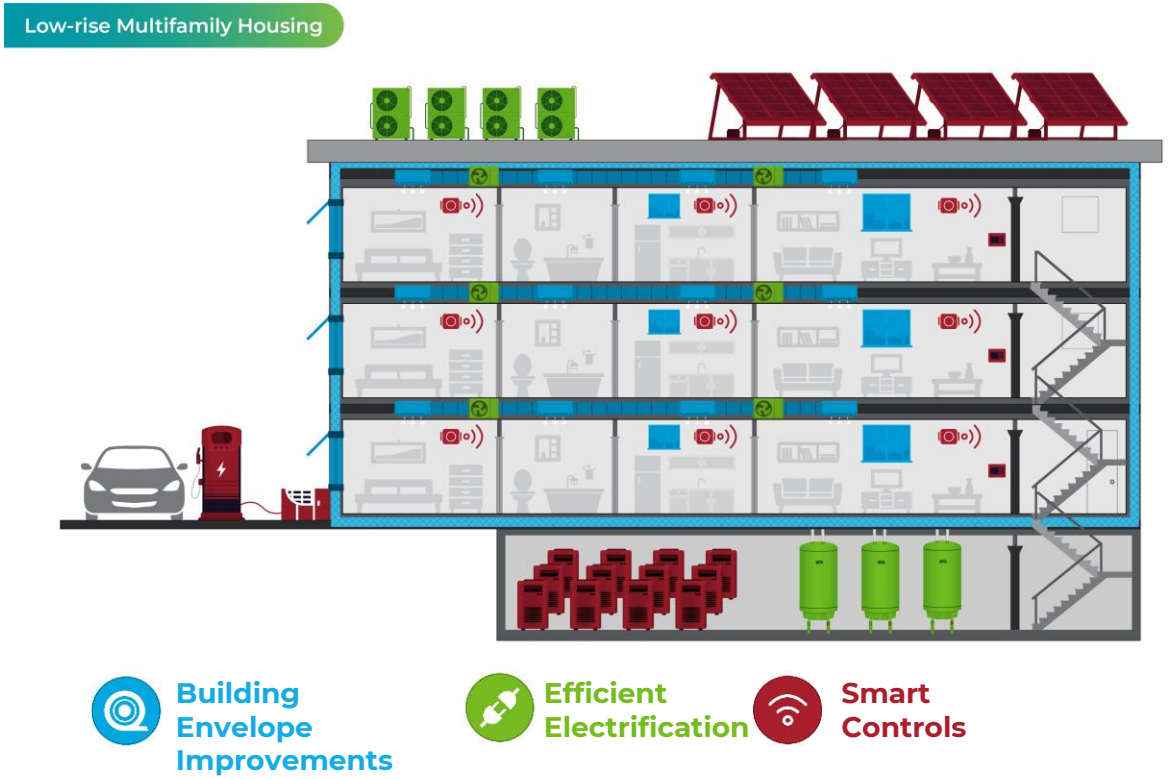
Vision for the Future

Building Envelope Innovations

A vision for the future

Super-insulated retrofit panels save money and improve comfort

- ✓ Off-site panel manufacturing supports high-quality jobs
- ✓ Residents can stay in place during makeover, which takes less than a day
- ✓ No more freezing windows and drafts that make it hard to stay healthy and comfortable
- ✓ Apartments get a continuous supply of fresh, filtered air to stay healthy

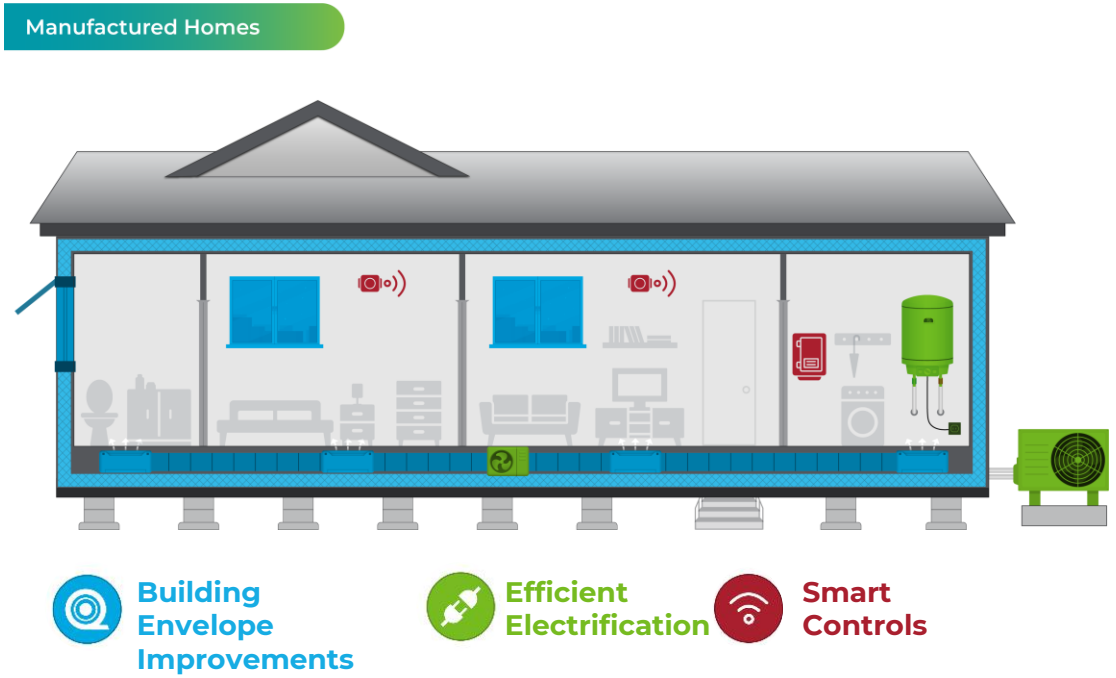


Efficient Electrification Innovations

A vision for the future

More efficient equipment lowers operating costs and enables more flexible installations

- ✓ New high-tech heating and cooling devices are small, quiet, and fit in all home types
- ✓ Equipment saves so much money residents can better afford rent, healthy food, and medical costs
- ✓ Whole-home air conditioning makes homes more resilient to extreme heat
- ✓ Quiet and efficient equipment runs continuously to keep indoor air comfortable and healthy



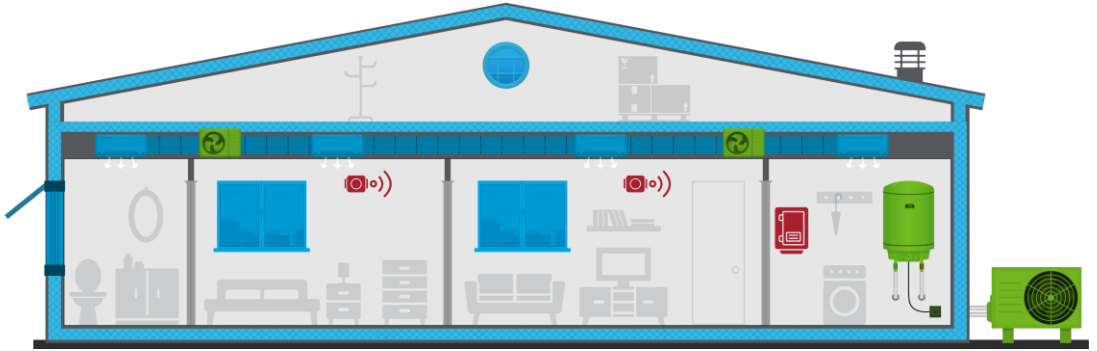
Smart Controls Innovations

A vision for the future

Smart controls make homes more affordable and resilient

- ✓ Controls so efficient and smart that residents make money without even noticing
- ✓ Smog and wildfire smoke is intelligently filtered out to keep residents healthy
- ✓ Home automatically figures out best time to charge electric cars or bikes—at certain times of year it is almost free.
- ✓ If the power goes out, home batteries and efficient appliances keep residents comfortable for days

Single Family Homes



Building Envelope Improvements

Efficient Electrification

Smart Controls

AFFORDABLE HOME ENERGY SHOT™ VIRTUAL SUMMIT

June 5

10:30 a.m. to 4:30 p.m. ET

- ✓ Equity-driven solutions
- ✓ Stakeholder perspectives
- ✓ Cost reduction strategies
- ✓ Technology R&D needs

bit.ly/AHES-summit

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Iain Walker

LBNL



Decarbonizing Low Income Homes

Iain Walker

May 23rd 2024
Better Buildings Residential Network

ENERGY TECHNOLOGIES AREA
BERKELEY LAB

Introduction

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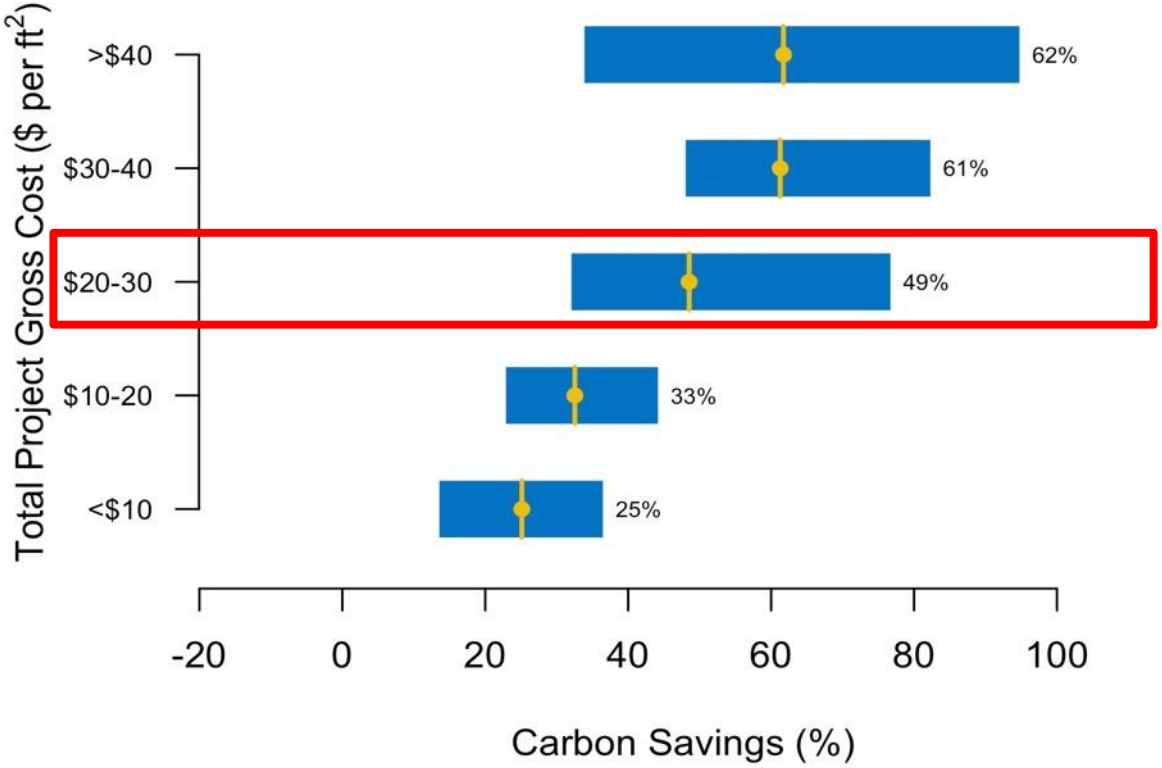
Affordable Home Energy™

To decarbonize American homes and improve energy affordability nationwide, DOE launched the eighth and final Energy Earthshot—the Affordable Home Energy Shot™—to accelerate innovative retrofit solutions that reduce up-front costs, lower utility bills, improve safety and comfort, and address communities' broader needs.

Lower upfront costs

Cost data from 1700 projects

>50% Carbon reductions currently more than $50,000 per home



Lowest cost projects: basic air sealing/insulation with heat pumps and solar PV

CO_2 focus: $40,000

About TEN TIMES median US household savings

Costs are highly variable

- Home with A/C trivial to add heat pump
- Home with no A/C – needs new 240V circuit(s), ductwork fabrication, drains, etc.

- Newer home needs no envelope upgrades
- Older home needs air sealing, attic/wall/basement insulation

- Adding EV Charger or Solar PV?

Existing conditions – critical in lower income households

- Asbestos abatement
- Broken/missing HVAC/DHW/appliances
- Broken/missing envelope: windows, roofs, walls, doors, downspouts
- Pest control
- No physical room/access
- Not enough panel capacity or space
- Poor condition electrics

Avoiding panel/service/wiring changes

What does it cost?

- Circuits: **$500-$1,500 each**
- Panel: **$1,000-$5,000**
- Service: **$1,000-$25,000** to homeowner + similar amount for utility
- Rewiring trigger: **$10,000 - $20,000**

Time delays

- **3-6 months** project delays
- >1-year lead time on transformers
- Utility might reject your interconnection



Image courtesy of Eric Morrill

Additional ratepayer costs for:

- Utility distribution system capacity increases + new generation/storage

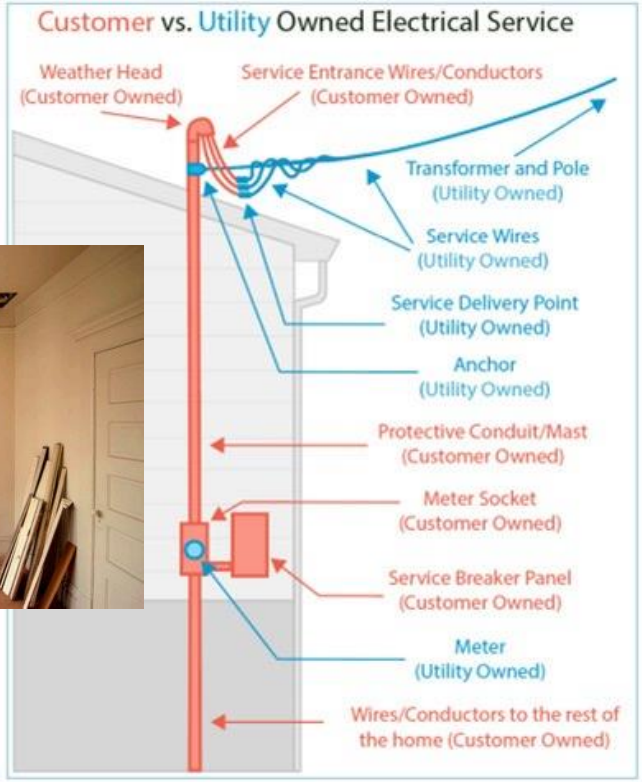


Image courtesy of Redwood Energy

Sometimes a panel replacement is needed

May be more common in older lower income less maintained/updated homes

Old, unsafe or damaged:
- Panels
- Breakers
- Wiring
- Junction boxes
- Fuse Boxes



Low Power Electrification Solutions: Smart Panels and Breakers

Smart Breakers
$200 + install







Smart Panels
$3-5k + install





Low Power Electrification Solutions: Circuit Sharing and Pausing

Circuit Sharing & Pausing
$300-900 + install, sometimes DIY
EV Charging and Hot Water

EV-PowerShare[xlii]
EV-PS Smart



SimpleSwitch[xliv]
240V / EV Circuit Switch



BSA Electronics[xli]
Dryer Buddy



Neo Charge[xlii]
Smart Splitter



Low Power Electrification Solutions: Low Power Appliances

120V plug-in heating, cooling, hot water





Battery-Integrated Cooking High cost premium

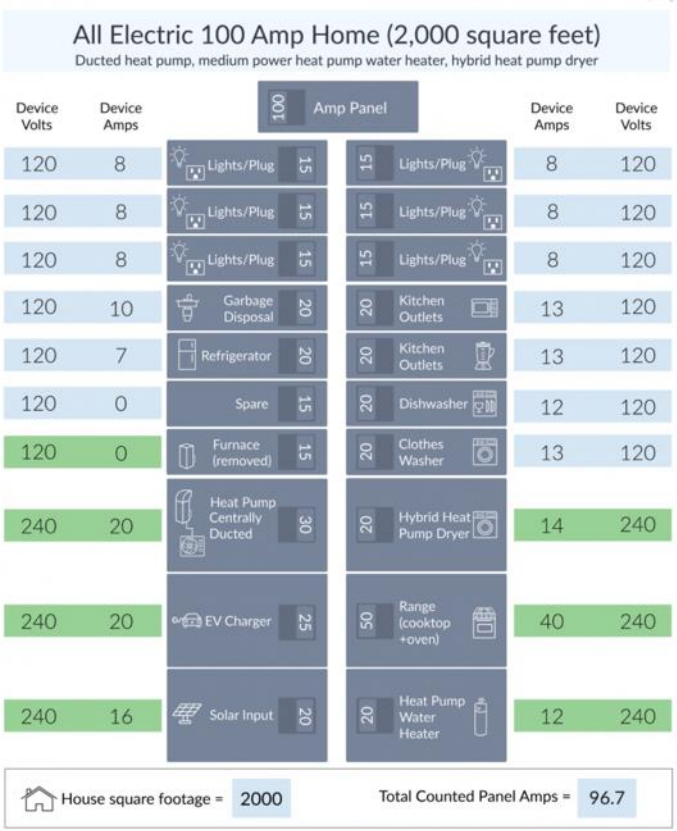


Low Power Electrification Solutions

Meter collars for EVs and PVs
$500 + install

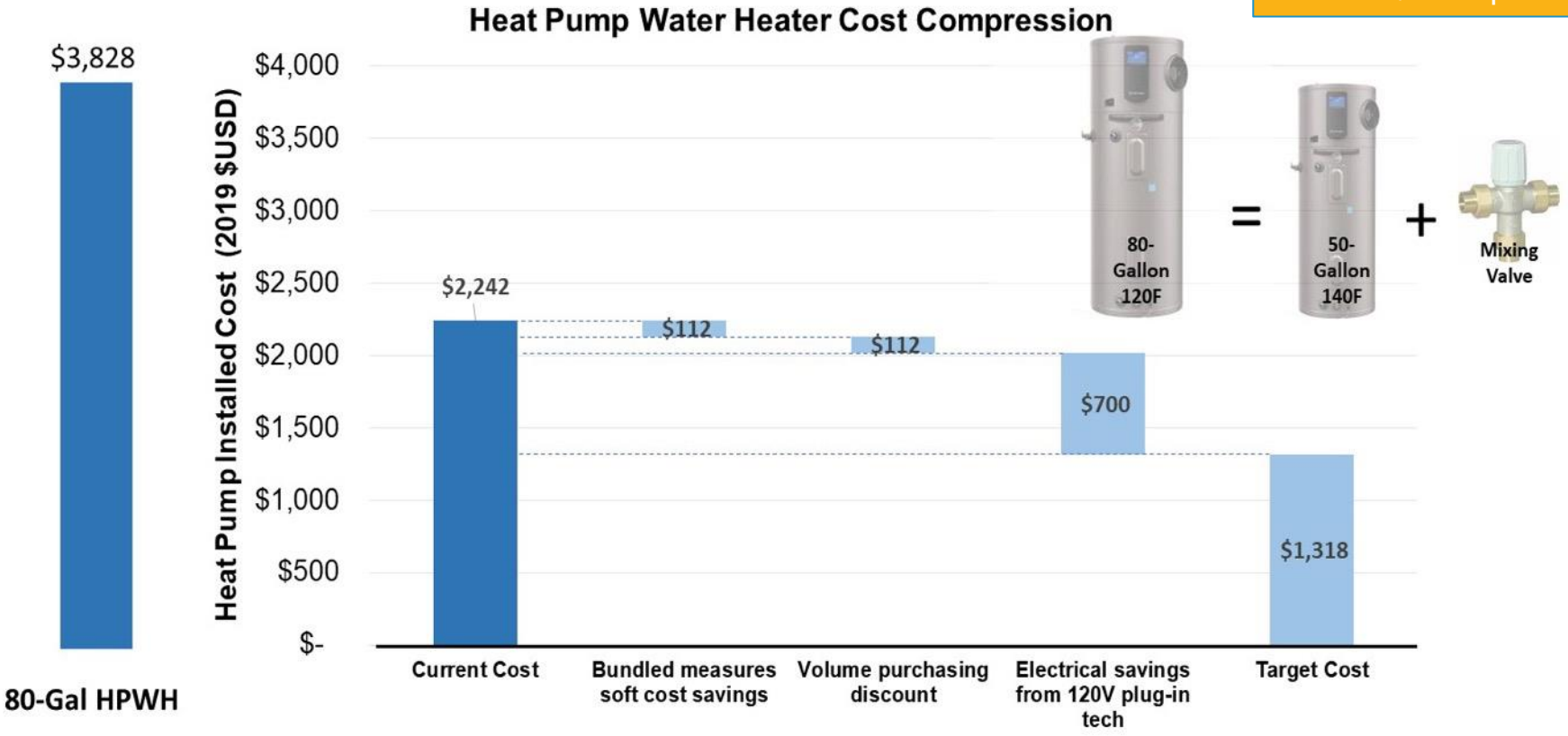


Using the National Electric Code: "Watt Diet" FREE!!



Appliance Cost Compression

Low income direct install program at SMUD has already proven the potential to cut costs from >$4k down to $3400 per unit



Other Affordability Ideas

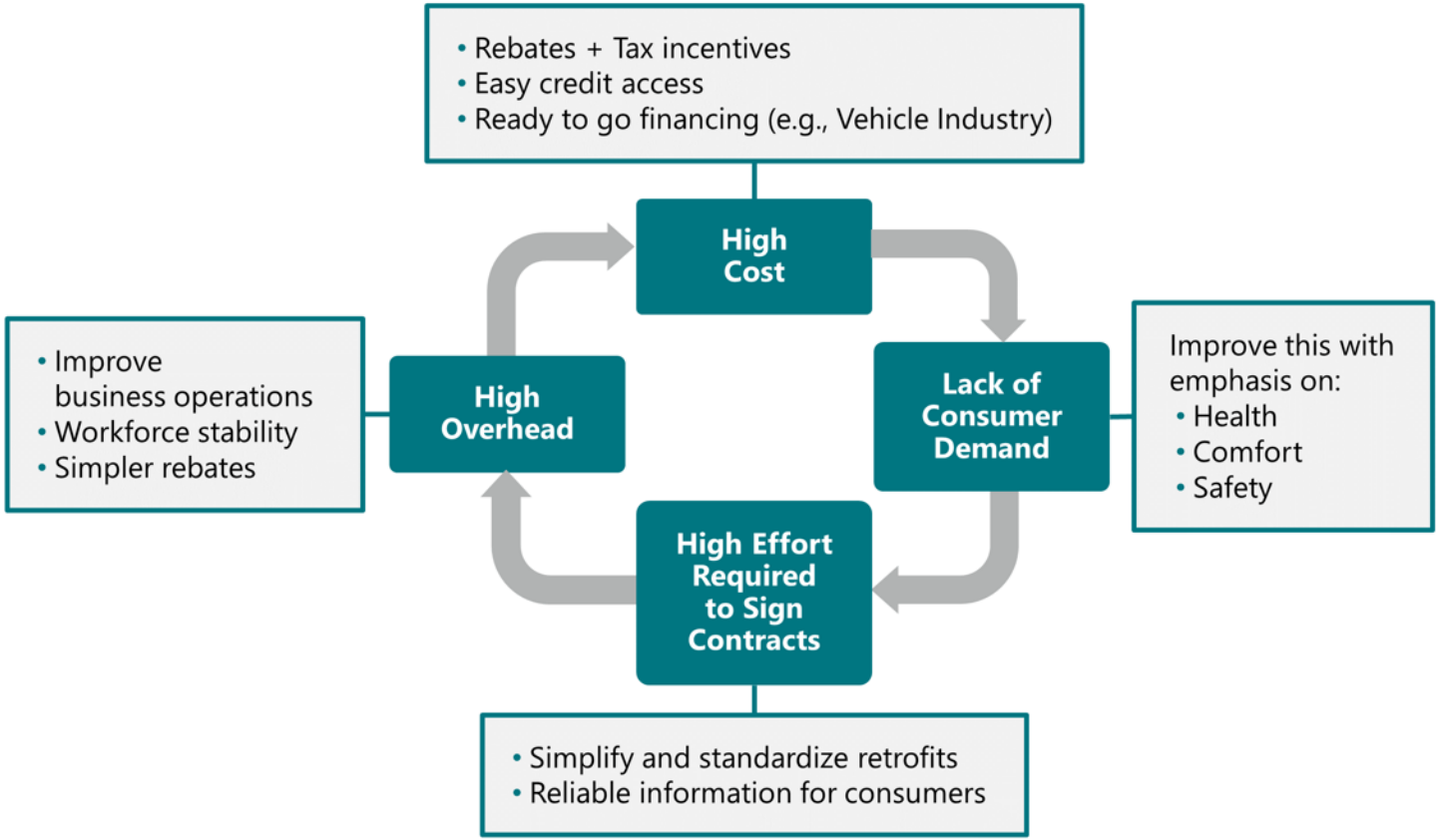
- "Affordability" - based on net monthly cost (not banking metrics of ROI, LCC, TRC, etc.)
  - Bundled financing – third party financing shares in bill reductions
  - Include added value: health, safety, comfort, etc.
- Better sizing, installation practice, commissioning = smaller, cheaper installs
- Consistent, long term rebates (not tax credits) helps business plan and organize
- Program design
  - Bulk purchasing
  - Contractors only do installs
  - Training
  - Focus on biggest carbon savings: HP, HPHW, air sealing, insulating
  - Consider DIY approaches (need more 120V plug-in solutions?)

Helping Businesses

Decarbonization upgrades have very high overhead (40%) – we need to address business models

Work is not attractive for contractors

Not enough installers/contractors – fewer electricians and plumbers every year…..



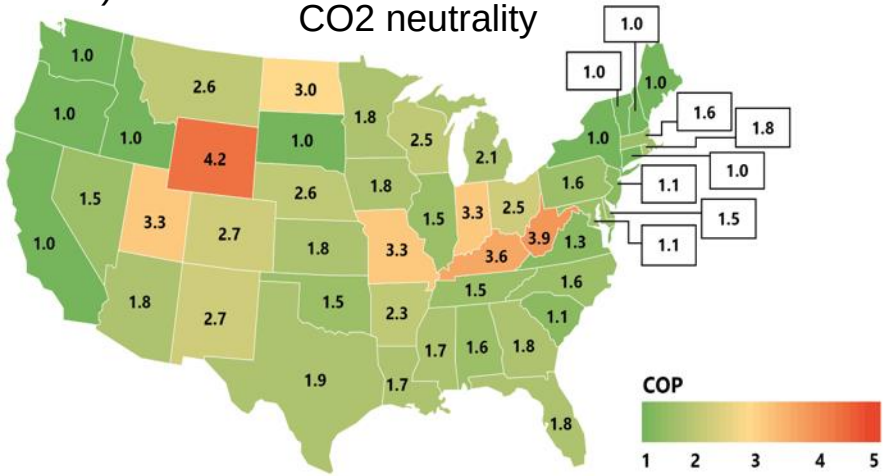
Lower utility bills

Bill Savings

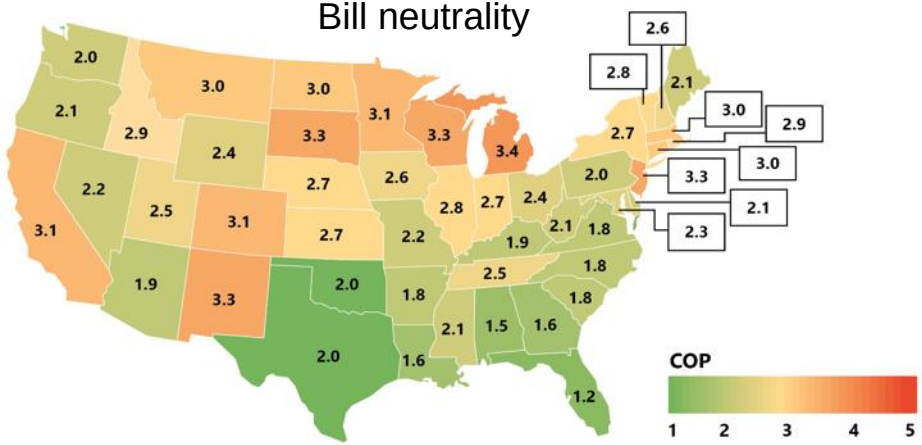
1. Almost everyone saves: regional variability
2. Rate structures matter. Turn *borderline* in to *savings* using pro-Electric rates. Consistent bills through the year: avoids high bill stress
3. Completely remove gas to avoid standing charges.
4. Need protections for low income – build on existing programs.
5. Any additional grid infrastructure costs passed on in future rate increases. Vital to minimize added load.
6. Solar PV – Net Energy Metering is important.

Heat Pump compared with an 80% AFUE gas furnace (in 2019)

CO2 neutrality



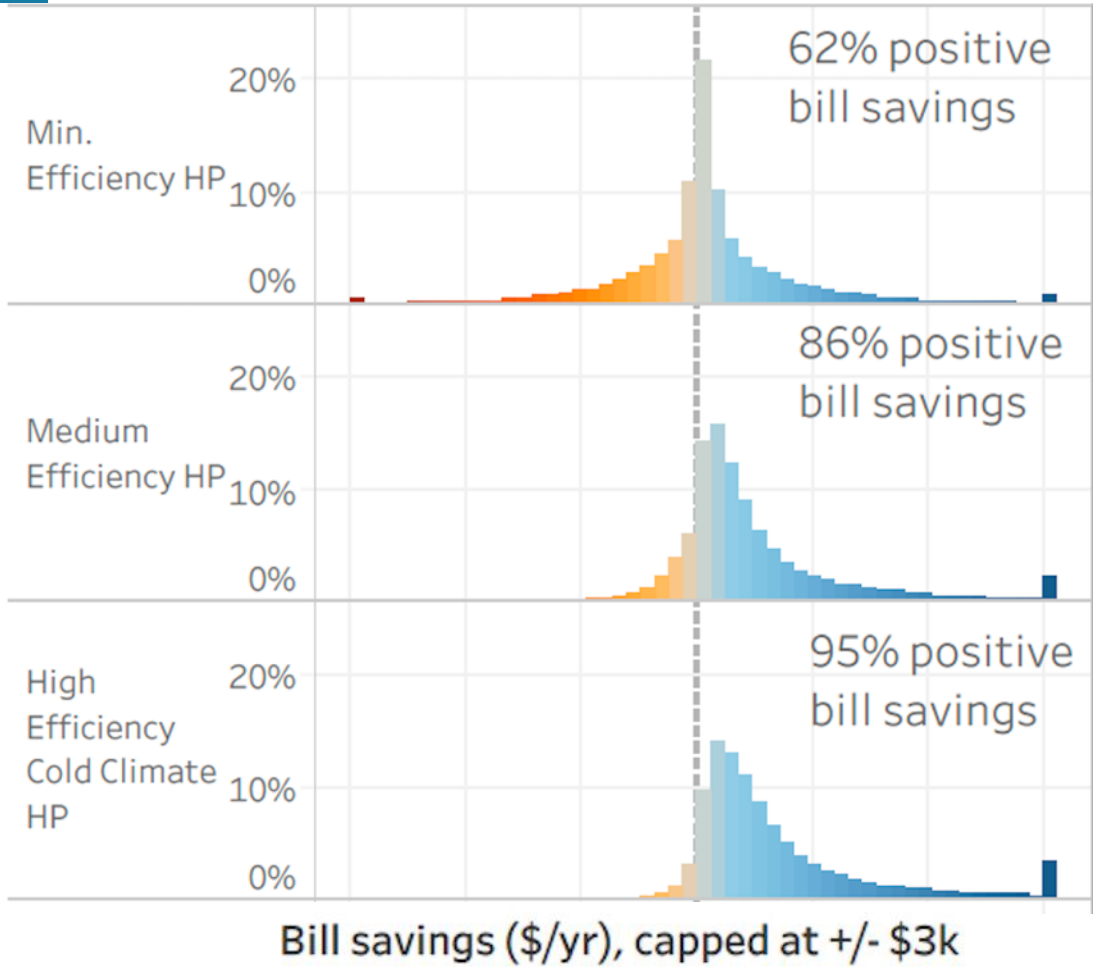
Bill neutrality



Walker, I.S. Less, B.D., Casquero-Modrego, N. (2022). Carbon and energy cost impacts of electrification of space heating with heat pumps in the US. Energy & Buildings 259, 2022. https://doi.org/10.1016/j.enbuild.2022.111910

Bill Savings

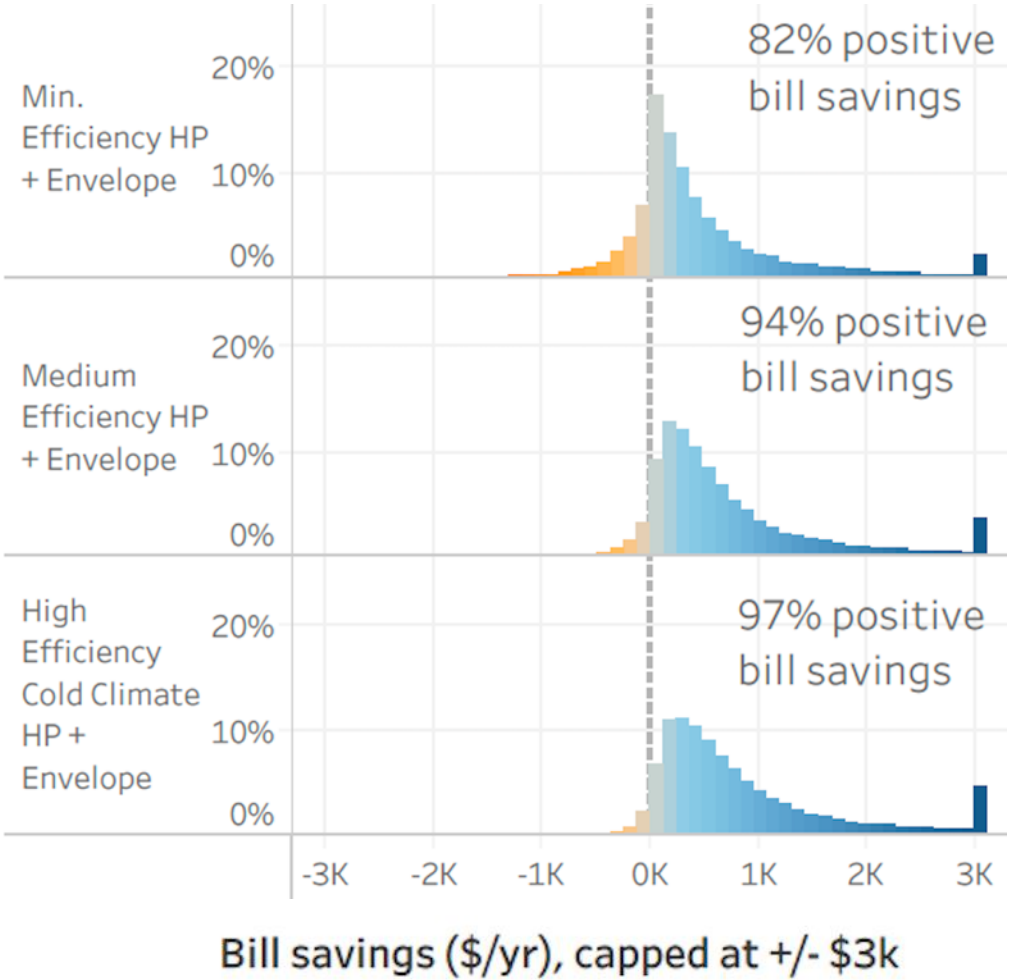
Install high efficiency equipment



Wilson, J., Munankarma, P., Less, B., Reyna, J. and Rothgeb, S. 2024. Heat Pumps for All? The distributional costs and benefits of residential air-source heat pumps in the US. Joule. doi.org/10.1016/j.joule.2024.01.022

Bill Savings

Load reduction: air sealing and insulating duct systems and older homes



Improve safety and comfort and address community needs

Non-energy benefits – considering added value

Functionality:

Comfort – steady temperatures with heat pumps + air sealing + insulation, adding ability to cool

Health & safety:

Indoor Air: main sources are cooking and poor appliance venting

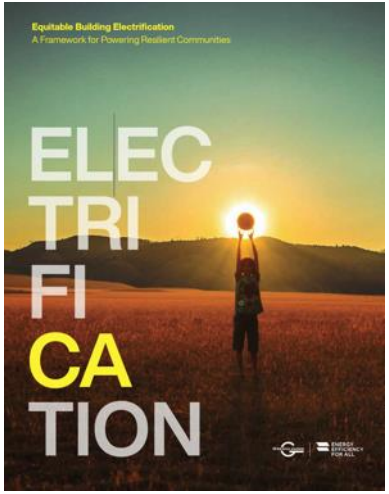
- This would serve Low-Income/Disadvantaged households the most
- More likely to have poorly vented appliances
- Smaller dwellings have higher contaminant concentrations
- Low income dwellings less likely to have ventilation systems

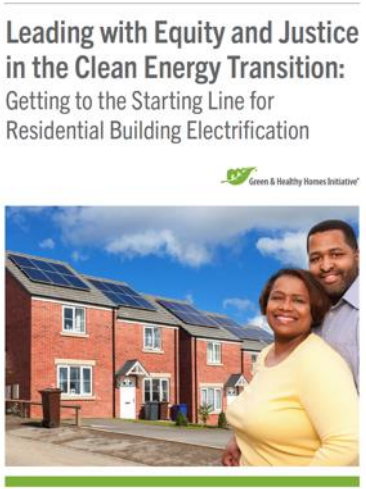
Outside air: Environmental Justice Issue – often worse in disadvantaged communities

Heat stress: Provision of cooling + more affordable heating/cooling

Solutions for renters, multi-family and low income households

- **Renters need protection form increased rents and eviction**
  - Look for solutions the do not require MF buildings to be empty – eviction and no right of return a major concern
  - In MF occupants often pay electric bill, but not gas bill if heat and hot water are central systems. How to compensate if someone starts to use a portable heat pump?
- **Develop plug-in/transportable solutions for renters**
- **Lower income households are risk averse** – can't afford to make a "mistake" – they need reassurance and low-risk, robust, "tried and true" solutions





Household interactions.. So many (good) questions….

Programs need to have ready to go, good answers to these questions:

- Will bills go up or down?
- Is it noisy?
- Will I be comfortable?
- Does it cost more to maintain?
- Who will fix it when it breaks?
- Who do you call?
- If you find someone, can they do it?
- If they can, how long do you need to wait? Many months for a contractor + many more months if a utility is involved
- What is the value?

Community and culture

Capitalize on existing culture to get to scale

Maine example:

- Bring training together at a state level – everyone on the same page
- Understand motivations and tailor solutions… e.g., “Made in America”



2. Years of ingenuity

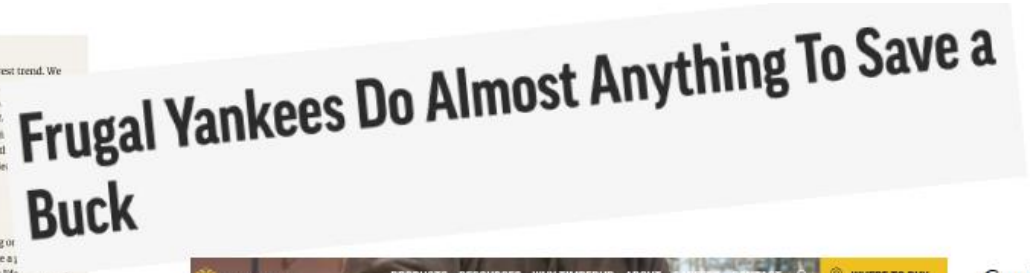
People from Maine were upcycling before it was a Pinterest trend. We pickle watermelon rinds instead of composting them an junk into Etsy gems. This stems from our insatiable nee sufficient combined with the impressions from our thrif. work hard and pride ourselves on our independence. Mai to “git ‘er done” on any budget, in any situation — whetl gerry-rigging a car repair or improvising a home remode prepared, usually with duct tape and vinegar.

3. Roughing it

Mainers take a masochistic pride in roughing it, working o budget, and being forced to find an original way to tackle a Sure, hiring someone to dig a well would make everyday life why not see how long we can make the rain cistern/hauling in water situation work? It’s not so much a matter of finance as it is a matter of pride. Even urban Mainers are well-trained in the art of survival, and we love showing it off. So much so that adversity actually makes us giddy. We perk up when a storm hits, or when the car breaks down.

4. Our heritage

Mainers can get weirdly hung up on the “How Maine are you?” competition. Questions such as, were you actually born in Maine? And what about your parents? Grandparents? These petty distinctions even come into play on the city/town level, with community bonds passing from generation to generation as people grow up with the grandkids of their grandparents’ friends. Things can get dicey when hometown loyalties are ruffled, and locals draw an invisible line to show outsiders their place.



Frugal Yankees Do Almost Anything To Save a Buck



Capitalise on

- Frugality,
- Tribalism,
- Territorialism,
- Independence,
- Self Sufficiency

Images from Naomi Beale, Retrofit Maine

What about “no income” abandoned property?

Strategies to ”decarbonize” while rebuilding:

- 20 properties at once for scale
- Utilize pooled subsidies
- Build to “code” with all-electric design
- Challenging to make a profit – needs subsidies















Images from Brendan Schreiber, Schreiber Brothers Development

Iain Walker iswalker@lbl.gov

Homes.lbl.gov

Remaining Challenges



Solutions for hard to electrify homes:

- Cold climates
- All-gas homes
- Multifamily homes
- Manufactured homes
- Old/historic homes

The Pathway

1. Start now, if not sooner
2. Low power electrification of heating, hot water, cooking and laundry (using heat pumps)
3. Air seal and insulate older homes & HVAC systems
4. Optionally, add Solar PV
5. Use the best performing heat pumps you can
6. Use integrated appliances for cooking/laundry
7. Easy access to rebates/financing
8. Help contractors with new business models
9. Develop homeowner and trades guidance/reassurance/risk assessment
10. Emphasize health/safety benefits
11. Train more trades
12. New rate structures + rebates + financing
13. Make every AC replacement a heat pump

HOME DECARBONIZATION IS:

Costly
Time Consuming
Hard



HOME DECARBONIZATION NEEDS TO BE:

Affordable
Simple
Easy



Michael Feldman-Wiencek

District of Columbia DOEE

DC'S AFFORDABLE HOUSING RETROFIT ACCELERATOR (AHRA)

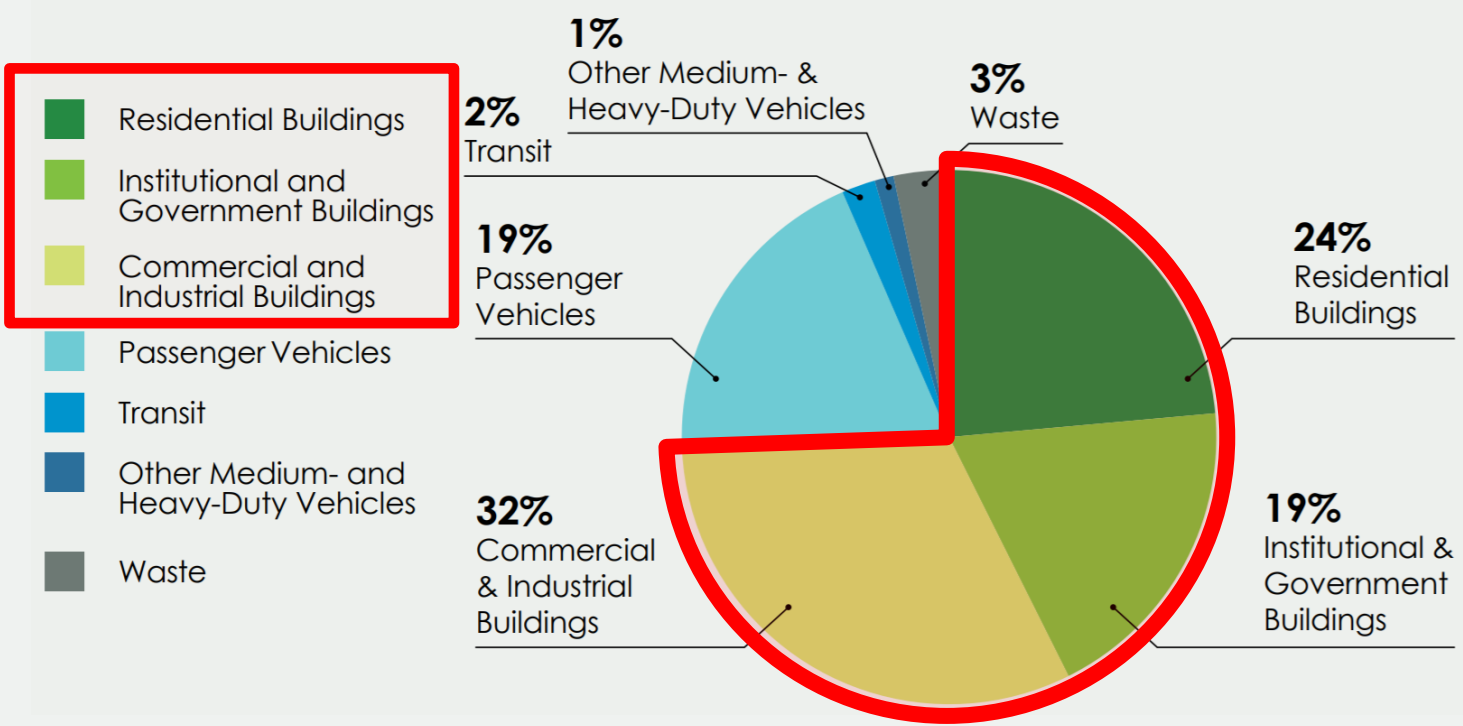
Michael Feldman-Wiencek
District of Columbia Dept. of Energy and Environment
May 24, 2024

DEPARTMENT OF ENERGY & ENVIRONMENT

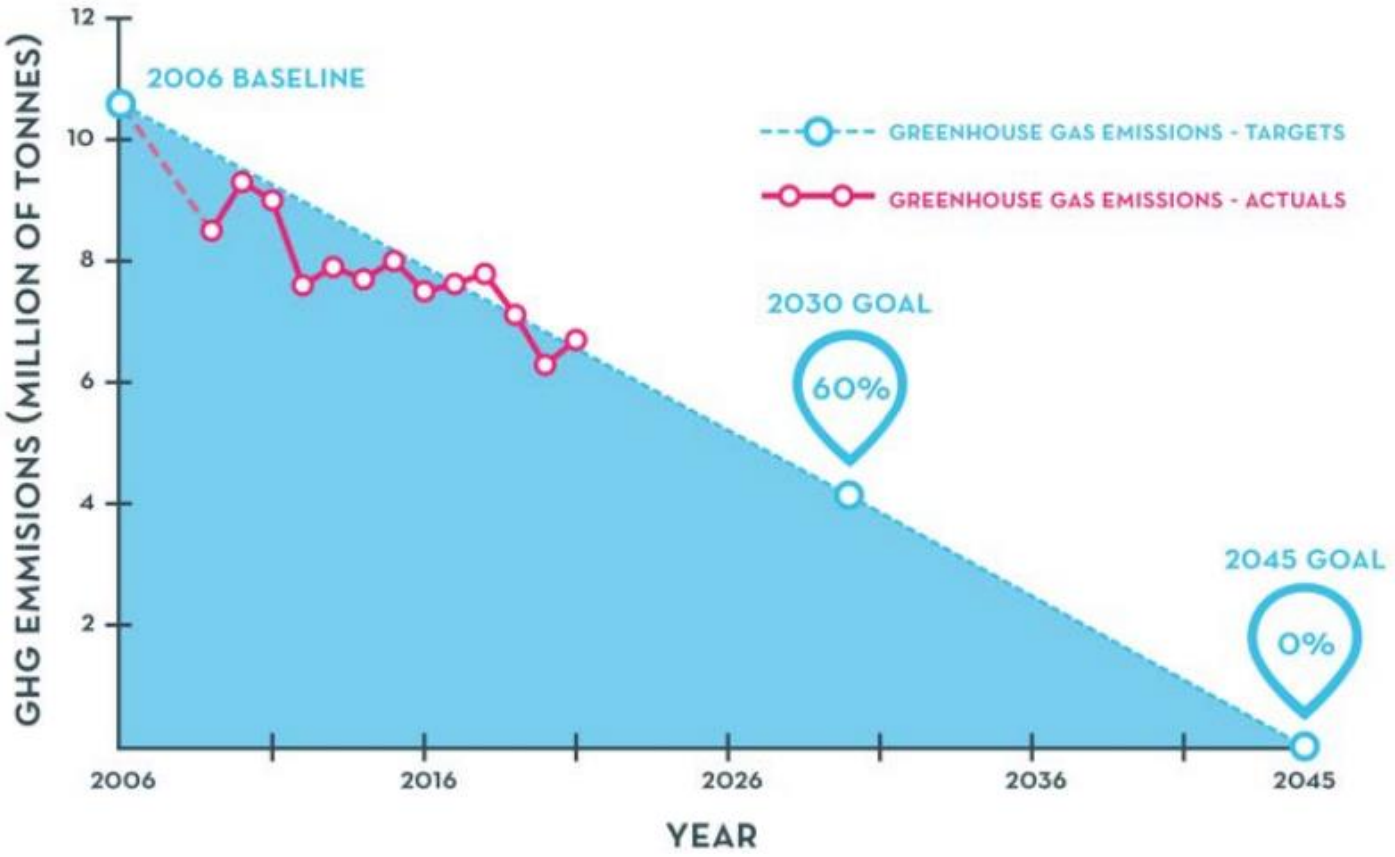
GOVERNMENT OF THE DISTRICT OF COLUMBIA
MURIEL BOWSER, MAYOR

ENERGY USE AND EMISSIONS IN DC

MODELED PROPORTION OF GHG EMISSIONS BY SECTOR



CITYWIDE EMISSIONS AND TARGETS



OVERVIEW OF BUILDING PERFORMANCE PROGRAMS

District buildings are required to measure and report their annual energy and water use through the **Benchmarking** process. Based on that benchmarking data, buildings will need to comply with the **Building Energy Performance Standards (BEPS)** by making changes to the buildings that save energy.

BENCHMARKING 101

Clean and Affordable Energy Act of 2008 requires all private and DC-owned buildings to report their calendar year (CY) energy and water use to the DOEE for public disclosure by April 1 annually.

Covered Buildings

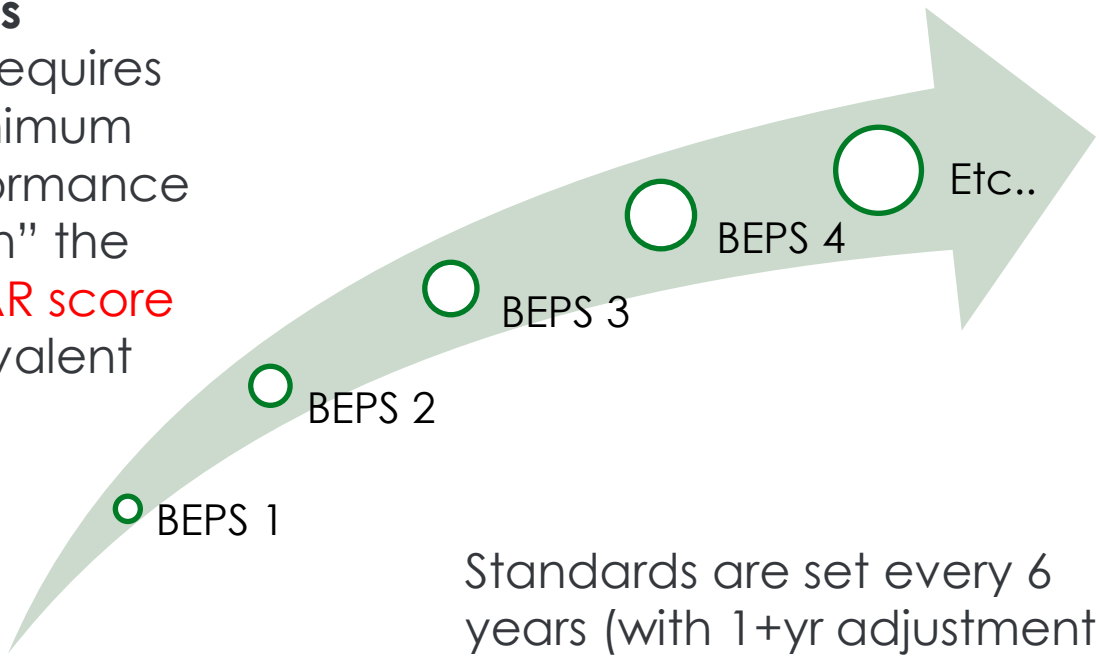
- ❑ 2010 and on – DC-owned buildings >10,000 sq. ft.
- ❑ 2014 and on – Private buildings > 50,000 sq. ft.
- ❑ 2022 and on – Private buildings > 25,000 sq. ft.
- ❑ 2025 and on – Private buildings > 10,000 sq. ft.

Third Party Data Verification Required

- ❑ Beginning 2024 and every three (3) years after

BUILDING ENERGY PERFORMANCE STANDARD 101

Clean Energy DC Omnibus Amendment Act of 2018 requires an establishment of a minimum threshold for energy performance that will be "no lower than" the local median ENERGY STAR score by property type (or equivalent metric).



Standards are set every 6 years (with 1+yr adjustment for COVID in Period 1).

BEPS APPLICABILITY

As the benchmarking requirements ratchet down in square footage over time, the buildings will be required to meet the BEPS in the following periods until all buildings 10,000 sq. ft. and over are following the performance standards.

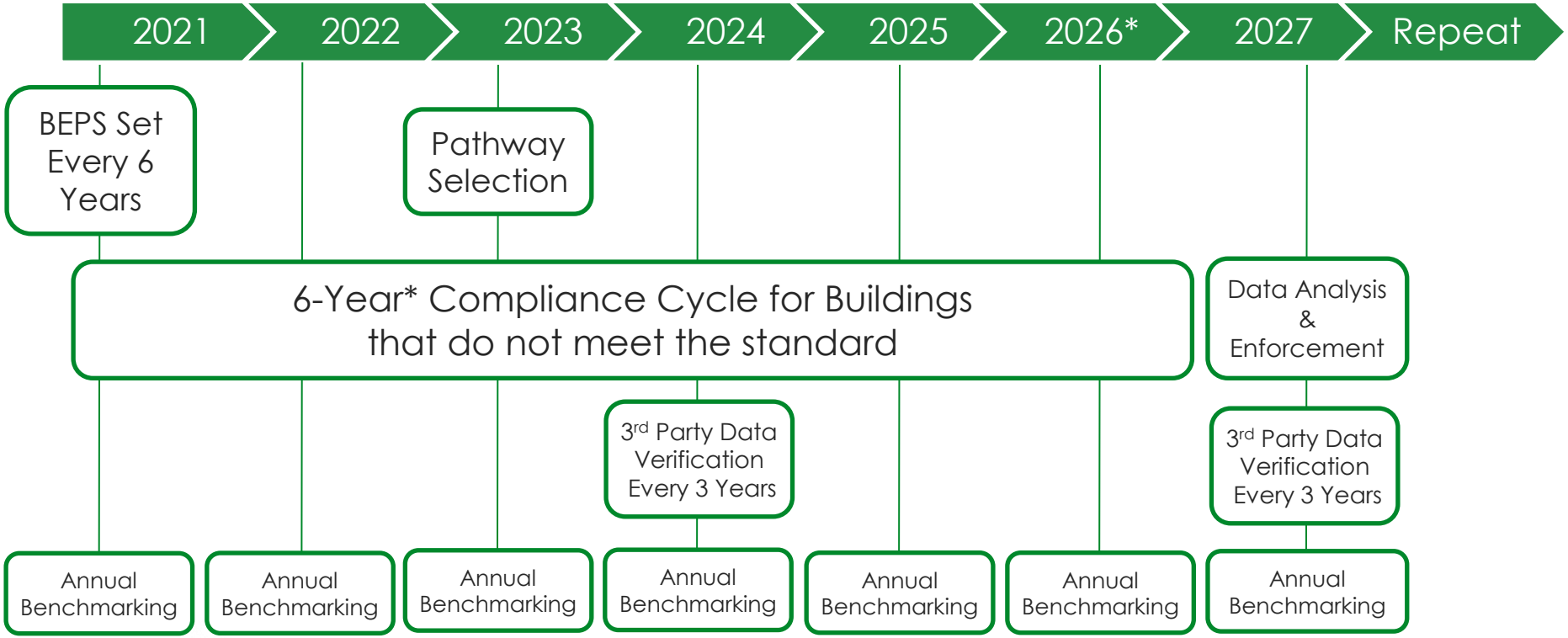
BEPS 1:
Private buildings >50,000 sq. ft. and DC-owned >10,000 sq. ft.

BEPS 2:
Private buildings >25,000 sq. ft. and DC-owned >10,000 sq. ft.

BEPS 3:
Private buildings and DC-owned >10,000 sq. ft.



BEPS REVOLUTION – with COVID-19 PHE adjustment



* COVID-19 PHE adjustment – automatic 1-year delay of BEPS compliance cycle

TIMELINE OF BEPS DEVELOPMENT + AFF. HOUSING OUTREACH



Aug '18 – Mayor's CEDC Plan Published

Dec '18 – DC Council passes CEDC Act

Apr '19 – DOEE Branch Established

Jan '21– First BEPS established

Jun-19 | Sep-19 | Dec-19 | Mar-20 | Jul-20 | Oct-20 | Jan-21

BEPS Working Group (WG) Sessions

Nov '19 – NHT + HAND Publish Findings

BEPS Task Force (TF) Bi-weekly Meetings

Nov '19 – Mayor appoints BEPS Task Force (TF)

Affordable Housing Focus Group Meetings

Spring '20 – DOEE hires affordable housing liaison FTE

NHT + HAND Report: https://nationalhousingtrust.org/sites/default/files/news_file_attachments/BEPS%20Recommendations%20FINAL.pdf

BEPS and American Rescue Plan Act (ARPA)

- ✓ Early summer 2021, District agencies began preparing proposals for use of the ARPA funds
- ✓ DOEE identified ~140 affordable housing buildings not meeting the BEPS (out of ~900 buildings)
- ✓ DOEE applied for multi-year funding with the goal of bringing all 140 buildings into compliance with BEPS for one or more cycles
  - ✓ Built off affordable housing outreach & engagement re: BEPS (2019 – 2021)
  - ✓ We identified local primary partners, the DCSEU and the DC Green Bank
  - ✓ Support for pre-development work, direct installation of EEM's, and construction financing over multiple years

AFFORDABLE HOUSING RETROFIT ACCELERATOR (AHRA)

- Financial and technical resources to improve existing building energy efficiency
- Help building owners comply with the Building Energy Performance Standard (BEPS)



OFFERINGS

For eligible buildings:

Financial Assistance for:

- Energy audits
- Retro-commissioning
- Installation of new energy efficient building equipment
- Low cost-construction loans for deeper energy retrofits

One-on-one Technical Guidance for:

- Understanding BEPS regulatory requirements and deadlines
- Uncovering energy-saving opportunities in your building(s)
- Developing a pathway and action plan to improve energy performance
- Cutting your energy costs, run your building more efficiently, and reduce your greenhouse gas emissions

BEPS + ARPA: Initial Plan

- ✓ Proposal approved, in FY22 rec'd **~$35 million** to launch the **Affordable Housing Retrofit Accelerator**



- ✓ Funding Overview:
  - ✓ ~40 mid-cycle (covenanted) affordable housing ($10M)
  - ✓ ~60 Naturally-occurring Affordable Housing (NOAH) Buildings
    - ✓ $8.244M for Energy Audits and Pre-development work
    - ✓ $10.8M for Construction Loans
    - ✓ $3M non-ARPA funds added in for support
  - ✓ ~40 Public Housing Buildings ($5.3M)
- ✓ Additionally, we received ~500k for DOEE Staffing (4 FTE's) and Admin
- ✓ In FY23, received a similar amount of ARPA funding

AHRA Eligibility

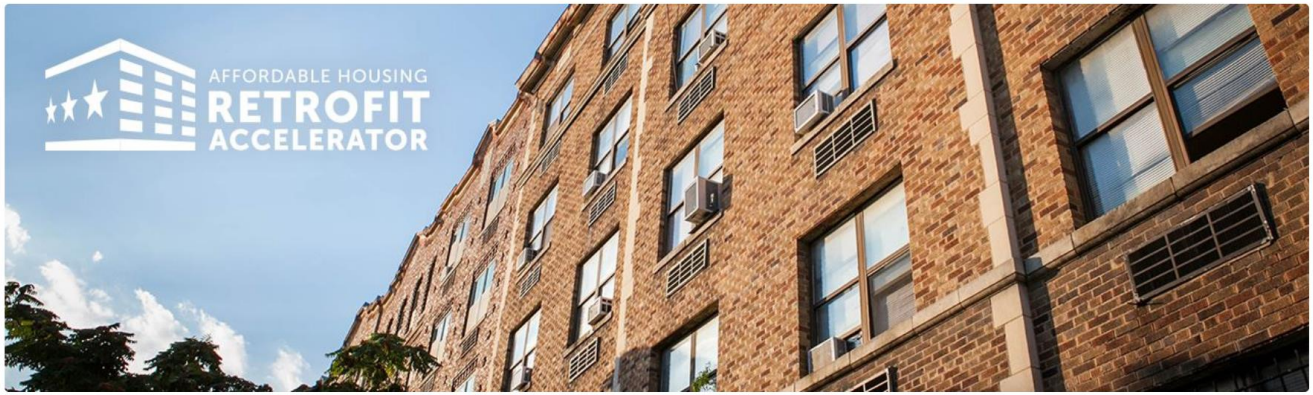
Application opened Dec. 2021 for:

- ✓ Multifamily building
- ✓ >50,000 ft^2
- ✓ Does not meet 2021 BEPS (ENERGY STAR Score < 66 in 2019)
- ✓ Meets definition of affordable housing[1]
  - Buildings that are primarily residential, contain 5 or more dwelling units where:
    - Use restrictions or other covenants require that at least 50% of all of the building's dwelling units are occupied by households that have household incomes of less than or equal to 80% of the area median income;
    - Or the building owner can demonstrate that at least 50% of the dwelling units rent at levels that are affordable to households with incomes less than or equal to 80% of the area median income.
- ✓ Must stay affordable via one of the following:
  - Existing covenant, OR
  - Rent control + agree not to seek exemption, OR
  - Sign new 10-yr affordability agreement

DC SUSTAINABLE ENERGY UTILITY

AFFORDABLE HOUSING RETROFIT ACCELERATOR

Affordable Housing Retrofit Accelerator



Accelerate energy savings and put your building on the path to compliance with DC's Building Energy Performance Standards

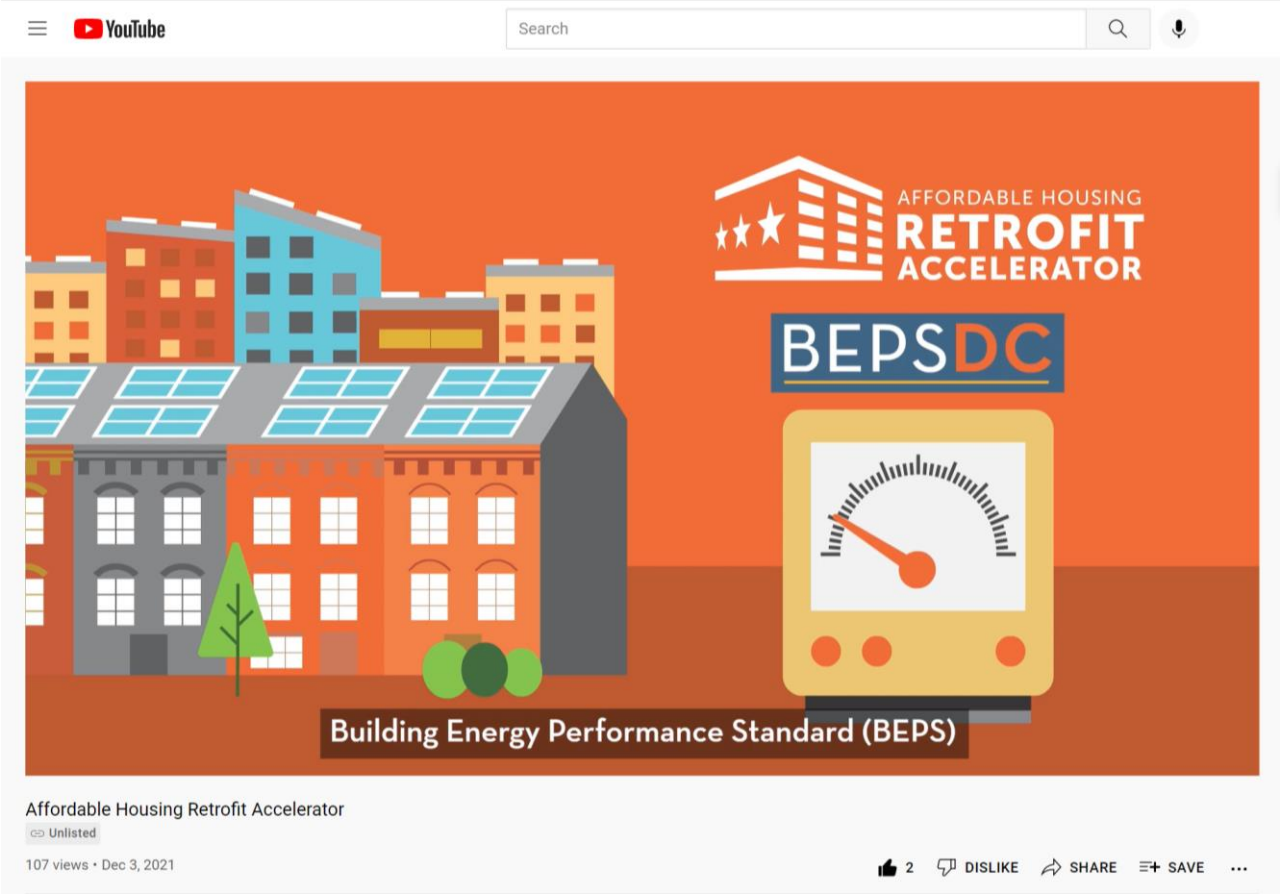
The DC Sustainable Energy Utility (DCSEU), in partnership with the District Department of Energy & Environment (DOEE) and the DC Green Bank, is offering enhanced technical and financial assistance to owners and managers of qualifying affordable multifamily buildings that do not meet the **District's Building Energy Performance Standards** (BEPS). The District's Affordable Housing Retrofit Accelerator program will help you:

- Understand the BEPS and how they apply to your building(s)
- Uncover energy-saving opportunities in your building(s)
- Identify resources, including financial incentives and financing opportunities, to help you make upgrades that will reduce energy use
- Choose a Compliance Pathway and get support towards compliance with the BEPS requirements as determined by DOEE
- Cut your energy costs, run your building more efficiently, and reduce your greenhouse gas emissions

Get Started

Chat

@DOEE_DC #BEPSDC



AFFORDABLE HOUSING
RETROFIT
ACCELERATOR

https://youtu.be/LgaNOj76Tq4

AFFORDABLE HOUSING RETROFIT ACCELERATOR

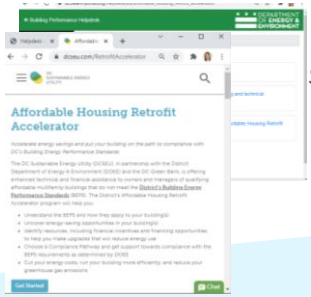
FY22 Implementation Milestones

AFFORDABLE HOUSING RETROFIT ACCELERATOR

Nov 2021

Soft Launch

Outreach, intake, and application assistance



Dec 2021

Press Release

Accelerator 101 training, schedule energy audits, continue outreach and intake

Jan 2022

Application Due Date

Accelerator 101, Continue Energy Audits, Begin owner meetings, final outreach and intake

Feb 2022

Implementation

Continue energy audits, owner meetings, begin construction

Mar 2022

Analysis of BEPS Compliance

Identify/select compliance options with owners, identifying early wins

Jul 2022

Tracking/monitoring, Results/Evaluation, Promotion

Sept 2022

Begin FY 2023 Work

Closeout FY 2022 construction

Begin FY 2023 audits and projects

AFFORDABLE HOUSING RETROFIT ACCELERATOR

AFFORDABLE HOUSING RETROFIT ACCELERATOR

Planning meets reality

Nov 2021

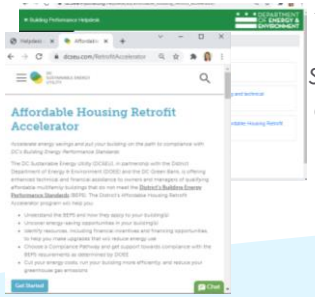
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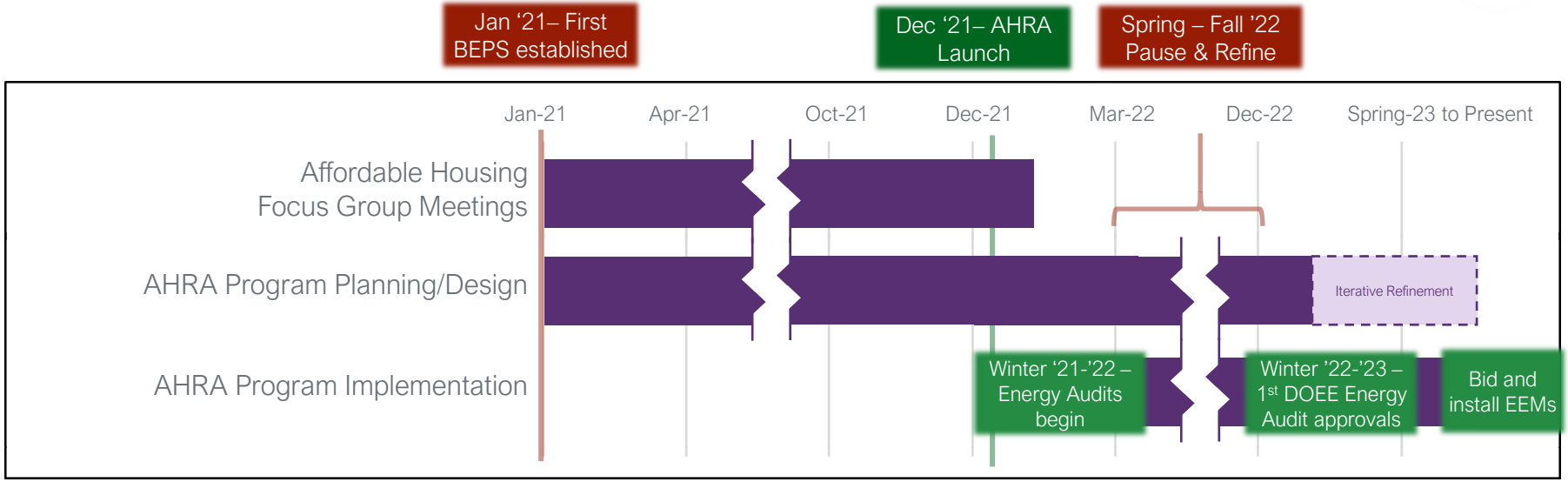
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AHRA Development & Implementation



AHRA PROGRESS

Audits*	
# Completed Audits	62
# Terminated After Audit	(7)
# Pending Audits	6
# Total Projects	**61**

Implementation	
# Completed FY23	12
# FY23 Carry Over and Phased	8 (3 and 5)
# FY24	5
# Total Projects**	**25**

** Audit = ASHRAE 211-2018 level 2 energy audit, performed by a credentialed energy auditor, reviewed by DCSEU and DOEE*

***A building could have multiple "projects" and most "projects" consist of multiple energy efficiency measures (EEMs)*

SUCCESSES & LESSONS LEARNED

Successes

- Robust stakeholder engagement
- Compliance support program from scratch in ~2 years
- >60 free ASHRAE level 2 energy audits for ~100 private affordable housing buildings that need to meet BEPS
- Defrayed >$10M in costs (audits + measures)
- Projecting >18,000 MMBtu savings/yr (as of work completed by Oct. ‘23)

SUCCESSES & LESSONS LEARNED

Lessons Learned

- **Don't assume** – be explicit about what key terms mean to you
  - e.g. "ASHRAE level 2 audit"
- **Do test runs early** – plans change, try out your initial plans ASAP, iterate
- **Capital upgrades aren't suited for operational budgets** – dream big, but know that multi-year projects are difficult or impossible within a fiscal year
- **Perfect is the enemy of good** – there is always more need than funding, don't get stuck planning how to do everything
  - "One-stop-shop" = multiple smaller shops in one place…may need to build one small shop at a time
- **Funding can be fleeting** – funds can come and go quickly, act responsibly, but decisively, or money might go unspent

AHRA: LOOKING AHEAD

- Ongoing implementation & BEPS compliance support
- Actual vs. modeled performance
- Impact on energy burdens
- Potential expansion to electrification and smaller buildings
- Understanding resident perspective post-retrofit

QUESTIONS?

DEPARTMENT OF ENERGY & ENVIRONMENT

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https://www.dcseu.com/RetrofitAccelerator

https://dc.beam-portal.org/helpdesk/kb/

AFFORDABLE HOME ENERGY SHOT™ VIRTUAL SUMMIT

June 5

10:30 a.m. to 4:30 p.m. ET

- ✓ Equity-driven solutions
- ✓ Stakeholder perspectives
- ✓ Cost reduction strategies
- ✓ Technology R&D needs

bit.ly/AHES-summit

ENERGY earthshots U.S. DEPARTMENT OF ENERGY | Affordable Home Energy™

Smart Tools for Efficient HVAC Performance (STEP) Campaign

Pacific Northwest NATIONAL LABORATORY

STEP CAMPAIGN

Scan this QR code to visit our website

Contact: christian.valoria@pnnl.gov

The STEP Campaign aims to increase adoption of smart diagnostic tools to streamline HVAC system performance testing and troubleshooting, reducing energy-wasting faults and improving occupant comfort.

To join the STEP Campaign, visit: bit.ly/3DFmEaE



HVAC Contractors and Technicians

- Reduce callbacks, improve consistency and quality, streamline processes
- Find out where to get training on smart diagnostic tools
- Be recognized for successful adoption of smart diagnostic tools!



Utilities and Program Implementers

- Streamline quality installation and quality maintenance programs
- Improve engagement with your contractors
- Be recognized for programs that utilize smart diagnostic tools!



HVAC Training Organizations

- Offer qualified training on System Performance with smart diagnostic tools
- Promote your training events
- Be recognized for providing training!



Weatherization Organizations

- Ensure your ASHP/CAC installations are operating at optimized efficiency
- Develop pilot with PNNL team
- Be recognized!

ORGANIZING PARTNERS

ACCA · BUILDING PERFORMANCE ASSOCIATION · CEE Working Together, Advancing Efficiency · HVAC Excellence · NATE · neea · U.S. DEPARTMENT OF ENERGY

Explore the Residential Program Guide

Resources to help improve your program and reach energy efficiency targets:

- Handbooks - explain *why* and *how* to implement specific stages of a program.
- Quick Answers - provide answers and resources for common questions.
- Proven Practices posts - include lessons learned, examples, and helpful tips from successful programs.
- Technology Solutions NEW! - present resources on advanced technologies, **HVAC** & **Heat Pump Water Heaters**, including installation guidance, marketing strategies, & potential savings.
- Health + Home Performance Infographic – spark homeowner conversations.



https://rpsc.energy.gov

Health + Home Performance Infographic



DOE's Health + Home Performance Infographic reveals the link between efficiency and health – something everyone cares about. Efficiency programs and contractors can use the question-and-answer format to discover a homeowner's needs.

The infographic is ideal for the "kitchen table" conversations where people decide what to do – and who they want to do it. It also has links for homeowners to find a qualified contractor if they do not already have one.

Download this infographic from DOE's Better Buildings Residential Network.

Looking for photos to help tell your energy efficiency story? Visit our image libraries: https://www.energy.gov/eere/better-buildings-residential-network/articles/image-libraries

Thank You!

Follow us to plug into the latest Better Buildings news and updates!

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Please send any follow-up questions or future call topic ideas to:
bbresidentialnetwork@ee.doe.gov