Cooling America: Helping disadvantaged communities across the United States cope with extreme heat

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BTO Brown Bag Webinar
27 March 2024

❶ Extreme Heat

Climate change has brought **deadly heat waves, wildfires, and the world's hottest days**

REUTERS® World Business Markets Sustainability Legal Breakingviews Technology Inves

Environment

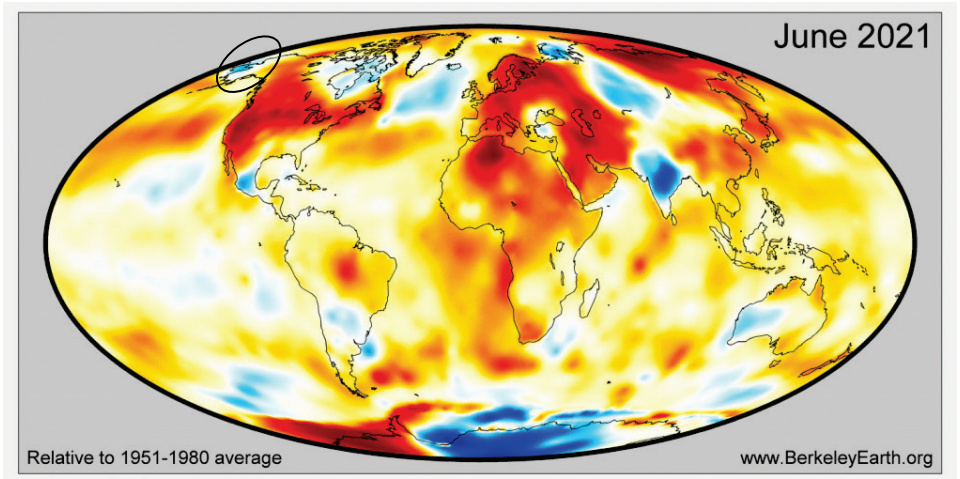
World breaks hottest-day record for third time this week, U.S. agency says

By **Jake Spring**

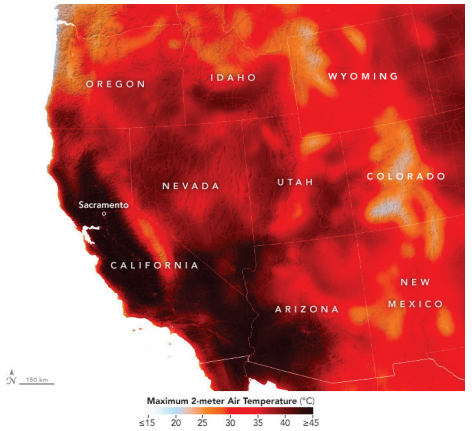
July 7, 2023 8:15 AM PDT · Updated 2 days ago

A woman walks with cold patches on her forehead and neck amid a red alert for heatwave in Beijing, China June 23, 2023. REUTERS/Tingshu Wang/

7/2023: Record-breaking world average temp.



6/2021 Pac. NW: Death toll exceeded 1,400 in a region unprepared for extreme heat



9/2022: Record temps in California, extreme heat fueled wildfires and stressed the grid

Heat wave impacts have **disproportionate impacts on underserved, disadvantaged communities**

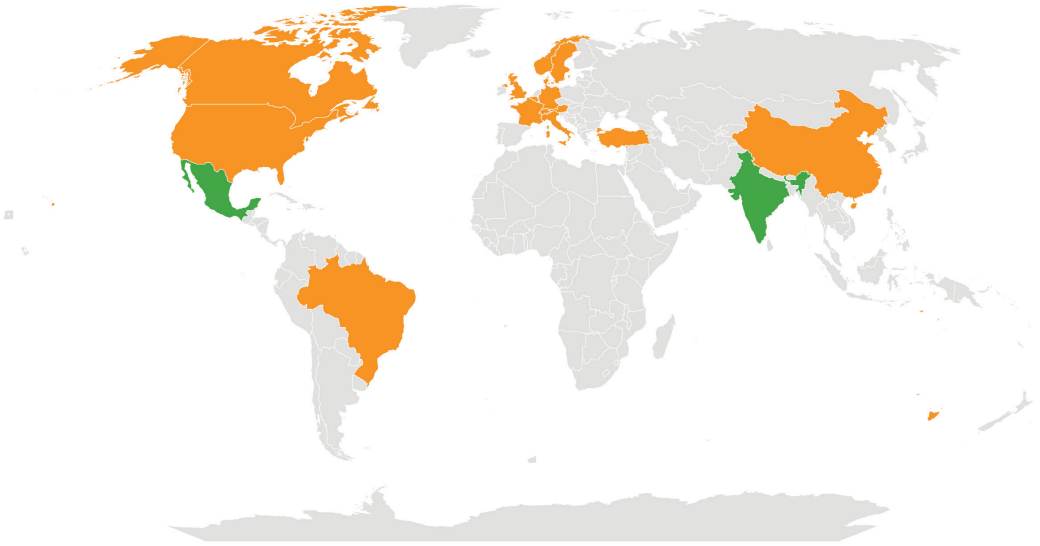
- **Extreme heat is the leading cause of weather-related deaths** in the USA
- Greater risk for people who do not have access to air conditioning
- There are many vulnerable populations during heat waves including elderly, very young, and low-income residents
- There are heat related disparities by race/ethnicity (56% higher death rate in heat for Blacks than Whites in CA)

❷ IEA Annex 80: Resilient Cooling of Buildings

IEA Annex 80: Resilient Cooling of Buildings is a 19-nation project advancing passive and low-energy, low-carbon cooling strategies

Supports the rapid transition to an environment where resilient low-energy and low-carbon cooling systems are the mainstream and preferred solutions for cooling and overheating issues in buildings.

https://annex80.iea-ebc.org



17 Participants
Australia
Austria
Belgium
Brazil
Canada
China
Denmark
France
Germany
Italy
Norway
Singapore
Sweden
Switzerland
Turkey
United Kingdom
United States

2 Interested Parties
India
Mexico

The Institute of Building Research & Innovation (Vienna) leads this ~35-party collaboration

NTNU
Kunnskap for en bedre verden

CSTB

Institute of Building Research & Innovation ZT-GmbH

University of Wollongong Australia

LIÈGE université

Politecnico di Torino

Brunel University London

Ghent University

TU Wien — Technische Universität Wien — Vienna | Austria

Oxford Brookes University

Högskolan i Gävle

Universidade Federal de Santa Catarina

USA

Berkeley Lab

CBE — Center for the Built Environment

La Rochelle Université

National Research Council Canada

CHALMERS UNIVERSITY OF TECHNOLOGY

KU LEUVEN

University of Lincoln

DTU

NUS National University of Singapore

Hunan University

Gebze Technical University

Queensland University of Technology

Fraunhofer IBP

ENEA

INIVE

Thomas More

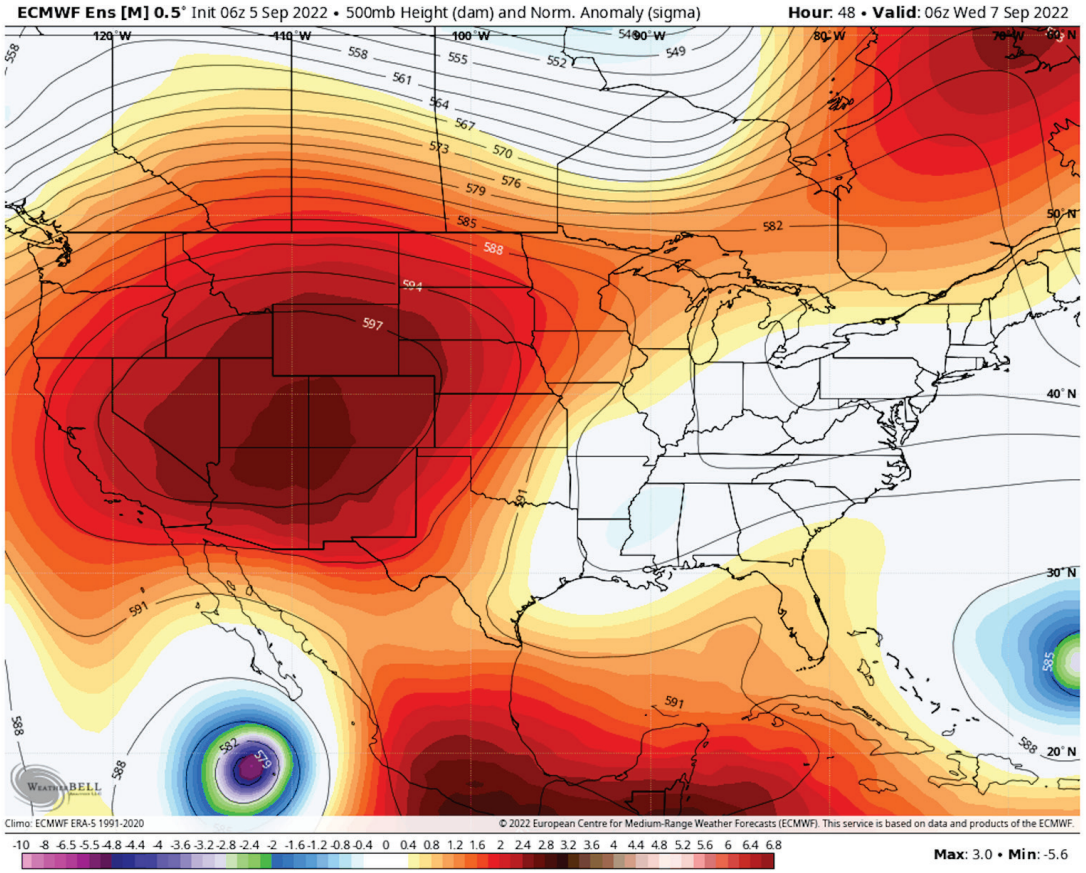
Effin'Art — L'art de l'efficacité énergétique

湖南科技大学 Hunan University of Science and Technology

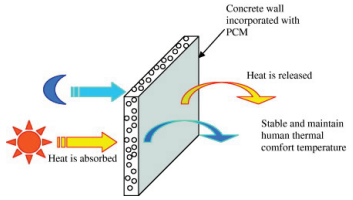
Aalborg Universitet

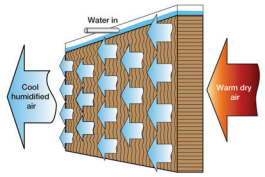
Université de Sherbrooke

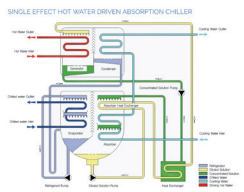
Annex 80 focuses on cooling technologies and policies that **boost resilience to heat waves** and **power outages**

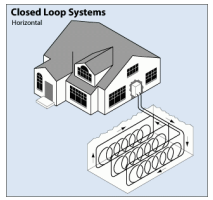


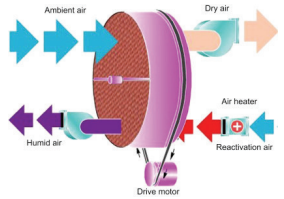
Cooling strategies (A) reduce heat gain, (B) remove sensible heat, (C) enhance personal comfort, or (D) remove latent heat











A1: Advanced solar shading/advanced glazing
A2: Cool envelope materials
A3a: Evaporative envelope surfaces
A3b: Ventilated envelope surfaces
A4: Heat storage and release

B1: Ventilative cooling
B2: Adiabatic/evaporative cooling
B3: Compression refrigeration
B4: Absorption refrigeration
B5: Natural heat sinks
B6: Higher-temperature cooling systems

C1: Comfort ventilation
C2: Micro-cooling and personal comfort control

D1: High-performance dehumidification

Meet the U.S. Annex 80 team at LBNL and UC Berkeley (* = past member)


Ronnen Levinson


Haley Gilbert


Sang Hoon Lee


Nari Yoon*


Tianzhen Hong


Amanda Krelling


Charlie Curcija


Christian Kohler*


Stephen Selkowitz


Xuan Luo*


Iain Walker


Edward Arens


Hui Zhang

LBNL contributed to Annex Subtasks A (Fundamentals) and B (Solutions), and **led Subtask D: Policy Actions**

A: Fundamentals

Define resilient cooling
Select KPIs
Create future weather files

B: Solutions

Create simulation framework
Assess potential benefits
Develop technology profiles

C: Field Studies

Create measurement framework
Measure solution performance
Develop guidelines

D: Policy Actions

Review existing policies
Develop policy recommendations
Disseminate recommendations

The Annex has published >20 articles and reports, with more on the way this year

❶ What is “resilient cooling”?


Energy & Buildings

Resilient cooling of buildings to protect against heat waves and power outages: Key concepts and definition


City and Environment Interactions

Conceptualising a resilient cooling system: A socio-technical approach

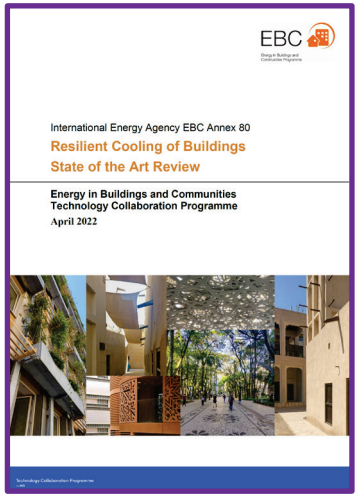

Building and Environment

Ten questions concerning thermal resilience of buildings and occupants for climate adaptation

❷ What’s the state of the art?


Energy & Buildings

Resilient cooling strategies – A critical review and qualitative assessment


EBC

International Energy Agency EBC Annex 80

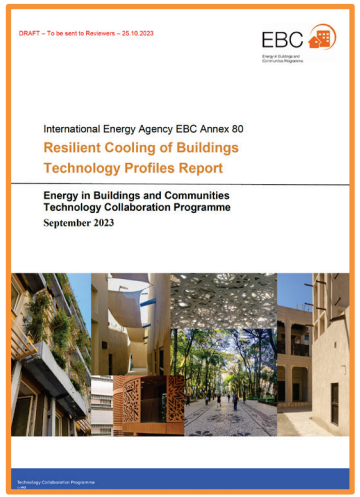
Resilient Cooling of Buildings

State of the Art Review

Energy in Buildings and Communities Technology Collaboration Programme

April 2022

❸ What technologies, practices, and policies do we recommend?


DRAFT – To be sent to Reviewers – 25.10.2023

EBC

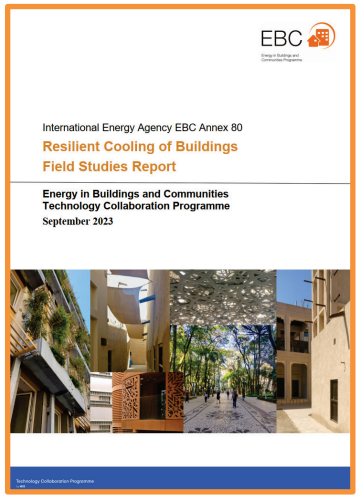
International Energy Agency EBC Annex 80

Resilient Cooling of Buildings

Technology Profiles Report

Energy in Buildings and Communities Technology Collaboration Programme

September 2023


EBC

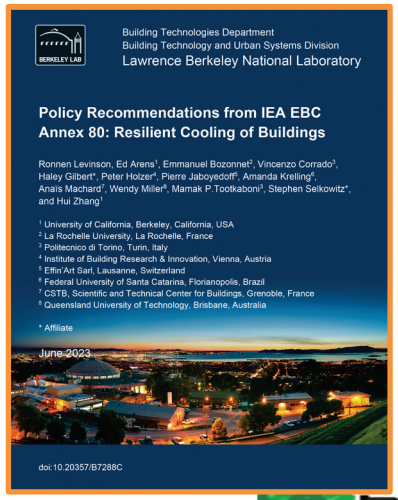
International Energy Agency EBC Annex 80

Resilient Cooling of Buildings

Field Studies Report

Energy in Buildings and Communities Technology Collaboration Programme

September 2023


Building Technologies Department

Building Technology and Urban Systems Division

Lawrence Berkeley National Laboratory

Policy Recommendations from IEA EBC Annex 80: Resilient Cooling of Buildings

Ronnen Levinson, Ed Arens[1], Emmanuel Bozonnet[2], Vincenzo Corrado[3], Haley Gilbert[1], Peter Holzer[4], Pierre Jaboyedoff[5], Amanda Krelling[6], Anais Machard[7], Wendy Miller[8], Mamak P.Tootkaboni[9], Stephen Selkowitz*, and Hui Zhang[1]

[1] University of California, Berkeley, California, USA
[2] La Rochelle University, La Rochelle, France
[3] Politecnico di Torino, Turin, Italy
[4] Institute of Building Research & Innovation, Vienna, Austria
[5] Effin’Art Sarl, Lausanne, Switzerland
[6] Federal University of Santa Catarina, Florianopolis, Brazil
[7] CSTB, Scientific and Technical Center for Buildings, Grenoble, France
[8] Queensland University of Technology, Brisbane, Australia

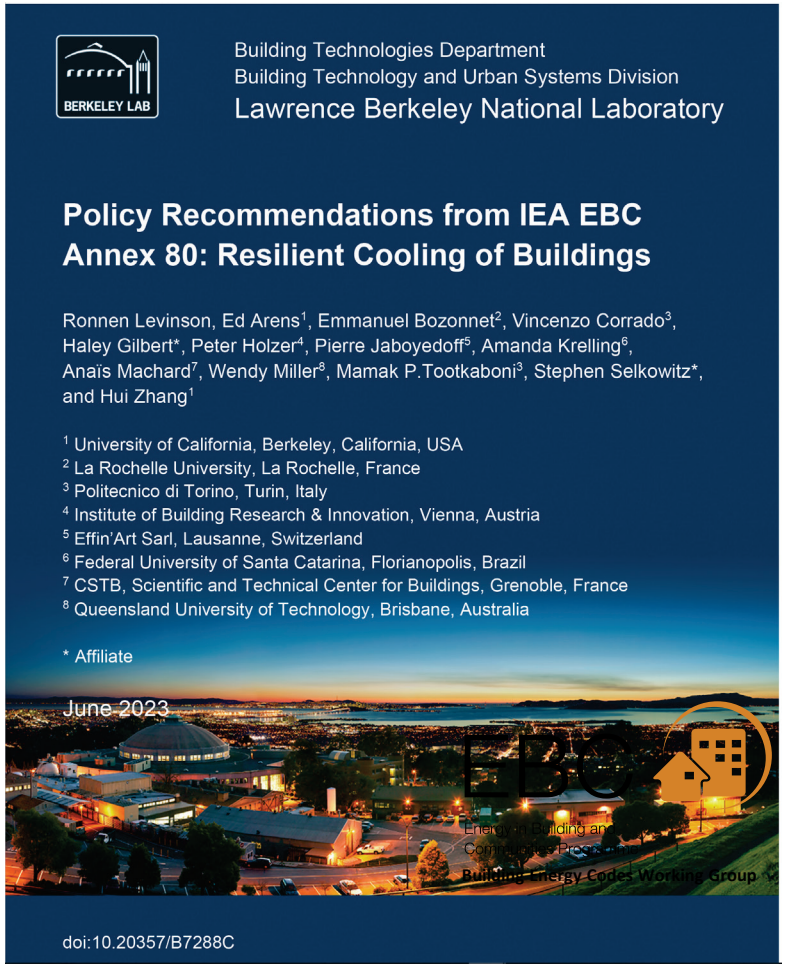
* Affiliate

June 2023

doi:10.20357/B7288C

https://annex80.iea-ebc.org/publications

LBNL led the development and dissemination **37 brief policy recommendations**



https://doi.org/10.20357/B7288C

3.21 Provide credit for occupant-controlled air movement in green building certification programs

Policy number: 21

Category: C1 (Comfort ventilation)

Author(s): Ed Arens & Hui Zhang

Summary: Inclusion of occupant-controlled air movement, such as ASHRAE Standard 55 Sections 5 & 6, in green building certification programs to credit group control of air movement.

POLICY MECHANISM(S)

Regulation	Information	Incentives	R&D	Standards
	✓	✓		✓

TECHNOLOGY TARGET

Specific	Agnostic
✓	

DISRUPTION(S) MITIGATED

Heat Wave	Power Outage
✓	✓

What: We recommend that green building rating programs such as LEED, WELL, and GreenGlobes specifically encourage the wider use of fan-induced air movement in design and retrofits by invoking the new comfort criteria given in ASHRAE Standard 55-2020 (*Thermal Environmental Conditions for Human Occupancy*) Sections 5 and 6. Section 5.3 specifies the boundaries of thermal comfort for different air speeds under two different levels of occupant control. Section 5.4 (and some European standards) increase the comfortable range of the Adaptive Model for different air speeds at higher temperatures, though the level of occupant control is not specified. Section 6 provides five classification levels for the effectiveness of various types of personal- and group-controlled comfort devices using the corrective power metric.

Why: Indoor air movement is an energy-efficient and occupant-responsive means of cooling occupants for their comfort. There are also associated health benefits from increased levels of indoor ventilative mixing, to its ability to help occupants survive extreme temperatures. Indoor air movement has never been part of conventional HVAC or comfort standards, which instead focused on operative temperature and humidity control, and on eliminating cold drafts. Only recently have the positive effects of air movement been properly addressed in standards and

Clean Cooling COLLABORATIVE

ICLEI Local Governments for Sustainability

Atlantic Council

Adrienne Arsht-Rockefeller Foundation Resilience Center

Australian energy efficiency COUNCIL

SUSTAINABLE ENERGY FOR ALL

Global Alliance for Buildings and Construction

EBC Energy in Building and Communities Programme

Building Energy Codes Working Group

Cool Coalition

Covenant of Mayors for Climate & Energy EUROPE

REHVA Federation of European Heating, Ventilation and Air Conditioning Associations

U.S. team is developing **passive/low-energy cooling solutions guidance for disadvantaged communities** in Atlanta, GA and Mystic River, MA (near Boston)

Identify two residential study locations in different climates

1. Assess building stock
2. Interview residents
3. Model passive/low energy cooling solutions

Develop cooling-solution guidance based on technical potential, cost effectiveness, and preferences of the residents

We have **engaged trusted local organizations in each community** to help implement the project

West Atlanta Watershed Alliance (GA)

Existing heat problem

Ranch-style single-family home in Atlanta

Duplex multi-family home in Atlanta

Mystic River Watershed Association (MA)

Emerging heat problem

Colonial old-style single-family home near Boston

Double-decker multi-family home near Boston

We **audited 17 homes and interviewed 50 residents**, split between Atlanta and Boston, about coping with heat

INDICIA Consulting

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OUR PLANET. YOUR HOME.

JONES SUSTAINABLE SOLUTIONS GROUP

"I try to go shopping early in the morning, stay inside in the air conditioning. Try not to go out. Work in the morning or at night after it cools off. Get ready and have a lot of water in the fridge to drink, ice..." — T., Boston

"When we get those nice little breezes, I like to see everything blowing and a little breeze come in. Then I keep the window in the kitchen, in the summertime I keep it open all the time." — B., Atlanta

Mystic River
WATERSHED ASSOCIATION

Malden, Chelsea, Everett (Boston)

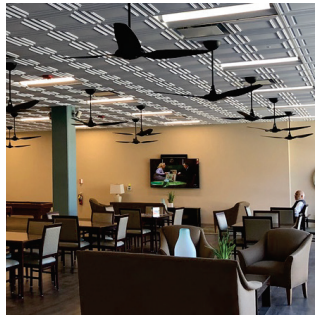
West Atlanta Watershed Alliance

West End (Atlanta)

Berkeley Lab + UC Berkeley modeled **solar control technologies, natural ventilation, and ceiling fans** in each community

Cool roofs

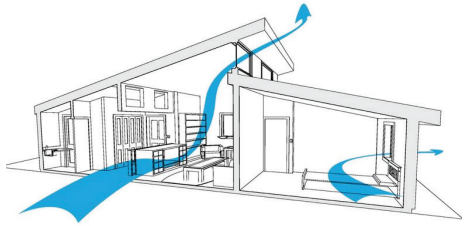
Solar-control windows



Ceiling fans

Cool walls

Window shading



Natural ventilation

BERKELEY LAB

CBE
CENTER FOR THE BUILT ENVIRONMENT

BUILDING TECHNOLOGIES OFFICE

We modeled **accessible** and **ambitious** versions of each solution or package of solutions in 2010, 2030, and 2050 (fTMY)

Strategies	Baseline	Most accessible	Most ambitious
1. Cool roof	Aged roof solar reflectance 0.10	Aged roof solar reflectance 0.40 (high-performance cool colored asphalt shingle roof)	Aged roof solar reflectance 0.60 (bright-white asphalt shingle roof)
2. Cool wall	Aged roof solar reflectance 0.25	Aged wall solar reflectance 0.60 (dull-white or off-white painted wall)	Aged wall solar reflectance 0.60 (dull-white or off-white painted wall)
3. Solar-control window	SHGC 0.7, VT 0.88, U-value 5.35 W/m²·K	Window SHGC 0.15, VT 0.23 (spectrally selective glazing with lower light transmission), thermal transmittance (U-value) 5.35 W/m²·K for single-pane window	Window SHGC and VT are switched from dark (SHGC 0.10, VT 0.15) to light (SHGC 0.50, VT 0.75) (dynamic glazing) with daylighting control based on solar irradiance on window, U-value 1.70 W/m²·K for double-pane window
4. Fixed exterior shading	No fixed exterior shading	External solar control screens or film with SHGC 0.20 and VT 0.30	External solar control screens or film with SHGC 0.20 and VT 0.30 PLUS external horizontal or vertical louvers (vertical fins and horizontal overhangs). Details: the louver shall be 0.5 m deep. On the south facade of the building, use a horizontal overhang; on the east facade, use a vertical fin on the southern side of the window; on the west facade use a vertical fin on the southern side of the window. No fins or overhangs on the north facade
5. Operable window shading	No operable window shading	Manually operated external shades/blinds/shutters, SHGC 0.10 and VT 0.09 when deployed, AERC standard manual operation schedule	Automatically operated external shades/blinds, SHGC 0.10 and VT 0.09 when deployed, AERC standard automation algorithm
6. Natural ventilation	No natural ventilation	When opened, the fraction of window area that is operable is 25%. Windows are always closed from 7 am to 10 pm. Windows are open for night cooling between 10 pm and 7 am when the outside air temperature is above the heating setpoint and below the cooling setpoint.	When opened, the fraction of window area that is operable is 50%. Windows are open only when the outside air temperature is above the heating setpoint and below the cooling setpoint.
7. Ceiling fan	No ceiling fan	Raise the cooling set point temperature to 28.9 °C and increase average air speed (m/s) near human skin to the result of the indoor air temperature function up to 1.6 m/s for the occupied hours if indoor air temperature is above 24.9 °C	Raise the cooling set point temperature to 28.9 °C and increase average air speed (m/s) near human skin to the result of the indoor air temperature function up to 1.6 m/s for the occupied hours if indoor air temperature is above 24.9 °C
8. Envelope package	-	Most accessible cool roof, cool wall, and fixed exterior shading	Most ambitious cool roof, cool wall, and fixed exterior shading
9. Non-envelope package	-	Most accessible natural ventilation and ceiling fan	Most ambitious natural ventilation and ceiling fan
10. Envelope + non-envelope package	-	Most accessible envelope package and non-envelope package	Most ambitious envelope package and non-envelope package

Online dashboards report potential annual **energy savings**, **carbon savings**, and **thermal comfort improvements** in each community

salesforce

+ableau public Create Learn Sign In

Who are the DataFam and what do they do on Tableau Public? **Watch a 2-minute overview →**

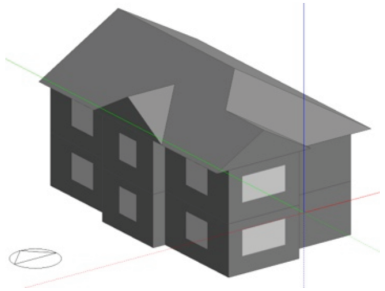
LBNL Analysis of Cooling Solutions for LMI Homes in Boston by Sang Hoon Lee

Passive/Low-Energy Cooling Strategies for LMI Homes in Boston

Audit House | Strategies | Energy Cost | Energy | Comfort | Carbon

Boston Multi-family House

- Representative multi-family double decker home from audit
  - Located in Chelsea, MA 02150
  - Built year: 1900
  - Gross floor area: 1,912 ft² (178 m²)
  - Two floors (each floor has one unit)
  - Each unit has heating with boiler and cooling with split system
- The energy model was generated using DesignBuilder software for EnergyPlus simulation
- 7 strategies and 3 packages (combinations of strategies) were modeled
- Strategy technology levels include:
  - Most ambitious
  - Most accessible
- Simulations using the 2010, 2030, and 2050 fTMY weather data from https://zenodo.org/records/8335815



Screen capture from the energy simulation model

Boston
https://bit.ly/4auc6Jh

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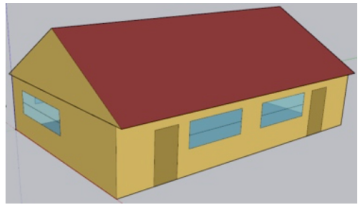
Atlanta Multi-family House

- Representative multi-family house from audit
  - Located in Atlanta, GA 30318
  - Built year: 1950
  - Gross floor area: 914 ft² (85 m²)
  - 1 floor with 2 units
  - Each unit has heat pump for heating and cooling
- The energy model was generated using DesignBuilder software for EnergyPlus simulation
- 7 strategies and 3 packages (combinations of strategies) were modeled
- Strategy technology levels include:
  - Most ambitious
  - Most accessible
- Simulations using the 2010, 2030, and 2050 fTMY weather data from https://zenodo.org/records/8335815



Screen capture from the energy simulation model

Atlanta
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Atlanta **energy cost** savings in **2010**, **most accessible**

Passive/Low-Energy Cooling Strategies for LMI Homes in Atlanta

Audit House | Strategies | **Energy Cost** | Energy | Comfort | Carbon

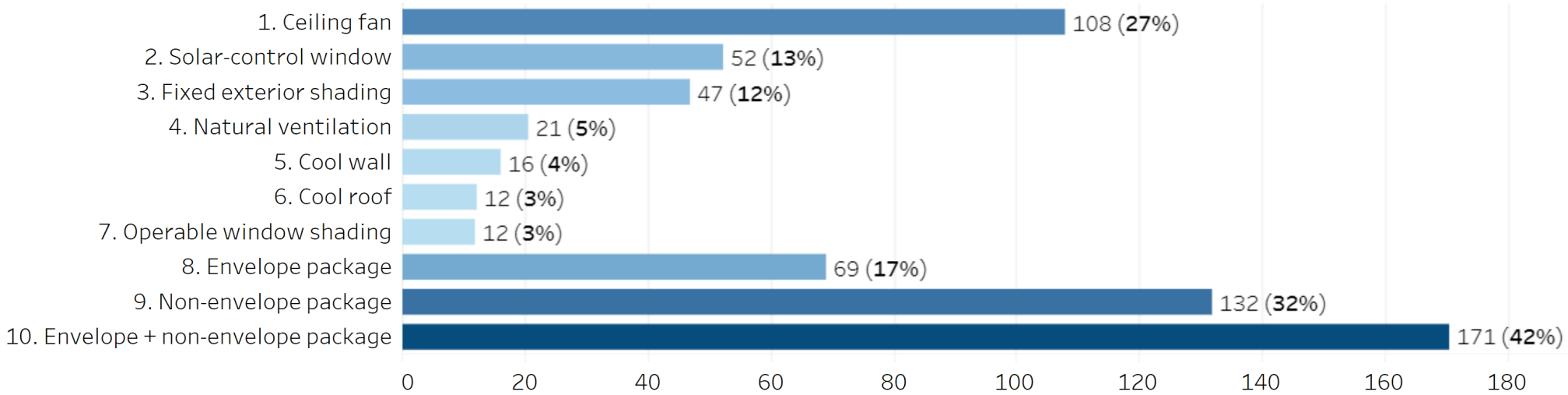
Weather condition

- (●) Year 2010
- ( ) Year 2030
- ( ) Year 2050

Scenario

- (●) Most accessible
- ( ) Most ambitious

Annual HVAC energy cost savings



Atlanta **energy cost** savings in **2010**, **most ambitious**

Passive/Low-Energy Cooling Strategies for LMI Homes in Atlanta

Audit House | Strategies | **Energy Cost** | Energy | Comfort | Carbon

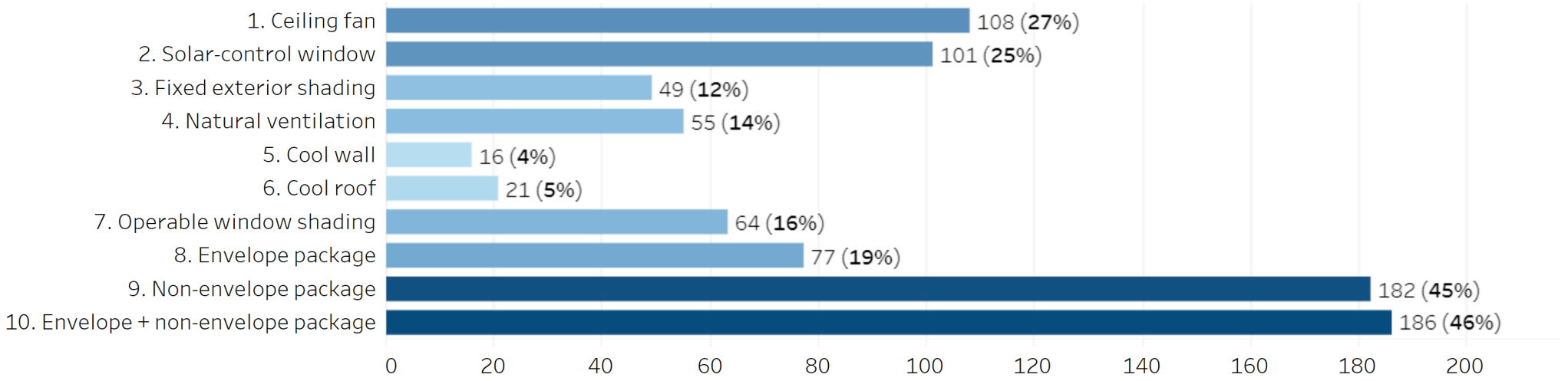
Weather condition

- (•) Year 2010
- ( ) Year 2030
- ( ) Year 2050

Scenario

- ( ) Most accessible
- (•) Most ambitious

Annual HVAC energy cost savings



Atlanta **energy cost** savings in **2050**, **most ambitious**

Passive/Low-Energy Cooling Strategies for LMI Homes in Atlanta

Audit House | Strategies | **Energy Cost** | Energy | Comfort | Carbon

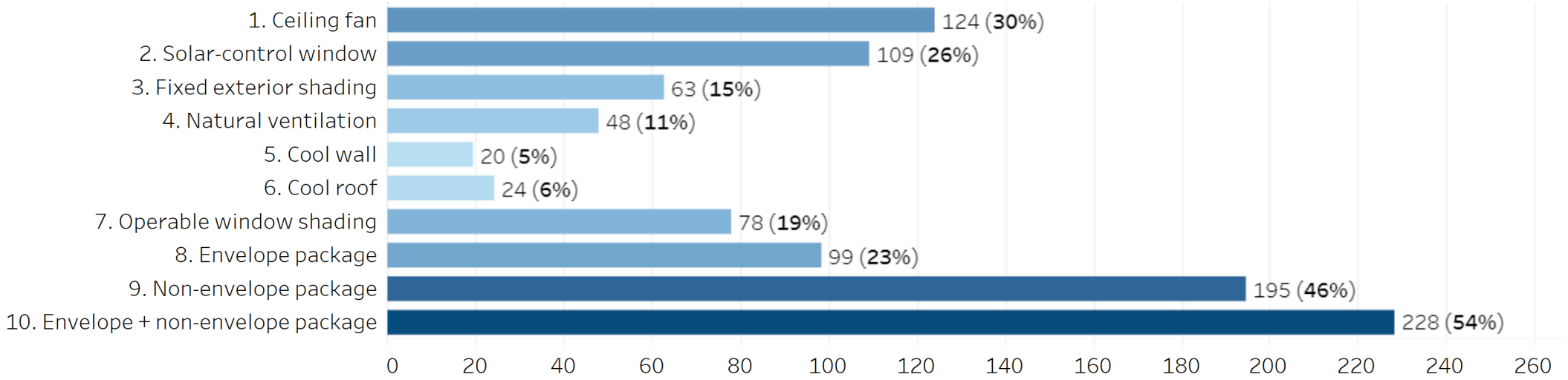
Weather condition

- ○ Year 2010
- ○ Year 2030
- ◉ Year 2050

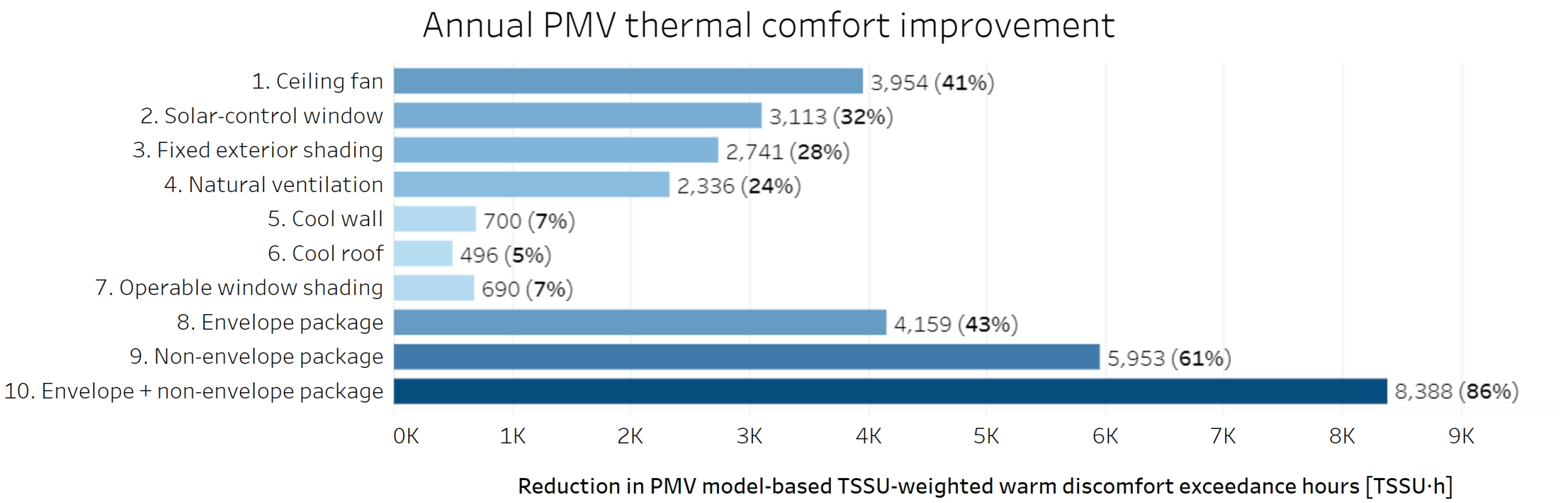
Scenario

- ○ Most accessible
- ◉ Most ambitious

Annual HVAC energy cost savings



Atlanta comfort benefit in **2010**, **most accessible**



We are working with the Boston and Atlanta CBOs to disseminate guidance to residents and policymakers this spring

Boston

- CBO: Mystic River Watershed Association (MyRWA)
- Mass. Department of Energy Resources
  Energy Efficiency Division
- Mass Save
- Mass. Energy Efficiency Advisory Council
- Executive Office of Energy and Environmental Affairs
- Metropolitan Area Planning Council

- ❖ LBNL to prepare collateral (informational materials)
- ❖ MyRWA to share social media messages via its network
- ❖ EOEEA to host "Lunch & Learn" webinar on Thu 18 Apr

Atlanta

- CBO: West Atlanta Watershed Alliance (WAWA)
- Clean Energy Atlanta
  - Clean Energy Advisory Board
  - WeatheRISE ATL
- Sustainable Georgia Futures
- Metro Atlanta Clean Energy Collective

- ❖ LBNL to prepare collateral
- ❖ WAWA to share social media messages via its network
- ❖ WAWA to host town hall meeting on Fri 5 Apr

❸ Annex 80+:
Sustainable Cooling in Cities

5-year IEA-EBC Annex for **Sustainable Cooling in Cities** proposed by Institute of Building Research & Innovation (Vienna) will seek to

- Identify and optimize heat mitigation/shielding strategies for outdoor spaces within existing structures, such as
  - Water (blue infrastructure)
  - Plants (green infrastructure)
  - Cool surface materials, including sky radiative cooling
  - Public solar shading
- Investigate the interrelation of buildings and outdoor spaces
- Identify and optimize supportive active cooling and heat dissipation strategies on the city level

Berkeley Lab will host the **first planning workshop for the proposed Annex** on Apr 11 – 12

- Hybrid 1.5-day workshop to plan objectives, scope, and deliverables
- 65 registrants (37 in-person, 28 remote) from 25 countries
- Remote registration still open (in-person also still open for DOE staff)

https://annex80.iea-ebc.org/follow-up-annex

11 – 12 Apr 2024
Development workshop at LBNL

CY 2023 | CY 2024

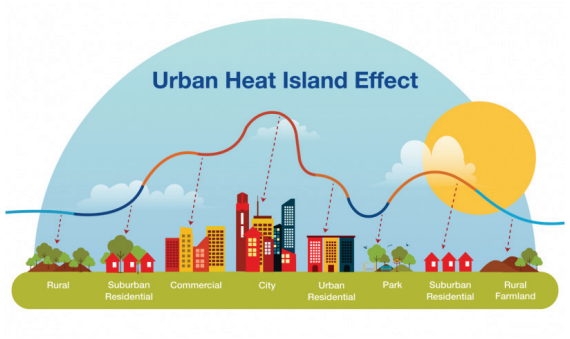
23 Nov 2023
IEA EBC Executive Committee approved concept phase for new Annex

Q3 2024
Tentative start of 5-year Annex:
Preparation phase (1 y)
Execution phase (3 y)
Reporting phase (1 y)

❹ United States Cool Surfaces Deployment Project

Cool roofs and walls can provide many well-known benefits to building occupants, communities, power utilities, and the planet

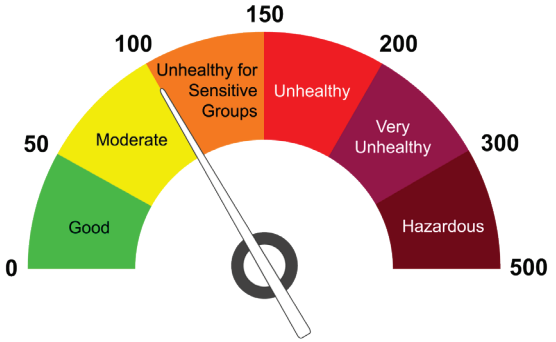
HVAC energy and $ savings



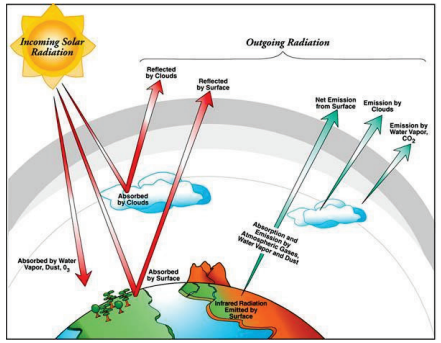
Heat island mitigation

Peak power demand reduction

Comfort, health, and safety in heat waves



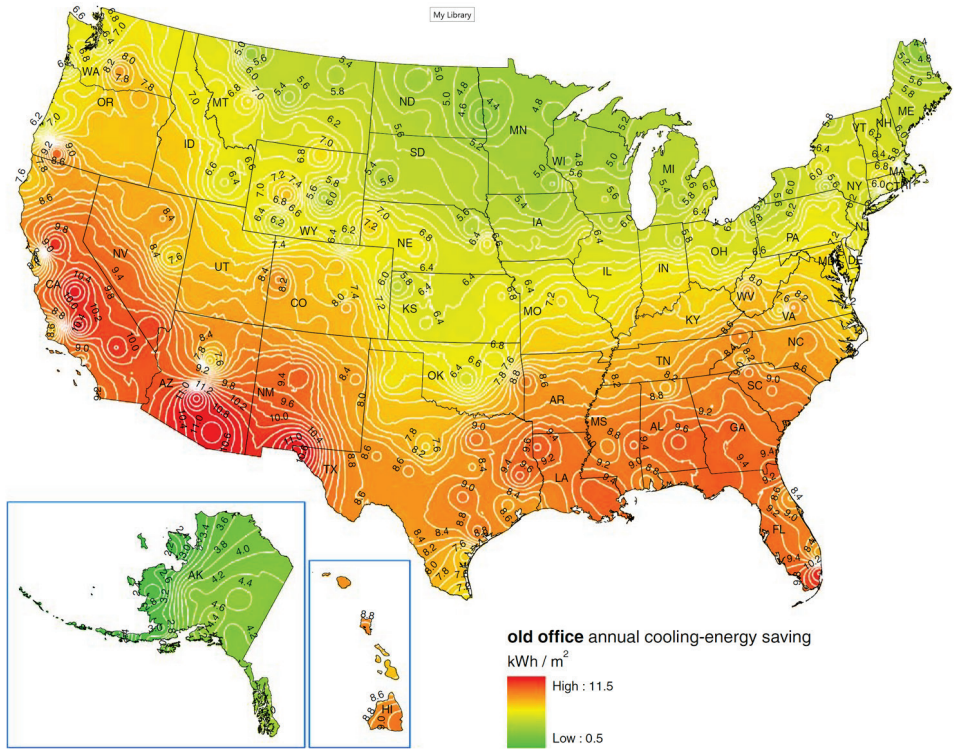
Smog abatement



Global cooling

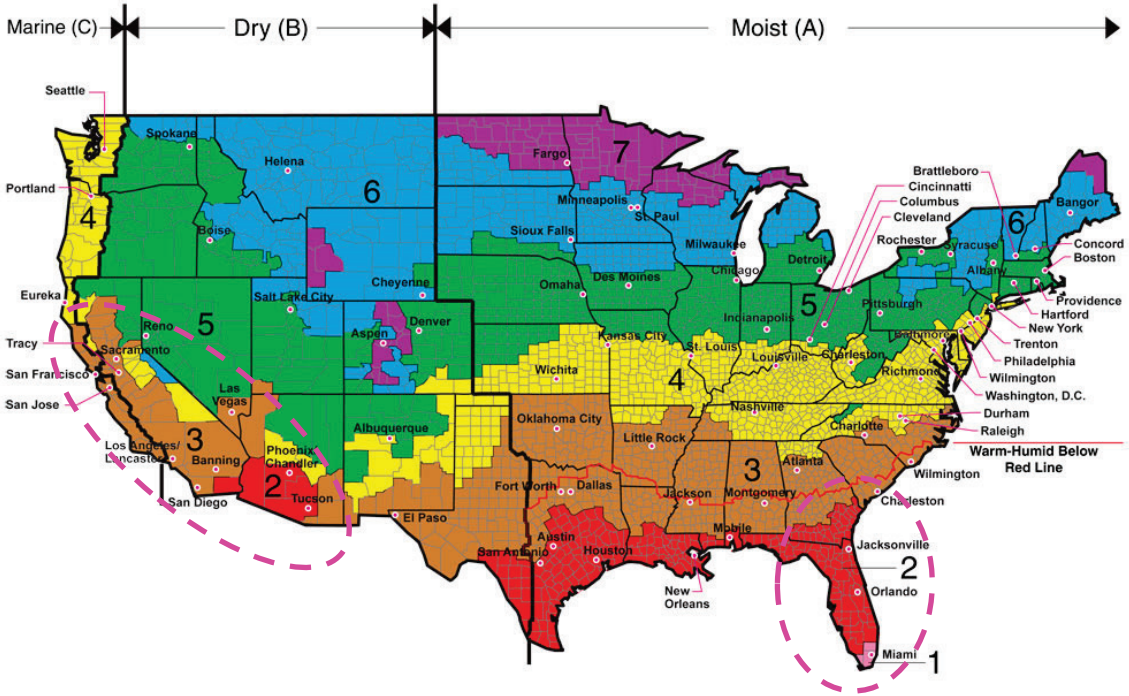
Cool surfaces can help across the **southern half of the U.S.** (ASHRAE climate zones 1 – 4), **and beyond** (climate zone 5)

(a) Cool-roof cooling energy savings



Levinson et al. (2010). https://doi.org/10.1007/s12053-008-9038-2

(b) ASHRAE climate zones



…but are found mostly in CA, AZ, and FL

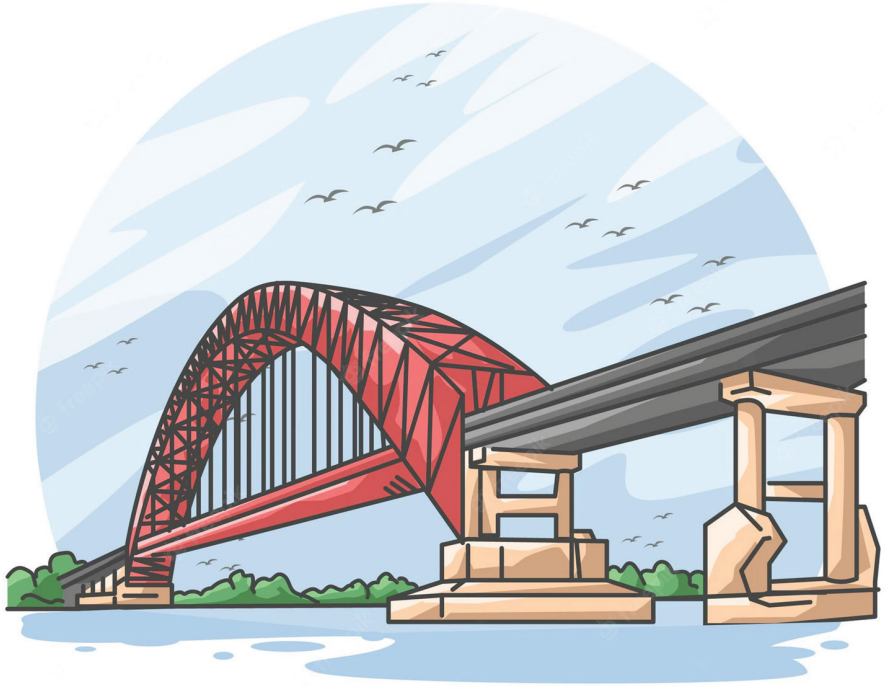
The **U.S. Cool Surfaces Deployment Project** seeks to make our aging building infrastructure cooler and more heat resilient

Challenge:

The uptake of cool surfaces has been strong in California and Florida but limited nationally.

Goal:

Dramatically increase the climate-appropriate deployment of cool surfaces across the U.S., with an emphasis on their application to disadvantaged communities.



A **broad team of cool-surface experts** is tackling this challenge with support from DOE's Building Technologies Office

BUILDING TECHNOLOGIES OFFICE

(Sven Mumme, Marc LaFrance, Kyle Biega)

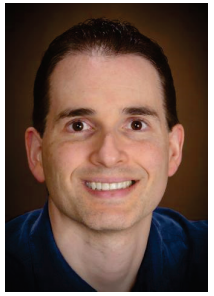
BERKELEY LAB

OAK RIDGE National Laboratory

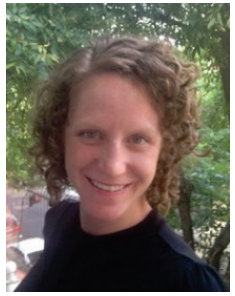
SMART SURFACES COALITION

CRRC COOL ROOF RATING COUNCIL

Meet the Deployment **project staff** (* = past member)



Ronnen Levinson, LBNL

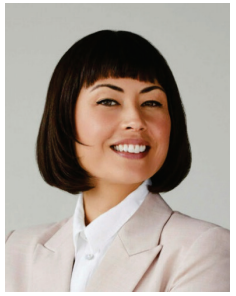


Haley Gilbert, LBNL

Andre Desjarlais, ORNL

David Sailor, ASU

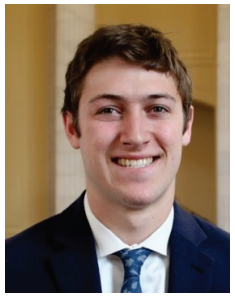
Mansour Alhazmi, ASU*



Sarah Schneider, CRRC

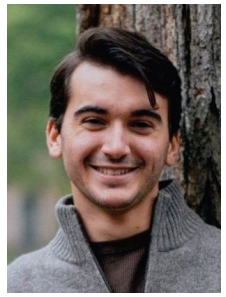
Greg Kats, SSC

Iona Isachsen, SSC



Jackson Becce, SSC*

Emily Morin, SSC*



Jacob Miller, SSC*

In **Project Phase 1** (2022 - 2023) we set out to develop a two-year national deployment plan

Phase 1: Research & planning

1. Identify opportunities and barriers
2. Adapt successful deployment models
3. Engage with stakeholders
4. Produce the Phase 2 deployment plan

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SMART SURFACES COALITION

CRRC COOL ROOF RATING COUNCIL

The top three needs identified in the interviews were ❶ **scaling-up pilots**, ❷ **codes**, and ❸ **R&D**

We prepared a **national deployment plan** based on findings from a literature review, stakeholder interviews, and a stakeholder workshop

SCAN ME

❶ Issued literature-review and stakeholder-interview reports (Aug 2022)

❷ Hosted workshop (Sep 2022)

❸ Published plan* (June 2023)

* Levinson, R., Alhazmi, M., Becce, J., Desjarlais, A., Gilbert, H., Kats, G., Miller, J., Morin, E., Sailor, D., & Schneider, S. (2023). United States Cool Surfaces Deployment Plan. Lawrence Berkeley National Laboratory. https://doi.org/10.20357/B7602K

The plan shares **19 transformative ideas**

Technical support

#1: Technical assistance to governments

#2: Leverage BIL and IRA

Education & communication

#3: “Keep Your Cool” educational campaign

#4: Contractor training

#5: Cool Surfaces Workshop

RD&D

#6: Cool Roof Prize

#7: High-profile demonstration programs

#8: Cost-benefit analytic engine

#9: Incentive program guidelines

#10: Tools and calculators

Building codes & standards

#11: Enhance green-building standards

#12: EE requirements for envelope retrofits

#13: Cool-surface boilerplate language

#14: Cool walls in codes, standards, & programs

Incentives

#15: Deployment competitions

#16: Upstream rebates

Government actions

#17: Government partnerships and training

#18: Climate action plan specifications & targets

#19: Stakeholder community input

20 key stakeholders, including cities/counties, manufacturers, building professional associations, research institutions, NGOs, utilities, and Google, **support our plan**

By the end of **Phase 2 (2024 – 2025)**, we seek to

A.	Greatly boost awareness about cool-surface options, benefits, and implementation paths through the educational campaign (#3), workshop (#5), and tools/calculators (#10, #8)
B.	Stimulate the development and deployment of economical, high-performance residential cool roofs via the Cool Roof Prize (#6)
C.	Demonstrate the effectiveness of cool surfaces and accelerate their deployment via high-profile demonstrations (#7) and deployment competitions (#15)
D.	Improve and grow cool-surface provisions in codes, standards, and green building certification programs (#11, #12, #14)
E.	Help government agencies and utilities include cool surfaces in public building specifications, building weatherization programs, post-disaster reconstruction, and climate action plans (#1, #2, #9, #17)

BTO (RBI) is now funding three ideas: **technical assistance**, **educational campaign**, and **high-profile demonstrations**

A.	Greatly boost awareness about cool-surface options, benefits, and implementation paths through the educational campaign (#3), workshop (#5), and tools/calculators (#10, #8)
B.	Stimulate the development and deployment of economical, high-performance residential cool roofs via the Cool Roof Prize (#6)
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E.	Help government agencies and utilities include cool surfaces in public building specifications, building weatherization programs, post-disaster reconstruction, and climate action plans (#1, #2, #9, #17)

We are also seeking BTO support to boost cool-surface provisions in **codes, standards,** and **green building certification programs**

A.	Greatly boost awareness about cool-surface options, benefits, and implementation paths through the educational campaign (#3), workshop (#5), and tools/calculators (#10, #8)
B.	Stimulate the development and deployment of economical, high-performance residential cool roofs via the Cool Roof Prize (#6)
C.	Demonstrate the effectiveness of cool surfaces and accelerate their deployment via high-profile demonstrations (#7) and deployment competitions (#15)
D.	Improve and grow cool-surface provisions in codes, standards, and green building certification programs (#11, #12, #14)
E.	Help government agencies and utilities include cool surfaces in public building specifications, building weatherization programs, post-disaster reconstruction, and climate action plans (#1, #2, #9, #17)

We are providing **technical assistance** to help government programs deploy cool surfaces (continuous)

Mission

Provide technical assistance to federal, state, and local officials (e.g., HUD, GSA, and analogous state and city housing programs) to incorporate cool roofs and walls into their program guidance and into specifications for constructing, retrofitting, and maintaining their building stock.

SAN MATEO COUNTY
Sustainability Department

THE CITY OF PHILADELPHIA
OFFICE OF SUSTAINABILITY

We will design and launch the "Keep Your Cool" **education campaign** for stakeholders & the general public

Mission

- Share how cool roofs and walls help by keeping unwanted solar heat out of our homes, workplaces, and communities
- Position cool roofs and walls as no-regret choices whose benefits will grow as the climate warms
- Highlight opportunities in disadvantaged communities (e.g., weatherization resources)

Media formats

- Short-form educational video
- Multi-lingual graphics
- Toolkits tailored to various stakeholder groups

Distribution channels

- Social media campaign with partner organizations
- Federal agency website(s)
- Community-based organizations

The Education Team has 36 members across three working groups: **Collection**, **Creation**, & **Distribution**

We will create high-profile cool-surface **demonstration programs in disadvantaged communities** across diverse climates

Mission

- Initiate high-profile, scalable demonstration programs that bring cool surfaces to disadvantaged communities
- Provide “local” examples and data about performance in geographically diverse hot-summer regions
- Locate some demonstrations in cold or mixed-humid climates

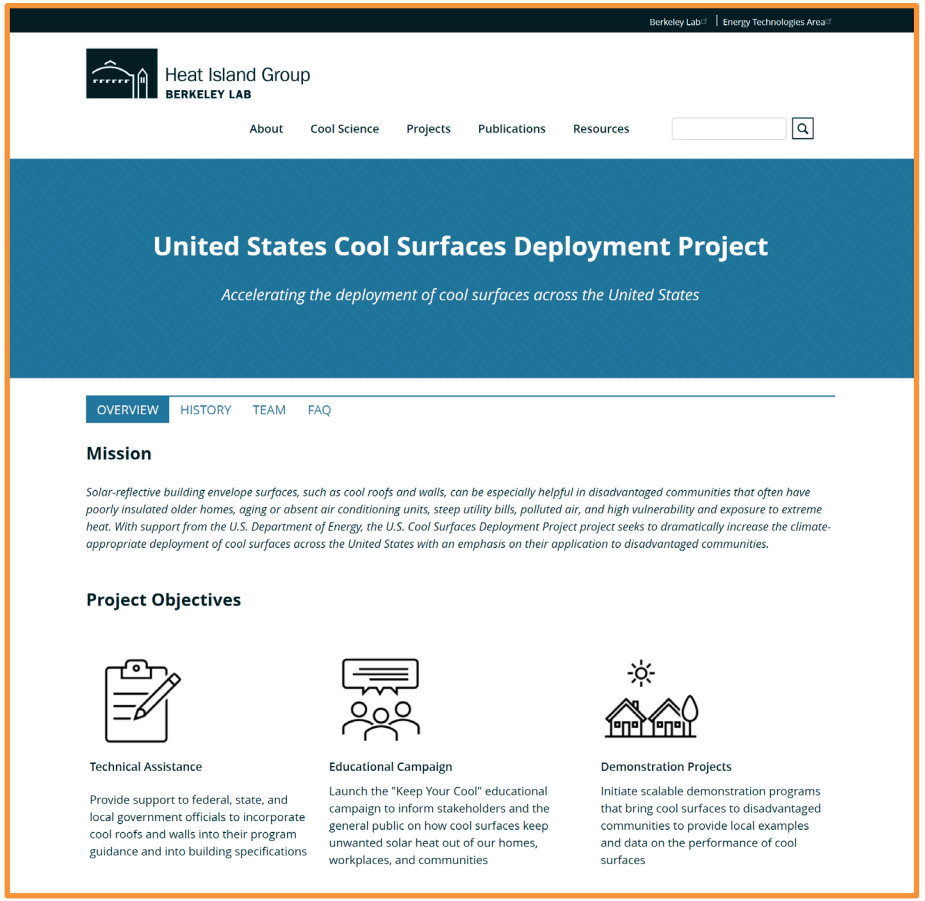
Approach

1. Form demonstration team, including government agencies, utilities, industry, and community-based organizations (Feb – Mar)
2. Design scalable programs for implementation in FY25 (Apr - Sep)

The Demonstration Team has 39 members across three working groups: **Materials**, **Siting**, & **Monitoring**

Please join our Cool Surfaces Deployment team!

- Our Education and Demonstration working groups meet every two weeks
- Let your colleagues know about this collaborative effort to increase cool-surface deployment
- Stakeholder interest form: https://bit.ly/3HTUA4V



https://CoolSurfaces.LBL.gov

Thank you!

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