



Welcome!

Accelerating Climate Resilience Speaker Series

Decision-Making Tools for Heat and Stormwater Mitigation with the Smart Surfaces Coalition



Jacob Miller
Deputy Director of U.S.
Policy and Programs,
Smart Surfaces Coalition



Sasha Shyduroff
Principal Planner, MAPC



Julia Nassar
Senior Clean Energy &
Climate Planner, MAPC

Zoom Logistics

- Please enter questions in the chat box
- To use the chat, click on the “chat” icon at the bottom of your screen, type in your question, and hit enter.
- Remain on mute

We reserve the right to expel anyone at any point should they disrupt the meeting for any reason. Similarly, we may need to end the meeting early and will follow-up with participants.

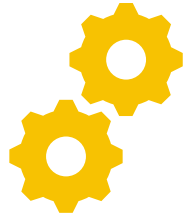
Accelerating Climate Resilience Speaker Series

Conversations with experts and practitioners from across the country who can speak to the ways they are perceiving and advancing resilience.

Past events include conversations about the effects of sea level rise on municipal budgets, climate resilience and racial justice, building social resilience through art, and empowering youth movements on climate.



Today's Agenda



Overview of MAPC's Cool Roof Resources



Demo of Smart Surfaces Coalition Tools



Open Q&A

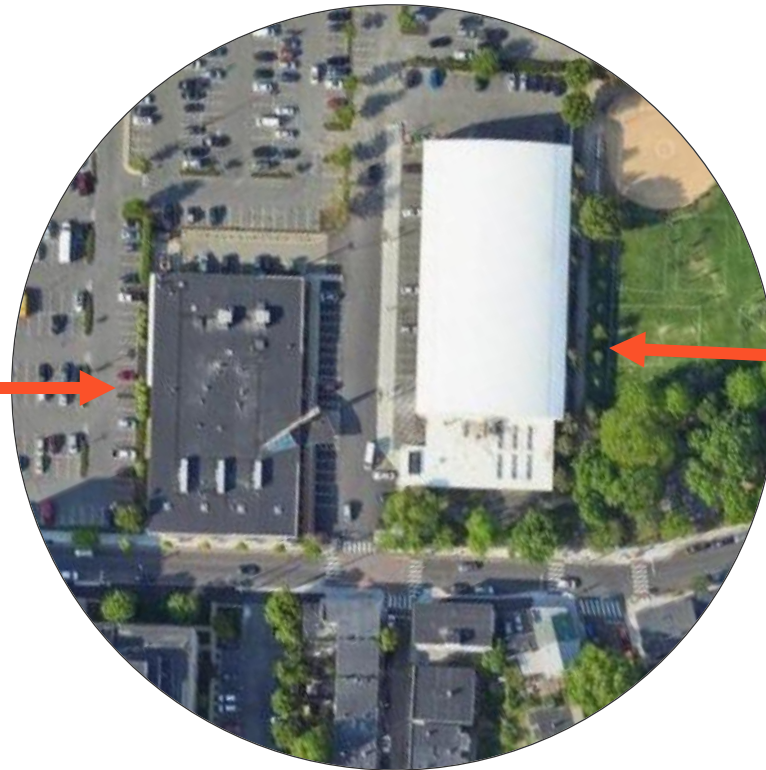


Cool Roofs: An Extreme Heat Strategy

What are Cool Roofs?

Roofs designed to **reflect more sunlight** and **absorb less heat** than a conventional roof, keeping the building and surrounding area cooler.

Traditional
Roof

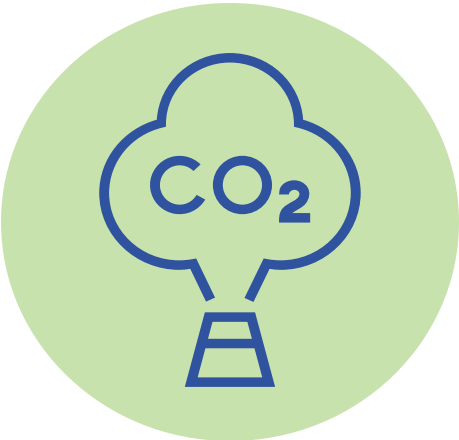


Cool
Roof

Benefits of Cool Roofs



Economic



Environmental



Health & Well Being

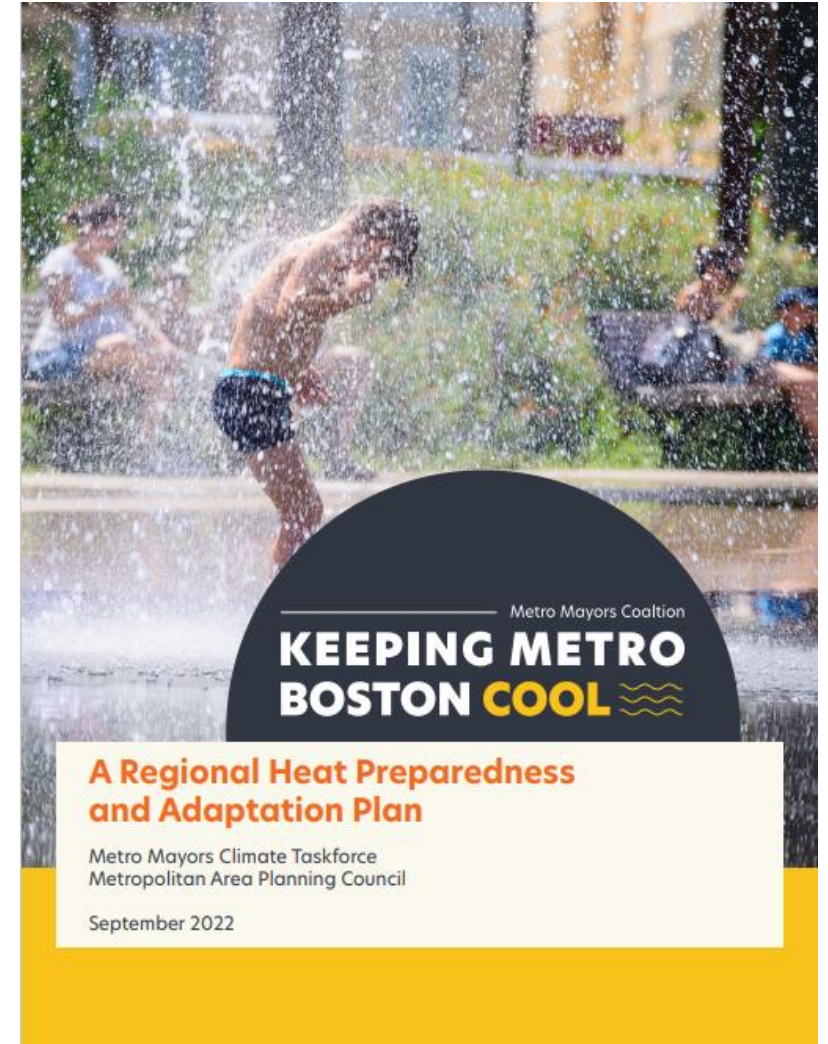
MAPC's Cool Roof Resources: Overview

Municipal Vulnerability Preparedness (MVP) grant to MAPC on behalf of Metro Mayors Coalition Climate Taskforce



MVP

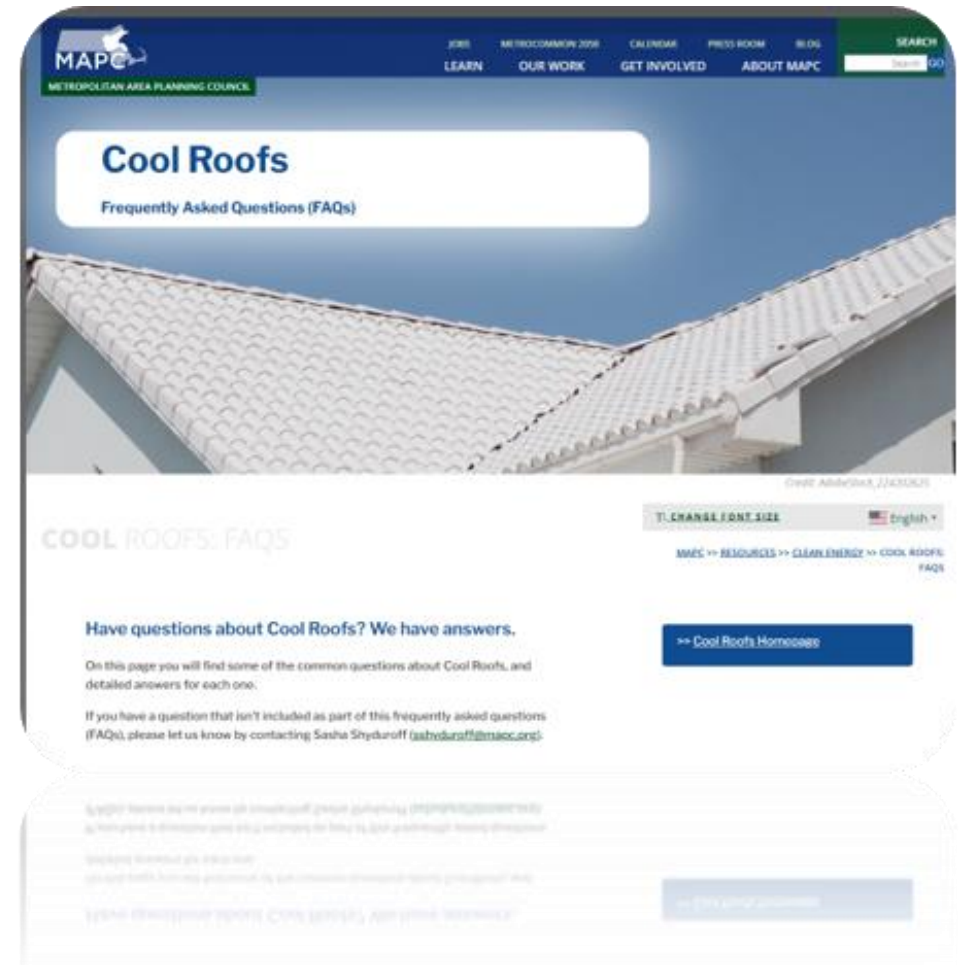
Municipal Vulnerability
Preparedness



Goal: To increase awareness & promote adoption of cool roofs in the Metro Mayors region through developing support tools and resources.

MAPC's Cool Roof Resources: Overview

1. **Suitability Tool & Assessment**
2. **Educational Toolkit**
3. **Other Resources**
 - Incentive Program Guidance
 - Procurement Toolkit
 - Climate Resilient Land Use



Determining if a Cool Roof Right for **YOUR** Property

Step 1: Cool Roof Suitability Tool

Cool Roofs Suitability Tool for Metro Mayors Communities (Rev. 20180628)

Municipality: **Arlington**

SELECT ROOFS
Filter by different site characteristics related to the following categories: roof typology, land use and ownership, social-environmental variables.

When the button next to the category is turned on, the selected filters within the category will be automatically applied to narrow the site list. Press the button to turn off any filters within the category.

Roof typology

- Low-slope roofs
- Dark colored roofs

Land use and Ownership

- Publicly owned
- Municipally owned

Building typology is any of...
 Selected

Social-Environmental Variables

- Within 50 communities
- Within hottest 20% of areas in municipality
- Within hottest 20% of areas in all Metro Mayors communities

Statistics:

- 30,232** potential cool roofs in Arlington
- 42,187,802** square ft of potential cool roof area
- 76,112** potentially impacted units

Step 2: Cool Roof Self Assessment

1. Is your building in need of a roof replacement or renovation?

Yes

No

2. Is your roof a dark color that absorbs more heat?
If your building is located in the Metro Mayors region, you can use the [Tool](#) to determine if your roof is considered dark-colored by clicking on the pop-up. If your building is not available in the tool, please answer the question.

Yes

No

I'm not sure

3. Is your roof made of any of the following materials?
Metal, Granule, Smooth asphalt, EDPM rubber, or Smooth aluminum.

Yes

No

I'm not sure

4. Does your roof receive a lot of direct sunlight without significant shading from trees or other buildings?

Yes

No

I'm not sure

5. Does your building have equipment on the roof (e.g., HVAC equipment)?

Yes

No


I'm not sure

6. Does your building have rooftop solar panels?

Yes

No

I'm not sure



Educational Toolkit Components

Factsheets*

- Cool Roofs 101 Factsheet
- Cool Roofs for Building Owners/Managers

Social Media Assets*

- For municipal planners and partners to raise awareness

Cool Roof FAQs

Recorded Webinars

- Basics & Benefits of Cool Roofs
- How Municipalities Can Use Cool Roofs to Advance Climate Goals

Blog Series

- Basics & Benefits of Cool Roofs
- Is a Cool Roof Right for **You**?
- Cool Roofs in Action: Spotlight on Successful Implementation

* Translated into Spanish, Brazilian Portuguese, Arabic, Haitian Creole, and Simplified Chinese.

打造凉爽的街区： 冷屋顶基本原理及优点

什么是冷屋顶？

冷屋顶（也称为白屋顶或反射屋顶）就是比普通屋顶反射更多阳光的屋顶。通过反射更多阳光，屋顶的吸热量减少，让建筑和周边的区域更凉爽。

冷屋顶的类型

冷屋顶多种多样，有多种颜色和类型，大部分建筑都可以找到适合其使用的类型。冷屋顶可



冷屋顶的优点：

节能和省钱。冷屋顶可以降低风扇的使用频率，节省电费。

保护屋顶和屋顶设备。冷屋顶可以减少热应力，帮助保护屋顶屋顶设备，例如太阳能板或 HVAC 系统。

降低室内温度。冷屋顶可以让室内更凉爽，防止出现高温导致疾病。

打造凉爽的街区。地表颜色较浅、树木少的城市区域温度比周围冷屋顶有助于降低街区的温度。

减少碳排放。通过减少在高天气的制冷需求，我们可以减少化石燃料产生的碳排放和空气污染。

Twati fre: Pou Pwopriyetè bilding ak Manadjè yo

Si ou
 • Gen yon do kay ki gen koulè fonsè, pant ki ba (plat), oswa
 • Ap ranplase twati ou byento
Twati fre yo se yon evidans!

Kisa yon twati fre ye, ak kijan li ka benefisyè bilding mwen an?

Twati fre (ke yo rele tou twati blan oswa twati meditativ) se tou senpleman twati ki fèt pou montre plis limyè solèy pase yon twati konvansyonèl. Lè yo reflekte plis limyè solèy, twati fre ofri ekonomi sou bòdwo enèji ak tanperati andedan kay la ki pi konfòtab.

Èske yon twati fre oblije Blan?

Twati fre vini nan yon varyete koulè ak materyèl. Pandan ke twati ki gen koulè pi lejè yo gen tandans pou yo pi bon nan bese tanperati, yon twati fre pa oblije blan. Gen vèsyon ki "pi fre" nan koulè nwa ak pwodwi tankou bado fre, ki ka adapte preferans estetik ou.

E si mwen gen panno solè sou do kay mwen an?

Twati fre yo se yon gwo konpleman nan enèji solè sou twati! Yo ka amelyore efikasite panno yo lè yo kenbe tanperati do kay la pi ba. Ou pral bezwen pou retire panno yo tanporèman pandan y ap aplike yon revètman fre sou do kay la.



Èske twati fre egzijè yon antretyen espesyal?

Twati fre yo ta dwe rete pwòp san poussye ak debri pou ogmante refleksivite. Sinon, antretyen an se menm jan ak yon twati konvansyonèl. Kom yon avantaj adisyonèl, twati fre ka diminye depans antretyen alontèm kòm yo dire pi lontan lè yo pa elaji / kontra nan absòpsyon chalè epi yo ka menm pwolonje garanti twati a.

Konbyen yon twati fre koute?

Pri yon twati fre depann sou gwosè do kay la, pwodwi twati fre (egzanp, kouch, manbràn, bado, elatriye), ak kompleksite enstalasyon. Yon revètman twati fre ka koute ant \$0.50-4.50 pou chak pye kare, tou depann de materyèl la, plis menm. ¹ Sonje pou pran an kont tou faktè nan ekonomi enèji lè w ap konsidere depans: yon etid NYC te jwenn ke yon revètman meditativ ka diminye depans AC a 50% nan yon bilding yon etaj, 25% nan yon bilding de etaj, ak 10% nan yon bilding senk etaj.

Èske twati mwen an ka konvèti an yon twati fre?

Pwodwi ak teknoloji twati fre yo disponib pou yon pakèt kalite twati sa vle di twati ou a gen anpil chans pou l elijib. Tcheke Zouti **Cool Roof Suitability MAPC a*** epi pran **Oto-Evalyasyon** an pou detèmine si yon twati fre posib ak avantajje pou pwopriyete w la.

Zouti **Cool Roof Suitability MAPC a**
Oto-Evalyasyon. Oto-Evalyasyon



1- Mwayèn HomeGuide an 2024.
 2- NYREJ (2010). <https://nyrej.com/print/11547>
 3- Zouti disponib sèlman pou Arlington, Boston, Braintree, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, Newton, Quincy, Revere, Somerville, Watertown, ak Winthrop.

Pou w jwenn plis enfòmasyon, vizite www.mapc.org/resource-library/cool-roofs/



Vantagens dos telhados frescos



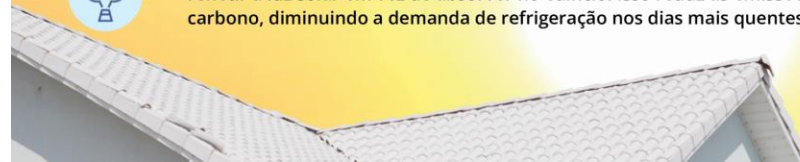
Econômicas: Ao reduzir a necessidade de ar-condicionado e ventiladores, os telhados frescos ajudam a economizar nos custos de energia durante o verão.



Para saúde e bem-estar : Os telhados frescos melhoram o conforto das casas, escolas e outras edificações, mantendo os ambientes interiores mais frescos.



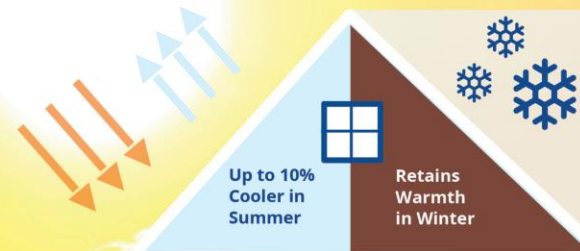
Ambientais: Os telhados frescos reduzem o efeito de ilha de calor urbano ao refletir a luz solar em vez de absorver no edifício. Isso reduz as emissões de carbono, diminuindo a demanda de refrigeração nos dias mais quentes.



Debunking the "heating penalty"



The "heating penalty" refers to a potential increase in winter heating bills since the roof reflects more heat than it absorbs. While this can happen, **the savings in the summer months usually far exceed any increases in the winter.**



Cool roofs are an increasingly important solution for adapting to milder winters and hotter summers in New England.



Residential Cool Roof Case Study

	Project Details
Overview	<ul style="list-style-type: none">• Triple decker located in Cambridge• Roof Area: 1,100 sqft• Completed cool roof in 2020
Cool Roof Type	<ul style="list-style-type: none">• Coating (Henry Tropi-cool silicone coating)
Cost	<ul style="list-style-type: none">• \$599
Testimonial	<ul style="list-style-type: none">• “I live on the top (3rd) floor and do not have AC in my unit. On 90°F days, my home would reach around 5°F hotter than the highest outdoor temperature of the day. After painting the roof, the indoor temperature has been much more comfortable and has never exceeded the highest outside temperature. On a recent 95 plus degree day, the indoor temperature remained below 90°F. Cool roofs should be required on all new and replacement flat roofs.”



Triple Decker Residence in Cambridge

Additional Tools & Resources

1. Guidance on Creating a Cool Roof Incentive Program

2. Municipal Procurement Toolkit

3. Land Use / Zoning Guidance

Guidance from Program Managers: Strategies for Success & Lessons Learned

Start Small

Integrate into Existing Energy Programs

As Feasible, Offer Point-of-Sale Incentives

Collaborate with Vendors

Educate Property Owners

Raise Public Awareness

Leverage Community Partners

Roofing Products

Debunk the Heating Penalty

Track Progress

Cool roofs make for great photo-ops! Take photos during the cool roof installation process; publicize a cool roofs tracker (e.g., number and square footage of cool roofs installed); table at community-wide events; engage with public health professionals; and tie in cool roofs to other related energy, housing, or health programs. Roofs may be out-of-sight, out-of-mind, so having signage or information about an installed cool roof is important to raising awareness.

- The City of Louisville circulated mail-in flyers with information about their cool roof program, targeting specific heat-vulnerable neighborhoods.
- Tailor outreach materials separately for residential and non-residential audiences to ensure that the messaging is relevant and effective for each. Residential building owners may be more concerned with the immediate benefits of cool roofs; therefore, outreach for this group should emphasize energy savings, improved home comfort, and health benefits. Non-residential building owners, on the other hand, might be more focused on the long-term economic benefits, such as reduced operational costs, increased property value, and compliance with regulatory requirements (such as building energy use disclosure ordinances). For this audience, highlight how cool roofs can lead to significant energy cost reductions, extend the lifespan of roofing systems, and improve the performance of HVAC systems.



Chelsea Housing Authority – Public housing for the elderly and people with disabilities

Strategies to Strengthen Heat Resilient Zoning Requirements

Development Standards

Climate Smart/Cool Roof Ordinances

Additional Resources

Municipalities can also address UHI through adding solar reflective index (SRI) standards into a “eco-roof” or “climate smart roof” bylaw. Climate Smart Roofs are roofs that mitigate the impacts of climate change either by addressing stormwater runoff, urban heat, or other climate threats. Cool Roofs are defined as highly-reflective roofs that reflect more sunlight than traditional roofs and can improve energy efficiency within a building and lower urban heat island impacts. Cool Roof standards can be paired with solar roofs as cool roofs can improve the efficiency of rooftop solar.

[Somerville, MA](#) ☞ Heat Island Reduction (10.10) has a minimum solar reflectivity required for 75% of roofs and surface parking.

[Cambridge, MA](#) ☞ Green Factor Standard (22.93.1) includes a minimum solar reflective index (SRI) for new roofs or when 50% or more an existing roof is being replaced. Additionally, 22.30 sets standards for “Green Roofs” for buildings 25,000 sq ft and above.

Smart Surfaces Workshop

Heat and Stormwater Flood Mitigation Tools



The Smart Surfaces Coalition is made up of more than 50 leading national and international organizations with a shared commitment to creating **cooler**, **healthier**, and **more resilient** cities by cost-effectively reducing the impacts of extreme urban heat and flooding.

What are Smart Surfaces?

Infrastructure strategies that cost-effectively manage urban heat and stormwater while maximizing health, climate, and equity co-benefits

Reflective/Cool Roofs



Green Roofs



Porous & Permeable Pavements



Solar Photovoltaics



Reflective/Cool Pavements



Trees



Green Stormwater Infrastructure

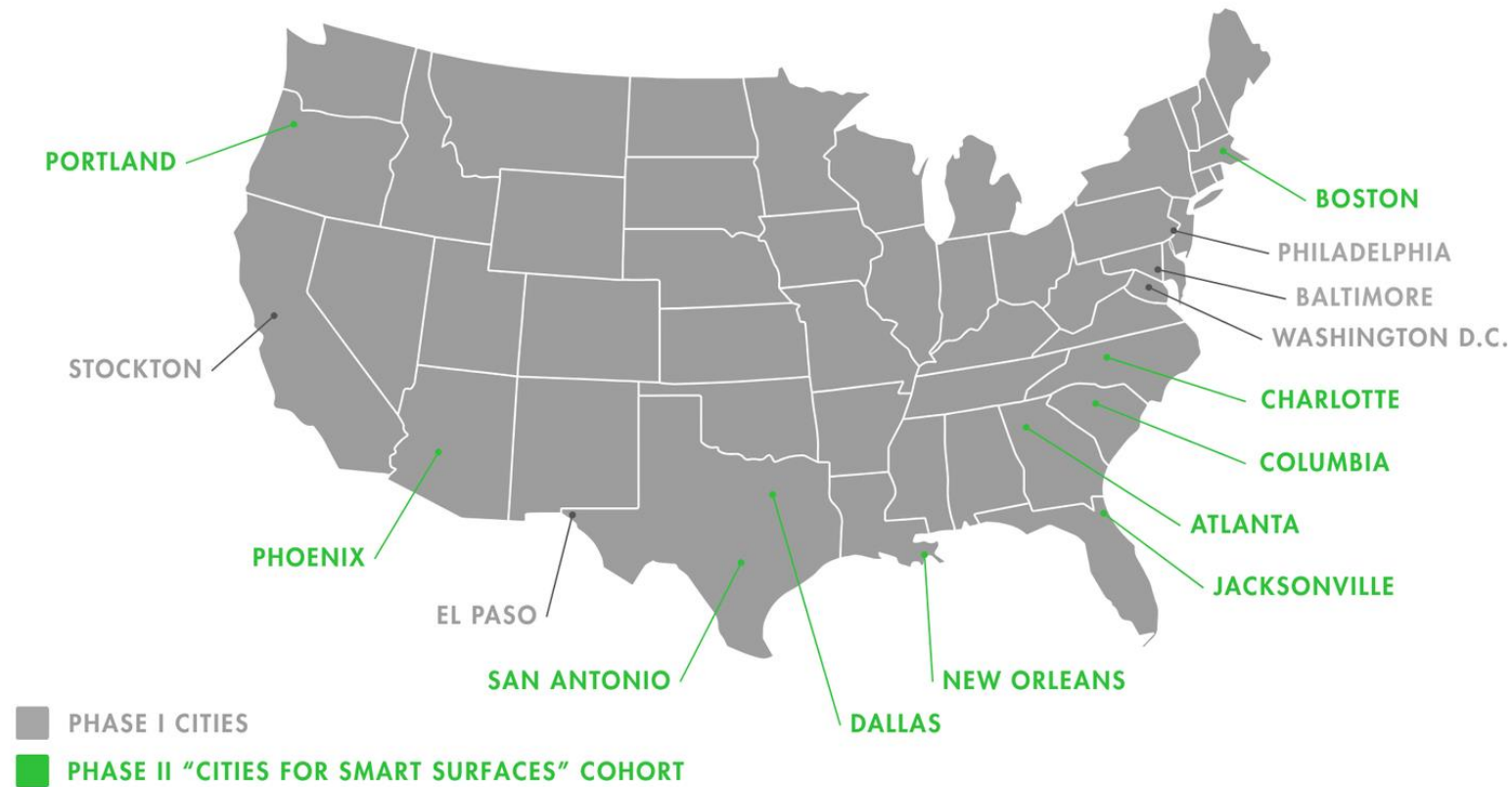


Zero & Negative-Carbon Concrete



Cities for Smart Surfaces

SSC is partnering with 10 metro areas across the US to facilitate the adoption of Smart Surfaces at the metropolitan level and working with communities in those regions to support community-led, local Smart Surface implementation projects.



Cities for Smart Surfaces Program Partners

Project Coordinator



Data Visualization and Cost-Benefit Analysis



Altostratus Inc.



City and Community Support



Federal Funding



COLUMBIA LAW SCHOOL

SABIN CENTER FOR CLIMATE CHANGE LAW



Policy + Legal



COLUMBIA LAW SCHOOL

SABIN CENTER FOR CLIMATE CHANGE LAW



Health Research and Communications



SSC Web Tools

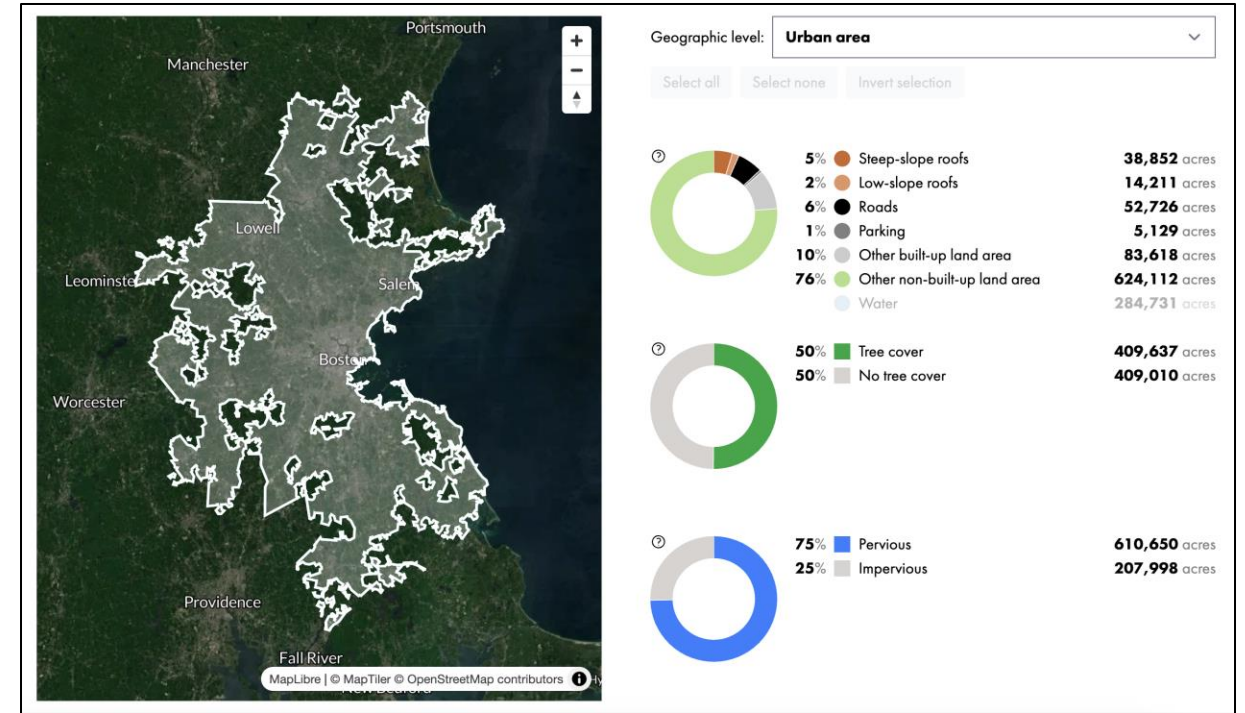
Decision Support Tool



Benefit Cost Analysis Tool



Smart Surfaces Policy Tracker



A snapshot from Boston's Custom Benefit-Cost Analysis Tool

Together, these tools help cities and metro areas develop and implement climate, sustainability, and resilience policies. They also can support in strategic planning, grant applications and infrastructure investments.

SSC Web Tool Demos

Decision Support Tool

web.tplgis.org/smart-surfaces-coalition/

Benefit-Cost Analysis Tool

<https://bca.smartsurfacescoalition.org/>

Smart Surfaces Policy Tracker

<https://smartsurfacespolicy.org/policies/>

Project Implementation Platform

Best Practices to Guide Construction Procedures

DRAFT

STEP 1: Project Location and Project Details
 Select the major city nearest to your project location

Project Location
 City:

Project Finances

Analysis Timeline*	25	
Social Cost of Carbon	\$100.00	USD per Metric
Discount Rate (real)	2.0%	

This calculator assumes that a project will be implemented in a single calendar year, eg year 0. The analysis timeline refers to the period over which costs and benefits are analyzed for that project.

STEP 2: Provide Existing Site Characteristics
 Based on the following categories, specify areas in square feet (ft2)
 Costs and benefits cannot be calculated for the "Undefined Surface Type" land category

Total Project Area [ft2]:

For each land category, provide either the area (ft²) or the distribution percentage. Check the box to indicate which input method you're using. The other cells will auto-calculate. Make sure inputs are complete before moving on to step 3.

Land Category	FALSE		TRUE	
	Area [ft2]	<input type="checkbox"/>	Distribution [%]	<input type="checkbox"/>
Road	25,000	<input type="checkbox"/>		<input type="checkbox"/>
Parking Lot	25,000	<input type="checkbox"/>		<input type="checkbox"/>
Other Pavement*	0	<input type="checkbox"/>		<input type="checkbox"/>
Steep Slope Roof	0	<input type="checkbox"/>		<input type="checkbox"/>
Low Slope Roof	75,000	<input type="checkbox"/>		<input type="checkbox"/>
Grass/Lawn	25,000	<input type="checkbox"/>		<input type="checkbox"/>
Undefined Surface Type	0	<input type="checkbox"/>	100%	<input type="checkbox"/>
Total	0	<input type="checkbox"/>	100%	<input type="checkbox"/>

**Other pavement includes sidewalks, driveways, alleyways, or any other hardscape comprised of concrete or asphalt that has not been classified into roads or parking lots*

STEP 3: Provide Project Details
 Based on the areas provided above, allocate your available project areas to smart surfaces. Units of input are shown on the right.
 Note: Each square foot of a given surface type can only be allocated to ONE measure type (i.e. Cool Roofs and Solar PV cannot be placed on the same square foot of roof area)

Measure Type	Surface Type	Unit	Area Modified		Kilowatts (1kW = 48 sqft of panel)
			Area Modified	Kilowatts	
Cool Roof --->	Steep Slope Roof	ft2	<input type="text"/>	75,000	
	Low Slope Roof	ft2	<input type="text"/>		
Solar PV --->	Steep Slope Roof	ft2	<input type="text"/>	- kW	- kW
	Low Slope Roof	ft2	<input type="text"/>		
Cool Pavement --->	Road	ft2	25,000		

*NOTE: For solar PV users can specify area modified in sqft or in Watts.



Questions?



Accelerating Climate Resilience Speaker Series

Thanks for joining!

Stay tuned for more climate resilience webinars in the new year! Please provide feedback for future topics!

