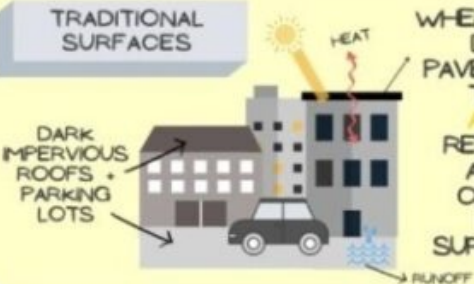


SMART SURFACES COALITION

40 leading organizations with a transformative plan to cost-effectively cut city contributions to global warming by 10-15% and cool cities by 2°F each decade while improving city livability, health, and equity

TRADITIONAL SURFACES



WHEN SUNLIGHT HITS A DARK ROOFS + PAVEMENTS MOST OF THE ENERGY IS ABSORBED AND RELEASED AS HEAT AS A RESULT... CITIES ARE 2-22°F HOTTER THAN SURROUNDING AREAS

CITIES ARE GETTING HOTTER + LESS LIVABLE ESPECIALLY LOWER-INCOME AREAS

SMART SURFACES

SMART SURFACES INCLUDE REFLECTIVE (COOL) ROOFS AND PAVEMENTS, POROUS PAVEMENTS, GREEN ROOFS, SOLAR PV, TREES, AND COMBINATIONS OF THESE SURFACES.



REFLECTIVE ROOFS + PAVEMENTS



GREEN ROOFS



SOLAR PV



POROUS PAVEMENTS



TREES

ADOPTION OF SMART SURFACES

CITIES ACHIEVE IMPROVED

- TEMPERATURE
- AIR QUALITY
- WATER MANAGEMENT
- HEALTH
- TOURISM



SMART ROOFS
 8% HEATS THE CITY AIR VS. 52%
 10% HEATS ATMOSPHERE VS. 38%
 80% IS REFLECTED AWAY VS. 5%

WITH SMART SURFACES CITIES FEEL -15-20°F COOLER

Urban Adoption of Smart Surfaces:

Benefits > Costs
2.5:1

Reduce Urban Heat by 2°F/Decade

Create Thousands of New Jobs

Improve Health Outcomes

Reduce Air and Water Pollution

Reduce City Contribution to Global Warming



SMART SURFACES



Combating urban heat & flooding while advancing health equity & environmental justice



NYCCoolRoofs: Cool rooftops (reflective, photovoltaic or green roofs) can reduce internal building temperatures by up to 30%, making the building cooler and more comfortable during the hot summer months.

PROJECT OVERVIEW

As the nation's leading public health voice, the American Public Health Association has called for strong leadership that prioritizes the strategies and interventions needed to address the health and equity impacts of climate change.

These impacts include those stemming from extreme heat, which is the top weather-related cause of death in the U.S. On average, heat kills more people than hurricanes, floods and tornadoes combined. Climate-related flooding also endangers human health; standing water and wet building materials breed viruses, bacteria and mold that can lead to respiratory and gastrointestinal illnesses.

Building on APHA's longstanding commitment to climate change as a health issue, the Center for Climate, Health and Equity APHA is partnering with the [Smart Surfaces Coalition](#), [National League of Cities](#), [Metropolitan AME Church](#), and many others to accelerate the implementation of "smart surfaces" in major metropolitan cities, as well as offer grant opportunities to APHA Affiliates. We invite your Affiliate to join our efforts in accelerating the adoption of smart surfaces to reduce impacts of extreme heat and flooding, improve public health, create jobs and advance equity.

WHAT ARE SMART SURFACES?

Over centuries, cities have replaced green and porous surfaces with dark and impervious surfaces. As a result of their paved surfaces and buildings absorbing more heat, city surface temperatures are on average 5 °F warmer than surrounding rural areas, while temperatures within cities can vary by more than 20 °F from neighborhood to neighborhood. This exacerbates the health impacts of global warming and increases energy costs and air pollution, particularly for low-income communities and communities of color who have seen fewer investments in trees, parks and infrastructure upgrades. Urban flooding also poses a significant risk to human health due to the size and density of the population, ineffective sewer systems and lack of natural drainage.

These problems can all be addressed by city-wide adoption of what we call "smart surfaces," or natural and man-made surfaces that manage the sun and rain more effectively. Smart surfaces include green and reflective ("cool") roofs; reflective and porous pavements and roads; solar photovoltaics (PV); and trees, bioswales and rain gardens.



Bioretention: Bioswales, rain gardens and other forms of bioretention allow rain to run off into green, porous basins, in turn reducing stormwater runoff, risk of flooding and stormwater system overflow, while recharging groundwater.

WHAT IS THE SMART SURFACES COALITION?

The Smart Surfaces Coalition is made up of 40 leading national and international organizations with a shared commitment to enabling and ensuring that smart surfaces become the urban design standard globally within a decade. Funding from Waverley Street Foundation supports the coordinated, collaborative effort of SSC partners.

Metropolitan areas increasingly face extreme heat and flooding, rising energy and health costs, and an environmental justice crisis. This three-year project will support more than a dozen SSC partners and SSC in a wide-reaching effort to enable, support and accelerate metro- and city-wide adoption of smart surfaces to effectively address this critical set of urban challenges.



Reflective or “high albedo” pavements include light-colored roads, sidewalks and parking lots. These pavements use a reflective sealant to bounce sunlight and heat away from cities to reduce surface temperatures.

APHA WILL PROVIDE FUNDING AND TECHNICAL ASSISTANCE TO SELECTED AFFILIATES:

- **Funding to build capacity:** Throughout the project, APHA will provide six Affiliates with grants of \$75,000 each, spread over three years (September 2023 to December 2025), working closely with them to build capacity and mobilize members and community partners in support of smart surfaces adoption and advancement of health equity in targeted metropolitan areas.
- **Educational materials on the health and equity impacts of smart surfaces:** APHA will offer fact sheets, workshops, peer-to-peer learning opportunities and other educational materials to help bring Affiliate members, partners and decisionmakers up to speed on health risks associated with extreme heat and flooding and explain how smart surfaces can deliver progress on climate change mitigation, adaptation and environmental justice.
- **Strategic guidance to shape budgets and workplans:** APHA staff will work closely with grantees to develop project budgets, timelines and activities that build new partnerships, influence decisionmakers and strengthen long-term internal capacity for advocacy on climate, health and equity.

PARTICIPATING AFFILIATES WILL WORK CLOSELY WITH THEIR MEMBERS AND COMMUNITY STAKEHOLDERS TO:

- **Build local, cross-disciplinary partnerships:** APHA Affiliates will build cross-disciplinary partnerships focused on achieving the public health and equity benefits of smart surfaces and ensuring the necessary experts and stakeholders are involved in building strategies to achieve collective goals and build collective power. Partners can include environmental justice groups, urban planners, architects and landscape architects, geophysical scientists, health and public health professionals, housing officials, faith leaders and more.

- **Engage and educate communities:** By utilizing the tools and educational materials provided by APHA, Affiliates will organize series of in-person or online info sessions to create awareness among the community. These events will bring experts from APHA, SSC and environmental justice groups together with city officials and other public health experts to discuss the health benefits of implementing smart surfaces. Grantees should also attend any workshops or events hosted by local coalition partners to keep decisionmakers engaged.
- **Promote public health messaging to guide city-wide climate policy:** Affiliate leaders will serve as a leading health voice in local advocacy around the built environment and engage in climate policy decisions in the target metropolitan areas, emphasizing extreme heat as a major public health concern. ecoAmerica's research consistently shows that health leaders are the most trusted messengers in America, and that health is a major motivator for climate action. By elevating public health messaging to support equitable climate policies, Affiliates can encourage cities to address and prepare for the health risks associated with climate change, reduce health disparities and promote social justice.
- **Develop a media strategy:** By utilizing the materials co-created by APHA, the American Lung Association and SSC, Affiliates will amplify the health co-benefits of smart surfaces and identify ways to educate the public on adverse health impacts of climate change through various media channels. This can include writing op-eds, press releases and commentaries, engaging with local media, etc.



Porous pavements allow rain to pass through the surface, recharging groundwater while reducing flood risk.

For over two decades, APHA has worked to improve health equity through changes to the built environment that also offer co-benefits as climate adaptation solutions. From improving access to safe and affordable housing to extending low-emission and safe multimodal transportation, APHA has worked to improve the physical and mental health of communities by advocating for the re-shaping of cities across the U.S.





If you'd like to participate in this funding opportunity to advance climate resilience in your state, please contact [Shweta Arya](#), APHA's Senior Project Manager, Smart Surfaces. The application deadline is August 31, 2023.

SMART SURFACES DELIVER COOLER, HEALTHIER, RESILIENT CITIES

WHAT ARE SMART SURFACES?





Smart Surfaces offer an integrated city-wide strategy to actively manage extreme heat and stormwater with reflective (cool) roofs and pavements, porous surfaces, green roofs, solar PV, trees, rain gardens, and combinations of these surfaces.

CITY-WIDE SMART SURFACES CAN:

-  reduce peak summer temperatures by 5°F
-  reduce energy demand & cut energy bills
-  deliver large reductions in flooding & resulting mold
-  improve health, air quality, and strengthen local economies

with the greatest impact in lower income communities and communities of color

THE SMART SURFACES PROJECT INCLUDES:

-  Transformative research quantifying health, climate, employment, energy, equity, and other impacts
-  Customized cost-benefit analytic tool enabling city optimization of all surfaces
-  Technical assistance with federal funding applications
-  Support from a powerful coalition of 40+ influential organizations committed to a common objective

ADDITIONAL FUNDED PARTNERS:

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LEARN MORE
SmartSurfacesCoalition.org
[Smart Surfaces TEDx](#)
[Baltimore Case Study](#)
[Transformation Story](#)

CITIES FOR SMART SURFACES

WORKING GROUPS



COMMUNITY ENGAGEMENT

- Holding workshops and developing educational materials
- Supporting local Smart Surface project implementation
- Engaging communities for equitable policy development



DATA VISUALIZATION & ANALYSIS

- Classifying and characterizing city surface infrastructure
- Visualizing spatial data
- Micro-meteorological modeling to predict citywide temperature impacts of Smart Surface interventions



POLICY & LEGAL

- Conducting policy research and benchmarking studies
- Developing a searchable Smart Surfaces policy database
- Drafting language for local laws & rules



FEDERAL FUNDING

- Providing technical assistance (e.g., research on Smart Surface benefits)
- Reviewing existing grant applications
- Drafting grant applications
- Advising on funding opportunities

HEALTH RESEARCH & COMMUNICATIONS



- Researching and quantifying the health benefits of Smart Surfaces
- Providing health-related technical assistance
- Generating communications materials with a public health focus

OUR TEAM



KEEPING YOUR COOL

How Communities Can Reduce the Heat Island Effect

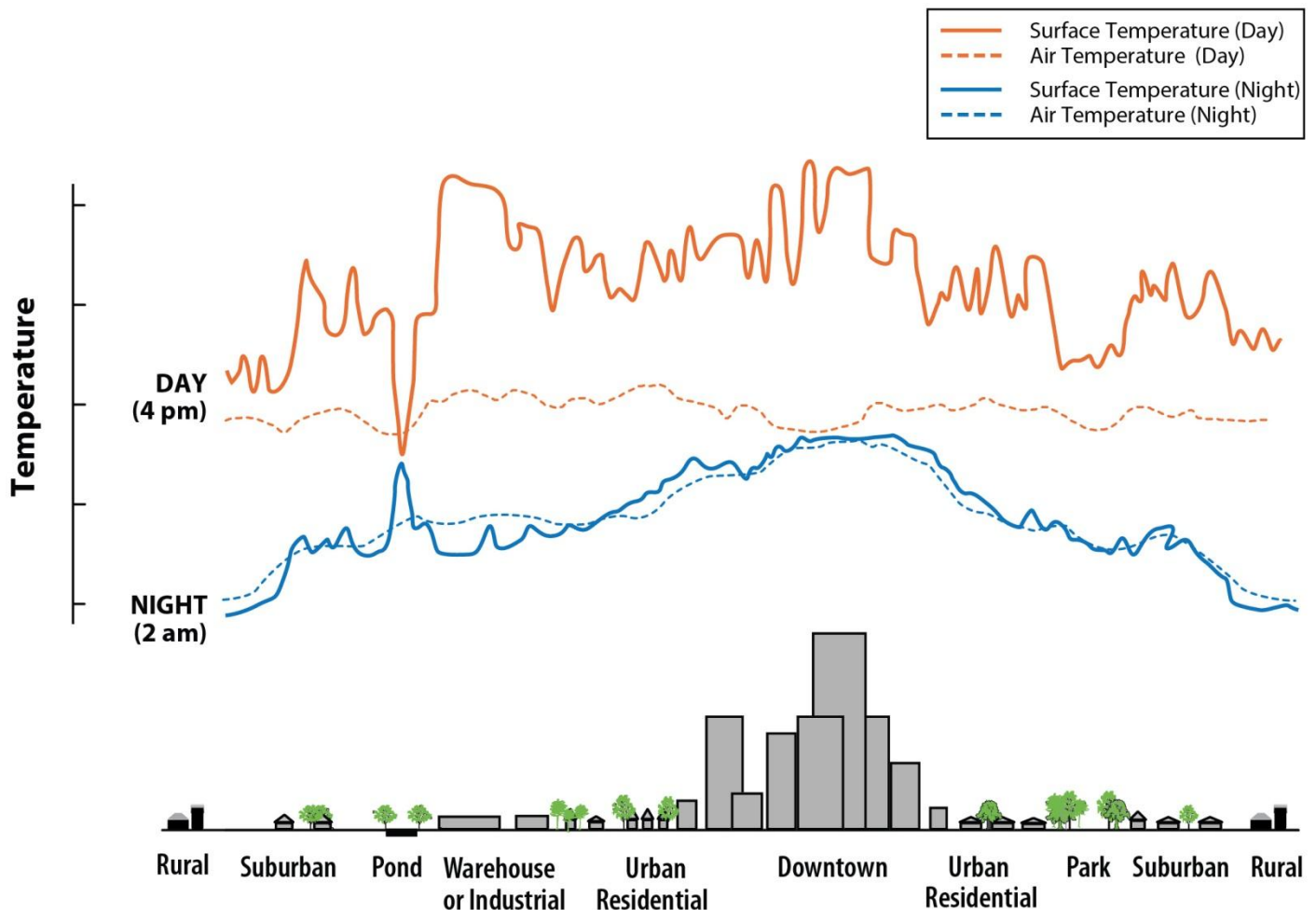
Millions of people living in and around cities experience summertime temperatures that are higher than those in surrounding natural areas. These urban “heat islands” increase energy demand for air conditioning, raise air pollution levels, and can cause heat-related illness and death. As temperatures continue to rise due to climate change, urban areas are more likely to experience more frequent, more intense, and longer heat waves. Fortunately, there are proven actions that communities can take today to keep cool in the future.

The Basics: What Is a Heat Island?

Heat islands are zones of relative warmth created by urban air and surface temperatures that are higher than those of nearby rural areas. Air temperatures in a large city can be 2–22° F (1–12° C) higher than its rural surroundings.

The sketch below shows a hypothetical city’s heat island profile at two times during a 24-hour period, demonstrating how temperatures typically rise during both the day and night as you move from rural areas toward dense downtown areas.

Typical Heat Island Temperature Differences Between Urban and Rural Areas





What Causes Heat Islands?

Heat islands form when cities replace natural land cover—trees, grass, wetlands—with pavement and buildings. These changes lead to higher urban temperatures because:

- Removing trees and vegetation eliminates the natural cooling effects of shade and evaporation of water from soil and leaves.
- Pavement, rooftops, and other non-reflective surfaces absorb heat during the day and release it at night, inflating overnight temperatures.
- Tall buildings and narrow streets reduce wind flow and heat air that is trapped between them.
- Waste heat from vehicles, factories, and air conditioners add warmth to the air, further increasing the heat island effect.

Heat islands are also influenced by a city's geography and prevailing weather conditions. For example, strong winds and rain can flush out hot, stagnant air from city centers, while sunny, windless conditions can intensify heat islands.



How Do Heat Islands Affect Us?

Higher temperatures affect people's health, air and water quality, and the amount of energy that we use for summertime cooling.

People's Health: Heat islands can intensify extreme hot weather, which can cause breathing problems, heat cramps, and heat stroke, and may lead to illness or even death—especially in vulnerable populations such as the elderly.

Air Quality: Heat islands raise energy demand to power air conditioning, which in turn can increase utility bills and increase power plant emissions of carbon pollution that causes climate change. Higher temperatures also accelerate the chemical reaction that produces ground-level ozone, or smog.

Water Quality: Hot pavements heat up stormwater runoff, which can hurt aquatic life in local waterways.

Energy Use: Heat islands are responsible for 5–10 percent of summertime electricity demand, leading to higher electricity bills, pressure on the electricity grid, and brownouts and blackouts.



How Can Communities Cool Down?

Communities that want to cool down have options. They include installing reflective **cool roofs**; planting **trees and vegetation**, including "**green**" **roofs**; and using **cool paving materials** for roads, sidewalks, and parking lots.



Four Strategies to Reduce Heat Islands

1 Green Roofs replace heat-absorbing traditional roofing materials surfaces with plants, shrubs, and small trees.

BENEFITS:

- Lower energy bills and energy demand
- Less air pollution
- Better stormwater management and water quality
- Aesthetic and habitat benefits

2 Cool Roofs reflect or release the sun's solar energy rather than retain it, are typically 50–60° F (28–33° C) cooler than traditional roofs.

BENEFITS:

- Lower energy bills and energy demand
- Less air pollution
- Increased comfort of occupants



3 Cool Pavements store less heat and reflect more solar radiation than conventional pavements. They may be permeable or porous to allow water to percolate and evaporate, cooling the pavement surface and surrounding air.

BENEFITS:

- Reflective pavements can improve nighttime visibility
- Permeable pavements can reduce stormwater runoff and tire noise, and can improve safety during rainstorms

4 Trees and Vegetation provide shade and cool the air through evapotranspiration.

BENEFITS:

- More green space
- Better stormwater management
- Less air pollution and erosion
- Lower energy bills and energy demand



What Are the Benefits of Cooling Down?

Implementing cooling strategies across a community has many benefits, including reducing summertime temperatures, lowering energy use and costs, curbing air pollution, and alleviating heat-related health issues.

By adding these strategies to long-term local and regional planning, communities can also prepare for or adjust to higher temperatures and changing conditions that come with climate change. For instance, planting trees helps prevent flooding while also lowering local temperatures.



Photo courtesy of American Society of Landscape Architects, ENERGY STAR partner, 2014

**Reducing Urban Heat Islands:
Compendium of Strategies**
Urban Heat Island Basics

Learn more about these strategies in EPA's *Reducing Urban Heat Islands: Compendium of Strategies*, available at: <http://epa.gov/heatisland/resources/compendium.htm>.

About EPA's Heat Island Reduction Program

Through its Heat Island Reduction Program, EPA works with local officials, community groups, researchers, and other stakeholders to identify opportunities to implement heat island reduction programs and policies that create comfortable and sustainable communities.

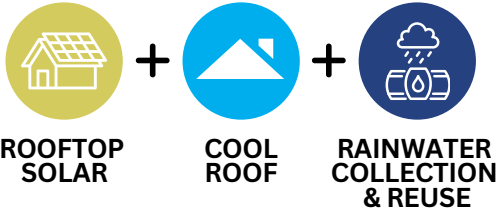


Learn more at:
epa.gov/heatisland

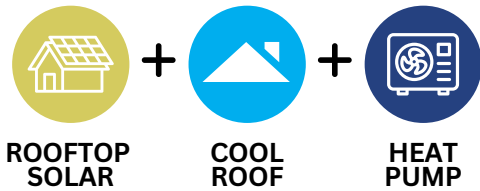
November, 2014
Publication Number: 430F14041

The Integrated Benefits of Smart Surfaces

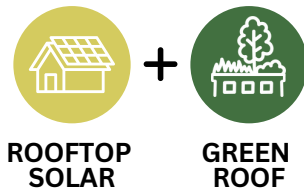
Smart Surfaces are most cost-effective when deployed in combination. In addition to implementing Smart Surfaces on individual projects, all of the solutions below should be deployed at the city scale to **cut peak summer temperatures by 5°F or more, improve air quality and public health, and provide up to \$10 in benefits and cost savings for every \$1 spent.**



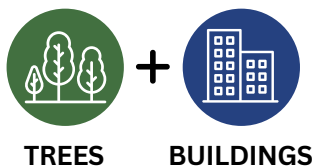
Cool roofs reduce surface temperatures, which can **boost solar panel efficiency by about 10%**. They also cool cities, decreasing the risk of heat-related illnesses and mortality. Solar power cuts energy bills and rainwater reuse reduces flooding and helps buildings meet stormwater regulations, while saving money on water bills.



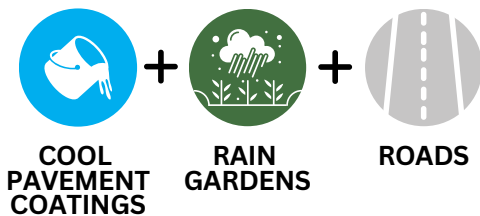
Cool roofs keep rooftop-mounted heat pumps cooler and thus operating more efficiently. They also benefit health by lowering city temperatures. Solar panels save money on energy bills, and cool roofs cut costs by reducing cooling energy use.



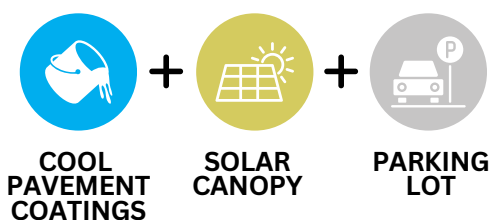
Green roofs cool cities, **boost solar panel efficiency by 3-4%**, reduce stormwater runoff, help buildings meet stormwater regulations, and provide habitats for plants and animals. Solar panels save money and create clean, renewable electricity.



Strategic tree planting near buildings provides shade, reduces stormwater runoff, improves air quality, and creates habitats for plants and animals. Trees can also cut energy costs by reducing the need for building cooling.



Painting roads with more reflective coatings can cool cities, extend pavement lifespan, and increase road safety by boosting visibility for drivers. Rain gardens also keep cities cool and help with traffic calming to create safer streets, in addition to collecting stormwater, reducing urban flood risks, filtering out stormwater pollutants, and increasing available habitat for plants and animals.



The shade and cooling provided by solar canopies save money by promoting the longevity of the parking surface, while also protecting public health. For the areas that are not shaded by solar canopies, cool pavement solutions are an effective option for reducing surface temperatures and urban heat islands.