

# U.S. EPA Heat Island Reduction Program

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**ENERGY STAR Requirements for Roofing Products**

**April 11, 2011**



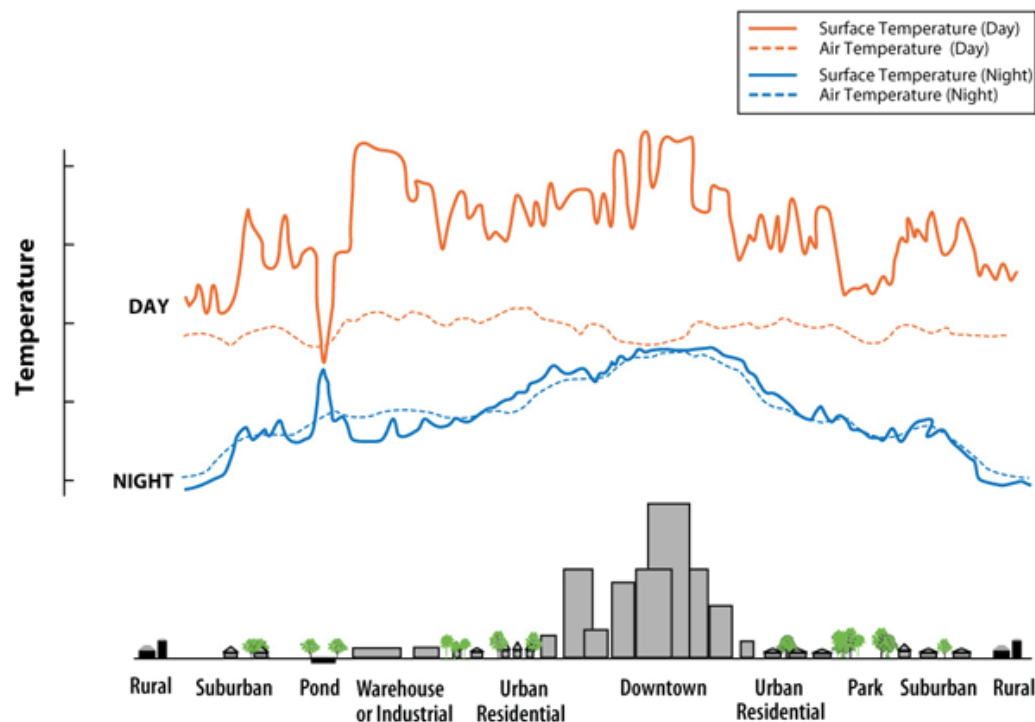
# The Heat Island Effect

## Definition

- Micro-scale temperature differences between urban and rural areas
- Urban areas can be 9 – 27 ° F higher than rural areas

## Causes

- Reduced vegetation
- Materials used to build urban infrastructure
- Urban geometry

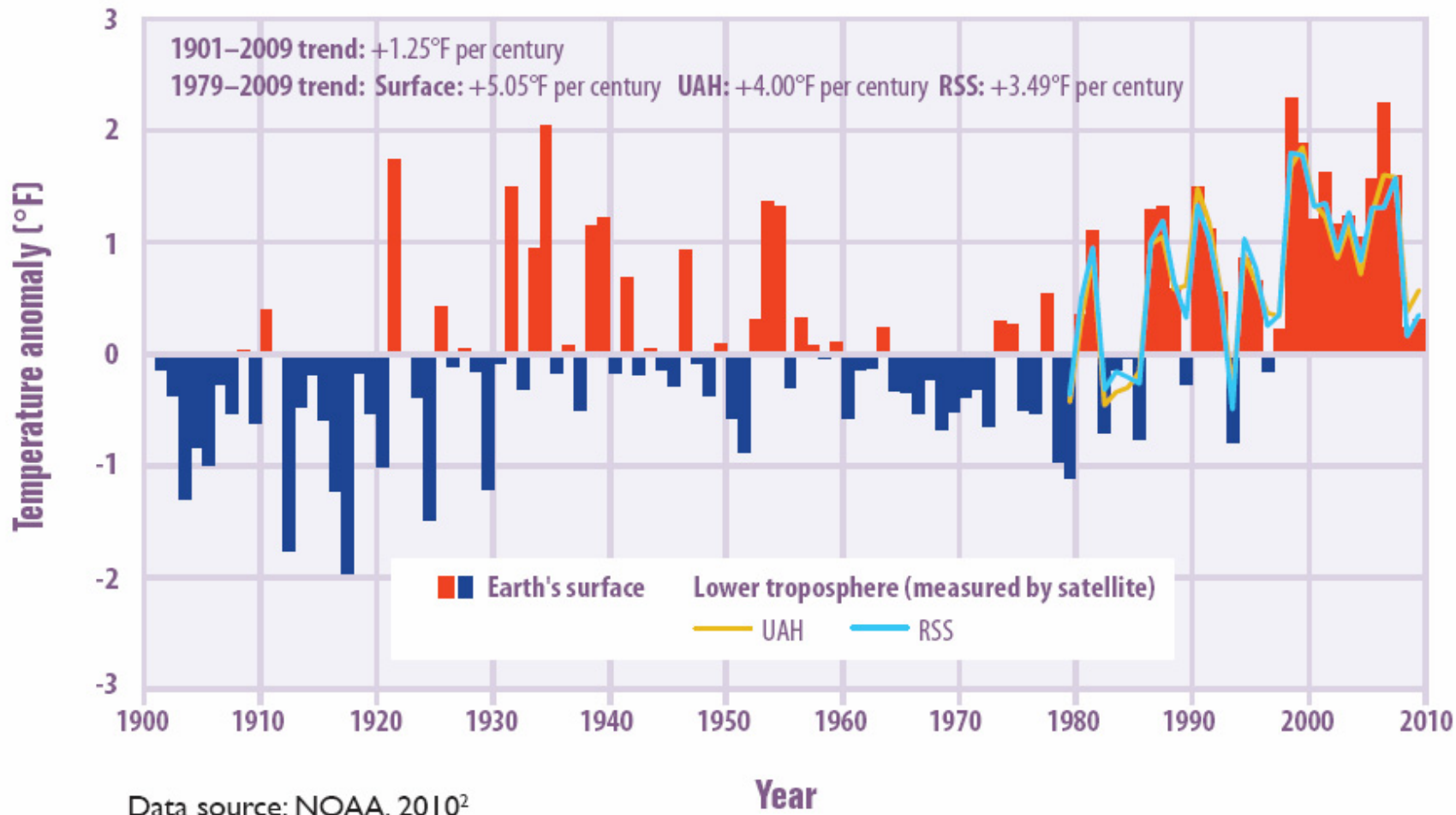


# Heat Island Impacts

- **Air Quality & Greenhouse Gas (GHG) Emissions**
  - ▶ Ozone formation
  - ▶ Increased air pollution
  - ▶ Increased GHG emissions
- **Increased Energy Use**
  - ▶ 5 – 10 % of electricity demand is to cool heat islands effects
  - ▶ 1.5 – 2.0% E demand ↑ for every 1 °F ↑ in the summer
  - ▶ Longer peak periods; pressure on E grid; brownouts, blackouts
- **Water Quality**
  - ▶ Warmer water runoff = ecological shock in waterways
  - ▶ Increased water runoff = more pollutants in waterways
- **Human Health**
  - ▶ Respiratory difficulties
  - ▶ Heat cramps
  - ▶ Heat exhaustion
  - ▶ Non-fatal heat stroke/sun stroke
  - ▶ Heat related mortality



# Trends in U.S and Global Temperatures



# Mitigation Strategies



- Communities can take medium to long-term action through community planning and infrastructure to reduce urban heat islands and achieve multiple benefits.
  - Trees and Vegetation
  - Green Roofs
  - Cool Roofs
  - Cool Pavements

# Mitigation Strategy

## Cool Roofs



- Cool roofing products are made of highly reflective and emissive materials that can remain approximately 50 to 60°F (28-33°C) cooler than traditional materials during peak summer weather.
  - Low-sloped roofs
    - Coatings
    - Single ply membrane
  - Steep-sloped roofs
    - Asphalt shingles
    - Metal roofing
    - Tiles
    - Shakes



# U.S. EPA Heat Island Reduction Program



## Program Objective

- Communicate and stakeholder build capacity heat island science, impacts, and programmatic opportunities
- Encourage heat island mitigation implementation through voluntary and regulatory programs and policies

## Heat Island Community - Stakeholders

- Policymakers, program designers and program implementers (e.g., cities, NGOs)
- Researchers/academia
- Industry, developers of new technology
- General public (e.g., K-12 students and teachers, coaches)
- Media

## Topics of Interest

- Heat island science, modeling, and measurement
- Innovative mitigation technologies in areas such as cool pavements, cool roofs, green roofs, and trees and vegetation
- Implementation case studies describing program design, challenges, stakeholder involvement, funding streams





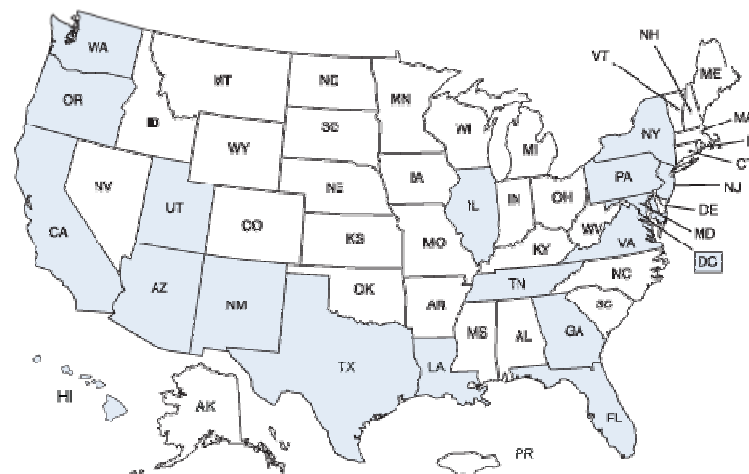
# Heat Island Program Resources

- **Website**, features include basic information on heat island topics, calendar of events, heat island newsroom, science corner and a variety of resources, <http://www.epa.gov/heatislands/>
- **Database**, provides info on more than 75 local and statewide initiatives to reduce heat islands and achieve related benefits
- **Compendium of Strategies: Reducing Urban Heat Islands**, provides an overview of latest science, mitigation strategies, case studies, and recommendations for additional resources, <http://www.epa.gov/heatislands/resources/compendium.htm>
- **Webcasts**, regular online meetings cover topics such as local/regional urban heat island programs, new scientific findings, and upcoming meetings [www.epa.gov/heatislands/resources/webcasts.htm](http://www.epa.gov/heatislands/resources/webcasts.htm)
- **MIST** (Mitigation Impact Screening Tool), tool that estimates the impacts of the urban air temperature, ozone, and energy consumption
- **Listserv**, to sign up, email [EPA\\_heatisland\\_subscribe@icfi.com](mailto:EPA_heatisland_subscribe@icfi.com)



# Examples for our Database?

- Actions listed in the database are some efforts underway to cool communities while saving energy, reducing greenhouse gas emissions and improving air quality
- Each entry in the database includes a description of the activity, its current status, and a link to a website (if available) for more information.
- The database can be searched by:
  - Clicking on U.S. map (diagram on right)
  - State and locality
  - Initiative Type
  - Strategy



[http://yosemite.epa.gov/gw/statepolicyactions.nsf/webpages/HIRI\\_Initiatives.html](http://yosemite.epa.gov/gw/statepolicyactions.nsf/webpages/HIRI_Initiatives.html)

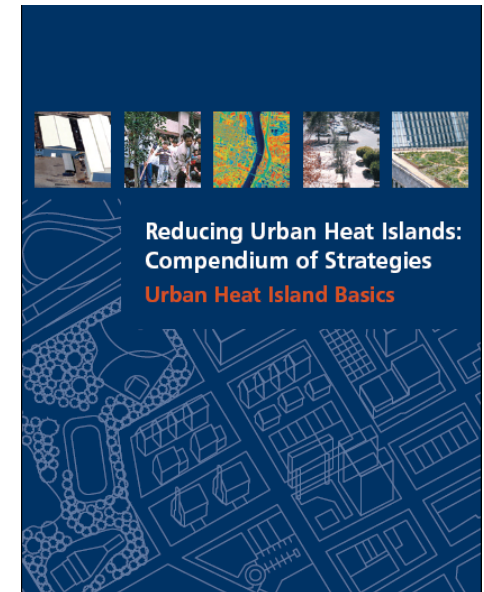
# Compendium



## Reducing Urban Heat Islands: Compendium of Strategies

- Provides an overview of latest science, mitigation strategies, case studies, and recommendations for additional resources
- Chapters
  - Heat Island Basics
  - Trees and Vegetation
  - Green Roofs
  - Cool Roofs
  - Cool Pavements
  - Heat Island Reduction Activities

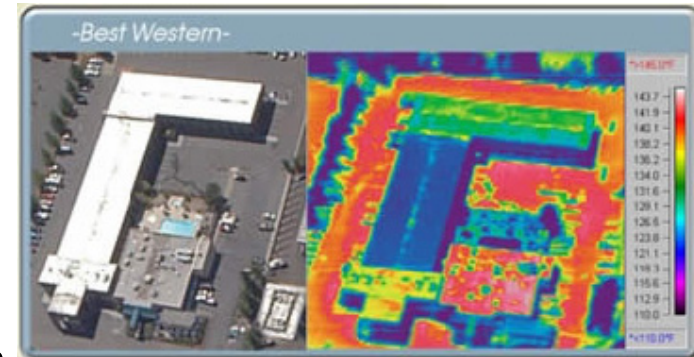
[www.epa.gov/heatislands/resources/compendium.htm](http://www.epa.gov/heatislands/resources/compendium.htm)



# Compendium of Strategies: Cool Roofs Chapter



- Provides detailed information that mitigation program organizers can use to understand, plan, and implement cool roofing projects and programs.
- Chapter discusses:
  - Roofing properties that help to mitigate urban heat
  - Types of cool roofing
  - Benefits and costs
  - Measurement and certification of cool roof products
  - Installation and maintenance of cool roofs
  - Tools and resources



Courtesy of Kelly Roofing

# Contact Info



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U.S. EPA Heat Island Reduction Program Website

- [www.epa.gov/heatislands](http://www.epa.gov/heatislands)

Sign-up for Heat Island Reduction Program Email Announcements

- <http://www.epa.gov/heatisld/admin/listserv.htm>