

# APEC Knowledge Sharing Platform (KSP) Workshop Task SB-3: Smart Buildings- Cool Roofs Demonstrations

**Cary Bloyd**  
Energy and Environment Directorate  
Pacific Northwest National Laboratory  
Cary.Bloyd@pnnl.gov

**Marc LaFrance**  
Buildings Technology Program  
Office of Energy Efficiency and Renewable Energy  
marc.lafrance@ee.doe.gov

**Kaohsiung, Chinese Taipei**

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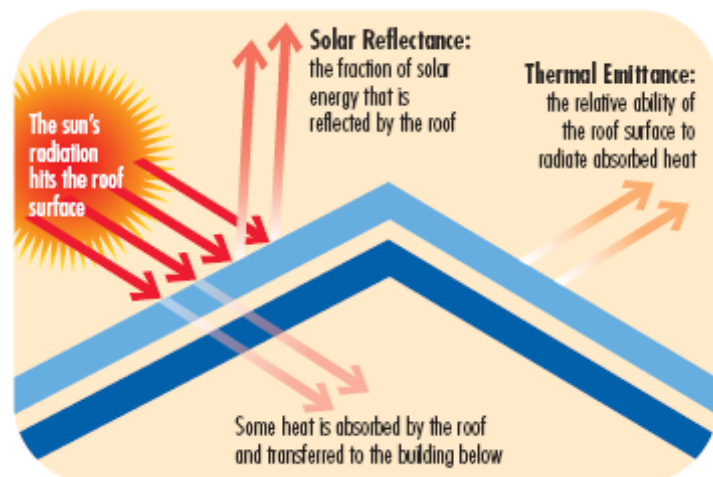


CRRC only looks at **surface** properties:

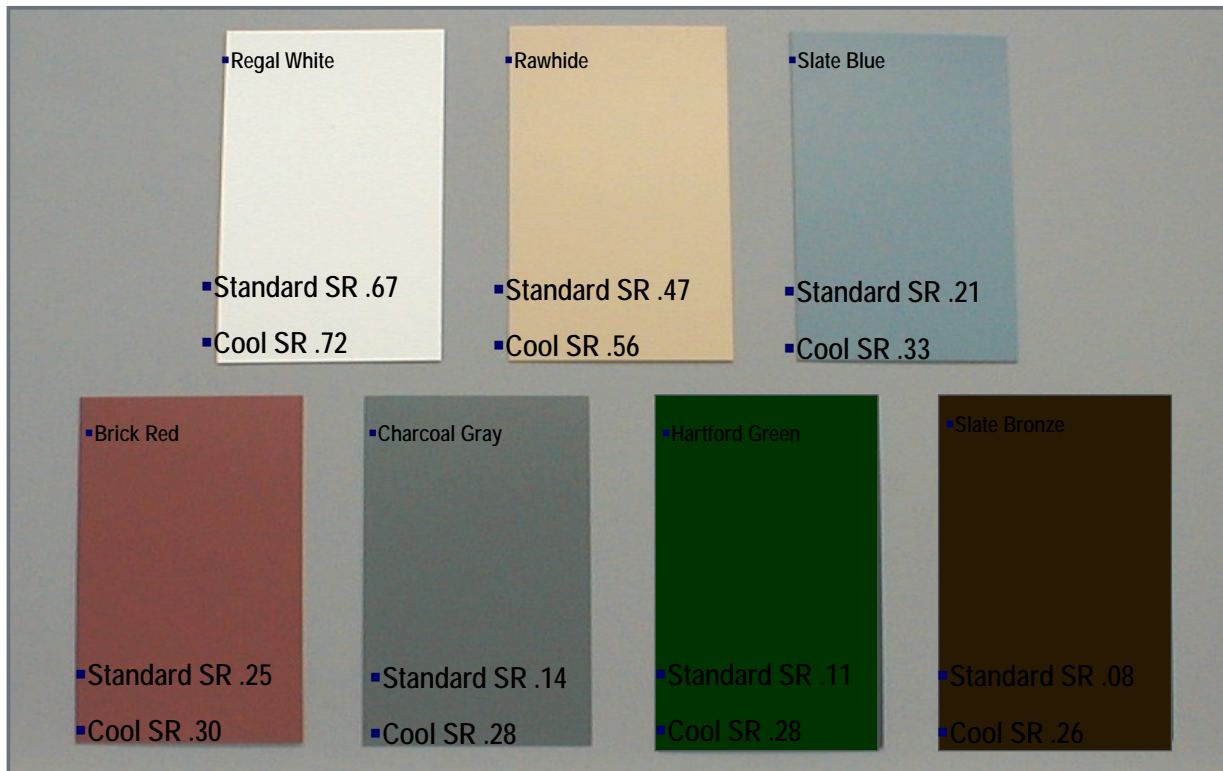
- Solar Reflectance
- Thermal Emittance

CRRC does **not** set minimum requirements

## What is a Cool Roof?



# Not All Cool Roofs are White



## Buildings Level

- Key Accomplishments:
  - Cool Roof Selection Guide
  - Cool Roof Calculator
  - DOE Cool Roof Policy
- Key Upcoming Work
  - Aged Rating Protocol
  - Advanced Materials

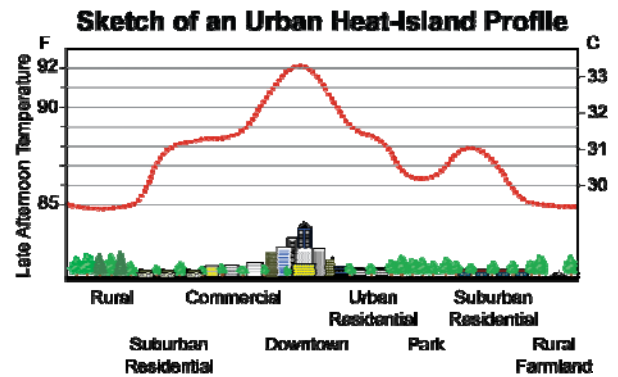


81°C

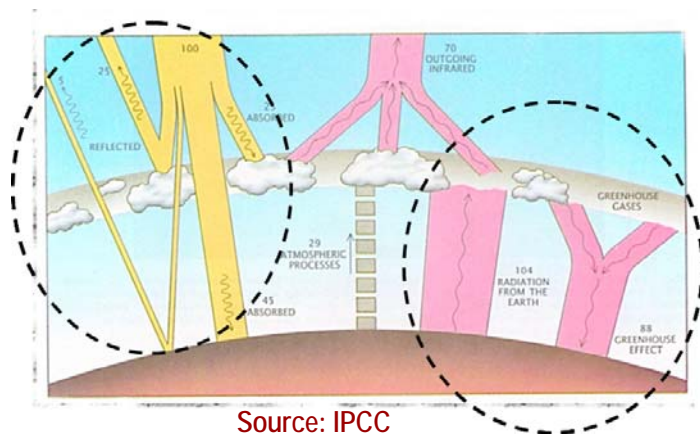


34°C

- Key Accomplishments:
  - Major Literature Review
  - Scoping study for validation work
  - Tentative plan for San Jose demonstration
  - Potential to reduce peak electricity by 10 – 15 percent

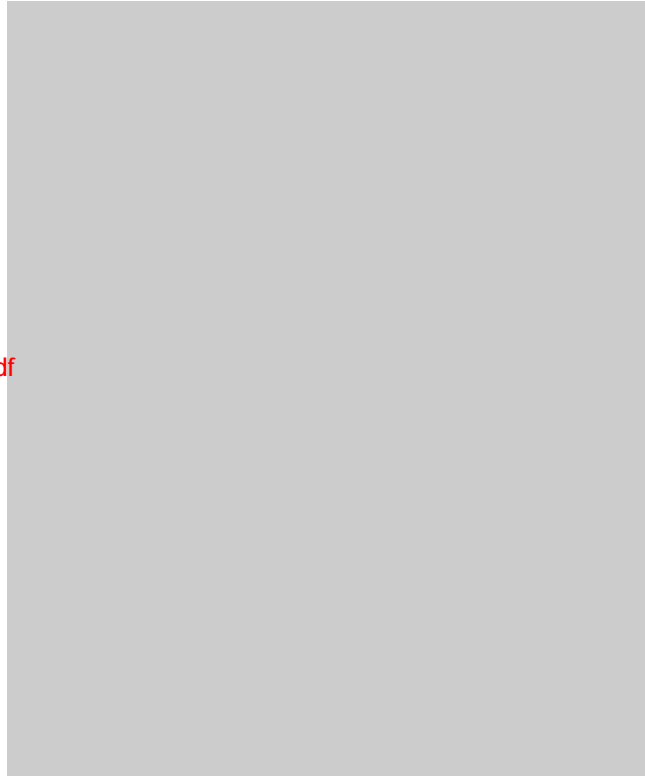


- Key Accomplishments:
  - Peer Review Panel
- Key Upcoming Work
  - Validation of Global cooling models
  - **India Project**



- Potential Carbon Mitigation: CO<sub>2</sub> offset for cool roofs and cool pavements = 44 GT CO<sub>2</sub>  
(key researchers: Rosenfeld, Akbari, Menon)

- <http://www1.eere.energy.gov/femp/pdfs/coolroofguide.pdf>



## Roof Savings Calculator

- Collaboration by ORNL and LBNL with funding from DOE and CEC and supported by EPA
- Provides cool roof assessments and advanced roof options
- Runs full simulations
- See [RoofCalc.com](http://RoofCalc.com)

### Roof Savings Calculator (RSC)

Beta Release v0.7

Oak Ridge National Laboratory  
Lawrence Berkeley National Laboratory

#### Introduction

The Roof Savings Calculator was developed as an industry-consensus roof savings calculator for commercial and residential buildings using whole-building energy simulations. It is built upon the DOE-2.1E engine for fast energy simulation and integrates AtticSim for advanced modeling of modern attic and cool roofing technologies. An annual simulation of hour-by-hour performance is calculated for the building properties provided based on weather data for the selected location. Annual energy savings reported are based upon heating and cooling loads and thus this calculator is only relevant to buildings with a heating and/or cooling unit.

#### Roof Savings Calculator

To begin, please select from the following options:



# Cool Roofs More Effective in Hot Developing Economies - Example

Key Driver	USA	India
Climate	Moderate	Very Hot
Insulation Levels	High	Low
Roof Configuration	Flat and Steep	Mostly Flat
Conventional Roof	Black on commercial, Asphalt on residential	Concrete Slab
Solar Reflectance Improvement Potential	Flat SR 10 to 60+ Steep SR 15 to 30+	All SR 20 to 60+
Labor Cost	High	Low
NET IMPACT	Mostly cost effective for new construction on commercial buildings	Can be cost effective for all existing and new buildings, and will provide comfort for non-conditioned buildings - avoid future conditioning.

## International Activities

- Active projects
  - APEC Energy Smart Communities Initiative, SB2 APEC Building Material Test Center (Thailand), SB3 Cool Roof Demonstrations
  - Under the Clean Energy Ministerial, the **Cool Roofs and Pavements Working Group** was formed as a subgroup with the Global Superior energy Performance Partnership (GSEP)
  - The Global Cool Cities Alliance is coordinating the activities of the Cool Roofs Working Group
  - APEC Cool Roof Project by Climate Asia, expected Nov 2011
  - Bi-lateral Agreement with China on cool roofs, Clean Energy Research Center, Study on impacts with PV and Green Roofs
  - Building Envelope Workshop in Brazil with ABNT, November 2011
  - Cool roof demos in India
  - Global Cooling Validation project in India
  - Recruiting international partners for ISO test standards