

COOL ROOFS WORLDWIDE

SIMPLE SOLUTION FOR CURBING BUILDING'S HEAT

In 2022 the [Million Roofs Challenge](#) will announce the winner among 10 finalists already identified. *Million Roofs Challenge* is a global competition aimed at rapidly scaling up the deployment of highly solar-reflective *Cool Roofs* in countries suffering heat stress and lacking widespread access to cooling services.

A *Cool Roof* is a white roof reducing indoor temperature, which results in a reduction in electricity consumption and carbon footprint. The use of cool roofs involves applying coatings and materials to increase the solar reflectivity to maximize the amount of incident solar radiation that is reflected and that is emitted back into the atmosphere. Simply painting the roof white goes a long way towards increasing the roofs' reflectivity and this prevents absorbed solar radiation being conducted to the building below as heat.

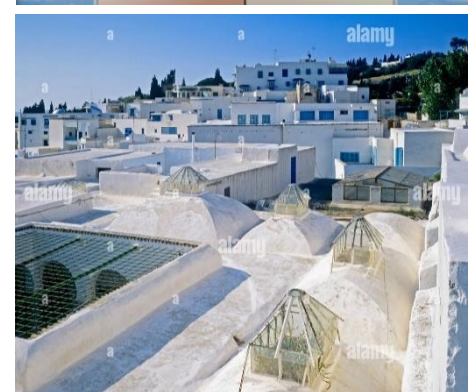
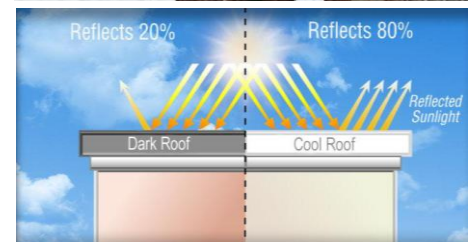
Organized by the [Kigali Cooling Efficiency Program](#) in collaboration with the [Global Cool Cities Alliance](#), the [Sustainable Energy for All](#) initiative and [Nesta Challenges](#), the Million Roofs Challenge awarded the teams that have demonstrated the best sustainable and transferable model for rapid deployment of *Cool Roofs*.

The finalists are managing initiatives in South Africa, Niger, Cote D'Ivoire, Senegal, Mexico, Bangladesh, Rwanda, Indonesia, Philippines and Kenya. [The website presents the main features of their practices](#) and the articles published in the [news section](#) allow to know more about their results.

These award-winning practices show that the simple, low-cost *Cool Roof* solution is gaining popularity all over the world, generating impacting results. The cool-roof idea is simple, while dark roofs absorb heat, making nearby surroundings hotter, white roofs reflect heat, making scorching hot days a few degrees cooler. Most of the roofs in the world are dark-colored and reflect less than 20 percent of incoming sunlight. A new white roof reflects about 80 percent of sunlight.

The use of white color to cover the roofs of entire villages to reduce the concentration of heat while building urban landscapes of high aesthetic value is part of the millennial construction traditions of peoples settled in areas of southern European and North African countries characterized by high temperatures. Today again, compared to most re-roofing alternatives, a white roof system provides an efficient, high-quality solution at a fraction of the cost.

Studies have shown that in a building without air conditioning, replacing a dark roof with a white roof can cool the top floor of the building by 2 to 3 degrees Celsius and that the net annual energy use for a building with air conditioning is reduced by up to 20 percent upon raising the solar reflectance of the roof. Additionally, concentrated deployment of cool roofs in a single area is associated with community-wide benefits, reducing the average external ambient temperature through a reduction in the [urban heat island effect](#).



By minimizing the amount of heat generated by solar energy absorbed by buildings, reflective building surfaces reduce the demand for cooling energy for those that can afford it, while also providing a sustainable passive cooling solution for the billions of people who do not have the economic means to access mechanical cooling options, in poor rural areas and urban slums. Furthermore, the deployment of reflective materials creates sustainable job and skills opportunities for low skilled workers in both rural and urban contexts.

Installing a solar-reflective white roof in place of a dark roof can have a positive impact on single buildings and their occupants, on cities and global environment by:

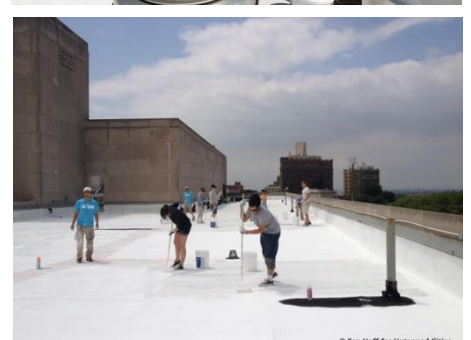
- Improving indoor thermal comfort for homes or spaces that are not air-conditioned, promoting occupant health.
- Decreasing air conditioning needs and reducing the energy required for interior cooling.
- Lowering overall maintenance costs and extending roof life. Decreasing roof temperature many cool roofing types require little to no maintenance and *Cool Roofs* typically have a longer lifespan than conventional roofing systems.
- Reducing the energy required and related power plant greenhouse gas emissions.
- Reducing local air temperatures in dense urban areas and mitigating the *urban heat island effect*.
- Increasing the air quality. Decreasing urban air temperatures, *Cool Roofs* slow the formation of ground level ozone, the primary component of smog, that can aggravate respiratory illness.

Considering all positive impacts, the interest in using these technologies has been expanding all over the world, both to cope with the serious problems generated everywhere by climate change and to reduce large quantities of greenhouse gas emissions in the atmosphere generated by the use of current methods of air conditioning in houses and buildings.

[Sustainable Energy for All](#), for example, reports the impacting results achieved by [New York Cool Roofs](#) in United States. Since 2009 this initiative, which is part of the city's goal of achieving [carbon neutrality by 2050](#), has coated more than 10 million square feet of rooftops throughout the city. Managed by the NYC Department of Small Business Services and the Mayor's Office of Sustainability, it achieves several goals: lowering indoor temperatures by installing energy-saving reflective rooftops, keeping neighborhoods cooler by installing clusters of reflective rooftops and providing local job seekers with training and work experience. Installations are provided at no-cost to nonprofits organizations providing public, cultural, or community services and for select cooperatively-owned homes. Privately-owned buildings can receive installations at minimal cost.

In 2017 the Government of the National Capital territory of Delhi in India published the [Design Manual Cool Roofs for Cool Delhi](#) in order to provide low-tech, low-cost solutions to citizens of Delhi for cooling their homes and reducing greenhouse gas emissions. *Cool Roofs* are presented as an innovative effort to reduce cooling costs, energy usage and also as one of the quickest and low-cost way for reducing global carbon emissions. In 2021 the National Disaster Management Authority of India published the [Guide Alternative Roof Cooling Solutions](#), which indicates the *Cool Roofs* as one of the technical solutions to reduce the rise in temperatures in houses and the heat island effect in urban areas having a severe impact on people's health.

Cool Roofs are also being implemented in the European countries and the [European Cool Roofs Council](#), founded in 2011, develops scientific knowledge and research on cool roof technologies and promote their use. In this context, studies and research are also underway to replace



bituminous membranes and white paints produced from petroleum derivatives with ecological materials based on vegetable oils and resins in the current market.

By recovering ancient construction traditions and improving technologies to adapt them to current needs, *Cool Roofs* today represent a solution that can make a great contribution to addressing the challenges of environmental sustainability. A wide range of studies and practical guides is available on the internet to explore the potential of these solutions, in order to adapt them to different contexts where there is an interest in experimenting and adopting their use.

To know more

[Finalists announced by the Million Roofs Challenge website](#)

[Finalists 2021 - Cool Roofs Challenge](#)

[Million Roofs Challenge partners](#)

[Cool Roofs Fact Sheet in Cool Roofs Challenge website](#)

[Million Roofs Challenge - handbook for implementers](#)

[Practical Guide - Cool Roofs Challenge](#)

[Cooling Rwanda in Cool Roofs Challenge](#)

[Brac University – Cool Roofs in Bangladesh](#)

[Cool Roofs in Bangladesh and Indonesia in Sustainable Energy for All website](#)

[CoolRoofers in Senegal in Cool Roofs Challenge](#)

[Million Cool Roofs in Mexico - Cool Roofs Challenge](#)

[Million Cool Roofs Challenge in Arup website](#)

[New York Cool Roofs Initiative in United States](#)

[Cool Roofs Implementation Guide](#)

[Article in Metreroofproducts website](#)

[Cool Roofs in Grist.org](#)

[Cool Roofs en ScienceDirect website](#)

[Design Manual Cool Roofs for Cool Delhi](#)

[Alternative Roof Cooling Solutions India](#)

[Case Studies and References in coolroofcouncil.eu](#)

