



IMPACT AREA:  
SUSTAINABILITY

# COOL ROOFS

A **CITIES OF SERVICE** BLUEPRINT

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## COOL ROOFS

Cool Roofs is a high-impact service strategy in which the mayor's office engages volunteers to take action to conserve energy, one rooftop at a time.

The logic behind Cool Roofs is simple: coating rooftops white reflects the sun's heat, helping the building maintain its internal temperature and thereby reducing energy usage. Reductions in energy demand, in turn, reduce greenhouse gas emissions and smog, lower the risk of brownouts and blackouts, and cut energy costs during hotter months. This initiative is a great opportunity for mayors to raise the visibility of their sustainability objectives and recruit partners that support the city's goals in that area.

## BACKGROUND

Given that air conditioning constitutes approximately 5% of electricity used in the U.S. and upwards of 40% of daily use during hotter months, reducing its usage is an effective way to reduce energy consumption. The benefits of lowering energy usage improve the environment through reduced greenhouse gas emissions as well while also helping consumers of energy save on cooling costs. A feasible way to achieve these outcomes is to coat rooftops in white, transforming them from absorbent to reflective surfaces.





# REQUIRED ELEMENTS

- 1** **Mayor's office engages the city's buildings department - or other relevant city agencies - and local partnering organizations to:**
  - Establish responsibility for volunteer recruitment and management;
  - Plan for project and site management - including safety management;
  - Ensure that appropriate liability insurance is in place; and
  - Identify sources of technical expertise pertaining to rooftops and special reflective coatings.
  
- 2** **Mayor's office secures resources to acquire all materials needed for the initiative (e.g., reflective coating, coating supplies such as brushes and rollers).**
  
- 3** **Volunteers paint roofs with a special reflective coating.**
  
- 4** **Mayor's office collects and reports impact for each building coated through the Cool Roofs initiative. Required metrics include:**
  - Number of roofs and square footage coated
  - Reduction in average electricity used per month by building size (square footage and number of units)
  - Reduction in average electricity costs per month by building
  - Reduction in the carbon footprint of each building, based on data related to each building's energy usage (Note: for each square foot of roof coating applied, carbon emissions are reduced at a rate proportional to the building's energy usage - in New York City, this averages about 0.5 lbs reduction per year per square foot of roof coated for buildings that are seven stories or less. As this effect is dependent on the height of the building, shorter buildings receive greater benefits than taller buildings).





# EXECUTING THE PLAN

## DEVELOPING THE INITIATIVE PLAN

**1** Conduct an initial planning meeting with all initiative partners. Good potential partners will be organizations with interests in areas such as sustainability, energy conservation, or affordable housing. The planning meeting is an opportunity to:

- Introduce partners and clearly define roles and expectations;
- Share or develop goals regarding the number of roofs and square footage covered by the Cool Roofs initiative; and
- Discuss the city services that will be made available.

**2** Determine the number of volunteer hours needed to reach the stated goals (e.g., square footage of roofs to be coated) and identify potential sources of volunteers. Cool Roofs can be positioned as an opportunity for both individuals and groups (e.g., corporate groups, veterans groups, job training programs in clean energy fields). Volunteer hours may vary from city to city depending upon various factors, including coating materials used and the weather. Some roofs may also have a maximum occupancy requirement, which may limit the number of volunteers the roof can accommodate at any one time. (See the Resources section for a sample Volunteer Run of Day.)

**3** Develop a budget to cover materials and supplies (see the Resources Section for a sample Budget and Materials List). Investments by building owners, in-kind donations, and discounts should be used where applicable. Supplies might include but are not limited to:

- Coating supplies: brooms, hose lengths, nozzles, extension poles, roller heads, mini rollers, power washers, dust pans, wheel tape measures, gloves, suit protectors, special coating, primer, paint screens, drop cloths, protective shoe coverings (see Resources section for lists of coating manufacturers).
- Volunteer/participant supplies: bottled water, sunglasses, sunblock, cups, event/sponsorship t-shirts or baseball hats.





## 4

### Create a project timeline, taking into consideration the following:

- Cool Roofs is weather dependent, requiring a minimum of 50 degree and a maximum of 90 degree weather, and dry forecasts for a minimum of 2-3 days post-coating.
- All roofs must be cleaned before they can be coated. This will tend to add an additional day to the timeline. Primer may be required for rubber-coated roofs.
- Two layers of white coating are required. Depending on progress, materials used, and weather, it is possible to apply both coats in one day, stopping for lunch. But, there are times when it might be necessary to divide the coating between two days.

## 5

### Develop a communication plan to mobilize volunteers/workers and inform, update, and confirm coating schedules and logistics.

## 6

### Determine what building owners will be responsible for as a condition of participation (e.g., paying for supplies, insurance), as well as information they must provide in order to track metrics.

## IDENTIFYING BUILDINGS

## 1

### In coordination with the city's buildings department or other relevant city agencies, identify which buildings are candidates for coating (see Resources section for a sample Site Assessment Checklist). Possible criteria include:

- Whether the building is public or private, as privately-owned buildings are less likely to need the help of a volunteer-supported initiative;
- Building height, as the reduction in energy consumption tends to be lower for taller buildings;
- Roof accessibility, to assure safety for volunteers and efficient movement of coating supplies;
- Square footage;
- Roof safety features (e.g., a protective parapet around the roof);
- Roofing materials used (e.g., gravel roofs can't be coated);
- Warranty status of target roofs (some roof warranties prohibit coating); and
- Current A/C usage.





- 2** Create and implement an outreach and communication plan to connect with building managers, supervisors, or other relevant partners to encourage them to engage their building community. As part of this, building residents and/or employees can be encouraged to join the volunteer effort.

## COORDINATING CITY SERVICES

Consult with the buildings department and other city agencies to develop a menu of city services that can be offered to facilitate the initiative. City services are intended to complement the volunteer efforts, not replace them, and may include:

- Providing safety inspectors and conducting inspections;
- Conducting workplace safety training for volunteer project managers;
- Lending safety equipment and any coating supplies;
- Cleaning rooftops;
- Creating safety parapets (wall-like barriers near the edge of a rooftop); and
- Providing trash collection on coating days.

## MANAGING FOR SAFETY ON ROOFTOPS

Safety considerations should be given significant attention, including developing a process for conducting safety trainings for volunteers. Each coating project will need to have a point-person on the ground, or site leader, to greet/direct volunteers, manage the day's various logistical components, and ensure proper safety protocols are followed. Site leaders should be trained – typically through an OSHA course – in order to ensure safe working conditions during a roof coating project. These trained leaders can also provide day-of training for volunteers. Further, all coatings must be preceded by a safety inspection and cleaning and washing of the rooftop.

In addition, the mayor's office will need to address any legal hurdles related to allowing volunteers on rooftops across the city. A great solution to this is to find a nonprofit partner that has general liability insurance – with adequate coverage for any potential accidents – to ensure that volunteers are allowed on rooftops. In New York City, a local nonprofit with construction experience was able to provide this insurance.





To help manage volunteer expectations and set clear rules for safety, your city might find it helpful to create a Volunteer Safety Manual. This manual can include sample coating schedules, tips for volunteers to help them remain safe, and other information that volunteers might find helpful. See the Resources section for a sample Volunteer Safety Manual.

## SECURING RESOURCES FOR COOL ROOFS

**Cool Roofs is a compelling fundraising opportunity for mayors' offices to solicit support from foundations and corporations with a commitment to the city and energy conservation. It is also an attractive opportunity for any corporation interested in funding a day of service for their employees. For instance, a company may sponsor the purchase of all the materials and equipment required for the initiative while also having their employees volunteer to do the coating as a day of service. This approach has proven successful in New York City, where 16 corporate partners have provided cash and in-kind donations, as well as 30% of the volunteers who participated in roof coatings.**

For resources to expand the city's capacity to manage the initiative, consider partnering with a national service organization that has expertise in the issue area and is willing to assign an AmeriCorps member (or other national service participant) to support the initiative. Pittsburgh worked with a Student Conservation Association Green Cities Fellow Corps member to manage the day-to-day tasks for their Cool Roofs initiative.

Local businesses, national corporations with local stores, and community foundations are also strong prospective funders for Cool Roofs. When public buildings and housing are targeted, the initiative may be funded by a combination of corporate sponsorships, vendor discounts or in-kind donations, and other private donations. When privately owned buildings are involved, the building owners may be asked to pay for supplies and other costs.

**Proposals for prospective funders should describe the opportunity for support and how the funds would be used. The elements of a typical proposal include:**

- Description of the Cool Roofs initiative
- How this initiative would positively impact the city and the environment (e.g., reductions in energy demand, electricity costs, greenhouse emissions and smog)
- Proposed breakdown of grants and how funds would be used
- Metrics that would be collected as part of the initiative







- Information on Cities of Service (this is especially helpful for national organizations)
- Recognition plan for the donor (e.g., logo on volunteer t-shirts, branding on your city's service website)

After the project is completed, be sure to provide donors with feedback on the results, including photos and metrics information. In some cases, private funders may not want to provide funding directly to city governments. In those instances, the mayor's office should identify an appropriate nonprofit partner to receive the funds and coordinate disbursements.

## PREPARING THE SITE AND COATING ROOFS

- 1** Work with building managers, supervisors, or other relevant parties to schedule coating dates and discuss logistics and needs.
- 2** Order required materials and coordinate with the building manager, supervisor, or owner to ensure secure storage of materials prior to coating crew/execution day, often through the partner responsible for site management.
- 3** Before the coating day, inspect rooftops for safety, ensure that rooftops are washed and clean, set up safety equipment (e.g., 2-3 foot parapets), and divide rooftops into coating blocks that can be worked on by volunteers (e.g., 100 square foot coating blocks). As mentioned, safety should be addressed across all areas, but at least one partner should assume accountability for safety liability.
- 4** Mobilize coating crews on scheduled coating days and ensure proper supervision and safety measures are used.
- 5** Volunteers coat rooftops under the direction of the individuals and organizations responsible for site and volunteer management.
- 6** Make adjustments based on progress and weather, including a backup plan for weather changes.





## RECOGNIZING AND THANKING VOLUNTEERS

There are numerous ways to recognize volunteer participants who contribute to the Cool Roofs initiative. Following-up with participants after the event is encouraged. For instance, consider sending volunteers a thank you card/letter with the details of their coating day (e.g., the site, the supervisor(s), number of square feet coated, and an estimate in the amount of energy to be conserved). Before and after pictures of rooftops and a summary of overall energy savings from the initiative may also be included.





# MEASURING IMPACT

**Collecting data on the impact of each participating building is critical. The mayor's office or its designated partners are tasked with tracking and publicly reporting the following required metrics:**

- Number of roofs and square footage coated;
- Reduction in average electricity used per month by building size (square footage and number of units);
- Reduction in average electricity costs per month by building; and
- Reduction in the carbon footprint of each building, based on data related to each building's energy usage (Note: for each square foot of roof coating applied, carbon emissions are reduced at a rate proportional to the building's energy usage. In New York City, this averages about 0.5 lbs reduction per year per square foot of roof coated for buildings that are seven stories or less, such that coating 1 million square feet of roofs will reduce 227 metric tons of carbon for the city. As this effect is dependent on the height of the building, shorter buildings receive greater benefits than taller buildings).

To collect impact metrics showing reductions in electricity used, costs, and carbon footprint, cities will need to first assess the baseline numbers for these three categories for all the buildings chosen for the initiative. After the initiative has been implemented, follow-up metrics in these categories should be collected to track the changes and determine the impact. Data for electricity consumption (and sometimes, costs) can often be collected from building superintendents or managers.

Partners responsible for overseeing coating days should submit "before" and "after" photos of rooftops along with photos of volunteers/participants.





# OPTIONAL ELEMENTS

## TARGET A SPECIFIC TYPE OF BUILDING

A city may wish to focus its coating efforts – along with the related benefits for the building in terms of reduced greenhouse emissions and energy costs – on a specific type of building that reflects city priorities. For example, the mayor’s office may choose to target low-income housing, schools, or nonprofits.





# COOL ROOFS IN ACTION

## NEW YORK, NY

Cool Roofs was first implemented in New York City in 2010 through a collaboration of NYC Service and the NYC Department of Buildings. NYC Service partnered with the Community Environmental Center (CEC), which recruited volunteers and worked with Green City Force to coat over one million square feet of rooftops. CEC managed the volunteer process and Green City Force used the initiative as a learning and work opportunity for its job training participants of mostly urban - disadvantaged youth who were preparing for careers in the clean energy economy. As of fall 2013, over 4 million square feet of New York City rooftops had been coated.

Below are some key lessons learned from the first years of implementation:

- Allot adequate time to discuss execution plans and logistics, which requires frequent meetings with multiple players.
- Set ambitious goals.
- Clarify roles and responsibilities on an ongoing basis.
- Be mindful of the weather-dependent nature of the initiative and develop schedules accordingly, allowing for postponement and rescheduling.
- Preempt logistical challenges with backup plans (e.g., if materials do not arrive in time for scheduled coating or if materials cannot be stored safely on rooftops prior to a day of coating).
- Launch a PR campaign to ensure broad participation of volunteers and suitable buildings (see FAQs under Resources/Technical guidance for rooftop specifications). For example: allowing local companies to request that their roofs get coated can help reduce energy consumption for buildings in both the public and private sectors and build broader support for the initiative.
- Identify city or partner organization staffers who are available during nights and weekends (outside of corporate participants who might be available on weekdays as part of a day of service), since many volunteers may only be able to participate on weekends.





## PHOENIX, AZ

**The City of Phoenix launched its Cool Roofs initiative in 2013, with a goal of coating 70,000 square feet of city-owned rooftops to reduce building carbon emissions by over 70 tons in the first year. The Mayor's Office and City Manager's Office helped select coating sites by collaborating with multiple city departments to identify buildings that would benefit the most from Cool Roofs.**

Phoenix partnered with HandsOn Greater Phoenix (HOGP) and Keep Phoenix Beautiful to assist with volunteer recruitment and management. Individual volunteers or groups registered for projects through HOGP, which provided a lead volunteer to manage each project. HOGP also purchased and secured all supplies for the initiative and is then reimbursed by the City of Phoenix. Additionally, to engage youth in Cool Roofs projects, Phoenix partnered with Youth Build - a program for low-income young people aged 16-24 working toward their GEDs or high school diplomas while learning job skills.

A lesson learned for Phoenix was to modify the coating schedule based on annual weather patterns. Coating projects are not scheduled during the summer months as the area's extreme heat from the nearby desert can pose dangers to volunteers. To use this time effectively, the city solicits feedback from partners and volunteers during those months in order to refine and improve the program in time for the fall coating season.





## **PITTSBURGH, PA**

**Cool Roofs was first implemented in Pittsburgh in 2013 through a collaboration between servePGH (the Mayor's Office of Service & Civic Engagement), the Mayor's Office of Sustainability and Energy Efficiency, and the Department of Public Works. In its first year, Cool Roofs aimed to coat approximately 50,000 square feet of city-owned rooftops, lowering the city's carbon emissions by an estimated 50 tons.**

To implement Cool Roofs, servePGH worked with city agencies and nonprofit partners to design the initiative structure, recruited and managed volunteers, and managed the public relations campaign and media inquiries. The city's Department of Public Works engaged groups of 10-20 volunteers - all of whom received safety training and instruction - to clean and coat the roofs. The Student Conservation Association supported the program by providing a year-long Green Cities Fellow Corps member who managed the day-to-day work of the initiative. The Pittsburgh Water and Sewer Authority provided water for volunteers.

**A lesson learned for Pittsburgh was to make coating supplies available to nonprofits and other public agencies at no-cost in order to expand the scale of the initiative. Through this setup, qualified organizations committed to:**

- Engaging volunteers to carry out the coating process; and
- Reporting impact information in exchange for in-kind materials and technical assistance.

This allowed the city to direct unused coating supplies to those in need while holding everyone accountable for measuring impact.





# RESOURCES

## Examples from NYC Service (City of New York):

- Communication to the public using social media: [facebook.com/nycservice](https://www.facebook.com/nycservice)
- Technical guidance:

## NYC Cool Roofs FAQs:

- <http://on.nyc.gov/1aNjT4L>

## NYC Cool and Green Roofs Manual:

- <http://bit.ly/1cefsh3>

## Sample Documents from servePGH (City of Pittsburgh):

- Volunteer Manual: <http://bit.ly/1fheEb3>

## Includes “run of day,” safety procedures, project background information, and more

- Budget and Materials List: <http://bit.ly/15fayRP>
- Site Assessment Checklist: <http://bit.ly/18YK97Y>
- Volunteer Waiver: <http://bit.ly/15faSQt>
- Implementation Timeline: <http://bit.ly/1cedaOW>

## Roof Coating Manufacturers Association:

- [roofcoatings.org](http://roofcoatings.org) (list of manufacturers)

## Columbia study on the science of Cool Roofs:

- <http://bit.ly/1cehrlq>

**Database of State Incentives for Renewables & Efficiency is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency:**

- <http://www.dsireusa.org>







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**Cities of Service** is a national nonprofit that designs and supports the implementation of high-impact service strategies that can be widely replicated in cities worldwide. We provide technical assistance, programmatic support, planning resources, and funding opportunities. Cities of Service supports a coalition of nearly 200 cities whose mayors are committed to using citizen volunteers to solve local pressing challenges, from engaging mentors to help decrease high school dropout rates to increasing energy efficiency in buildings. We help coalition cities share solutions, best practices, and lessons learned, as well as spread awareness about their great work.

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