

# Implementing Green Roof Projects at the Local Level

Webcast Transcript

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# Webcast Agenda and Meeting Logistics

## Slide 1: Title Slide

Operator: Good afternoon. My name is Tasha and I will be your conference operator today. At this time, I would like to welcome everyone to the Implementing Green Roof at the Local Level Conference Call. All lines have been placed on mute to prevent any background noise. If you should need assistance during this call, please press star then zero and an operator will come back online to assist you. Thank you. Ms, Patel, you may begin your conference.

Neelam Patel: Thank you, everyone, for joining us today for EPA's webcast titled Implementing Green Roof Projects at the Local Level. This webcast is being hosted on behalf of the EPA, the U.S. EPA Heat Island Reduction Program, as well as the U.S. EPA Local Climate and Energy Program.

## Slide 2: Webcast Agenda

Neelam Patel: Today, I will begin the webcast, Neelam Patel. I am the green – excuse me – the Heat Island Reduction Program manager and also a team member of the U.S. EPA Local Climate and Energy Program. I will introduce both of these programs, the concept of green roof and also webcast logistics.

Following my introduction, David Sailor, from Portland State University will be presenting the energy performance of Green Roof. Then we will have Jason Berner from the U.S. EPA talking about one of the significant environmental benefits of Green Roof, the Storm Water Management element. Following Jason, we will have Sarah Loveland from DC Greenworks discussing different Green Roof incentive programs that can be implemented at the local level, and also covering briefly some programs that describe the connection between NGOs part and – describing the connection between NGOs and local governments to help support Green Roof implementation. And lastly, we will have a live case study – we'll have Michael Brookshire from the city of Chicago talking about the different Green Roof initiative programs that the city of Chicago has and their success.

After all of these presentations, we will have a question and answer session and you'll hear more about this question and answer session shortly, but I would like to iterate at this time that you are welcome to submit questions at anytime using go – anytime throughout the webcast using GoToMeeting and it would be great if you could indicate the presenter that you would like to direct the question towards.

So I would like to turn it over to Nikhil from ICF International who will go through some of the GoToWebinar logistics.

## Slide 3: GoTo Webinar Software Logistics

Nikhil Nadkarni: So just a couple of quick logistical points here. You will be muted throughout the webcast to minimize background noise. The webinar is being recorded and the files will be posted and available in a few weeks at the URL you see on your screen. And if you have any logistical question and problems today, contact Lauren Pederson at [lpederson@icfi.com](mailto:lpederson@icfi.com). Next slide, please.

#### Slide 4: Questions (GoTo Meeting)

Nikhil Nadkarni: As Neelam mentioned, please submit questions, you know, throughout the webcast, using the GoToWebinar window. You should see a pane titled questions on the right side of the screen. You can type in your question and submit them by hitting Send. We will be collecting the questions, and as time permits, we'll be asking them at the end of the webinar. Be sure to direct your question towards a certain panelist, you know, just by including their name in the question. Next slide, please.

#### Slide 5: Optional Feedback (GoTo Meeting)

Nikhil Nadkarni: And at the end of today's webinar, a pop-up will appear with a couple of quick feedback questions. So please take a minute to fill those out, since your feedback will be most helpful. And that's all for logistics.

Neelam Patel: OK. Thank you, Nikhil.

# **U.S. EPA Heat Island Reduction Program and U.S. EPA Climate and Energy Program**

Slide 6: Title Slide

Neelam Patel: So, today's webcast, Implementing Green Roofs at a Local Level. The topic of Green Roofs is very important when it comes to heat island mitigation, and you'll hear more from David Sailor about that, specifically, shortly. But Green Roofs are also this – the ability of Green Roof to reduce the heat island effect also helps address climate and energy issues. So we really did want to, in conjunction – in partnership between the Heat Island Reduction Program and the Climate Energy Program bring to you information about Green Roofs so they can be implemented at the local level.

Slide 7: Outline

Neelam Patel: In my presentation, I will provide a brief overview of the heat island effect, a brief introduction to Green Roofs, talk a little bit about heat island implementation, and then talk about the resources from both our U.S. EPA Heat Island Reduction Program and our U.S. EPA Local Climate and Energy Program.

Slide 8: Heat Island Effect Overview

Neelam Patel: So starting off with, "What is a heat island?" So, the heat island effect is actually a micro scale phenomena. In dense built-up areas, the temperatures are much higher. In some cases, the temperatures in urban areas that are densely built-up can be as high as 9 to 27 degrees warmer than surrounding rural areas. So, the reason that we get this micro climate temperature increase in more densely built-up areas is because there's reduced vegetation, there's a lot of infrastructure, and the surface is a lot of roof and pavement. And the other issue is the design.

So the urban geometry, there is little room for air circulation to move that heat away from these areas and so we end up having the heat island effect.

Slide 9: Energy and Air Quality Impacts

Neelam Patel: Some of the impacts from these higher temperatures in densely built up areas is increased energy use in summers. So, the electricity demand can be 5 to 10 higher – 5 percent to 10 percent higher in areas that have the heat island effect, that exhibit the heat island effect. This, in turn, puts a stress on the electrical grid.

So with this increased energy (usage), there are other issues as well. So for example, there are increased greenhouse gas emissions from the energy source, so for example, if you're powering your city with a coal power plant, you are in turn – by having to use more electricity – you are in turn increasing greenhouse gas emissions that go out. There's also increased air pollution both from the power plants and also the higher temperatures increase the rate at which ground level ozone forms. So we do have impacts to both air quality and greenhouse gas emissions.

## Slide 10: More Impacts

Neelam Patel: Other impacts are related to water quality. There's two issues that I'd like to discuss with water quality. The first one is that the runoff in these densely built up areas is actually warmer and that leads to ecological shock in the waterways that receive the runoff water. And the second issue, that we'll hear more from Jason about, is that there is just more runoff from these – from areas that are densely built up. So many of the mitigation strategies cannot only reduce heat island effect but they can also reduce the amount of stormwater that is being runoff.

Other impacts include health impacts and there's many existing health conditions that can be exacerbated by higher temperatures. And there's also symptoms from high temperatures that can affect human health. One of the main things that we are concerned with is actually heat-related mortality in extreme heat events.

And because of the higher temperature, the higher maximum temperatures in densely built urban areas, there is the possibility of a higher heat related death. And this is something that heat island mitigation strategies can help reduce but we can also – an additional resource to help with that public health planning when it comes to (excessive) heat island is available through the link that you see on your screen. So there are many impacts from the heat island effect.

## Slide 11: Mitigation Strategies

Neelam Patel: So, what we focus on through our program is providing information on mitigation strategies that can reduce the heat island effect and have multiple benefits. Here on this slide, you can see that we have four main mitigation strategies that we support with scientifically sound information. Of these four, cool pavements is still an emerging technology but there is a – there are innovative technologies available for cool pavement. What I have done is focus only on Green Roofs for today's webcast but as you can see in the title of mitigation strategies, there is an appendix at the end of the presentation that briefly discusses each of these mitigation strategies.

## Slide 12: Green Roofs vs. Cool Roofs

Neelam Patel: I will focus quickly with a comparison of Green and Cool Roofs and then talk specifically about Green Roofs. So if a local government is looking at roofing as an option to mitigate heat island effect, there are two options, Green Roofs and Cool Roofs, and each one has different benefits. Today, I'll focus on Green Roofs. In some cases the initial cost for Green Roofs can be higher compared to Cool Roofs, but the Green Roofs offer additional environmental benefits that you'll hear about through the webcast.

## Slide 13: What is a Green Roof?

Neelam Patel: So now, I'm moving into "What is a Green Roof?" And I think through these pictures on the slide you can see that a Green Roof is very much having a vegetative surface on a building, and these are great and densely built-up areas where there's lots of buildings and you can – excuse me – yes, lots of buildings, and you can see here in these pictures that this Green

Roof breaks up the built infrastructure by adding vegetation and that lack of – by adding vegetation, we're addressing one of the causes for the heat island effect.

So, the types of Green Roofs are extensive Green Roofs and intensive Green Roofs. Extensive Green Roofs require less soil and there's less maintenance. Intensive Green Roofs, on the other hand, have larger plant growth and a greater soil base that's required. And they also require more maintenance. So you'll hear more about the different projects and examples through the webcast today to get a sense of what could work if you were interested in implementing Green Roofs in your community.

#### Slide 14: Green Roofing Market

Neelam Patel: And so, I just would like to take a second to talk about the Green Roofing market. There are many, many roofs so – and lots of square feet of roofing which is being replaced. So, even if a fraction of these – of the roof replacements were replaced with Green Roofs, we would have – we have a very large market. The point of the slide is that there is a large Green Roof market because lots of roofs are being replaced, and thinking in terms of square feet, three million square feet of commercial roof are retrofitted annually.

So if even a fraction of this surface area were to be replaced with Green Roofs, it would have a significant environmental impact, but also that shows that there is a huge market for Green Roofs. So the more programs we have out there, the more we can implement Green Roofs.

#### Slide 15: Green Roofs

Neelam Patel: Here are some benefits of Green Roofs, and many of these we are going to go through on the call today. But some things I'd like to talk about quickly from a practical perspective are the benefits of Green Roofs include increasing the roof lifespan, in addition to reducing the heat island effect and reducing stormwater. So, it is just a good opportunity.

There are some disadvantages and – that leads to additional upfront cost. But looking at the benefits and the disadvantages are important for a local entity to balance out or a local building to balance out. And so, you'll hear more about that in some of the examples today.

#### Slide 16: Roof Types

Neelam Patel: So there are multiple different types of Green Roofs. And you can see flat roof were in the earlier picture, there's shallow sloped roof, steep sloped roof and this emerging trend of having green walls which are more basic in their structure.

#### Slide 17: Setting up a Green Roof

Neelam Patel: So when thinking about Green Roofs and implementation, there's a couple of things to cover here and think through and I'll cover those here. You have to think about installing a drainage system, the different layers of the roof, the types of soil that you will use,

the types of plants, how you'll plant these things and then maintaining these. And depending on the amount of investment, you can make the decision to go with the intensive or extensive type.

#### Slide 18: Setting up a Green Roof (2)

Neelam Patel: And here is a diagram to show you some of the factors that need to be integrated into a Green Roof.

#### Slide 19: Using Native Plant Species

Neelam Patel: When thinking about implementation, an important element of that is deciding on the type of vegetation that you will use. I just want to quickly mention using native plant species. This is a smart strategy for a couple of different reasons, but mainly it comes to maintenance and cost because it would be easier to manage by using local species – excuse me, native species. They're already able to grow within the local environment.

#### Slide 20: Heat Island Reduction Implementation Activities

Neelam Patel: So that's a little bit of an introduction to Green Roofs and just bridging the gap, when you're implementing Green Roofs into your community, there's a couple of different ways.

#### Slide 21: Urban Heat Island Mitigation and LEED

Neelam Patel: There is the LEED rating system that – when you're looking and thinking about design, you can get credit for Green Roofs through the LEED rating system.

#### Slide 22: Implementation at the Local Level Activities

Neelam Patel: And then other implementation considerations include for a Green Roof and heat island reduction, generally, is that if you're thinking about Green Roofs, you can integrate them into your planning processes from many different perspectives. They can be part of a climate strategy, an energy conservation strategy, a sustainability strategy, they can be a part of green building efforts, and they can be part of climate adaptation, stormwater and air quality programs. So depending on how you would like to implement, you can work with the air quality folks, you can work with stormwater mitigation folks, you can work with energy conservation, the building, you know, efforts. There's many different ways to creatively integrate Green Roof into your work at the local level.

#### Slide 23: Heat Island Reduction – Voluntary Efforts

Neelam Patel: So just very quickly, you can take different steps to integrate Green Roofs and one way would be voluntary efforts. Today, we'll hear about – through the city of Chicago's presentation an award program and a demonstration program, but there's many ways to get these projects on the ground.

#### Slide 24: Heat Island Reduction – Policy Efforts

Neelam Patel: Another option to get these projects going is through policy efforts. The Green Building Programs and Standards is a very effective way to integrate Green Roofs into the work that you're doing at the local level.

#### Slide 25: Heat Island Funding – Climate Showcase Communities Grant

Neelam Patel: The last implementation concept I'd like to mention to you is funding. And while it's rare that there's funding that comes out specifically for heat island mitigation, there are creative ways to integrate the Green Roof concept and other heat island mitigation concepts into different grant program projects. And one example of this is a grant program that's run through the local climate and energy program. And this particular grant, the Climate Showcase Communities Grant, allows applicants to submit projects that essentially reduce greenhouse gas reductions, and this covers a range of activities. And heat island management is one of these categories that can be considered for this grant program.

So while the main focus of this grant program is to reduce greenhouse gas emissions, you can integrate heat island reduction, specifically Green Roof projects, into the project. So this grant, we've had for one year and we're going to be announcing a funding opportunity for the second year some time this – some time very, very soon and when I say soon, I mean, any day.

#### Slide 26: U.S. EPA Heat Island Reduction Program

Neelam Patel: So with that, I'd like to switch over to talk briefly about the Heat Island Reduction program at EPA and our program is a communication infrastructure that works with policy-makers, program designers, the implementers, research – researchers that have information that can help get different mitigation strategies implemented on the ground including Green Roofs. We also support the general public.

Topics that we address are heat island science, modeling, measurement and mitigation strategies such as Green Roofs.

#### Slide 27: Heat Island Connections with other Programs

Neelam Patel: I made this point before but I would like to just reiterate that, heat island mitigation and Green Roofs can be connected to a variety of programs and here's a list of the different types of programs that you can look at and one of the things I would like to emphasize here is that you can make connections to public health programs.

#### Slide 28: Key Program Features

Neelam Patel: Through this program, we have a couple key program features, we have a website that provides a calendar of events, Heat Island in the news – this is a news article that covers Heat Island issues and a science corner where you can get new science.

#### Slide 29: Database

Neelam Patel: We have a database that you can see here, there's a link at the bottom of the slide. Here you can access examples of different heat island projects and if there's any Green Roof projects out there, for which you are looking at building energy conservation or overall atmospheric temperature reduction; we'd like to include your example here in this database so please let me know.

#### Slide 30: Compendium

Neelam Patel: We have a compendium of strategies and you can see that there's a chapter on Green Roofs that talks about the different Heat Island mitigation benefits.

#### Slide 31: U.S. EPA Local Climate and Energy Program

Neelam Patel: And in addition to the Heat Island reduction program, we also have some resources through our EPA Local Climate and Energy program. The goal of this program is to really help local governments reduce greenhouse gases while achieving multiple sustainability goals and through this program, we help maximize multiple benefits, this includes cost savings, public health, economic growth, and having – securing local energy.

#### Slide 32: Local Climate and Energy Program Approach

Neelam Patel: So again, this multiple benefits framework allows you to attain many different goals – air quality improvements, energy security, quality of life.

#### Slide 33: Local Climate and Energy Program Resources

Neelam Patel: And here again, through this program we have many, many resources that can help today's audience on different types of projects that are related to climate and energy and that focus on greenhouse gas mitigation. So here, we have a website, you have a link to our website. We offer regular webcasts and you have a link to our webcast page; our next webcast is on transportation control measures which will be later in June and that date will be posted on the website as soon we confirm our speakers.

We have some resources for economic recovery and the grant that I mentioned. There's more information is available on the web for our grant and we have a series of local climate strategy guides. And again, this is just a quick list of the resources. If you see at the top of slide, see appendix B. There you can find more information about the resources.

#### Slide 34: Local Climate and Energy Webcasts Widget & iTunes

Neelam Patel: So, today's webcast is going to be recorded, Nikhil mentioned earlier, what we will do with the webcast is have it on our iTunes channel, as you see here, for download and we will also have the presentations available online. The other thing we do for our webcasts is we have a widget that you can download to your own websites to inform you of what our upcoming webcast will be. So if you're interested in learning about other topics related to local climate and energy issues, please visit the site.

### Slide 35: Contact Info

Neelam Patel: So here are the contact information for both of these programs, here we have the Heat Island program which is me, Neelam Patel and then for the Local Climate and Energy Program, I have listed our contacts, Andrea Denny who is the lead for the Climate Showcase Communities Grant Program, and then my other colleague, Emma Zinsmeister who helps support the program.

### Slide 36: Appendix A and B

Neelam Patel: So you can see that the appendixes are attached to your presentations for more information. So with that quick overview of the programs, the resources, I would like to introduce our next speaker, and that is David Sailor from Portland State University. David is a professor in engineering and he is also the director of the Green Building Program at Portland State University.

He has a long history of research with Urban Heat Islands and more recently, he has been involved in the building scale heat island reduction and today, he'll be talking about Green Roofs; so as David gets his presentation up on the screen, I would like to remind you to please submit your questions for me and the other presenters as they come up and include the presenter for which your question is directed. So, we will have David on here shortly.