

# U.S. EPA Heat Island Reduction Program

## Cool Fixes for Hot Cities Part 1: San Antonio

Webcast Transcript

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### Contents

Introduction.....	2
Overview of Cool Roofs for Heat Island Reduction.....	5
Poll Question 1.....	11
San Antonio’s Under 1 Roof Program.....	12
Poll Question 2.....	21
Performance Assessment of High-Solar Reflectance Roofs in San Antonio .....	22
Question and Answer Session.....	28

# Introduction

Slide 1: Cool Fixes for Hot Cities Part 1: San Antonio

Operator: This is Conference # 5995248.

Good afternoon. My name is James and I will be your conference operator today. At this time, I'd like to welcome everyone to the Cool Fixes for Hot Cities Part 1 Conference Call.

All lines have been placed on mute to prevent any background noise. And if you should need assistance during the call, please press star, then zero on your telephone keypad and an operator will come back to assist you. Thank you.

I'd now like to introduce Program Manager of the Heat Islands Reduction Program, Victoria Ludwig. You may begin.

Victoria Ludwig: Thank you, James. Good afternoon, everyone. I am Victoria Ludwig with the U.S. Environmental Protection Agency (EPA). I'd like to welcome you today to a very exciting webcast.

We have a great lineup of speakers, including a surprise speaker that you were not aware of yet. And we're going to talk about cool roofs. We have a – we're going to talk about them from the perspective of an overview of what they are and how they reduce heat. And we're also going to have some on- the-ground experience with the city of San Antonio, Texas; including some monitoring efforts that they have done to verify the effectiveness of their program.

First of all, I'd like to also let you know that we have part two of this series happening on September 12 where we're going to highlight the city of Los Angeles and their work on cool streets.

Slide 2: Cool Fixes for Hot Cities Part 1: San Antonio

We are going to be taking questions and answers and you can enter them anytime throughout the webcast. Just type them into the chat box and if you could please indicate who your question is directed to. At the end we will have the question and answer period where we will read out the questions that you have typed in and we hope to get to all of them.

Slide 3: Webcast Agenda

We, as I said, have a great lineup of speakers where you can learn all about San Antonio's project, as well as learn more about the technical aspects of cool roofs.

Slide 4: Webcasts now use Adobe Connect

A few upfront logistical and technical instructions from my colleague, Alexis St. Juliana.

Alexis St. Juliana: Thank you, Victoria; and thank you, everyone for joining today. For those of you that have attended past Heat Island webcasts you may notice that we're using a new

platform, Adobe Connect. We hope everyone is able to join free today.

If you are having connection issues, there are a couple of workarounds. The first is to try a different web browser, such as Firefox or Chrome. You might also update your Adobe Flash player plugin. If one of those solutions does not work, you should contact your information technology department or browse Adobe Connect's online help pages.

Since we are using a new software, we ask that you add [epacallcenter@epa.gov](mailto:epacallcenter@epa.gov) to your e-mail contact list. All future invitations and reminders will come from this list.

Slide 5:           How to Participate

Hopefully everyone is already connected to the audio. There are two options. The first is to listen via computer and that will begin when the host signs on and starts the audio. And to listen that way, you should unmute your speakers or headphones on your computer. You can also dial in to the phone line and, if you are experiencing audio feedback from your computer speakers, you should go ahead and mute those.

Participants joined both via phone or computer are muted. Everyone is in listen-only mode.

Slide 6:           How to Participate

The ways that you can participate today are through the question and answer box that Victoria just mentioned. If there are any questions that we don't get to, certainly we'll do our best to respond to those and post them on the Heat Island's webpage after the fact. We'll also be posting two poll questions during today's webcast and it should be fairly self-explanatory when we get to that stage.

And the final way to participate is through a webcast form – feedback form that we will post at the very end of the webcast and you can let us know your thoughts on today's webcast and ideas for future webcasts.

Slide 7:           Introduction

Victoria Ludwig: Thank you, Alexis. Well, let's dive in.

Slide 8:           EPA's Heat Island Reduction Program

First of all, I wanted to explain why – who we are at the Heat Island Reduction Program.

We have been around for about 20 years trying to raise awareness of the heat island and understanding of how to mitigate it at the local level. We provide outreach and technical assistance and we work with all of the important actors in this area – local government officials, researchers, non-profit organizations and industry, such as the roofing industry, to work together to identify solutions for reducing urban heat.

Most of our – our primary audience is local and state policymakers and decision-makers. But because this topic involves science and overall policy, we also work with other federal agencies

like the Department of Energy and the U.S. Forest Service and, as I mentioned, a few – well, actually, several researchers and academics.

#### Slide 9: Heat Island Program Resources

We provide a variety of resources, including a series of webcasts that we do about – maybe two or three per year where we try to include on-the-ground case studies of what’s going on at the local level. We cover other topics related to heat islands like the public health connections, different ways that mitigation policies have been effective, whether that be cool roofs or green roofs.

And we also have – the flagship resource we have is called The Compendium of Strategies. There is a chapter on just the science of heat islands. There is a different chapter on each of the, you know, several different mitigation strategies that are out there, including cool roofs. We have a chapter on different policy options that local governments can take in order to mitigate the heat islands either through incentives or ordinances, things like that.

We have a web site that I encourage you to look at because that also includes information on conferences that are upcoming, newsworthy-related things that have come up recently related to heat islands and links to other resources. I would point you to a chapter – sorry, an updated page that we just released on how to measure your heat island, how to map it and understand where the hot spots are in your city. That’s the newest part of our web site.

We have a database of some local and state-wide examples. And then, finally, jumping around here, we have a newsletter. There is a link there that you can use to sign up. And we will also – that also came in your reminder e-mail. There is a link to sign up for the newsletter. We have one coming up in about a month or so.

#### Slide 10: Contact Information

And, finally, please reach out – here is the link to the newsletter. Please reach out with any questions. We love to hear what’s going on. If you are a local government or a state government or non-profit that is working on a – on a program or a policy initiative, we’d love to learn about it. Please let us know. And don’t forget to sign up for the September 12 webcast. There is – registration is open if you go to our web site right now.

# Overview of Cool Roofs for Heat Island Reduction

Slide 11: Overview of Cool Roofs for Heat Island Reduction

So let's jump in. I want – our first speaker is going to give us a good overview of all you – everyone wanted to know about cool roofs but were afraid to ask. He is Jeffrey Steuben. He is the executive director of the Cool Roof Rating Council (CRRC) which is a non-profit organization that provides third party energy performance ratings for roofing products and he's just a great resource of all things related to cool roofs.

Mr. Steuben previously worked as the technical liaison for the council where he worked on technical research projects for the organization. So, Jeff, I'm going to let you take it away.

Slide 12: An Introduction to Cool Roofs with the CRRC

Jeffrey Steuben: Great. Thank you, Victoria. Welcome, everyone, and good afternoon. So, as Victoria mentioned, we have some really interesting presentations of on-the-ground projects and my role today is really just to give an introduction and some overview of the concepts of cool roofs to help you understand what the CRRC does and what cool roofs can do for you.

Slide 13: CRRC Overview

So a little background about the organization – we've actually been around for 20 years. We celebrated our 20th anniversary this May. And, as Victoria mentioned, we are a third party rating organization. So we provide independent ratings of roofing products following our rating process.

We also participate in the Energy Star program as a certification body providing Energy Star certifications for roofing products, and as well we are an anti-credited standards developer and maintain one of our own standards which is the American National Standards Institute (ANSI)/CCRC S100, which basically encapsulates a lot of the aspects of our program to provide an independent consensus-based standard around measuring and understanding cool roofs.

And lastly, we are also an International Organization for Standardization (ISO) 17065 accredited organization. So that's all to say that, you know, we've been around for a while and we participate in a lot of broad-based industry organizations and I think it helps build our credibility.

Slide 14: CRRC Mission

So the focus of the CRRC is basically we have three main pillars of our mission. Simply, it's ratings, research and education. So the most central piece of the work of the CRRC is our rating program. And we also conduct research around roofing products around understanding and evaluating the performance of roofing products from the energy standpoint.

And lastly, and maybe most importantly, is providing education. So we have a lot of resources on

our web site and as well participate in web casts like this to get the word out about what our organization can do and what the resources that we have available.

And so, that's sort of what we do. And the reason that we do that is we have a number of – the basis of our mission is that we want to become really the foremost recognized informational resource. And so, we're looking at urban heat island; we're looking at building energy efficiency, improving occupant comfort for those that maybe don't have air conditioning, or even if they do, you know, keeping the temperatures lower in their homes; and also, on some grand scale, working to combat the effects of global warming.

Slide 15: Cool Roof Basics

Slide 16: Cool Roofs 101

So to go into some basics of cool roofs, the main thing that our organization looks at are two properties of roofing materials and they are solar reflectance and thermal emittance. Solar reflectance is the amount of energy that is reflected back off the roof. So the sunlight comes down and hits the roof surface. Some of that energy is going to bounce back into the environment. So that's the – how much is reflected.

Not all of that will be reflected unless you have a mirror as your roof, so some of the energy is going to be absorbed into the roofing material. And so, then, we look at the thermal emittance, which is the ability of the material to re-radiate that energy back out into the environment. And so, what isn't reflected and what isn't re-admitted back into the environment, that's the energy that's going to be absorbed by the building.

So that's really key that we look at these two properties as a way to evaluate how much of that solar energy is going to be transferred into the building and absorbed by the building and that's something that you're going to have to address with air conditioning, sort of additional cooling load.

Slide 17: Dark Vs. Light Roof

So just a couple illustrations of this concept here, just another sort of way of showing the same information. You look at a dark roof. You know, some of that energy is going to be – some of it is still reflected, but much less than a high reflectance light-colored roof.

So you still see, you know, the same amount of solar energy coming in, but a lot more the energy is going to go into the building compared to a light roof where a lot more of that is bounced back off and re-radiated into the environment. And that results in a lower temperature of the roof and then less of that energy that is being transmitted down into the building.

Slide 18: Before & After

And here's just another sort of quick example. You know, this is basically an anecdotal thing, but you can look at the measurements being taken by a thermometer on the roof when it's in construction and it has a black under alignment, much higher temperature at a 178 degrees Fahrenheit or 81 degrees Celsius.

And then, the finished roof product with the light-colored one results in a much lower temperature. You've got a 93 degrees or a 34 degrees Celsius. I'm actually not sure where the location was of that, but it seems like it's pretty hot given that 93 is the cooler temperature of that building.

#### Slide 19: Cool Roof Benefits

So that's just sort of some basics of the properties that we're looking at, but let's sort talk about the impacts of it. So I mentioned occupant comfort, which is something that, you know, here in America, we might be thinking more about air conditioning.

You've got your utility bills, you've got the amount of load that's being placed on your electrical grid. But in some parts of the world, people don't have air conditioning or they are looking to add air conditioning which is something that, you know strains the development of those countries.

So people who live on the top floor of buildings, their apartments might be a lot hotter. I mean, that could have some health impacts as well. So actually, occupant comfort is definitely a key consideration as well.

But also, like I said, you have air conditioning. You know, if you're running your air conditioning all the time, that's going to be a lot of money for you as the homeowner and also taxing to the electrical grid of your community.

#### Slide 20: Urban Heat Island

So that sort of takes us to the urban heat island concept, which basically – so in – the most basic description, the urban environment has a lot more dark surfaces; has a lot more thermal mass; a lot of asphalt and concrete materials that are going to be absorb the heat throughout the day. And, as that happens, it heats up higher than other environments that might have, you know, different surfaces, less development. So you end up with an urban heat island.

The urban area gets hotter and it stays hotter. It doesn't cool down as much in the evening and this has a number of considerations. For the local environment, you have increased pollution happening at those higher temperatures, the reactions that create ground-level ozone and smog happen faster and more at the higher temperatures.

You also just have, you know, sort of less reflectance if you – if you're in a hot downtown area, you're going to have to be running your air conditioning more than if you're in a less-developed area.

And so, there's – yes, so there's sort of a – a lot of considerations around the urban heat island that cool roofs, you know, not only impact your building and your energy use and your – the cost that you're spending on air conditioning, but also has a bigger impact on the community around you.

#### Slide 21: Winter Heating Penalty?

So I want to actually pivot really quick to talk about something else which is the winter heating penalty. So, I think it's pretty well understood that you live in a hot climate. If you're keeping your building cool, that's going to be helpful.

But what if you live in, you know, a more moderate climate? How do you tell if that cool roof is going to be helpful for you in the summer or maybe are you actually losing out on some energy in the winter? And that is true. This is – this is a real phenomenon, but I think, generally, this is overstated. There's basically a couple different reasons why that is.

The – in the winter, your – the sun is lower in the sky, so you're actually not losing as much of that solar energy. Not as much of that solar energy is making its way through the atmosphere to the building.

Also, in winter, you've got shorter days, so there's less total sunlight depending on where you are, but oftentimes the winter days, you know, you might have more cloudy or sort of more overcast weather, so you're – again, you're sort of cutting back on the amount of solar energy.

And then, lastly, if it snows, you already have a white roof. So, if you – if it snows, then the color of the roof underneath that basically doesn't matter anymore.

So all this is to say that, in the summer, you're going to have some gains from keeping your building cooler. And, in the winter, you might have to heat your building a little bit more than you would if you had a traditional dark roof, but the relative difference of that is much different than your – the gains in the summer are much more than what you're losing out on in the winter because you're really – there's not as much solar energy getting absorbed by your building to keep it warm in the winter than what you're avoiding in the summer.

My rule of thumb is, if you use air conditioning, then you'll probably benefit from a cool roof. But that's just sort of a quick rule of thumb. Obviously, there's a lot of variables that go into your location and the type of building that you have.

I think this is an important concept to understand because it basically helps people understand that cool roofs are beneficial in a lot of different climates. It's not just, you know, the San Antonio area which we'll be talking about today, but there's a lot of other areas of the country where cool roofs can still be beneficial.

Slide 22: Solar Radiation

So I want to spend a second here. Don't get overwhelmed by the science here. I just want to give a quick illustration of the solar spectrum.

So you've got visible light here in the green and then you've got the ultraviolet (UV) light and the infrared spectrum on either side of that. So this is just a graph of some sort of material that's reflecting energy in different ways.

Slide 23: Selectively Reflective Products

So to take that – and the reason I want to understand this is because this really gets into some of



the interesting things that are happening with cool roofs. So cool roofs don't necessarily have to be white. You can have cool colors that look basically the same in the visible light spectrum, but are more reflective of infrared light.

So you can see this red line here is, you know, standard brown and it looks – it follows the same curve as this blue line very closely, but then the blue line is much more reflective of infrared light.

So you're not going to be able to see any difference – obviously, there's like a little bit here at the tail end of the visible light spectrum that's maybe a little bit different, but it's basically going to be the same color as the standard brown, but much more effective at reflecting that solar energy.

So that's something that's really interesting is that cool roofs don't just have to be white. There's a lot of different options for cool products, you know, using technologies like this.

Slide 24: Cool Colors

And just to sort of further that illustration, here are some examples of different materials that have been coded. So the – in this case, the R is the solar reflectance value. So you can see that the black is 0.4, so these numbers would go from zero to one in sort of a ratio of how much of that energy is being reflected.

So a standard black is 0.4. That's pretty close to zero, but a cool black is actually 0.41. That's – 40 percent almost of that solar energy is being reflected back off. And it looks more or less the same. You can see a little bit of color difference, but, you know, fairly close.

So that's an interesting way of sort of demonstrating the power of cool colors and technology to keep building school, while not sacrificing on the aesthetics of your building.

Slide 25: CRRC Product Rating Program

Slide 26: Rating Program

So just in the next few minutes I want to just briefly talk about the CRRC rating program. So the CRRC program, as I mentioned, you know, the ratings are a big key component of our organization. What we do is we take samples of materials. We have them measured for their initial values and then we actually take those materials and we put them out on weathering farms in three different climate zones around the United States – Ohio, Arizona and Florida.

And then, after three years, we bring those back and we measure them again to get the three-year weathered value. And so, that's more representative of how that roof will perform over time, right. You know, how the roof performs at the beginning is nice to know, but your roof is going to be on your house for 10, 15, 20, 50 years.

And so, being able to understand how it performed over time is going to be more useful for your benefit, so we definitely – we want to have those three- year values in addition to the initial ratings.

And then, we provide labels for those products. They can, you know, be clearly identified as being part of the program. And then, we post all the information on our online directory.

Slide 27:      [Coolroofs.org/directory](http://Coolroofs.org/directory)

So if you go to [coolroofs.org/directory](http://coolroofs.org/directory), you can go straight to our site that has about 3,000 different products and you can filter and sort through them.

Slide 28:      Directory Filters

So I'll just jump in to that here. So you can see you can sort by product types, you can sort by color and you can also specify what a minimum value would be that you're looking for solar reflectance or thermal emittance. And that can be useful in determining compliance with specific programs or local codes.

Slide 29:      For More Information

And I also just want to say, you should go to [coolroofs.org](http://coolroofs.org) if you haven't already and there's a lot of information. We have lots of resources and educational information. So, you know, there's a lot of good information there, not just the directory. So there's a lot of interesting things to see there.

Slide 30:      Questions?

All right. So that wraps up my presentation. I believe questions will happen at the end. With that, I will turn it back over to Victoria.

Victoria Ludwig: Thank you, Jeff. Great job. And I'm glad you mentioned the winter heating penalty. We get questions from time to time about that, so I think it is something that is good to clarify for folks.

# Poll Question 1

Slide 31: Poll 1

So before our next speakers, we wanted to do a poll question just to get an idea of what you guys think, those who are listening. The first question you can – you can choose more than one answer. And so, we will open it up now. I'm going to read the question and the answers. You can vote anytime.

What cool roof benefits appeal to you most? Is it lower temperatures, energy savings, improved comfort of the building, reduced greenhouse gases, public health benefits or other? So I'll give you about a minute or so to vote. You can select more than one again. So let's see what happens.

OK. Get your vote in and then we're going to show the results which will tell us usually very interesting. It looks like energy savings is way – is number one at 80 percent – at 80 percent votes. Number two is temperature, which is a close second with reducing greenhouses gases. And then, the public health benefits is another benefit. And then, wrapping up is other.

(Inaudible). It just goes to show that (inaudible). So thank you for your votes on that. It's good to see.

# San Antonio's Under 1 Roof Program

Slide 32: San Antonio's Under 1 Roof Program

Moving on to our next speakers, we have two folks from the city of San Antonio, Texas, including our surprise speaker that I was mentioning was not originally announced. But we're very excited to have Roberto Carlos Treviño from district one. He's of the city council; and the city staffer Barbara Ankamah Burford.

Roberto is going to talk first and then Barbara. And they're going to explain about this great program that San Antonio did for both helping lower income residents save money on their utility bills, improve their homes and also cool their homes and help reduce the urban heat island effect.

So I'm going to do a quick introduction for councilman Roberto Carlos Treviño. He is the district one councilman representing central San Antonio. His background in architecture has led to thoughtful policies and programs like San Antonio's Under 1 Roof Program, also, the city's first downtown lighting master plan and the first sidewalk master plan which use – all of these use innovative design strategies to meet the diverse needs of the seventh largest city in the country.

It is his approach that guides his devotion to a city by design and the continual evolution of San Antonio with the goal of providing a life of dignity for all.

We're very happy to have you, councilman, and hear what you have to say. Please go ahead.

Roberto Carlos Treviño: Well, thank you. I'm really thrilled and happy to be here. You should know that this program was built over many years, and so, it's exciting to be a part of this program to talk about the benefits and then we think that, ultimately, we want to point out that what is important here is that we are affecting people's lives where it impacts them the most, in their homes.

And, you know, this program, believe it or not, was started because of – one of the first acts I had at the council was back in 2014, which was to save a home. There was a gentleman whose home was going to be demolished because it needed work and it was seen as kind of a blight in the neighborhood.

And the neighborhood fought for it and we fought for it and, in talking to the gentleman, one of the first things he told me when I asked him, "What happened? What – how did it get to this point?" His name was Miguel (inaudible).

And he said, "It started with a roof leak." And, boy, it just got my head spinning and I said, you know, I really got to do something about this because I don't want to just help one person. I want to help many people that I know are going through this issue.

So the program was really born out of saving homes and I said this before, the best affordable housing that we have is the existing housing, so we want to protect that existing housing and we know that doing roofs is one of the most important components in a home.

So when we structured the program, we structured the program centered around fixing roofs. And, of course, then, we thought, “Gosh, this is a great opportunity to really start doing roofs the right way.”

So, right now, earlier, we heard about the impact of heat on a roof. Of course, we also know that, in the winter months, it’s colder and, yes, you know, there are certain locations geographically where that’s an issue. But I can tell you that, San Antonio, we do not have very cold winters. In fact, most people don’t know that Cairo, Egypt sits higher above the equator than San Antonio, Texas. So the sun hits us pretty solid here in the south.

And a program that thinks about high-reflectance roofs as a way to help benefit homeowners was at the heart of this. And we know that this is something that can be spread throughout other cities, throughout the south. Heat is such a big deal and, most importantly, when I – when I said – if you take the idea of the best affordable housing, this existing housing, well, we apply that to energy as well. Well, that’s the best energy savings. It’s just simply to not use it in the first place.

Slide 33: San Antonio Under 1 Roof

Slide 34: Program Objectives

And so, a program that helps save energy in the home by keeping the home cooler so that you do not have to spend electricity is so impactful. In fact, we’ve seen some homes saving about \$1,800 a year in the utility bills just through this program.

One of the first persons that received a roof was in tears saying, “I don’t know what you did. It feels like magic.” And, of course, you say, “Well, it’s not magic. It’s physics.” And we’re really – we’re really just so proud of this.

So many benefits that have – that have made this really something that we have grown and today I think we’re at about 176 roofs in San Antonio. We’re looking to do a lot more. Many people are looking at this. We want to share our program as much as possible.

Your poll has some interesting points. One that I want to mention, we recently learned about having high-reflectance roofs and creating a home that’s comfortable. We received information about the fact that a cooler home actually helps to lower domestic violence rates.

Slide 35: Program Benefits

So the benefits keep layering on and on with doing and building homes in the most efficient and proper way.

So, as a city official and somebody that’s looking to try to find a way to provide quality of life and improve the situation for many folks in San Antonio, this is something that’s very important to me. And, you know, you can see that what we’re trying to do is educate folks throughout San Antonio and anywhere in South Texas – all over the south, for that matter – about this benefit.

So, I guess I would want to also point out that I’m very thankful to have a city staff that has been very, very cooperative in helping to establish this program. When we started the program, we

started the program with only \$200,000. Those \$200,000 was something that got us 11 roofs, basically just to get it off the ground and to approve this as a pilot program.

We know that once we can demonstrate the program through projects, through real projects, we could show those benefits to the rest of the city. And so, this program is going from just my council district, which is the center city, the center part of San Antonio, all throughout the city of San Antonio now.

And it's important because we know that this is a program that is needed throughout the entire city primarily because we need to repair roofs, but also because, as we speak, it's going to be well over 100 degrees here in San Antonio and heat island something we really need to pay close attention to.

In fact, that was on a news program earlier this morning what we reported today was an ozone day and we need to be very careful about the amount of ozone that's going to be atmosphere.

We hope that this program can have the potential to help contribute to the reduction of ozone by helping to cool the cities in the most effective and pathway possible using technologies that have existed for thousands of years. This is – this is not a new technology.

I also want to say that I agree that it doesn't have to be a white roof. It could be a light-colored roof. But, in our program, what we try to do is demonstrate the stark differences between a black roof and a white roof using the same three-tab shingle.

And, by doing that, we have demonstrated the – that some of this is just simply a choice, the choice to do the things in a way that benefits everyone in the city, doing things that are most effective and are a way to show a great responsibility for the community.

So I – again, this is just something that we think is an important part of what – not only San Antonio is going through, but many cities are going through. And at the heart of this, as we know, cities have to find ways to create and administer programs that can help the communities much quicker and more effectively than state or federal government can.

So I – with that I want to hand off to Barbara Ankamah. So she's going to speak a little bit about the program.

Slide 36: Program Application

Barbara Ankamah Burford: Thank you, Councilman Treviño. And, we – in Neighborhood and Housing Services, we share in Councilman's Treviño's excitement about the program.

When the discussion came up about funding this program, we quickly just got together as a team to really talk about, OK, how are we going to qualify people; how are we going to, you know, market this program and really make sure that we expended all the funding that he secured through our general fund to deliver this really great benefit to our resident.

You know, the really unique thing about the Under 1 Roof Program, we received Community Development Block Grant (CDBG) and home funds to do owner-occupied rehab. So a lot of our

focus is addressing the whole house. And this is very singular in focus with addressing a roof. But a really neat piece to this is it allow us to help clients that otherwise would not, you know, most likely be helped through our other programs because they may be over income or may not meet those federal requirements.

Councilman Treviño, one thing that he was really stressed, “Look, I want to help our veterans; I want to help our seniors.” And so, we have made it, you know, a point to definitely target those areas that we know veteran seniors, people that meet the qualifications for this program are at.

And so, someone might be over income by \$10 and get turned down for any assistance through our federal programs and, this program, if they meet one of these conditions of falling into that category of a veteran or a senior or a disabled; we can assist them.

So it’s been really rewarding because it’s kind of opened up this whole other avenue of assisting clients who most likely would be turned down versus into our federal program.

Well, what you see is our program application. So we really do have a formalized process that outlines, you know, the eligibility requirements. As Councilman Treviño mentioned, it initially started in just district one and then opened up to four other districts.

And so, we’ve worked very hard to kind of market and coordinate with those respective council district offices. We do presentations to our senior centers, to neighborhood associations. Anyone who will have us, we talk about the program so people are aware that there is this great benefit to them.

Slide 37: Roofing Materials

So the roofing materials, you know, we’re using a SOLARHIDE underlayment in addition with the Shasta to white shingle. So, when you drive through some of the neighborhood, especially when we initially started in district one we had some targeted neighborhoods and we really, really did work to cluster the homes that we’re assisting and doing our best to qualify people in close proximity, so we have some streets that have four or five homes that we’ve done.

It might be spaced apart, but you can clearly see those white roofs, so we’re quite proud of that. It makes for a good tour to really kind of point out those roofs and see our – see the benefit at work.

Slide 38: Roof Demolition and Construction

Here’s some pictures of the roof demolition. We have – we partner with our transportation and capital improvement department. We utilize one of their large contractors to do this work. They are very sufficient and really solely focused on supporting our program. So they’re able to turn over a roof in one to two days. That’s kind of the timeline of completing these roofs.

You know, we’ve got a size requirement. The homes cannot exceed 1,500 square feet. We have exceeded that. that shift was to kind of sustain some sort of efficiency with cost.

Again, as we moved out into other districts, you know, we encountered some districts have larger older homes, and so, we did accommodate for those requests. We didn’t want to turn people

down.

Slide 39: Fiscal Year (FY) 2018 Timeline

Our timeline, we're aggressive because, again, this year, you know, our goal was to spend \$2.25 million and we've got – we are almost there. So, as you see in those first and second quarters, we completed 85 roofs; third quarter 42; and fourth, it states five, but since this presentation was handed in, we've got four more additional roofs – excuse me – nine more additional roofs that have been completed. So we have an aggressive performance measure to complete 161 roofs for this program. We're at 141 to date.

Slide 40: Program Challenges

Our challenges. So, initially, when this program started, residents really didn't believe they were going to receive a free roof, let alone an energy- efficient roof. So we had – so we would – we would get one person, we would do their house and then quickly be accosted by the neighbor saying, "Well, why aren't you fixing my roof?"

Well, we handed – we blocked walked; we handed out flyers; and then they admitted, "I really didn't believe it was real. I just thought that there was a gimmick to it. I surely owe something." But again, this is granted to the homeowner.

We do place a restrictive covenant that's filed with our county courthouse that will stay in place for five years and this just requests that they don't go transfer the home. And it's really to protect us. It's to protect homeowners that might come through the program so we don't attract people who are just flipping properties and want to, you know, game our program and get a free roof.

So that was – that was one of those initial challenges just getting the homeowners to believe, yes, it is free. You will not owe us anything. There's a great benefit.

And then, the second challenge, residents weren't certain if they would see a reduction. "Really my energy bill is going to be lower?" And I think the great thing – and Hazem will talk about this, the partnership with University of Texas at San Antonio (UTSA) – and once they saw the data logger or something going up in the attic and installing that prior to construction for two weeks and then, they would be removed while, you know, they were removing the old roof and being installed right after the new roof was installed.

I think that kind of added a lot of validity like, OK, there is a process here. It is going to be monitored and we, of course, followed up with homeowners. And, really glad to see that they are, you know, seeing energy savings.

We had a client who, you know, CPS Energy bill was in the range of \$300 to \$400 and now she's saying she's seeing bills that are less than \$150. You know, again, it's hot, so we're running our air conditioning (AC) 24/7. But what those – that – that savings she has now can be applied to something else.

She can put that aside to address first – future repairs for her home. It can go something else that



the homeowner needs. So that's – it's really touching to see people – I mean, it's really impacting their lives.

Another challenge was, because the program started off in district one, we get calls from other districts prior to these other districts of coming onboard, “Well, why don't I have that in my district?” And so, we would explain, you know, talk to your – talk to your council member if, you know, Councilman Treviño requested this funding; he spearheaded this program.

And so, that was a little challenging having to turn people down initially because there was an allocated funding for it. But, you know, again, it did – it did expand and, this fiscal year, it will go citywide. So that – and that's just a testament to all the great work that Councilman Treviño has done and just really educating the colleagues about this.

I mean, historically, council members in the past would – this is kind of like really cutting edge stuff because they would not request money for their district for housing-related projects. It was for focusing on streets; for focusing on policy because the city has federal funding in place that allows them to address the homes.

But again, our challenge – we have challenges with the federal programs because their – those guidelines are tight and fast and we cannot just, you know, OK, we're going to allow or let this slide. So this really kind of opened up this opportunity to help a whole group of residents that may not be assisted through our federal program.

And then, just the last challenge is administratively adjusting to the increase in funding. We initially started off with 200,000, 11 homes, and then now at \$2.25 million and 161 homes with the – with the same staff complement. But again, through the work of Councilman Treviño, we're going through our budget process.

We're right-sizing that and getting some additional staff to support the program because I think a couple of fiscal years ago, we saw the trend and knew that more money would come our way. So that was a little adjustment. But we really worked to be very efficient in our team and brought on, you know, temporary help as we needed, but we're really excited we're getting some full-time help, permanent.

Slide 41: Program Results

So program results. So here it states 175, but we are actually now up to 184. A total of \$2.95 million has been allocated to the program since its inception in October of 2015. And the average reduction in energy use intensity is 7.3 percent as a result of the cool roof.

So it really has been so beneficial and so great. It's a great piece to talk about when we talk about housing programs. It gives us more options to assist our residents which makes us highly excited and happy and I just forwarded a little too fast.

Slide 42: Before & After Pictures

But here are some before and after pictures of two homes that we did initially when we started and you can see the bright gleaming white roof. And they're all happy residents. I want to also

mention that you know as this program evolves we're always looking to improve and we – I guess it's been maybe a year now that we had a really, really bad storm hit us and, you know, roofs were damaged. And so, one thing we don't – what we don't require people to have homeowners insurance because sometimes that is a lot for people to afford.

So if you don't have it, that doesn't eliminate you from receiving the assistance. But if you do, we get copies, but we make sure people have claims that's well documented. And again, it's just protection. We don't want, you know, those that may have the means to address their roof taking advantage. So we've got some things in place to just make sure we are – we're helping those who need the help and the assistance.

And again, if you look at the houses, it's the houses that we're addressing. Their house is in fairly good condition because, again, if there are substantial issues like foundation and other things, we then move them for them to another program that can address their issues. So that concludes our presentation.

Slide 43: Under 1 Roof

And I don't know if Councilman Treviño if you have any closing remarks.

Roberto Carlos Treviño: Well, yes. And, you know, I want to thank all the hard work of Barbara and all the people over at housing services because, as she mentioned, they are working on overdrive to make this program a success. They need more help and we're working very hard to get that in our budget for this year because we want to – we want to increase the amount of capacity that we get done for a city.

And so, what you see now is a slide of contacts for both offices. Please contact us if you want to know more this demand that is in your city. Cities can do this. This is part of a program that can help any city, specifically cities from the south where heat is a – in huge huge issue. But, more importantly, you know, housing is one of the biggest issues the country is facing and this is a great approach.

So I...

Victoria Ludwig: Great. Thank you, guys, so...

Barbara Ankamah Burford: Yes. Thank you. Victoria Ludwig: Go ahead – go ahead.

Roberto Carlos Treviño: Well, no, we just want to, again, say thank you and like – we like to say we have a motto in our office. It's really "City by design, not by accident". Thank you.

Victoria Ludwig: Then, that is obvious from the way you thought about this program; very well thought out and complete including the monitoring and helping people apply. I really want to congratulate you both. This is a – this is a fabulous program. The results that you – that you mentioned are impressive and you also created jobs with the city government. That's also a great benefit.

And we, at EPA, have talked to other cities that are also concerned about the equity issue related

to heat as far as a lot of the neighborhoods that are the hottest are also where lower-income people live and they don't have efficient homes in order to get the most advantage out of their air conditioning. So this is a common concern that we've seen and you guys have successfully addressed it in district one.

So I just want to congratulate you and thank you for telling the story on our – on our webcast. I also want to apologize, Barbara, I didn't mention your bio. I'm going to do that now, so people know about you.

Barbara Ankamah Burford: Thank you.

Victoria Ludwig: Barbara is with the Neighborhood and Housing Services Department where she serves as a liaison for the city by working closely with neighborhood associations, community organizations and public and private agencies to ensure questions and concerns are addressed.

She also provides oversight for several housing programs administered by the department. And prior to joining the city, Barbara was the vice president of business development for the San Antonio Hispanic Chamber of Commerce.

So I know, Councilman, that you can't stay for the entire time, so if it's OK, we have had one or two questions come in that I wanted to ask. One of which is, what advice would you have for other cities that want to do this as far as – you mentioned some great lessons learned and how you overcame barriers, but, I guess, is there a part of what you did that might be applicable to other parts of the country, you know, that don't involve things that were unique to sort of the Texas government or San Antonio government structure?

Roberto Carlos Treviño: Well, I think it's like with most anything that's never been done before. It can be – it could be a little difficult. Most people can have a hard time understanding how something may work.

So we took an existing program that was called Let's Paint and I felt that the program that we had for painting houses, while a good program, was not impacting people's ability to stay in their homes for a long term. And so, I converted that – those dollars. I was able to do that and create a pilot program.

And so, I would encourage other municipalities to use our data – use the pilot program that has, as of now, 184 roofs. Is – it's not magic; it's science. And, you know, we have shown the success of this program. And, most importantly, we've also shown that you don't have to do an entire house to make up the impact.

One of the most important components of a home is your roof. And we first got to address the problem of home maintaining. One of the – one of the biggest issues that people have with their homes is simply maintenance and roofs are a big part of that. And so, a lot of people just simply live with a leaky roof and not realizing that there is – that, you know, there are some serious health (counting) issues when letting that go.

So, lastly, just contact us, obviously, for more information. Partner with folks like the UTSA, Dr. Hazem Rashed-Ali, who has done a great job on handling the science behind this and, most

importantly, start working on identifying funds that you can use for this, but get started.

Barbara Ankamah Burford: If I may add to Councilman Treviño's comments, so something that he also did that I think just continue to support the success of this program and his other colleagues really wanting to be part of it, was he was out there just marketing and talking to other partners. So our CPS Energy, our local utility company here, Councilman Treviño spearheaded an energy rebate program based off of the Under 1 Roof Program.

So they created this program which they didn't have. And so, anybody doing a cool roof can now get a rebate. On top of that, our other – our parks and recreations department, we partnered with them because Councilman Treviño had a conversation with them.

So now, all the – all the homeowners that we have assisted through the program can receive, if – should they want – a one to two free tree planted at their property to provide for more canopy cover.

And then, in addition to that, we also have a partnership with AACOG, Alamo Area Council of Government. They have a weatherization program, as well as CPS Energy. And so, we refer people to get their home weatherized if they haven't, so we've done that.

So we've got – so it's really nice (layer, in fact,) with, you know, partners to, again, make that house even that much more energy efficient and safer for that homeowner to live in. And he initiated all those – I would just get calls – I would just get a call, "Councilman Treviño was just here. You know, we need to meet." And so, it really kind of helped a lot. But I just think, again, it just, like, solidified the importance of the program.

I mean, when he, you know, ask for people money, it just reinforces there is a need. Our residents are taking advantage of it. We have partners on board. It all helps.

Roberto Carlos Treviño: I would just like to add before I end, so that – I've seen – I feel this program, this high-reflectance (third) program is a solar program much like when we talk about the solar panels (is) in a way because it does not dissipate the heat and it doesn't create a consumption of more energy. I believe this could be one of the most affordable solar programs this country can see, so we apply it in areas where we can find it can be most utilized.

Victoria Ludwig: Yes. That makes sense. That – I see what you're saying. Well, thank you, Councilman Treviño. We really appreciate it. It's been an honor to have you and congratulations again both to you and to Barbara and the rest of the team at the city level.

I know, Barbara, you're going to stay on the line. So if anyone has any questions for her about the city's program, feel – or any of the other speakers – feel free to type those in whenever you like.

## Poll Question 2

Slide 44: Poll 2

We're – before we go to the next speaker, we're going to do one more poll question, so get ready to vote, please. Again, you can choose more than one answer. And the question is, do you or your community offer any roofs programs, if so, what kind? Are they utility-provided rebates, government- provided incentives, ordinances, code requirement, some – some kind of regulation? Do you do education or outreach campaigns or none of the above?

We'll give folks a few – a little bit of – just a minute or so. OK. It looks like none of the above is the – is the highest number, but that's why we do these webcasts and that's why we have the heat island program at U.S. EPA is to help raise awareness of cool roofs programs and how they can be implemented throughout the country. And then, kind of equal amount with the other four, with education or outreach program being the number one, so that's really interesting. Those are definitely important.

Thank you for answering the poll.

# Performance Assessment of High-Solar Reflectance Roofs in San Antonio

Slide 45: Performance Assessment of High-Solar Reflectance Roofs in San Antonio

Our final speaker is Dr. Hazem Rashed- Ali. He is an associate professor in the Department of Architecture at the University of Texas at San Antonio. He teaches design studios, as well as building technology and performance simulation and analysis courses.

His current research focuses on sustainable and high performance buildings and communities, performance modeling – performance modeling and analysis and post-occupancy evaluation. And he is the recipient of the University of Texas Systems Regions Outstanding Teaching Award.

So welcome, Hazem, and we know you're going to teach us now about the monitoring efforts of the Under 1 Roof Program.

Dr. Hazem Rashed-Ali: Well, thank you very much, Victoria. It's a pleasure to be here and, as Victoria mentioned, I am going to talk to you a bit about the research study that we conducted through the Center for Cultural Sustainability in the University of Texas in San Antonio for evaluating some of the impacts of the Under 1 Roof Project.

But first, I want to thank Councilman Treviño, Barbara, the entire Neighborhood and Housing Services Department for inviting us to do this work. I think it's really important for more or less every program and policy to have a component of evaluation that objectively looks at the impacts of that project and then can be used for guidance as to what the project has achieved. Sorry, excuse me.

Slide 46: Performance Assessment of High-Solar Reflectance Roofs in San Antonio

So one of the things that I think you realize now about this project is how multifaceted it is. So the project aims to achieve multiple objectives. It certainly does have an impact on the urban heat island phenomena as you heard from Jeff at the beginning of the webcast, but it also has a direct impact on people's lives that the councilman and Barbara has already mentioned.

So when you replace the existing roofs and – for this new roofs, you not only help the community through improving the urban heat island effect, but you can actually improve the health and wellbeing of the homeowners through improving thermal comfort, through reducing their utility bills and both of these are important in general, but they are all specifically importantly for the population that this project was aiming for, which I think Barbara talked about slightly.

Slide 47: Project Objectives

So, based on the this, the objectives of our project, really we're trying to capture the impact on the homeowner. So we were trying to achieve two objectives or evaluate two issues. The first is we wanted to evaluate the impact of the new rules on added temperatures or, more specifically,

on the difference between added temperatures and concurrent outside temperatures.

So we consider that as a measure both of the success of the new material, as well as the potential impact of having that new material on improving thermal comfort condition and cooling energy use in these homes.

Slide 48: Project Methodology

Then, we also wanted to directly look at the utility bill information and see if we did see if that impact that we're predicting can be seen in this – in this information.

So what we did, we looked at 30 homes which was part of the first phase of the research study which is now completed and the results have been published. We also have another 30 homes, by the way, that we're currently monitoring which will form the second phase of the project. We hope to complete that by next year.

For each one of these homes, we did multiple steps. First, you probably heard that we installed data loggers inside the attics and took detailed temperature and humidity measurements both before the roof replacement and after the roof replacement for a certain period. We then went ahead and collected utility bill information for at least one year before construction and, again, one year after construction.

And then, finally, we conducted surveys. We went and interviewed each homeowner and our intent was really to identify their energy use patterns and, more specifically, to see if there are any other external variables that may have impacted their energy use patterns post roof replacement that we need to be aware of so that it does not affect the accuracy of our results.

Slide 49: Attic temperature – Summer

So, if I jump directly into the results, and the first result that I want to share with you is the results of the added temperature analysis. So when we did the added temperature monitoring, we decided to divide our work into two parts. So we look separately at homes that were installed during the summer versus homes that were installed during the winter.

And the reason we did that is probably something that you've already heard about which is that the impact of the material will vary in summer versus winter. And while we expect positive impact in summer, there was the potential of also negative impacts in winter, so we wanted to make sure that we capture that.

Like I said before, we installed a data logger in every home. We then kept that data logger for – as much as possible before the roof replacement. That period varies slightly depending on construction schedules and homeowner availability, but, on average, we got between 10 days and two weeks pre-roof replacement and then we kept it after the roof was replaced for probably at least about a month.

We then collected that information and we collected also concurrent outside weather information from a nearby weather station about a mile or a couple of miles away from our airport, so that was not a big problem. And we calculated the hourly difference between the outside temperature

and the temperature inside the attic. We used that to generate an average daily profile of that temperature difference for every home which are the two graphs that you are seeing at this point.

So if you take a look at these two graphs, the graph to the left with the red line, the average daily profiles for each one of the homes, the three monitors that were installed in the summer and these are the light grey lines, so each one of these grey lines represent one of the homes – and then, the red line is an average of all of these homes pre-roof installation. The other graph represents the same thing post-roof installation.

So if you look at the pre-installation graph for a while, you can see that the temperature difference actually was really, really high; so in a couple of our homes you can clearly see that we got a temperature difference of about 30 degrees to 35 degrees. So to put that in context, if you have a 100-degree day, which are not uncommon in San Antonio, the temperature inside the attic was 130 degrees to 135 degrees.

And if you add to that the fact that some of the homes or maybe many of the homes that we were looking at were not in perfect condition and may not have complete attic installation or, in some cases, no attic installation, you can probably imagine how much of an impact these attic temperatures would have on cooling energy use if the homes were air conditioned, or even if they were not, they will have a direct impact on the thermal comfort of the occupants.

You also probably can see that there is a lot of variation between the homes which is somewhat typically.

If you compare that, however, with the post-room installation graph, the one to the right with the dark blue line, I think it's very clear that the installation of the new roof that helped you see a lot less variations, the peaks are much lower and, in general, the curves are a lot smoother in the post-installation period versus the pre-installation period.

Slide 50: Attic temperature – Summer

So if we just specifically look at the two average profiles, I think you can clearly see again the positive impact that installing the roof had on the added temperatures. We got a reduction of, in some cases, 12 degrees to 13 degrees on average in the peak – in the peak daily temperatures, which is really a significantly large impact that would positively impact both the energy use and/or the thermal comfort of the occupants and we believe that that was due to the new roofing material.

Slide 51: Attic temperature – Winter

So – and then, we try to tackle the issue of winter. So is winter the same? Do we get another large impact and these two graphs represent the homes that were installed during the winter period, around December and January.

Slide 52: Attic temperature – Winter

You can still see some improvement or some reduction in – I shouldn't see improvement – reduction in temperatures due to the installation of the roofs. Again, the peaks are somewhat



lower. But if – again, if you compare the average profile, you see that, in winters, the impact of the roof is much less and for the reasons that Jeff has already described, as the councilman mentioned also, our winters in San Antonio are not really that extreme, which was a very positive result because that indicated that the new roof would not have a major negative impact on heat and energy use in San Antonio, which are, to begin with, not that large in the overall context of the energy use of the home.

Slide 53: Home electricity use intensity

So if I move to the second part of our work, as I mentioned in the second part of our work, we look directly at utility bills. So for each one of the homes we collected utility bills for at least one year before roof installation. In some cases, we manage to get more than that. And at least one year after the roof replacement, we got – we collected that information from our local utility company, CPS Energy, which have been incredibly helpful in the project and we greatly appreciate that.

After we got that information, we inputted the information into the EPA's portfolio manager which, if you have not used before, is an excellent tool; a very helpful tool to use.

So through portfolio manager, we achieved two things. We first aligned our utility billing information with calendar months, so it became much, much easier to compare them. But much more importantly, we normalized the utility data for weather differences.

What that means is, when you had utility data before the – in this case, before the roof replacement than after, you're not really assured of any difference between them was affected by the year after roof replacement, for example, being more hot or less hot or the winters being too cold or less cold.

So it's really important in studies like this to make sure that you account for these differences and we did that through, again, the EPA portfolio manager tool. So now, whatever difference we saw in the utility bills could be attributed to something that is actually happening in the home, not through – not to any weather difference.

As I mentioned before, we also conducted owner – homeowner surveys to identify any external variables that may have affected energy use patterns before and after the roof replacement. We wanted to make sure that whatever results we report are reflected of the impact of the roof as opposed to any other variables and we actually did identify four homes that did have such variables.

In one case, for example, the homeowner had four additional family members that needs to live with them for about six months post-roof installation, so obviously that would skew the results significantly. We had a couple of other homes that had major construction retrofits, one that had essentially being left empty for the majority of the post-construction period.

So we decided to remove these four homes and report the results without them. We also reported the entire sample as well just for information purposes, but really the results that we feel are more reflective of the impact of the roofs are the ones that exclude these four homes.

In addition to that, we also decided to look separately at homes that had central air conditioning and homes that did not have central air conditioning.

The reason behind that is that we expected the homes with central air conditioning to show a more positive impact since the major impact of the cool roof on home energy use is through reducing cooling home energy use, or if you didn't have air conditioning, you don't really have that much to reduce, so we separated those.

We maintained the group without central air conditioning because we expected to still see some impact there because some of them had window units that they didn't turn on all the time, but they still had some cooling energy use, but we wanted to look at those separately.

So if you look at the graph before you, the line that expresses the overall results of the survey which you heard about from Barbara already is the line saying "Old homes except excluded" which is that line. So that's all the homes that we looked at in phase one and, in that case, we showed about a 2.8 reduction in electricity use intensity in the home to 2.8 kBtu per square foot per year.

Slide 54: Home electricity use intensity

If you look at the homes with central AC, the reduction was larger. The reduction was about 5 kBtu per square foot per year. The reduction in the homes without central air conditioning was somewhat less. It was about – excuse me – it was about 1.4 kBtu per square foot per year.

If we look at the same numbers as a percentage, which is probably a better way of looking at it, you can see that, again, the overall stamp showed a reduction of about 7.3 percent in the electricity use intensity.

Homes with central AC, as we expected, show the larger reduction of 12.5 percent; while homes without central AC – and again some of those had window units that were turned on at least for some parts of the time, so it's not that they're without cooling completely, but these homes showed an average reduction of about 3.9 percent.


So, in general, all of the groups that we looked at showed an average reduction in electricity use intensity after the roof installation compared to before roof installation.

So, in summary, I think – I think the results of the first phase of our work show a clear positive impact of the new cool roofs on – certainly on the electricity use of the homes, but also on the thermal compression.

Even the homes that don't have their AC on all the time we expect to have witnessed an improvement in their thermal comfort conditions by the reduction in their added temperatures. And I think these results demonstrate the success of the program in improving both thermal conditions and energy use in the homes.

Slide 55: Thank You

So, finally, again, I would like to thank the City of San Antonio for asking us to conduct this



program. We appreciate having the opportunity to contribute to such an important project. I look forward to completing the second phase of the project and hopefully sharing it with everybody once we have those available.

Thank you, all, and I think we can be open to questions for everybody now, thank you.

Victoria Ludwig: Thank you, Hazem. That was really a great presentation and I commend you again on the work you did to monitor the effect of the program, as well as the plug for our EPA Energy Star Portfolio Manager tool. Thank you.

Dr. Hazem Rashed-Ali: You're definitely welcome.

Victoria Ludwig: And this is – as Councilman Treviño was saying, the data – look at the data of what they – what you did as a way to help if you're – if you were a city that wants to do something similar, and so, you have done a good job of explaining all that data to us, so I appreciate it.

# Question and Answer Session

Slide 56: Question and Answer Session

OK. We've had several questions come in. I don't think we'll have time to answer all of them and it's hard to choose. So what I will do, as I mentioned, we are definitely going to answer all of them afterwards when we post the PowerPoint and the audio on the web site which should be in a couple of weeks.

We will also include a transcript which will include every word spoken today, as well as the answers to all the questions that came in, including the ones that we didn't have time to do today. So, speakers, get ready.

I think the first question is going to go to Jeff. Where did this come from? OK. Jeff, we've seen some studies that seem to suggest that cool roofs, particularly on taller buildings, don't necessarily cool the air as the street level. Could you try to address this?

Jeff Steuben: Yes. So this is an interesting question about the environment in a – in a city where you might have, you know, shorter buildings and taller buildings and how they interact together in the cool roofs. So I don't have a – necessarily a concise answer about this. I think it sort of gets into the physics of air currents and sort of how you are interacting with the sort of immediate local environment above the roof surface.

But actually, what I wanted to plug in here for is the next presentation – the next heat island program is going to be talking about pavements, cool pavements, and sort of street-level cooling efforts, as well as cool walls, which is sort of the new area of looking at do we continue to address sort of the urban heat island.

So it may be true that, you know, it's not having – a 30-story building might have not have a huge impact at the ground level. But there are other ways to have those impacts through other cool surfaces as well.

Victoria Ludwig: Thank you, Jeff. I would agree with that. That sometimes it takes a combination of cooling strategies to have a measurable impact on the ambient temperatures.

But I would add that I think there – and I believe there are some studies that I can look up – there are – if you have several cool roofs in a – in a – in small area concentrated, that just gives you economies of scale and I think does help to reduce some of the ambient air, as well as the fact that, when you have a cool roof, you have less energy use in the building which means the air conditioner that's on the top of the building is not putting out as much waste heat into the surrounding area which also waste heat from air conditioners and cars as you – also contribute to heat island effect. So thank you for that answer.

Barbara, I think you're next. Let me see. Someone would like to know, how did you get buy in from the stakeholders and residents? You mentioned that – some of the ways that you were able to get residents to join the program. Were there any other sort of skeptics or that you had – that – that you – that you needed to sort of bring on board and, if so, how did you do that?

Barbara Ankamah Burford: Well, really kind of like – I think the biggest skeptics were just the residents. I mean, our partners are – they are always looking to provide more to who they serve. And so, I think we’ve done a really great job in San Antonio that we really kind of understand the benefits of partnering.

But what helped us is, once we got (back), you know, the first few houses done and a neighbor – a couple houses down could see it and actually speak to the neighbor and say, “Well, are you – are you sure you’re not paying anything back to the city?”

You know, oftentimes when we do housing programs, people – the fear is that the city is going to acquire – take this person’s home from them. That is constant fear that we’re always fighting against where we have to always make that clear that we’re here to keep our residents in their home.

And so, what we really just helped was the few – the few first houses we did were just the best testimonial for us because the neighbors could see that. And again, we initially did a lot of block walking, so we left applications and flyers and it was just – we visited those initial homes to, you know, gather testimonials of how the homeowner was feeling about the new roof.

We would get accosted by, “Why haven’t done my house?” “Well, we put out a flyer.” “Yes, you did. I ignored. I didn’t believe it.” Well now, they see it and so we were able to go back and help other people who initially kind of turned down the assistance who didn’t think it was true.

Victoria Ludwig: Thanks, Barbara. I’ve heard about another energy efficiency programs where people have to kind of see it to believe it. And so, it helps to kind of be available as you did to answer questions and be in the neighborhood to kind of show people in person how it worked. Thank you.

Dr. Rashed-Ali, we have a question for you. This one is, did humidity vary a lot during the study and could it affect the results? I don’t know if you measured that, but could you talk about humidity at all?

Dr. Hazem Rashed-Ali: We did measure humidity. So all of our data loggers were measuring both temperature and humidity. We didn’t see a major impact on the humidity before and after. We did look at it and we didn’t – we don’t expect that to have an impact on the (building) energy use since, in most cases, the air inside the attic would not actually make its way inside the home. So we don’t expect that to impact the results of the study, no.

Victoria Ludwig: Great. Thank you. Jeff, I’m going to go back to you. Does the council work with local builders to advance and advocate directly for cool roofs and new buildings? I think an adjunct to that might be if you could explain some of your members what – who they represent in the industry.

Jeff Steuben: Yes. So that’s a good question. I’ll start with the second there. So the members and the participants of the CRRC program really span the breadth of the roofing industry. So we have representatives from all different kinds of manufacturers and manufacturing sectors, as well as a lot of members of sort of interested parties.

So the EPA is actually a member of the CRRC, as well as consultants and contractors and sort of a lot of independent city officials and things like that. So there's a – there's a huge range of interest being represented by the CRRC membership.

But, yes, so the question about advocating and sort of working with local builders, we don't actually take too active of a role in this area because our role is to be an independent third party rating agency. And so, we want to avoid taking a – too strong of a position in favor of any one particular product or solution.

So, we provide educational resources, we help people make decisions. So, obviously, you know, we work with – with a variety of local governments and folks just to give them the information that they need and help them make a decision about the policies that they want to set. But we don't actually set policy or advocate for a particular policy. We just try to help people understand all of the options that they have and sort of get to that solution.

Victoria Ludwig: Great. Thanks, Jeff. That's very helpful. Barbara, we have, I think, a couple of quick – this should be easy to answer, but can you remind people how the program is funded and adjunct to that that I will add is did you look at any other way to fund it or how did you decide to fund it the way that you did?

Barbara Ankamah Burford: So, the program, the funding comes from our general – our city's general fund budget. So these are non-federal funds again, and so, that is how it initially started.

This fiscal year, through our housing – through our San Antonio Housing Trust, our housing agency that the city has oversight over and our councilman also sit on a board, they allocated some funding that the housing trust had to this program as well.

And again, these aren't federal funds, so we have the flexibility to utilize it with the program. So again, the recommendation is if, you know, the – as a city, if you can look in your own budget and come up with just even that initial \$200,000 to start, that's an awesome thing.

Victoria Ludwig: Great. Thanks so much. I think if there are other representatives of local governments on the line, which I know there are, that kind of question is really helpful for them to know the answer too. Hazem, a question for you.

The different phases of the project, was there any kind of learning curve that you developed, meaning, did you analyze any improvements that you could make in the impacts but, you know, as you went from one phase to the next? If that makes sense?

Dr. Hazem Rashed-Ali: Yes. It does, actually and it's a good question. And, yes, obviously, as with any other projects or activity, you learn things as you go through the project. So I think our biggest learning point on the research side is with homeowners and being able to get our equipment in there at the right time, to make sure that they are not interfering with them.

In a couple of cases at the beginning, we had to ignore some results because there were some interference from the homeowner, they went up into the attic, got to find out what's going on and so on. So that part we kind of got a process for working with them, what to tell them to do and not do and so on. So that certainly was a learning curve.

On the data analysis side, it also took us a couple of tries to figure out what exactly is the data that we're looking for and how to represent it in a way that makes the most sense to the audience which I think is very critical.

You can have a lot of information out there, but if you don't represent it in a way that makes sense for the – to the policymakers and that gets them the results that they can benefit from, then the data is much, much less useful. So I would say these were two areas in which we learned as we progressed with the project.

Victoria Ludwig: Great. Thank you very much. We have just a few minutes, but I do want to ask, I think, this question and I think any of the speakers can answer it because it's something that I've heard commonly asked which is, how do you deal with any potential unwanted glare that may come from a, you know, cool roof? And I think – I think that really kind of applies more to commercial buildings, so maybe, Jeff, do you want to – you may have thoughts on that?

Jeff Steuben: Yes. I think that's a – an important question is that sort of – it is a possible side effect of a – of highly reflective product and I think that gets to some of the new technologies like I mentioned, the cool colors and there are other types of products such as reflective materials which look, you know, dark or look a certain color from the street level, but are highly reflective from the sun's perspective. But if you – if you do have a very bright white coating that is going to result in a lot of the light reflecting off of that.

There are also other technologies – retro-reflectors is a term for something that reflects back at the same angle of the incident sunlight. So it's not going to bounce – it's not going to bounce at a different angle and, you know, hit your neighbors. But it is going to keep the energy out of the building and sort of reflect it back up into space.

Victoria Ludwig: Thank you. That's really – that's a good answer because I have gotten that question a lot as well as glare from streets which we will have Los Angeles mentioned and that's a good segue to wrap up here.


Slide 57: Cool Fixes for Hot Cities Part 2: Los Angeles

This was part one of our series Cool Fixes for Hot Cities talking about San Antonio as you heard. On September 12, we will learn about Los Angeles. They also are doing cool roof work as well as painting their streets light colors, including white. So please join us for that. Registration is open now.

Slide 58: Connect with the Heat Island Program

And as I mentioned, we are going to put the presentations up on the web, on our heat island homepage web site. That should be up in a couple of weeks, we will send an e-mail to anyone who registered for this event letting you know that they have been posted and that will include the presentations themselves, an audio recording and a written transcript.

At the end, when you exit – when this is over, there will be a feedback form that we really ask you to help us fill out. It won't take long and it helps us plan future webcasts. Sign up for the newsletter by clicking on this link, and also, you can go to our web site for a form. We're going



to be sending out a newsletter in about a month.

And then, I just want to thank Councilman Treviño, who I know has left; Barbara; Jeff; and Hazem; all great presentations and I appreciate you taking time to help our audience understand how cool roofs can actually be effective for both reducing the heat island effect and also helping lower income residents improve the safety of their homes and save money on utility bills.

I think that's it. At this time, James, I'm going to turn it over to you.

Operator: Thank you. And this concludes today's conference call. You may now disconnect.

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