

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

Michael Freedberg: Hi, everybody. Welcome to the 21st of July installment of the Better Buildings Summer Webinar series. It's great to have all of you join us. We have a large group who have signed up for today's session. I'm Michael Freedberg. I'm with HUD's Office of Environment and Energy, and I'll be your moderator today. In this series, we're profiling the best practices of Better Buildings Challenge and Alliance partners and other organizations working to improve energy efficiency in buildings. We hope you'll join us for the remainder of this summer series and stay tuned for the 2021 series that we'll be launching in the fall. So lots more to come. Next slide.

So, the importance of this topic has never been greater. We're building homes more efficiently than ever, and as a result of the COVID-19 virus, people are spending more times in their homes than ever, and that's presenting new management challenges for multi-family building owners and operators. And of course, we all know that asthma-related respiratory ailments have been identified as one of the risk factors for the virus. So we really need to be sure that when we rehab our homes, build new homes, and operate existing buildings, we maximize the indoor experience and minimize the hazards. Next slide, please.

I don't have to tell this group that health and the indoor environment are closely correlated. Up to 40 percent of asthma attacks can be linked to home conditions. Thousands of deaths related to radon. And of course, falls and safety issues are always a challenge. Next slide.

So today, we're going to do a short introduction to energy and health. That will be my piece of the puzzle. I'm then going to hand the baton over to the great panelists that we have lined up for today's session. Then we're going to do some moderated discussion. And finally do some Q and As from all of you. So please be prepared to enter your questions and answers and we will definitely get to as many as we can. Next slide.

So, obviously, all of us that are in the energy efficiency space know that energy efficiency itself can reduce health risks, just by insulating air sealing properties, heating system upgrades, we improve the quality of the air by removing moisture. We can lower mold accumulation. And those translate into fewer asthma symptoms, can impact your heart disease risks. And finally on the right here, reduce hospital stays and medical visits. We're seeing increasing evidence that there's this connection. Next slide, please.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

And, of course, when we add healthy housing practices in addition to basic energy upgrades, we see some additional improvements. This is the Bright study supported by the Office of Healthy Housing at HUD showing fewer ventilation complaints: 27 percent versus 89 percent, all the way to if you eliminate combustion products on the right, no problems with the indoor air quality as far as combustion is concerned. Next slide, please.

And we also now have evidence that these interventions paid for themselves. This is a CDC evaluation that showed strong evidence of the effectiveness of these indoor interventions, particularly when it comes to asthma in this case, benefit to cost ratio returns of anywhere from 5.3 to \$14.00 on the every dollar that's invested. So there are significant cost benefits, as well, both on the health side as well as on the building operating side. Next slide, please.

I wanted to mention before we get to our speakers that in addition to today's session, my office, the Office of Environment and Energy at HUD, have launched a Health@Home guidelines and trainings series that began last month. We'll be doing the second session in this four-part series this Thursday, actually, July 23rd, where we'll be dealing with contaminants and pest-free measures that you can adopt when you're doing a rehab project, focusing more on single-family and low-rise multi-family buildings. So if you're interested in that series, go to the Health@Home page at Exchange, and we will get you signed up. Next slide, please.

So today's session is really going to focus on some of the exciting things that are being done by both Better Buildings Challenge Partners and others in this space to layer in healthy housing measures and practices, both on the buildings side scale, as well as on the community scale. And I think you'll be really interested to hear about some of the innovative work that's being done to better integrate healthy housing and energy efficiency upgrades or new construction. Next slide.

So, as I said, we want to engage all of you as best we can with a large group of you. So, I'm going to ask Becca Curry, who has been a key member of this team, to just talk you through how to get onto the Slido app, and also some other housekeeping details, and then we'll get into the meat of the discussion. Thank you.

Becca Curry:

Great. Thanks, Michael. Hello, my name is Becca Curry with ICS. And before we introduce our panelists, I'd like to share a few

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

housekeeping notes with you. Your phone line is on mute today. If you experience technical issues during the webinar, please type them into the Go to Webinar chat box on the right side of your screen.

We are excited to announce that today we will be using an interactive platform called Slido for Q and A and polls. Please go to www.Slido.com right now using your mobile device, or by opening a new window in your Internet browser. Today's event code is #DOE. If you would like to ask any of our panelists questions, please submit them at any time throughout their presentation.

We will be answering your questions near the end of the session. You can select the thumbs-up icon for questions that you like, which will result in the most popular questions moving to the top of the queue. I will give everyone a few minutes right now to open up Slido, and we will be launching a poll there shortly. Next slide, please.

So, now we'd like to do a quick poll to hear from you. Again, please go to Slido.com and type in the event code #DOE to access the poll. So the poll question is as follows: Which of these healthy housing measures is most important to you in addressing health in your energy upgrade projects? Choose up to three of the measures you see now on your screen. And we're going to pull up on the screen the Slido poll so we can actually see all of your results live.

So, give everyone a few minutes to respond. It looks like indoor air quality and ventilation upgrades is in the lead with about 87 percent, followed by mold and moisture mitigation. Then we have following that close in a tie healthy building materials and mitigate toxins. And then coming up at the bottom, we've got well-being measures, as well as integrated pest management. So it seems like indoor air quality, ventilation is really what people on this webinar right now are most interested in. So thank you for that.

So, now I'm going to turn it back to Michael to introduce our panelists.

Michael Freedberg: Thank you for that, for all of your participation. That's obviously good information. Not surprising that indoor air quality really comes out on top. So we will hopefully address that topic in a variety of ways. So now to today's presenters. We have a number of really outstanding folks who are going to be talking today. Drew

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

Vernalia with the Codman Square Neighborhood Development Corporation, Krista Egger from Enterprise Community Partners, Neil Steinkamp from Stout, working with NYCHA, the New York City Housing Authority; Ruchi Shah with the Tenderloin Neighborhood Development Corporation San Francisco, and Roberto Valle from the Healthy Building Network. So great to have all of you. They're going to speak really briefly and then we're going to do an interactive discussion and get into some of the issues in a little bit more detail.

So the first speaker is going to be Drew Vernalia, who is the asset manager for the Codman Square Neighborhood Development Corporation in Boston. They're doing extraordinary work working with medical health organizations in that city. Drew oversees portfolio redevelopment energy and resident life improvements in their 19 affordable housing properties, both in Boston and the surrounding area. So, Drew. Good to see you.

Drew Vernalia: Thank you, Michael.

Michael Freedberg: Thank you for joining us. Over to you.

Drew Vernalia: I'm glad to be here. And hello to everyone. I'm Drew and I work at Codman Square Neighborhood Development in Boston. And as a community development corporation, we aim to change the community and people's lives. So there's a lot to do. Next slide, please.

In my three-part presentation here, I explain the key green planning tools that we use. As a disclaimer, I quickly go over these. So if you want all the great details that you'll see in the slides, you'll have to get you copies of the slides afterwards.

I start with green community and organization plans, including strategic operating sustainability plans. Next is green asset management plan that has individual property plans and a dashboard planner. And last, green development, which includes development standards and health action plan. But before we can plan for health, we must understand it. Next slide, please.

Of all the factors affecting health and well-being, only 20 percent comes from doctor care, which is in the left quadrant of this graph. CDCs like us are involved in 80 percent of health work, which is 30 percent behavioral, 40 percent socioeconomic, and 10 percent the physical environment. Starting on the outside right and going

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

around, our CDC has diet and exercise classes, an urban ag program, child after-school classes, safety programs, social events for residents in the community, education on home ownership and finances, job assistance, business advising, financial coaching, savings programs.

For transportation successes, we've facilitated train stations in Boston, built transit-oriented developments, and walkable bikable streets. In our rental housing and affordable homes, we improve indoor air and outdoor air quality, among other things. And last, provide access to care directly in some of our newest buildings. All this relates to health and housing. Next slide, please.

So, green is the goal in all our plans. And by "green," it means always health included, and it has three meanings to us. The first green is physical buildings, developments and the neighborhood. Better buildings equals huge financial benefits to us, our neighborhoods and the planet. It also means validated health benefits, such as cleaner outdoor and indoor air, better lighting, acoustics, and thermal control.

Although greening the physical environment is only ten percent health, we go beyond that doing green communities. We recently achieved a certifiable LEED neighborhood, which encourages biking and walking with street infrastructures, as well as health, nature interactions through sidewalk and property landscapes.

The second greening is healthy habits, which is 30 percent of health. Think garden green vegetables, like this picture of our urban ag site called Oasis. We promote healthy living for our residents in community.

The third last, and not least, green is money: income, jobs, and social well-being. That is 40 percent of health. So we promote economic prosperity in our many programs. Next slide, please.

So to go green for your company, the key is within your strategic and annual operating plans. Have sustainability and health goals for all departments. They go hand-in-hand. Due to time today, I don't show these strategic and annual operating plans, which are fairly common practice. But I share a community sustainability plan. One pointer here is if you're trying to start green, consider a green culture movement in your office by energy conservation, reducing, reusing, recycling, and again have everyone participate. Next slide, please.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

So here is our community sustainability plan with all our departments across the top and green categories going down the left. Again, every department should attempt sustainability goals. Like here you got climate, energy, water, waste. But also health goals like mobility and health, which is at the bottom. There's more. So, next slide, please.

Most of these – actually five of these – are health categories. Ecosystems, food, and health, innovation, economy and jobs. Equity and livability. So again, you'll have to get copies of these slides, but I'm just showing you. So if you go to the next slide, please.

Part two is here is green housing. This property featured in the BBC blog got all-new LED lighting, solar, boiler retrofits. For health and well-being, it has a new rec area and garden, which you can see on the lower left. We have a computer learning center. It's not pictured here. But that's for education, job assistance. We've also started HUD's family self sufficiency program for financial coaching and savings. So thank you, HUD. Now, let's see how to make a green asset management plan or GAMP. Next slide, please.

So a GAMP should have a brief intro, individual property plans like this one, a dashboard, and policy attachment, which may include your green procedures and a green resident handbook. Here is the individual plan for this property I showed. Notice the two columns labeled Green Practices in Place and Green Practices Planned. And then on the left, notice the green and health categories. So, commitment. An example is entering the Better Buildings Challenge. Climate, electric, heating, water, waste. But also health things, such as mobility, health and food, environment, ecosystems, economy, jobs, equity, and livability. So next slide, please.

The second main part of our GAMP is my master dashboard planner that combines bench-marking and green planning together. Building engineers with the help of list helped me create this awesome tool. At the top you set and enter performance targets. You copy your property address, property names, addresses, and data from portfolio manager, and then the colors indicate building performance. Notice heat, gas, electric, and water bench-marking. But also notice the smoke-free housing and retrofit columns on the right. So, cut off on the slide here off to the right are many more

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

green and healthy planning columns like green cleaning, gardens, water retrofits, solar, et cetera. Next slide, please.

So here is our Waldeck development highlighted, which is uniquely for homeless and high users of medical care. These persons have a staggering cost upon our health care, which is why hospitals are huge donors to housing like this. Namely, you see Boston Medical Center, Enterprise Community, and Boston Health Commission are partners. Next slide, please.

So no development team should be without development and construction standards. These are the major categories that I included in our plan. So you have planning team, site selection, massing, building programs, landscape, circulation around the site, of course, unit design, building systems, materials selection, and culture. Next slide, please.

And the last healthy planning tool we have is – and this is Waldeck's health action plan in a summarized format – you have key health issues selected and interventions and strategies. This is the tool that comes from Enterprise Communities. Just take a look. You can see if you look at trouble sleeping, for instance, and you can see we have interventions to enhance safety and reduce noise. So we analyze the locks, the gate safety, and for noise reduction we have doing window replacements and adding wall insulation. But this is a great tool if you have a property that has medical site on staff, and having a program like that.

So that's it for me. Next slide. And this is my contact information here.

Michael Freedberg: Okay. Thank you, Drew. That was really interesting. I think we learned a new term, GAMP, GAMP. We have to unpack that later during the discussion. You also heard about the Health Action Plan that Codman Square is developed for that project, and we're going to hear more about that from Krista Egger next, who is the director of initiatives at Enterprise Community Partners, managing Enterprise's national green training and technical assistance programs.

So Krista, as many of you may know, is obviously closely involved in the Enterprise Green Communities standards and criteria. But I think we're going to be hearing more today about the Health Action Plans that Enterprise is developing with a number of organizations. So Krista, over to you. Thank you for joining us.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

Krista Egger:

Great. Thank you, Michael. Really appreciate it. So, as some of you all may know, Enterprise as an organization, we're a national non-profit in the affordable housing space. And we develop programs. We advocate for policies. And we deploy capital to promote affordable rental housing. We've been around for about 35 years. We've created more than half a million homes, invested more than \$53 billion and touched millions of lives. And we recognize that there's more work to be done to solve for affordable housing in this country. And even though we're solidly in the housing space, we recognize that the decisions that we make with housing impact health. And we like to say at Enterprise that health begins with home. One minute. Excuse me.

Sorry for that interruption. I hope I'm in a quieter space now. So at Enterprise we say that health begins with home. And intentionally or not, the decisions that we make with design, and development, and operations influence health outcomes of residents in the housing projects that we're involved in. So a few years ago we challenged ourselves to think about what framework could we develop to assist and really catalyze the ability of affordable housing developers to consider how their practices influence health.

We were inspired by the HIA framework, Health Impact Assessments, which is in the domain of public health. And we were inspired by the integrative design process, which is in the domain of green building. And with those two processes created the Health Action Plan framework. And so I'm going to share with you a little bit about the two key inputs that are really non-traditional in affordable housing that go into the Health Action Plan process, and then how we're working on scaling it. So you can go ahead and move to the next slide.

And I'll share with you that the first non-traditional input in some ways in these health action plans is getting input from community stakeholders. So while involving stakeholders in your development process may be a part of your process today, we've found that it's not common for affordable housing developers to really query the impact of community about what aspects of their health are of most priority to them when it comes to how the built environment influences their health. So that's a key component of the health action plan process that we've involved.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

And you can see here on the screen some of the examples of the benefits that this provides, from lifting up health concerns that you would not be able to discover without this person-to-person conversation, building relationships, building power and agency for residents, et cetera. And we've actually found that through many of our health action plan engagements, mental health issues come up more often than not in this community stakeholder involvement phase, such as social cohesion and connection to community members, which you would not be able to solve for unless you're able to identify it through this process. So that's community stakeholder involvement.

And then if you go to the next slide, the other key input that's non-traditional for affordable housing development is bringing in a public health professional. So bringing in someone from outside the housing space to provide their input in your process of development. So when we're referencing public health professional, that person can come from many different backgrounds.

It could be an organization. It could be an individual. They could work for a local public health departments or universities or private practices. They could have many different titles. But the key is someone who has experience in accessing and analyzing community health data so you can evaluate what the needs are in your space, that they have experience in engaging community members and assessing health priorities, and they have experience applying this information to housing so that they can speak housing, if it were.

So if you move to the next slide, you'll see the health action plan process as it comes together. First, housers commit to prioritizing health in their development process, then partner with a public health professional, then go through the data analysis phase, and then engaging with community stakeholders, then identifying different housing retrofit strategies or new construction strategies that can respond to those needs that they identified, and then measuring that over time.

So, if you go to the next slide, I'd like to just highlight for you all how we've tried to move from just concept, to piloting, to really scaling this health action plan process in affordable housing. And we've been approaching this scaling concept at Enterprise by merging with my colleagues at Enterprise who have expertise in managing capital funds for affordable housing. So we were really

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

thrilled to announce last year the launch of two new funds. One is an equity fund, the Housing for Health Fund. And then the other is a loan fund, the RxFund, that we were able to launch with initial investment from Kaiser Permanente.

And each of these funds provide capital for affordable housing development, and they require the use of a health action plan to guide those developments. The equity fund also requires a measurement aspect of evaluating how the residents are impacted over time. Although the loan fund does not because of the short length of those capital tools. But those are huge. This is a huge step forward for the health care sector and the affordable housing sector to collaborate in making decisions on development based on resident input and ensuring that those are paying off over time through measuring those results. And you see the five logos of the affordable housing developers who currently are participating in one of these funds or the other. And we're looking forward to growing these over time.

So if you move to the next slide, you can see some examples of the different types of interventions we see some of these developers choosing to input in their property based on the framework. The categories at the top are the five different categories that we see are most often available for affordable housers to use to actually impact health through their decisions and development.

Then if you move to the next slide, you'll see some learnings from the strategy selection that we've picked up from an evaluation that we did of this pilot that really boiled down to weighing choices based on impact, evidence-based, feasibility, and cost. But if you move to the next slide, you'll see some of the outcomes of our evaluation pilot, which even with developers who were prioritizing health in their properties from the beginning, really found an elevation of health in their residence through participating.

And then if you move to the next slide, I'll just really highlight for you that developing strong partnerships between the five different entities that you see here – the developer, residents, community members, designer, public health – are essential for success.

And if you move to the next slide, I'll just wrap up by sharing that measuring impact of the project of the framework is critical, also, so that you can ensure that you have the results that you would like by looking at evaluation metrics through design, operations, and self-reported resident health data.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

So, if you move to the next slide, I'll close, just by showing you some places you can go to find additional resources for this information, and really happy to follow up with anyone afterwards to provide more detail over what I've covered here today. So, thank you.

Michael Freedberg: Thank you, Krista. Good to hear about the progress, both on the call to action plans and the equity and Rx Funds that you have managed to put in place with Kaiser Permanente. I think that's a potentially great model for others around the country. And hopefully some of the organizations on this call will be able to take advantage of those opportunities.

Next, we're going to hear from Neil Steinkamp. And this is going to be a little different. It's a focus on a specific contaminant – in this case, mold – that Neil and the team at NYCHA, the New York City Housing Authority, took on as a challenge in their many units around New York City. So, we were very interested to hear and learn about the protocols and the regimen that NYCHA set up to address this very specific challenge that has very significant health impacts. So, Neil, over to you. Thank you for joining us today.

Neil Steinkamp: Thank you, Michael. Hello, everyone. We'll go to the next slide.

As Michael said, I want to share some information regarding the standard procedure that NYCHA is implementing now that is commonly referred to as Mold Busters. But let me provide a little bit of background first so we can appreciate the scale of what this program is intending to do and better understand what it has done and where it will go from here.

So we're talking about a half a million people, roughly, that are housed at NYCHA. Obviously, the largest public housing authority in the US, and is a population roughly the size of the entire cities of either Boston or Miami. So I know everyone on this call appreciates the scale of this is significant. Approximately 300 developments, 175,000 apartments across the five boroughs of New York City.

We'll talk mostly during the next few minutes about mold. At NYCHA in 2019 we saw approximately 35,000 mold work orders. So a significant number, obviously. Most of them requiring some form of relatively complex remediation activity involving skilled trades of some form. We're also considering – I'll mention this near

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

the end of the presentation, as well – how this same concept can be applied to the nearly 300,000 LEED work orders that NYCHA experiences on an annual basis, as well. Same concepts, similar benefits. And we expect similar impacts, as well. But, mold presented the first in a critically important step in reducing the contaminants in the units. Let's go to the next slide.

So, the Mold Busters standard procedure really sits on three really critical and key conceptual foundations. The first is a rigorous standard inspection. And we'll talk about that a little bit. But it's a standard procedure that is designed and intended to create a standard, that there's a consistent process of inspection and evaluation and work order creation. And there's a variety of benefits to that. But it's rigorous and it's structured. And that improves the opportunity for staff to go through the process consistently and to have it fully and completely remediated.

Obviously, a consistent remediation process follows from that. And then ensuring that there's a process of review through quality assurance, and then oversight and accountability to make sure that when that process is breaking down that it can be redirected and corrected. Next slide.

Really quickly I'll hit on the high point of the impact of this standard procedure. Prior to the implementation of this standard procedure, NYCHA was experiencing recurrence rates for mold in the 20 to 30 percent range, which means that after completing the remediation work, mold was recurring that frequently. That's obviously a significant waste of resources and exposes the residents to a significant amount of risk associated with consistent persistent exposure to mold.

We have seen through the initial evaluation of this – which is obviously ongoing and continues – that those recurrence rates have dropped dramatically down to the two-and-a-half to maybe six or seven percent, depending on the method of recurrence calculation that we use. And there's good reasons for that. Again, the three pillars that we talked about on the last slide create a structure, and a consistency, and then ensuring that the work is done correctly every time. And we have seen that by implementing that dramatic reduction of recurrence. A better use of resources, a more efficient use of resources, a more cost-effective use of resources. And obviously, most importantly, better and safer housing for the residents. Next slide.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

I want to go through sort of what this looks like. I'll go through these slides quickly. As Drew mentioned, we will all receive these slides so you can review this in addition, and feel free to reach out. I do want to mention that this standard procedure was developed in part by the extraordinary contributions of Bill Southern and the team at MicroEcologies, who you see referenced at the bottom of this. I'll reference Bill on several occasions. He is serving as the independent mold analyst in the bios litigation, which has a system of development of the standard procedure with NYCHA.

And they have done truly extraordinary work to create this and to continue to refine it over time through the development of the standard procedure. So you can see that it uses a handheld and requires a variety of inspection equipment, moisture meter, and a variety of other tools to ensure that all of the moisture conditions are being evaluated during the inspection. Next slide.

We'll move through these pretty quickly, but I wanted to show some screenshots of what this looks like. So on the handheld, you have an app. You can sort of start your work order. During the inspection, you've got the particular unit details. And then you just, you jump right into evaluating the conditions. Next slide.

You go through the process of, obviously, seeing things visually. But you've got a few key questions you're asking. Is there visible mold? Is there visible water damage? And is there a moisture measurement greater than or equal to 599? Which is a threshold – very reasonable one – frankly if there's moisture measurement, it's typically much higher than that. And so these are three key questions that help to identify do we have a situation? Next slide.

Then you go through the process of really evaluating that. What does that look like? What are the things that need to be done to correct the situation based on the answers to those questions? Next slide.

Moisture conditions are being measured, right? Here's an example of that using the moisture meter. And all of the results of these are being reported for every single inspection. The answer to every question, every measurement. They're all being recorded. And you have a phenomenal opportunity to use data to help inform this process. Next slide.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

Identifying root cause. As you can see here, there's a lot of questions that are asked about the conditions in the unit. What is going wrong? What is not working correctly? Next slide.

Conducting wall breaks. There's a whole bunch of steps here in the process. I've only highlighted a couple just because of the time that we have. But there's lots of ways to make sure that you're guiding people through the process. What is required? A wall break is a great example. But also this continues to highlight for us the needs for just regular review and training. But the structure and data gives you the opportunity to see how frequently things are happening, whether they're getting done correctly, whether the mediation's working correctly. Next slide.

Submitting the inspection work orders. To go through this process, you've completed the work order. There's these validations to ensure that the resident has the opportunity to sign for it. The maintenance worker, the supervisor, everyone. There's a role for accountability in the process, as well. And then you selected the create trial work order, right? So there's an automation process. Based on the answers that you have for the inspection results, it will automatically create the necessary trial work orders. And those are all mapped to the answers to the questions and the conditions that you evaluated during inspection. Next slide.

And as I said, all of those are automatically generated. And then one by one they are completed. Important here is at the end of the process, once you've completed all of these work orders, there is a quality assurance work order that is also generated. So you finish the remediation process. There is a requirement that the property management supervisor or assistant supervisor goes back to the unit to evaluate whether the work was done correctly. And that has been an incredibly important and incredibly valuable part of the process to ensure that it's done correctly. And that is what is ensuring that recurrence is not happening, because you're making sure that the work gets done right the first time. Next slide.

A few insights here, some of which I've touched on through the course of my comments already, and I know we have a limited amount of time, so I won't go through these individually. But as Drew mentioned during some of his remarks, as well, there's so much value in the data and for an iterative process. And that is what the Mold Busters standard procedure is really allowing for is the opportunity to see is it working across the portfolio?

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

And when it's not working, you have the opportunity to respond to that, refine it, evolve it. And we've continued to do that, working with MicroEcologies to understand what's not working and why. Where are the opportunities for retraining? Where there's opportunities for changing the standard procedure. And that's an ongoing process. But you have to have the data, and you have to have the process around that to make sure that you can do that. Next slide.

Here I've just laid out some of the costs and benefits. As everyone can appreciate, doing mold remediation right the first time has a tremendous number of benefits, both fiscal, social, and health-related. The costs of those are outlined on the left, as well. Of course there are some, as there are with any of these programs.

But the ability to and the importance of measuring things and evaluating things, which Krista mentioned as well during her presentation, is critically important to all of this. So a structured data and a structured process becomes really, really important. Based on the results that we're seeing here with the Mold Busters program, we are working to implement this same sort of concept across the portfolio for leak work orders, as well. So we're really looking forward to that in the months ahead. Next slide.

So my contact information is provided there. Certainly welcome anyone reaching out with questions, comments, or ideas. Thank you.

Michael Freedberg: Thank you. Thank you, Neil. That's just great work. We're going to keep moving. We're going to now go to Ruchi Shah, who is with the Tenderloin Neighborhood Development Corporation in San Francisco. And Ruchi manages their portfolio-wide sustainability program, 43 properties in the Bay area. And she is their senior sustainability manager. Over to you, Ruchi. Thank you for joining us.

Ruchi Shah: Thank you, Michael for having me and good afternoon, everyone. As Michael already mentioned, we are in San Francisco. We have been building affordable housing for over 35 years. And we not only build, but we operate and manage. So you get the whole life cycle of affordable housing. And our operating philosophy has been that housing is a basic human right. In moving forward, it's not just to provide access to affordable housing, but we need to look at how energy and other aspects of sustainability holistically.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

And given in the new reality we are, health is not at all an optional category now.

In terms of our demographics and who we serve, we serve the most vulnerable population in San Francisco, people making less than \$20,000.00 a year is a majority of our population. And imagine surviving at that salary in the city. We are located in eight San Francisco neighborhoods and are growing at a very high pace. As we speak, we have 43 buildings and 11 more in development. Beyond housing, a lot of our work comes in in the form of services. We have a comprehensive urban agriculture program. We have our own people's garden, which is open for community through urban ag for every building we have dedicated health and programming activities, access to code use, and we also have social services onsite for every building. So we look at housing holistically. Next slide, please.

In terms of sustainability and what it relates to my work, right now we have five goals organization-wide. And I'll talk in a bit how those impact new construction, as well as our current portfolio. But as part of BBC and our commitment to the Department of Energy's challenge, as well as our partnership with HUD, we are committed to reducing energy and water throughout our portfolio. We already met our first target in the first ten years and we renewed them. We are also, given that we're in San Francisco and there is a tremendous focus on compost and recycling, that's one of our goals is to increase waste diversion and engage residents as part of that.

Recently, we started measuring carbon, because often that was left out of the equation. We focused too much on just energy. We also have a goal, too, for every new building we built, look at solar P. Traditionally, we are focused on solar thermal because we had a lot of gas-based systems. But moving forward, we are building all electric. Even though it's not a code mandate yet in San Francisco, we know that's coming our way. So we are already preparing. And that has a huge impact in terms of reducing combustion on site. We are kind of eliminating it altogether.

And then, as Krista mentioned with Enterprise standards and other certifications and rating systems, we are adopting a goal to have GreenPoint Rater or LEED, and we are looking at different levels in terms of what we can achieve for every certification. Not only because in most cases it's a funding requirement, but that's the standard we want to have for every new building we build. On a case by case basis, we are also starting to look closely at occupant

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

health-based design approaches. And many of them are being focused in terms of operations. But we are looking from a design perspective from the get-go what could be achieved. So on top of it on one of our FitWel pilot that we are doing. Next slide, please.

In addition to the goals, we have two ambitions, which to us are what we can do above and beyond. And we are starting to focus on healthy building materials. Some of these things we have been doing, but we are taking a holistic approach as part of our design guidelines. And I share that in a bit with our partnership with HomeFree and Healthy Building Network. Currently, we are – it's a great timing because we are updating our design guidelines and we are incorporating what we want, what we do not want at all in our buildings, and also going deep down into, based on our research, based on what we have put in our buildings, we are recommending products.

There are some open-ended items and specifications, too. But where we know what we want, we are clearly saying to our architects what to specify. Embodied carbon is sort of a new approach, too, that we have started taking a closer look at since last year. All electric building is one strategy on operational carbon. But embodied carbon, healthy building materials are a part of it to see what could we do in terms of low carbon. Because these things, once we decide what we put in the buildings, the carbon is locked because we're not going to change insulation down the lane.

One of the key areas we're focusing on is concrete. A lot of our buildings, given the type of development we use, are very heavy in terms of concrete usage. So we are working with our structural engineers to increase the amount of cement and supplemental cementitious materials – meaning less concrete and more of other things which have low carbon impacts. And insulation is also a key focus for that approach. Next slide, please.

In terms of opportunities, we're seeing these sort of three buckets where our work on sustainability and health touches each other, as well as there is a great amount of overlap, as Drew and Krista and others already mentioned. From a design perspective, we can do a lot in the construction. Also, as our buildings get older and we do substantial rehab or retrofits, we are taking a closer look at what materials we are putting in. And then a lot in terms of mold remediation, leak detection, and other things gets looked at in operations and maintenance. And from where I sit in property management and I closely work with the facilities team to sort of

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

make sure we all are talking to each other, not operating in silos, so that there is a clear chain of communication between these three areas of work. Next slide, please.

As I mentioned as part of our goal our baseline standards are LEED and GreenPoint Rated. And they also touch on many of the health indoor air quality aspects, which gives us more comfort. With every new building we are doing better. We are making sure that the standards are maintained. In terms of what more we can do beyond these is that we are looking at FitWel and Living Building Challenge standards. Not necessarily every new building has to meet this certification. And I don't think the key is to meet certification, but it's to look at these approaches and see what could we adopt. So we are taking a closer look at that as part of our design guidelines, which is happening right now. Next slide.

So as I mentioned, we have one project in new construction that is looking at FitWel design certification. In a sense, FitWel is a building certification that looks at design, as well as operational strategies to support health and well-being. And it's really dependent on what population are we serving? And where we need to put more focus on.

The good part about the certification is that there are no prerequisites. So right now in this stage as we are exploring, it gives us a good sense of what we are already doing, where we are validating our approaches, versus where we need to push ourselves further. They have seven categories and in each category several evidence-based strategies. For us, we took on, we decided to do FitWel in sort of mid-design phase. So it was not the goal from the get-go. In mid-design phase, we learned that this could be a great opportunity. Let's just try it out. So we started working with architects.

And some of them, currently, just based on our design, we are at one star. We are still having ongoing discussions on can we achieve two stars or three stars? But it's not sort of a funding requirement or anything. We're just doing it for our own knowledge, and just to validate our design approach. In the project, the good part was the registration and certification fee is not that expensive, but it takes a lot of due diligence, paperwork, and documentation. And our architects were really generous to share the costs. Because as I mentioned, this was not planned from the get-go.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

I just want to quickly highlight though the project that I mentioned in a second did not go through Fannie Mae's lending, we had a separate lender. But, for our other projects, looking already going through Fannie Mae as our lender, this might be something really interesting because they have basis point reduction if the building gets FitWel certification. Next slide.

So the project at 681 Florida. It's 130 units in an urban setting, nine stories. So high-rise residential development. The population type is going to be families – formerly homeless families. And the goal of this building was to sort of ensure that Latino families, this is in mission neighborhood in San Francisco, were not being forced out as part of urbanization approaches and what's happening in the city. So it has a mix of studios up to three bedrooms. Next slide, please.

So here is a quick snapshot on some of the things which we are doing, anyways, as part of our urban ag programs. As well as just being in an urban setting, we are having a great proximity to transit and things like that. But in terms of what the maybe areas and the known areas were, we are still exploring what could we do more in terms of outdoor fitness. This building has rooftop garden. But we don't traditionally have an exercise room in our buildings, just because we're listed as you know in San Francisco, it's super hard to manage with all competing needs and parties. So we are looking at really can we get funding for a few bikes, stationary bikes, and things like that?

In terms of the new part, water quality is something that we don't do active testing. We just rely on city's source. And we have water outlets in our buildings. So we are seeing what would it take for us to do some like additional quality testing. We are working with our urban ag teams to see what can they do for healthy food and beverage policies. Usually, we have a standard vending machine, and they have things ranging from pretzels to Cheetos, and whatnot. So can we be more strategic about what we offer to our residents?

And also it's not here, but one of the things we are actively discussing as part of this project the overall organizational strategy is smoke-free buildings. Right now we only enforce no smoking in common areas. So we're trying to think and reinforce that. We have to talk to the city in terms of in-unit no smoking, as well. Because as we do our post-occupancy surveys, as well as when we talk to residents, some of them have real concerns about smoke

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

being transferred into their units as part of ventilation. So we are tightening our standards on that, too.

Michael Freedberg: Hey, Ruchi, I think we have one more minute, and then we can move to our next speaker. This is all great. Thank you.

Ruchi Shah: Yep. Can we move to the next slide? Yep. I'm almost at the end. Yeah. And just quickly highlighting with Healthy Building Materials, part of specifications we are looking at several of these programs and certifications. And next slide, please.

I can give a quick snapshot of what we are doing with HomeFree. So right now in our basis of design, we are taking this traffic light chart approach, where many categories to say what's in green what we want, and we are asking architects to take a closer look at the specified products. Next slide, please.

So, lastly, with my presentation, I really want to spark that we have to move beyond being hopeful and really focus on taking action, as we are in the midst of a pandemic. So thank you, everyone, and happy to answer questions.

Michael Freedberg: Thank you, Ruchi. That's great. Unfortunately, we didn't have more time to get into the Home Free slide. But I think we'll get some more information from Roberto Valle Kinloch, who is going to now talk through some of the issues related to material selection and their destiny, which is really the work that the Healthy Building Network is doing through the HomeFree project. So, Roberto, thank you for joining us.

R. V. Kinloch: And thank you, Michael, for the opportunity to be here and share about the work that we're doing at HBN, and specifically HomeFree, right? And for those of you who are not familiar with HomeFree or HBN, we are a non-profit. We've been around for over 20 years. And we have a division to advance human environmental health.

And we do so by improving transparency on hazardous chemicals, but also by inspiring healthier product innovation. The way that we work is we leverage cutting-edge research and product materials and then their impact on health. And we use this information, this knowledge, to develop products, and ultimately build the capacity of stakeholders in the construction industry so that together we can make better decisions about the materials that we specify and ultimately use, right?

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

Now, HomeFree is HBN's national initiative focus, specifically in working with affordable housing leaders, called architects, developers, contractors, building owners, managers, right, who wish to improve human health by using less toxic materials. Slide.

And when we were discuss – and this is something that I want to address. When we discuss strategies, for example, to deliver sustainable and green buildings, it's not uncommon for conversations to gravitate towards accounting for strategies that involve energy, and water efficiency, technologies, and measures, including the adoption of passive design concepts. We talk about responsible sourcing and efficient material use including, for example, using wood that is certified or materials that can be reused, recycled, or composted. We talk about strategies that can help to minimize or avoid – even better yet, right? – waste and pollution and that is originates from the operation and the maintenance of buildings.

And this is all really important, but one aspect critical component that is often missing from this discussion is how the toxic chemicals that are found in the building products that we use to achieve or to pursue these strategies, they can hinder our overarching sustainability ambitions, per se, right? And if you have to put it in another word when we talk about sustainability in the building environment – and Ruchi mentioned this, right? – we're talking about delivering buildings that are not only energy efficiency or that use less or emit less greenhouse gas emissions.

But we have to talk about creating healthier communities, and be about healthier homes, healthier playgrounds, healthier schools. So that old people, children, can work, live, play, and learn, more importantly, right, in environments where they are not continuously exposed to chemicals that have the potential to increase the risk of cancer, or affecting their reproductive, respiratory systems. And even affecting their learning or cognitive abilities. And this is crucial, right? Because we have a problem with an achievement gap in the vocation system and the construction industry remains being toxic as it is, then we just become a silent contributor to the problem. This needs to be acknowledged.

And this is truly a matter of equity and justice, and I just want to make this very clear, because these chemical exposures are particularly and disproportionately affecting low-wealth

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

households, communities of color who not only have to pay high bills, energy bills, because of the conditions of the affordable housing building stock, but also have to suffer from the compounded negative health impact of not only having to live in these houses, but having to work in the manufacturing, or in installation of these toxic products. Slide.

So, bringing it a little bit closer to home – no pun intended in this. When we're talking about the relationship between chemicals, and energy, and climate; we tend to also think about first the usual suspects, right, carbon dioxide and methane and how they contribute to climate change. And these are really good examples. But we also need to think about what you don't know what you don't know. Kegels are less known that live in the world of building materials. And we can talk about, for example, chlorinated blowing agents that are used in some forms of insulation. And these agents have either a high global-warming potential, or use chemicals in the production of these agents that could actually have also high global warming potential.

And a recent report by the Ellen MacArthur Foundation highlighted the importance of considering product cycles as we think about climate action plans. And this is really important because report argues that even if we focus on renewable energy transitions and energy efficiency throughout the strategies, right, that are very important, I think, and important to consider in a circular economy context. They can only address 55 percent of the total current emissions, and then that leaves another 45 percent of emissions that come from producing products that we – the cars that we drive, the clothes that we wear, or even the building products that we use, right?

And the problem or the dynamic between toxic and chemicals is more of a vicious circle, because as we continue to release these toxic chemicals and increase climate change, global warming, higher temperatures, and the disasters what they lead is to changing the way that the toxics behave and that they get distributed and released into the environment at the same time. Right? For example, warmer air can lead to the breakdown of toxic chemicals into toxic byproducts. It can make some chemicals to vaporize and just enter more easily the air that we breathe. And disasters, or like fires, or hurricanes, can destroy homes or factories that just end up releasing higher-concentrated doses of toxic chemicals into the environment. Next slide, please.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

So, what can we do? Which is sort of what we're here today, right? What can we do with our partners in order to address these issues and to make use of healthier materials and energy efficiency upgrades? So I'm going to talk about three things, and these three things are related to partnerships and the collaborations that we work recently, right? So one is we can work to improve our understanding of the products that are used in energy efficiency upgrades, identify healthier options so that we avoid the problem of regrettable substitutions. And support the innovation and diffusion of these products.

Second, we have to engage with the manufacturers and demand increased disclosure and transparency. And you can do so by requesting products that have help, product declarations or declare labels. But transparency is still an issue, right? And we need to work towards that.

And thirdly, I think it is important that we support and we pursue certifications that value, that promote healthy building materials. So over the past few years we have teamed up with, for example, the National Resources Defense Council and Energy Efficiency For All. And we collaborated and improving our understanding about their sealants and insulation material, but also to formulate a specific simple actionable recommendations that can actually be used to encourage their use in multi-family energy efficiency upgrades. The reports or the findings are contained in a couple of reports that you can find at HomeFree, or at the home of our partners.

And we are happy to announce that we'll also be moving to a second phase, which is more action oriented, taking those recommendations and actually helping to see how we can use these recommendations at scale. Also, we've collaborated with Affordable housing and developers like Preservation of Affordable Housing, and Tenderloin Neighborhood. I think it – TNDC, right? And we work a little with Ruchi, who is truly a champion of champions.

And two of the products that we've worked on is in, for example, reviewing material specifications regarding insulation and sealants; identify what products contain some chemicals of concern, identify healthier solutions, and sort of make those healthy substitutions. But the one that I'm also excited is the one that Ruchi mentioned is that it's material specification guideline that they can use to engage with architects and their contractors to prioritize these healthier

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

solutions. And we can and we urge that we need to talk about how to put this in a format that is accessible for everybody, right?

And finally, I just want to say that regarding green building certifications, we are thrilled to help partner again with Enterprise Green Communities in supporting the development of their criteria for 2020, particularly about the recommendation on the materials section. Slide.

I just want to highlight very quickly some of the free tools and resources that we have at HomeFree that you can use today to improve your understanding about these healthier products, and understand how to specify healthier options, right? If you have to do one thing, go check the hazard spectrum, which as Ruchi mentioned, is a simple traffic light approach to understanding and ranking materials depending on their toxic chemical content. And you can just see where you're at and move a step or two towards a healthier practice. Right? Simple. Check out our courses, as well. Anyways. I'll talk more. You can please reach out. Slide.

I'll just finish by saying that really come ahead, visit HomeFree. We have our products, and it's all evidence-based. It's rigorous research, and it's free for you to help you improve your understanding and how you specify materials, right? So, visit, learn, apply, share with your peers, and give us feedback. At the end of the day, we're in this journey of really, continuously improving; taking into account that this is not just, this is not research. This is research-powered, but it's guided and shaped by a group of HomeFree champions who are experts in affordable housing development and architects, and other intermediary organizations. So do reach out, say hi, and we'll keep on working. And I'm done. Thank you.

Michael Freedberg: Thank you, Roberto. Much appreciated. Thank you to all of our speakers, we're now going to do the discussion and Q and A. We have 15 minutes or so. Becca. You going to do a quick Slido poll?

Becca Curry: Yes. Thanks, Michael. So, okay, as we did before, we're going to do one more Slido poll. So please go to Slido.com and type in the event code #DOE to access the poll. And if you're already here, you should see the second poll question up on your screen, which is what barriers do you face in incorporating healthy housing measures into your energy retrofit projects? For example, financing, lack of information, resistance from leadership, or resident engagement.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

So, we'll give you a few moments to go and type a word in. And it's going to pop up in a word cloud. So far, no surprise, financing is the largest right there in the center. We also have lack of information, which is coming in second. Leadership. I see a few of those. Affordability of housing materials. Again, resistance from leadership and financing is still in the lead. We've also got learning curve for contractors, a lack of comparables, split incentives – always a big issue in multi-family housing. And then skilled labor and stakeholder buy-in. So really good group of barriers that we have here. So thank you, everyone, for chiming in. It's really good for us to hear your feedback, and that can be used by us when we're looking to do programs and provide additional resources.

Michael Freedberg: Thank you, Becca. Okay. We're now going to a little bit of discussion with panelists and then get to your questions and answers. Thank you, all, for hanging in there. So if the rest of the panelists can get their video links activated, that would be great. The first question we just wanted to go to – I know this has been a topic in the Q and As, as well – which is the COVID connection, which of course is front and center for many of our projects – all of our projects. So the question we wanted to unpack with the panelists was how has COVID changed what specific or general changes have you made in the management and operation of your buildings? If we could just go to the next slide before I call on a couple of the panelists.

We wanted to point out that there is a lot of good information – not necessarily complete consensus, but in particular ASHRAE has packaged a very good guidance on what you should consider in your multi-family building, both immediate actions, some specific things that you could and should be considering, longer-term upgrades, and then resident education. And we've pulled out a small sample here just for your information and would recommend that you go to the link at the bottom, which we will post on our website, for more specific information.

In the immediate actions space, of course, there's a lot to do with informing residents about good social distancing and practices in common spaces. I'm sure all of you are already doing this who are involved in multi-family management. Looking at portable air cleaners with HEPA filters, going to MERV13 filters, wherever possible, both in central systems and dwelling units, et cetera.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

I won't take more time on this, but we could go to the next slide. We've provided some links here to first the ASHRAE guide, as well as other materials from the Institute of Architects, CDC. And then we've posted quite a few additional materials on our HUD Exchange Better Buildings Challenge website. So, some good resources there, and we will certainly be doing more webcasts and training in the future on this specific topic.

But perhaps, Neil, did you want to take the question first, which is how have you changed, has NYCHA changed your practices and some of the things that you've done to address the COVID-19 situation?

Neil Steinkamp:

Yeah. Thanks, Michael. As I think everyone would expect, there are many, many things that have been contemplated and changed and got updated as a result of COVID-19 across the metro portfolio. I'll touch on a couple. The first is obviously ventilation. I know that was a key focal point of the first poll question that we had is an issue generally, anyway. But in this moment, ventilation is obviously critical. Working with Bill Southern, again, and MicroEcology, who have really provided a tremendous amount of insight in terms of air flow and the importance of ventilation, that has been a key focal point across NYCHA to try to maximize air flow in the units and to improve ventilation.

And there's a number of ways that that can be done. I think there are some additional considerations as we get into the summer months and air conditioners start to be used. So, I know Bill and others are trying to provide as much guidance to residents, as well as to NYCHA staff about how to improve air flow and ventilation in the units.

One way that we do that through Mold Busters inspection is that every single mold inspection has a question about air flow. So in my presentation, I mentioned three key questions that both inspections require. Those were visible mold, visible water damage, or moisture reading. The fourth question that is asked is related to ventilation and air quality. And so by identifying that in every single unit you go into, you can see whether there's an issue in ventilation and air flow. You can make sure that the roof fan is inspected, repaired, replaced, whatever it is, to make sure that that's not only impacting that unit, but all of the units in that building line can be improved. So there's a lot of focus on that.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

The other one that I'll mention is implementing virtual inspections. And so we've tried from the very beginning when the COVID pandemic was really taking off in New York in mid-March, we began to think, "How do we maximize safety for both the resident and for the staff?" And one of the ways that we began doing that is to use really video conferencing techniques using mobile phones, right? So a lot of residents have mobile phones. It's not all. But, a lot of them were beginning to use the Zoom app, even for communication with friends and family.

And so we began to pilot ways in which we could have a video conference with a resident to see what their conditions look like, to do an initial video inspection. Obviously, you can't do repair work by video. But at least that way you're better prepared for what you're going to do, and you can be communicating with a resident about what safety precautions can be taken as you do go to the unit. And that was very, very well-received. And we piloted that for several weeks and are beginning to implement that across the portfolio now.

Michael Freedberg: Virtual inspections? That's really interesting. Drew, Codman Square?

Drew Vernalia: Sure.

Michael Freedberg: And a number of properties that you're focusing on.

Drew Vernalia: Yeah. We've had a lot of changes on the property management side. I think a lot of it, obviously, the immediate response is more cleaning. Looking more at instead of a lot of our facilities, we don't have a lot of ventilation. Most of our heating systems are forced hot water systems. So, we're looking more at reducing contamination through touch. So in other words, front doors that open automatically, faucets and fixtures that are automatic.

The other thing is, I would say, is the inequities that became apparent because of the COVID crisis were real clear to us as we're from a black community in Dorchester, which is part of Boston. And so we realized that we needed it, but we plan on doing more resiliency, communication with our residents. But that might be getting people computers and access to that in case of other types of emergencies. But also in the long term doing more economic development classes and getting people into other types of jobs that don't necessarily have to be in such high-risk. Or just make

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

sure they're getting proper training as they're going into those types of fields.

And I think the other challenge is, I think Neil mentioned, was doing like virtual meetings and inspections. But that may be a good thing for us in the long term, where we do more case management with the residents virtually, which we weren't doing at all before. So, some good things may come out of it.

Michael Freedberg: Great. Anybody else have anything to add on this? Ruchi, your work in San Francisco?

Ruchi Shah: Yeah. Absolutely. And many things are very similar to what Neil and Drew mentioned. Just additionally, at least our offices – many of our offices – are in our buildings itself. So we are upgrading to more 13 filters, and also taking a closer look at ventilation. That's a key strategy for us. Also, TNDC's providing green masks to all residents because, like Drew mentioned, inequity could be – or access to these items could be – a key challenge, too. So, we are trying our best in terms of resident education, too, making sure there is lots of signage in multiple languages to ensure that people are getting aware as much as possible.

Michael Freedberg: That's great. Krista, I just wanted to ask you. The whole issue of ventilation. Are you finding that your existing Enterprise Green Community standards are working? Or are there some additional concerns or issues or interventions that you're looking at or considering in the –

Krista Egger: Yeah. It's a great question, Michael. And our green communities program for any new construction properties that certify, we require that they install ventilation systems according to ASHRAE 62.2 or 62.1. So those are mechanical ventilation systems that will ensure the air flow. For rehab projects that come through our program, it's an optional [*obscured by dog barking*] because of the costs associated with retrofitting a new mechanical system into an existing building is going to be excessive. So I think what Drew, and Neil, and Ruchi were talking about here touches on some of those challenges.

Michael Freedberg: Great. Your dog has some ideas on that, as well, it sounds like. [*Laughs*] The hazards of dealing with the webcasts in the COVID era. But it's great. I think we're going to have to go to some Q and As. Becca, did you want to just bring out a couple questions for the panelists that we had on Slido?

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

Becca Curry: Sure. Thank you. So we've had a lot of great questions come in. The first one is actually for Drew, and that is how can affordable housing organizations team up with hospitals to fund health or energy interventions?

Drew Vernalia: Okay. That's a great question. Well, the hospitals have a requirement being mostly almost all of them are non-profits and they have to put some of their funding into the community. And they're realizing that their costs for particularly homeless people and keeping them housed is a huge cost. I think I was reading a statistic that on average a homeless person comes in for three days, and it costs \$90,000.00 for three days. I was like, "Wow. That's staggering."

And so you add that up over the course of a year. Boston Medical Center said they had million-dollar homeless people. It costs them \$1 million. So to them, putting \$1 million into a development so that they can stabilize housing for dozens of, or more, of these types of residents, homeless individuals, it will save them money.

So I think it's a matter of connecting with your local hospitals and the leaders there and reaching out to them. And you want to plan, too. And I think the key is around the homeless population, because that's where they're seeing their expense. I think statistically it's somewhere between 20 and 25 percent of our health care costs if we could stabilize homeless, housing for homeless people, we could reduce our health care costs. So, it's a big number for them.

Becca Curry: Great. Thank you, Drew. So this is for anyone on the panel. We've had a few requests. Could anyone speak to the energy efficiency measures that you think are most tied to health improvement? So if you had to choose maybe the top few you'd recommend.

Krista Egger: Can I start by just maybe answering a big, big picture-wise, and then let others answer? I think reducing the energy efficiency of your buildings reduces greenhouse gas emissions, which improves health of people on the planet. *[Laughs]* So like big picture-wise investing in energy efficiency relates to improved health outcomes in whichever way is most appropriate for your project. But, be happy to turn it over to others on the panel to share their favorite specific intervention.

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

Ruchi Shah: I agree with Krista. It's all interconnected. And for us, our strategy on new construction all electric is a huge energy efficiency strategy, as well as in terms of health impact and mitigating impacts related to combustion. Also, in new construction, we are toying with the idea of can we move away from electric resistance coils, even induction? I'm fully aware that it's an expensive thing. Tenants need to be educated to have the right pots and pans. But we are considering that as we are building so much new housing. And in retrofits I think active thinking actively about our equipment, boilers are coming in with gas for life. Can we electrify those systems? TNDC has not been using gas stoves for a long time. What can we do further on that?

Drew Vernalia: I just want to add I think the best thing in terms of finding out what the biggest health impact for your residents is is creating a health action plan. So, for the property that I was demonstrating, we use this in the Bright Communities Health Action Plan model. It's a great tool. It's not too hard to use and put together. But every property has unique challenges. Every resident. So if you're in the city, it might have ventilation and noise issues. But in the country, you might have one or the other. So you might have a different focus. So it all depends. And I think that starting with the health action plan – and find out what your residents are interested in, too, could be helpful.

Michael Freedberg: Thank you. Becca, I think we're going to have to leave it at that since we're pretty much at our endpoint here. Unfortunately, there are some other questions. We will try to get to those afterwards. And we can post the responses online. So, over to you, Becca. And I think the panelists can stay with us on the line, or until we wrap up.

Becca Curry: That would be great. So, for our final slides, we just want to highlight some different resources and events coming up for your. So in addition to our on-demand webinars library, the Better Buildings program recently launched its E-Learning center, which is a collection of webinars, courses, and other E-Learning resources covering a range of areas relevant to Better Buildings Better Plans Partners. So, please check out this helpful collection of resources on the Solutions Center. Next slide.

There are three more webinars left in the summer series. And in this series we are taking on the most pressing topics facing energy professionals with new experts leading the conversations each

Michael Freedberg, Becca Curry, Drew Vernalia, Krista Egger, Neil Steinkamp, Ruchi Shah, Roberto Valle Kinloch

month. All previously recorded webinars are archived in the on-demand webinars library. Next slide.

As a reminder, the slides and recording from today will be archived on the Better Buildings Solution Center. Please revisit the slide deck to access the resources that we discussed today. And we have several resources highlighted on the screen right now that we talked about today and we recommend. Next slide.

We hope you will join us for the next webinar in the summer series happening tomorrow. Join DOE's Plug And Process Load Technology Research Team for a technical presentation about a statewide plug load strategy developed by the Oregon Department of Administrative Services and the Oregon Department of Energy. Next slide.

So, to find more resources from the Better Buildings program, please visit the Better Buildings Solution Center. You can explore by topic, solution type, or go to one of our program or partner pages directly. Going to our partners tab will lead you to our sector pages. Clicking the multi-family box will take you to our multi-family sector page. And here is where you can find our multi-family page filled with various resources. It has a list of our solutions, and then other links to helpful resources. To go to Energy.gov\BBSC to explore all of the Better Buildings Solution Center has to offer. Next slide.

Michael Freedberg: Okay. I think with that we're going to wrap up. I wanted to thank the panelists. We will try to get you back for more questions at a future session. And we will be taking a deeper dive into some of the subjects that we've discussed today. Thank you all, panelists, for your great, great presentations. And look forward to having you back at a future time.

For those of you who would like to sign up for or join us for our July 23rd Health@Home rehab program, which is this Thursday afternoon, go to Health@Home@HUDEExchange, and you should be able to find that information. Or drop me a note at Michael.Freedberg@HUD.gov. So thank you all. Thank you.

[End of Audio]