Josh Geyer: Hello, and thank you for joining the webinar today. We're going to give folks another moment to log in, and we'll be starting soon.

All right, let's get started. Hello everyone and welcome to the 2023-2024 Better Building Webinar Series, dedicated to bringing you the latest actual insights from leading industry experts, this annual series is a chance to explore the topics, technologies and trends that affect your organization as well as effort to accelerate the partnerization in energy efficiency options. Next slide please.

Today's webinar is called Nothing to Sneeze at: Health Benefits of electrification in multifamily housing. Before we dive in, there are a few housekeeping points I would like to cover. So please note, today's webinar will be recorded and archived on the Better Buildings Solution Center. We will follow up when today's recording and slides are made available. Next, attendees are in listen only mode, meaning your microphones are muted. If you experience any audio or visual issues throughout the webinar, please send a message in the Q&A box located on the bottom of your Zoom panel. Next slide.

My name is Josh Geyer. I am the Multifamily Sector Lead for the Better Buildings Initiative. I'll be your moderator today, and I'm excited to be highlighting the ways that decarbonizing our country's multifamily housing stock can lead to significantly improved health outcomes, especially for populations like environmental justice communities who are more likely to live in multifamily housing and bear disproportionate risk from environmental health hazards.

So connecting health to electrification advances this administration's overall climate goals, and its specific commitments under the Justice40 Initiative. Electrification is not only an essential component of reducing building greenhouse gas emissions, it has clear and significant health benefits for multifamily residents. Electrification decreases residents' exposure to indoor allergens and pollutants that are linked to serious health conditions, including asthma and low birth weight.

Today's webinar will explore the health benefits of electrification, best practices for creating healthy housing, and how multifamily housing organizations can leverage information on health outcomes to obtain additional funding and support for building electrification. Next slide.

So here's our agenda. Today we'll be hearing from two excellent

speakers about the evidence for health benefits of electrification in multifamily housing, and ideas for approaching electrification in your multifamily portfolio with optimum health in mind. We'll then have time for some, our speakers to address audience questions before we wrap up. Next slide.

Today's webinar is presented by the Better Building Multifamily Sector. In February 2022, HUD was excited to join the Department of Energy to launch our newest challenge to multifamily housing providers, the Better Climate Challenge. Partners that join the Better Climate Challenge commit to the ambitious goal of reducing their portfolio-wide greenhouse gas emission by at least 50% within 10 years. HUD and DOE are partners to support this transformative market leadership program in the multifamily sector.

Together with the DOE National Labs, we are providing technical assistance to help partners overcome barriers to decarbonizing their portfolios with forums for peer to peer exchange and a national platform that demonstrates partner leadership in addressing climate change. If your multifamily organization is interested in joining the Better Climate Challenge and being a leader in decarbonizing the U.S. multifamily building sector, please contact me through e-mail. You can also learn more about the Better Building Multifamily Program by visiting the Better Building Solution Center website. Next slide.

Today we will be using an interactive platform called Slido for Q&A. Please go to www.slido.com on your mobile device or by opening a new window in your Internet browser. Today's event code is #DOE. Feel free to send questions or comments for our panelists by typing into Slido any time during the presentation. You can also upvote other attendees' questions by selecting the thumbs up icon for questions that you like, which will result in the most popular question moving to the top of the queue. We'll address your questions at the end of the two presentations. Next slide.

We have a great lineup of presenters today. We'll be hearing from You Ann Tan, from RMI, and John Kane from Boston Housing Authority. Thanks to both of you for being with us today. Next slide.

To begin with, I'm pleased to introduce Yu Ann Tan. Yu Ann is a senior associate with RMI's Carbon Free Buildings team where she works on advancing the climate, health and fair quality

benefits of building decarbonization. She focuses on precedent setting policy solutions that eliminate building sector emissions. Thanks, Yu Ann. Go ahead. Next slide, please.

Yu Ann Tan: Hi everybody, and thanks for joining us. Next slide please. So, RMI is a non-partisan, nonprofit organization that works to transform the global energy system. And as part of RMI's carbon free buildings program, my team, the Health and Air Quality Workstream, lays important groundwork for policy transformation by expanding the evidence base for healthy electric buildings. Next please.

So, how we got started with the work that I'm going to be presenting on today. You know, we were a few years into the coronavirus pandemic. We have been seeing you know, increasingly frequent catastrophic wildfire events across the country. And a just growing body of research that really highlights the proliferation of polluting indoor sources. And you know, we're seeing a renewed urgency to really understand and address health risks in some of our most intimate spaces.

And really, at a more cerebral level, there's also a palpable sense that we need to be going beyond just energy and emissions reductions. You know, we really need to be making more connections with other sectors to ensure that our work is relevant, timely and responsive to challenges that continue to be incredibly intersectional. And so really there came this desire to be able to problem solve and respond in kind. And that's really at the core of this work.

So what we're looking at is the average American spending approximately 90% of their time indoors, where the concentration of some pollutants are often two to five times higher than typical outdoor pollutants. Outdoor concentrations. And so, buildings have emerged as this opportune venue for us to advance climate, energy and health goals. And so our hypothesis here is, by simultaneously addressing all three aspects of work in the climate, energy and health space, we can tack on more resources to deliver deeper and more comprehensive benefits to our communities. Next please.

So, how did we go apart about teasing apart this problem? Well, first is with the recognition that a large part of our climate work is intrinsically bound to understanding what our energy consuming behavior looks like, and what you know are the climate emissions consequences of that. And that's exactly what we did first.

This chart demonstrates the breakdown of emissions from burning fuels in our buildings for both residential and commercial. And at the top you can see that the action of space heating is where most of the emissions are created for both residential and commercial buildings, followed by water heating and then cooking and other activities. Next please.

And so there is this you know, reality, and what we're finding is that burning fuels in our buildings is not just worthy of our attention because of the bulk of climate harming pollution that it produces. But, we're also finding that combustion indoors also contributes to poor indoor air quality.

So doing so releases health harming pollutants such as carbon monoxide, nitrogen dioxide, fine particulate matter, and formaldehyde. And the exposure to fossil fuel appliance pollution has been connected to a wide variety of acute and chronic negative health outcomes that span respiratory illness, cardiovascular disease, poor birth outcomes and adverse child development. Next please.

So our team put our heads together, and you know, we thought of what this blue sky scenario looks like. You know, what would we like to see in buildings? What is the ideal building? And the building that we arrived at had three main features. One, it had a high performing building envelope, an air ceiling with no gaps or air interaction between units through compartmentalization and mechanical ventilization.

Two, we have highly efficient all electric equipment and appliances for space heating and cooling, hot water heaters, stoves, clothes dryers and more. And finally, that the building is smart, and it has demand controls, onsite renewable energy, and energy storage, which helps manage the amount and timing of electricity consumption. Next please.

And what we're seeing as we combine the health literature with all of these building level interventions, what has arose is four main buckets of health benefits. And the first being that by removing in-building fossil fuel combustion, we see a significant improvement in indoor air and environmental quality.

And then the second piece being that high performing envelopes, compartmentalization and ventilation create safer indoor environments during extreme weather events. The third being that adopting all electric equipment increases access to air conditioning

and can mitigate deadly effects of extreme heat events. And finally, that removing fossil fuel combustion in a building improves neighborhood air quality and reduces risk posed by fossil fuel infrastructure. Next please.

So the first thing is that by removing indoor, in-building fossil fuel combustion, it's this piece about indoor air quality. So on the right here, we have documented what are the typical fossil fuel burning appliances in the home. So these span stoves, water heaters, furnaces, dryers, gas furnaces and ovens.

And the combustion that happens with these appliances releases as I have mentioned, you know, a bunch of health harming pollutants from nitrogen oxides, carbon monoxide, fine particulate matter, and so on. And the bulk of the literature has linked exposure to these pollutants, whether it's short term, long term, in small concentrations, in large concentrations, to a variety of health impacts such as decreased lung function, increased risk of stroke, brain damage, seizures, and many other negative health impacts. Next please.

So out of all fossil fuel burning household appliances, we're finding that gas stoves are the most significant source of indoor nitrogen dioxide pollution, especially when stoves are unvented. So the EPA states that homes with gas stoves can have concentrations of NO2 that are 50 to 400 times greater than homes with electric stoves.

Earlier this year, an air quality monitoring pilot registered a significant drop in NO2 reductions. So a 35% reduction, after switching out an old gas stove for a new induction stove in New York City public housing apartments. And new research has also found that nationally, on average 12.7% of current childhood asthma is attributable to gas stove use, with several states having even higher numbers than this national average, including Illinois, California, New York, Massachusetts, and Pennsylvania.

So although exposure to gas appliance pollution is harmful to everybody, children are particularly at risk. Infants and children are more susceptible to illnesses associated with air pollution than adults due to several factors. They breathe faster. They tend to engage in more physical activity, have a higher ratio of lung surface to body weight, and have less mature respiratory and immune systems. Next please.

So moving on to the second bucket of health benefits that we might

be able to see. You know, we're seeing that studies show a combination of both a high performing envelope with compartmentalization and enhanced ventilation has showed positive effects on indoor environmental quality. On one hand, well-sealed envelopes and compartmentalization helps reduce pest infestations, and the moisture conditions that often lead to mold. It also prevents infiltration of potentially polluted outdoor air.

And research is also finding that high performance envelopes have the added benefit of providing increased hours of safety, which is a way of understanding how long a home can maintain thresholds of comfort and safety before reaching unsafe indoor temperature levels. And this is especially important in considering the health and safety of vulnerable populations as extreme weather events increase in frequency.

So, some analysis that my team did compared a passive house standard building envelope to a code compliant new building during a simulated power outage in a cold snap. And what we found was that the passive house was able to maintain safe indoor temperatures significantly longer than the code building, lasting over four days longer before indoor temperatures fell below 40 degrees Fahrenheit. When this research simulated a power outage during a cold weather event, while this research was simulated for a cold weather event, the hours of safety concept is also related, relevant to heat waves as well. Next slide please.

So, speaking of heat waves, in our exploration we also document the benefits of adopting all electric equipment and appliances and how they may increase access to air conditioning and the ability to mitigate the deadly effects of extreme heat events. So extreme heat ranks among the deadliest effects of climate change, and is already the nation's leading weather related killer. The ability and access to use cooling technology in the home has repeatedly been demonstrated to be the most effective protection against heat related illnesses and deaths.

So my team modeled the performance of several cooling options for a Seattle home during a three day heat wave in June 2021. We looked at an air source heat pump, a typical AC unit, and a higher capacity AC unit. And what we found was that heat pumps are both the most climate aligned cooling technology, while also being superior at maintaining a comfortable and safe indoor air temperature.

The bonus of adopting all electric equipment and appliances in the

home also means that we can cook without open flames. You know, with the use of electric induction stoves. This way we avoid heating up of our space while cooking, which means that we spend much less effort trying to cool down our home while simultaneously keeping our energy consumption and cost down. Next please.

So the final bucket that I'm going to speak about today is really this improvement to outdoor air quality and the reduction of health risk to the community. The literature really strongly suggests that removing in-building combustion can have a significant positive impact on what goes on outside of our buildings. Large combustion equipment in our homes such as boilers, furnaces, hot water heaters, are regulated to be vented to the outdoors.

And so it goes to believe that the removal of these will contribute to better outdoor air quality. A recent Harvard study found that roughly 18,300 premature deaths in 2017, which is the most recent data available, translated to about $205 billion in health costs, was due to outdoor PM2.5 air pollution from burning fuels in buildings.

Now, this sensitivity to the interaction between indoor and outdoor environments is particularly necessary as outdoor air can infiltrate buildings even when we close our windows and doors, because there are things like structural gaps and cracks. Studies have shown that 90% of U.S. homes likely have air leakage where outdoor air comes in. And during wildfire events, indoor air quality is worse than on smoke-free days. And staying indoors provides only limited protection from wildfire PM2.5. Next please.

So in recent years the healthcare system has begun to acknowledge the significance of housing and other non-medical determinants of health outcomes. Likewise, our climate and energy sectors have done so too, acknowledging that the opportunities to unlock both more resources but also more inclusive and comprehensive pathways of work.

Here we believe that expanding our definition of benefits beyond just energy and emissions savings can allow us to tap into deeper non-traditional pots of funding, resources and work models which effectively moves us from providing just short term assistance to transformational measures. And there are already emerging examples of the health and housing sectors pooling resources and priorities to deliver comprehensive electrification and building upgrades so that residents can simultaneously enjoy improved health outcomes and better quality of life.

So two examples that I'd like to highlight include the Denver Healthy Homes Program in Colorado that is targeting low to moderate income households with members with a respiratory illness. The program makes available three upgrades that address any identified home air quality problems, and it also includes cash incentives to replace gas appliances with induction stoves and other HVAC measures such as heat pumps and more. Next.

The second example is the Bay Area Healthy Homes Initiative in California. It was launched by the Bay Area Air Quality Management District earlier this year, and it was really designed to improve health outcomes and climate resilience in overburdened communities of the Contra Costa and Alameda Counties, where there are really high rates of asthma related emergency department admissions.

So, the air district was awarded nearly two million dollars from the Automobile Emissions Research and Technology Fund by the California Attorney General's Office to implement this initiative. And the program brings together asthma services and home retrofits to address health triggers, improve energy efficiency, and keep outdoor pollution out of the home through a unique partnership model that brings together regional agencies, local government, and nonprofits.

So for residents that are most impacted by traffic air pollution, the program funds and completes home retrofits that remove health triggers, mitigate pollution exposure, and increase energy efficiency through the use of enhancing air filtration, window replacement, home electrification, insulation measures, and adjusting of allergens and irritants. And for asthma patients that enroll in the program, the program provides access to asthma services that includes asthma assessment, asthma consumer supplies and also general education.

So given the growing body of evidence around health hazards from gas stoves and other conduction sources in buildings as well as the lifesaving capabilities of high performing building envelopes, there may very well be future opportunities for nontraditional sources of funding such as healthcare, housing insurance to cover select home interventions related to electrification and other building upgrades.

There is really much progress to celebrate, and there is also still much more to be accomplished. As awareness of the impacts of and solutions for all electric high performing buildings grow, I

truly encourage everybody to look beyond just energy and emissions savings as metrics of success, as doing so may very well open a whole suite of resources and pathways that can transform our building sector for the better. Thank you.

Josh Geyer: Thank you so much, Yu Ann. Excellent presentation. And just to put an additional point on it, I would say that whether your top priority for your portfolio is getting off carbon, decarbonizing, or whether your top priority for your portfolio is making sure your multifamily residents are as healthy, have the best health outcomes as possible related to your buildings, the answer is the same. Which is electrification, high performance envelopes, and getting those buildings performing as well as possible, ventilation, you're going to get, it's a two for one deal.

So, for our next speaker, before I announce our next speaker, a reminder to our audience. Go ahead and type your questions into slido.com. We'll address them at the end of the session. Our next speaker is John Kane. John is a Coordinator of Grants and Strategic Partnerships for the Boston Housing Authority, and has worked for the BHA for the past 20 years with an emphasis on resident engagement and health. Thanks, John. Go ahead.

John Kane: Thank you. Thanks, Yu Ann too for your presentation. Thanks to DOE and HUD and ICF for the invitation to be here today and for the opportunity to shine a light on the work we're doing at the Boston Housing Authority. And we have a goal of going fossil free by 2030. So I'm going to be talking about policy partnerships and data from a housing practitioner perspective. And I'll try to touch on additional paths for funding or improving resident health through collaboration. Next slide.

So the Boston Housing Authority is the largest housing authority in New England and the largest property owner in Boston. And residents of Boston who live in housing administered by BHA makes up about 9% of the city population. It's a very diverse population, and just to underscore that where you live has a big impact on your health.

I'm going to start with a policy example, but just to you know, I'm really coming from a multifamily housing perspective, and a large part of our portfolio is older public housing. Most of our family public housing developments were built in the 1930s, '40s and '50s. And then most of our elderly disabled public housing was built in the '50s, '60s and '70s. And so in housing, there are a number of healthy housing issues including lead exposure, pests,

mold, injuries, radon, and then I'll kind of go from there. Next slide please.

So another key healthy housing issue is exposure to secondhand smoke. And in 2006, the Surgeon General came out with a report that said that secondhand smoke causes or exacerbates a lot of problems including asthma, lung infections, cancer, heart disease. And air has a way of getting around buildings, whether through doors and windows but just cracks and crevices as well. And there's not an easy way for us to stop that, especially in older public housing. And then also, just to note that most of the populations living in our public housing fall into these vulnerable groups: elderly, disabled and children. Next slide please.

So, internally at BHA, in the wake of that report coming out, we wanted to do something to try to mitigate secondhand smoke exposure. And we were talking about in the context of one of our redevelopments, making a building smoke-free. And what we were going to need to do about that, in terms of making changes to our lease. And around, and this was a few years later, after that Surgeon General report came out.

But our mayor at the time, Mayor Menino, gave an interview to the Boston Herald in January 2010. And in that interview, Mayor Menino said that the Boston Housing Authority public housing was going to go smoke-free, our entire portfolio, in two years. And so what was a small internal conversation about a redevelopment now was really going to encompass our whole portfolio.

So we developed a policy in 2011 which was approved by HUD, and that we then implemented in 2012. And when we implemented that policy, we had to spend a lot of time doing community process and talking about the policy implementation. And I was in a number of community rooms, and with supporters and opponents. And I would ask the cooking question, which was essentially, when you're in your apartment or walking down the hallway, can you smell what your neighbor is cooking? And whether folks supported the policy or opposed it, everybody acknowledged that they could smell what their neighbor was cooking.

But it really went a long way towards reducing the opposition to the policy, because everybody really just knew that air was getting around. And really, things that you were doing in your apartment did have an impact on the health of other residents there. So we came out with our implementation in 2012, and then HUD saw that we were a model for implementing a non-smoking policy. And

they adopted a national non-smoking policy in 2018. Next slide please.

So I'm going to talk about a few partnerships, because none of this work can be done really without having some strong partnerships. So this is an example of a partnership that included our health department, inspectional services who are the folks who enforce the state's sanitary code, hospitals, health centers, and housers. So essentially, if somebody presents at a health center or hospital with asthma, they'll get triaged with a couple questions, if there are housing conditions that are impacting their asthma. Essentially, do they have pests or mold in the home.

But they'll then refer those cases to inspectional services to do follow-up inspections. And so this is an example just of a collaboration, but it really helps to improve the health of our residents to have this kind of a response done on a webpage, and it could be picked up in many different communities. Next slide please.

So, this next partnership example I'm going to mention included some of our local colleges, community groups. And we applied for a grant from the HUD Office of Healthy Housing and Lead Hazard Control. And we were looking at the health of our residents in conventional public housing, and then as they transitioned into green redeveloped housing. Next slide.

So one more time, because this has a transition. Thank you. So we were looking at the health of our residents, but their comfort, satisfaction, environmental exposures, health and energy in this study. And so part of the redesign of our housing development that we were using in this study was we, in the conventional, we had gas stoves. And then in the green housing, we were removing the gas stoves and replacing them with electric stoves. Next slide.

In the environment, we were able to show that there were a number of environmental pollutants. So Harvard was doing air sampling, and we were able to show that there were significant reductions in particulate matter. Nitrogen dioxide, which was again a significant reduction. And a lot of that comes from the biproduct from the gas stove. And then there were also significant reductions in pesticides. And a lot of this lines up with what Yu Ann was talking about in reducing these environmental pollutants inside people's apartments. Next slide.

So then, picking up on some of those health benefits, and by the

way there were many energy savings as well. But on the health benefits, specifically around asthma, we were doing surveys with our residents. And there were a lot of reductions in the severity of asthma symptoms, as well as reduction in missing school or having to go to the hospital because of an asthma attack. So there were a lot of health benefits that were realized as well. Next slide.

Thank you. So now I'm going to talk about some data, and having data, it's so helpful for furthering our understanding of the link between health and housing. And in Boston, as with all states, all 50 states and some other major cities, the health department undertakes a biannual survey called the Behavior Risk Factor Surveillance System, which asks people a number of different questions about things impacting their health.

Do they eat their fruits and vegetables? Do they exercise? Do they have health insurance? Do they smoke or drink or do drugs? Many questions. But in 2001, through our partnership with our local health department, they added one more question, which was do you live in BHA public housing or section eight leased housing, or do you not? And this created a data set where we could see how BHA residents were doing compared to the rest of the city of Boston residents. Next slide please.

So, the results showed that the public housing residents were more likely to report fair or poor health, to have current asthma. I think Yu Ann had cited a statistic that showed that people in Massachusetts had higher than the national average with asthma. And in public housing, it's even higher than the state average. And really, when you think about it, most tenants don't want to share their health information with their landlord.

But by going through this survey, it's a neutral third party that's gathering information over time. But it helps to give insight into our BHA policies and programs, and it can make a difference in the health and quality of life of our residents. So we use this data to leverage additional resources. And we're usually citing the data that we get from the BRFSS survey when we're applying for grants or we're approaching other partners that have resources. Next slide.

So this is one last example, and this kind of straddles the line between our partnerships and data. And this is with the Boston Community Health Needs Assessment, or CHNA, and the Community Health Improvement Plan, CHIP. And so part of the Affordable Care Act was that nonprofit hospitals periodically need

to do a community health needs assessment, and then to develop health improvement plans.

So we all know that one of the big determinants of health is housing. And so the hospitals come out with grants, and housing is often part of their strategy, whether it's promoting affordability, home ownership, housing stability, housing quality. And there are different ways that affordable housing providers can leverage information on the health outcomes to obtain additional funding.

So my suggestion in addition to trying to work with your health departments to add a question about do folks live in public housing or subsidized housing, you can also try to work with your local nonprofit hospital to see what they have to say about their community health needs assessments and their community health improvement plans. BHA has spent parts of grants to improve public safety, improve health of families with children, and offer training for our residents so that they better understand their rights. And next slide.

And so this is just contact, and so I just want to encourage people to be thinking about who they are partnering with, what sorts of data that you're using. Because there are a number of additional sources of funding out there in addition to ARPA and IRA. And I will stop there. Thank you.

Josh Geyer: Thanks so much, John. You know, the thing that comes out for me listening to that presentation is that I think that this is not a surprise to a lot of us. But a lot of health conditions that we typically think of as just something that's going on in an individual person's body are actually much more strongly correlated to what's going on in their environment.

Whether they live near a highway, whether they live in old housing with asbestos or mold, the things that are happening to our bodies are not individual. They're a result of the environment that we all share. And so it's so important for us to keep that in mind as we're designing environments for people to live in and thrive in. So I'm going to pose a bunch of questions to John, because I know you have to leave a little bit early. But Yu Ann, if you want to add on to anything please feel free.

So, one kind of specific question I'll start out with. Someone noticed that for the asthma impacts in the green housing, that there was one outcome that was not expected, which was there was more frequent trips to the hospital once residents moved into the green

housing, and wondering whether you have any explanation for that.

John Kane: So I'm not, I don't have a real great answer for why there would have been an uptick in the hospitalizations. And I'm not sure if you are able to show that slide again or not. But sorry, don't have a –

Josh Geyer: Can we get the slide back up? Yeah, I noticed that too, John. We were going through this a couple of days ago. And, we have a sharp-eyed listener who pulled that. I mean, we could speculate and say that someone in this program is experiencing a treatment effect of having more attention drawn to their health, their health status, than they were previously. And that could lead to them taking more action than they otherwise would be.

But yeah. Okay, next question. Are you aware, what's your awareness of programs that are funded by hospitals or hospital systems who conduct these kind of assessments that you've done?

John Kane: Yes, so again the Affordable Care Act requires all nonprofit hospitals. So this is a national thing. So, to do these community health needs assessments. And so I encourage folks to look up their local hospitals, because they have a requirement to be doing these needs assessments, which then occasion them to produce these health improvement plans. And in our area, that means that they're coming out with different grant opportunities. And because it is widely recognized that health has a big impact on health, there have been opportunities for us as a houser to apply for these grants that the hospitals are putting out.

Josh Geyer: So, here's another kind of general question for you, John. To what extent are cities' health department mandate reporting on matters that relate to the health of residents, they use an acronym, MUD, which I'm not familiar with. In private dwellings. So I guess the question is around do you know about what kind of mandates or requirements there are from city health departments around resident health in multifamily building, multiunit dwellings?

John Kane: Yeah. So in our context, the BRFSS again, so this started back in the 80's. And it started in a smaller number of states and jurisdictions. But by the early 2000's, this is in all 50 states. So there is a regular collection of this kind of data that's happening in all 50 states. So again, it's a resource that's out there that people can go and look at. And to see the data results. But the one thing that we did that was –

Josh Geyer: We seem to have lost John momentarily. Okay. Let's, I'm going to, while John figures out his situation, I'm going to switch over and pose a question to Yu Ann, which as a huge question that might be a little more than we have time to address. But the question is –

John Kane: Other residents.

Josh Geyer: John, we lost you for a bit. You froze for a minute. So –

John Kane: Oh no, sorry about that.

Josh Geyer: Oh no. It happens. So I'm going to ask you one last question, John. So the question is notwithstanding the health benefits of your pilot, moving from conventional to green housing, what were your results for the energy savings that resulted from those moves?

John Kane: Oh gosh, you know, so we were comparing really old, inefficient public housing buildings. So we had tremendous savings in energy. Water, heating as well. So it was a huge success, and that's why it also was important for us to be able to model the things that were happening in terms of the air quality and reductions in pesticide or pest infestations, and these other sort of sick building syndrome.

So reduction in things that mostly you know, we associate with things like headaches and breathing. So, it really, there were a number of energy savings all across the board. And we were actually also able to duplicate some of those, even just in our renovations. But again, we're just coming from such an older kind of an infrastructure that most of them are just kind of begging for some investment. But so it was very successful energy savings and emissions reduction-wise as well.

Josh Geyer: So, first question I was kind of leading up to for Yu Ann which is a huge one. So the question is, how do you design incentives for landlords to decarbonize while ensuring they do not raise rents?

Yu Ann Tan: Wow. Yeah. I hear you. I think that is definitely a big concern. Especially for you know, the renters that make up a big percentage of the population that, yeah. It's definitely a big concern. So I think the first caveat here is that it's an evolving process. I think that we are still figuring out what are some of these best practices, especially when it comes to tenant protections.

But the thing that's top of mind for me is really the federal inflation reduction act, the IRA. We're looking at the home

efficiency rebates program, which offers up to $8000 per household. And then the home electrification and appliance rebates program, which provides up to $14,000. And you know, this piece about raising rents to make up for the costs that have been put into upgrading our buildings, you know, I'm thinking of what are some ways to mitigate that?

And we have here these massive pots of money that can do that. So, as we're thinking of raising rents to cover costs, program design is incredibly important. That makes sure that we have tenant protections built in, and you know, first up is really just how do we slash up front costs. And I think a good way to think about that is by stacking incentives, right? We have here these two programs that can be stacked with existing federal, state utility and even local incentives. That can really drastically reduce the costs of these upgrades.

State energy offices also have a big role to play here. So looking at them to collaborate with their sister agencies, community based organizations, and even Josh, the DOE to really inventory our current residential retrofit programs and identify what are some friendly ways to stack funding resources together to deliver these kind of retrofits that we're talking about and to make the process as simple as possible.

I think the DOE has provided some great starting points recently for states when it comes to incentive stacking. I think the agency also clarified in which circumstances a home can act as both programs. You know, whether it's receiving a rebate or tax incentive for a heat pump and other efficiency measures, and how other federal financing options can support other retrofit costs. So I think that there are critical pieces of the puzzle that we need to be thinking about.

States have a big role to play here. But it's really about how do we launch this robust incentive stacking effort that can pull in all of the state, local, utility, philanthropic incentives to really support the whole home retrofits that we're vending out, so that at the end of the day we don't see those costs being transferred over to the renters.

Though, I think my last thing here is that you know, as I was saying in my presentation, that yes, we are thinking about you know, how do we prevent rent increases. But I think that also looking beyond that, while, let's say worst case scenario rents do look different. But what are other things that might change? We

are looking at lower utility bills, lower health care costs, lower insurance costs because of lower utilization rates. You know, I think –

Josh Geyer: of air conditioning.

Yu Ann Tan: Yeah, not dying of extreme heat events and all the other costs that might be –

Josh Geyer: Not dying is an amazing benefit that might come with a small rent increase.

Yu Ann Tan: Exactly. So I encourage folks to, yes, rent increases. And these concerns around rent are definitely very important, especially for lower income households. But I think that again, expanding our idea of benefits and what can come out of these improvements, I think is also really key to understanding the bigger puzzle.

Josh Geyer: And I'll just add on, so that was all awesome. I'll just add on, I think that there's some work to be done around what are best practices for metering. And so there's always a question when you're going to figure out the funding for one of these retrofits, especially either naturally occurring or subsidized affordable building. Is it individually metered, or is it master metered? And what's the split incentive dynamic with that metering?

I think one thing that I would say is that the kind of, I have found that I'm, in terms of the tradeoffs between individually metering and master metering, I think there's much less of a problem with switching to master metering, in that, in fact there isn't some huge increase in consumption because tenants no longer have the incentive not to overconsume. That's actually a pretty marginal issue.

Whereas if you're able to, because the situation we're talking about is a lot of times fuel switching. We're talking about we have gas driven appliances. We have gas stoves, we have furnaces, we have water heaters. And when you electrify, you switch those things to electric. And if your tenant has, if you have individually metered electric utilities, the tenant has potentially actually to see a huge bump in their utility bill even while their rent to owner may not change.

Whereas if you're doing deep retrofits at passive level or above code, stretch code, you may see a massive decrease in energy consumption overall. And then the owner taking on the electric

payment, so that the tenants are no longer paying for any of their utilities. There may be a small increase in rent to owner, but that I think in a lot of cases, that increase would be less than the averted costs of individually paid utilities. And so I think that's something, that's really something to look at.

Some of these asset class retrofits have very, very low per unit energy consumption, and it's something that could make everything easier for tenants and owners. And also, in low income and affordable buildings, it allows owners and tenants to bypass the risk of utility shutoffs in months where tenants maybe are not able to meet their utility bill, which is also a huge benefit that we've seen. I'll just also say that as we know we have a national housing crisis that is being driven largely by an undersupply of housing where people want and need to live.

As we respond to that by building housing where people want to be, the marginal additional rent that owners of these newly retrofitted properties can charge their tenants is going to go down. These new buildings are also going to be very high performing, just because that's where codes are now. And so as we build out the residential housing stock that we need, there's going to be less of a tendency to be able to jack up rents post retrofit.

That was a lot from me, but I thought I would just throw that in there. So next question for Yu Ann. So, the question is, what about central or mini central plants distributing hot and chilled water for heating and cooling? Perhaps scrubbers can be placed on the central plant equipment to reduce or eliminate source emissions.

Yu Ann Tan: Can you repeat that question again?

Josh Geyer: Yes. So I think the question is getting to if you have existing gas fired central equipment, can you mitigate the emissions impacts of those without completely swapping it out?

Yu Ann Tan: Emissions as in greenhouse gas emissions, or?

Josh Geyer: Yes, that's my, I think this is like getting the health benefits of electrification without doing the actual electrification for central equipment.

Yu Ann Tan: Short answer I believe is no. Because I think that those emissions still have to go somewhere. And realistically I don't, I mean unless there's somebody in the audience who has a good example. I can't

think of a good technical way that you would be able to achieve that.

Josh Geyer: Yeah, I mean, I think the best, I mean especially now post-IRA, with all this money coming online. You're, there's never been a better time to swap out your fossil fired appliances than right now. And so I think that's what we would encourage. I would certainly encourage people to be thinking about getting your head around doing that, as your, you know, as your existing equipment reaches the end of its useful life.

But also, if it's going to reach the end of its useful life in maybe a couple of years, you should probably think about doing it early so you can access these funds before they run out. So we're going to have to leave it there, even though we had lots of great questions, to wrap it up. So, can we do next slide please?

So, thank you Yu Ann and John, both of you, for your insightful presentations. So let's see. I want to just shout out that this webinar is part of the 2023-2024 Better Buildings Webinar Series. As you can see, we have a great lineup of presentations through March. Visit the Better Buildings Solutions Center to learn more and register. Next slide please.

We hope you'll join us on Tuesday, September 19, for our next webinar titled Home Energy Store 101: Assessing Energy and Saving. Join this webinar to learn more about the program and how it can be useful in your residential market. Next slide.

Mark your calendars. The U.S. Department of Energy's Better Build and Better Plants Summit will be April 2nd through 4th in Washington DC. This event will feature engaging interactive sessions along with opportunities for attendees to network with interstate peers and national experts as well as hear from leading experts from the government, from private sector, around how they're thinking about these problems. Registration details are coming soon. Next slide please.

Also please check out Season One of the Better Planet Challenge Roadshow. Our energy experts hit the road to see how our partners in the national area are reducing their emissions. Watch as we visit Nissan, Whirlpool and Kenmore to see decarbonization in action. Are our partners on their way to meeting their goal of reducing emissions by 50% in ten years? Will our partners survive trying national hot chicken? Tune in to season one on the Better Buildings Solution Center to find out. Next slide please.

With that, I'd like to thank our presenters Yu Ann and John again for taking the time to be with us today. Please feel free to contact our presenters directly with additional questions, or if we couldn't get to your question during the Q&A period. I encourage you to follow the Better Buildings Initiative on LinkedIn and Twitter, or X I guess, for all the latest news. You will receive an e-mail notice when today's recording, slides and transcript are available on the Better Buildings Solution Center. Thank you everyone. Have a great rest of your day.

[End of Audio]

Nothing to Sneeze At: Health Benefits of Electrification in Multifamily Housing

Additional Resources

Learn more about the topics discussed on the webinar by visiting the resources below.

Better Buildings Resources

- Multifamily Resources for Reducing Carbon Emissions

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Other Resources

- RMI's Decarbonizing Homes Report
- RMI's Health Impact of Buildings in Your State website
- Contra Costa Asthma Initiative Program

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