*Automated Voice:* The broadcast is now starting. All attendees are in listen-only mode.

*Krystal Laymon:* Hello, and welcome to the second installment of the Better Buildings webinar series. In this series, we're profiling the best practices and Better Buildings Challenge and Alliance partners and other organizations working to improve energy efficiency in buildings. I hope you will join us twice a week for the remainder of the summer and stay tuned of more information on our 2020-2021 webinar series launching in the fall. Next slide.

I am your moderator, Krystal Laymon. I serve in the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy as a policy advisor. My work focuses on resilient and equitable solutions for states, localities, and utilities interested in clean energy projects and programs. Next slide.

We're excited to announce that today we will be using an interactive platform called Slido for questions and answers. Please go to www.Slido.com using your mobile device or by opening a new window by your Internet browser. Today's event code is #DOE. If you would like to ask our panelists any questions, please submit them anytime throughout the presentation. We will be answering your questions through the end of the session.

You can select the Thumb Up icon for questions that you like, which will result in the most popular questions being moved to the top of the queue. I will give everyone a few moments to open up Slido, and we will be launching a poll here shortly. So please go ahead and do that now. And also let us know if you have any issues on the chat box. Let's go to webinar. Next slide.

And we'll start the poll. We are curious where folks are coming from, so you have some selections. So we'll give this about 20 to 30 seconds. People may be downloading it now and also responding. All right. We'll go ahead and close the poll. Looks as though we have quite a few consultants, but also a smattering of local and state and federal government. Okay. You can go ahead and close the polls.

So, I will go into a brief overview of some of the activities and the resources from the Department of Energy. I won't to into detail, but the slides will be available after the presentation. Next slide. Next slide.

These activities are brought to you by the Office of Energy Efficiency Renewable Energy by the Department of Energy. Next slide.

A program that recently sunsetted was the Clean Energy for Low-Income Communities Accelerator, which worked with over 30 stakeholders to understand the challenges and create solutions on low-income energy issues. Next slide.

The results include various replicable models for states, cities, and non-profits, reduce energy burden, and deploy clean energy for low-income families. One of our CELICA partners, Philadelphia, will be presenting today. Next slide.

We also have the Low-Income Energy Affordability Data Tool, which helps stakeholders conduct their own analysis on energy burden and other characteristics. Next slide.

We're happy to announce we just published a new use case on how the state of Kentucky has used the tool to serve areas in need. Next slide.

Other examples are included here, and most recently the New Jersey state legislator used part of the LEAD tool to cite some of the activities on their legislation to create a new Office of Energy Equity for their state. Next slide.

The Solar in Your Community Challenge that sunsetted recently highlighted various models in how community solar can reach disadvantaged communities and awarded innovative models with cash prizes. Next slide.

Here's a highlight of one of the winners, a municipal utility that is reaching customers in need with clean energy. Today, Denver Housing Authority will speak that is also named a winner of the program. Next slide.

And finally, we have the National Community Solar Partnership, which recently launched, focused on making community solar affordable and accessible. We're accepting partners to participate, and you can register to be a partner at the DOE website. Next slide.

Partners will receive various offerings, such as an opportunity to apply for technical assistance. Next slide.

So with that, here's my contact information. And feel free to reach out to me. We have a great lineup of presenters today. Next slide.

Our first panelist will be Nate Hausman, a program director for the Clean Energy States Alliance, where he works on solar policy issues. At CESA, Nate manages a program to accelerate the development of solar projects that benefit low- and moderate-income houses and communities.

We'll also hear from Emily Schapira, part of the Philadelphia Energy Authority, and currently the vice chair and executive director of the board. Emily joined in June, 2016, _____ the Philadelphia Energy Campaign, a $1 billion, ten year initiative to advance energy efficiency and clean energy across cities and school buildings, residential housing, and small businesses in Philadelphia while creating over 10,000 jobs.

And finally, we will hear from Chris Jedd. Chris Jedd's role at Denver Housing Authority is to provide primary oversight from the development of sustainable affordable housing. Chris has over 17 years of combined experience in real estate development, renewable energy and energy conservation, including the financing of over 15 million energy and water conservation upgrades, the development of over 5 megawatts of solar, and the development of over $100 million in multi-family properties.

As a reminder, please send any questions through Slido, by typing in event code #DOE. And we'll try to get to as many as possible. And with that, I will pass this on to Nate. Nate, are you ready?

*Nate Hausman:* Yeah. Ready. Thanks. Thanks. Appreciate the intro. And excited to talk about low- and moderate-income solar program design. Next. And you can go to the next slide.

So I first want to just start by telling you a little bit about the Clean Energy States Alliance. That's the organization I work for, or CESA. We're a national non-profit coalition of public agencies and organizations. We work together to advance clean energy. You can see our members on this slide. We're mostly a state agency members that work in the clean energy space. And actually, that's going to be my focus today, on state approaches to low- and moderate-income solar, because that's primarily who we work with. And also after my presentation, I think Emily and Chris will talk about some of the programs they operate that operate under the municipal and public housing agency level.

So first – next slide – I'll offer a sort of smattering of what states have done in the low- and moderate-income solar area. It's not intended to be a comprehensive overview of what all states have done. It's simply designed to give you a sense of some of the diversity of different state approaches, and program models, and promising program models.

So first, California, they have a Single-family Affordable Homes (SASH) and Solar on Multi-family affordable housing program. Both provide up-front capacity-based incentives to different sectors, whether it's the single-family sector or the multi-family affordable housing sector, both going to low-income homeowners and tenants, respectively.

Colorado took a slightly different approach. And I'm just going to stay on this slide just for a second to talk through all these. Colorado took a different approach. The Weatherization Assistance Program that's a federally-funded program, but states administer that program. And Colorado in 2015, they integrated rooftop solar. They got approval. They became the first state to get approval from the Department of Energy to integrate rooftop solar into their weatherization assistance program. So that's sort of a different program approach.

Connecticut, they have a Solar For All program that's a public-private partnership model. It's a partnership between the Connecticut Green Bank and PosiGen Solar. It focuses on single-family owner-occupied homes, and it maximizes benefits for those homeowners using a third-party ownership structure, a lease model solar paired with energy efficiency, monetizing the federal tax credit and reducing capital investment burdens on participating households.

The Illinois Solar for All program. Under this program, incentives are offered through approved vendors who agree to certain consumer protection standards. And also there's a solar jobs training component to that, as well, for the approved vendors who are required to use qualified trainees on a certain percentage of their projects.

Where am I? Did I talk about Hawaii's program? That's an on-bill financing program. I guess I skipped over that. Apologies. It's an on-bill financing program where clean energy investments get repaid through a line item on customers' monthly electricity bill, and that includes efficiency upgrades, as well as solar.

Maryland has a Focus on Resiliency hubs, and those are facilities within a short walking distance of an economically-disadvantaged population that in an emergency, in an outage situation, can provide refrigeration of medications and other resiliency electricity needs for those communities. And it's a grant program. So it essentially provides grants to micro-grid developers for project costs in high-density LMI communities.

Massachusetts has a Solar Loan Program connecting its financing – connects homeowners with financing opportunities through loans. There's an interest rate buy-down, a loan loss reserve. And there's also an elevated incentive, income-sensitive incentive associated with that program.

New Hampshire. They have a Community Solar Grant Program. They offer grants to community solar projects that provide direct benefits for those low- and moderate-income tenants.

New York has a Solar For All Program that offers low-income households the opportunity to subscribe to shared solar arrays at zero up-front cost.

And then lastly, I wanted to highlight a slightly different approach that Oregon's taken that's really a stakeholder engagement initiative to expand opportunities for LMI residents to access solar and other renewable energy resources. And basically as part of that stakeholder engagement process, that sort of multi-stage process, they also created an innovation grant program to cede funding to local organizations that are operating and leading projects and programs in this space. So those are just a handful of things states have done in this space. Next.

I want to quickly offer some suggestions for recommendations for sort of program design at the state level. And these are drawn from a report we produced in collaboration with a whole bunch of folks: Jackson State University, Partnership for Southern Equity, University of Michigan, and The Solutions Project. And we produced – this was last December – we produced a report called Solar with Justice: Strategies for Powering up Under Resourced Communities and Growing an Inclusive Solar Market.

It identifies strategies for advancing solar in under resourced communities, but it looks at what states can do. It looks at what other stakeholders can do, too. So I highly recommend that resource, and the recommendations, the suggestions I'm talking

about today are drawn directly from that, in particular with the focus on what states can do. Next.

The first recommendation for states is to measure progress toward energy equity. Of course, states can better target and tailor their programs if they have good data on the scope and nature of the problem they're trying to address. And of course, that's especially the case when it comes to solar equity. So it need not be an expensive proposition. There's lots of ways you can approach it. But there's some resources out there that already exist, research organizations that have already compiled data. So I listed a few of those here. In the interest of time, I won't cover all of those. But, there are some resources out there as a starting place for folks. Next.

Great. Recommendation two. Ensure Pro-Solar State Policies Are in Place. So it's hard for LMI solar to thrive unless there's a policy environment that's conducive to general solar policy development. And there's a whole bunch of policies that can help that along. And I won't cover all of them again in the interest of time. But favorable compensation, solar incentives, third-party ownership allowing those, those go a long way. And the other thing I'll just mention is that policy consistency over time is also an important consideration. Next.

So in addition to the background solar policies, it's also important to target incentives to low- and moderate-income customers directly. Of course, in addition to some of those policies, targeted approaches are also necessary. So possible strategies include grants, or loan programs, rebates, or lower interest rates, interest rate buy-downs for low- and moderate-income program participants. And incentives, also, in addition to sort of directly to consumers, also, states can offer incentives to attract financiers, solar companies, others in to become active in under-resourced communities. Next.

Leverage Private Capital. So, financial incentives are certainly necessary to jump start solar in under-resourced communities. But, lots of states don't have the sufficient financial resources to give away solar to LMI communities or to be the only source of public funding. So there's ways to leverage private funding through loan-loss reserves, green banks, other financial partnerships that can help enable solar projects, too. Next.

Recommendation five is to work with trusted organizations, community organizations. And there are several ways that states

and others can engage with front line organizations in under-resourced communities. For one thing, I think it's important for states and others to bring representatives from community organizations into the program design process as part of it. And states can provide funding and training to help communities put together their own plans for solar project development. Next.

Bring low- and moderate-income issues into regulatory proceedings. Utilities should be encouraged as part of their general social obligations to look at solar equity. It hasn't been a focus for a lot of public utility commissions, or PUCs, but there's many things that state regulators can do, and just to highlight a few, include integrating equity considerations into all proceedings, or to include them in special utilities integrated resource planning, or to consider opportunities within the rate design process to support low- and moderate-income solar adoption. An example of this is if a state were to undertake net metering reform, for example, that would reduce solar compensation, perhaps low and moderate-income customers could be grandfathered for a period, or something along those lines. Just a couple of examples of regulatory approaches. Next.

Design Programs for Specific Market Segments. A solar program is unlikely to be able to serve both homeowners and renters equally, and targeting to programs to specific market segments can help. I'll just note that the multi-family affordable housing segment is a particularly important one – and we'll hear from Chris about that – in part because a high percentage of LMI populations live in that kind of housing. Next.

This seems like an obvious one, number eight, but it's really important. Some programs and projects in under-resourced communities don't provide meaningful financial benefits to residents, either because there's excessive financial risks or because those benefits accrued to a developer, or a financier, a building owner, or someone else. And so assessing to whom the financial benefits of a solar project flow is critically important, and there's some suggested ways to do that on this slide. Next.

Impose high consumer protection standards. Low-income customers have more to lose if their solar doesn't perform as expected. So consumer protection is especially important in this area. So what can states do? Well, one thing they can do is create regulations on solar contracts to protect consumers, requiring certain performance guarantees or other consumer protection information be included in all solar contracts. And the Clean

Energy States Alliance has a report on state solar contract disclosure requirements, too, that you can check out that might be a good resource. Next.

Great. And I'll just briefly mention a couple other considerations before closing out here. States can, by focusing on community institutions, states can reach a broad number of people. Community institutions are highly visible. There's a lot of people that they can serve. And they can also provide resiliency benefits and the like for community at large. I mentioned workforce development before when I was talking about Illinois' program. But this can be an important strategy to build wealth in under-resourced communities. Not only does it directly do that, but it also is important because solar companies may ultimately have more sales if customers see people from their community that are working in the industry. And there can be increased community support.

And last, but not least, education is important. States are well-positioned to provide even-handed solar information to consumers. They can also help providing education to project developers and solar installation companies to help them understand the specific needs and perspectives of under-resourced communities and low- and moderate-income residents.

So with that, I'll close out and turn it over to – well, I'll turn it back over to you, Krystal. Thanks.

*Krystal Laymon:* Thanks, Nate. A quick reminder to our audience to send in any questions you may have through Slido by going to Slido.com and typing in event code #DOE. We're collecting these for our Q and A period at the end of the session. With that, let's transition to Emily and Philadelphia Energy Authority. Emily?

*Emily Schapira:* Great. Thanks, Krystal. Next slide, please. Awesome.

Hi, everybody. My name's Emily Schapira. I'm the executive director of the Philadelphia Energy Authority. We're a city government entity that's focused on creating a robust, equity clean energy market in Philadelphia. Next slide, please.

Before I jump into our content, I just want to give you a little bit of context about Philadelphia. We're the poorest big city in America. We're the fifth or sixth largest city, depending on who you talk to – about 1.6 million residents, with population growth year after year for the last decade. Twenty-five percent of all Philadelphians live

below the poverty line. And that was pre-COVID, and we've seen those numbers skyrocket since. That includes one in three children, pre-COVID. We're having a real estate boom, a thriving downtown inner-ring neighborhoods, and our citywide unemployment was pretty good at about 4.6 percent right before the pandemic hit. But we know that even in good times unemployment among African American populations in Philadelphia is about double the city average. Next slide, please.

And this is how energy sort of plays into this. We try to talk to our council people and our decision makers in the city about these statistics all the time, because it really plays into the broader issues in the city. So, using the DOE's lead tool, we can see that in Philadelphia residents below 30 percent of area median income, so our poorest residents, pay 23 percent of their income to utilities. And compare that to the national average for low-income populations, which I believe is 9 percent lately. So Philadelphia has real issues here.

Over 50 percent of African American households at any income level in Philadelphia face energy insecurity at least once a year, foregoing food or medicine to pay for utility, or having utilities shut off, or setting their home to an unsafe or unhealthy level to keep the utilities on. And that's particularly difficult right now as we're in the middle of a heat wave. Similarly, for over 40 percent of renters in the city. So this is a huge issue here. Next slide.

So that's really the way that we frame our work. We look at energy as a tool for impact on our city's biggest challenges: economic development, poverty reduction, public health education, job creation; really just one path forward to addressing those issues. Next slide.

So, in 2016, with the leadership of our city council president, Darrell Clark, we launched the Philadelphia Energy Campaign. It's a ten-year initiative to invest $1 billion in clean energy and energy efficiency projects in Philadelphia to create 10,000 jobs. It's gone very well. We're about to release our 2019 report – late. But in the first three years, we helped launch over $136 million in projects, created about 1,300 jobs, and we're expecting 2020 to be a big year, as well.

I threw a couple of highlights up here. I won't spend a lot of time on them since I know we're here to talk about our low- and moderate-income solar program. But just to give you a little bit more context on the work we do, we helped launch the largest

solar project in Pennsylvania, to date. Although we will be outrun quickly, and that's something we're excited about. *[Laughs]* It's actually an 80-megawatt project that we're taking 70 megawatts of to power 22 percent of our municipal electricity.

We've completed a $12 million energy retrofit at the Philadelphia Museum of Art, which is our largest energy-consuming building in the city – largest city-owned energy-consuming building – reduced the city's utility costs there by 25 percent. We've done over $50 million in school energy makeovers, including really major capital systems and investments like boilers and windows, and have seen in some schools as much as 50 percent energy reduction.

We've completed over $10 million of residential rooftop solar, and we're particularly proud of this achievement because this was done in four-kilowatt increments, if you can imagine. *[Laughs]* We run a program that 85,000 households have enrolled in for water and sewer line infrastructure. That's been great. And just recently, we launched C-PACE and closed our first C-PACE project for commercial and industrial energy efficiency and renewables projects. So we're really excited about how things are moving forward for clean energy in Philadelphia. Next slide.

All right. So, let's talk about solar. So we now are on the fourth round of Solarize Philly. You can go to the next slide. You guys might be familiar with the Solarize model. It's sort of a group discount program, essentially, where we vet contractors and help to marketing to really reduce those soft costs and drive down the price of solar. Philly is a really nascent solar market. Just a few years ago, we had very little solar in the city at all. And we don't have a particularly friendly regulatory or legislative environment for solar in Pennsylvania.

So this was our sort of beginning of the solar market really built on the back of residential solar. We've had over 650 households participate. I believe we're the largest solarized program in the country. We've contracted about three megawatts of solar, $10 million, created about 100 direct jobs that we can sort of point to these 100 people and say, "They now work in the solar industry." Next slide.

When we run Solarize Philly, we take program fees from each project that we run and we apply them to two things. The first is workforce training for solar, and the second is our low- and moderate-income solar program. So I'll just briefly share with you about our training. We've really found that in Philadelphia – and I

imagine this to be the case in most urban areas, as well – there's a core group of really underserved, underemployed folks who are ready and eager to enter the clean energy market and need a bit of training to get there. And so we are really lucky to have gotten support from the solar energy technologies office of DOE to develop Bright Solar Futures. It's a two-tiered program.

One is for the Opportunity Youth, 18-30 year old young people who are underemployed or unemployed or not in school for whatever reason, and in partnership with PowerCorpsPHL, which is just an amazing organization, have been able to provide 680 hours of classroom and online training, plus a summer internship, plus now job placement to our first cohort of students, which just completed their work in May. And that's been an incredibly successful program. They're all in internships now, even despite COVID, which is really heartening.

The second course of Bright Solar Futures is through the high schools, and we're really excited how this turned out. I think this is an easily replicable model. So with DOE's funding and support, we're able to get the first vocational solar program for high schoolers approved in Pennsylvania. And I think it's really the first of its kind in the country. It starts in tenth grade. Students get 1,080 hours of instruction over three years, really, as part of their core high school work.

And because the state Department of Education approved it, now funding becomes available to any school district in Pennsylvania that wants to offer this program. We're also happy to share our curriculum elsewhere. So if you have a school district that's interested in this, let us know. We're building a solar lab right now at Frankford High School, which is where the program will be housed, sponsored by PECO, our electric utility, and Community Energy. And over the course of those three years, all the students will have three internships plus get help getting placed into a career.

And I just want to note this picture because I love this. This is some of our PowerCorps fellows at the Energy Coordinating Agency's Solar Training Lab before COVID hit this year, working on our mock roof. Next slide, please.

Okay. So, here's the main event. So we take a 25-cent-per-watt fee out of our Solarize Philly projects, and four cents goes to our training program because we've had other funding for that; and 21 cents goes to our Solar Savings Grant Program. This is a program

that's really designed to put solar on the rooftops of low- and moderate-income households. And that is a function of the regulatory and legislative environment here in Pennsylvania. We have extremely restrictive rules for virtual met metering, so Community Solar is not really enabled at all in Pennsylvania, even to the extent that if you live in a multi-family affordable building, you're not allowed to put solar on the roof of that building to benefit the tenants.

We also have really low-value SRECs, so that makes it very difficult to find the subsidies that you often need for low- and moderate-income households. So we've designed a program to just go straight onto your roof. And actually, with a lot of the concerns that Nate raised, I think those are all of the issues that we talked about as we were designing this program. It took us over a year and a half to get the model right. But I think we have it now.

So, there's a pilot going on right this very moment for 40 low- and moderate-income households. They'll go solar with no up-front cost. They're expected to start saving in year one. Our goal was 20 percent less than what they're paying on their PECO bill right now. We felt like that gave us enough of a margin that if there are some months where they generate more, and some months they generate less that this would do a little bit of smoothing for them throughout the year by having that buffer. We're providing a grant for about half the cost, and then low-cost financing for the remainder. And I'll explain more details about that in a minute.

We're able to do some alternative underwriting, which we're really excited about. Rather than looking at credit score, we just looked at on-time payment of your electric bill. So if you paid it on time for 12 months, you're in. we did make a few exceptions for COVID, given what's going on. And the household income limit was 80 percent of area median income. So that's the table on the right, if that's of interest for anyone. And the installs are starting right now. Next slide, please.

So, this is the design. Our financing is in partnership with two amazing organizations. Centennial Parkside CDC is a local community development corp who was able to get some grants from a couple of partners. And rather than sort of just using the grants directly, they were thoughtful and creative enough to want to lend that grant money, take a three-percent return with principal, and so they're able to reinvest that back into their programs with Parkside Neighborhood. And then in partnership, also, with the National Energy Improvement fund, who works across the country.

And I encourage anybody who is interested in doing this work to talk to them about it. So we designed a 15-year loan at a 5.99 percent interest rate with 3 percent return to Centennial Parkside CDC.

In order to make the alternative underwriting possible, and in order to keep NEIF's profile and costs low, we are holding a loan loss reserve. And we used expected default data from PosiGen, who in Louisiana and Connecticut and now in New Jersey have done over 15,000 LMI solar loans. So we felt like that was pretty good data, and NEIF agreed.

And then we also incorporated into our contract the first right of refusal on curing any defaults. Our goal is not to penalize people of not being able to make a payment. We want them to have solar. We want them to be able to keep it. So we held a bit bigger loss reserve than we expect to need. Also, I think with just an early-stage solar market, that was important to the lenders.

We also hold an emergency repair or removal fund for 15 years. If somebody has a roof leak and needs to remove the solar, that's a big risk, I think, to low-income households. And if they're not able to do it, that could be a real issue. And so we have a fund and they'll be able to appeal to us if they need financial help for that. And we've also purchased a 15-year maintenance contract. So every other year, the maintenance folks will go up there and do a tune-up and an inspection to make sure everything's performing as it should.

Our grant also included a 15-year purchase of the SRECs at an above-market price. In Pennsylvania, as I mentioned, our SRECs are very low. I think right now it's under $30.00. And this way we're able to sort of say, "Okay. We'll fix the price. We'll take that risk." And it helps us revolve a little bit of the loan funds. And then the owner is required to transfer that agreement to the new owner in case of a sale.

So that's kind of the model. I think the next slide is just my contact info. So, I'm looking forward to talking to you guys more. I just want to say about this picture – because I love it so much – this was our 150th Solarize Philly install. And all of the young people that you see here are Solarize students under Bright Solar Futures, my board members, and our partners. So, thanks very much. Pass it back to Krystal.

*Krystal Laymon:* Thank you for a great presentation, Emily. Please keep sending your questions to Slido. I just will mention this again, Slido.com, use event code #DOE.

So now, last but not least, we'll hear from Chris. Chris, the floor is yours. Chris, you might be on mute.

*Chris Jedd:* All right. Sorry.

*Krystal Laymon:* We can hear you.

*Chris Jedd:* Well, thanks for having me. You can probably jump to the next slide here, and just a quick introduction of the Denver Housing Authority is we're a housing authority for the city and county of Denver, and we develop, own, and operate mixed-income and affordable housing. So we do, we have HUD properties, public housing. We have LIHTC properties, project-based properties, and manage vouchers. So we do a lot of self-development, and we also have a pretty robust energy management program, where we have a couple of energy performance contracts underway, as well as some solar assets that I want to share with you guys today. So, next slide, please.

So, today, just jumping into solar, over the past ten years, DHA has really propelled it solar investment. And this is kind of a snapshot of what we've done. In 2012, we did a 2.5 megawatt power purchase agreement with a third-party developer. And that's what that picture is on the left. And essentially, it was 665 rooftops and systems, equating to $10 million of investment. It was a typical PPA where a third party brought all the expertise, all the financing. And it was really a turnkey deal for DHA, where we would provide rooftops and then share in the energy savings for residents, as well as the buildings.

The second was as low-income community solar programs roll out in Colorado, we are fortunate to have a program. Like Nate said, not all states have similar programs. So we're starting to dabble in community solar, where we shared about a five percent subscription to a third-party developer, and we've provided bill credits to our residents to save energy. And then lastly with all new construction and rehabs, we do our best to deploy solar on the rooftops, as well.

So, as we went through this evolution of different solar models and different programs, we're starting to run out of rooftops. So, there's only so many good rooftops that you can use. A lot of the

properties we have slated for demolition. So you don't want to do that. A lot of properties are shaded. A lot of properties just wasn't good orientation. And so we were we like how do we keep our solar program moving and growing with all of these challenges? So we turned to community solar, and we can jump to the next slide, please.

So community solar, if you boil it down into its simplest form, it's a solar array. There's no real size limitations. It can be really small. You know, 10KW up to huge, you know, 100 megawatts. But the really crux is is the array shared by a multiple meters and multiple customers? So it varies state by state. Not all states have community solar. We are fortunate that Colorado did. And so there's various ways to participate in community solar. You could do a power purchase agreement. You could buy in and put equity in and be able to own your solar panels. Or you could develop your own community solar garden.

There's pros and cons to each of that. The benefits of community solar is it's offsite. It's typically maintained by a third party. So if you are a building owner and you have a large portfolio, typically your maintenance team doesn't have the training that it takes to maintain solar as it should be. So the nice thing is it's done by a third party. And it is a lot of energy savings that is generated, as well. And then the challenges for these projects, in my opinion, are, they're definitely the long-term contracts; 15 to 20 years. And then there's a lot of terms in the legalese in the contracts that are challenging, as well, especially for different types of affordable housing.

And so in the world of affordable housing, there's public housing. There's tax credit housing. There's a lot of different buckets of housing. And each type of housing may have different rules, different utility allowances, different policies. So the nice thing about community solar is it's agnostic to that, and it can plug into any meter, and it's fungible, so you can switch meters around and you can share meters. So there's a lot of good benefits to that. So, with all of this in mind, and with DHA running out of rooftop space that we own, we made the jump in to develop a community solar garden. And if you go to the next slide, please.

And so this kind of forms up the program and what we envisioned. And the thought was if DHA would do a lot of affordable housing development. And so as we develop housing in house, we thought the best thing to do would be to develop this solar garden in hours, too. It would allows us optimal control. It would allow us to shape

the contracts and the terms a little differently, the way that would benefit our programs and our residents. It would allows us to keep the costs down and just have a lot more control over it.

So we decided to go after it as a developer of it. The goal was 100 low-income. We didn't just want it for Denver Housing residents in Denver Housing properties. The idea was to share it across the Denver metro area with other housing authorities, other developers, other affordable housing partners, and other residents, as well. So, the energy savings goal was about 20 percent of bill savings for the subscribers of electricity savings.

And another big part of this is we want to definitely have a robust workforce training and employment opportunities for not only DHA residents, but all residents of Denver. So this kind of is a snapshot of what we set out to do. If you go to the next slide, please.

Like all good projects, we had a great team. Definitely, this is our first community solar development we've done. We do a lot of affordable housing, but we've never done a solar garden before. So we definitely had a quick learning curve, but we had a great team, including the Department of Energy and Solar in your Community. They provided a lot of technical assistance through different consultants, as well.

So the team is, DHA acted as the sponsor and the developer. Namaste Solar, who is a prominent solar developer in Denver and nationally, they were the EPC. And engineering, procurement and construction; which is different than the EPC I was originally used to, which is Energy Performance Contract. So, essentially, Namaste was the general contractor for the solar array. Solar TAC. They were the property owner where this is located in Watkins, Colorado, which is just south of the Denver International Airport, for those of you familiar with the area. GRID Alternatives. They were really instrumental in providing policy expertise. Because we were really astute at affordable housing policy.

But as Nate said, and everyone else knows, that the policies around the country; even within your own state, they're pretty tricky, and you want to make sure you're headed in the right direction. So they were our policy consultants, you could say, as well as our workforce development consultants that helped us pull together the workforce training and the employment opportunities.

ENSIGHT Energy, they were funded through the Department of Energy through their Solar in your Community program. And on the bottom were our financing partners and counsel. And Monarch Private Capital was the tax credit equity investor for this. And Enterprise was the debt. So we definitely leveraged, as Nate recommended, to get private financing and outside financing. There wasn't a significant amount of grants or any city or federal money in this project. So, that's the project team. If you would switch, flip, next slide, please.

And this is how the dynamics of it work. And not all the slide is there, unfortunately. So, but the way that community solar works with Xcel Energy, which is the solar rewards program in Denver; is on the lower right there was a picture of the solar garden down there, and essentially the solar garden produces clean, renewable energy, and feeds it up to Xcel up on the upper right hand corner, which is that lightning bolt. And in return, Xcel gives us RECs, or renewable energy credits.

So every kilowatt hour our community solar garden generates, we feed it to Xcel Energy, and they reward us through their solar rewards program and give us money for every kilowatt hour. And so that's how that works with Xcel. And then if you look at Globe Ville Homes on the left there, that's a property of Denver Housing; essentially Globe Ville Homes buys their electricity from Xcel, Xcel gives them electricity. And because they're subscribed to the solar garden, they also get a bill credit.

So, essentially every kilowatt hour that Globe Ville Homes is subscribed on the solar garden, they get a bill credit on their bill. So what that looks like is if their utility bill is $80.00 a month, maybe they save $20.00 a month through bill credits. So the bottom line on the bill is reduced by $20.00. So it's a win-win for Globe Ville Homes resident, Xcel Energy, as well as it helps underwrite the deal for the community solar program, too. So, next slide, please.

Oh, there it is. Okay. So you stop right there. Sorry. So there's the solar garden. As you can see, Globe Ville Homes subscribes to the solar gardens. They pay a subscription fee. In return, they get that bill credit from Xcel. And that's where the meat of this is is the bill credit from Xcel is greater than the subscription fee. So if the bill credit is seven cents and the subscription fee is four cents, then effectively you're getting a three-cent credit on every kilowatt hour that the community solar garden produces.

So this kind of illustrates how it's all – the economics of it go. And you can see there's two different revenue streams to the solar garden, which is how this thing's financed and underwritten. One is through the Xcel Energy RECs, and the other one is through the subscription agreement through Globe Ville Homes. So, next slide, please.

The ownership of this. So this is more the financing and structure of it. The array is owned by Denver Metro Solar, LLC, which is the instrumentality of DHA. And we had to set this up like this to take care of the tax credit equity, which brought north of $1.4 million of equity to the deal. And so essentially, you have your equity investor, which is Monarch Private Capital, who gave us their tax credit equity, which allowed us to take out less debt, essentially, which less debt means less debt service, which means you can drive more money into the project and into the savings.

So, Monarch is 99 percent owner as an equity investor. But after the compliance period is over, which is about five years; then it lifts, and then Denver Housing, Denver Affordable Energy, Inc., is 99 percent owner and the equity investor can either stay in as a limited partner, or they can just exit the deal altogether. But we want to bring that equity investor in just to lower the debt service.

And it was really interesting. We modeled this both ways: with just straight debt with no equity investor, as well as with an equity investor. And both were surprisingly underwriteable and financeable, which was great. But you can't beat the free equity into the deal. It was a little more complex on the closing. Took a little longer, a little more closing fees and legal fees to make this structure happen. But at the end of the day, it was definitely worth bringing that equity investor in as a partner with us. So next slide, please.

The project economics. So this is for Denver Metro Solar. And that picture right there, Denver is in the center of that Google Maps. And you can see kind of where the solar TAC – that's solar TAC on the upper right picture there – who they, Solar TAC houses a lot of different solar technologies and other solar facilities, for lack of better words.

So Denver Metro Solar, if you look at it as a business, it has two revenue streams every year, which is what it's underwritten to. One is the renewable energy credit from Xcel, and one is through the sale of electricity to the properties and to the residents. And the expenses, it's like any business. There's debt service. We have to

pay Solar TAC. There's a long-term ground lease on there. There's O+M costs for the third-party operations and maintenance provider. There's management fee, and then also we put money away for replacement reserves. So that's kind of the OPEX of the deal.

And then on the lower left is the financing, which we've talked about. There's a tax equity partner, which is Monarch; the lender, which is Enterprise, which is a 15-year term on a loan; and then DHA, we put in a soft loan, subordinate loan as equity, a cash flow loan, essentially. So if there's any money we'll get paid back on that. So, next slide, please.

So, this is kind of an overview of the project that was successful. It worked. As far as the residents, there's really two ways the residents benefit. Some residents have direct subscriptions to this program, and they receive a direct bill credit on their bill. And it's pretty substantial because a lot of those residents don't pay for the subscription, either, so they just get the full bill credit. And then a lot of our billings are master metered, like his building on the left, Syracuse Plaza. And so there's no way to really – the residents don't pay utilities because it's just one big meter on the building. There's no way to track it.

So essentially what happens is the building reduces the operating costs, and then the savings – not only from the savings from the building, but any cash flow that's left over on the Denver Metro Solar, LLC, all gets directed to our residents in different programs. And this was important for our utility – and Nate kind of touched on this, too. It was important to the utility. It was important to our board. It was important to us, just to make sure that these residents get a benefit.

And so oftentimes it's not always – in fact, it was written into our resolution that the board approved that any cash flow would go to the residents in terms of resident services or other benefits. So the goal is if it's not a direct savings to the residents, whether it's due to metering and building typology, or HUD policy in terms of utility allowances and stuff like that, it would go into either the property or resident services.

So, in addition, it's not only DHA. We have Mercy Housing, who is the largest affordable housing developer. They have a couple buildings subscribed to it. There's Denver residents subscribed to this, as well as the Aurora Housing Authority also has some buildings. So it's definitely a community in spirit, and certainly has

some significant environmental impacts, and it helps align with DHA's commitment to renewable energy and the city's goals, as well as DOE's goals, as well. So we're really excited.

And next steps is we're looking to do this again. There's a lot of change in policy across our utility and the PUC. So, we're kind of waiting to see how things turn out, and hopefully we can turn out another one of these soon. So, I think that's the last slide, I believe. Yeah. And there's – that's a picture of it from an airplane. That's right by the airport. So that's coming in on a landing. It's just south of Denver International Airport. And that's the four black little things. It's the DHA community solar array. So it's definitely out there in the middle of nowhere. *[Laughs]* Good. Well, thank you.

*Krystal Laymon:* Right. Thank you, Chris. At this time, we will be taking your questions, and we'll transition into Slido. As a reminder, slides and recording will be archived on the Better Buildings Solution Center. You can visit the slide deck to access the resources we discussed today. We've gotten a few questions so far, which is great.

The first one I will ask to the group is on some of the activities that should be avoided. Do you have any examples of what to avoid in setting up a community-shared solar design, more specifically for LMI communities?

*Nate Hausman:* I can take an initial crack at that. And Chris and Emily, feel free to weigh in, too. I think one of the key issues around what people call community solar is that it can look like a lot of different things, that it's not a uniform structure, that it's actually could be – it could be an array located within a community that it serves. It could be located offsite, as Chris talked about. It could be in ownership, where you actually own an interest in an array. Or, it could be that you're actually paying to get electricity generated, or it could be a savings guarantee model. So there's a lot of product confusion around community solar.

And so one thing I would say is to be as clear as possible. There's premium products where you pay more, and there's products where you can get savings associated with it. So there's a lot of different ways it's structured. And so to the extent you can be as clear as possible as to what the product you're offering is. And then there's lots of for low- and moderate-income customers there's important facets like there can be penalties withdrawing and lots of deposit costs, and those kinds of things can raise real consumer protection flags, particularly for low- and moderate-income customers. And it's kind of a more abstract concept than solar on your roof, which

you can see. So, I would be as clear as possible as to sort of what the product you're offering is, and what the savings proposition you're offering is.

And then there's a series of other consumer protection concerns that I would highlight to avoid about who actually are the renewable energy credits from a project? Where are they flowing? Can consumers say they're actually using solar power associated with the product? Investment tax credit issues. Those types of things. And then I'll just point out that a lot of well-meaning programs that are set up to encourage low- and moderate-income customers have some unintended consequences: carve-outs that end up costing developers more to develop products that ultimately end up eroding the savings proposition for low- and moderate-income customers. So those are some flags that I would avoid. Yeah. I'll stop there.

*Krystal Laymon:* Chris and Emily, any suggestions for those who are starting out on this and what they should avoid?

*Emily Schapira:* Since we don't get to have community solar in Pennsylvania, I don't know that I have any good feedback on this one. I'll pass it to Chris.

*Krystal Laymon:* Take the next one. Chris?

*Chris Jedd:* I would say I think Nate nailed it. I think there's two things. One is the solar policy and what they're signing up for, and making sure the deal is good and there's not unintended consequences. And on the other side, I think know your customer in terms of LMI. Who are they? Where are they living? Because if they're living – there's LMI that live in public housing. There's LMI that live in both LIHTC housing, project-based housing, voucher housing. And some are unlucky and they don't live in any subsidized housing, and they're paying full rent. And so some are renting, some are not. Some pay utilities. Some don't.

So just as important as knowing the solar policies, knowing your customer and who, and how they plug in, and who has utility allowances, and kind of figuring that out is a tricky one, too, to make them all blend together. So there's really two different policies. There's the solar world, and then there's the LMI world. And trying to find a sweet spot in there is the tricky part.

*Krystal Laymon:* The next question – and this has been voted on – is LMI benefits to community solar possible without government grants? And also a

question on how COVID may affect such initiatives. Emily, you are nodding your head.

*Emily Schapira:* Yeah. Totally. So, well, and again, our model isn't community solar. It's individual rooftop solar. But I think it's definitely possible without government grants. And I'll say in Philadelphia, we don't have a particularly high cost of electricity. It's probably 13.5 cents, maybe, per kilowatt hour. So it's high, but it's not so high that it makes the math very easy here. We also have bad SRECs, and we don't have virtual net metering, really.

So, yeah. Everything we've done we've been able to do it without government grants. And we started Solarize Philly with literally a $15,000.00 grant from the Solar in Your Community Challenge from DOE. And we're able to really use the power of the rest of the market to be the subsidy for our low- and moderate-income households. So we didn't have to get any city or state grants to do it.

And I see that there's a question lower, so I'll just answer it since I'm talking about it, which is that we charged a program fee as part of Solarize Philly, and it was just embedded in the cost that the installers gave to the customers. And we're able to lower the soft costs so much that customers were still paying less with Solarize Philly than they would have on the open market. So that was kind of the magic, is you have to sort of do all the work and make sure that it's fair to the customer each time they're sort of getting a piece of it. But we charge 25 cents a watt as part of that program, 4 cents a watt went to the training program, and 21 cents a watt was set aside for the LMI solar program.

*Krystal Laymon:* Great. We had a question on suggestions for working around solar-unfriendly state leadership at the municipal level. Emily?

*Emily Schapira:* Okay. Just because I'm in Pennsylvania. *[Laughs]* So, we have a complicated political setup in Pennsylvania. We have some progressive ends of this state, and then not so progressive in the middle. We have coal country. We have fracking country. So, the politics are pretty thick when it comes to energy issues in Pennsylvania. The utilities also, frankly, have been very unfriendly to solar generally. And we're lucky to have a progressive governor and a thoughtful public utility commission who, I think, has sort of done the best they could with what they have.

So, I think you can see in our program design that we are not waiting for Harrisburg to do anything. We've taken the rules that

we're faced with and we've said, "Okay. What can we do with this? And is there a model that can get people savings and still make sure that solar is available to everyone, not just the wealthy?"

And so that's what I'd encourage you to do. Take a look at what the dynamics are, and that's what you have to work in. And just design a model the best you can to get to as many people as you can. I think our preference would have been community solar. Honestly, this is challenging to do on a house-by-house level. But since we don't have that available to us, this is where we've gone.

And honestly, I think a combination of community solar and rooftop solar is valuable, because it really is empowering for neighborhoods to have that solar on the roof, and for community members in the neighborhood to be the ones that are installing that solar, it really just transforms the way everybody thinks about clean energy and climate change.

*Krystal Laymon:* Unfortunately, we are out of time. But I just want to allow – if you want to give one piece of advice for folks looking at solar and low-income, what would be the one piece of advice? We'll start with Chris.

*Chris Jedd:* I get – caught me off guard.

*Krystal Laymon:* *[Laughs]*

*Chris Jedd:* I think it's know your policies. And that's both on the solar – and I'm repeating myself, but it's important – the solar policy and the customer policy. And just kind of optimize those two.

*Krystal Laymon:* All right. Nate?

*Nate Hausman:* Yeah. I just say lean in. You know? There's some models out there that exist. Chris', Emily's – and there's ways to make it happen. And so don't be scared to jump in.

*Emily Schapira:* Amen. I'd echo Nate. Don't take no for an answer, and keep working. Because I think there is a solution in any regulatory or legislative environment. You just need to keep poking around and looking for it and build partnerships and go for it.

*Krystal Laymon:* Excellent. Really helpful. And everyone's information is on the slide, so feel free to reach out to these panelists. We'll just go ahead and close with just a last slide of reminders for the upcoming webinars. You can see that. And then the contact information for

all of our panelists teacher the end of the slide. There it goes. And you can also rate the session. We want to know how you enjoyed it, and also if you'd like to see more of this in the future.

And with that, I want to thank our panelists very much. There's our contact information. And please have a great day. And keep thinking about solar. All right. thank you so much.

*Nate Hausman:* Right. Thanks, everyone.

*Chris Jedd:* Thank you. Take care, all.