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Ian: And I'd like to welcome you to today's event: Timely Tales of Energy Codes Kickoff to the National Energy Codes Conference Seminar Series.

So to kick things off and introduce our group of esteemed panelists and presenters I'd like to hand things off to Jeremy Williams with the US Department of Energy. Take it away, Jeremy.

Jeremy Williams: All right, thanks Ian. Good afternoon everybody, welcome and good morning, I suppose to our West Coasters. So as Ian mentioned you're tuned into the National Energy Codes Conference or NECC what we're calling our fall seminar series. We're kicking off the series today and it's going to continue through the coming weeks throughout the fall and so now through early December.

I am Jeremy Williams; I work for the Building Technologies Office at the US Department of Energy. I'm going to get us started here, tell you a little bit what you're in for, and then we're going to pretty quickly turn it over to today's panel. Ian, if you mind clicking us to the next slide.

[0:01:00]

Okay. So here we go, today we have a line up of state and local panelists they're going to talk to us a little bit about new and innovative things that are happening in their states, their cities, their regions. Anything from the influence of new and advanced technologies to how they're using codes to support pretty ambitious state and local policy goals. Anything from new and existing buildings to zero energy to electrification and how energy efficiency can play a role in things like hazard mitigation and resilience.

We're going to start out with a series of short talks from our panel and then we're going to spend much of the time of today's session in discussion. And we'll have a moderated discussion amongst the panelists. But as part of that discussion we also want to hear from you. And you can weight in in a couple ways here.

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One, we have a chat as part of the webinar that Ian mentioned, so as we're moving through the presentations and the early part of the

program be thinking about questions that you might have, comments, feedback. Don't be afraid to fire it into the chat, send it our way, and we're going to collect those comments and we'll circle back to those later on in the session.

The second piece is we're going to be doing some audience polling. And so, from time to time we'll throw some poll questions on the screen and we'll give you a shot to respond to those, let us know what you think. And we're going to use those to help frame the discussion and we're also going to use those to help the – we're going to give the panelists a chance to respond and react to the polls.

So be thinking of those question as we go, put them in the chat and then we'll circle back to those. But before we get to today's panel, I want to give everyone kind of a quick heads up what's to come in our seminar series. So we're going to be meeting weekly Thursdays, every Thursday at 1:00 PM. We'll take a week off for things like thanksgiving break but otherwise, every Thursday and 1:00 PM Eastern, I should say.

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And the sessions are going to take a variety of formats. And so today we have a panel discussion, we'll have some other panel discussions like today. We're going to do some deeper dives via lectures, for example. We'll do some training seminars. We'll have some interactive break out sessions. A number of different formats that kind of lend themselves to the individual topics.

And so, while it's unfortunate that we can't be together in person this year at the NECC, and it may be 2020 but I think everyone would agree this year has been anything but perfect vision anything but clear. But as far as energy codes go, the discussion continues and, in a way, there's more happening than ever so we want to be sure to provide a forum where we can talk about those issues, answer questions, share information, and do all the things we typically do through the codes conference.

So before we get into the panel today, let's get us going by learning a bit more about you.

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So this is going to be our first set of polls and we want to know where you're from, what you do, how long you've been at it. And

to do that, we're going to do three different questions here one at a time. And so, Ian, if you don't mind pulling up that first question, we'll give people a chance to respond. Okay, here's the first one.

So you should see a screen popping up or a window popping up on your computer screen. We'll give each of these about 10, maybe 20 seconds for everybody to read the question and respond. And then we'll have Ian show us the results, hopefully and we can see where we stand here.

So this first one, looking to see which region you're located; southwest, Midwest, western, and across the board.

Ian: All right, so here are the results.

Jeremy Williams: Okay. So most, many of us are in the Midwest today, most of us are in the northeast and pretty evenly distributed in some of the other regions here.

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So everyone should see the results on your screen now. Hopefully, you can see that breakdown. And then, why don't we jump to the next one. Okay, so which role here most closely aligns with your profession?

And so, the response we've offered up here they're actually based on the typical audience that we tend to see at the codes conference or at least what we've seen in recently conferences. And so, we're curious to see who's joined this year in this new or alternative virtual format. Whether we look the same or whether we look a little different than the average year.

Ian: We'll give it just a couple more seconds here so get your response in if you can.

[0:06:00]

Jeremy Williams: Okay, lots of designers, architects, and engineers. A handful of trade members, builders. Fifteen percent code officials. Just shy of 20 percent in the NGO or nonprofit or consulting category and a solid fifth in the other category so we'll have to figure out who you are in the other category. This is the breakdown of who's on the phone today.

And then third, let's jump to our third question. We typically have a pretty good mix of newcomers and seasoned experts that are involved with the codes conference or attend the codes conference which is a good thing. It's good to kind of have a nice mix of different perspectives, different backgrounds, different levels of experience.

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And so, we usually get a pretty good blend of professions and geography, which helps make for a lively discussion.

And so that's what you're going to see in the third question here once we can get it up. There we go. Okay. So years of experience and so it looks like about a third of us, just shy of a third are in the at one to five year category. Almost the same number in that ____ plus year category and everybody else is kind of in the middle, so interesting. That’s heavy on both ends of the spectrum but again, that's great for discussion purposes and hopefully we'll be able to take advantage of that today.

So okay, that's our three poll questions to start with. And last we checked, I think there's about 200, 250 folks or so on the phone today so that gives you a feel for who's out there and who else is listening as part of our virtual meeting.

[0:08:00]

So with that context let's shift towards our panel, I want to start by introducing today's moderator who is David Nemtzow. David is the director of the Building Technologies Office at DOE.

And as part of his job he oversees a $285 million research and development portfolio, it's focused on innovative and cost-effective energy efficiency, demand flexibility, market facing projects, and other solutions for building technologies, equipment system, as well as whole buildings. He was previously the director general of the New South Wales Australia Department of Energy Utilities and Sustainability. He's also a past president of the Alliance to Save Energy in Washington DC. And he was the chief policy office of Ice Energy, which is, I believe, a company specializing in thermal storage systems.

He has a masters from Harvard University in public policy, a bachelor from Brown in environmental policy.

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Most importantly, he's a great boss, he understands the impacts of energy codes, the issues that they face and so David, it's my pleasure to introduce you today. And I'll send it your way to get us rolling with the discussion.

David Nemtzow: Well great, thanks Jeremy. And frankly, you could have cut out all that introduction junk until you said, "great boss," but it's nice, thank you for saying that.

Hey, I'm having some bandwidth problems here in Bethesda Maryland so my camera doesn't want to turn on. I trust you can hear me okay, Jeremey, yes, thumbs up? All right. Okay.

So thank you all, welcome on behalf of the US Department of Energy and the Building Technologies Office. We're disappointed not to be with you in person in Chicago or Denver but we're delighted to be with you online and thanks for participating.

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And as Jeremey said, I hope you'll be able to join us after the next 11 sessions after today and have your calendars marked for this time on most Thursdays.

We have a really great panel today. We're going to hear from code officials, code leaders from the city and county of Denver, from New York City, from the state of Oregon, from the National Association of State Energy Officials, and from the International Code Council. So stay tuned for that but first, let me give you a little bit of a word from our sponsors and tell you about what we're up to at the Department of Energy. And we're going to even ask a question of our panelists today and of you all in the audience about what we're doing and what we should be doing so stay tuned for that.

We think of our job as bringing innovation to building energy codes. We're here to support you. You're the people who are doing it. Who are developing and adopting and encouraging compliance and enforcement with code? We're here to support you and I'm going to tell you how we do that.

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First, a reminder to all of us how big the stakes are. How important our job is with energy codes? Buildings consume more energy than

industry, than transportation. That's 39 percent of total US energy use happens in our national 125 million residential and commercial buildings whether it's a condo in a big building or a big hospital complex and everything in between.

And on electricity it's that much more, we're talking about three quarters of US energy use happens in the building sector. And at peak times in just about all the country that's even more so there's a lot of energy consumption here and that leads to a lot of pollution. About 35 percent of our nations CO2 admissions are from building related energy use. And that leads to a total bill of over $400 billion each year and of course, a lot of that wasted.

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I put that here, look 20 plus percent. If you wanted to say 20 plus plus percent or 30 percent, I don't think I would argue with you.

That's a big number and part of our collective job is to get it down across the building stock especially with new construction. A lot of the buildings, of course last a long time so most buildings in the US are over 20 years old and just about half of them are over 40 years old which means they were built before the modern period of energy considerations including the energy code. So that's our job in both new and exiting buildings.

And so, in fact, why don't you click through on this one, Ian, for me. So I'm just going to list here some of the things we do at DOE.

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So we're very active participants, I want to say DOE by the way, I just want to say I'm talking now about those and Jeremy and I who work in the mothership here at the department proper but also, the lab infrastructure led by Ian and his colleagues at the Pacific Northwest National Lab.

So with the DOE in the process including the labs we are active participants in the model code process that the ICC, IECC and AHSRAE 90.1. Our secretary of energy is required by statute that when the ICC and AHSRAE promulgate new standard every three years for each of them to make a determination whether they will save energy compared to their predecessors. And we support the technical analysis to allow the secretary to make such a determination.

The next one is very important.

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We provide technical analysis to you at the states and local government for adoption. You're our in client in many ways and we have a goal that we hit every year by hook or by crook but we hit every year. If you have a question for us, if you are a state or local, a state agency and we do as many local governments as we're capable of, if you have a question for us, if you want us to analyze the 2018 code and say but do it for our climate with our new housing starts or our new commercial starts, oh, and swap out the windows for this. And we'll do that.

And if you say to us, we want it done in KWH and KW and tons of CO2 and dollars, we'll do that. And if you say we don't care about CO2 but we care a lot about peak, that's what we do.

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So that technical analysis and P&L takes the lead with us. It's very important and I hope you won't be shy about asking for our support for that.

We're working and you'll hear a lot about it over the coming 12 weeks about protocols and research methods to help you do your job and help our broader community to understand the role of codes and how energy is used in buildings and how codes can support that.

We work to build partnerships and that means working with you and you're going to tell us, I hope, today and in the coming weeks if we're not doing a good job there. But whether it's a workshop such as this as part of the National Energy Codes Conference or specific workshops over the course of the year, work that we're increasingly doing international with colleagues at the International Energy Agency. We want to build partnerships with you all and to help your own technical development.

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We're developing tools, typically software tools such as RES check and COM check on the residential and commercial side respectively. A compliance tool, workforce development to help, again help you do the job you have. And the new do have generally speaking, you all are going to regulate building energy codes in America but when it comes to manufactured housing that's a federal responsibility DOE does that in conjunction with HUD.

And my sister agency, the Federal Energy Management Program promulgates standards on federal buildings themselves. But everything else is your fair game not our fair game. And of course, the question to you all is what else should we be doing with our resources so we'll be asking you about that.

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So I mentioned partnerships, if you're in this audience you are a partner of ours and I hope you will stay that way. But we partner with a lot of groups. The key element ones are listed here. The National Labs I talked about and not just PNNL but the based in Washington and Oregon but also the National Renewable Energy Lab based in Colorado and the Lawrence Berkley National Lab based in Berkeley, California. But these are international, ones with international stature.

We partner, of course, with the IECC who's with us today as well as ASHRAE, other federal agencies. And I'm talking about now partnering on the energy codes front but in our office, the Building Technologies Office we conduct other non code related energy efficiency activities.

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And so, we're partnering a lot with other agencies. Of course, the states and that means state energy offices but also code and safety agencies. Of course, local government, city, and county code and safety departments. You'll hear from two of their representatives today.

And many of you, I'm sure, work for home builders or local building associations, state building associations or advocates, work for the regional energy offices or for other groups. And we welcome partnering with you all and research teams to help look into the science of building energy technologies as well as building energy code, big data, and visualization research.

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And so, we're anxious to work with you and I hope we're doing a good job and we look forward to doing that with you wither it's in cyberspace or in real live.

All right, let's talk about money for a minute from my office 'cause money's a good thing I life and we have some funding opportunities on the street. Some are directly related to energy codes and some ore not but these are competitive funding

arrangements that we put out and they're in different stages. The first one is more focused on research but there is a topic in there on workforce training that I think, I don't think that is directly relevant to any folks in this meeting.

This is funding opportunities what we call them in my parlance is called BENEFIT, which is a clever acronym in there. It's just got released last Friday, just got announced and if we haven't already sent it to everybody on our mailing list, we will do that. You can see the URL here or you can just google it.

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Just google BTO and DOE and benefit you'll get that. So that's $80 million that we're putting on the street for a series of activities. Most are on the R&D side such as lighting and HVAC but some of them are on the workforce training issues and on manufactured housing and things relevant here. So if you're interested, please apply. This is going to be open for several weeks.

Next is one that's already closed called Proving Ground, in which we're working with state and local partners as well as private partners to field validate emerging technologies working, again, especially on the state and local front. That's one closed we're evaluating that and we may do that again in the coming year so I hope you did apply.

This one's called Connected Communities and, in a nutshell, it will be coming out in October we're quite sure of this year and be open for a few months.

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A very big, ambitious approach to look at how do we take not just buildings, homes, and offices that are smart and connected and grid flexible but how do we do entire communities of them?

And so, we're looking for applicants who will take new or existing, and/or existing buildings, residential and/or commercial buildings and develop them in a way that are connected and flexible. And we'll have tens of millions of dollars for probably six to eight or nine demonstration projects.

And finally, another long clever acronym called EMPOWERED, which had subtopics on, again, workforce training for code officials.

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That's closed, again, we're making final decisions there. So wanted to let you know about that and please stay tuned with us, if we can support you financially in this competitive environment we certainly will. And stay on our newsletter.

So finally, I want to just conclude my time and if we could do the next slide. Just these are some topics that, you know especially for Jeremy and Ian and the PNNL team and myself what's on our minds as the ideally end of building energy codes. And I'll let you read these for yourself but these are some of the key issues. When this panel is over today, we're going to have more issues as we learn from our panelists and as our next series of 12 seminars.

I'll just briefly say we want to be able to integrate not just the traditional technologies of fenestration and HVAC, lighting and insulation but looking at the emerging technologies that are coming out.

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Electric vehicle, and ____ storage and keeping an eye climate impacts, which are increasingly part of the mix. I already referenced smart and connected buildings and what that means for the code.

Of course, a lot of impacts of the Covid-19 pandemic situation both social distancing element of it as well as the public health element of it. And what it means for the macro economy in terms of new housing starts, etcetera. A lot of focus we'll hear about some it today on shifting towards whole building performance not just elements and what that means. We need better analysis tools and big data tools to do all of the above.

Resilience is a particularly important issue and I don't think I have to tell anybody here who's –

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Blake is with us from Oregon I don't have to tell anybody who's from California or Oregon or Washington or the Gulf Coast about resilience. So we want to find that nexus so that we can promote energy resilience at the same time we're promoting energy efficiency in buildings.

And of course, you know, the joke on the second to last bullet is as somebody once said to me technology keeps getting newer and my buildings keep getting older. So we want to see how do we marshal that innovative technology.

So those are some of the things on our minds. Let me stop talking and let me turn to our panel, please. And then we'll plenty of time later for questions from you in the audience. So we got a great panel. We're gonna start today with Amber Wood. Amber is energy program administrator for the city and county of Denver doing a lot of exciting work.

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And then turn to Emily Hoffman who's director of energy code compliance from the New York City Department of Buildings. Turn to Blake Shelide in Oregon he's an engineer at the Department of Energy in the Beaver State.

Ed Carley is building programs director at the National Association of Safe Energy Officials and he'll bring the perspective of the SEOs. And then batting clean up today is Ryan Colker who's VP of Innovation. Great title, Ryan, VP of Innovation at the International Code Council and is a very active player in codes, in code development, and in resilience.

So with no furth ado, Amber, take it away, please.

Amber Wood: Thank you very much. So I'm Amber Wood, I'm with the city and county of Denver. I actually work in our Office of Climate Action, Sustainability, and Resiliency. So it's essentially our climate office.

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And if you'll go to the first slide, I'm really going to start with the why. So I'm gonna kind of go over what do we talk with our stakeholders about when we're talking about moving energy codes forward? And then, ultimately, get to our kind of some more detail about our actual work.

But I do want to just acknowledge that particularly now more than ever, although we have always tried to put together the nexus and find the nexus between equity, affordability health as it addresses buildings within Denver. That's obviously, more important now than ever.

The basis of lot of what we do are our climate goals, which is the next slide and currently, we have an 80 by 50 climate action plan where we're trying to get to an 80 percent reduction in greenhouse gas emissions by 2050.

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We actually also within that have a net zero energy goal of being net zero by 2035. And then, just this year in 2020 we actually had a climate action taskforce that got together to look at how we can equitably move Denver forward and address climate change broadly.

One of the areas was buildings, of course, transportation another resiliency adaptation and on and on. They actually made a recommendation that we look at going ahead and moving forward more quickly to be more in line with climate science. So we're looking at how do we possibly meet being net zero for homes in 2024 and net zero for commercial buildings in 2027 for those code cycles.

If you go to the next slide the reason that we're addressing buildings in Denver is similar to a lot of the country but also So, a lot of other cities where 63 percent of our greenhouse gas emissions are from buildings specifically.

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Twelve percent from homes, 50 percent from commercial and multifamily.

And if you go to the next slide that's our current is 63 percent of our current building stock. Of course, we all have to address the fact that by 2050 in Denver specifically, 40 percent of our building stock will be new construction. And so. How do we ensure that those are highly efficient, all electric type buildings that won't just continue to add to our greenhouse gas emissions?

So if you go to the next slide this is actually how our new construction market is broken out. So we primarily right now are building apartments and condos followed by offices and banks as far as the square footage. And this is the five-year increase forecast and we're building a lot of ingle family homes as well.

If you go to the next slide. So a piece of what we're trying to do is figure out how to tie together our climate goals within and what can we do in energy code.

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So we recently adopted the 2019 Denver energy code and the 2019 Denver green code which is a stretch code based on the IGCC. Both of these are based on the 2018 I codes. So 2018 IECC for the Denver energy code and the Denver green code is IGCC.

You'll see that actually; we did succeed in being more efficient than the actual base 2018 code IECC. And you'll see the line on there for reaching Denver's goals for commercial buildings. If you go to the next one, we've also done the analysis for residential buildings as well.

And then, finally, if you go to the final slide is really what we're doing now. So Denver has a green buildings ordnance, which requires either green roof, essentially, or solar green on grade.

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It also has energy efficiency in it and so there's options for new and existing buildings. So there's some energy efficiency not requirements but selections that can be made beyond code. There's also a net zero new building implementation plan that we're working on and planning to wrap up this year, by the end of this year.

And really, that implementation plan that we're working on in conjunction with – so the climate office in conjunction with community planning and development, which does all the design and permit review and has all of our building code experts there. We are working together on a collaboration where we basically map out how we get to net zero within the energy code over the next code cycles.

The big deal on this though is that we're working with stakeholders to figure out what that plan might be. And putting a plan in place that we can essentially get to net zero. What happens with that plan ultimately is that it goes into our coded option process.

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So Colorado is a home rule state we don't have a state energy code so Denver is very involved in their coded option process. We are committed to have our energy codes and all of our codes based on the I codes. We then amend them, generally, to be more stringent and to help us meet our climate goals but in a way that the community, that works for Denver.

So we do a lot of stakeholder outreach and engagement to get their input on how we can make this equitable, affordable, how we can ensure that our buildings are healthier particularly as Covid-19 has happened and we have considerations for ventilation and all of those pieces and trying to wrap it all together.

And I should mention that for this net zero implementation plan as well when we're talking about net zero.

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We're actually talking about more broadly highly efficient buildings, all electric buildings looking at that potential renewables and grid flexibility are all addressed within this implementation plan. And we're wrapping it up now and actually having stakeholder meetings in October to look at how we put this as a comprehensive plan to address all of those pieces.

And then, finally, in 2021 we will be doing a coded option process based on the 2021 I codes so we will be doing a base energy code based on the 2021 IECC. And then, in addition, we have a voluntary stretch code that's the Denver green code that we're looking to somewhat based on the IGCC but also this round we are trying to get innovative ideas for other items that we might include. We've had discussions about whether we need to be talking about more materials or other specific pieces within the Denver green code. And so, we may increase the scope of that significantly.

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We've also as part of the IECC our current code has EV requirements within it, our current IECC. And we've also looked to other technologies that might be able to get us both buildings that are more efficient but also, reductions in greenhouse gas emissions are both extremely important both to us and to our community.

So that is what we've been working on and with that, I am done. Thank you very much.

David Nemtzow: Thanks very much, Amber, for that, we appreciate that and glad to see you keeping busy there.

Let's turn East, Emily Hoffman with New York City.

Emily Hoffman: Hi, good afternoon or good morning everybody, depending on where you are. Today I'm going to talk about New York City sustainability policy.

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My name is Emily Hoffman, I'm the director of energy code compliance. I work at the New York City Department of Buildings so we regulate the building stock. We also develop the energy

code. We have a separate agency that works on the sustainability plan, which is what you're seeing on the slide right now.

In New York City about 68 percent of our greenhouse gas emissions come from our building stock. So the sustainability plan that is in put in place is greatly dependent on what happens in our buildings.

So just to give you a brief history, Mayor Bloomberg in 2007 created the first sustainability plan it was called Plan YC. And it had a goal of a 30 percent greenhouse gas reduction by 2030. Then in 2014 Mayor DeBlasio issued the One City Built to Last Plan and in there he upped the goal to be 80 percent greenhouse gas reduction by 2050.

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And also, to have 40 percent of that reduction to come from a building stock by 2030 so that's a pretty big list. As of, I believe, two years ago we had gotten to about 19 percent greenhouse gas reduction so we still had quite a ways to go.

And then just last year there was a new sustainability plan came out called One NYC 2050. And this includes eight visions for sustainable New York City. It doesn't just focus on buildings it focuses on a lot of different social justice and economic plan and free public school for all down to age three. But I just wanted to highlight the two visions in there that affect my work at Department of Buildings.

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So one of them is vision six, which is a called a livable climate and the goals in their state that New York City will achieve carbon neutrality. So they upped the goal from 80 percent by 2050 to carbon neutral by 2050. And also, to have 100 percent of our grid be from clean electricity. So meaning that 100 percent of it is coming from renewables or renewable source if they're dealing with _____.

And then vision eight just want to touch on this since this sort of touches on our building stock is to have modern infrastructure. And the goal is to have 20 percent electric vehicle share of new motor vehicle sales by 2025. So New York really wants to push that electric vehicles are purchased and used in the city but in order for that to happen there has to be the infrastructure for chargers. If you've been to New York City there's not a lot of space.

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So a lot of these electric vehicle chargers need to go within our buildings. So I'll touch on that in a few slides and what's happening. If you want to look more at the report there's a link and these will be posted later.

Some of the legislation that directly affects our energy codes, you know at Department of Buildings there is a local law, its called local law 32 of 2018 and this really set forth the policy for our energy code adoption process. So this law states that we must have in 2019, which just passed and in 2022 we must follow the NYSERDA stretch code. So NYSERDA is a state authority, the New York State Energy Research and Development Authority and they have published a stretch code.

The publication was actually in 2020 but they're working on another stretch code that we will be required to adopt by this law in 2022 or whenever the next code cycle is it might be 2023.

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So that will be mandatory that New York City adopts it and all new construction, any additions, alterations that will all have to follow New York City Energy Code which will require the stretch code provisions.

And then in 2025 the law says that we need to have an energy code that has absolute energy limits for buildings 25,00 square feet and greater. So really no longer can we have this mandatory prescriptive requirements in our code we need to have, the law says that we need to create an energy metric and we need to it by occupancy, building occupancy. And have research to back up why we set these limits and what they are.

Now the energy limits the law leaves it open it could be based on carbon metrics, it could be based on EUI, you know that's wide open for us to figure out what that will be.

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So that's one law and then the other law, you might have heard of this one it's called Local Law 97 of 2019. And this is a law that – so the energy code affects any construction that's happening in the city but Local Law 97 sets a greenhouse gas limit for any building 25,000 square feet and greater.

Now these buildings may not plan on doing construction but they still have this greenhouse gas limit. So they have to reduce their energy consumption to be under this limit starting the calendar year of 2024 to 2025 that's the first year it goes into effect. And then the fines will start in 2025 if buildings exceed that limit. So there's a certain greenhouse gas limit in between 2025 and 2030 and in 2030 that limit will drop.

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So the idea is that it becomes more stringent over time and many of these buildings are going to require deep energy retrofits to reach the new greenhouse gas limits.

So those are really the two policies that affect us. and then the rest of my presentation I'm going to really dive into three new code provisions that came in our 2020 code that we thought would be interesting to share with everybody.

So our 2020 energy code went into effect May 12 of 2020. Yes, this was during Covid-19. All of this happened while we were all working from home. And the provisions are based on we are a local jurisdiction, New York City is part of New York State so we are required to adopt the state energy codes. We adopt the 2020 New York State energy code, which is based on the 2018 IECC and actually 90.1 2016. By Local Law 32 we're also required to adopt the provisions in the NYSERDA stretch code.

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So we took those provisions and basically, modified the state energy code to include the stretch code provisions. We also are required by law to have New York City advisor in energy code advisory committee so we go through all the provisions that are in the code and that committee comes up with new provisions that they feel the city should adopt. So we also have new provisions that came out of that committee that are in the code.

And just to point out, the 2020 New York City energy code is for the residential provisions. It's about 19 percent more stringent than the 2015 IECC so our previous energy code. And the commercial provisions are about 11 percent more stringent than ASHRAE 90.1 2013 or about five percent more stringent than ASHRAE 90.1 2016. We had a lot of ____ on residential and somewhat on commercial.

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So one of the first new provisions I'm going to talk about is thermal bridging. A new requirement in the code that requires documentation of three specific types of thermal bridging. This code requirement is only for documentation. It's not for, you know we're not requiring D rating of wall assemblies at this point but we felt this, you know, the code doesn't really address thermal bridging so we wanted to make sure that we were priming the design industry to identify thermal bridges, document them on the plans, and then in the future code cycle require the performance of these thermal bridging to be taken into account.

So the three types of thermal bridging are clear field assemblies, point source thermal bridges, and linear thermal bridges. So this documentation is now required in both the residential and commercial provisions and it would be for any envelop work.

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So all new construction, any addition, and then any alteration that affects the envelop.

So just wanted to give you an idea of the type of documentation that we're looking for. So for clear field thermal bridges we just want description of the thermal bridge assembly. Most of these are found in ASHRAE 90.1 appendix A. So a lot of the effectors are just taken from there so we want that documented. We want section details on each one of these thermal bridges. So we want them documented on the plans and we want a visual of the section detail.

For the point thermal bridges, we want all of the ones that are – so for the commercial provisions any specific thermal bridge that's greater than 12 square inches needs to be called out. So we want that area of each thermal bridge and then the number of occurrences that happen throughout the building. So for residential that threshold is eight square inches; 12 square inches for commercial.

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And then for linear thermal bridges we actually have a list in the code, there's a table in the code that lists five specific linear thermal bridges. They're parapets, balconies, floor slab edges, fenestration perimeters and shelf angles. And we have a default SI value listed in the code and this default SI value comes from the BC hydro building thermal envelope bridging guide and it's based on unmitigated thermal bridges.

So we want the design applicant to list the type of thermal bridge. We want the SI value either from the code or if it's better than the code they can do a therm analysis or provide documentation on where they derive that SI value from. Then we want the total length of that thermal bridge within the entire building. So we want that added up throughout the entire building and also, looking at the section detail locations.

So that's the type of analysis that we want – not really analysis – that's the type of documentation that we want to see on the plans.

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So we've done a lot of, we've put together a how to guide so we've done a lot of documentation on this and trying to prime the industry for what that needs to look like.

So that was the first provision I wanted to talk about. The second provision I want to talk about affects energy modeling projects. So it's not for all projects but just the ones that choose to follow energy modeling as the compliance path. It's in the commercial provision of the code and it's for any new building that's 25,000 square feet and greater that choose to follow energy modeling. Paths to meet the requirements of what we're colloquially calling the envelope backstop.

So previously if energy modeling was the chosen compliance path you could trade off without limit the envelope performance with high performing HVAC and high performing lighting as long as the total annual energy cost of your design was better than that of the baseline building.

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So now there's an additional requirement that says in addition to meeting the modeling provision you also have to meet this envelope backstop meaning that your envelope assembly cannot be 15 percent worse than codes. So it can still be worse than your prescriptive provisions. The allowance is negative 15 percent, 15 percent worse than codes for residential occupancies like multifamily dorms or seven percent worse then for all other.

So when we go to check the ___ plan exam we require all of the modeling documentation. In addition to that, we also require a contract report. And we work closely PNNL and PNNL has been great and developed a specific contract for the envelope backstop.

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So if you go to the next slide, I have an image of what that looks like. You can see if you look here in project information you see the energy code called out is the 2020 New York City energy conservation code, appendix CA, which is ASHRAE, modeling envelop backstop.

So this contract is specifically used to demonstrate compliance with the envelope backstop. And if you look at the bottom of the green banner, you'll see that this particular envelope design is negative six percent so six percent worse than code, essentially, and the allowable margin is negative 13.8. So this is a weighted average between the residential and nonresidential occupancies. So this is something that's required and definitely needed in the industry.

And then, the last provision I wanted to talk about was electric vehicle ready requirements. So like I said, in New York City there's a big push for the sale of electric vehicles within New York.

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With that we have to build the infrastructure. So actually, in the building code Local Law 130 of 2013 required that any new construction of a parking garage or an open lot, which is essentially the type of building that falls under our commercial provisions in the energy code.

This building code requirement said that for 20 percent of those spaces you had to provide electric vehicle ready, essentially, for level two charter. So there has to be panel capacity within the garage and conduit that can handle a level two charger. And again, that's for that 20 percent of the spaces of that garage and open lot. What this didn't touch was single family homes, personal garages so that was added in our 2020 energy code for the residential provisions.

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So now if you build a one, two family home you have to provide this electric vehicle ready for each parking space per dwelling until. So two family home two parking spots are required to have this.

If you have a common parking lot for like a low-rise multifamily building only five percent of those spaces are required to have this. And the requirements are you either have to have an outlet for a level two charger or you have to provide the panel capacity and conduit for the future installation of this charger.

These requirements also do come into, you know are triggered for alterations. So this would be when the electric capacity is increased during an alteration and there's parking then electric vehicle ready requirements would be triggered.

And with that, those are the slides I have today. Thank you.

[0:50:00]

David Nemtzow: Great. Thanks a lot, Emily, and thanks for the work that you and New York City are doing. Let's go west. Let's go to Oregon and hear from Blake Shelide who's with the Oregon Department of Energy. Blake, please.

Blake Shelide: Hi. Hope every can hear me, good morning, or good afternoon. I'm just going to talk a little bit about what has been happening in Oregon regarding energy code development and kind of the policy drivers that are really leading our efforts. So next slide.

So over the past few years our agency and our sister agency in the building codes division have been kind of really guided by a couple of recent executive orders that were issued by our governor that targeted energy efficiency and greenhouse gas reduction in a number of sectors including the new construction sector. So starting in 2017, you know 17-20 included three main sections for energy efficiency.

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The first one was leadership in state buildings and just making sure that we are operating our own buildings as efficiently as we can. And setting targets and conducting audits and just racking our energy in a way that helps us to manage that and reduce our consumption.

The second element of that executive order really targeted for building code reductions primarily on the residential side looking at equivalency into the US DOE zero energy ready home standard. And then on the commercial side, exceeding the ASHRAE and the IECC model codes. It also set provisions for solar ready and EV ready elements to be factored in and included in the codes in future cycles too.

And it also asked our agency to start looking at opportunities for applying standards and I've got a little bit more about that in our presentation today too and how those complement building codes.

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And then the third element of this executive order was around existing buildings and affordable housing in developing kind of a 10-year plan to maximize efficiency in that space and what would come in affordable housing space.

And then most recently, kind of right before the pandemic hit in early March of this year our governor issued the executive order 20-04 which targeted a number of state agencies with specific greenhouse gas emissions reduction directives. And our agency and the building codes division in our state had a couple very specific targets to kind of continue on from the policy directives that were achieved in the previous executive order and kind of carried those forward all the way till 2030.

And the goals that were laid out in this executive order are a 60 percent reduction of new building annual site energy consumption you know, only for code regulated items. So excluding transportation and then plug loads by 2030 comparing that to a 2006 baseline.

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So kind of continuing on what was already a pretty aggressive energy efficiency goal for our new buildings and new construction.

This executive order also had a directive to refocus on the Reach Code. Oregon has had a Reach Code for a while but we're a statewide code state not a home ____ state so what we have at the state level is mandatory. And we had a Reach Code but there's been just some challenges in adoption and kind of incentivization to get local jurisdictions and to get projects to actually use the Reach Code. So this executive order kind of included a couple of elements to spur additional Reach Code development and outreach so that we see more update with it.

And then, it also directed our agency to work on 10 specific appliance standards and energy efficiency standards for equipment. Which is really we see it as very complementary work to our building codes efforts.

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You know as building codes become more and more efficient, a larger percentage of a buildings load will go towards what's plugged in or what's used. So we see kind of that as the next

frontier, the next step for achieving net zero energy buildings and to reduce the overall energy load of a space.

I think it's really important to have these kind of high-level policy drivers like executive orders and like Amber and Emily were talking about with some of their local policy drivers too to really give agencies the ability and the authority and the motivation and direction to get to these goals. And that's what these executive orders have really done for us.

So on the commercial side, Oregon is really moving toward a quick adoption of 90.1. We see it as kind of the most advanced of the model codes. You know 90.1 and IECC tend to kind of mirror each other but we see that 90.1 kind of comes out a little bit earlier.

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It kind of leads the IECC process by about two years so the quicker that we can adopt a more efficient code the more buildings get included in that code.

So we adopted ASHRAE 90.1 2016 in October of last year. And actually, coming up later this month the plan is for our commercial code energy board to start the process for considering adoption of 90.1 2019. And we see a number of advantages to moving toward a mostly wholesale adoption of ASHRAE. You know, one, it's very well supported. We can kind of lean on and build upon the expertise that goes into the development of the ASHRAE codes and all the committees and the cost effectiveness analysis and the technical analysis that goes into it.

It's really supported by the US DOE in its determinations and contract development. In the past we've had kind of a homegrown code that took a lot of resources at the state level to manage and to kind of manage the process for new code proposals and adoption.

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And then, developing the compliance software and a custom COM check for Oregon but kind of moving toward 90.1 it really streamlines that whole process and reduces resources and adds some efficiency into our code development process.

But we've also layered on an element that includes and requires an incorporation of the architecture 2030 framework for estimating the consumption of what's a building going to use for its energy.

And it leans on the architecture 2030 zero code calculator. And so, with every permit and every code submittal there's a requirement to not only cement the contract for code compliance but to also submit to Oregon zero energy ready code form. That estimates the buildings energy consumption. It asks for an estimation of how much renewables could be installed on the building and what might needed to be to offset in order to achieve net zero energy consumption.

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We're not at the point where we're requiring any on site renewables but this step kind of adds to the awareness in the design and building community for what's the gap between now and the net zero building?

So kind of speaking back to some of our goals for a 60 percent reduction versus a 2006 baseline this slide demonstrates our progress. So right now, we're on the ASHRAI 90.1 2016 which represents 64 percent of where we were in 2006. So that's a 36 percent reduction. We think that as soon as we're able to adopt 90.1 2019 we'll be at 55 percent of where we were so about 45 percent reduction on our way toward that 60 percent reduction goal in 2030.

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The ability – so ASHRAE, overall, has been kind of on glide path to help us to get to those goals, you know, over the past few cycles. We kind of expect a similar trend but you know, you never know how some of those code developments could go. So we'll have to look at where we are over our next two or three code cycles to make sure that we're continuing that same glide path to where we want to be in 2030.

So just a couple other kind of final items to close it out and some of the other things that we've been working on that aren't necessarily directly related to the energy code but are kind of associated with it. We, as an agency, have developed a voluntary home energy scoring program across our state that we've now seen some local jurisdictions starting pick up and adopt and can make mandatory. The biggest example of that in Oregon is the City of Portland who a couple years ago adopted a mandatory home energy scoring requirement.

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So whenever a home is sold and there's a transfer there it needs to have a home energy score that's development and kind of made apparent to the buyer so that folks can know what they can expect in terms of efficiency for their home. And that's both for new construction and existing homes.

And then, appliance standards are another element that I mentioned before that we really see as very complementary. So we're about halfway through our appliance standards development process now with our current round. We've done our rule making to adopt 11 new standards in Oregon to really align with the standards that California has and that Washington recently adopted too. So to kind of create an aligned and harmonized West Coast set of standards and we really see that as important element to complement our building codes work.

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And I also just wanted to mention too, you know we've had a really heavy fire season out west and it's really impacted a lot of our state, a lot of California and Washington too. And I just wanted to mention that a couple years ago we did adopt what's known as the Wildland Urban Interface Code for wildfire hazard mitigation that, you know, I mentioned before that we're not a home rule state.

But this is actually one element of our code where we have adopted an optional appendix to our state wide code that local jurisdictions can adopt if they choose to that provide some additional wildfire hazard mitigation construction requirements to hopefully, protect against some of these fires and some of the destruction and devastation that we've seen on homes and buildings in our communities.

And with that, that's all of my slides so thank you.

David Nemtzow: Great. Yes, thanks Blake. And look, you know, Blake, you just used the term glide path for your previous slide.

[1:01:00]

Something tells me there was no gliding involved that you were working it like galley slaves but I appreciate the progress there. I want to say before I introduce and Blake, you gave us a lot to think about, before we turn to Ed, just a reminder to everybody please use the question function. I might have said chat function in the go

to webinar but it's, I understand it appears as the question function. We're collecting your questions and we will be asking them shortly but not before we hear from Ed Carley with NASEO.

Ed Carley: Thank you, David. So I'm going to speak without slides today but first, I do want to thank the Department of Energy for hosting this event, the Energy Code Conference is always great chance to catch up with code experts and get everybody together. So I'm glad we have a forum this year even if it's all virtual.

David Nemtzow: Yeah, and I'm sorry, Ed, we can't all do it at the bar afterwards. I just want to put that on the record for the meeting.

[1:02:00]

Ed Carley: Hopefully, next year, right?

David Nemtzow: Yep. Yep. And hopefully, back in Chicago. We were supposed to be at the Palmer House in Chicago, a great hotel, and a great city. So all right, sorry, Ed, back to you.

Ed Carley: I was looking forward to taking a stroll down the, what is it, the million-dollar mile? It's beautiful architecture there.

But so yeah, this has been an eventful year for codes, there's lots of activity around the 2021 code. There have been NG code field study results published from a variety of states, especially in the Northwest. There's lots of conversation in states and jurisdictions across the country considering EV codes. More and more places are considering existing building performance standards. St. Louis adopted one this year on top of New York City, which just spoke about it, Washington, DC, and the state of Washington.

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You know layered on top of all that activity are climate change concerns, which has brought a lot of attention to building codes and the role they can play in reducing emissions.

So David and Jeremy and Ian and the PNNL team asked me to kind of speak about the broad trends that NASEO has seen across the country from our members and just sort of give a sense of what's going on. So we've seen this year that a number of states that have not updated their code in some time have moved up to 2015 or the 2018 codes. But at the same time, there have been delays to effective dates in codes due to Covid-19. Places like

Massachusetts and Connecticut have had significant delays, I think Washington state also delayed the adoption of their code.

Some places have gone forward with adopting new codes, for example, Maine, Delaware, the District of Columbia, St. Louis, Kansas City, New Mexico, and the city of Albuquerque within New Mexico all adopted this year.

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Other places like Virginia, Arkansas, Connecticut, and Montana are considering adoption or they were before prior to the pandemic but you know, obviously that has thrown everything up in the air.

Some places like Arkansas had a fulltime virtual meeting format prior to the pandemic so they were able to just kind of push along smoothly. But that's a process that is largely stakeholder drive-in and will have to approved by the Arkansas state legislature. So what happens there is sort of still to be determined.

Let's see, so in addition to considering adoption there are a lot of states, like we've heard today, that are considering either developing or adopting stretch codes. Some of those states are responding to state and legislative mandates, some are responding to governor's executive orders.

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And a lot of cases these are members of things like the US Climate Alliance that are really looking at how codes can play a role in achieving their goals. We've seen Maine and Connecticut are two good examples of this but there are others.

And as Blake noted, we've seen a lot of states that are considering how appliance standards can contribute to efficiency. More of this action we saw happened last year rather than this year but you know, things could always change but there was kind of a flurry of activity around that in 2019. Hawaii, Colorado, for example, were two states that adopted appliance standards in addition to Oregon. I believe Nevada also adopted some new standards.

In many places zero energy codes are being discussed mostly as stretch codes so far but often with targets for a net zero base code in the 2030 timeframe, give or take a couple of years there.

[1:06:00]

I believe Oregon is still the most aggressive target so way to go, Blake and good luck.

Let's see, we're also seeing some states are adopting the 2018 code and have specifically noted that they intend to incorporate some of the 2021 language either immediately or over the next year or so, we kind of heard that today. The EV ready language is what's most commonly cited. I've heard this from western states and from western and midwestern cities, northeastern states and cities are other examples of places where they're considering this.

But it's not just northeast and west, we've also seen this in Florida in some places, Atlanta, Georgia is a commonly cited example down in the southeast. So there's broad interest and it's not just in kind of the places that are the leading edge on code adoption. So something to keep an eye and make note of.

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With all that said, there are still a lot of states and jurisdictions that are using the 2009 or 2012 code. As we look at the current landscape, I think if there's anything that's gonna push states and jurisdictions that are on the '09 or '12 off of that its likely to be the Federal Emergency Management Agencies Building Resilient Infrastructure and Communities or BRICK program. BRICK proposals are going to be led by state emergency management agencies but as the part of the evaluation rubric that FEMA's using there's a 20-point category for adopting one of the two most recent codes.

I was on a webinar or I listened in on a webinar recording that ICC hosted with FEMA a couple weeks ago and at this time, it doesn't look like FEMA is going to penalize states and jurisdictions that have amended codes –

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but it sounded like that might be an option in the future. To be determined, obviously, that program is still in its first year and still only accepting its first round of proposals. BRICK is really a huge opportunity for building officials to increase awareness of the importance of building codes and unlock a significant amount of funding for their offices.

Like I said, the lead agency is the state emergency management agencies. NASEO has been strongly encouraging our state energy office and territory energy office members to get engaged on the

topic because it's really important and potentially a lot of money on the line. That notice of funding opportunity or NOFO is available on the FEMA website now and the application period is open until January of 2021. So I wanted to flag that for folks, it's definitely something that should be on your radar if it is not already, especially for if you work for a jurisdiction of some sort.

[1:09:00]

Shifting gears, a little bit I'd like to note that NASEO is available for our state and territory energy office members to offer technical assistance. If you have any questions about energy codes, we're happy to answer those or provide research support, connect you with other states that have handled similar questions. We've also worked with a number of states now to conduct energy code field studies that can be used to help get a sense of how buildings are being constructed in a state and measure any remaining savings potential available with whatever code is in place.

We've partnered with DOE and Pacific Northwest National Lab on those. Thank you to DOE for the support and PNNL for all the help. That’s a really useful tool for states to use and for jurisdiction to use to get a sense of what's going on in our communities and how buildings are being constructed.

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There's a lot of data that comes out of those and I can't state strongly enough how useful those are and encourage you to pursue those just to get a sense of what's happening and how buildings are being constructed and if there are energy savings being left on the table.

So I've run three for NASEO and there have been studies completed in a number of states across the country and most of those are available on PNNL's website. I think the four northwestern states have all now been published this year but there's also a number from a cohort of field studies that happened starting back in 2013. I'm happy to share my experience with how to make that work and go smoothly. There are a lot of things that come up along the way and we've gained a lot of experience with running those.

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In addition to those technical assistance aspects we've been tracking the spread of virtual audits. This is something I personally

am excited about because I think it can help to solve some of the workforce challenges that building officials and building offices are facing, you know, the lack of qualified talent. I spoke recently with someone from a jurisdiction in Nevada who told me that they had been trying to hire a code official back in November in the before times. They got 29 applicants, three of them were qualified and all of the three that were qualified were out of state.

Now they have had so much success with their virtual inspections and they're only using them for a limited number of types of inspections, they have opened up a position for a fulltime, full virtual inspector.

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So that person can be located anywhere in the US, they'd, obviously, prefer located in Nevada but they'll hire somebody from wherever and bring in a new qualified code inspector who can do some of these inspections.

Obviously, there are some concerns around access to high speed internet, whether that's wired or wireless or cellular internet. There's some challenges there for the rural areas. But I think that there's also a strong opportunity for rural areas where maybe they haven't had qualified code officials or there's so much windshield time involved in code inspections that it limits their ability. I think that there's really good opportunities there

So I think that it can also do a lot to speed up construction, like I said, by reducing that windshield time between job sites.

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There's some safety elements that that individual out in Nevada noted, I think that a neighboring jurisdiction and had an inspector fall off a ladder. And you know, if you're doing an inspection with a drone or with somebody else who's working the camera if it's a PV installation for example, one of the folks who does the PV installs is probably more comfortable on a roof than a building official who has to do all different kinds of stuff and maybe isn't always climbing on roofs every day.

Let's see, so finally, the year has, of course drawn a lot of focus to the 2021 IECC development process. I don't think it's an understatement to say it's been contentious. There's been a little more than 20 code change proposals that were challenged by a variety of industry groups.

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And a series of hearings have been held by the National Code Council to determine which proposals will or will not be included in an energy code. I've been monitoring the appeals process closely for NASEO. We've been working to preserve the ability of all of our members to continue to participate in that process in an effective and inclusive way. I don't want to go too deep into that, there's a lot going on with it, it's very complicated but I'm happy to share additional information on the 2021 cycle if any of the participants are interested. Like I said, there's a lot going on there.

And our main concern is ensuring that our state energy office members and territory energy office members continue to have a voice in that process. They see it as an important part of their authority as states to help set the regulations and building codes of their own states even if they are home rule states.

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With that, I will wrap it up. So thank you for the opportunity to speak.

David Nemtzow: That's great. Thanks a lot, Ed, and thanks for that overview of state and local activities around the country. I want to say on that issue of remote and virtual inspections and diagnostics and we couldn’t' agree with you more DOE. I personally think that's one of those areas we're not going, I don't think we're going back to the old normal on that. That was happening anyway and when we're past Covid-19 I think it's a one-way street and we're going to a have very different new normal.

It is, you might have noticed, the topic of one of our upcoming sessions in this series on November 5 and we'll be doing a deeper dive into that and we're also, my office the Building Technologies Office at our annual peer review coming up in November doing a discussion and it's been internationally discussed.

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So there's a lot there and I appreciate NASEO's work on it.

We're going to turn to Ryan. Colker. Ryan is VP of Innovation at the ICC and active, very active in these issues. And Ryan, take it away, we wouldn't be having a model code to work on if it weren't for the ICC so tell us what you guys are up to.

Ryan Colker: Yeah, thanks so much, David, and I definitely appreciate the opportunity to be here today. Certainly, thanks to the previous panelist who really laid out some of the things that are going on at the state and local level. So I'm going to talk about sort of how some of those things culminate at a national level and then some of the other things that we're working on at ICC to really move energy codes resilience and really create better communities and better buildings.

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Most folks are actually probably familiar with the code council because of our model code development process. But I think it's really important to understand that there are a variety of other activities that fall under the code council, which really support implementation and communities in a whole wide variety of different ways. You know, certainly, training and certification is key but also looking at things like product evaluation and making sure that the products that are specified meet the code requirements.

Working with communities on really understanding their resilience and providing benchmarking tools to help them move forward. I'll talk a little bit about that through my work with the Alliance for National and Community Resilience. But I think it's really important to sort of understand that bigger picture.

It was really great to hear from the prior panelists on their various different commitments to greenhouse gas emission goals or zero energy building goals or various different strategies to improve their building stock.

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I think one of the challenges that we've seen in some areas is that connection between sort of those broader community wide goals and the application of energy codes is actually just not there. They haven't necessarily sort of made that connection and so, I think that's really an important point to think about.

You know in the table there you see some analysis done by NBI to look at the various difference types of commitments and sort of the extent of how state and local governments have committed to these various different goals. But at the same time, as Ed mentioned, you know we have some of those states and some of those communities actually on a 2009, 2012 energy code. And so, there's sort of that

disconnect there and so I think that's really an opportunity to bring those goals and the impacts of buildings together.

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And so, it's really sort of an impetus to think about sort of where your energy code currently sits.

So one of, I think, the important tools that we've been thinking about and real opportunities to help move the discussion forward is this intersection of energy codes and resilience. I think previously we've seen a lot of work within the energy code community separate work within the resilience community, really looking at, you know at the end of the day, improving communities.

So how do we bring these two sort of potentially dispirit activities together to help really move communities together into a common goal and really looking across various different policies and practices that can support their work. And so, we were looking at the intersection of various different codes and resilience. And so, we developed a white paper specifically on the intersection of energy codes and resilience and how they really contribute and work together to improve communities.

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And so, you know thinking about some of the things that are within the energy code, light durability, moisture management, extreme weather protection, which I'll talk about in a minute, and really, the coordination with other codes really sort of expands that dialogue beyond just kilowatts or greenhouse gas emissions but really further illuminates community benefits through the adoption of building codes.

So I'm going to touch on sort of two aspects of that resilience message. One sort of physical and one sort of social. But you know when we think about opportunities to address extreme heat or cold events or power outages that happen after some other disaster event the concept of passive survivability really that you can stay in your home longer because it's more comfortable.

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You don't put pressure on community shelters. And so, design decisions that are made relative to insulation, windows, and those sorts of things can really contribute to passive survivability.

And so, how can we think about opportunities that we have today within codes and moving forward into the future to really have that coordinated approach that when we do talk about things like insulation and windows, we're not just talking about energy use we're also talking about the contributions to passive survivability.

And then, you know thinking about on the social side of energy and resilience we think about not just sort of the infrastructure systems or emergency response but sort of the day to day impacts of stresses on communities.

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And particularly for low income household's energy is certainly a significant amount of their monthly cost. and so, being able to keep folks in their homes, reduce their stress of do I pay the electricity bill this month or do I provide food for my kids? Can I afford to turn on the furnace? Those sorts of question.

And so, there's certainly been some great analysis out of ACEEE just over the past couple weeks of looking at how energy burdens impact various different constituencies. And so, they looked at low income households as a whole. They also looked at various different communities, Africa American communities, native American communities, Hispanic communities, older Americans, and in most of these different demographic groups they all experienced higher energy burdens than the median American household.

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And so that's sort of another benefit that we can identify through the application of building codes and energy codes, in particular, is reducing that energy burden and reducing those stresses.

I mentioned the Alliance for National and Community Resilience, which I think is really important to sort of build out the conversation when we talk about resilience. So ANCR has identified 19 different community functions that really make communities great places to be but it also influences their resilience. And so, it's thinking about the social, organizational, and infrastructural aspects of communities and sort of the intersection and the interplay between all of those particular functional areas.

And so, it really provides that big picture of what sorts of activities are going on.

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I think Emily certainly talked about the broader plans within New York City and sort of the intersection of various different departments that's really helped these things move forward. And so really sort of understanding how these pieces work together and having a common set of benchmarks to really start from I think is really essential.

We can't talk about resilience these days without talking about Covid-19 and how various different folks are responding to the challenges that Covid-19 provides. So we've actually been doing a series of surveys of code officials and code departments, our first survey was actually conducted in April. Really, you know, the sort of first wave of response to Covid-19. We asked code departments how are they responding? What are they doing to continue to provide public safety and sort of how are they adapting?

[1:25:00]

And so, we actually reconducted that survey just a few weeks ago and really looking at sort of how code departments have evolved to address those particular challenges. So many of them are continuing to perform inspections but we asked them specifically about remote work, electronic work. We actually see that in some of department code officials have gone back to their offices.

But I think the real sort of things that we've seen and David actually just touched on this, about moving to electronic and remote processes, you know whether that's permitting, plan review, or inspection. As you see here, you know we've seen some increased uptick in electronic capabilities, which is certainly a positive, and something that I think we'll definitely see moving forward.

[1:26:00]

Sort of based off of what we've heard from code officials about their particular challenges we've actually developed a few documents to help support them to move towards more electronic practices. So the two documents on the right are sort of recommendations or considerations for remote plan review and permitting and remote inspection. And then we actually just recently put out a document on recommended practices for remote virtual inspections. It's actually available as a free pdf for anyone who's interested in taking a look at that.

But really, you know, providing tools for code departments that recognize they need to change and need to be able to work and inspect virtually. And so, this document certainly helps move down that pathway. I would certainly recommend folks to take a look at that.

[1:27:00]

I will say that these documents, the results from the survey are available from the code council's coronavirus resource center, which you can get to from the code council's home page it's just ICCsafe.org. A whole bunch of other resources there as well around building reopening and those sorts of things. So I would certainly recommend taking a look at those.

And then I just wanted to touch on a couple additional forthcoming resources from the code council that hopefully, you know, provides a sense of some of the things that we're talking about, we're thinking about, what are members are asking for. And so, we're actually working on an adoption and implementation toolkit specifically around energy codes, stretch codes, and really how to support communities in achieving zero energy in low carbon buildings. So that should be available within the next few months.

[1:28:00]

We're also heavily involved in offsite construction standards and offsite construction industry in general. I know I didn't talk a lot about it here but we certainly see it as a significant opportunity for the building industry to address many of our different challenges. And so, there is some work at ENRO specifically on this topic but we will be launching a standard on MEP systems, energy efficiency, and water conservation in offsite construction. We certainly have activities through the international green construction code. And then the 2021 international codes are due out within the next couple months and so, we certainly encourage folks to take a look at those as well.

So hopefully, I've provided a good sort of preview for some of the upcoming sessions in this series.

[1:29:00]

But really, laying out the things that are going on within the code council and really helping to support our members and the broader industry in achieving their energy conservation calls. So really appreciate the opportunity to be here, thanks so much.

David Nemtzow: Yeah, you absolutely have, Ryan, and there's your contact. Thanks for that, you're going to get some questions about that. So we're going to do one quick polling question for the audience and then we're going to turn to questions for our panel. So Ian, send up the polling question, please.

Oh, this is a tough one. So if folks could respond to that and again, please submit your own questions through the question function. We're collecting those and we have a couple of our own and we're going to turn to those.

[1:30:00]

Ian: We'll give it about five more seconds so get your votes in there. Okay, closing polls.

David Nemtzow: Good, that gives us something to think about, a bunch of challenges there, huh? Distribution, net zero, is in first closely followed by performance and compliance. All right, why don't we ask the panelists to turn your cameras back on, please, and unmute yourselves. And then, I'm going to start and then we'll turn to an audience question.

[1:31:00]

I think we heard, I know we heard a lot today from you all about things that you do and things that I think are different than you might have been doing two or three or five years ago. Whether its technology like Emily was talking about or folks on EVs or net zero like Blake and Amber were talking about. So let me ask you this, let me tie that to a question about workforce. How comfortable, are you nervous or are you comfortable that your own workforce?

I'm not talking about particular the construction workforce, are ready for these new technologies and new approaches? Is that something to be worried about or you feel good that you're moving forward with your people as the energy code situation changes? That's a question to all of you but I'd really like to hear especially from Emily and Amber who are in the forefront.

Emily Hoffman: Sure, I'll go first.

[1:32:00]

I've been at the buildings department for seven years now and we're on our fourth code update since in those seven years. So we're used to training our staff on new code updates and we've made a lot of progress going from the 2011 or I guess it was the 2009 IECC to the 2018 and beyond.

We're kind of in a rhythm now of creating new training materials and figuring out where we need to go. In 2025 we're going to have a performance-based code so kind of prepping everyone that this is coming. And trying to feel out on our own staff where the deficiencies are and where we need more training. And then reaching out to different organizations, DOE, PNNL to kind of help us fill those gaps if we don't have the expertise on staff.

[1:33:00]

David Nemtzow: Gotcha. Amber, other panelists, any reactions?

Amber Wood: Yeah, I'd add to that. So I'd say that similar to Emily we have really good training right now. I would say our bigger issue which has been impacted by Covid-19 is simply that we need more inspectors and reviewers. So we just right now we have a limitation of staff numbers and we just need some more people to assist with the load of work that we currently have.

And so, training definitely is a consideration and we do use both internal and external resources. We are looking for some additional pieces to the training itself. But I would say our bigger challenge is just needing some additional staff.

David Nemtzow: Gotcha. So and before other's response, I just have to ask because we do have two women here, look, this is a traditionally male dominated field and I mean both building energy codes and construction and retrofit.

[1:34:00]

Any reflections on being a leading woman in a traditionally male dominated field that you'd like to share? Or sorry, and we only have half an hour.

Emily Hoffman: I'll be quick. I have a degree in engineering and in engineering school women were the minority. I think we had a lot of women in our class and it was 25 percent. But we found, actually, in the sustainability industry within the construction workforce in New York City it's about 50/50. Our own team is about 50 percent

women. We have a lot of women in leadership. And even in our buildings department we have our first woman commissioner. So things are changing so it doesn't feel like we're at a disadvantage.

Amber Wood: Yeah, I would just piggyback on that.

[1:35:00]

Actually, the director of both community planning and development and the director of our office, the Climate Action Sustainability and Resiliency are both women. And I would just continue on that and say you know, I think a lot of it is I am an engineer as well, we had about 25 percent women in school.

And I think it's a combination of it's important for anybody to find their mentors and you have to find people that you admire both from all aspects of life I think that's important. And I think a lot of people are continuing to address the other side of it, which is structurally how can we encourage all sorts of people in industries they're not currently in and I think that's an important side.

I think personally, it's great to see more women, more people of color, more – you know, there have been a lot of changes and I hope to continue to see those changes. So I would say both sides of that, right, we want to continue to change and see that change.

[1:36:00]

And I think then personally, finding mentors is really important and people that ___ with you.

David Nemtzow: Thanks, Amber. Look, on that latter point about diversity, in my office I personally, we care a lot about a diverse workforce and we don't do it just because we're members of society we do it because our job is so hard, right, helping the US trim that energy loss. If we don't get all the talent we can regardless of their background with the diversity of personal background or educational background, right, our jobs hard enough without excluding anybody and not being inclusive.

But anything else from Blake or Ed or Ryan about workforce training in general and especially as codes become more aggressive and evolve?

Blake: Yeah, I can certainly talk a little bit about that from the perspective of code officials. We actually did a study or a survey a few years

back at the code official workforce and no surprise to anyone, you know it's an aging predominantly white male profession.

[1:37:00]

And so, you know I think there's some real opportunities there as we talk about new technologies or moving beyond just the role of the code official as public safety officer.

But thinking about some of the strategies around resilience and the impacts on communities and sort of broadening that vision that you're not just a code official to work specifically on saving kilowatt hours you're actually impacting a broader community and making communities great places to be. And so, sort of leveraging new technologies, remote virtual inspections and the like and sort of the equity impacts of energy codes. I think we can really broaden that perspective to get new folks interested in the kinds of work that we do.

[1:38:00]

David Nemtzow: I'd like to turn to Jeremy Williams who is fielding questions from our audience. Jeremy, what do folks want to ask our panel?

Jeremy Williams: Sure, hey there. So we have a lot of questions pouring in from the audience now so that's great, keep putting those in the questions panel there as you think of them. Some chatter, comments, so Anna noted that the city of Chicago has updated their code based on the IECC recently so that's great. Some additional comments about workforce challenges. And actually, why don't we start there with a question. So Roxanna asked what specific changes are driving the need for workforce education and training programs? An that's really for any of the panelists who want to jump in on that one.

Ryan: I mean I can certainly start. All of our panelists talked about various different new technologies or new processes that they're looking on incorporating within their building codes.

[1:39:00]

You know certainly things like energy storage, you know EV tying to buildings. You know all of those various different things and code officials' sort of look at all of these various different pieces of technology and if they're not familiar with it or need to do additional research that can slow the permitting and plan review

process. And so, having code officials that are familiar with all of these various different technologies is certainly beneficial.

And kudos to DOE on the EMPWOWERED program I think that will be a huge opportunity to get code officials up to speed on many of these different things.

Jeremy Williams: Okay, good. And then just to build on that real quick, Ryan, there's a little bit of commentary about shortages of skilled labor, which is pretty recognizable widespread problem across the construction industry.

[1:40:00]

Ryan, you mentioned the technological aspects, you know dealing with new technologies and one thing to add from the DOE perspective is our field studies sort of also shed light on this question. They're focused on a number of key items neutrino just technologies but the practices that surround them, installation, quality of installation in particular tend to be a big deal.

And in those studies which were state by state, you know, we tend to see a lot of the same issues show up in terms of training opportunities and they tend to be related to duct tightness and envelope tightness, which, you know not coincidentally are some of the bigger more recently changes in the model codes too. And so, some good information there.

We'll pivot to one more question maybe from the audience. Amber, we'll head your way. So this is from Colin and Colin mentioned or I should say Amber, you mentioned that the Denver code incorporates EVs and the question here is does Denver require actual EV charging stations or readiness?

[1:41:00]

And so, do they have to be what is often referred to as capable or what is often referred to as ready?

Amber Wood: So right now, within our energy code, our current energy code we have three levels. We have EV ready, EV capable, and Evan actual charger installed. And we have basically, a table within our IECC depending on building type. So you know, for our buildings there's different requirements. So there are multiple levels, it is dependent on the parking spaces provided for the project.

So if there's just a single parking space we're asking that that's EV ready. So EV ready in our vernacular just means that there's panel space and conduit. And then EV capable in our definition is panel space and then actual wiring to the parking space.

[1:42:00

And then, EV installed, obviously, is that the charger is installed.

David Nemtzow: That's an overlapping but a little different regime than New York City has it sounds like in terms of the levels you showed, Emily, right?

Emily Hoffman: Mm-hmm.

David Nemtzow: Jeremy, before we go on, let me ask this. Let me be maybe controversial and I'm going to start with Ed and Blake and then turn to Amber and Emily and Ryan. Ed and Blake, you represent states here and what we're hearing are local governments are doing their own thing. And whether their home rule or not they're doing their own thing and they might be next to local governments not doing their own thing or sticking with the state level codes.

So as state representatives, Blake, and Ed, are you troubled? Any reactions to local governments doing their own thing?

[1:43:00]

And don't worry, you'll get a chance to rebut just a moment. Blake or Ed how do you feel about that?

Blake Shelide: Yeah, I mean I know that I'll say every state is different with regards of their structure and what they can do. In Oregon we have the law that says we're essentially a statewide code and that certainly provides some stability and uniformity for builders and folks across the state know that they can go to Portland or Bend or Eugene and have the same energy code, the same building code.

But you know, I think that there are, certainly, benefits to local jurisdictions that have separate climate plans, separate goals to be able to move in a different direction or maybe a little bit faster and more aggressively than jurisdictions that don't. And you know every city is different and in the states that have that flexibility I certainly think that there's an advantage and a benefit to doing that.

And like I mentioned before like we have some ability in Oregon like the Wildland Urban Interface code.

[1:44:00]

Not an energy code but the ability for local jurisdictions to adopt some elements of the code that are different. And we are looking toward a reach code that would be more meaningful for a local jurisdiction to adopt. Maybe not as mandatory but to be able to adopt that and then incentivize it either through like more streamlined permits or different allowances. You're incentivized through local utility programs to get a more widespread adoption of that reach code and if it's not a mandatory code at the local level.

David Nemtzow: Does that mean, Blake, I know you haven't decided that you would have a single Oregon model reach code and then an individual local government could choose to adopt that. Is that what you're thinking?

Blake Shelide: Yeah or even to adopt it, it could have incentives behind it to really increase the use.

David Nemtzow: I gotcha. Ed, any reactions? Don't worry, you're only speaking on behalf of all 50 states and seven territories but please, don't be intimidated.

[1:45:00]

Ed Carley: Six territories. I'm going to hedge a little bit; you know every state is different and every city is different and the needs and desires of their citizens are all different. You can have very successful energy codes and states that allow for local individual stretch codes. I mean California is the biggest example they use Title 24 and states can develop their own stretch codes or excuse me; cities can develop their own stretch.

Then you've got New York where I think New York City is the only city that's allowed to kind of develop a stretch code that is not exactly the New York State stretch code.

[1:46:00]

We've also got programs like the Green Communities Program in Massachusetts a great example of a statewide stretch code. But then you have communities, you know states like New Mexico

where cities can either adopt the statewide code or they can develop a more stringent code if that's what they want. You have states like Colorado that have a home rule but have set sort of a baseline where I believe if a community has adopted a building code at all it's gotta adopt one of the last three published codes

It really depends on context and what works for that community.

[1:47:00]

Since speaking for myself, I think if I were trying to enforce or build in a state, I think I'd prefer to have one statewide stretch code. But really, it depends on what works for your community.

David Nemtzow: Sorry, Ryan, before we finish, the local governments that's ICC or you personally you have a view on the issue of local governments adopting their own codes?

Ryan Colker: I'm going to dodge a little bit like Ed. But you know, we provide model codes to be able to work in a variety of different situations and states and localities operate differently. You know sort of as a blanket statement we'd encourage folks to be on the latest edition of the code. You know whether it's a state or a locality but the actual application, you know certainly varies.

[1:48:00]

David Nemtzow: All right, so Amber and Emily and Amber do you get Jefferson County saying to you what are you guys doing you're confusing everything? Or do they say how brilliant, anyhow, I'm not trying to name names, just want to give us a response from your perspective, please?

Amber Wood: yeah, sure. I mean I think there's two pieces. I think, you know, interestingly, the home rule does kind of a fascinating thing of allowing Denver to or any other jurisdiction to really figure out what's important to them and move that forward in a meaningful way. So it is kind of question of, you know, obviously, we need base code for health and safety but then as we proceed to some of these more complex issues, the flexibility within choosing how you kind of move forward, I think, is actually extremely important is my point of view.

Now, of course, I am at the city level so of course that's probably important to me.

[1:49:00]

But I do agree that having a basis is important but I also think that as we start to look at some of these more complicated issues as we get into some of the climate type issues beyond just energy being able to address those in different ways that are meaningful and can have stakeholder feedback. I mean that's, honestly, it comes back to us for stakeholder feedback like incorporating the community in moving these things forward has been very critical for us to actually do anything with them.

And so, being able to really say here's the national energy code but what do we as Denver push forward given our climate zone, given our current where we're at has been extremely helpful for us.

David Nemtzow: Emily.

Emily Hoffman: And I'm going to go a little deeper not on the policy level as much but obviously, I think you know, local jurisdiction should have their own, which is I'm in the local jurisdiction. But one of the issues that we are going to be running up into is a lot of the tools that are used by the industry are developed onto the national model codes like RES check and COM check.

[1:50:00]

And so, we're going to be coming into this issue in 2025 and we have a performance-based code what tool do we use? How do we get you know we can't just have a code where it's not easy to implement, so that's something on our minds too. We want to make sure that the national model codes are also moving where we need it to go so that we have all of these resources for implementation and training and things like that.

Blake: Building off of what Emily just said, I mean that really sort of points to the importance of having state and local governments involved in the code development process as it moves forward. And so not being sort of a bystander of whatever comes out of the process but assuring that the model codes are sort of the basis for supporting whatever's going on at the state and local level.

David Nemtzow: Thank you, I hope we'll have a chance to talk about performance-based codes but Jeremy, back to you, what do we hear from the audience?

[1:51:00]

Jeremy Williams: Yeah, so we have a handful of additional questions here. One is sort of let's pivot back to goals for a second, I would say. And Emily, I think this question is headed your way, probably. But this is from Robert and Robert asks as utilities add solar and wind into their generation mix plus nuclear will those additions impact your New York City reductions goals? And so, do you factor in the percentage of noncarbon producing sources into your GHG goals?

Emily Hoffman: Yeah, that's a good question. So kind of at the policy level in New York the overall policy is that, you know the way that we're framing everything is that the grid is going to be going towards 100 percent renewable. That's a statewide goal as well. So they're going to be doing solar and wind. But we're not there yet and we're not going to be there in the next five years or 10 years.

[1:52:00]

So on the building level we have to build these buildings to be electric ready, electrification ready. So that's kind of a goal on the building code side. As far as the local I97 where we have the greenhouse gas emission caps, those have specific GHG factors in their based on the current grid but there is a mechanism in the law that those have to be updated and I can't remember the specific timeframe but between now and 2050 those have to be updated to align with how the grid will look like in the future. So I hope that answers that question.

Jeremy Williams: I think it does. And there's a related question, so on the topic now pivoting the topic of buildings and grid integration there's a related topic that's asking about the role of codes enabling that two-way communication between buildings in the grid.

[1:53:00]

And that's for anybody who wants to weigh in or David, being that the DOE is pretty active in this area, feel free to sprinkle on some thoughts of our own possibly too.

Emily Hoffman: I'll just jump in and say it's tough, you know there's been discussion, I think in the ___ stretch code there is like an option for these sort of grid interactive, how the building interacts with the grid. But at a code official level we feel like we have no enforcement over that so it's kind of this we know we have to get there but how do we get the code to move that way in an enforceable manner is where we're getting held up in New York.

Sorry, Blake.

Blake Shelide: Oh no, no, that was great. Thanks. So I'll just add that not necessarily building code related but I mentioned appliance standards in my part of the presentation.

[1:54:00]

And one of the standards that we are putting into effect now is a demand response water heater standard that would require a communications port to allow for a utility to be able to connect to that water heater and use it in a ___ response way to be able to balance grid needs if there's some sort of a capacity issue during high demand periods. That's one way that some states are looking to tackle or at least start to address that question.

Amber Wood: We're similarly looking at that and putting it in our implementation plan both equipment that is interactive as Blake was talking about and then also looking at storage. Energy storage and what that might look like in future code cycles.

Ed Carley: Yeah, this is Ed. So I think the way we're going to start to see that come into codes is like Blake said and Amber alluded to through appliance standards.

[1:55:00]

I think that there are a lot of states and statement buildings that are probably going to start to be used as test beds for these technologies. Part of that was just through the DOE funding announcement that David talked about. It's certainly going to be a question over the next few years and it's complicated to do. So keep an eye on appliance standards it's kind of the first way to get in and then we'll see where technology is as the cycles, code cycles progress.

David Nemtzow: Jeremy, looking at the clock, you're going to cover a little bit about our program and what's to come so why don't you cover that and if you can fit in more questions, great, but why don't you land the plane?

Jeremy Williams: Okay, sure, let's do that. And thanks everybody for wrapping up the panel here.

[1:56:00]

I just have a couple slides and Ian, since you're at the helm, let's skip all the way down to what's next, which is slide 41, I think or at least in the version I'm looking at. Right there. Okay, good. And you can go ahead and hit next one more time for me. All right.

And so, just real quickly, lots of people have had questions about what's going on with the in person event, in person code conference. And so, hopefully since you've made your way here today you've seen the e-mail that went out, our announcement that went out last week. And what that said is that we're tentatively rescheduled for May 11-13 2021, this coming May at the Palmer House Hilton still in Chicago.

But that's very tentative at this point, obviously, just with everything's that going on with in person gatherings right now and waiting to see how that's going to unfold.

[1:57:00]

So feel free to pencil into your calendar but definitely keep an eye in the coming months, coming weeks on energycodes.gov the URL that is on the screen there is where you'll see those updates.

Okay, and more on what's to come. So we touched on this briefly early on but we kind of glazed past it. I just want to mention that the entire, the remainder of the lineup is coming up in the next 12 weeks through early December every Thursday at 1:00 PM Eastern. And on the screen, there you have kind of a basic listing of some of the other topics we've settled on.

So I mentioned early on there's more to talk about than ever at this point. This is what we've narrowed it down to for the purpose of the individual seminars and sessions here. So it's everything David mentioned, remote and virtual inspections as did some of the panelists. That starts beginning next week with electronic permitting, which is largely a prerequisite to a lot of those processes.

[1:58:00]

And then later on, 11/5 we'll have another one that goes more directly at remote and virtual inspection processes. That's hosted by ICC.

We'll also have sessions on things like performance-based compliance, some new tools that DOE, PNNL and others have been working on to help local building departments, local

jurisdictions demonstrate compliance with performance-based codes, which is, of course, the challenges. Recognizing the shift towards performance-based codes, which we saw is one of the most if not the most popular response in one of our polls. A lot of times we hear at the local level is a challenge that the building department faces in verifying compliance with performance-based codes. So we're working on some tools to hopefully help out with that.

We have some of our updates, typical updates, those will be deeper dives, training orientated seminars on the 2021 IECC. Separate sessions on commercial and residential.

[1:59:00]

We've got a similar session in early mid-November on the new ASHRAE standard 90.1 that's the 2019 edition. We have policies for efficiency and resilience. Ed had mentioned FEMA's BRICK program that will be featured as part of that particular session. We have field study updates from the Pacific Northwest up in Blake's neck of the woods. We have a lot going on.

So anyways, you can go, if you want more detail on these, we have much longer descriptions, session leads, the specific speakers are all posted on energycodes.gov the URL on the screen there. You can go check those out right now and you can also register for those sessions that are coming up here.

So finally, to close this out I want to give a big thanks to everybody who's contributed to the NECC seminar series.

[2:00:00]

Getting us to this point, getting this planned and on the calendar but also who are going to be helping lead these sessions between now and the rest of the fall here. So top of that list is you all at PNNL, Rose Marie Bartlett, and Ian Blanding you all have been instrumental in helping us get this series organized. And PNNL is always instrumental in helping us with the NECC and getting our line up and everything pulled together.

ICC, Ryan, you all, Michelle Brit, thanks for everything you guys are doing with not only leading the virtual inspections discussion but all the work that you've done behind the scenes pulling together guidance and all the content we're going to get to cover and share there so thanks for that.

Ed, you all at NASEO, a shout out to the REEOs the Regional Energy Efficiency Organizations, which is MEEA, NEEP, SEEA, SPEER and SWEEP who are also leading a number of the sections coming up.

[2:01:00]

And of course, all of our presenters, speakers, discussion panelists, the session leaders, and of course, all of the participants as well.

So that is it. I want to say thanks again for everybody for swinging by today specially to stick with us here till the end and actually a couple minutes past. We had more to share, we were a little ambitious with the amount of content we had at the tail end today so we're make sure to work that in to another session so we don't miss out there.

We do hope you'll pencil us in every Thursday from here on out. Make sure to swing by energycodes.gov for the additional detail on the sessions and registration. While you're there check out some of the other resources whether it's a technical analysis or the compliance tools that David mentioned. That whole list of things that David mentioned earlier. And then keep an eye on your inbox for more updates on the in person version of the NECC in the coming months.

So that will do it for today.

[2:02:00]

David, did you have anything you wanted to tack on before we end here?

David Nemtzow: I want to add my own thanks to Ryan, Emily, Ed, Amber, Blake for a great panel, very informative and we'll see you next Thursday.

Jeremy Williams: Yeah, thanks everybody, we'll see you soon.

[End of Audio]