

**Compliance Pilot Studies
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Rosemarie Bartlett: Welcome ladies and gentlemen. I'm Rosemarie Bartlett with the Pacific Northwest National Laboratory and I'd like to welcome you to today's Webcast, 90% Compliance (inaudible)... to you by the U.S. Department of Energy's Building Energy Codes Program.

We have four presenters from the Pacific Northwest National Laboratory for the Webcast today, Dave Conover, Linda Connell, Eric Makela and myself. Dave Conover will start us off. Dave, take it away.

Dave Conover: Hello. Welcome to the Building Energy Codes Program Webinar on measuring state energy code compliance. First, we're going to start with an introduction today and we need to understand that buildings consume 40% of our nation's energy. That's more than industry and more than transportation, something I think some folks don't readily recognize, and when we look at that, we can recognize that changes in human behavior can help us reduce energy use, not only in transportation and industry, but also in buildings and we're focusing today on buildings. Changes can occur due to awareness, to empowerment, incentives, laws and regulations. We don't know what percentage we'll be able to reduce from 39% down to some lower number, but certainly by making more people aware of energy efficiency in buildings, we can get people to voluntarily do things, provide them ways to show that they're doing a better job with buildings, certainly giving them incentives, but when all of those fail, sometimes

we need to turn to codes, standards and other requirements to provide the designers and contractors and others associated with building design and construction, achieve some minimum level of energy efficiency.

Energy codes will, in fact, and can drive better buildings. They provide a vehicle to drive and provide minimum acceptable requirements, they establish a foundation for going beyond a minimum so someone can say I have a minimum code or I'm X% better than the minimum code, and certainly as time progresses and technology changes, the beyond can become a minimum. This is not unlike we'll say track. Years ago, if somebody ran a sub four hour, or excuse me, a sub four minute mile, it was considered pretty significant, and now we, of course, see numbers below four minute miles so the standards change as technology changes and time moves on.

There is a history associated with energy codes and standards that goes back 35 or even more years. We have both residential and commercial standards in the voluntary sector and then we have federal agency requirements. If you look to the left of the screen, even off the left of the screen, you might see or you would see 1965, 1960, even back in the 60s, the U.S. Department of Housing and Urban Development had requirements in their minimum property standards for the energy efficiency and insulation of houses, but it wasn't until the Arab oil embargo of 1973 that folks started focusing on energy in buildings and coming up with mandatory requirements, and actually it was the states that asked then the National Bureau of Standards to develop a set of provisions that could be applied to new buildings and renovations to existing buildings. The Bureau of Standards developed that document and then it was turned over by the states to ASHRAE who in 1975 released the first energy standard for new buildings,

Standard 90-1975. That document was subsequently put into code language and became the model code for energy conservation in 1977 and tracking along there in kind of the voluntary sector, you have various additions of ASHRAE Standard 90 and then Standard 90.1 in 1989 with Standard 90.2 covering residential, and then you have the residential and commercial energy codes embodied in the Model Energy Code of the Council of American Building Officials and then beginning in 1998, the MEC became the International Energy Conservation Code of the ICC. And of course, paralleling this were various federal directives that dealt with federal buildings for federal commercial and federal residential buildings.

So with that as a preface, we also need to look at codes and standards formats, how the requirements are specified in a particular code or standard. You have prescriptive requirements that would delineate how much insulation, for instance, you have to put in an envelope, duct insulation, service water heating, efficiency - - lighting efficiency. You have what are called performance requirements which are essentially your comparing your building as if your building just met the minimum requirements in the code. In other words, there is a - - for each building that is designed and constructed, there is a performance equivalent to that building. In addition, there are expected outcomes or what are called outcome based codes which focus on metered energy use but those are not predominant today, but I believe that the codes and standards will be moving in that direction in the future. The analogy would be an outcome based code or standard is to run a four hour marathon without any specificity as to pace, what type of equipment you would use, et cetera. Prescriptive would be totally prescribing how to run, where to run, what to eat, what to drink, what shoes to where, et cetera.

Codes in adoption are very important to recognize as well, energy codes and standards. Without adoption you can't guide change. You can adopt in one of two ways. You can voluntarily adopt, because I want to do it. I drive a market advantage or I get a carrot. Consider, for instance, recycling. I can voluntarily decide to recycle. I may drive a market advantage because I can look better than maybe a different community that doesn't or maybe I get a reward of some sort for voluntarily recycling. If everybody did this, I wouldn't need mandatory requirements but then at some points in time, when there isn't enough voluntary application or there aren't enough incentives, then sometimes you need a law or regulation requiring people to do this, do something. In the case of energy codes and standards, federal, state and local government adopt these codes and standards for new construction and renovations to existing residential and commercial buildings. Government agencies may, in fact, deploy these codes and standards to their own buildings or those receiving financial assistance. For instance, the Archives and Records Administration of the U.S. government is the authority having jurisdiction for all presidential libraries. Those are not subject to state or local code, but in fact, it is Archives that determines the standards that will be applied to those particular structures and they also may apply codes and standards to private sector buildings as well where the government may be leasing the private sector building for their use in which case federal requirements would apply as well. So you have both federal, state and local adoption of these energy codes and standards.

And adoption isn't enough. You also have conformity assessment. It's analogous to adoption being - - seeing 55 mile per hour speed limits on the highway but then recognizing that everybody is speeding and there's really

nobody out there checking to see if anyone is speeding. So conformity assessment is where compliance assurance is making sure that whatever is adopted is satisfied. It's an activity to determine directly or indirectly that a process, product or service meets relevant standards and fulfills relevant requirements. In this instance, it's making sure that the energy code or standard that is adopted is actually complied with. A household analogy might be if you have an extension cord, you might find a third party label on it. For instance, Underwriters Laboratory, they have made a determination that that particular product has met certain standards and this is no different. In energy codes and standards, you're making sure that what is required by code, in fact, actually happens in the real building.

So terms of measuring energy code compliance, which is the focus today, state and local government have been charged with or tasked with figuring out and determining what their level of compliance is, no different than maybe that 55 mile per hour speed limit I mentioned, making an assessment of how many people are, in fact, obeying the law, how many people are not or if I were to say have that four hour marathon cut score, it would be simple as measuring at the finish line how many people were under four hours and how many people were over. The Pacific Northwest National Laboratory, on behalf of the U.S. Department of Energy, developed a document on measuring state energy code compliance. This document is available on the Website, shown at the bottom of your screen, and contains sections dealing with code adoption and equivalency. If someone doesn't - - has not adopted, in particular, ASHRAE Standard 90.1, their provisions to determine the equivalency of that document, their adopted code to 90.1, measurement of compliance on a regular basis, planning for compliance evaluation, what procedures are used to actually go onsite and

evaluate compliance and some materials like evaluation checklists which can be used in making a determination in compliance. All the materials covering the Webinar today will focus on a lot of the provisions that are in this document.

There is a step by step companion guide that is available on the Web and in this document that kind of helps one if they are interested in measuring and expressing level of compliance, very simple steps to go through in terms of getting checklists, generating samples of buildings, actually going onsite and gathering the data and then actually aggregating the data and making some assessment. In terms of recommendations, the Building Energy Codes Program has recommended that a statistically valid sample of 44 buildings in each state in each of four populations, new residential, new commercial, residential renovations and commercial renovations, will be - - will represent a statistically valid sample. Residential is defined as one and two family dwellings, townhouses, modular construction for residential uses and multi-family structures that are three stories or less in height. Commercial would include all other buildings in addition to a high rise that is four stories and more multi-family residential structures.

So gearing up to measure compliance. Now we've gotten these materials and we're going to get ready to go out and actually measure compliance. In preparation, one needs to ask some key questions. You need to verify what's been adopted. What is the code and if effected parties are aware of the adoption of the code? What compliance assessment process is relevant to the specific criteria that have been adopted? What's the scope as to building types covered, technical, administrative and other provisions? What processes used to review the date of the plans, the inspection, et cetera? Essentially, what actions and

information are needed to verify compliance? You may want to establish a compliance working group to oversee or lead this effort and that may contain individuals representing all facets of design and construction, contractors, builders, architects, engineers, utilities, code officials. Those that are involved in the front lines all the way from initial planning to the occupancy and use of the buildings. You would want to look for folks in your state that are recognized as experts in their field, their ability to organize and lead and also ability to identify and secure needed resources, and this working group would logically review evaluation materials and also establish reporting mechanisms that would be used during the conduct of the compliance evaluation project.

Develop a plan to measure and report on findings related to compliance. In other words, are the requirements in the adopted code being satisfied, certainly need a plan to look at this. Looking at what information is relevant to compliance. Who can get that information? What qualifications does somebody need to have in order to get the information and understand that, in fact, the information they've gathered is valid? Where do you go to get the information? When might it be available? For instance, if I'm doing a - - an inspection of the insulation on a foundation, you obviously want to do an inspection during construction and before backfill. How will the information be secured? Are you actually going to go out onsite and look at it with your - - have the evaluator look at it with their own eyes or are there other intermediaries that could, for instance, take pictures or gather the data and forward it on? How are you going to collect, store and analyze it and again, and part of what we'll be covering today, is how much information is needed to really provide a valid assessment? Part of that is the 44 plus or minus the statistically valid sample but in addition, it's when I get out to one of those samples, how much information do I need to get from the site.

Then you want to determine how to manage the plan. You've got planning, communications and tracking and analyzing, this is really a circular process that's constantly ongoing. You want to look at tasks and responsibilities and a schedule. Who on the team, and is involved in this, is going to be interacting with one another and how is their work integrated? You'd want to look at meetings on a regular basis, reporting, communications and information, both internal and external. Internal (inaudible) project team and certainly, external, to let people in the construction industry and other interested parties know what's going on and then certainly, keying up questions and getting responses to those. It goes without saying when you go out and start doing this, there will be questions. Certainly PNNL, through the Building and Energy Codes Program, will be able to handle a lot of the technical questions you may have and others will cover that later during the presentation. But certainly, you're going to need questions addressed as they come up.

And then implementing the plan. For instance, and this is just a suggested approach, certainly some may want to just go out and immediately start doing the full blown evaluation and see where they are. Others may want to take an approach of we'll say small bites. Take a small assessment, kind of see where you are, refine the assessment tools. Possibly use the assessment results to identify needed design and construction improvements. Maybe through what small assessments you do, you find out that the window provisions haven't been complied with on a regular basis and so maybe that suggests a need for getting it more information out on window provisions. Widen this net. Make more assessments. Refine the assessments. Identify additional tools, design and constructions improvements. Re-refine the tools. In other words, it's an ongoing

evolutionary process. This is again, something you may want to consider in lieu of just grabbing the evaluation and going out and doing four times 44 buildings and seeing what the results are, and then when you get the results, obviously the information you want to evaluate them. Regular oversight by the steering committee, reporting release of findings. What are the findings? What is the level of compliance and if it's not 90% or it's some other number, well what are the reasons why and that can suggest changes to the code or education and training or any number of things to improve the level of compliance.

So with that, I'm going to turn the program over to Linda Connell who's going to cover with you the compliance evaluation checklists.

Linda Connell:

Hello. Hi. This is Linda Connell and Dave mentioned the evaluators going out with checklists so I'm going to discuss a little bit the checklist tools that we developed within the Building and Energy Codes Program. Right now online, we have supported checklists for the 2009 IECC, both residential and commercial and also 90.1-2007. Those are what we consider the target codes but there is a possibility that a state may need some modifications to those checklists or alternative checklists, especially if they have some state amendments or any special needs and so we welcome any requests for modification to those and later today, we will also discuss some evaluator training that we've developed that will - - can be used to teach people to use the checklist.

So the residential checklists shown here were developed by climate zone so there is a separate checklist with - - for each climate zone and right on the checklist itself it contains the prescriptive requirements for each climate zone.

This can be very handy for the evaluator. Also on the checklist are the sections

within the code that each checklist requirement applies to so if there's a question, they can be looked up. Also, for residential, each requirement, each row in this checklist, represents a different code requirement and there are instructions for each separate requirement. So if you look at the requirements on the right of these instructions, there's a unique ID there and on the left, there is a - - the same ID and so you can see that not only on the instructions in the checklist, you've got instructions for each requirement but you also have the code section that those apply to.

So from the commercial checklist, it's a little bit different beast. It's very difficult to have put commercial prescriptive requirements on the checklist because they actually represent tables of requirements. Commercial buildings have different window - - different requirements, for example, based on different aspects of the building such as different window wall ratios and so we've built the commercial checklist with the expectation that the evaluator will have a pretty good understanding of the code or will have the code or standard with them onsite along with the checklist. So there is no breakdown on commercial by climate zone.

The checklists, both residential and commercial, are broken down by stage of construction. So as you can see on this slide, there is - - these are sort of some examples of stage of construction for commercial, things like plan review, foundation inspection, roughing inspection, plumbing, mechanicals, final. The idea is that different stages of construction probably occur at different times in the building's life cycle. In some cases, for example, with very large commercial buildings, it could be very difficult to evaluate one building throughout all of its life cycle. It could be that the time elapsed between when you could actually

evaluate foundation insulation, for example, could be a fairly lengthy from when you can do final inspection and maybe evaluate lights, so we have in our guidelines, provided an approach that you can use multiple buildings to do a single evaluation.

We've actually provided two approaches. One of them we referred to as the construction phase approach which pretty much says that you can do different buildings for different phases of construction. The caveats with the multiple building approaches is that we ask that the building be about the same type and within the same jurisdiction. The other approach which we've dubbed the primary building approach, recommends that you take one primary building, go out there and look at all you can on the primary building, do all of the evaluation and check for all the requirements. If there are a few that cannot be evaluated on that building, such as foundation inspection because it's been covered, you can go to another similar building in the same jurisdiction and evaluate compliance on the separate building. For the case of using multiple buildings for different construction phases, we do ask that the - - there's a place on the checklist for recording the building information, such as the owner and the location and who did the evaluation for each building that was evaluated.

Now then the same checklists that are out there for new construction, we are also recommending being used for renovations. You can see that the compliance columns include a not applicable selection and so our expectation is for renovations, depending on the type of renovation, there may be a large number of requirements in some cases that are just not applicable to that renovation and that's fine. The evaluator will mark them as not applicable and they won't be included in the compliance evaluation. So given the checklists,

let's move on to how you generate a sample for going out in this state and taking your checklists and doing these evaluations.

As Dave mentioned, the sample is based on a statistically valid number of buildings of approximately 44 plus or minus in each of these building populations. Now where does the plus or minus come from? First of all, for commercial buildings, there are states that have very, very large commercial buildings and other states that do not. For states with extra large and extra, extra large commercial buildings and the cutoff is defined in our procedures, there may be a need to go beyond the 44 samples and evaluate some of the extra large and extra, extra large buildings. For smaller states, based on recent construction activity, there may not be as much construction going on in the state as was estimated to come up with the 44 samples and they may actually need to have fewer than the 44 samples in that state.

So the - - generating the samples, we have a whole chapter in our 74-page procedures that talk about how to generate samples manually and you're certainly welcome to read that. It may be of interest to some of the statisticians out there but it's a little involved and your eyes may glass over, so for the rest of us, we have generated a very simple tool called The State Sample Generator that is currently posted online. This tool, if you go out to it and you click on your state, it will bring up a picture of that state and you will have some choices to make. So for example, this demo shows Wyoming and in bringing up Wyoming you can see at the top that there's an option to choose the category you want to generate a sample for. The categories are new commercial construction, commercial renovation or new and renovated residential buildings. We did - - underneath the hood of the Sample Generator tool, is some data bases. On the

residential side, it's census data about recent permitting information and on the commercial side, it's dodge data, about commercial building starts within each county, and so that data is used underneath the hood to predict the construction activity expected in the state in the next year. It was very difficult to find any residential renovation data so barring having that data, we're recommending that the resident - - new residential and residential renovations use the same sample set which is the census permitting data.

The other thing that you can select from is to base your estimate of new construction on the most recent year of construction, the most recent two years or the past most recent three years. We sort of recommend that you do an evaluation based on the most recent three years; however, in some cases, the state may feel that the previous year would give the best indicator of construction in the upcoming year. This could be very true perhaps with the recent down sizing of construction activity and you may - - if you were doing this in the near future, may want to just generate a sample based on past years' construction activity. So making those two selections, what kind of samples to generate and how many years of previous data to use in the estimate, you click the Generate Sample button and what will come up is a third screen which shows the samples by county that this tool randomly generated as a statistically valid sample. The samples are shown by climate zone and one column in the table will show you the estimated building starts or building activity that these samples were based on. You would expect to see more samples taken from counties that had more activity in the past. This particular example for Wyoming, you can see that most of the samples come from the climate zone that covers most of the state and one climate zone is not even included. If you click this a second time, you would get a different but similar probably random sample. So that tool is available online.

The - - one thing I would like to say about it is that the samples are generated by county and not - - and in the state that may not equate to jurisdictions so you may have one county that does have authority over the entire county, one jurisdiction or you may have several jurisdictions within that county. Since a lot of the data is not available by building department and jurisdiction, we're leaving it to the state to take those county samples and allocate them to the jurisdictions they feel would be adequate within that state.

So one thing I'd like to say about the samples is that if you deviate from what's generated randomly by the tool, you may introduce an unintended biases. So there's a list of biases that you may want to think about if you deviate from a purely random regenerated sample such as a selection of only friendly jurisdictions. This - - we've kind of heard from some states that have already embarked measuring code compliance that they've picked maybe three jurisdictions out of their state that are happy to work with them, but by only picking those jurisdictions that seem openly willing to participate in the study, you could create an unknown bias. Also if you select too few jurisdictions, there's a tradeoff between going to all the jurisdictions that samples are generated for, which can be quite a number of different counties that have to be visited versus consolidating all your sampling in just a few counties, you don't want to probably draw from pools of above code buildings only. They do exist, databases, perhaps of just lead buildings or energy star buildings and it might be tempting to just generate a sample from those databases, but that would be introducing a bias. Also lack of diversity of building types, as Dave mentioned, residential includes multi-family. Commercial buildings include a wide variety of use types and our procedures have some discussion about the use types that should be

included in the sample and you may want to review that and also, if you do too few samples.

So to summarize, the samples generated from the tool that I just demonstrated, are preferred. There are logistics that could make this difficult and so we understand that. It is possible to use this tool to kind of infer a final sample set. If something doesn't work out in one county and you were supposed to take two samples from it, you can probably see where maybe those samples could be taken from a jurisdiction in that county or at least you'll get an understanding based on current construction where those samples should come from.

And so now I'm going to turn it over to Eric who's going to talk a little bit about approaching the jurisdiction and what to do when you get there.

Eric Makela:

Thanks, Linda. My name's Eric Makela from the Building Energy Codes Program and we're going to first talk about approaching the jurisdiction. This isn't the actual visit itself, this is getting the jurisdiction on board prior to even visiting them and Linda made some very good points as far as trying to keep the sample as pure as possible so that means the jurisdictions that are selected, we want to get them on board. We want to visit them. We want to get the buildings we need just to keep up, just to keep a sample based on what we had already selected. So there's a few ways of doing this and I know that different companies that are actually doing quite a bit of work on the evaluation side have their own methodology, so we're going to be presenting one approach that has been successful and the thing of it is is that you need a partner with a jurisdiction and this isn't necessarily only going to the friendly jurisdictions, this is to partner with the jurisdictions within your state to make sure that you can get access to what

you need. The jurisdictions are going to have the plans. You're going to have energy code compliance documentation and they're going to have direct access to the building sites too so it's very important to get them on board with this from day one. As you're developing the plans, as Dave was talking about developing plans for the study, get the buy-in from the jurisdictions at the very beginning of the process. This is working with the local International Code Council or ICC chapters. Get them onboard. Let them take a look at what you're doing. Let them provide feedback to what they think will work and will not work. If they give you - - get buy-in from the jurisdictions, then they have a vested interest in making this happen and they can actually help you and kind of market this program out to the jurisdictions so that they're not blindsided with - - when you come out to do the study. Collaboration is the name of the game that I have on here and it's really - - you need to collaborate. The jurisdictions are going to look at this as an audit. They are - - it's kind of one of those nasty, I guess, five letter words but when they see an evaluator or data collection or something like that, they will look at this as an audit and that's going to create some concerns with them, so getting their buy-in and working with them on this process from the very beginning will actually go a long way toward getting a successful sample and getting out to the buildings you need to do it.

The jurisdictions are going to have concerns. Time and manpower is one. How much time? How much staff time are they going to have to allocate to this study? With the budget cuts that have been happening across the U.S. and layoff of jurisdictional staff members, there are - - some of the jurisdictions are very limited to what they can actually provide so time and manpower will be a big concern of theirs. What are you going to do with the study results? Are the results only going to be released to the state agency and they're going to keep them and no

one will know exactly what's going on at each jurisdiction? They're going to want to know what's going to happen with that and this will pop up in my slides as we go through here, but the study results and what's going to happen - - what you're actually - - the intent behind those are going to be a key critical issue. It goes down to reporting of the study results. Are the city and county government going to get a copy? Are your peers, their peers going to get a copy so the other jurisdictions will know what you're doing? These are all going to be concerns that are addressed in our reporting on this. It's basically we're trying to keep everything as confidential as possible. What are the jurisdictions going to get out of the study? Are they going - - are you going to give them the results back to say you're only at an 85% compliance rate or an 80% or a 75 or what or you're at 100% compliance rate, so they're going to want to know if they're going to be able to get the results of that study and then what incentive do they have to participate in the study? Understanding that the jurisdictions don't necessarily have to participate, they can always opt out. It's not (inaudible) obviously, but they can opt out of this and that's why we want to keep them on board as much as possible. Some states have actually offered free training to the jurisdictions that participate in the study just as kind of a carrot, but this - - these are the types of questions that the jurisdictions will have and concerns. Other questions: How many buildings and what stages will be reviewed? Are you asking to poll 30 buildings, 20 buildings, three buildings? Are they all residential? Are they all commercial? These are the types of questions they'll want. How long is it going to take? How long is the evaluator actually going to be at the jurisdiction and on the site? Is it going to be a one day process in the building department then they're gone and then they'll be out onsite the rest of the time or is it going to be longer? And again, what is their involvement in the process? Do you only want them to pull the plans for you? Do you want them to pull the plans and also get

you access to the construction site? Do you want them on each of the inspections that you go out on? This will kind of dictate to them how much manpower they're going to have to allocate for this process and then again, their question is what are you going to do with the results?

So we - - I've created kind of a five-step process for setting up the study with the jurisdictions and again, this process - - no... I don't think any plan works perfectly so contingencies are something you have to plan for. For - - as Linda was talking about, you have to select the jurisdictions and the type - - the number and type of buildings and projects you're going to be doing for each jurisdiction. That's step one. As part of step one, you have to develop plan A, plan B and probably a plan C because you're going to need a contingency plan because again, no plan is perfect and you need to be pretty flexible as you go through here. Jurisdictions will drop out. You'll get new jurisdictions. Samples will drop out and you need to plan for that. If you don't plan for that, you'll find you're going to be starting to use a lot of resources ineffectively. That's either going to be funding or it's going to be the evaluators are going to be going out there and not getting what they need and have to continue to get to work harder and basically expend more resources to get the data that you're actually looking for.

Then you need to market the study which is kind of an odd thing for an evaluation study but people need to know what you're doing and again, the more buy-in you can get from the ICC chapters, from builder groups, ASHRAE, AIA, interested and affected parties out there that are going to be impacted by this evaluation, the better off you're going to be because everyone's going to have a heads up that the study's happening and there won't be any surprises when the evaluators go out in the field.

We are creating a brochure that can be sent to the jurisdiction on an overview of the study, kind of the expectations of the jurisdiction, what their roles are going to be and that type of thing and that will be available soon that will be of - - we'll have available to anyone interested in getting this. This brochure can be sent to the jurisdiction. It's kind of a heads up on what's happening and it can also be followed by a letter that we're developing too that can actually be emailed to the jurisdiction that gives more specific information on what they're going to be looking at from that jurisdiction. So sending kind of written correspondence to the jurisdiction would be step three.

Step four is a follow-up phone call. You need to make contact directly with the building official or whoever in charge of the jurisdiction to make sure you can schedule a time to come out there, make sure they actually have the opportunity to ask questions of you on what this study's actually going to be, what - - and again, to kind of raise all and address all the concerns that they may have but this would be a very - - this phone call will be a very important part because if you can't talk to someone there, you won't be able to show up onsite and actually get what you're going to need.

So once you've done step three and step four, then step five is repeat step three and step four until you actually have your full sample size because again, you also may go into your contingency plan C or B just to be able to get the numbers you're going to have to get to meet your requirements for the evaluation study. So this again, this section really focuses on how do you approach the jurisdiction before you even get onsite of this and do your visit - - your data collection.

The next piece that I'd like to talk about is the actual evaluator training itself. So this is the training for the evaluators who are going to be out working to collect that data and the evaluators can be - - they can be third party contractors, building officials. See our report on measuring state energy code compliance for recommendations of the types of folks that should be out there doing the evaluation, but typically they're going to be experienced people with knowledge of the energy code and also knowledge of doing data collection. So that's really the prime evaluators that you're going to be looking at. The evaluator training, the goal is to - - making sure that they have all the necessary tools and knowledge of those tools and the program at large to go into the field and do the job. Essentially, you want them experienced on using the data collection form to reduce the amount of time that they're going to be spending out there on the job site and the jurisdiction itself, and they also have to be able to interact with the jurisdictional staff, the builders, the designers, whoever they're going to be meeting out there and if folks have questions on the study, they're going to have to be answering questions on the study. So the evaluator questions really or evaluator training is going to be focused on getting them up to speed and to be able to do that.

Linda talked about the actual inspection forms themselves are based on the residential provisions of the 2009 IECC and also the commercial provisions of the 2009 IECC and the ASHRAE 90.1-2007, those are going to be the tools that will be the focus of the training so the goal will be to teach the evaluators how to use those tools effectively and again, we have a section that deals primarily with focusing on the aspects of the program that are not technical in basis but more programmatic that will be focused on too. Our target audiences for the training are going to be third party contractors, building officials and energy office staff, if

they actually select folks that will be going out and doing the evaluation, anyone else that's or - - interested in actually providing evaluation services to the states, this would be consulting firms, which I guess are the third party contractors, but anyone that might be interested in actually doing these evaluations and offering this as a service to the state. That will be the primary goal of the evaluator training.

We have thought through what we think should be kind of a recommended background for the evaluators. The training was designed around the thought that those that are coming to the training are already going to know the provisions of the residential - - of the 2009 IECC, the residential for commercial and also ASHRAE 90.1-2007, so you'll have to have a base level of knowledge to do the evaluation. This type of training, to get this base level of knowledge, is available in several places. I know the International Code Council runs courses on this. Other states are doing classes on this so there - - you should be able to pick this up. We actually have training materials that we've developed here at the Building Energy Codes Program that you can get up to speed but we really need to have this background. You also need to have experience with plan review. You need to - - we feel the evaluators need to understand how to read building plans and also to understand the energy code compliance documentation and to pull information off of that because that is part of the typical plan review process, so you need to understand both residential plan review and also commercial plan review and where to find that information. Now also the evaluator should have experience in the field looking for these different energy features for both residential and commercial types of buildings. For example, if you go out to look for an economizer on a commercial building, you'll need to understand what to look at. Where is that? Where are you going to be

able to find the information on the economizer? Also for lighting, do you actually have - - did they meet the requirements for the code by putting in the right type of control system for lighting? So this is all information that we feel that the evaluator should have prior to coming to the training so the training can focus on how to actually use the tools to collect data in the field.

We will, again, be providing a - - about a half day worth of overview training that deals primarily with the types of information we're actually covering today in the Webinar so and it's going to be - - we're going to be taking this information that we're covering and turning this into a half day or so stand-up training session just to make sure that everyone understands the aspects of the program so they can answer questions out onsite or to the building official or whoever you're working with. So we feel that's an important part of the whole thing. The actual form training itself, if you will, the evaluation form training, for residential, the session's designed for one and a half days of training. One day of that training will be for - - will be on the form itself and how to complete the form and the other half day of that is actually going to be out in the field. It will be a half day practicum conducted onsite and the attendees of the training will have the opportunity to show that they actually understand how to use the checklist and so we're going to be setting these up when we're doing our onsite or our evaluator training throughout the country. So they will have the opportunity again to be out on an actual jobsite and to show that they understand how to use the form for residential. The commercial training will be a one day training session. We were discussing having a practicum with the commercial training but it's too difficult to find commercial sites to be able to do this, so instead what we've done is incorporated several video clips into the training to give some actual onsite field

shots and actually enhance the training quite a bit, so the video clips are also going to be incorporated into the residential training format.

We will be offering evaluator training in four states that we are in the process of setting up the schedule right now, so stay tuned for that. We also anticipate some online video training. Without the practicum, obviously, for the residential session but that will be offered on our Building Energy Codes Program Website once we do the (inaudible) evaluator training sessions.

The last thing I want to mention for evaluator training is how do you get information on kind of getting yourself up to speed on the codes. We have available right now our Building Energy Codes 101 training session that's available. The presentation materials are available on our energycodes.gov Website. We also have training materials on the 2009 residential IECC and also on the 2009 IECC for commercial for lighting envelope and mechanical, and we also have a class set up right now for ASHRAE 90.1-2007, so these are good overview classes you'll be able to get information on. You can also visit the IECC or the ICC Website at ICCSafe.org and gather - - they have study tools on the IECC codes. Also, you can go out to the ASHRAE Website and actually order a copy of the 90.1 User's Manual which is a very good source of information on how to get through to compliance with 90.1-2007 and it provides you a lot of good background information. So anyway, that is it on the evaluator training.

So we've kind of talked about how do you get jurisdictions to buy-in to this program, if you will, and getting them to agree to participate. We've talked a little bit about what type of evaluator training the evaluators will get before they

actually visit the jurisdiction but now I want to spend a little bit of time once you're at the jurisdiction, how the process is typically going to work there. The first thing I want to emphasize on here is that the - - you need to focus on - - or the evaluation team needs to focus on relationship building with the jurisdiction. While you're going in once to collect data, if you want to build an effective energy code program within the state, you need to have the jurisdictions as partners. So the evaluator training or the evaluator team, whoever represents the state energy office or whoever is managing this process for the state, needs to understand that you need to go in and build a relationship with the building official so that they can get you - - you can get buy-in from them on future work, on training, whatever it's going to be.

Contrary to popular belief, the jurisdictions may not want to participate in the study. Again, they view this as an audit and this is something that you're going to have to work through to kind of build their trust on here, so the more that you can do with the jurisdictions to eliminate concerns on here, the better off and the more successful that you're going to be, and you really do want to focus on long-term relationships between the jurisdictions and the project partners. That's a key critical piece of this whole thing so where we look at this as an evaluation study, it's really building relationships. Also, take advantage of being onsite. We have - - we actually have an evaluation form set up that you can ask questions and we'll talk about that in a little bit, but take advantage, get as much information as you can. Use that information for future planning for your future energy code programs but it's a great opportunity to be able to get as much information as you possibly can.

When you go to the jurisdiction, when the evaluator team goes to the jurisdiction, the first thing you'll want to do is meet with the building official and the plan review and inspection staff that might be interested in the study, and the purpose of this is to take a look at what's going on in the study, review the goals, review the objectives, review the forms basically, answer any questions that you can about the study and what's going to be used - - done with the data and then we do have a survey that is great at collecting information about how they actually go through the process of doing plan review inspection. It can be used for your future planning, for future training programs, to determine how you're going to support the energy code and that's located on the Building Energy Codes Program Website. Also, if the - - your evaluators have a background in energy codes, they might be able to answer energy code related questions which is kind of a side benefit of having you out there because the experts will be out there doing the data collection and they hopefully will be able to answer questions from a plan review and inspection staff on exactly what a code provision might mean, so that's a good reason to have someone with a fairly strong background in the code.

The brochure that we're developing is going to recommend that the building departments actually have the building plans pulled by the time the evaluator gets out onsite. That takes less time for the evaluator. This will allow the building departments to actually do this more at their leisure because they'll have some lead time. So while we're recommending this, typically what's going to happen is the - - they may wait until you actually get there, until the evaluator gets out there and work with the evaluator to pull the plans so I would account for this in your planning that they may not - - everything might not be set the way you might think it is once you're going - - once you get out there.

So from that standpoint, you can work with the permit tech, the plan reviewer, the building official, to actually pull the right number of building plans for residential/commercial renovations, get the correct number of buildings. If you are building - - if you're proposing to do - - take data based on stages of construction as Linda had discussed, so you're taking the foundation from one building and the - - doing framing at another building and doing insulation from yet another building, you may have to pull more than one set of plans to be able to do that so you have to make sure you have a complete building and that will factor in when you're pulling your plans on the building. So all of these - - and then you also need to make sure you have the right stage of construction. Often times, there will be some confusion in the plans that you get. Someone will also already be living in the house so you can't access the building, so you have to make sure that the plans that are pulled aren't currently under construction or they might be under construction but at the very initial stages of construction. So all of this factors in to make sure you can actually get out and collect the data that you want to get.

There's going to be a varying degree of permitting data available to building departments because each jurisdiction's going to have their own requirements. Some are going to be dictated by the state, home rule states. It may not be that. It might be dictated by the actual policy within the jurisdiction. For residential, you could get a complete set of plans with architectural, structural, mechanical, plumbing and electrical drawings, and also the energy code compliance documentation that goes with that. In some jurisdictions, you may only get a plot plan that is essentially showing a well and septic location because they don't really get into plan review. And then you can get anywhere in between that so

again, this gets back into making sure that you have some contingency plans on how to deal with this. Commercial plans, you typically get better commercial plans because you have design professionals associated with that so you'll probably, in most cases, get full architectural, mechanical, electrical, plumbing sets of plans to work with or you could actually get design bill drawings which are typically going to just show the - - kind of the footprint of the building and may not give you a lot of specifics about the building itself with some very minimal information on that. You can also get into a situation with shell buildings for commercial where you have the one permit pulling the building envelope that shows the glazing, shows your insulation and that type of thing and then you have to pull different permits and different projects that will show the tenant buildup that will show them potentially lighting and mechanical. So again, this - - will have to be accounted for. The goal is to get complete buildings when you're pulling this and pulling the plans to make sure that you can complete your sample size.

From an enforcement standpoint, and then this kind of gets along with the - - what's required of the building permits, some jurisdictions will require full plan review and inspection, and this is going to be optimal because they typically will also - - if they're enforcing the energy code, they'll also be requiring full energy code documentation and so you're chance of success from a plan review standpoint will be fairly high on this, and we would hope that all jurisdictions are doing this but we know in reality that's not the case. Some jurisdictions you get the issuance of the building permit with no plan review or inspection. Again, this might be a jurisdiction that does not have an enforcement mechanism. Maybe the planning department's actually issuing the - - or the health department's issuing the permits on this for septic and for your well, and in this case, you have

a medium to low probability for success, not actually getting out onsite and getting the information you're going to need. So you'll have to account for this. You may end up having to review the plans onsite if you can get out onsite and actually - - pulling the plans directly out from the builder out there and trying to review them onsite, and then going ahead and doing the inspection.

You - - there are still jurisdictions or areas within the country where there are no building permits required. The probability of success on this is low to no probability essentially. Your options on this are trying to contact the builder themselves and trying to get out onsite or if it's a large commercial building, trying to contact the developer. You can choose another jurisdiction but you need - - you should be documenting the non-response about why you chose another jurisdiction just to again, try to keep your sample size as pure as possible. You, I guess, always have the option of choosing another jurisdiction of the study but not documenting non-response, but again, the goal is trying to keep your sample size as pure as possible based on what you selected, so if you do have to select another jurisdiction, it's always best to record why you had to do that.

From an evaluators standpoint, after they've done the onsite interview with the building department and asked the - - or answered a lot of questions and kind of brought up what's going to be going on with the study, then there is a section in the form that will be covered in the evaluator training itself that focuses on plan review and we have somewhat de-emphasized the plan review portion of this primarily because we realize that most of the data for the buildings will be collected out in the field and that not every building department is going to have access to plans or going to be storing plans, and so we have somewhat de-

emphasized this but it's still a portion that you need to take a look at and actually getting the information from the plans is probably the best source of information, especially for commercial buildings. So from an evaluator standpoint, the process will be if there's energy code compliance documentation, for example, a res check or a com check, review that. If you can get a copy of it, great. Use their Xerox machine. Ask first, obviously, but go ahead and try to get copies of the documentation on that. Take a look at that. Compare that to the building plans. Take a look at the checklist itself and try to... There are sections in the checklist that you'll see that will be where you actually record the proposed levels of efficiency out there like insulation, types of glazing and that type of thing, so you can take some time and fill out the checklist to do that. Record any special features about the building that'll need to be taken - - checked. For example, if they're using overhangs for protection factors on windows and taking credit for that, that's something that should be recorded so you can verify that those are installed onsite. If they're using special equipment or something that they're taking credit for, this is the type of thing that again, you need to record to make sure that it can be verified onsite because this will impact energy code compliance.

There are also going to be times when there - - you may not have energy code compliance and you may have to actually determine energy code - - determine compliance for a feature before you head out onsite. As an example, commercial lighting. If there is no documentation that shows that commercial lighting complies with the code, this is something you're going to have to verify on the building plans before leaving primarily because once you get out onsite, you'll have no way of knowing if the lighting complies or not unless you've actually done the documentation on that, so there are some features that will be covered

in the evaluator training to make sure that - - are checked in the building department, are on the plans, before getting out there just to determine if you complied if there's no documentation.

So last, but not least, we've talked about at the jurisdiction itself and pulling the plans, and looking at the plans and collecting data on this, but the last piece of this that I want to mention is getting onsite and in a way, it's significantly easier to get data off the building plans than it is to actually get out on the plans and collect the data on the building site. One study I was involved in, we pulled 140 residential buildings and we were actually - - probably could only get on to about 80%, or I'm sorry, 20% of those buildings, so 80% of the buildings were - - we could not get out onsite on to actually be able to do the onsite. There were several reasons for that but this is something that can happen based on where you're going to be working. The first thing you need to look at is access to the building sites and again, pulling plans is the easy part of the process. Getting access to the building site is more difficult. You're going to have to get permission from someone. This is - - this could be - - you could ride with the inspector in the jurisdiction to get out onsite. That's one option if they're willing to let you do that. You can contact the building owner directly or contact the general contractor to get out onsite or contact the builder. So you have a few different options but again, in most cases, you're going to have to get permission to get out on there to be able to actually collect - - to collect this data.

Some of the issues that can arise and some of the questions that are typically asked: When is liability? Do you have the right insurances to be out there? What happens if you're injured out onsite? So you need to make sure that the evaluation team covers - - has the right type of insurance and right type of liability

coverage to make sure you're covered on that so that can eliminate that problem. Trying to actually contact and talk with the builder, with the developer, whoever in charge of the project, this is where sometimes you can actually lose several jobsites if you can't actually talk to a physical person and they will not return phone calls. The only solution to this is perseverance. This is just to try to again keep your sample size as pure as possible, so continuing to call, continuing to try to contact, showing up onsite and actually trying to talk to the person to see if you can get out there, so kind of cold calling (inaudible)... standpoint. Your only other option on this if you can't get it, is to select another sample and then document the non-response. The responsible party for the building site can also select not to participate in the study so you may call and they say, "No, we don't want you out here." In that case, there's not much you can do except to probably document the non-response and select another sample. So hopefully this gives you some good guidance on focusing on - - when you actually get to the jurisdiction.

Now I'm going to turn it back to Linda and Linda's going to be talking about scoring the results of the data that you've actually collected out onsite.

Linda Connell: Okay, well thank you, Eric. So you've got your evaluators. They've been trained. They went onsite. They completed the checklists, now what? In terms of scoring the results and analyzing the data from the checklists, first of all, I would like to cover a little bit differences in how these checklists are scored.

So the new construction checklists are scored differently than renovations. For new construction, it's assumed that each building is roughly being evaluated for the same number of checklist requirements and so as such, we can assign a

score to each individual building and then at the state level, we just sort of look at the average of those buildings that were evaluated. The one exception to this is new commercial construction where we do have some metrics for weighting the commercial building evaluations by the size of the building. Because obviously a very, very large commercial building has way more energy impact and potential savings than a very small one.

For renovations however, the number of checklist items that could be looked at a renovation could vary quite a bit depending on what type of renovation it was. If there's - - a whole building is gutted and the renovation includes the entire building and all the systems within the building, that could be very much like a new construction where almost all the checklist requirements are involved. In other cases, it may be a small addition or it may be just a lighting - - some upgrade in which case only a small number of the checklist requirements are included. So for that reason, on renovations we're providing a way to score the renovations and come up with a metric at the state level only and are recommending that you do not provide a score for an individual renovation.

The checklist requirements are ranked according to sort of what our best guess is as the energy impact of each requirement so obviously, some code requirements have the potential to have a great deal of impact on the energies of the building while others maybe not so much. So for residential buildings, we've actually divided the checklist requirements into two tiers. The tier one requirements are the ones we deem most impactful and the two tier requirements are less so. For commercial construction and commercial - - the commercial checklist, we have that divided into three tiers where the third tier is again the least impactful and in evaluating a score for the checklist for new construction,

the tier one items are allocated three points, the tier two items two points and the tier three items one point. So obviously, a tier one item that's missed in the compliance evaluation will have more impact on the final result and the final score for that building than a tier three item that is non-compliant.

So there was some discussion also about whether the commercial compliance could be based only on tier one items and we're going to discuss a little later some initial studies we're doing where we hope to evaluate the time it takes to do one evaluation, one commercial evaluation, and the time it might take an evaluator to do one residential evaluation. We hope to gather some information also about how much time it would take to do just the tier one requirements versus doing all tier one through three requirements for commercial. Our feeling is that the tier two and three requirements are also the easier to inspect so that - - this will be a interesting outcome of some of the initial studies we do.

Now then the checklist themselves, an evaluator could score those by hand but we also plan to provide an online tool called the Checklist Store and Score to make it easy for states to upload their data into an electronic format, into a database, and also automatically score each checklist and provide a state total. So how to get those checklists into this tool, there's about - - there's three different ways that can be done. If you're evaluators go out onsite with paper checklists, you can gather those and you can provide them to the Building Energy Codes Program and we will take care of getting that - - those paper - - the data from those paper checklists into this online tool. Alternatively, if the evaluator wants to take a laptop with him, the checklists are in Word form so they can actually bring them up on a laptop and fill them out electronically and then those Word forms can be uploaded into the tool and the data converted into the

database. And a third option, if the evaluator or the state wants to enter them directly into the tool, there will be an online interface. It will look a lot like the checklist and the user can pick the data from a paper checklist or a Word form and enter them into the online tool.

Now then, what will happen with this data, we plan on password protecting all the data. The state will receive a password which will provide them full access to all data for their state. They can give that password to a contractor that's helping with the evaluation. At any time they want access to all of their data, they can just click a link and they will get an Excel file that contains all the data, all the checklist data for any evaluations in their state. However, the individual scores from the checklist and the state scores will be protected. The data, by the way, is not really valid for subsections of a state because the data sample size is not big enough so it is kind of important probably not to report compliance results by climate zone or by a utility area, for example, if it's a subset of the entire state. We may provide some reporting capabilities so both to the state that are password protected and also some publicly available summarization of some of the data. Things such as total state scores or regional scores, national results, may be provided.

I'd like to take this time also to encourage states. It's quite possible for you to evaluate the checklist yourself and come up with a state score and not share it on this online tool, but we feel that the collection of data at a national level will provide answers to a lot of questions that can't really be answered just at the state level and that the more data collected, the more we'll be able to come up with answers not only about state compliance rates but things such as which building systems overall have the lowest compliance rate. So is it mechanical

systems? Is it lighting? Is it envelope? Which building use pipes have the highest compliance rate and the lowest? Which energy code requirements most often fail and by how much and what's the impact? That type of information could actually feed into training efforts across the country. If there's clearly some code requirements that are failing in a region or even nationally, training should focus on those requirements. Which code requirements almost always comply? If you have 99% compliance across the country of several of the code requirements, maybe it's time that those are considered common practice and then they be removed from the code. And also, what percentage of building compliance is demonstrated under each of the compliance approaches: prescriptive, component tradeoff or performance? That's information that we have anecdotal information on but we really don't have firm data and it is something that's on the top of the checklist by which - - per compliance approach was used for a building and so it would help us to gather that type of information.

So in - - on the checklists, there are unique IDs for each checklist item and that's true across checklists as well so the ID for an item in, for example, 90.1-2007 checklists corresponds to the same ID in the 2009 IECC for commercial buildings, and we're hoping that this will allow us to do just some of that analysis that I just mentioned. For example, take the same code requirement, whether it's in the IECC or 90.1 and be able to evaluate on a larger scale, the compliance of that particular checklist requirement. So that being said, if there are state amendments that states want to make to these checklists, we encourage you to ask the program to assist with that to ensure, for example, that these IDs remain consistent across codes including state amended codes. There are also places on this checklist to collect building values. These can be very important and in some cases states may actually want to transfer those values into compliance

software or even performance software. There's locations for comments and these might actually be useful to the state in the long-term and will also be included in the online tool that we have for data entry.

So given that, I'm going to move on to talk a little bit about annual measurement. So code compliance is not just a one time formal measurement and then you're done. It's really a process and I think Dave mentioned some of this process of rolling the results from measurements into training, into ways to improve compliance and then assessing again. Have we made improvements? Has the training helped? So there are other ways. On years where maybe the state is not engaged in a full blown evaluation, to keep your temperature on code compliance measurement, one option is to do spot checks. Those could even be a predecessor to doing a full blown evaluation or perhaps you've done an evaluation. You found where some of the weaknesses are. You've done some efforts to improve those and you want to just do some spot checks to see if those have improved in those particular jurisdictions or those particular code requirements. You could choose - - a state could choose to evaluate only of the four populations each year. A state could also choose to do a survey of all of their jurisdictions and we are providing a survey tool, which I'll talk about in just a few minutes. The survey is a good mechanism for getting a better understanding of what's going on at the jurisdiction either before or after an evaluation is done there. If surveys are done at all jurisdictions within the state, you can start to get a feel for which jurisdictions are actually inspecting and enforcing the energy code, which are not. The ones that are not, it might be of interest to compare those with jurisdictions that are - - do have a high level of enforcement and see what the resulting differences are. It may be of interest after an evaluation is

done to use surveys to see if any of the processes of the jurisdiction have changed.

So online, we do have a set of recommended survey questions on paper format that the states are welcome to use and to customize for their state. We do also recommend that the survey information, the generic questions that we provide, not be altered a lot because we would also like to collect and compare survey answers across regional and national levels. Over time, a combination of actual evaluation of jurisdictions and surveys taken there can even possibly inform whether or not there is a strong correlation between jurisdictional practices and energy code compliance rates and where that correlation is stronger and where it's weaker.

So also online is available our generic state energy code jurisdictional survey. As mentioned, this can be customized. You can put your state logo in the upper left. You can put a different title. You can create some of your own custom questions. All you need to do is contact the Building Codes Program and we'll help you customize this. The survey itself is sort of broken into three main sections. There's a section about the jurisdiction. A section about the people within the - - the staff within the jurisdiction, their education and training and certification levels and then the processes used in the jurisdiction. Such as how much time is devoted to energy codes, how long the documentation is kept and that type of thing. So the survey... There is a mechanism by which you can create your own custom state survey and then you can email your jurisdictions and provide them a URL where they can go online and complete the survey, and then again, the results from within your state would be made available to the state at any time.

So with that, I'd like to move and pass the baton to Rose who's going to talk about reporting the results of studies.

Rosemarie Bartlett: Thanks, Linda. So we've talked through the process now and all of the recommendations that have been put together by the Building Energy Codes Program. I'm going to spend just a couple of minutes talking about what we need to have happen with all of the results from all of that effort that has been undertaken. So first off, we need to get the data from those evaluation checklists. Linda talked about a few different ways that that information can be collected so we'll need to get the paper forms, the Word files and/or if they've been uploaded into the online tool, a notification that that effort is complete. We also are really interested in getting information and feedback on the tools themselves, the materials that have been provided by Building Energy Codes Program and the evaluator training. We are undergoing a process, with pilot studies in particular, to try to make sure that the materials that we make available to the states on a wide scale that we've accommodated everything that really has happened in the field. We want to know what was good about the materials. What maybe didn't work so well in the field and what would be really helpful is also to know why maybe something was not so good so we can try to rectify that. As the evaluators are working in the field and working with the checklists and the other tools, any recommendations on how to fix anything that's wrong or provide any suggestions for enhancements, that will be greatly appreciated as well. Obviously, we also would like to know any lessons learned from using the materials. If you have anything - - any recommendations, anything that didn't work out so well, any observations that you have on the materials, we need to

collect all of that feedback so we can make the materials the best that they can be.

Another key piece of information that we're very interested in is the length of time. This has come up a couple times already as we've been presenting to you today. How much time did it take to get the needed information for all the applicable types of evaluations to be done? How long did it take you to work with the jurisdictions ahead of time? How long did it take you when you really got onsite? If you're undertaking the jurisdictional survey part that we discussed, how long did it take you to conduct that actual survey? As was mentioned, the jurisdictions are going to be particularly interested in knowing in the future how long their evaluators or their own staff are going to have to be involved in these studies, so we really need to get some good time estimates.

We're also interested in trends. In doing the studies, in using the materials, were there any issues that really stuck out that were repeatedly a problem and any suggestions for how those issues and problems might be addressed? And one example that we thought might come up is perhaps there weren't any load calculations so the mechanical contractors need to be told, "Hey, you have to provide those load calcs so those can be reviewed as part of the compliance studies." And we also want to know any other tools that might have been missing. What else would have helped in the field? So we can use that to potentially develop any new materials or tools. So we're really interested in getting all of that information back and we'll be working with all of the evaluators to try to make the materials the best they can be.

As part of this effort, we're starting with some pilot studies related to the compliance so we can see how these materials are going to work. So we want to be able to measure co-compliance based on the procedures that we've developed, that 74-page document that was mentioned and also the helpful step by step guide that was developed, that's a little shorter, and the tools themselves. So we went through a process to actually develop and select some pilot study states. We submitted a statement of interest, announcement to the states and asked any state that was interested in participating in a pilot study, to respond back to us by April 9th. We then selected a certain number of states to prepare a two to three page write up on what they would undertake in their particular pilot study. Those were due back to us April 23rd and then we worked with the Energy Efficiency Partnerships to select the pilot study states and those were selected on April 29th or 28th.

There are nine pilot study states that I'll talk about in just a minute but what we're hoping to get again, from those pilot studies, those time estimates that I already talked about, if we can get those separated out by the four building populations, that will be even more helpful information for us. Hopefully one thing that will come out of these pilot studies is some initial metrics for the states that are participating, so depending on what population they're looking at, they'll get an idea of what's going on with compliance in their states, those recommended modifications to our materials so we can make sure to make those the best that they can be and lastly, some compliance data. So we hope to see all of those in the pilot studies.

The states that were selected are listed here on the screen. As I mentioned, there are nine in total and each of the pilot studies involve different aspects that

we want to try to learn more about. So for example, in Massachusetts, they're undertaking a residential pilot study. Throughout the rest of them, there's a mix of residential, commercial. We're also looking at renovations for residential and commercial versus new construction, and we've tried to do a good mix across climate zones to have a good representation of that as well. Different aspects will be undertaken in each pilot study in terms of the jurisdictional surveys, the way that they'll report the information and et cetera. So we hope to learn an awful lot from these pilot studies and we will be making available on our Website, energycodes.gov, the information that we learn from these pilot studies.

So we're undertaking those through the Department of Energy's Building Energy Codes Program, but meanwhile, there are other states that are also working on their own compliance measurement activities. So for example, New York, Indiana and New Hampshire are all undertaking their own activities in this area as well. New York has put out an RSP and has selected their contractor and they're underway. Indiana and New Hampshire are just getting underway as well, so we hope to learn what we can from those activities being undertaken in those states so we can share that information as well.

Support that's available through the Building Energy Codes Program. If you have any questions about the pilot studies, you can always send an email to our tech support at becp.pnl.gov, that's our main tech support email. That is monitored constantly by staff at the Building Energy Codes Program so you can always make sure to reach the staff here at - - that way. If there are any contractual issues related to the pilot studies, we have our contracts person, Marley Barrett* who can handles those; and if there are any issues related to the

reporting specifically, you're welcome to address those to me at my email shown on the screen right now.

On our Website, we will be posting the support materials and the information that we learn. We have a lot of materials that are available already at the URL that is shown on the screen. This is the main URL for the efforts that we are undertaking for the 90% compliance so this will take you to our portal page where you can have access to all of the tools that are already available. We're also interested to know whether there's any interest in setting up something like an online forum or some other mechanism that would allow states - - pilot study states and other states and their contractors to interact with each other, so anyone who's involved in undertaking a compliance evaluation at this time, if there's any interest in doing that, we'd love to hear from you so you can send in a question using the question pane and we'll see what kind of response we get and whether setting something like that up would be of value to people.

And lastly, if you want to contact us in general, we've mentioned the Website several times today. That's energycodes.gov. We also have a solutions and help center at the URL that you see here. We have all of our existing training materials that can be accessed through energycodes.gov so if you need some of that background information on the codes in order to think about being an evaluator, for example, you can go out to the Website and go through some of our training materials or if you just want basic information or to keep updated on our activities, you can get that from the Website as well.

So I think with that, it ends our main presentation today. Thank you.

And the Department of Energy would like to thank all of you for your attendance today. Now it's time for the questions. There have been several questions that have come in. If you have a question but haven't submitted it yet, please do so just as quickly as possible. We'll try to get through as many as we can and I think Linda's going to start us off. Linda?

Linda Connell:

Okay. **So one question came in about where the findings will be released and to whom and I believe the question came in prior to the part of the program where we did, I believe, answer that, but I'm just going to repeat.**

For the information we collect on our online tool, the information is - - will be available to the state and to the state contractors. It will be password protected and so it will not be released to the public; however, summaries and - - well summaries of the information will probably be reported. The very lowest level that would be reported would be at the state level. Overall - - an overall metric for the state may be included in a public report. Any of the individual jurisdictional data, any individual building results, none of that will be made public.

The next question I have is to clarify the definition of similar building type if someone is using the multiple building approach where they're using multiple buildings for a single sample. We are defining that as being within the same jurisdiction, being of the same building use type and for commercial buildings which are distributed into size bins, it would be of the same building size. Not exactly square footage but falling within the same bin which is small, medium, large, extra large and extra, extra large. So the building use types, we do in our larger document that's posted on the site, list a couple of the - - we list

both residential and commercial building use types that we recommend. They're pretty standard breakdowns. The residential includes multi-family types.

So the next question, the commercial checklists are currently draft. Is there an estimate when the checklist will be finalized? We consider the checklists that are out there to be final. A few of them may be marked draft, that will be coming off in a new posting we have this week. What, I believe, there's not out there yet is the commercial checklist for the 2009 IECC. Those and they're corresponding instructions will be posted this week in an updated file so if you want to wait until early next week, you should have all the final checklists. We do anticipate getting possibly some feedback from the pilot studies on how the checklists work, if there were any problems people had with it, so there may be minor modifications made to those checklists based on the pilot studies but that would probably at least a half a year or a year down the road. We don't anticipate their functionality changing however.

And another question: **Why wouldn't the rules require data from each new development plus individual buildings in different price categories?** I can say that you cannot cover every new development with a random sample of just 44 buildings, so if there is a new development in a jurisdiction that was pulled in the random sample, for sure you could do a building within that new development. There may be lots of jurisdictions that don't come up in the random sample that have new construction. Certainly it would be a good thing if the Building Department evaluated those for code compliance, but that's a very different evaluation than the one that's done for measuring code compliance in this state. In terms of price categories, we feel that that's fairly covered by the distribution of commercial buildings by size. Obviously, the very large

commercial buildings will be more costly and also by the distribution in building use type.

Another question asks about how you can tell the jurisdiction, how many buildings - - up front, how many buildings will be evaluated within that jurisdiction? We recommend that the sample be generated up front and the state have a pretty good idea of how many buildings they plan to get from each jurisdiction. I would also recommend that when you notify the jurisdiction up front, that you maybe bump that up a little bit to account for the non-response that Eric mentioned is likely to occur in some jurisdictions and in some buildings where you can't get onsite access.

And another question: **What are you going to do in Massachusetts where it has been left to the individual communities as to whether they require compliance with the Green Communities Act?** So in questions like this, also in home rule states where jurisdictions may have different codes on the books, we're recommending for residential that you evaluate against the 2009 IECC. That is what we consider a target code. If the jurisdiction has a above code program, that's fine. They still should have good compliance then with the 2009 or if they haven't gotten there yet, this still may information jurisdictions as to what things they are missing in order to comply with that code.

Eric Makela:

Okay, Linda. I'll take the next question. **If we notify the builder contractor and basically have a good relationship with that jurisdiction and kind of alert them what inspections we're going to be out there looking at, is this going to taint the sample and taint the study?** Not really, no. I mean you're going to have to let them know you're coming anyway. They're going to want to know

what you're - - what phases of construction you're going to be evaluating. A lot of the projects you're going to be looking at are probably going to be already under process anyway prior to getting out there, so once you get the plans and look at the plans and head out onsite, they've already - - will have probably already gone through plan review and into the inspection process so it really shouldn't taint the sample.

Next question: **Are there potential conflicts by using building officials from one authority having jurisdiction in a state to evaluate another?** Essentially now with a lot of layoffs in jurisdictions, there's some very qualified people out there that have experience in plan review and inspection from the jurisdictions that would be really good to get involved in these studies as far as having them going out and evaluating or doing part of the evaluation process within the jurisdiction, so this is part of a job creation bill so it makes sense to pull in people with expertise and if the jurisdiction's either plan review or inspection staff or building officials have this expertise and they are - - have been laid off, it makes sense to pull them on these types of studies and there shouldn't be a potential conflict on that one.

The next question: **It appears your checklist for residential are based on the 2009 IECC.** Yes, they are so it is based on the 2009 IECC and that's part of what the evaluation's about. They're also based on the 2009 IECC commercial and 90.1-2007 for commercial.

Will the commercial training videos be new or are those the one that are already existing out on the Website? The commercial training videos are the ones that are currently existing out on the Website and the short, anywhere from

about 30 second to three minute, videos are tied into the commercial training - - evaluator training session. So they - - yes, they are already out there.

The next question deals with setting up ROPs to be able to contract to potential folks that will - - can do the evaluation and what's kind of the best process? If a state issues an ROP to select an evaluator, should it be set up as a deliverable, number of assessments completed and scored by the building type? The ROPs that we've been reviewing essentially are more of a fixed price and they say you have to review so many buildings and this is the information that you have to collect from those buildings, and it's up to whoever bidding on the - - to do the evaluation to come in within the budget for that particular part of the study so it is fixed price. You - - I guess you could set up something where you did it by the hour, by the - - per each individual inspection but that's typically not the way it's done. It's typically a lump sum and you bid on the number of inspections for that fee, so I will turn it back to Linda for the next question.

Linda Connell:

All right, so someone has asked where do I find the Checklist Store and Score tool? That is the one tool that we have not yet completed so a link to that tool, when it is available, will be on the same Website that we've posted in these slides and we hope to have it out there in time for any state that is starting to do evaluations. I'm guessing that will be New York - - will probably be coming in soonest since they seem to have a head start.

Another question: **Does sample data in the Building Energy Codes Program tool provide only addresses or is there more detailed data?** That tool does not even provide addresses. All it provides is the number of samples

recommended by taken from each county and it does not even drill down to the jurisdictional level so we've left it up to the states to determine what jurisdictions within the counties those samples should come from. So if it says two samples to be taken from county X and if there are more than one jurisdiction in county X, then the state can determine what would maybe be most convenient or have the most construction and want to take those samples from those jurisdictions.

And another question: **Would you suggest that pilot states attempt to avoid selecting interested jurisdictions to avoid potential bias?** No. The point we wanted to make was not to eliminate interested jurisdictions, but just to realize that there will be some jurisdictions that are more willing to help than others and that to the degree possible, you should follow a random sample and include the jurisdictions that come up in the sample and do your best to encourage all of those that you'd like to go evaluate buildings from to participate.

And so we have another question: **How can you evaluate a house to the 2009 IECC when it will be constructed to the 2006?** So a state has several options. Those two codes are very similar in format. It might be possible for us to develop a tool that could actually look at checklist data and come up with a score based on both of these codes; however, the 2009 is the target code and if it's evaluated - - if the code in the jurisdiction is the 2006, obviously you will probably miss some checklist items but you can still get an evaluation of how close those buildings are to the 2009 because let's hope that those jurisdictions will update their code. We do have the unique IDs across the different code checklists so if a state wanted us to develop 2006 IECC checklists, we would consider that and we would want to be involved to ensure that the numbering of the checklist items were comparable across those two codes.

Rosemarie Bartlett: Are there any other questions that Linda or Eric have had come in? All right. I think we actually made it through all the questions then. So we'd like to thank all of you for participating in today's Webcast brought to you by the U.S. Department of Energy. A video of this presentation will be made available on energycodes.gov within the next week if you want to review any information or suggest that anyone else review the information. Thank you again. You may all disconnect.

Please Note: * Proper names/organizations spelling not verified.
[sic] Verbatim, might need confirmation.
- - Indicates hesitation, faltering speech, or stammering.