

Getting Building Codes Right: Implementation and Enforcement

—Transcript of a webinar offered by the Clean Energy Solutions Center on 14 February 2014—
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Webinar Panelists

Jens Laustsen	Technical Director, Global Buildings Performance Network
Ryan Meres	Senior Code Compliance Specialist, Institute for Market Transformation
John Lee	New York City Mayor's Office of Long Term Planning and Sustainability
Hans-Olof Karlsson-Hjorth	Swedish National Board of Housing Building and Plan

This Transcript

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Sean Esterly

Hello everyone, I'm Sean Esterly with the National Renewable Energy Laboratory and welcome to today's webinar which is hosted by the Clean Energy Solutions Center and the Global Buildings Performance Network. Today we are very fortunate to have Ryan Meres, Hans-Olof Karlsson-Hjorth, Jens Laustsen, and John Lee joining us. This great group of panelists will be discussing the Getting Building Codes Right Implementation and Enforcement. One important note of mention before we begin our presentation is that the Clean Energy Solutions Center does not endorse or recommends specific products or services. Information provided in this webinar is featured in the Solutions Center's Resource Library as one of many best practices, resources reviewed, and selected by technical experts.

And, I just want to go over some of the webinar features today, you do have two options for audio, you can either listen through computer or over your telephone. So, if you choose to listen through your computer please select the “mic” and speakers option in the audio pane, by doing that you'll just eliminate the possibility of feedback and echo, and if you select the telephone option to call in today a box on the right side will display the number and audio pin that you should use. Panelists we just ask that you please mute your audio device while you are not presenting, and if anyone has technical difficulties with the webinar you may contact the phone number at the bottom of that slide which is 888-259-3826.

And, now we encourage the audience at any point to submit questions, just feel free to type an entry in the question box which is in the go to webinar pane at any point throughout the webinar and I will present those questions to the panelists at the end. If you're having difficulty viewing the materials through the webinar portal we did post pdf copies of the presentations at the URL posted on that slide and that is cleanenergysolutions.org/training and you can use those to follow along. Also, within the day or two of today's webinar we will post an audio recording to that site.

Now, we do have a great agenda prepared for you today that's going to explore the current barriers towards implementing rigorous enforcement systems for new buildings and present examples of good enforcement, other best practices or measures for supporting implementation, and then lessons learned from implementing many such measures. And, before speakers begin their presentations I just want to go over some short informative overview of the Clean Energy Solutions Center, and then following the presentation, we'll have a question and answer session, and then some closing remarks and a very brief survey.

Now this slide provides a bit of background in terms of how the Solutions Center came to be. The Solutions Center is an initiative of the Clean Energy Ministerial and is supported through a partnership with UN-Energy. It was launched in April 2011 as primarily led by Australia, the U.S., and other CEM partners. So, now comes with this unique partnership includes support of developing countries to enhancement of resources on policies relating to energy access, no cost expert policy assistance, and peer to peer learning and training tool such as the webinar you're attending today.

Now there are four primary goals for the Solutions Center, it serves as a clearinghouse of clean energy policy resources, helps to share policy best practices, data, and analysis tools specific to clean energy policies and programs. The Solutions Center delivers dynamic services that enables expert assistance learning and peer to peer sharing of experiences, and then lastly the center fosters dialogue in emerging policy issues and innovation around the globe. So, our primary audience for this is the Energy Policy makers and analysts from governments and technical organizations in all countries but then the Solutions Center also tries to engage with the private sector, NGO's, and civil society.

In this slide, highlights are Ask an Expert feature that Solutions Center offers. So, Ask an Expert is a great service offered through the Solutions Center at zero cost. So we've established a broad team of over 30 experts from around the globe who are available to provide remote policy advice and analysis to all countries. So, for example in the area of Energy Efficiency in Buildings we are very pleased to have Caesar Travinia, the leader of the Mexico Green Building Council serving as our expert. So, if you ever need policy assistance on energy efficiency in building or any

other clean energy sector we do encourage you to use this useful service which again is provided free of charge. So, to request assistance you simply submit your request by registering to our Ask An Expert feature at cleanenergysolutions.org/expert. We also invite you to spread the word of the service those in your networks and organizations that may be interested. So, in summary we encourage you to explore and take advantage of the Solutions Center resources and services including the Expert Policy Assistance, subscribe to our newsletter, and participate in webinars like these.

And, now I'd like to provide some brief introductions for our panelists today. The first panelist that we'll be hearing from is Jens Laustsen, the Technical Director of the Global Buildings Performance Network, and then following Jens we will hear from Ryan Meres a Senior Code Compliance Specialist with the Institute for Market Transformation where he works with state and local government to improve compliance with Building Energy Codes, he also works on the development of code change proposals to improve the understanding of the application of the International Energy Conservation Code to renovations. And then, following Ryan we will hear from John Lee. John is the deputy director for Green Buildings and Energy Efficiency at the New York City Mayor's Office of Long Term Planning and Sustainability. In this capacity he is leading the city's policy and legislative efforts driving the build environment to unprecedented energy efficiency standards. And then, our final speaker today is Hans-Olof Karlsson-Hjorth of the Swedish National Board of Housing Building and Plan. Hans is head of the unit for the Sustainable Buildings and Construction [inaudible][0:06:26]. And so, with those brief introductions please join me in welcoming Jens to the webinar.

Jens Laustsen

Sorry, I needed to get the microphone back on. As said, I'm Jens Laustsen, I'm the Technical Director of the Global Buildings Performance Network, I sit here in Paris, it's a pleasure for me to welcome you all to this webinar, we have been working with building codes for nearly two years and as part of this we have been scoring some of the best building codes against each other and try to come up with building codes that really drive the building consumption towards a zero one or at least bring it very, very close to a zero bring it significantly down, but all of these measures are nothing worth if the building code just stays as prettiest paper in the world, then needs to have both implementation and enforcement, so therefore we saved one of the best parts to this last webinar.

Let me dive into it. What is the idea of getting building codes right? We would like to use these webinars to share best practice experience on how to do things, it's as practical and as much about development and implementation of state of the art building codes as possible. We try to bring some of the best experts together to tell you about their experience by developing building code, and as we heard already in two previous webinars this is a difficult task and there is a lot of stakeholders, and if we don't get them all in dialogue as it's shown on this slide then it's difficult

to get it right. We started out this series with discussing the importance of having targets and frequently revisions of building codes, so it's not just about establishing a very good building code and then we are safe for many years, no you need to drive it forward and as innovation go forward we need to implement this and get better and better building codes.

All of our 25 building codes have very good elements of this type built in. The second one is when you come close to a zero or you want to work towards a zero you need to go to performance in the end. You cannot continue just tightening the individual elements in your building code but at a certain point you need to look at the building as a machine, try to look at how can we really drive the last bites of the energy consumption down so that we—in maybe end with our zero positive energy. Again we found a lot of very good experience from our 25 building codes and we presented some of it in the last webinar. The last one where we look at enforcement and learning from the best practice experience in trying to set-up regimes like this, trying to control that people actually follow the building codes and see how this really comes from the paper out in the real world. That we found out in the process of looking at building codes, this is actually one of the most tricky and most challenging parts of building codes. It's where you have to work with communities, you have to work with citizens, you have to work with media, you have to work with everybody to get this in place, and you need to do training and many other things. We put the webinars online on our website and you can download them, and we're working at making short extractions so it becomes easier to get the bytes that you really want. We also expect to do more of this in paper versions so that you can download a small paper trying to summarize both what we learned in the study before but also what we learned from these webinars.

As I said we have the most challenging task when we started to compare how well these codes implemented. When we look at some of the other elements we got scores on ten and nine, and if not so good the best were at eight, but when we looked at the performance we came to the conclusion that all the countries have a lot to learn in particular this field. One of the elements that we found was often missing was the focus on this problem. So, when we ask your [inaudible][0:11:38] do you have an evaluation on the implementation of your building. How many percent of the new buildings are actually fulfilling the requirements in the building code, it was very weak what we got back, and especially when we say are those sources independent or is it just people telling we think the building codes are working very well. So, therefore we came out with relatively poor scorings in the implementation. We also here I stress it by putting the three elements of implementation next to each other so there is the implementation and enforcement of the standard itself, there is certification, and the last one is the policy packages which is supporting building codes.

When we look first at the enforcement standards that's where we scored quite bad in all jurisdictions and only Sweden came above the five which is the medial score that was possible. We come back to these examples and we hope to hear more about these kind challenges and why it's not so well evaluated. Certification was a place where we found more and where some countries do relatively fine, and again we found there were still missing some elements in doing the right policy package to drive your building code so that we get better and better performance and better and better building codes.

The—a special challenge which we try to look at and we hope to illustrate a bit more here today was when you go from prescriptive building codes and you go to more performance based building codes in your revision cycles, what are the lessons and what is new in implementation of a more performance based building codes which is maybe more complex. We looked at how these changes are reflected in the regimes work, the models I used for enforcement what finance mechanisms could drive this, what about training, education, awareness, and what about the final question does this really give savings in the buildings in the end, [inaudible][0:14:08] consumption also going down. It was a question we looked into but it was very difficult to come up with the true story about this.

We still see building codes as a very, very important part of building policies for new buildings, and but it has to be a mix of sticks, carrots, and tambourines we used to say. So, the minimum requirements are the stick that we try to apply on people, you have to do this otherwise we come after you, and the next one is the carrots the benefits that you get out of the building code, the finance assistance, the subsidy, and finally the tambourines where we give the message this is a good idea for you, for the planet, for the people living in the building, and everybody. So, we try to come around this kind of elements also when we talk about building codes. I hope all of the speakers here will stick with idea of talking about how to implement building code and enforce them, and how you have been either successful or challenged in this process and what can we learn from it. I think that was what I would bring here, I hope to come back in the end with a very few concluding words, but otherwise I would leave the screens with true experts, people who work with this in their daily work. The first one I would hand over to is Ryan Meres from the Institute for Market Transformation in the U.S.

Ryan Meres

Yes good morning everyone, I'm loading up my presentation here and I'll get started. So, thanks Jens, that's a great introduction to the webinar series and what we're trying to do in terms of addressing the enforcement issue and how to implement energy codes. So, my presentation today is going to look at a U.S. perspective on what we're trying to do for building energy codes enforcement. First a quick overview before I dive into the enforcement issue I'm going to look at—do a quick overview on how codes are developed and adopted in the U.S. it's important to give the

context of development and adoption in order to really understand why enforcement is an issue here and is one that we're trying to tackle and believe that there are significant energy savings from that. So, then I'll address some of the barriers that I come across in terms of enforcing the code, and then provide some solutions as I see them.

So, first of all for development of energy codes in the U.S. it's important to note that the U.S. does not have a mandatory national energy code. The U.S. has what I refer to as model codes, and model codes are developed by two non-governmental organizations, one is ASHRAE and they develop standard 90.1, and also ICC or the International Code Council and they develop the International Energy Conservation Code and each of those are on a three year development cycle, so the new codes are published every three years, and the process is open to all interested parties which is why it often becomes quite complex and tedious because anyone can provide input into the development of the codes and ultimately governmental building officials are who vote for the final version of the code.

When it comes to adoption of energy codes in the U.S. it's largely a state level activity, there are a few exceptions where local jurisdictions, cities and counties are responsible for adopting a code and not the state, and often when the state adopts codes they will make amendments, they like to change the code up to be specific to construction practices within their state, the map here is put out by the Building Codes Assistance Project and it basically covers the—what level of energy code each state has for all the 50 states in the U.S.

So, now we dive into the enforcement side of things. Enforcement within the U.S. is largely a local or a city or a county level responsibility, compliance is most commonly verified by local government officials, they do this by conducting a review of constructions plans and also conducting onsite inspections to verify compliance. Now, that's really where the issues come in, I show an example here of New York state, and this a map of each of the counties in New York state, and then the image to the right shows Orange County which is one county within the state, and in Orange County alone there's 44 cities and towns, and each of those cities and towns has the authority to enforce a building code, to enforce the safe building code. So, that's where you start to see that there are—the reason that enforcement has not been addressed and is often shied away from because it's a very difficult issue to tackle. Across the entire U.S. there's over 3,000 counties and then there's over 30,000 local jurisdictions which includes cities and towns and villages. So, there's a significant need for outreach to a very, very large audience of building officials who ultimately enforce the codes in every single city and town across the U.S.

So, of course the reason that we're interested in this a—there's energy savings potential from good energy code enforcement, even the best code on paper really doesn't mean much until it gets adopted and then enforced effectively, so this map here is actually from the IMT website, there's a

link at the bottom of the page that has the full report, basically in—last year IMT did a study of all 50 states to determine what the energy savings potential was, and we didn't look at it as a—~~from a baseline of the current code, we looked at it from if the state enforced the code that their under now, if they did it to—if they improved their compliance rate by 25% what would the savings be, and if they improved it by 75% what would the savings be.~~ So, that gives an idea at the top which I site 37.1 billion dollars in lifetime savings for just five years of bringing construction into full compliance with the energy codes that are in place now.

So, next we start to look at the barriers. So, obviously there's a lot of barriers that exist when it comes to enforcing the energy code. I think the one—the most common I think the universal barrier regardless of country is really the lack of knowledge of the code and inadequate training provided to bring both code officials and also design professionals up to speed on what the energy code is with you know, of revision cycle of every three years and there are some states who will adopt every three years, it's often a big task for code officials and design professionals and builders to get up to speed on what the current code is.

Next is inadequate funding. I think this is also a significant problem, but it's not one that cannot be overcome, the next one lack of political will is definitely a major issue that we come across here in the U.S. and sometimes it can be tough to overcome lack of political will, you know, global warming and climate change has become a very political issue here in the U.S. and a very polarizing one and so unfortunately energy efficiency and energy code lumped in with that, and often there's not political will to really enforce the energy code. And then, various paths for compliance, now this is—having multiple paths for demonstrating compliance, it can be a barrier but I would—it could also be lumped in with lack of knowledge and training which is frequently is, you have a prescriptive path where you can simply follow what the code says and specify that on your plans or performance path where you're actually conducting an energy model to demonstrate compliance. And then, the third one is outcome based compliance path and this is not yet in the model codes, it is being proposed but this is—an outcome based path is one that will look specifically at measured performance, so after the building is constructed have you met the target that the code has set in place and therefore demonstrate compliance after the building has been occupied. And then, the last one is not knowing what compliance issues exist, this is one that we're coming across more and more frequently in that building officials they just don't really know where to start in terms of addressing issues because they don't know what issues they have within their jurisdiction.

So, that brings us to our first solutions slide and the—one of the biggest recommendations that I make is to conduct an assessment. You really need to determine what is broke in order to know how to fix it, and when it comes to an assessment for building energy codes there's really two areas,

and one is a quantitative assessment. This is kind of a—this is one that allows you to compare you know, what your compliance number is versus other jurisdictions, it really is a—it involves reviewing plans, doing onsite inspections, and just checking for what has been submitted and what code violations are observed onsite versus what the code requirement is. So, that gives you a number that says you have an 80% or a 50% compliance rate, and that's really just an estimated number but it gives you an idea of where you are and where you need to go.

The second one which is really more in depth is a qualitative assessment and that uncovers the reason of why? So, for example there maybe there's a lack of documentation, maybe design professionals were not required to submit the appropriate documentation on their plans that shows they're in compliance. It could be a lack of knowledge from the design professionals or from building officials, or it could be a poor process, or it could be political priorities that are uncovered that is the reason for non-compliance. So, quantitative really gets to the number but the qualitative side really gets at why those things are happening, why the compliance level is where it is.

So, then you need to develop a plan, you use the assessment as a means to see where the issues lie in order to develop a plan to improve that, so that—you want to address both the quantitative issues so if you observed within your assessment that fenestration or insulation is the most commonly cited violation you want to focus some training efforts for industry and also for your code officials on how to address that, what the code requirements are and what they should be looking for, but you should also draw from established best practices and I show down here there's five images of case studies, these are covers of case studies that I've done over the past two years that really pull out what we've seen across the U.S. as best practice examples of how to implement and enforce the energy code, and they kind of range in topics from how to use third parties for plan review, how to use design professionals, how to make design professionals more accountable when it comes to code compliance especially energy code compliance, and it also looks at local government processes, often local governments in the U.S. and especially building departments, they're underfunded and they frequently don't have you know, the most recent advances in technology to allow them to do things more efficiently, so that looks at some technological innovations that will improve the compliance process and thereby making code officials and building departments more efficient so that they can then take on the task of enforcing the energy code more effectively.

Now, I'll go into one example of the case studies and this is the—the example here is from the State of Georgia. State of Georgia implements it a state level requirement for duct and envelope leakage testing for all residential construction of three stories or less. It's required that the testing be done by someone who's certified, it does not specifically have to be a third party individual, a builder could get certified and conduct their own

testing, and of course that would be verified by the local code official, but it would allow the builder to test their own homes as well as mechanical contractors in testing duct work, but the state developed a one day training program that would allow individuals to get certified while at the same time they recognize that the common industry certifications could be accepted as well so this—in the U.S. that's the home energy rating system, the Building Performance Institute Building Analyst Certification, those are industry certifications that already exist that they recognize as individuals who can also perform this testing. And, what it really does—the barrier that this addresses is a lack of resources for code officials in being able to do this so their program actually relieves local code officials of having to do the testing themselves. So, you know, obviously when it comes to energy code enforcement it's really rubber hits the road, it's really where the savings from the code that you've developed and got adopted are realized, and so as I close out here, here's my contact information, please stay in touch if you have questions on energy code enforcement in the U.S., my email is there as well as the IMT website, and all of the resources that I've shown here are available on the IMT website. So, now I'm going to turn it over to John Lee from New York City, he's going to give you their local perspective on their energy code enforcement.

John Lee Thank you Ryan. Can I confirm from Sean that are you able to see my screen?

Sean Esterly Yup, I see you, I see your screen and hear you just fine.

John Lee Great, thank you, thank you very much Sean. And, my name is John Lee, I'm with the New York City Mayor's Office and I will be speaking to the enforcement program thus put together at the Department of Buildings, pertaining to the New York City Energy Conservation Construction Code. At first I wanted to go through just some background on the enforcement regime in New York City as it pertains to codes and this first slide is partly to impress you out there in the audience that we are a city of nearly 8.3 million people and within New York City close to one million buildings and the permit activity that is generated that the construction—is generated through construction is estimated to be somewhere to the order of ten million dollars a year, and in order to address code compliance in general I'm not talking about just the energy code but the construction Code, and the mechanical and plumbing codes, and few gas codes that accompany it, the Department of Buildings employs over a thousand persons of which there are over 300 inspectors and almost 200 plan examiners that are distributed over several department offices and their primarily head quarter within each of the five boroughs that comprise New York City. You'll see that in 2011 nearly half a million plan reviews were conducted and total about 143,000 work permits were issued, and this work permit application does generate a revenue source for the Department of Buildings in the fiscal year of 2011 generated about \$165 million in revenues, much of this was allocated towards the salaries of the

personnel that went into conducting the plan examination and the inspections accompany those permits. These nearly—over 1,000 employees covering 144,000 work permits ever issued what seems like a small standing army is actually inadequate in order to address the entire permit volume comes into New York City and to that extent much of the compliance is deferred to the likes of professional you know program that we called professional certification by which licensed engineer or a licensed architect [inaudible][0:32:43] plan and attest to their full code compliance and be issued a permit based on their license. Those permit applications are then subject to a randomly selected enforcement audit and the Department of Buildings maintains a 20% random selection rate on which then applicants are pulled, and if there's found to be not in compliance issues that would warrant amendment to the plans then the department has the authority to place a stop work order on the permit until the compliance issues have been resolved. This also gives the mechanism to the department as a disciplinary action to go after someone's filing privileges with the department again based on their license for those the worst factors with the required the most deep punitive measure.

One thing that I would also add before I leave the slide is I wanted to show on the upper right hand side of the slide is the permit volume for Manhattan and then below that is Brooklyn, and Manhattan and Brooklyn being the two largest boroughs in terms of construction activity in New York City please note first that the Y-axis scale on their slightly different. So, I just wanted to point out there's a distinction made on this slide between what's called an NB Alt 1 versus Alt 2 and Alt 3, and that's just describing the kinds of permits that are issued by the Department of Buildings. NB refers to new building, Alt 1 is a significant alteration that changes the use of the building, and then Alt 2 and 3 are the more minor alterations that would typically be—considered a renovation repair. This is actually a fairly crude way to describe a very nuance picture, within this universe of Alt 2 and 3 it can be as significant as the you know, full apartment renovation which is considered an alteration or even just a swap of a sprinkler's fire pump would be considered a minor alteration too, and then within New York City even though there may be an over arch in a new building with permit that is pulled the regime allows for permit any construction job to be chopped up into multiple permits across all discipline. So, any given jobsite may have a dozen, two dozen different permits pulled for, for that job related to their separate disciplines again around construction activity again they could be carved up in many different ways and also mechanical systems, electrical and plumbing systems could be permitted separately.

Within New York City there is a large degree of local jurisdictional control over the building codes, earlier in Ryan's presentation he showed the county-by-county break up of New York City which is subject to the New York State Construction Codes. However in New York City and this is part of the executive law in New York State this city of New York is

allowed to legislate their own building codes and take enforcement action independent of the rest of New York State. The way that it works around energy codes is slightly different and I won't get too deep into nuance but just to say that there is an overarching in the New York State Energy Conservation Construction Code and in 2009 New York City legislated its own New York City Energy Conservation Code which is based on the background New York State Code, again this is also based on the International Code Council's model on energy conservation code, and what this did which was the most important thing that happened in 2009 was under the state code that was in effect at that time there was a so called... [Gap in audio].

Hans-Olof Kon-Hjorth Give you over a building project is that the developer has got an idea and starts to design, and he notices that the municipality building board about the project and then the municipality invites the developer to a technical consultation where the developer presents the project, and together the building board and the developer takes—and makes a control plan what is agreed on, and the control responsible person is presented by the developer and the building board has to approved this person to be the control responsible, and the—at this stage a restoring permission is given by the building board. During the erecting phase the control responsible performs controls decided in the control plan, and for the energy control there are two different phases. First, you can tell the developer to order control responsible to do control of calculated values during the project, as the project proceeds, and then there is a second phase and that is the control of the measured values that are measured during the second season of use and the building board can—depending on how well known and competence of the organization of the developer, the building board decides whether or which of these methods that are appropriate to apply on the certain project, and when—if they are told to make the both checks, when it differs between the two methods, the second method the control of the measured values is the reference method, so that makes the developer to develop projects that are—has got a safety marginal and so far in Sweden we have the country divided in three climatic zones. We are starting to change that but so far we use the three zones, and the safety margin in these zones is [inaudible][0:40:45] country stretching from the South to the North. The zones are divided so there are about three similar sized areas, and if you're looking at the buildings built in one of those zones you see in the North in the coldest part of the zone the building—the safety marginal is about 10% and in the South part of the climate zone it's between 35 or 40% better than the building code.

During the using phase the—or when the building is finished the building board gives the developer a permit which is a must to be allowed to use the building but when it comes to energy and radon the permit is just an interim permit. For radon it's because in Sweden you have to measure radon during the heating season and if the building is finished in the summer you can't present a radon measurement, and the energy because of the second point

of the compliance control plan, and sanctions not doing this could be used by the building board is that the owner can't be told not to be allowed to use the building or they can get an injunction of correction, or when it's very bad, perhaps not when it comes to energy but to other requirements such as strength and so of the building, it could be an injunction of demolition, and to correct this there could be a fine deemed, and as the national board has nothing to do with this process with the control responsible and the developer and the building board, we have some years ago according to the energy performance of buildings directive, started to do some energy certificates that went enforced in the beginning of 2007. This building certificates is to be presented according to the period measured in the points of the control plan, so this too loss or they are strengthening each other. Why we have not chose to use measured values, well, before 2006 we had a calculated values to show the energy use, and then we found out when checking out it could be projects that differed up to 250% of the calculated values, and since we changed from calculated to measured values we have seen a decree in the energy use in this certification register since this control system went into force.

This—when it takes part of the control system the municipality chooses within the two ways of handling the compliance checks in the control plan but the energy certificate always has to be made. The role of the National Board of Housing, Building, and Planning is that we have what the checking if the certificates are made. The effect of these when we are following the energy statistics in National Energy Certificate Register we can see a trend of lower energy use in buildings erected off the operational ratings compliance checks was introduced in 2006. There has been some difficulties since the municipalities once in a while doesn't choose any of the methods and that before 2012 the municipalities had the supervision of the energy certificates, it wasn't always checked as it should have been, and in some cases the building is sold before it is ready and then there is a demand that you should have an energy certificate already when you sell it, and then you can only make the compliance check out of this energy certificate that is only calculated, so there's some problems. This was my presentation.

Sean Esterly

Great, thank you very much, and thank you to the rest of presenters for the wonderful presentations today. We do at this point we have quite a few questions from the audience so we move on to those and address those, and I just like to remind the audience that if they do have any questions please submit them through the questions bar or pane and they go to webinar's box there on your screen. And so, the way we will do the question and answer question is I will read out the questions that I have received, if some of these are addressed to specific panelists but if they are not then feel free to just un mute yourself and address the question.

And so, the first one that I received today just asked so with building codes, if they—this was during the first presentation during Ryan they

were asking, "If the building codes are not mandatory how would they be enforced if they are voluntary."

Ryan Meres Yeah, okay, this is Ryan I'll take that, good question. So, they're not—the building codes are not mandatory at the national level, they—when a state adopts a code it then becomes mandatory with a state or local jurisdiction being a city or a county then it becomes mandatory. I just wanted to make the point that at the national level there is not a mandatory code, there's only model codes which the states then adopt as mandatory.

Sean Esterly Great, thank you, and Ryan this next one's for you too. They were wondering where the case studies that you were referencing can be found or if they are available.

Ryan Meres Yes, they're all available, you can go to imt.org and you'll find them under the codes tab there.

Sean Esterly Great, and I'll send out that link as well, that was imt.org.

Ryan Meres Yeah, imt.org.

Sean Esterly And, the next question we have is "Does the energy inspections and analysis do they have to be completed by an external resource or can it be done by a qualified building and housing resource?"

Ryan Meres You want me to take that?

Sean Esterly Sure.

Sean Esterly Okay, I'll do quick—it terms of the—this is Ryan—in terms of my presentation when it came to the actual assessments, so they can be done internally or by a third party, a consultant that's brought in, but it's really up to the jurisdiction that is conducting it.

Sean Esterly Great, thank you.

Hans-Olof Karlsson-Hjorth [inaudible][0:50:04] from Sweden, the assessors of the certification system has so far has been mandatory too belong to an accredited company which—and there is three different types of accreditation where one of them are that you can be a part of the company but then you have to be in a well divided part of the company so they don't—they're not allowed to work within the same part of the company that is erecting the building but normally it is done by a third party.

Sean Esterly Great, thank you, and the next question we have states "In New York City and other cities, is there any effort to verify energy models beyond looking at the proposed energy cost compared to the budget?"

John Lee This is John Lee from New York City. Yes, that is part of the verification process that the new plan examiners will be conducting that along with the

energy cost budget model form that is submitted, they also have to—if they are picked up for audit or as part of a prior to approval plan examination, they would have to demonstrate the correlation between their energy model and put it into the energy cost budget to confirm the validity of the model.

Sean Esterly Great, thank, and we have two questions that are in regards to the [inaudible][0:51:57] program, the first is "Is there a system in place to check the compliance rates in New York or the U.S. in general as part of [inaudible][0:52:09]?", and the second part of that question is "Is there any information on the progress achieved by the [inaudible][0:52:17] program, has it made a significant impact on code compliance?"

John Lee I guess, again this is John Lee, and I guess that this question is directed towards me since I'm the one that brought it up, but I would say and I apologize for this been very bureaucratic but I can't really comment on that because it's not part of the city's obligation here at this point, again this is something that's deferred to the state and while we the activity that we are doing for compliance will ultimately feed into the state's program to demonstrate their compliance with 90% we are under no obligation the city to implement or develop plan so again I apologize for the bureaucratic answer, but I would rather defer to other experts to answer that question.

Ryan Meres Yeah, this is Ryan, I can take that one, I can give the non-bureaucratic answer to that. So, the Department of Energy did a series of pilot studies a couple of years ago to come up with a methodology for conducting compliance assessments. They more or less expect the states to then take that methodology or some version thereof and conduct their own assessments, however there is no—currently there's no funding dedicated to the states to be able to do that, it's the responsibility of the states to take on that obligation of conducting their own assessments and then reporting their results to the Department of Energy.

Sean Esterly And, the next question is for Hans-Olof, and the question is "How frequently are fines imposed for non-compliance?"

Hans-Olof Karlsson-Hjorth Well, I don't have the figure of that because that is within the municipalities, but since we last year took over the checking of the energy certificates we have been sending out a lot of letters to building owners that hasn't done their homework so to say. We have a possibility to force them to make energy certifications and that is within the whole system of energy certification, so could also been other buildings that is within the system so I don't have the figure yet, but we are so far we have I think sent out letters to owners of about 10,000 buildings to do energy certification so... this register of ours will or are going to plan a cooperation with the Society of Municipalities to do some work to make it easier for the municipalities to use our certification register, to go in and check, so if they tell us that there is a new building built we well we can get that also from the land survey authority, and then we can tell the

building owner to make a new building certificate and the municipality can force them to do it when they're fined and so on.

Sean Esterly Great, thank you Hans-Olof, and the next questions brings us back to the New York City and it asks "What is New York City's definition of an alteration type 1, is it based on value or on the area affected by the works, and is it similar to the EU definition of major renovation?"

John Lee I would then characterize that definition as being similar to anyone else's it's fairly nuance, the—I guess the – easiest way to describe it, is that the alteration type 1 is a significant alteration that among the changes the use of the building and I would help caveat also what is described as an alteration type 2 which can also be a major alteration but is not affecting the main use of the building. So, again I will not align it with other jurisdictions, definitions, it just sort of ease of during this high level metrics and also try to describe the universe that's in New York City, I'm free of distinction along these lines but I would emphasize that you have to take into consideration that these aren't very neat definitions and the most clearer distinction being that change of use between an Alt 1 and an Alt 2.

Sean Esterly Alright, thank you, and another question for the New York City and they asked "Could you speak about how this Building Department enforces energy code violations, is it through stop work orders, fines, or otherwise, and also do they have any energy code item that have to be verified post certificate of occupancy?"

John Lee With the scheme that's in place for the new building and alteration type 1 applications they are subject to the energy code review, they cannot pull a permit until they demonstrate full compliance on their constructions drawings with the energy code, it is only then that they get the permit. For all other jobs, they are subject to a random selection audit, in many cases the permit has already been issued but through the enforcement audit, if they are found that they are not compliance issues have need for the drawings to be amended and the scope of work possibly amended then the department can issue a stop work order on the permit until the objections have been resolved. In terms of the inspections there is a prior to close out progress inspections requirements if any of the inspection items have either been unfulfilled or failed and were not corrected then the applicant would have to submit that final progress inspections report and which means that the permit would not be closed out which technically means that the certificate of occupancy will not be issued. Those are the major actions that the Department of Buildings can take in terms of how it will affect the progress of the permit.

Sean Esterly Great thanks, back to Hans-Olof for this question "How are the operational energy targets in Sweden developed for complex commercial buildings?"

Hans-Olof Karlsson-Hjorth Well, so far until this—until the next alteration of building codes, we have only so far worked with residential and non-residential building codes and also we have difference between electrical heated and not electrical heated buildings, but if the building has got different types of well a mix of non-residential and residential it's divided into the area of the sort of a well you have—the part of the where the dwelling has to comply to the dwelling code and the part with non-residentials has to comply with that part, and it sort of a mixed...

Sean Esterly Thank you Hans-Olof, and the next question is to any panelist and it is "Financing is always an issue with increasing training or improving other methods to achieve better code compliance, how do you see ways of tackling this issue?"

Ryan Meres This is Ryan, I guess I'll take a stab at that one, I'm not sure if I follow the question completely but I think it's in reference to funding for code compliance initiatives and one of the case studies that I did is on streamlining and that's probably the one that addresses the—it certainly addresses the issue from the local jurisdiction's standpoint and that it essentially puts out their solutions and methods of the local building departments can follow in order to streamline their processes and which almost always will lead to them being able to do things more quickly and efficiently, and therefore allowing them time to focus on the energy code, and that's without specifically allocating funding for it as often times you know, trying to implement a new fee or raise permit fees it becomes a very political issue and so this is a way to be able to get compliance without specifically having to raise fees or try to bring on other staff in order to do that.

Jens Laustsen This is Jens. I would like...

Sean Esterly Let's go with Jens first and then we'll go on to other panelist.

Jens Laustsen Was it to me? I am—I would like to tip in that there is a couple of places where we have seen that you pay a fee for the building permit and this way you pay for some of the control or as the case I guess we were to tip in on this one too that you request a certification which is made by an independent consultant and you have to pay for him to submit this certificate for the community so that they can check whether you fulfill the requirement or not, and if the price for a thing like that is a couple of hundred Euros or a couple of hundred U.S. dollars it's a very little price compared to the construction cost just over one family house which might be half a million or even more, so it's not a very big amount that you need to claim from those people, and then at least the City Hall doesn't have an excuse not to enforce the building code because they get money to do it, so that's one possibility.

Hans-Olof Karlsson-Hjorth Hans-Olof here, well in Sweden the developer has to according to the law has to know how about buildings and so on, but the municipality

judges the organization around the developer to see if it's good enough so to say, and if they find that the organization around the developer hasn't got the skills of energy for example shown in their background papers and so on, they can tell the developer to hire an energy expert that is certified, and it's the same kind of energy expert that can make but not this— couldn't be the same one but same type of energy expert doing the certificate of the building later on, so if the developer hasn't got an energy expert in his organization they have to hire one certified to be able to, and then there is the certified control responsible to check the project during the time of the project.

Sean Esterly

Thank you Hans-Olof and Jens. We have time for one more quick question has everyone I believe applies to everyone if you could just maybe 20 seconds providing an answer to this it would be great, the question is are there additional references, studies or studies for enforcement procedures, pamphlets, things like that, any resources that our audience could use to find out more about any aspects of this. And, we can go right in order with Ryan first if you have some additional references or studies for the audience.

Ryan Meres

I'm not going to name a specific one but I'll bring up a resource and it's energycodesocean.org and that is a website run by the Building Codes Assistance Project and they have a compliance portal on there which has a wide variety of ways to improve compliance.

Sean Esterly

And, John or Hans-Olof if you have an answer?

John Lee

This John Lee from New York City, I would point to the New York City Department of Buildings website which is at www.nyc.gov/buildings and there's an entire page devoted to energy code guidelines and what I would like to say is that [inaudible][1:08:20] gave us pretty high level but you know, when it comes down to the very nuance and detailed definitions and methods by which specific items would be regulated, they are laid out much more excruciating detail on the Department of Buildings website through a number of bulletins which describe procedures and policies that aren't clearly addressed by the codes as well as general guidance on how to conform to the New York City regime.

Hans-Olof Karlsson-Hjorth

And, Hans-Olof here, and I can give one link as well and that is to the implementation the energy performance of buildings directive, a booklet featuring country reports from 2012 with the different countries involved in the concerted action for energy performance buildings directive and that is www.epbd-ca.eu where I think you can find this booklet describing the different countries of Europe and all the different parts of the energy work according to the energy performance of buildings directive where there are demands for the level of the building codes and the certification of the buildings and so on.

Sean Esterly

Thank you, and now real quick we're going to go back over to Jens who wants to make some closing remarks before we finish up and I'll just ask the audience to stick around also we have a very brief survey that we'll do after that.

Jens Laustsen

Thank you, I already mentioned the paper too made by the World Bank called Mainstreaming Building Energy Efficiency Codes in Developing Countries which is made by Feng Liu, Anke Meyer, and John Hogan and so there might be known to you, anyway, I would also thank everybody who have participated in this webinars and who have helped us to scope up new material discussions on how to implement good building codes, and we thank all the speakers it was our aim to get people those everyday heroes who have been developing building codes and trying to implement them and very often they are not getting well treated for that and they never get an award or anything like that, they work in silence and this was an idea of having some of them to tell about their experiences which other people could learn a lot from and we have learned a lot ourselves we mentioned this, and especially need my [inaudible][1:11:28] been putting these webinars together and done the work with comparison talking with the speakers and all of these things. So, I hope it has been useful for all of you and we would like to come back soon, maybe we will focus next time on renovation policies but we could definitely also in the future come back with something about building codes and maybe in hot and humid climates where it's a different task again. So, I hope you've got something out of these webinars, we definitely did, and we hope to see you back in webinars again in the future, thank you.

Sean Esterly

Thank you Jens, and now we just ask the audience to answer three quick survey questions that we have that just help us improve the webinar and get some feedback, Marina if you could show that first question please. And, the question is the webinar content provided me with useful information and insight. And, the next question, the webinars presenters were effective. And, then the final question, is overall the webinar met my expectations. Great, thank you very much for answering on our survey and on behalf of the Clean Energy Solutions Center I just like to thank the panelists and attendees for participating in today's webinar. Please go out to the cleanenergysolutionscenter.org training page over the next few days if you'd like to listen to an audio recording on today's webinar and view the slides they are posted beside they're posted up there right now, the audio recording will take a few days to get up there, and feel free to share this information with those in your networks and organizations, so thank you and this concludes our webinar.