

# Locking in Energy Savings through Building Codes

—Transcript of a webinar offered by the Clean Energy Solutions Center on 10 July 2019—  
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## Webinar Panelists

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**Kamyria Coney** Hello everyone. I'm Kamyria Coney. And welcome to today's webinar which is hosted by the Clean Energy Solutions Center in partnership with the Building Efficiency Accelerator BEA partnership, the Pacific Northwest National Laboratory, the Columbia Green Council and the World Resources Institute. Today's webinar is focused on locking in energy savings through building codes.

Before we begin, I'll quickly go over some of the webinar features. For audio you have two options. You may either listen through your computer or over your telephone. If you choose to listen through your computer, please select the mic and speakers option in the audio pane. Doing so will eliminate the possibility of feedback and echo. If you choose to dial in by phone, please select the telephone option and a box on the right side will display the phone number and audio pin you should use to dial in. If anyone is having technical difficulties with this webinar you may contact the Go to Webinar's help desk at 888-259-3826 for assistance.

If you would like to ask a question, we ask that you use the questions pane where you may type your question. The audio recording and presentations will be posted to the Solutions Center's training page within a few days of this broadcast and it will be added to the [Solutions Center's YouTube channel](#) where you'll be able to find other informative webinars as well as video interviews with thought leaders on clean energy policy topics. Finally one important note of mention before we begin our presentations. The Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions

Center's resource library as one of many best practice resources reviewed and selected by technical experts.

Today's webinar agenda is centered around the presentations from my guest panelists Sha Yu and Meredydd Evans who have joined us to discuss an opportunity to learn about the experience with building energy codes in the building efficiency accelerator, BEA, as well as a new playbook the BEA has developed for countries on how to get started on building energy codes. Before we jump into the presentations, I will provide a quick overview of the Clean Energy Solutions Center. Then following the panelists' presentations, we will have a question and answer session where the panelists will be able to address questions submitted by the audience. At the end of the webinar you will be automatically prompted to fill out a brief survey as well. So thank you in advance for taking a moment to respond.

The Solutions Center was launched in 2011 under the Clean Energy Ministerial. The Clean Energy Ministerial is a high level global forum to promote policies and programs that advance clean energy technology, to share lessons learned and best practices and to encourage the transition to a global clean energy economy. 24 countries and the European commission are members, contributing 90 percent of clean energy investment and responsible for 75 percent of global greenhouse gas emissions.

This webinar is provided by the Clean Energy Solutions Center which is an initiative of the Clean Energy Ministerial. The Solutions Center focuses on helping government policy design and adopt policies and programs that support the deployment of clean energy technologies. This is accomplished through access to no cost expert policy assistance and capacity building activities such as this webinar. The Clean Energy Solutions Center is cosponsored by the governments of Australia and the United States.

The Solutions Center provides clean energy policy programs and services including a team of over 60 global experts that can provide remote and in person technical assistance to governments and government supported institutions, no cost virtual webinar trainings on a variety of clean energy topics, building partnership building with the development agencies and regional and global organizations to deliver support and an online library containing over 3,500 clean energy policy related publications, tools, videos and other resources. Our primary audience is made up of energy policy makers and analysts from governments and technical organizations in all countries. But we also strive to engage with private sector NGOs and civil society.

The Solutions Center is an international initiative that works with more than 35 international partners across a suite of different programs. Several of the partners are listed above and include research organizations like IRENA and the IEA, programs like SE4All and regionally focused entities like ECOWAS center for renewable energy and energy efficiency. A marquee feature that the Solutions Center provides is the no cost expert policy assistance known as the Ask an Expert.

The ask an expert service matches policy makes with one of the more than 60 global efforts selected as authoritative leaders on specific clean energy finance and policy topics. Again the assistance is provided free of charge. If you have questions for our experts please submit them through our simple online form at [cleanenergysolutions.org/expert](http://cleanenergysolutions.org/expert). We also invite you to spread the word about the service to those in your network and organizations.

Now I would like to introduce Shannon Hilsey. Shannon is a project associate with the Building Initiative at WRI Ross Center for Sustainable Cities. For the past three years, one of Shannon's roles has been to support the growth of an expanding global partnership to accelerate the rate of energy efficiency improvement in cities worldwide.

Shannon also holds a Masters of International affairs and a bachelor's degree in government. Our first presenter will be Meredydd Evans. Meredydd Evans—Meredydd is an energy policy and finance expert with over 20 years of international expert experience and has worked on energy efficiency and clean energy policies and projects in numerous countries. Ms. Evans has a BA from Columbia University Barnard College and an MA from Harvard University. She is also fluid in five languages and has published numerous books and articles.

Following Miss Meredydd we will hear from Sha Yu. Sha is a scientist at the Pacific Northwest National Laboratory. Her research focuses on developing and implementing energy efficiency and clean energy policies in developing countries such as India, China, Vietnam and Russia. In addition she is currently leading international collaboration projects in several countries covering integrated assistant modeling, standard development and policy implementation.

Following with be Sarah Arboleda. She is a Building Energy Efficiency Accelerated program advisor for Bogota and Columbia. She has more than nine years of experience in the environmental field both in the public and private sectors in energy efficiency, sustainable design, urban planning and climate change. Sarah also holds a master's degree in sustainable design. And now at this time I would like to welcome Shannon to the webinar. One second.

## **Shannon Hilsey**

Just a moment everyone. All right. Let me get my screen shared here. Hi everyone. Sorry for that brief delay. It's great to have you all. Thanks for joining us today for this webinar on locking in energy savings through building codes. I know that many of you are already pretty familiar with the BEA, the Building Efficiency Accelerator Partnership. But I'm going to give a brief introduction just to explain what the partnership is and what we're trying to do here before we have Meredydd and Sha dive into the best practices on developing and implementing building codes.

So the Building Efficiency Accelerator is the secretariat for the—the World Resources Institute is the secretariat for the Building Efficiency Accelerator Partnership which is a Sustainable Energy 4 All Initiative. My name is Shannon Hilsey. I am a project associate at the World Resources Institute

primarily working on running the BEA. And we run a webinar series as part of a broad technical assistance and support offered to cities on building efficiency policy and project development. And I'm going to introduce a little bit about what we do in a few minutes. We've already gone over our agenda for the day so looking forward to that.

Sustainable Energy 4 All as many of you know is a United Nations initiative that strives for three goals in support of the sustainable development goals. And one of those three goals of Sustainable Energy 4 All is to double the rate of improvement of energy efficiency worldwide by 2030. So the building efficiency accelerator is the buildings implementation branch of that platform. There are six sector specific accelerators as well as other initiatives under development within Sustainable Energy 4 All and each of them has organizations as partners and implementing partner as well as a broad network of relationships. So the Building Efficiency Accelerator focuses on partnering with cities as cities are the main implementers of building efficiency worldwide, the ones with the power to take action.

I won't go into this in detail but just a brief note on why we feel that building efficiency is particularly important in the global climate effort. One of the pieces that we focus on most often is the long lifespan of buildings. So as we referenced here it's a 40 to 100 year or even more lifespan of a building. And since so many cities worldwide are growing rapidly, urbanizing rapidly at this moment it's especially critical time to be thinking through energy efficiency plans at the city level that can avoid locking in high energy costs and high climate emissions for an extremely long time.

The Building Efficiency Accelerator is currently over 50 global partners. Not all of them are represented here. We have global technical partners. We have regional implementing partners, private sector companies that work with us and we're partnering with new experts every day. So it's a broad network of expertise where partners are working together to bring solutions and best practices to cities to support their goals on building efficiency. Our current subnational partner network contains 45—sorry about that—45 subnational partners including states and cities from over 17, I think about 20 countries right now. Our newest partners are in Costa Rica, El Salvador and Mexico. And each of these cities is working with us on an enabling policy on building efficiency, a demonstration pilot program in support of their policy and has committed to tracking and communicating their progress against these goals they set with us and sharing their experiences with other cities around the world.

Our overarching vision is that by 2030 all new buildings worldwide will be highly efficient and that by 2050 all buildings including existing buildings will be highly efficient and zero carbon and that's what we've recently identified with—the community has recently identified as necessary to meet global climate goals. So the global partner network that I presented a few moments ago is all working together to support these three goals that cities commit to. We have a wide range of commitments on many different topics

but a good number of our cities are working on codes. Hopefully some of them are on the line today. And if so we're happy to be speaking with you.

These are just a few examples of what our cities are working on. Some are mandatory building codes. Some are above code programs. We also have cities that are working specifically on retrofit guidelines which also can be worked into a building code or city policy. So when cities partner with the Building Efficiency Accelerator they go through an assessment process of what kinds of actions make sense in the local context and I'm happy to speak with you about that if you're interested at another time and what that assessment process looks like. But many of them find that some sort of code or mandatory action makes sense for them. And Meredydd is going to go over that a little bit more later.

Once cities have decided on a policy or project, and project action to pursue with the partnership, there are a number of different forms of support that we can offer. The local action prioritization and tracking process is the first one of these. We have a wide range of materials for stakeholder engagement, for receiving and analyzing feedback from across a city or subnational landscape of all the actors that are involved in buildings. We have tools, expertise and solutions from our large network of global experts, everything from baseline tools and assessment to code development resources, etcetera. We work with cities to identify finance options and funding opportunities that can work for the kinds of projects that they're considering and we also bring international recognition and collaboration to cities in support of their work.

And these come in several forms that Meredydd and Sha are going to touch on a little bit later. This webinar is specifically focusing of course on energy and construction codes which is one of our three key thematic areas. And on playbooks which are a term that we use for a self-guided resource under development that can help cities take step by step action toward energy and construction codes. So I won't get into our city action process in too much detail as I want to get to the meat of the webinar. But it is a five stage process that we lead cities through and I believe Meredith and Sha are going to identify some key actions in each of these stages in a minute.

So I want to thank you again for joining us and just to note that if you are not a BEA partner or partner city we are actively interested in working with more experts and more subnational entities that want to take action on building efficiency so please get in touch with us. And not on to the Pacific Northwest National Lab.

**Meredydd Evans** Thank you Shannon.

**Shannon Hilsey** Thank you.

**Meredydd Evans** So welcome to everyone who has joined. We're really excited to share this information with you today—I let me just launch my presentation. Ok. So as Shannon mentioned, Sha Yu and I have the privilege this morning of sharing some thoughts with you on building energy codes and how cities around the world can use building energy codes to achieve large scale improvements in

energy efficiency in their buildings. During the presentation I'll just briefly touch on building energy codes and the Building Efficiency Accelerator building on what Shannon said. And then we'll go in detail through the playbook, looking at the four stages that Shannon had mentioned so assess, develop, implement and improve.

And we've aligned these on purpose with the BEA stages. And we've aligned them across the other playbooks as well so that it's as easy as possible for cities to go to the information that they need and understand the steps that are important. I think it's important to think about building energy efficiency and codes as closely linked. And codes basically help you lock in your savings when you're building your building. They, when we've done analysis looking at national building efficiency policies, codes rank in most cases as the most impactful policy that you can undertake assuming that you do a good job following through with implementation.

And frankly while that point sometimes scares people, it's not unique to codes. Any policy that doesn't get implemented, doesn't really get implemented, right? So thinking through the implementation framework is an important part of what we did with the playbook.

So briefly on the different steps, assess. That means looking at existing resources, drivers, benefits, who are the stakeholders, what are the barriers so that you can plan your program to maximize impact. With codes, this stage is actually really easy because there are a lot of things that are out there. Develop means thinking through based on your existing situation how you may adapt a code for your local situation, what kind of capacity building you need to do and so on. And then implement means adopting your code, celebrating success with your stakeholders. And improve then is evaluating what you've done with implementation, how it's gone and then analyzing how you may improve it even further in the future. And then we'll have a few concluding remarks.

So on the first stage, assess resources and information. And I should also say we aren't spending a lot of time during this webinar telling you about the incredible benefits of building energy codes assuming that people who have joined have a good bit of that information. We recognize that that is a really important piece for talking to stakeholders. And so there is some in the assess stage about that. But also it is important as you look at codes to think through just how impactful it could be in talking to your stakeholders.

All right. The first step in assessing is collecting existing resources and information. Important here that many countries have building energy codes which can really simplify the process for cities. It's fairly rare for cities to develop a code from scratch. If a code doesn't exist in your country in any form—which to be honest many countries have a code whether it is formally adopted, dropped or whatnot. But the alternative would be to look at international examples and consider those such as for example ASHRAE 90.1.

So first look at what's out there and also look at other resources that may exist. Because if your country has a national code there may be training materials. There may be permit forms and procedures or you may look at other jurisdictions to see what theirs look like. Software tools might be out there. There are also code toolkits. We have one citation of a code toolkit here with many, many more resources than we can fit in this webinar. So this step can actually be really quick for codes because often cities are looking at adopt an existing code. But it can also save a tremendous amount of time if you do it well.

So in terms of understanding the drivers—and I apologize. I think I have not shown the screen properly. In terms of understanding the drivers, benefits and potential barriers which is step two, the benefits of a building energy code are multiple. Obviously there are the energy savings. But codes also create new skilled jobs. They can improve the air quality in your city and they can improve energy security and resilience. Some of the barriers for adopting and implementing codes include the lack of capacity to review and inspect buildings. So thinking through that carefully in your implementation plan is really important.

Also there's often the cost or perceived cost of the energy efficiency measures, particularly in markets where those measures are not yet common. So that as well is something to think about, share some information on, possibly work with vendors to ensure that the supply of given technologies is there. The construction industry also for very good reasons doesn't necessarily like to change the way they do business. They like certainty that the buildings are going to be well constructed. So it's important to address the perceptions of risk and to work with stakeholders closely. Sarah will have some great information later on working with local stakeholders.

And then also there can be just a lack of understanding of the code. And that again comes back to capacity building. So one quick example, their new code that they have developed saves 15 percent more energy in terms of the lighting requirements than the previous code. That's an example of the type of information you can get if you look at some of the existing resources.

Ok. So all right. Assessing the stakeholders. This is also quite important and it's important in two directions I would say. The first is that the national—looking up at the national and regional governments because if there are existing resources that's really important to grab those. Also making sure that there's good coordination. If your national government or a national entity is developing the code, having communication will ensure that your stakeholders' needs are also met. At the same time, talking to your local stakeholders is incredibly important in making sure that the code becomes effective and you're successful in implementing it. These can include the code officials so local government officials or third parties, the developers, building owners, suppliers, utilities, energy efficiency experts, sometimes university researchers who may have expertise that can be helpful.

So thinking in both directions, both looking at the national scale as well as the local scale and trying to bridge those can result in really successful implementation. Many countries have resources available to help cities and local stakeholders. And so don't feel like you're alone in this. The code obviously should reflect local needs which makes implementation easier. And there's always a balance between making sure that it reflects local needs while not trying to rewrite the entire code.

The technical task of writing a code and making sure that it is cost effective and feasible is not insignificant. And that is usually something that happens at the national level. So at the local level it's important to look at specific measures that you may be interested in adapting to meet your local conditions. It's also really important to share information on the code as early as possible to build implementation capacity. And on stakeholder engagement we had another Clean Energy Solutions Center webinar a year or so ago specifically on stakeholders. And I've included the link.

Next stage is develop. So here the first step of it is to define the scope of your code. Some jurisdictions that have a code, they say well, maybe to start we're only going to apply this to certain buildings. Maybe it's government buildings, maybe it's commercial buildings because for the code to be effective it needs to be mandatory. That's the concept of a code. It's typically not a voluntary approach. And so you want to make sure that the code that you are implementing it becomes feasible based on the scope of the buildings that you're initially considering.

I will be honest. The majority of cities simply go forward with all the buildings that are relevant to the scope of a code. But there are cases where cities may choose to limit that initially. If you do that, it is important to clarify the timetable for expanding the scope so that the market understands that it's serious, that there's really an intent to move forward with this policy and that the market can accept the code as a mandatory requirement for building, the building is covered. You don't want to spend time delaying to build capacity without giving the market the signal that, yeah, you do need to build the capacity and we're going to help you with this. So defining the scope is one tool cities can use to ensure that they are successful.

Next is developing or adapting the locally appropriate code. So as I mentioned, very few cities develop a code from scratch and countries are the ones that typically are developing codes. In cases where there isn't one, there are as I mentioned some international examples that you can draw from to try to adapt. And then when the local government has jurisdiction to adopt the code which is not universally true. In some countries such as Columbia, only the national government can adopt a code.

So assuming that your jurisdiction has—your government in the city has the jurisdiction, has the ability to adopt the code, it's important to engage the local stakeholders to ensure that the provisions meet their needs, seek opportunities to potentially exceed the national code. I mean that is actually something that is fairly common in cities where they try to experiment and



exceed the national code to help in developing future codes. Seattle is a leader in that. There are many cities in China that have done that and so on.

And then identify specific measures that may be hard to implement initially and target those for change instead of trying to change large sections that may make it less feasible ultimately to understand and implement. Holding hearings on the code is a really great tool to collect feedback on specific proposals and to make sure that your local stakeholders are aware of what's happening. And then also recognize that if you soften the requirements that that will slow the adoption of energy efficiency technologies or approaches so do it carefully.

And then your implementation plan. This is really critical. This is where you ensure that the plans of achieving energy savings are going to be realistic. The implementation plan provides clarity to all its stakeholders and demonstrates your seriousness of intent. Three key questions, we've tried to boil this down to essentials particularly for—and I should have said this earlier, essentials for cities that are beginning to develop a code. But I think that in general these principles hold true regardless of what stage you are in your code process.

So the three questions are what steps are necessary to integrate the code compliance into the permitting process, that that can include for example forms, instructions, guidance, also the capacity building for code officials and stakeholders. Second question is who will conduct plan reviews and inspections. This is really critical because that is where you ensure that the buildings are in fact meeting the code. This is what makes it mandatory. So different cities have experimented with different models. There—in many places government officials, code officials who look at the building permits will inspect the buildings. In other cities they may have third, private third parties do that or sometimes there's a combination where there are private third parties but with a cross check by a government that is not as detailed.

And thinking through both the review of the plan of the building as well as having inspections at least in a portion of your buildings to convince the market that this is serious are important. What kinds of incentives and penalties will help ensure success with compliance? So this is also really important. And a code is different from other policies in that the largest incentive is the permission to build. So if you only allow developers to build when their plan meets the code and you only allow them to occupy the building when their building meets the code, they will very quickly understand the importance of it and adapt to that.

Another example of an incentive that is fairly common and low cost for cities is to relax zoning requirements. So what that means is that you might get to build a building that is slightly taller or has smaller setbacks from the road or alternatively at least in the initial period, maybe you get to jump to the front of the line in terms of the permitting process if you meet or exceed the code. Ok. And then I will turn it over to Sha Yu now who will go through the rest of the presentation. Thanks.

All right. Thank you Meredydd and hello everyone. Following up on the development process. So once the building code is developed, the city needs to actually adopt it in order to achieve the intended energy savings. So code adoption can happen at a different level. It can happen national, state or local level. In some cases like when there's a national model holding place the city can choose to adopt the national model code with some modifications. And if there's no national or state code available the state may need to develop the code by itself.

To start the code adoption process which they can normally start with a city office or mayor's office, city council often release the purpose notice of intent with more information of building code itself an implementation plan. But in this process, the city also needs to seek feedback back from the technical team which normally are the building local like building department or the technical committee convened for the building code as well as the public input in order to get more stakeholder buy in and engagement.

And at the end of the adoption process, the city mayor's office or city council will need to set a date so specify when the new codes will go into effect and the enabling legislation. In this case it's normally local building bylaws or the executive order. And the effective date of building codes is normally several months after the adoption which gives the city and the stakeholders a buffer to get themselves more familiar with the new code as well as prepare for the code implementation. So I think similar to the development process Meredydd just talked about, there are some critical elements in the adoption process as well including like getting the involvement and buy in from city council, get feedback back from the technical review committee or local building department as well as for other stakeholder engagement and public input which are critical for the later success of the code.

Next one. So once a code is adopted, the city will prepare to implement to build capacity to implement a code. So capacity building needs to be aligned with the implementation framework and plan which Meredydd discussed earlier on developing the implementation plan. And also worth noting that the capacity building could be a dynamic continuous process. And there are like capacity building activities to cover the near term needs that have to roll out the building energy code as well as capacity building activity in the long term that helps continuously improve the building code and compliance.

And in any of the compliance evaluation or I mean capacity building process it's critical in the beginning to assess available resources and identify gaps. But basically identify what are the available resources at national, state, local or even international level the city can leverage to develop the capacity building plan or training materials. And another critical element of capacity building is to use train a trainer program. Normally there are a large need for capacity building. And using train a trainer program can help the city to roll out the capacity building activity at a large scale in a quick way.

There are several places using this train a trainer model right now. Like for example in India to roll out the energy conversation building code, the Indian bureau of energy efficiency developed a train a trainer program and that

qualified master trainers to come back training at different states and local levels. So that helps spread the capacity building activity broadly and quickly. And similarly like you have to have the building energy code ambassador programs that can also do the same way.

And it's also important to note that the initial training of the building energy code needs to be done after the code is finalized but before it entered into force. The reason for that is actually we'll prepare the local stakeholders and local building code officials to implement a code once it goes into effect. So in this kind of initial introductory training the city needs to cover some basic items including the benefits of the code in terms of energy savings, economic savings or environmental benefits. It also needs to cover the cost effectiveness of the energy codes. And in addition it needs to cover the details of the code requirement as well as the details of the implementation plan like whether the requirement for plan reviews of compliance check and how does this change the current building permitting process.

And finally also needs to share if there's any resources or tools available for stakeholders or code officials to use to implement a building code. So that's actually critical. And the example here is like for India in order to roll out the building capacity or roll out training for capacity building activities fast enough we're working with Indian local partners like AEEE to develop the \_\_\_\_\_ presentation, cover some basics of the Indian energy conservation building code. And that can also be used in multiple states and cities to roll out the training activity at once.

So in addition to the initial code training, the capacity building activity needs to be continuing going forward as the code starts to develop and implement. And so over time it also needs to cover more details on compliance checks like plan reviews and also how do you do the inspections. And so the capacity building activity will continue to build on and keep improving along with the code itself.

Next one. So the next stage of the building code, development implementation is implement. And next slide please. The code will only be effective when it's effectively implemented. And so once the building goes into effect local building department needs to integrate a new code into the building permitting process. And that's including the two stage compliance checks which happens at the plan review stage as well as the construction inspection stage. So in the plan review stage the code officials or third party need to verify whether the document submitted is correctly prepared. So whether the building energy efficiency shows a—in plan meets or exceeds code requirement and whether the plans include sufficient information to conduct field inspection later.

And so if everything in the plan review stage meets the code requirement the local building department will issue the construction permit so the city can—the stakeholders or developers can start the construction. And in the construction stage, the local building department also needs to do the construction inspection which basically looks into whether the work performed on the construction site conforms to the approved plan and

document as well as code requirement. In this stage it's also, it also requires like field testing certification, product evaluation to determine whether it actually in fact complies with code or not.

And it's worth noting that—I think Meredydd mentioned it in the earlier slides that plan review and construction inspection can be done by either the local building departments or the third party or in combination of both ways. So using a third party normally is a factual way of rolling out codes quickly in the initial stage. Like a few places like China or in some cities in India are doing this way. But it's also worth noting that when you use third party inspectors it's important to make sure there are institutional frameworks to ensure checks and balances in place. Like normally the third party needs to be certified passing certain tests. And there also needs to be rules like if the third party does not perform as supposed to be, is there any penalties or any penalties to punish them so they will follow the rules. So it's critical to have checks and balances for third party inspectors in place.

The other thing worth noting when doing the implementation is there are some really helpful tools can be used in this process. That's including the compliance check software and also the check list. And some countries such as US or India have compliance check software which will help the inspectors to verify compliance quickly. And like \_\_\_\_\_ has both prescriptive and whole building version which helps checking the code compliance in India. And similarly I think in US has res check and com check for residential and commercial buildings that helps with the compliance checks.

It is also worth noting that compliance checks is a learning opportunity for the city in the early stage and that—so initially can be a little bit loose where like gradually phased in and maybe in some cities like they initially only cover the plan review, not only the - not construction inspections. So that gave the local stakeholders some time to actually gradually phase into the code implementation. But over time you have to be more stringent, strictly following and covering both plan review and construction inspection. So it could be a staged compliance checks or implementation plan.

So the next slide. Yeah. So once you implement a code, the city will actually make efforts to track and maintain data on code compliance. And that's including like the number of buildings complying with the code and energy consumption of code complying buildings or like the deployment of energy efficiency technologies. And so the city—by tracking this kind of data the city can track the progress of code implementation and also evaluate the impact of building energy code.

Meanwhile when you have this data, it's actually really important to communicate with the stakeholders and the public on the progress and benefit of building energy code. By showing this kind of success and sharing success stories you can—the city can get stakeholders buy in and build confidence with the market. There are several ways of sharing success. One way is to publish a status report periodically. So that could be including the number of code compliant buildings within a city, the types to energy efficient

technology have been used in the city or in the buildings, and also the potential energy code, energy economic savings.

Another way of showing the success is actually having some specific case study highlighting successful forays. And in that case, you can get more testimonials from different stakeholders and also pointing out specific city members or technology being used in the building. Another way is to recognize the building energy efficiency improvement in certain awards. And an example here is in the \_\_\_\_\_ state of India they actually put the energy efficient building as subcategory for the energy conservation award. So every year on the energy conservation day which is December 14<sup>th</sup> the award actually recognizes large commercial buildings that comply with code and have extraordinary energy performance which is actually a strong encouragement for the local stakeholders to comply with code in the initial stage of code implementation.

Next one. The final stage of code implementation or code development implementation is the improve. So next one please. So the whole building code implementation process does not stop at the implementation stage. Once a code is implemented, the city needs to continually monitor the progress of implementation as well as assess impact and potential areas of improvement. And this can be done through the compliance evaluation which actually has multiple benefits. And by doing compliance evaluation, the city can ensure the code achieved its intended savings and can also build trust among different stakeholders and then instill confidence in the market. So get more stakeholder buy in into the code implementation and improvement stage.

Compliance evaluation can also help cities to identify potential improvement opportunities and areas. And there are several ways of doing the compliance evaluation so such as like cities can assess the compliance rate from the existing building permitting database and that will give us how many buildings in a city complying with a code. And the other way of doing this one is estimating energy and economic savings. This sometimes could be difficult to implement. At the same time it's super effective when you're communicating with the stakeholders.

And there are also some easy ways or relatively less systematic ways of doing this one such as like conducting stakeholder surveys or \_\_\_\_\_ compliance surveys. And this will not give you true comprehensive picture. But at the same time it will provide some information of building code compliance. So the example here is like the city of Bogota actually developed a small working group to determine how it will assess the progress with code implementation. And that building working group reviews existing data and evaluation while through different evaluation approaches. Meanwhile Bogota keeps the data base of newly constructed buildings and also can see which can provide more information on compliance evaluation later. So I think since Sarah will talk about both of them we're not going into the details. We're just looking forward to seeing more existing things out of Bogota.

Next one. Yeah. Sure. So the final, final step here is to finalize evaluation results and assess next steps for building code implementation. So I think there are several functions or purposes of analyzing evaluation results. The first one is just kind of actually help cities to identify where code requirements are implemented successfully and where the measures and process can be improved later. So when you do evaluation you can identify if there are certain kinds of buildings meet certain requirements on a regular basis or not and will give you a sense on where you need to do further improvement.

And the other purpose of this one is also it can inform the development of future code. For example like if the majority of buildings exceed code requirements for a given measure, the city might consider improved code stringency regarding that measure in the next code cycle. And similarly if like certain measures are difficult to implement as indicated by compliance evaluation, the city may need to adjust it and make it more implementable in the future.

I think over time, the city may want to improve the code to better reflect local needs. Like in some cities observed like they have their own code that's more stringent in the model code at a national level. And so they're serving as a \_\_\_\_\_ for these measures such as like Seattle in the US, like \_\_\_\_\_ in India and also several Chinese cities. So they're doing actually more and more stringent code over time and exceeding the national code requirement.

Next one. Great. Yeah, so the final side. So building energy code I think has significant potential to general energy and economic savings. It can also contribute significantly to the local economy. But also while the building code impacts can only be achieved by effective implementation and design. So in terms of design implementation it's actually a comprehensive and integrated process which links code development, adoption, implementation, evaluation all together and continues to improve the code over time.

Bottom line, the stakeholder engagement and buy in are really critical for the whole code development implementation process. And so it would be really important to engage them throughout the entire process. I think with that I'm going to turn that over to Sarah.

**Sarah Arboleda**

Hi. Hello to all. Thank you very much. Is the screen ok? Ok. So good morning to all, as Shannon and Meredydd and Shannon, Kamyria presented me, I am Sarah Arboleda the advisor of the Building Efficiency Accelerator Program for Bogota and also now for Columbia. So I will present today some of the strides that we have achieved through the program focusing a little bit on stakeholders and on the implementation part that we are now developing.

So a little bit of context. This is Bogota. It's a very big city, 7.1 million inhabitants and it extends in 1,600 kilometers square. That fountain that we see at the back of the city is our big, our big production of water and energy that supplies all the city. So as it's so big, the city, it's committing and committed to the program in 2016 to have policies, programs and strategies

in order to save water and energy and to have a more resilient city to climate change.

So the objective, the BEA objectives that were defined by Bogota as Shannon explained earlier, for the policy is implementation of the national code that is called resolution 5.9 of 2015. We did for this a whole diagnosis. We went through all the policies that existed in the city and in the country. And this was selected because it's a policy that is not being implemented effectively at the moment that needs some corrections and some precisions in order to be implemented. As for the program, it was defined renovation urbanism plan in the center of the city. And our aim for this program was just to improve water and energy efficiency in this plan.

And as for the information and communication goal, well, it was to firstly create a system that updates the—sorry—that updates the local baseline for water and energy consumption that reports once a year the improvements or the new reports. A program also that was able, that is able to share this information with other cities that also needs to implement the resolution 549. And the city also wants to be able to make the translation of all of these into the national effort to comply with the embassies. So it's a big, very ambition information and communication plan that we're developing now.

So resolution 549 just to give a little bit of context of what it is, it's a national code that was issues in 2015 that is mandatory for all the users in all the cities in the country. So it's not only for housing but also for all commercial, hospital, hotels. And it mandates too for savings of energy between 15 and 45 percent depending on the use and for water between 10 and 45 percent.

So why was it important for Bogota, the new buildings? So the projections of population growth that were made in Bogota the first three years ago when the government, the current government started in the city said that Bogota will grow 2.5 times by 2050. Also this means that we will have 2.9 million homes in the city by this date. So if now we imply or if all these new constructions complies with energy and water efficiency standards, international standards, this will mean that by 2050 half of the city will be complying these new standards of efficiency. So here the city saw a very important opportunity and this is why also this policy was selected for new buildings.

So the purpose here is that through the BEA program will be also able to align and to articulate not only resolution 549 but also other policies and other normative framework that is currently in the city or in the country such as the national policy for sustainable construction that not only aim for operation but for all the stages in the life cycle of the buildings. And locally a public policy that is also current, that was adopted in 2015 but that wasn't mandatory and that wasn't aligned in terms of goals with resolution 549. So we saw the need to align these two policies in order for the compliance to be more clean and that the projects could know what they were aiming to comply.

And finally, the city's master plan which is also a big policy that is issued every 12 years in the country, in the city. Sorry. In this period of government, the master plan, the current master plan is being reviewed and we already have a proposal for a new master plan. So the idea was also to have all these in the master plan which will give also a validation for the next 12 years.

So one of the keys of all of the process has been the participation of a good and wide range of stakeholders that today conforms or compose a network of more than 25 stakeholders. These come from different parts of the industry and of the sector. For example we have both utility companies are part actively of participate active in the program, the water and energy company for example. We have more than six institutions of public institution, three ministries of the national order. And we have also three secretaries in the local level that also comes and make part of the program. We have two civil societies that also participate actively and more than 15 private companies that are constructors, developers, sustainable consultants. Also banks and financial entities that has been participating and that today still participates in the program.

So these stakeholder are reviewed in four committees. One advisor committee that revises or that follow up other decisions are made by the three committees that are one technical committee that is composed by 15 stakeholders, one normative committee and one information or MRV committee. So all of these committees we meet once a month. We have at the beginning of each phase a set of goals that needed to be achieved by each of these committees. And sometimes they help reviewing documents and we have feedback on other documents that we create along the program.

One example, one important example is that when we issued the first—sorry. The first—well, it was in one of these committees or through the technical committee that all the action plan of Bogota's BEA program was developed. And it was in this technical committee that it was defined that we needed an implementation protocol for resolution 549 in order to comply with this national law. So by the end of phase one we had the first draft or the first proposal of these implementation protocols. It was at the beginning of 2018. And through the technical committee where we were doing specialization of the results, we had some constructors that were like—they doubt on the proper operation of one of the measures that were given by this protocol.

So with the help of one of the constructors that were part of this committee he raised his hand and he said like let's try and see if with the technology that we have in the market today and with the prices that we are aiming to that we can—this shower, it was a shower. We needed to see a shower that was proposed was having the proper water temperature and pressure. So we tested the showers in a project in two different apartments with the help of other stakeholders that were part of these committees.

We did like a pilot and the results were positive and so we could see that what was presented or proposed in the protocol were operated as we expected. But this was very important because this gave legitimacy to these measures, to one of the measures that was the one that was creating a little bit of



controversy between the stakeholders. So this is one example that for us was important and that where we have participation of many of the technical stakeholders that works in the program.

So the milestone just to go through very quickly on the milestone of all the objectives. So now we have implementation protocol of resolution 549 that is aligned both with local policy and with the city's master plan that will be adopted very soon. We hope that this implementation protocol will be adopted like in the next days by local norm. And also we designed through the study that we did we could also design some incentives for higher savings in projects. So through these incentives also we hope that we could motivate projects to go beyond what is obligatory. And these incentives also will be adopted through the city's master plan.

And for the pilot project on phase one we managed to hand it over, the technical guidelines for the improvement of energy and water efficiency not only in the buildings but in the urban project. And also we designed a mechanism to estimate the gas house, the greenhouse gas emissions reduction by the implementation of these recommendations in the project. This is a program that is very big but that is moving forward very successfully as well. And for now what we have at the moment is we for phase two that I will go through with more specifications later. But so what it's like remaining to achieve is mostly around the information and the communication targets that are set for this phase.

So the methodology that we use for the implementation protocol that we had a very close—how do you say? I mean the PNL and WRI worked very close in the technical advising us on other, on all the execution of this methodology of the study. So we could interview these two companies for 25 projects in the city and to a comparison with the international standard, we could define two compliance paths for the obligatory savings for the city. One that was prescriptive and one that is performance based.

And also we—and with these packages of compliance that were based on cost effectiveness that were defined also by the secretary of planning of the city, we then got all the technical bases to write our implementation protocol of resolution 549 which is the protocol that will help all the city projects to comply with the national law. Also with this methodology we could define voluntary savings, percentages related also to cost effectiveness goals that were defined by the secretary of planning of the city. And with this we have the design of incentives for the city's master plan that I mentioned before that will give—that will be normative incentives that will give more area of building for buildings that will achieve these percentages that were defined through this methodology.

So as I said in phase two, we aim to finalize the implementation protocol. And for us now implementation means how it's as Meredydd and Sha were saying it's more about how now we are going to make this code to be implemented successfully. So for this, we worked off a cycle of workshops to build capacity both in the private sector and in the public sector. We saw a very important need for all the public office officials that work in the

secretary of planning, secretary of environment, secretary of habitat which are all the ones that manage our urban and housing projects and environmental projects in the city that they understand perfectly what the implementation protocol is so they could answer in a clear way all the questions that will start arriving to these secretaries.

This was one of the big problems of the national law resolution 549 that was issued four years ago. It was that when the questions started to arrive to the ministry of housing, people in the ministry didn't even know the law. So they didn't know how to answer these questions. So we are trying to—so that doesn't happen and that we have all our officials in the city ready to answer the questions that will start arriving.

Also we have the design of the monetary reporting and verification system. We are doing this with the leadership of the secretary of planning. And we are aiming to have first results by August and by November we hope to have already the incentives through the city's master plan. So we're now in the phase of implementation and we hope that by the end of the year we will have all these goals achieved.

So as I said the BEA program, it's now part of the efficiency policy of the city's master plan that aims for a compact adaptive and of low consumption territory in the city. It was defined for a specific goal of this eco efficient policy that aim to establish urban environmental standards through the BEA program. This is the program that helped define these standards of water and energy consumption in buildings.

So what is this implementation protocol? Well, it's just a tool that is made, that was made for the city to comply in a clear way and in a cost efficient way with resolution 549. It is a cost efficient way because we managed to achieve the savings between 20 and 30 percent just with an increment below one percent in the cost of the projects. It is made by—I mean we have this protocol will be aligned. And it presents two methodologies, prescriptive methodology and the performance based methodology for eight typologies in the city.

And also we add two more typologies which are social housing and varied social housing that are not mandatory but that we saw a very important need because these were the typologies that in the study appeared to be with most problems in comfort related to energy consumption. So we are handing the methodologies to comply with percentages in these typologies even though it's not obligatory by the law. But we saw very important need but also a very important opportunity now that we were making all these studies and all these efforts so we could have also these to these. So at the end we are handing the methodologies for ten typologies in the city.

So as I said we have four methodologies. I mean two but one for energy compliance based on performance. One for water compliance based on performance. One prescriptive package for energy and one prescriptive package for water and these four paths or four ways can be used in four

combinations. So you can see which one is better for your project and how it's better for your project to comply with the savings.

So as part of our implementation strategy as I mentioned before we are working with a communication firm but it's been supported by also by the world green building council that are helping us to be able to communicate to the public and to all the cities the importance of water and energy savings not only for them to save but because we see that they are very important when they buy a house that they ask for these savings to comply with what they say they are complying. So we are working in this communication strategy that is, that we see as a very important opportunity for the compliance of the code.

And as I said before also we work a workshop and building capacities sessions for the public and private sector. We already did that three cycle of workshops for the public sector. It was very nice. People were very interested. We did a workshop at the end that was filling out the formularies that were calculating the savings so they also could understand what the constructors or the projects needed to do. So it was very good and we had very good feedback from them. And we're starting next week the general cycle of workshops that for the public we will have two general workshops and then we are having like specific workshops for developers, one specific workshops for architects and designers, one specific workshops for academies so students and also professors of universities, and one for the industry for all the materials and providers of all the buildings appliances.

So now also with Bogota one of the very important aims of this year but also of the information goal is that as with the leadership of Bogota and now that Monteria and Cali are also developing their own code for the compliance of resolution 549 we give them all the feedback and all the lessons learned through this period so they can have a most fast but also precise process that responds of course to their local priorities but that they can learn through our process. And with all these three cities we are also giving feedback to the ministry of housing for them to improve the national code, the resolution 549 that has been in provision now.

So by the end we hope that all the cities in the country will profit the effort that is being made by Bogota, Monteria and Cali through the BEA program and all of the city will have an implementation protocol but that will be done or developed by the national government. And that all of course makes part of the national effort for the compliance of the NDCs and of the SDGs. Ok. So this is the end of my part. Just let me know if you have any questions. Thank you.

**Kamyria Coney**

Awesome. Thank you. Let me get the presentation. All right. Perfect. So I just wanted to thank each of our panelists for an outstanding presentation. And at this time we are going to shift over to our Q&A session. Please all of our attendees submit your questions through the questions pane at any time during this. We will also keep several links on the screen throughout for quick reference to where you could find more information about any upcoming and previously held webinars on our program website. So at this

time we do have a couple questions. First one is what are the hardest things to overcome in getting started in Bogota?

**Sarah Arboleda**

Sorry. Can you repeat the Kamyria?

**Kamyria Coney**

Yeah. What are the hardest things to overcome in getting started in Bogota? You kind of explained it in your presentation. So if you don't mind just going a little bit, digging into the things that you had to overcome during that process.

**Sarah Arboleda**

Ok. So I think one of the things was even though we had stakeholders participation for example there is a trade here of constructors that are very skeptic to sustainable measures because of the cost. So this was a very—I mean it wasn't easy at the beginning because they didn't want to support the implementation protocol and the process. Even though they were attending all the committees they were always a little bit skeptic with that. So this was something that was kind of difficult to go through.

And also with the utility company, the water utility company because their business is to sell water actually. So there wasn't—they weren't very happy with us telling buildings to save water because that will affect their business. But we had to have a lot of meetings with them and explaining. And at the end they were supportive as well. I think this is, this could be and also the relationship with the national ministry because not their relationship but a national law, there's a lot of restrictions that are put in in the law between lines and how it is written.

So I think it's very important when you are going to adopt a national law or a national code to have a legal review like with the lawyer to see really what this law is allowing you to do in your city. And these for example for us even though the ministry was all the time informed about all we were doing and they participated also in some of the committees when we had the protocol then they started saying oh no. You cannot do this because the law doesn't allow you. So we needed to change some of the things that we thought we were already agreed to do. So I think also this was a hard thing, like all the legal things to understand legally but not just technically the norm or the codes but also all the legal things that are besides the codes that sometimes is not very obvious for technical eyes or for like one of these committees and stakeholder network.

**Kamyria Coney**

Perfect. Thank you so much. I have the next question. This will probably be more towards Meredydd and Sha. In terms of the playbook that you guys described it has multiple steps and access, development, implement and improve, all that good stuff. To your understanding and to you—just from your experience, what do you think, what step do you think is most crucial for communities and cities establishing this when they're looking through the playbook or are all steps equally important?

**Meredydd Evans**

Thank you. So this is Meredydd. I guess if I had to pick one, I would say your implementation plan because without that all the rest becomes really difficult to achieve. But at the same time I would encourage cities not to skip

important steps like reviewing existing resources. I know one city we had worked with was in a country where they had a code with existing resources. And the city didn't realize that and they were trying to reinvent a lot of things that would have sped progress. Just one quick example of that.

But yeah. So we tried to boil down the essentials into the steps but if you had to get your mayor's attention on one I would say it is the implementation plan and also probably the adoption if you do have to adopt. Because if you don't adopt the code then it doesn't have legal force.

**Kamyria Coney** Right. Absolutely. And then I mean I guess on the topic of codes—codes are different everywhere. And so how can people use resources from other jurisdictions if that is the case?

**Meredydd Evans** Sha, do you want to take that one?

**Sha Yu** Sure. Yeah. I think there are like common resources like some training materials I think like it may be similar for all the like—the structural system over there. And the other thing is like the benefit of code like when you first started you may not have that information so you may want to borrow information from other jurisdictions to show the potential benefit of a code. And certain things like some complex checklists so you can probably modify existing resources. And then it's always easier to modify on something else than let's start from scratch. The bottom line is you have to modify it carefully and make sure it is tailored to your own jurisdiction even if you're using others resources.

**Kamyria Coney** So this would be beneficial if the city doesn't have a code. They would just use the resources to kind of help them so they do not have to start from scratch essentially?

**Sha Yu** Yeah.

**Kamyria Coney** Ok. Ok. Great. I do have a couple more questions here. Let's see. Can you guys give more information if you have any about the technical assistance for the building energy codes. Is there like a certain process or requirement for the cities that they must meet to receive this assistance? And is it beneficial for these cities to have that?

**Shannon Hilsey** I can start with that one maybe and then if Meredydd or Sarah has anything to add. So there is a slide that we had briefly shown on our categories of technical assistance. But we can also circulate –

**Kamyria Coney** You want me to share the screen?

**Shannon Hilsey** Sure. Just real quickly. Let me see if I can reopen that slide.

**Kamyria Coney** This is Shannon, right?

**Shannon Hilsey** Yes.

**Kamyria Coney**

Awesome.

**Shannon Hilsey**

One second. So sorry. It's not quite in its full screen form.

**Kamyria Coney**

That's ok.

**Shannon Hilsey**

But so this is a brief overview. We also have a sheet that goes into more detail on these things that I can—that we can circulate maybe and follow up. But the BEA's technical assistance falls into four categories for partner cities. What we've been discussing today are the playbooks which again will be sort of a written or sort of self-learning guide. Eventually we hope to have content in a learning package that's more like a slideshow with links to many best practices and bullet and step by step guidance paired with a longer resource.

But we will also have more webinars on this topic. We'll have trainings sometimes that are regional or city specific and sometimes that are global. Those are periodic sort of as there's a good opportunity to connect with many cities that are interested in the same topic. We offer peer learning that we're getting a cohort model up and running where cities that are working on codes will exchange with each other which we can do on a one on one basis or as a forum, sometimes generally at the regional level. We offer direct assistance in the form of the ask an expert program that Kamyria talked about.

So either a city can, a partner city can apply for targeted assistance overcoming a certain barrier to their BEA actions. So sometimes that will be in the form of expert technical assistance on reviewing a draft policy or developing a retrofit program or even assisting with a city baseline, a lot of different things. Or in some cases, that direct assistance is a little bit of funding for a local partner organization to work more intensively with the city on the action development and stakeholder engagement process or in support of workshops at the local level.

And then there in purple, the smallest and deepest version is what we call a BEA deep engagement. So every two years we select a new crop of deep engagement cities where we place half or full time staff member and a much higher level of resources to work with the city more intensively on their actions. And once a city is a BEA partner then they're eligible to apply to be a deep dive city in the next phase of the program. We also have several national level deep engagements at this point where we're working with many cities in the same country to help national governments pass enabling policy that will help local city governments.

So here you'll see Mexico, Columbia, India are national engagements for the time being. So we're working with those national governments to develop actions that can support all of the cities in the country that want to work on building efficiency with things whether it's for instance a national code so that they put the work in to strengthen that code that the city simply implements or whether it's some other form of incentive program or otherwise. So I hope that answers the question. We have more resources that go into more detail on what this technical assistance looks like for our partner

cities. But we're happy to talk to any city that's interested. Meredydd or Sarah do you want to add anything?

**Sarah Arboleda**

Yes. I mean I would like to add because for us it has been so much helpful all the assistance that we've had from the WRI and the Pacific Northwest National Laboratory. So just to encourage other cities that this is a very good and supportive assistance that really helps the process to go with more—I mean not only faster but so you can really know and also to—I mean they help a lot to make things in a technical way but also to adapt to your technical local needs because of their experience that these two institutions have in all of the cities and all of the national different countries. So just to encourage this that this technical assistance works very well for us in Bogota. It has been very, very helpful.

**Kamyria Coney**

Perfect. We do have another question. It is how important has the communication been to engage the different stakeholders and how did you define the scope of work with communication agencies? Have you managed communications for the BEA program nationally or separately?

**Shannon Hilsey**

I think it might make sense, Sarah, for you to start with this one from the Bogota perspective because I know you've done a lot of communications both nationally and at the city level.

**Sarah Arboleda**

Yeah. Well, for the stakeholder engagement well the BEA methodology like in the commitment phase you start with a kickoff event. So in Bogota we did a very big one. We had more than 50 stakeholders invited that went to the event. And in the event we make like this call for stakeholders to participate. We made terms of reference for each of the committees that were conformed with what were the hours per month that needed to be committed from each of these stakeholders. So after this we made a letter of intention so every stakeholder that wanted to participate were signing this letter of intention.

And in the letter they say well, I would like to participate in this committee, for example in the technical committee and I'm committing to participate and to spend—I don't know—four hours a month between meetings and revision of documents. And this is how it was like how we got the stakeholders to participate and also when we see a key stakeholder that we want to be engaged but that is not engaged then we ask for meetings and we go there and present all the things that were learned and to try to convince to participate because of the importance of them to be active in the program. That was the question?

**Kamyria Coney**

So sorry to cut you guys off but we have to end the webinar right now. So I'm just going to make the closing announcement. Any questions that we did not get to, I will definitely send it to our panelists and they will be able to email you individually for your questions. I'm so sorry about that. But on behalf of the Clean Energy Solutions Center I'd like to extend a thank you to all of our expert panelists and to our attendees for participating in today's webinar. We very much appreciate your time and hope in return that you will share some of the valuable insights that you can take back to your ministries, departments and organizations.

I invite you to check out the Solutions Center website if you would like to view the slides and listen to the recording of today's presentation as well as previously held webinars. Additionally you will find information on upcoming webinars and other training events. Finally, I would like to kindly ask you to take a moment to complete the short survey that will appear when we conclude the webinar. So at this time please enjoy the rest of your day and we hope to see you again at future Clean Energy Solutions Center events. This will conclude our webinar.

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