



Driving Transformation to Energy Efficient Buildings: Policies and Actions

—Transcript of a webinar offered by the Clean Energy Solutions Center on 28 November 2012—
For more information, see the [clean energy policy trainings](#) offered by the Solutions Center.

Katrina Managan Program Manager, Institute for Building Efficiency

Heather:

Greetings everyone. I'm Heather Stafford with Confluence Communications and welcome to today's webinar hosted by the Clean Energy Solutions Center. Our discussions today are focused on Johnson Controls Institute for Building Efficiency second edition of their report, *Driving Transformation to Energy-efficient buildings: Policies and Actions that Outline Policy Options Available for Developing Countries to Accelerate Energy Efficiency*.

One important note of mention before we begin our presentation is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. This report is featured in the [Solutions Center's resource library](#) as one of the many best practices documents reviewed and selected by technical experts.

Before we begin, I'd like to 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. By doing so, we will eliminate the possibility of feedback and echo. If you select the second option, the blocks on the right side will display the telephone number and audio PIN you should use to dial in. We ask that you please mute your audio device before the presentations begin. If you have technical difficulties with the webinar, you may contact the GoToWebinar help desk at 888-259-3826 for assistance.

We welcome you to introduce yourself and you may do so by typing into the chat pane located on your screen. If you would like to ask a question, we ask that you use the question pane instead or by typing your question. If you're having difficulties viewing the material in the webinar portal, you will find PDF copies of the presentations at cleanenergysolutions.org/training and you may follow along as our speakers present the audio. Also, an audio recording and the presentations will be posted to Solutions Center training page within a few weeks.

We have an exciting webinar prepared for you today that is focused on Johnson Controls Institute for Building Efficiency second edition of their report, *Driving Transformation to Energy-efficient building: Policies and Actions*. We are fortunate to have Katrina Managan, program manager of the

Institute for Building Efficiency and Rob Moulton, vice president of marketing and solutions for Asia at Johnson Controls presenting today.

Before our speakers begin their presentation, I will provide a short informative overview of the Clean Energy Solutions Center initiative. Following the presentations, we will have a question and answer session for approximately 30 minutes and wrap up with discussion and closing remarks.

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 it's supported through a partnership with UN-Energy. It was launched in April 2011 and it's primarily led by Australia, the United States and other CEM partners. Outcomes of this unique partnership include supporting of developing countries through enhancement of resources on policies related to energy access, no cost expert policy assistance and peer-to-peer learning and training tools such as the webinar you are attending today.

The Solutions Center has four primary goals. It serves as a clearinghouse of clean energy policy resources and also serves to share policy best practices, data and analysis tools specific to clean energy policies and programs. The Solutions Center delivers dynamic services that enable expert assistance learning and peer-to-peer sharing of experiences and lastly, the center fosters dialogue on emerging policy issues and innovation around the globe. Our primary audience is energy policymakers and analysts from government and technical organizations in all countries but we also strive to engage with the private sector and civil society. Our Ask an Expert is a valuable service offered through the Solutions Center. We have established a broad team of experts from around the globe who are available to provide remote policy advice and analysis to all countries at no cost. If you have a need for clean energy policy assistance, we welcome and encourage you use this valuable service. Again, this assistance is provided free of charge and to request assistance, you may register and submit your request through the Solutions Center Ask an Expert feature at cleanenergysolutions.org/expert. We also invite you to spread the word about this service to those in your networks and organizations. Some of the broad sectors covered by experts include energy access, energy efficiency, renewable energy, smart grid, microgrid, clean transportation and regulations and utilities. We encourage you to explore and take advantage of the Solutions Center resources and services including the expert policy assistance, subscribe to our newsletter, participate in the webinars and read and respond to blogs on our policy forums. On our policy forums, you will find many articles discussing progress of clean energy policy development and implementation occurring in countries around the world.

We have two dynamic speakers presenting today. First is Katrina Managan, a program manager with the institute for building efficiency at Johnson

Control. We also have Rob Moulton, Vice President of Marketing and Solutions for Asia at Johnson Control. Without further delay, I will turn the webinar over to Katrina. Katrina, welcome.

Katrina:

Thank you so much. Let's go ahead to the first slide. Thank you all for joining the webinar today and here's a talk about a report that the Institute for Building Efficiency at Johnson Control has released titled *Driving Transformation to Energy-efficient Buildings* and we go on to the first slide. I'll start by just introducing who the Institute for Building Efficiency is. The Institute for Building Efficiency was started about three years ago now and is an initiative of Johnson Controls. We provide information and analysis of the technologies and policies and practices that can help a growth market for energy-efficient buildings. We research six different areas — existing building retrofits, green buildings, smart grid, renewable energy, clean energy finance and finally, energy and climate policy and it's this policy area that we'll really be focusing on today but feel free to go to our website, which is listed there at the bottom of all of these slides, institutebe.com, to look at some of our other resources as well.

Going on to the first slide, we started the work on the driving transformation report about a year and a half ago now and we worked on the report in partnership with the four organizations you see listed here on the screen. Each brought a really good complement to our own expertise on both clean energy policy and the World Green Building Council. You can see we're partners who bring a strong expertise in green buildings and energy-efficient buildings around the world and we altogether really identified a need for greater implementation of clean energy or on building efficiency policies around the world to transform buildings to be more energy efficient. Let's go on and I'm going to start just by talking about the opportunity in building efficiency. First, we just have to look at the demographics of the world.

Tomorrow's cities are being built today. There's rapid urbanization happening. The percentage of population that is urban in the world is now greater than the percentage of the population that is living in rural areas and as cities grow, demand for energy is increasing and the number of buildings being built is increasing and the amount of energy being used by those buildings is increasing. So in a time of great change in our cities there's an opportunity to choose what kind of buildings we're going to build for tomorrow.

Going on to the next slide, we can look at what is this energy demand growth that is happening today. What does it look like and what are the opportunities to slow that growth and energy demand because new energy is — and energy infrastructure is expensive and often trying to use energy more efficiently is very cost effective. Here you can see the buildings represent potential to reduce demand for energy and the new demand for energy by 34% through 2020 so there's a large opportunity in the building sector and really energy

efficiency to bringing universal energy access. A dollar invested in efficiency avoids \$2 spent on supply of energy.

Going on to the next slide, we can see just how significant buildings are to carbon emissions in the future. This is looking at comparison of 2010 emissions in blue with 2030 emissions in green and especially in Asia where all of you are located, we can see that the contribution of buildings in those environments to CO2 emissions is going to skyrocket under a business-as-usual scenario.

Going on to the next slide, here we can see just how much of that CO2 and that carbon emission can be abated using energy efficiency and you can see the light blue portion of the abatement of carbon emissions as all energy efficiency. It's the largest piece of the solution to climate change and — so going on to the next slide, we can see there are also other benefits of buildings that are energy efficient. Energy-efficient buildings often can carry features that makes cities more resilient to the impact of climate change that not only are we mitigating the greenhouse gas emissions but a better designed building will be easier to keep cool on hot days and warm on cold days so occupants will be more comfortable if there are more extreme weather conditions. There are exteriors of buildings that are energy efficient that can reduce heat gain in the summer and better handle heat waves, help avoid some of the urban heat island effect. Often energy-efficient buildings will use the more passive cooling techniques, which can really help also with that heat island effect in the summer. So there are a number of benefits, sort of co-benefits of having energy-efficient buildings that if they're designed into those buildings can also be part of the picture of cities of the future.

Going on to the next slide, this slide gives an overview of what we tried to accomplish in this report. If you look on the left, it represents the way that our cities and our buildings are being built today and that — and all of the stakeholders that are involved in that process. Over on the right you see the vision that we'd all like to see in the future where our buildings are more energy efficient and there are a number of barriers to getting there today. There are market barriers, financial barriers, technical barriers, awareness barriers, institutional barriers and I'll talk a little bit more about each of those. You'll be able to read a lot more about them in the report itself. The real idea of the report was to look at the government policies that can help bridge that gap, that can help overcome those barriers and it's combination of policies that in any given location will really help transform the market to open up this possibility for more energy-efficient buildings which in the long term are more cost effective but often will have some upfront costs.

Going on to the next slide, let's talk a little bit about the life cycle of a building because as a policymaker, the energy use of a building is not only determined during the design and construction phase of a building. Energy use is also determined at a number of other decision points over a building's

life. The building, once it's built, will be around anywhere from 30 to 50 to 100 plus years and using energy throughout that entire time and every time a building is sold or leased, a new tenant moves in, when operation and maintenance is done in the building or the building is renovated and retrofit, there are opportunities to improve the efficiency and make decisions that will improve the energy efficiency of that building so policymakers will need to think about transforming that entire life cycle of a building and a different suite of policies or a combination of policies will probably need to be designed to target each of those phases of a building's life. So when you're thinking about building efficiency policy and you'll hear these sort of [indiscernible] [0:13:49.8] presentations, it's thinking about the right combination of policies to kind of overcome the barriers at each step in the market.

Going on to the next slide, let's talk a little bit more about those barriers. The first set of barriers or market barriers, there's split incentives between the building owner and the building occupant who runs a space on energy because usually the tenants pays the energy bill and the owner is the one that would make capital investments in improving the efficiency of the space and so the cost of those capital investments is not borne by the same person who then pays the energy bill and sees the cost savings from a more efficient building. So policies can be designed to overcome and line up the incentives between the owner and the occupant.

There are financial barriers. There is an upfront cost to make a building more energy efficient and often that investment today is not seen as a high priority and there are a number of reasons for that sort of low financial institution awareness. There's a just a general hesitancy to spend, more money upfront because budgets are constrained and so — then there's the set technical barriers where there's not always a lot of technical capacity in the market. If buildings have always been built inefficiently, there's some momentum around the technical capacity to just continue doing and not change to a more efficient form of construction or renovation.

There are awareness barriers. If you think about the last time that you rented a home or an apartment where you're told anything about the energy cost every month of that space the time when you signed the lease or purchased the home — and in most market around the world that information isn't available at the time of the transaction and so it's not factored into the rental price or the sale price and there are policies that can help change that.

Then there can be institutional barriers where there may not be the capacity in governments or between the governments and the private sector to implement some of these new building styles and new policies.

Going to the next slide, let's get into the meat of what these policies are. So what is it that government can do to make buildings more energy efficient

and again — I'm going to go through each of these six categories in greater depth so I won't stop too long here but to again highlight that it's a combination of these policies that is likely to transform a market because each of them targets specific barriers to building efficiency so no one policy by itself is necessarily going to instantaneously make all of the buildings more energy efficient but in combination of and we're starting to see some really good case studies that show these work and we see a combination on integrated policy approaches that are appearing in certain places around the world that are sort of unleashing this opportunity from our energy-efficient buildings.

Going on to the next slide, the first policy category is codes and standards and this is probably the most important category for new buildings especially if we're looking at that [phonetic] [0:17:27.9] design and construction phase of the building life cycle. This is just requiring that new buildings have a certain amount of efficiency and have a certain standard met in terms of energy efficiency. There can also be appliance and equipment standards. One of the challenges, of course, with codes and standard is enforcement of those codes and that's something that some of the other policies can complement really well some of the policies around awareness and such but having just sort of basic building codes in place that require energy efficiency to be included in the design and construction can really help.

Going on to the next slide, the next category is target and the ideal with the target is that it really can focus the country or state or city on a goal around energy efficiency improvement and it can spur a lot of other policies to be implemented and other actions that will help meet that goal. So, efficiency targets can either just be as general as the country setting up percentage improvement in efficiency. It could also be something like the energy efficiency resource standard that we see often in the United States, for example, where it mandates that the utilities and energy distributors actually seek energy reductions over time. There are other examples where the obligation is on the end user such as the energy efficiency scheme. That's an example from the UK. And then the government can actually set targets for their own building. Government occupies many buildings around the world and setting standards for public buildings can significantly increase capacity in the building efficiency market.

Going on to the next slide, let's look at awareness policies. I think this is one of the biggest challenges of very little transparency around the energy consumption in buildings today so having greater information and data on energy consumption will enable the owners and operators and tenants to make better energy management decisions. So, one of those is having data collection at a national level or larger geographical level so that better policies and programs can be designed. Another kind of policy is have a competition or awards program where there are incentives for a participant to participate on a voluntary basis to compete for the most efficient buildings.

Government can help provide audit which help explain and analyze the efficiency of buildings.

Going on to the next slide, there are other awareness policies such as rating and certification programs and sometimes these are run by private entities such as the US Green Building Council and green building councils that exist around the world. Having a building be rated and certified is a great way to reward a building owner for investing in efficiency and having the disclosure of that rating or certification or disclosure of energy requirements is the next category. That's where all the buildings, whether they are top performers or bottom performers are required to disclose what the energy efficiency is of their building. You can see an example of that here at the bottom from England and Wales where buildings are all being raised a letter scheme of A, B, C, D, E, or F or G. Then the final category of policies that can improve the information and mark a transparency and awareness are just public awareness campaigns where the government is running a campaign to raise awareness among users.

Going on to the next slide, let's talk about the incentives the governments might put in place. There are various financial incentives we know that rebates or grants [phonetic] [0:21:53.5] for paying down cost of systems and equipment or utilities, paying for rebate programs for energy efficiency can be effective in certain contexts. There are also incentive programs that help banks get involved in financing building efficiency projects and covering that upfront cost so a risk mitigation guarantee can help lower that cost of capital for investment and lower the level of risk to banks who are new to writing loans for things like building efficiency. There could be a setup of a revolving loan fund where public funds are actually used to finance energy efficiency investments and in some cases, you see these revolving loan funds being run by a private bank. In that case, the bank really learns how to finance these projects and what is the risk on building efficiency project and it gets banks involved in the market.

Going on to the next slide, other incentives that we see, incentive-type policies or things like energy-performance-contracting-enabling legislation and you'll hear a lot more a little bit later about what energy performance contracting is and how it works but a contractor that goes in and does an energy efficiency retrofit of an existing building. There are a lot of ways that government can facilitate this kind of contract with standardized paperwork or pre-approved providers and other legislation that really enables that business model to work in the market. There are tax incentives that a government can put in place and that, of course, may take a whole number of forms. Finally, tax lien financing has come up as an interesting policy option in a few locations especially Australia and the United States is taking off because typically in those two markets at least tenants pay the property taxes. So if the energy efficiency improvement can be financed and repaid through the property taxes, then the incentives have been aligned [indiscernible]

[0:24:13.0] as a tenant who pays the energy bill who sees the energy savings from an efficient building also pays the property taxes and therefore repays the investment in energy efficiency so it overcomes that split incentive barrier and it's a pretty interesting policy option.

Going on to utilities, the next slide, utilities have a lot of access to energy customers and there are a number of forms that policies have taken to involve utilities. One is just a public benefit charge where a flat fee is charged for all users and the utility runs efficiency programs of various sorts. Another is [indiscernible] [0:24:55.2] financing where the retrofit of a building can actually be financed on a utility bill so that again the split incentives barrier is overcome because the person who pays the utility bill is also the one repaying the investment in efficiency. There are other things like revenue decoupling that has been tried and I'll let you read more details on that in the report.

Going on to the next slide, let's talk just briefly about some of the smart grid options that utilities — there are policies that can encourage utilities to get more involved in the smart grid whether — it could be time-based pricing so that — or dynamic pricing where electricity prices change so that at peak times when the maximum demand is out there for electricity the price is higher driving more people to use electricity at off-peak times and integrating more efficiency in the electric grid, by the way. There are other mechanisms to encourage demand response and the government can participate in the deployment of advanced metering infrastructure so...

We'll go on to the next slide, talk a little bit about — and we can go in-depth on any of these policies, if you're interested, during the question and answer session. There's capacity building policies finally [phonetic] [0:26:17.8] where either international institutions or governments can help each other through direct technical assistance in helping to build expertise for policy development inside government and then there's also programs that governments can run workforce training that increase the skills of workers in the market on energy efficiency.

We'll go on to the next slide. One thing that we did as we were writing this report was to gather a group of private sector actors who are investing in the building efficiency market in emerging economies and we asked them, "Which factors influence your investment in emerging economies to all of these private sector companies?" Some of these are probably pretty obvious. The size of the market affects their investment in building efficiency investments. There needs to be a market-enabling regulatory regime, stable investment framework, integrity of the business community, ideally small to midsized companies that would be available and willing to enter into partnerships. So that sort of speaks to having some of that technical capacity for building efficiency already in the market. Then having public funding

and incentives is good, having a skilled workforce. All of these things attract more private capital and investment into the market.

We go on to the next slide. The other question that we ask this group that we convened at a round table of private sector actors which of these building efficiency policies — and I named more than 20 of them even during this presentation. Which of these is the most important to you and which of them, if you see it present in a market, if you see that this policy is in place, makes you want to go invest in building efficiency and build your building efficiency business in that location? Interestingly, some of the top policies — these are not precisely ranked. It was sort of a small focus group of private sector actors that we spoke with but I think it's still interesting and a good discussion for you all to then go have with your own private sector what policies will drive their investment. But what we found is that the building efficiency target having that vision and goal for how much building efficiency needs to be improved in a certain location is one of the top priorities and building energy codes having the standards for new buildings is another indicator that this is a good market in which to invest in building efficiency businesses. Having building energy performance disclosure where the performance of a building has to be publicly disclosed or at least disclosed at the time when a building is rented or sold so that the efficiency and the energy cost of a building is known when there are major transactions in that building place [phonetic] [0:29:23.6] was also a top priority. Then just having rating systems and certification systems for building also came out in the top four.

Over here on the right-hand column you can see where the private sector role was first, the first two columns, does the private sector want to just inform policy design or can they actually assist in policy implementation in [indiscernible] [0:29:51.9]? Down here you can see some of the policies where the private sector can get actually — potentially play a role in policy implementation including things like building rating systems, government leadership programs. The private sector could actually help the government green [phonetic] [0:30:09.2] their own government building. Of course, an energy performance contracting that's directed — it's designed to enable the private sector. Similarly, risk mitigation policies, they're designed to enable the financial sector to get involved so those are policies where the private sector can really help assist in the implementation.

On the very right-hand side of this side you can see whether the policy had a direct impact or an indirect impact on the market and so things like building energy codes have very direct impact in requiring that new buildings meet a certain energy standard. The same for disclosure of energy performance where the disclosure will make energy efficiency very directly valued in the sale of the building. The indirect effect is more things like building efficiency targets where it creates that vision in the market but there may not be a direct effect so...

I'll go on to the next slide. You can look at this in greater detail and when you download the report at the end of the presentation. Briefly, I want to just talk about some of these policies interact and really think — the goal of this slide is to get you thinking about the right combination of integrated policies that will transform a market. On the left-hand side of the slide you can see the policies that work best for new buildings; right-hand side, those that work best for improving existing buildings. Target help with both [phonetic] [0:31:42.0]. Energy performance disclosure helps with both as do certification programs and some of these supportive down at the bottom. But things like building codes, as I have mentioned, are really — and appliance standards are aimed at new buildings, things like energy performance contracting and the financing of retrofit projects and risk mitigation really follow [phonetic] [0:32:04.8] an existing building. It's a combination of these that will transform either of those markets.

Going on to the next slide, let me just talk about a couple of case studies and the first one is the case study from Thailand and then maybe some of you on the line that know far more about this than I do but the N compound [phonetic] [0:32:25.2] in Thailand was financed by a levy on petroleum products. It's, of course, a number of different energy efficiency and renewable energy activities but very interestingly, the thing I want to highlight is the energy efficiency revolving fund which provides capital at no cost to Thai banks who then provide low-interest loans to energy efficiency projects. The idea was that the Thai banks would then really start to understand the energy efficiency loans and the process and the risk profile of those loans so that they would eventually be comfortable giving energy efficiency loans without the no-cost capital from the government.

Going on to the next slide, I just want to talk about the case study from Eastern Europe. The European Bank for Reconstruction and Development has provided a number of types of assistance, technical assistance to both Romania and the Ukraine. They've provided help preparing regulations and then they've also provided financing for energy performance contracts so interestingly, in Romania that technical assistance combined with the €10 million loan helped catalyze the pipeline of €45 million in projects to be implemented over the next 10 years. Some of those were city projects, things like energy-efficient street lighting and co-gen projects and municipal hospitals. So there's a whole number of energy performance contracts that are now being financed because there was that combination of technical assistance and finance policies in place. Then similarly, in the Ukraine there was the combination — they identified the right policy combination with technical assistance in regulatory reforms that were needed to enable the uptake of energy performance contracting.

At this point I'm going to pass the presentation over to Rob Moulton. He's going to talk about one other case study in which he was directly over it in Asia and then he's going to tell you about our building efficiency policy

assessment tool that we put together and which is detailed in the report which provides a framework to help decide what the right combination of policies is in any given location to drive more energy-efficient building. So take it away, Rob.

Rob: Thanks, Katrina. Hi. This is Rob Moulton. I'm in Singapore this morning, joining you from Singapore so it's morning my time but I understand it's afternoon or evening for many of you around the world. Actually I just flew in from Tokyo on a red eye so I'm a little bit tired. If my speech starts to slur, I'm sorry. You know a presentation is boring if the presenter falls asleep. I'll try to stay awake through the rest of it but it's going to be pretty exciting material here. The case study on Inorbit Mall in Mumbai, India was the — it's called the largest mall in Mumbai and it was the first project that was completed as part of the Clinton Climate Initiative Energy Efficiency Building Retrofit Program. There are a number of measures that all right listed here which I'm not going to go into but I want to comment on something that's not listed here and reference how energy efficiency can be used as an enabler for broader initiatives.

When we went through the mall and did our analysis, we were measuring footfalls of how many people were coming in and out in various places and one of the challenges that the mall owner was finding is that they had a big central food court in the mall and above that was a large skylight. But during the day or around lunch time, there was so much heat generated from the sun coming in from the skylight that it was impacting the amount of traffic and business that the food court operators were able to get so as part of this energy efficiency retrofit, we installed an artificial tarp cover that still let light in but provided the level of shading. If we had looked just at artificial roof covering for the skylight on its own, the payback would not have met the client's requirement, which was less than three years payback. However, when that particular measure was combined with other factors such as on the chiller and control [indiscernible] [0:37:26.1] and so on as a bundle, it not only saved energy for the customer but it also allowed them to impact their direct business. This is one of the key factors of energy performance contracting, the ability to bundle a variety of solutions together.

So we can move to the next slide. I'll be now talking about the building efficiency policy assessment tool. Katrina has been sharing with you a lot of thinking, some 25 slides or so, on the topics of building policy options. The report that she mentioned is roughly 150 pages long and goes into a lot of detail with many case studies from around the world explaining how different countries or different cities have approached these policy options so it's like a library of best practices...

Heather: Rob, are you there? [indiscernible] [0:38:53.0]

Katrina: This is Katrina. I can't hear him. Let me [crosstalk] [0:38:59.4].

Heather: [indiscernible] [0:39:08.0]

Katrina: Let's give him just one moment and then if not, I can go ahead and present his slides. Does that sound good?

Heather: Yeah, that sounds great. I am looking at his [indiscernible] [0:39:23.5] and it shows offline so it looks like he may have lost his connection but [indiscernible] [0:39:30.9] in a minute or so. So we'll give just a few seconds to see if he comes back online.

Katrina: That sounds good. I imagine he will but let's...

Heather: The beauties of internet connections. [laughter] [0:40:04.8]

Katrina: I know. Thank you everyone for your patience. We'll kick it off again in a moment if he doesn't come back online.

Heather: While we're waiting for Rob, I received a question that I could answer real quickly and this is — it applies to the entire audience. The question is, "As we wait for Rob, could I please let everyone know if we can get a recording of this presentation?" And the answer is yes. We will have — we already have PDF copies of the slide presentation on the cleanenergysolutionscenter.org website. If you go to the training page, you'll find a link to this particular webinar and the actual slide presentations are already posted there in PDF format and within a few weeks, we will add an audio recording of this particular webinar to accompany the slide and it will be delivered in the format of the video so that the slide will advance at the appropriate time while the speakers are providing their content so yes. The answer is yes, that we will be able to have a recording of the presentation within a few weeks.

Katrina: Great. Well, should I just go ahead and keep going and if Rob comes back on, then we can pass the presentation back? Does that sound good?

Heather: Okay. That sounds great. Thanks so much.

Katrina: Yeah. No problem. As Rob was saying, the report is about 150 pages and the first section of it goes through case studies of the various building efficiency policy options. The final section of the report really looks at how to design the right policy package for any given location so in any given country or even city there are many stakeholders in the energy and the building efficiency space. There's the private sector, academia. There are NGOs, the general public. And then even within the government often there are quite a few different ministries involved in the building sector. There may be the ministry of energy but also the ministry of public works or sometimes — it depends on the country but sometimes a ministry of industry and mines will have a role to play in building codes, for example. So it's often necessary to

really work in a cross-governmental way to design the right suite of policies for building efficiency.

If we go to the next slide, often the interests of these different stakeholders are not quite lined up. Each of them have their own idea about the best way to get to a place where there are more energy-efficient buildings in the market. Even if they have the same vision, they may not see the pathway quite the same way and including all of the ideas from those different stakeholders together can be challenging. So if we go on to the next slide, what Johnson Controls has done is put together a workshop format that is our own proven patented technique for bringing diverse stakeholders around a designing sustainability plan so we've...

If we go on to the next slide, we really designed these workshops based on the approach that we've used with more than 2,000 organizations to help companies — and these are private sector customers at Johnson Controls — design their sustainability strategies so we'll bring together the diverse stakeholders from inside a company and a client and help them capture and prioritize their sustainability needs and goals. So we see this as an opportunity to take a similar approach to help government bring stakeholders together to really set priorities so I'm going to go through it with [phonetic] [0:45:05.5] today how one of those workshops would work.

Before I do that, I just want to talk a little bit about the opportunity that there might be to collaborate with us on such a workshop so that you are able to think about these workshops in your own local context. I'll give you my email at the end of the conversation but just so that you know what our role might be, we would be interested in helping to put together and train you as policymakers to do one of these workshops in your location. Really the idea is to do a half-day workshop to bring together key stakeholders to share views and gain consensus on areas of building efficiency policy priority. The idea of a workshop is to usually involve 10 to 20 people from those various constituents that are highlighted, government departments, NGOs, private sector, academia, though leaders from the general public. The goal is to have a brief report come out of the workshop, which really will be one data point in the development of a building efficiency policy plan. We want the report really have high credibility with those people who are responsible for crafting government policy so the key to a good workshop is getting the right stakeholders in the room. I want you to be thinking about that a little bit as I go through what the workshop would look like. The first step is to have the right organization or government department take the lead in running the workshop and that's where Johnson Controls Institute for Building Efficiency is happy to help train and work with that organization or government department in how to run a workshop like this. Really, that organization or government department won't have any more influence on the outcome or content of the workshop than any other participant, that they will serve as the facilitator. Johnson Controls would appreciate participating as a participant

in a workshop but we really think of the organization that is organizing it, facilitating it should probably be a government department. So I hope that provides a little bit of context for these workshops.

Now I want to go through what a workshop would look like so that you understand how the workshop is designed to bring stakeholders together around coalescing around one vision for what the pathway is for more building — policy pathway is to achieve more building efficiency in the marketplace.

So going to the next slide, the flow, a workshop using our building efficiency policy assessment tool starts with a visioning exercise. The idea is to get everyone, all of the stakeholders participating on the same page about what it is that they're there to accomplish. The next step is to establish the current policy status and have a consensus in the room about what policies are already in place in a given location where the workshop is taking place. The next step is for the group to assess the importance and the difficulties of implementing each of the building efficiency policies under consideration. This is where discussion among the group will be very illustrative and then each of the individuals will have a chance to vote for how important and how difficult they think each policy is. Next, the workshop should look at and discuss the short-term and long-term priorities among these policies and finally, the workshop will conclude with next steps and action planning where the participants really agree on how to keep working together in the future.

Let's go on and talk about each of these steps in just a little bit more detail. First — and I talked on most of these points about planning the workshop. The workshop is really designed to support a consensus-based multi-stakeholder collaboration and so we use a lot of visual tools to help participants prioritize the building efficiency policy options. The idea is that this will take a half day but it could be extended or shortened to meet any time frame. The most important step is getting the right stakeholders in the room. As I had mentioned them, so you know, somewhere between 15 and 30 stakeholders is about right to have the right sort of amount of discussion in the room and the tool and the report that's on our website, and we'll send you the link to that at the end. It does include a facilitator's guide on how to run a workshop and quick templates and analysis tools. Let's just pause for a moment and check back in with Rob. I don't know if you're back on the line and would like to present some more of this or if I should just keep going but...

Katrina: Rob has joined us again and — Rob, if you'd like to go ahead and pick up the conversation?

Rob: Sure. I apologize. We had some connectivity problems here. So, yeah, the planning is the most critical aspect. Getting the right people in the room, the

stakeholders involved, if you don't have the right people in the room, then the report that gets generated, the brief report that gets generated, will not have credibility with the government organizations who are responsible for defining and implementing policy. So, getting the right people in the room and having the right organization lead the workshop, facilitate the workshop, is absolutely key. So, most of the work quite frankly is during the planning stage, making sure that we get the right people in the room, we got the right organization leading it, so that we maximize the impact on the policy makers as to the — a path forward.

All right, let's move to the next slide. Now, in visioning, really this is creating a — this is getting people in the right frame of mind. And the facilitator puts out the question if we transported ourselves 10 years into the future and we're interviewed by a reporter, what would you like to say that we had accomplished because of an acting new building efficiency policies? And I want to stress that this is going to be very tailored, very specific to a particular country. Different countries have different priorities, so there is no one right answer. There is a right for a country, but there is — it's not necessarily the optimal answer for another country. So, it really has to reflect the local priorities, the local issues. What we — recently, the — it's a *different* building efficiency, did a survey of countries around the world asking them what are the barriers to energy efficiency in your country. And we found that there were significant differences from one country to the next, the challenges that will be based. North America and Europe, it's primarily capital availability and the fact that many of the quick payback projects have already been done after 20 years of energy saving opportunities. Whereas in countries like China and India, in India, the issues were more the technical capacity of the people that execute and questions around how do you measure savings. Those are the countries — so, different countries had different challenges, start at different points. So, the visioning creates a vision for that specific country and that's critical, but it's tailored to that country.

We move next to the next slide is included in the facilitator's kit are series of excel spreadsheets which will be blown up to low poster size that allowed different constituents to cast their votes. You would then say, this, the red blocks belong to the private sector, blue to the public sector, green to NGO, you may have yellow dots for academia, different groups of participants and they all get to vote on which is the — what are the ranking of the current policies are? How effective and how — or rather whether they are in place. Are they planning a piloting? So, each of the policies in this example is on building energy codes, we generate a consensus on how people view where the building efficiency code standards are.

There'd be another similar sheet like this for other areas such as setting targets or increasing awareness, financial incentives, utilities, capacity building and so on, so that — and that list can be tailored to the specific

country. But basically, the different groups of constituents vote on where they view the current policy is.

Next slide please.

Once that is done, we then move to — okay, now we're moving from a one-dimensional what stage are we at in terms of planning and implementation to looking at the importance and the barriers or how difficult it would be. So, here, we got a two-dimensional graph reach or building — this case, building efficiency codes in terms of where different people see the importance of building efficiency codes to achieving the vision, referencing always back to the vision as the common output, and where the difficulties that they see in implementing in the local environment. So, this creates a two-dimensional scatter plot, also color-coded, of the importance and difficulties.

Next slide please.

We then say “Okay, based on what we've seen so far, the current status, the importance and the difficulty, where would we say it should be in terms of short-term priorities and long-term priorities? Where do we think that they should be?” And we again, do our color-coded rating so that this helps generate some consensus, or rather it creates a visual consensus, this visual tour creates a visual consensus, in this case around building energy codes but a dimension would be similar charts around the table or around the room or other areas of policy options or financial incentives, utilities and so on.

Next slide.

So, this can be then captured on a graph of importance versus difficulty and you can view long-term priorities and short-term priorities. This is kind of summary graph is extremely effective when it goes to policy makers. They know that there's been a lot of thinking in and different people analyzing a bunch of credible constituents giving their input, but summarizing it at this level helps them focus on “okay, short-term, we got to focus on these 4 or 5 things, longer term maybe on these two.

Next slide.

We can then do a — another way of graphically presenting this is in this radar graph where we take all the different areas of policies around the edge, look at the current status which is in blue, the desired short-term and desired long-term so the gaps become — this is another way of visualizing the same information for [inaudible][00:28:05].

Next slide.

Then, the next steps in action planning. Here, downloading that 150-page document would be extremely useful because let's just say that it turned out

that financial incentives turns out to be something that the constituents believe it's an important area. Well, in the book, the 150-page book, there is lots of detailed analysis of what financial incentives can be done in case studies, what different governments around the world have done, and so, using that information, you can prepare a suggested steps forward for the policy-makers saying this has worked in another country. We think we should — we can may be able to tweak it a little bit because of unique requirements in our country and here's a recommended, perhaps next step forward.

Next slide.

All right. So, where are we on this tool? This tool is created based on best practices in terms of process best practices from Johnson Controls, but then, as well of global survey from Johnson Controls and all of our partners as to what different countries are doing around the world. So, this building efficiency policy assessment tool and facilitator's guide was the first step that was done. We then review that tool with multiple governments basically showed them and said "Do you think that this would be useful?" Many of these governments were from Latin America, from developing countries. There was very strong endorsement. We then reviewed it with World Bank, Asian Development Bank, and also got *paired buy in* that they felt this tool could be very effective as well. So, that part has been done. We're now at the stage of identifying pilot countries where we want to actually run through this and learn from it.

I have presented these slides at a recent conference organized by the Singapore Building Construction Authority where policy makers from governments from across Asia, there was about a dozen different countries represented and when I presented this, I said "All right, who wants to volunteer to get involved in running these kinds of workshops?" Two or three countries went up immediately. And so we are currently in that first stage, which I mentioned is the most critical and the most time-consuming, is identifying who the key stakeholders are, getting the logistics of putting them together in the room, and then for even a half day, identifying which is the right organization. Should it be World Bank? Should it be Asian Development Bank? Should it be a local government department? To facilitate this workshop, who should be doing it? That's the stage we're at, those kinds of preliminary discussions with two or three countries across Asia right now. Once country has been identified, we would then go and say "Okay, this is the general framework. Let's find two misprocessed that reflects the specific needs of your country so that we're not taking a generic process, we are fine tuning it to your requirements. The sponsoring government ministry or it could be an organization like World Bank, or ADB, they assemble people, either they or ourselves facilitate this half-day workshop. Frankly, my preference is that Johnson Controls does not facilitate. We prefer to have the sponsoring government ministry to the

actual facilitation and Johnson Controls would, a day or two in advance, give an hour or two of training so that this group can facilitate effectively. And then, what we would like from the institute of building efficiency is to collect feedback on how effective the tool was, what the outcomes were, so that we can continue to fine tune and improve upon this tool for other countries and for future use. So, we're in the process right now. Our current status is we're in the process right now of working with a few countries in Asia to organize these workshops and fine tune them to the local needs.

So, I again apologize for the communications problem that happened earlier. And that concludes the presentation. I think there's one more slide just to wrap up, a "thank you" slide at the end. All right. And so now, I'd like to turn it over to the organizers and they will solicit any questions. Katrina and I will then give you our responses.

Katrina: Great. Rob and Katrina, thank you so much for that truly interesting presentation filled with great information. I have a few questions. I do have one person who actually — I'm going to try something a little different, one person here who has their hand raised on the panel and, Heather, could you open up the microphone for — oh, he just lowered his hand so, I guess we're good. So, anyone who has questions, please type them into the questions pane and then I'll present them to Rob and Katrina to answer. But in the meantime, I just need to switch screens here real quickly. I have a few questions to throw out to our outstanding panelist.

And so, this first question is, does anyone collect information on building efficiency use by type of building, be it commercial, industrial, or even more specifically, hospital offices, data centers, and such as that?

Katrina: This is Katrina and perhaps Rob can speak specifically to Asia. Actually, I think that depends a lot by country and how much data exists on energy use. Sometimes that is sort of private and proprietary information. Sometimes it is collected by the government so that there is the ability to benchmark a building against the average building. And so, really it depends on the location, how much of that data is publicly available. Of course, for building owners that information is available because they pay their energy bill. But it may not always be in good data set against with to compare your building. It depends on the country.

Katrina: Okay. Thank you.

Katrina: [inaudible][00:65:20] info and how much of that data is available in different Asian countries.

Rob: Australia, and there is disclosure information in Australia and some countries in Asia, but no. This is a scenario where Asia has not been a — has done a lot of work. So, Europe and Australia are far ahead of the rest of Asia.

Katrina: Great. Okay. Thank you so much for that. I have a second question here. It's regarding combining heat and power. And there hasn't been a lot of discussion of combining heat and power as an energy efficiency solution for building retrofits. This study includes CHP as an energy efficiency option.

Katrina: You know, we really, in this report, don't look at specific building efficiency technologies like combining heat and power. We really look at policies that could help apply to all technologies. So, I think that *technically combined* heat and power could benefit from some of the qualities highlighted in the report. It's a good building efficiency technology option and we have more information about some technologies on a Wednesday. It's just that we don't get into technologies specific policies in this report.

Katrina: Thank you. Okay. Here's a next question. You discussed of — requester is asking, you discussed a range of policies, but the details are critical. Does the institute have model language for energy efficiency policies or legislation?

Katrina: No, we don't have model language of our own, but we do reference quite a few case studies. And so, I think that there are probably interesting languages that can be found among some of those. And also, I imagine that the Clean Energy Solutions Center would be great resource because they have that group of experts available to help develop things like model legislative language if that was the need. So, I would also say that I have very good resources in addition to the case studies that we have in the report.

Katrina: Thank you for that and thank you for mentioning that the Solutions Center is a good resource for people who come to — in search of that sort of eyes on for policy and legislative model language for those types of products. I'm going through the special links to make sure I'm not missing anything. Here we go. Here's another question. Sorry for that confusion.

Back to the workshops, when would you suggest your policy workshops would work best in the policy planning process? And I assume that means at what stage of policy development would the workshops be the most logical place to hold those events?

Katrina: Rob, do you want to take that question or — I'm happy to...

Rob: I'll take it. You mentioned the last few so well. Let me give a shot. I would say that it has to be done very early where there is a prioritization of focus. So, are we going to focus our policies around an area of codes? Are we going to focus it on the targets, financial incentives, capacity building? Where should we put our priority? That's the first cut of in which area because there's so many stakeholders in so many areas. It's at the very, very preliminary stage. During the workshop, then it gets fine tuned down to "Okay, the constituents believe that these are the top short-term priorities. These were the top medium-term or longer term priorities."

And referencing the material from that binder, from the book from the report, here are some best practices that we could look at adapting or adopting, and each of those best practices, of course, includes a link to a government website in some country or other and so you can start to get much more detail. There may be only one page of detail in the report, but when you follow the web link into what Thailand has done or what Singapore has done or Ukraine has done, whatever, you're able to download considerable information right from the source. So, at the earliest possible stage would be the appropriate time when you're setting policy philosophy areas. And that's where a number of countries, yeah, they're already progressing along some areas, but have they missed anything? Did it belong to anything? So, even though they may have some policies in certain areas using this just to validate that yes, they're on the right path, they didn't miss anything according to the constituents, is a good validation.

Katrina: I'd *hardly* agree with that, Rob and I think that that sort of gap analysis as you were saying if the country had a couple of policies in place, they may really want to know — are they doing enough to really transform their *built* environment to be more energy efficient? And if they're not doing enough, what is the next step? So, any time there's that search for the next step or the larger plan, be it at the very early stages or at a time when a couple of policies have been done but there's a need to do more. I think the workshop can really help with that planning process.

Katrina: Thank you. I have another question here. Okay, great. I'll just read the entire *little* sentence here. So, there is the concept of meeting to get certain building blocks and place such as data, research, and technical support, etc. I noticed you don't have the sort of conceptual model. So, what are your thoughts? Is data a policy or a building block?

Katrina: I think that it's both. You probably need, in many instances, a government policy in place to collect the data. At least, that sort of a ministry level for someone to start sort of collecting the data that's needed to design some of the other policies, but a lot can be done and therefore, the data becomes a building block. But a lot can be done even if a country doesn't have perfect data about all of their buildings. Benchmarks can be developed. But will benchmark buildings against should've standard set of physical features in a building it doesn't necessarily have to be a benchmark against precisely all the other buildings in that market for example. So, policies can be designed in ways, I suppose. that are more or less dependent on data depending on how much is available and having sort of good benchmarks available, you know, benchmarking systems in the market that can then may be disclosed these kinds of policies, [inaudible][00:72:40] very data intensive but I think can be designed in ways where they — the data are collected as they're implemented. Once again, it depends a lot on the local circumstances and what that pathway looks like, but policies can, — and some of the first policies can be building blocks from later ones and also something as high enough priority can often be

designed in a way that can work early on even in the absence of some of those building blocks.

Katrina: Great. Rob, did you have anything to add to...?

Rob: Yeah. I think we need to view policies as not something that are passed down from on high and fixed for a long, long time. They are an evolution. And I'm going to use Singapore as an example. A few years ago, they came up with their green mark rating system to promote energy efficiency in buildings and they said we just want to get out there and learn. And then, they saw what they learned in the local market. And I want to stress that, in the local market, they went and fine tuned it multiple times with a lot of stakeholder input once you got the beginning of the policy. Recently, they — just a month ago, Singapore came out with a green rating system for data centers, the first in the world. Now if you at the document, it's — I mean, it's great that they're doing this, but it's very preliminary. And so, there's going to be a lot — once they get it out there, they start to get some experience with it. Then, they'll collect more data, local data of how people feel about it, how effective it is, and then, the release *tube* of that rating system or that policy will be much better tuned to the local marker. So, again, policies are an evolutionary thing, not a one-time event.

Katrina: Great. That was actually very informative and thank you very much. Also, I just want to mention to Heather thank you and point out to everyone that Heather has provided a link to the report within the chat function bar. So, I'd like to refer everyone to that chat function bar to be able to access the link and actually download the report.

I do have another question here and this is regarding awareness campaigns. And the question is: About the public awareness campaigns, how do you go about that? Are there documents you actually have prepared? I assume that means documents that you've prepared to initiate some sort of public awareness campaign materials that you've already developed.

Katrina: Again, I think I'd refer you to the case studies in the report because some of the best examples of the awareness campaigns that we found are listed there and there are links to the websites of different programs where you would find what various countries have actually done, what documents have been put out there in their public awareness programs. I would add that I think one of the most effective ways to build public awareness, and this came out of our discussion with both private sector building efficiency providers and corporation and as well as with building owners, is policies that require the disclosure of energy performance so that there's better transparency around the efficiency of buildings in a market. So, the public is — are going to be far more aware of energy use if the efficiency rating of their office or home is disclosed to them, asking people to take action to being more energy efficient or to green their offices and homes in the absence of good

information that enables those kinds of decisions can be challenging, I think, because today, there often just isn't the information available to the public, to the real estate sector, to incorporate good energy management in their decisions. So, I think having the information available to enable good decisions is one of the key aspects of building awareness.

Katrina: Thank you so much Katrina. And I believe we have one last question. The question is: Do you have any advice for how to measure and evaluate building measure policies?

Katrina: Measurement and verification can be something that we do every day at Johnson Controls when we do retrofit of a building. We know the baseline energy usage of the building before individual project and we can monitor and verify energy usage after we've improved the efficiency. And so, there's the well-established protocols for how to measure and verify ceilings at an individual building level. During measurement and verification at our policy level that is *caused a large* geography, something like building codes and standards, does require good data about building energy use to be available. But once again, if there's sort of a building reading this time and place, for example, and if all the buildings are required to be rated and those readings are disclosed, you could imagine that the reading could be tracked over time. The average reading of buildings in a market, for example, could be tracked there with [inaudible][00:80:01] you could see if there was an improvement given the requirement for a disclosure of a building rating system. So, there's — a lot of these policies are, I would say, are new. A lot of them have not sort of in their first stages of implementation had been — they're sort of being tied in a number of geographies around the world for the first time, so the measurement and verification is being developed as we're speaking. But again, this same kind of case studies that you see in the report will be attempting their own measurement and verification plans for all of their policies because they know that's very important to most policy makers as they're — they want to know if it's working, right? I think it's in the works and that looking at the case studies and how they are measuring and verifying those policy examples is probably the best place to go for details of how to do it.

Katrina: Okay. Great. Thank you so much. So, we just have a couple of minutes left and Rob and Katrina, I just — I believe we covered all of the questions that have been asked. I'm just double-checking real quick. We — and looks we have. And I just want to offer you a couple of extra minutes in case you have any additional thoughts you want to provide the audience or any specific closing remarks before we close the webinar?

Rob: I'd like to make one comment. I've been working with some government agencies and they say "So, what's in it for Johnson Controls? Come on. What's your angle in this? Why are you doing this?" And basically, and this is a valid question, so I want to put it out upfront. The answer is that a rising

tide lifts all boats. So as the government implements building efficiency policy, the market size for the products and services that we offer will increase. And that's good for us. Even if our market shares stays the same, if it's good for Johnson Controls from the commercial point of view, but it's also a part of our corporate vision and mission to help bring the planet save energy. So this is really why Johnson Controls has decided to invest our efforts and attention in creating and promoting these kinds of workshops.

Katrina:

That's a great point and thank you so much for sharing that, all that. It's really good to hear your point of you from the Johnson Controls' perspective as to why all of these work is being done, so thank you for that. So, I believe that —yeah, I'm just double checking to make sure if we don't have any additional questions. And we don't. So, Rob and Katrina, thank you again so much for participating in this webinar and providing all of these great and valuable information. It's your time and your effort and hearing about all of the work your doing, all of the good work is really valuable to our audience. So, thank you very much.

So, with that, I'll just sort of close and state that on behalf of the Clean Energy Solutions Center, we'd really like to thank you all for participating in today's webinar. You've been a great audience and we very much appreciate your time, appreciate your great questions. And I just really want to say before we close that I invite all of you in the audience to please check the Solutions Center website during the next few weeks if you would like to view the slides again and listen to a recording of today's presentations as well as also viewing and hearing other previously held webinars that may be of interest to you.

And additionally, you will find information on upcoming webinars and other training events sponsored by the Solutions Center. We encourage you to attend those. And I will also ask you to please inform those in your networks about the Solutions Center resources, the services that we provide, specifically and specially including the no-cost policy support. Again, it's no cost, free of charge, and a very important valuable service that we provide to all of you who are working hard to develop clean energy policies.

So, with that, I just think at this point we'll bring the webinar to a close and I'd like to wish you all a great rest of your day and hope to see you again at future Clean Energy Solutions Center events.